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Relationship between creativity self-actualization and hypomania

Chris Nadasi
The University of Montana

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THE RELATIONSHIP BETWEEN CREATIVITY, SELF-ACTUALIZATION, AND HYPMANIA

by

Chris Nadaszi
B.A. University of Toledo, 1992

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Approved by:

Chairperson, Board of Examiners

Dean, Graduate School

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Date
Past research and descriptive work have drawn anecdotal, empirical, and theoretical connections between creativity and psychopathology. Both biographical and empirical studies suggest that creatively eminent individuals are more likely than others to exhibit pathological psychological symptoms. Humanistic theory, on the other hand, relates creativity to self-actualization and positive mental health. Past research has primarily focused on the cognitive similarities between creative individuals and those diagnosed with schizophrenia. Recent research suggests that creativity may be more closely connected to incidence of affective disorders. Studies of diagnosed schizophrenics and manics indicate that both populations score higher on some tests designed to measure creativity than do normals.

This study looked at a nonclinical college population, not distinguished for creative eminence, and made predictions about subclinical traits of mania (hypomania) and schizotypal features based on scores from several pencil and paper tests of creativity and a measure of self-actualization. Recent empirical literature relating creativity to psychopathology, as well as theoretical similarities in thought processes between schizophrenia and bipolar affective disorder, would suggest that scores on creativity scales should be most predictive of hypomanic personality features, although a weaker relationship may also exist between creativity scores and scales tapping schizophrenic-like traits. Humanistic theory would suggest a group of creative individuals high in self-actualization should exist, and for these individuals creativity scores should instead be positively correlated with measures of self-actualization, and negatively correlated with both types of indices of psychopathology.

A 2(gender) x2(creativity) x2(SA) MANOVA was used. Additional univariate analyses of each of the scales by group and gender were also conducted. Self-actualization as an important differentiating factor among those who are creative, and the possibility that tests of creativity may allow some prediction concerning the possibility of later major affective disorder were considered.

The results generally support the positive relationship between creativity and measures of psychopathology previously discussed in the literature, with high scores on measures of creativity being predictive of higher obtained scores on measures of hypomanic and schizotypal features. The measure of self-actualization was unsupported as a defining variable distinguishing "healthy" creativity from "unhealthy" creativity. Strong correlations between measures of psychopathology may suggest similar underlying thought processes common to both bipolar and schizotypal diagnostic categories.
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The relationship between creativity and psychopathology has been a focus of philosophical and scientific speculation since the time of the Greeks, perhaps beginning with Plato's association of creativity with both epilepsy and melancholia (Andreasen & Canter, 1974). The connection between "genius" and "madness" was first systematically approached by Lombroso, who published a work on genius and insanity in 1864 and concluded that genius was a "degenerative psychosis of the epileptic group" (Lombroso, 1864). Research on creativity remained steady but slow until the 1950s, when creativity research was marked by a rapid increase following Guilford's (1950) presidential address to the American Psychological Association. Since that time, much research has been undertaken to try to relate creative thinking processes to particular psychopathological as well as non-pathological thinking processes, and to features of emotion and behavior. Some researchers have speculated that creative and pathological thinking processes differ only in reference to the subject's amount of ego strength (Kris, 1952; Barron, 1974) and ability to reintegrate concepts following conceptual disintegration and inspection (Lukoff, 1988). Research up to the present time has largely looked at similarities in the cognitive processes of creative individuals and those diagnosed with schizophrenia. Within the last fifteen years, however, an increasing body of research indicates that perhaps the creative process is more closely akin to the cognitive and affective processes of bipolar "spectrum" disorders (Akiskal & Mallya, 1987).
What is Creativity?

Before drawing comparisons between creativity and psychopathology, it is helpful briefly to examine creativity as a construct. Davis (1986) suggests that creativity theories may be divided into three categories: those that focus on the person, those that focus on the product, and those that focus on the process. The categories are greatly overlapping in their divisions, as the interdependence of one category upon the others is fairly clear; a creative product identifies a creative person using a creative process.

Person theories focus on that which distinguishes the creative individual from other people. Most biographical studies of creative individuals fit into this category. Barron and Harrington (1981) suggest that a fairly robust constellation of "core characteristics" of the creative person seems to emerge as a correlate of creativity across many domains. The creative individual is marked by "high valuation of aesthetic qualities in experience, broad interests, attraction to complexity, high energy, independence of judgment, autonomy, intuition, self-confidence, ability to resolve antinomies,... and a firm sense of self as 'creative.'" (p. 453) Additionally, biographical/person instruments tap into fairly reliable indicators of creative aptitude, such as creative activities, unusual hobbies, artistic accomplishments, and scientific inventions. Andreasen (1978) adds the qualities of sensitivity, introspection, and social detachment to the list of personality characteristics of creative individuals. Davis (1983) includes personal history characteristics predictive of creative ability, such as having an imaginary playmate when a child, keeping a diary, and participating in theater.

While closely related to personality characteristics, there also seems to be some consistency in the special "tools" or techniques possessed or used by those considered to be creative. By locating individuals with strengths in
abilities theoretically related to creative thinking (process), one may predict with some accuracy that an individual is creative. Davis (1983) provide a list of these abilities, drawn from lists appearing elsewhere in the creativity literature. This list of abilities includes: "fluency, flexibility, originality, elaboration, sensitivity to problems, problem defining, visualization, imagination, ability to regress, metaphorical thinking, analysis, synthesis, evaluation, transformation, extending boundaries, intuition, predicting outcomes, resisting premature closure, concentration, and logical thinking." (p. 50)

Cognitively, creative individuals seem to differ from others in their ability to break ideational sets, form unusual comparisons, and generate a large number of responses to open-ended questions. This latter set of abilities has been termed Divergent Thinking (DT; Guilford, 1967) and has formed the basis for many early assessments of creativity. Tests of divergent thinking typically consist of open ended problems with multiple possible answers; a creative response is one that demonstrates ingenuity, overcomes ideational sets (functional fixedness), and demonstrates ideational fluency or generativity (Guilford et al, 1951). DT tests have received much criticism concerning their ability to measure actual creativity (Barron and Harrington, 1981). Much of the criticism is related to the notion that a creative endeavor not only involves a divergence of thinking, the generation of multiple possibilities for solution of a given problem, but also involves a crucial reconvergence, the selection from among those multiple possibilities the course of action that seems most likely to succeed. It is not enough to possess ideational fluency and generate a large number of responses; there must be a selection and consolidation process from among the many possibilities. The selection of the most appropriate response is the necessarily reconvergent component of the DT process. Barron and Harrington (1981) reviewed several hundred studies using DT tests and were
"left wondering" whether DT tests measure actual creativity and whether the distinction between divergent and convergent thinking is really a useful one. Nevertheless, DT continues to form a basis for many tests of creativity.

Tests of divergent thinking have been joined by tests measuring other abilities theoretically related to creativity. The Barron-Welsh Art Scales (1963) relies on the consistent finding that artists and creative people demonstrate a preference for complexity. The Welsh Figure Preference Test, which contains the Art Scales, presents the testee with a series of drawings; reliably, highly creative individuals seem to prefer complex and asymmetrical drawings over simple and symmetrical ones (Barron, 1969; Gough, 1961). Ridley (1979), however, disputes the claim that the Barron-Welsh Art Scale actually measures a perceptual preference for stimulus complexity, and instead asserts that artists and other creative individuals are more likely to choose “complex” or asymmetrical shapes as a reflection of their rejection of the conventional, rather than their preference for the novel. Regardless of the underlying mechanism of choice, test results indicate that preference for complex figures remains a reliable marker for creative individuals.

Mednick (1962) proposed a behavioral theory of creativity based on the learning of paired associations. In his theory, creative individuals possess a greater number of more distant associations between words and ideas relative to average individuals, who possess but a few, strong associations for each word or idea. The greater number of associations allows the creative individual to mentally recombine associations into unusual or novel combinations. Mednick created the Remote Associates Test (RAT, 1962) as an assessment device designed to measure the ability to form unusual associations, and, by extension, as an index of creative ability. Davis (1985) criticizes the RAT as an
instrument to measure creativity, as high scores on the test require the giving of the "correct" word associated to three stimulus words. The convergent nature of the task actually penalizes unusual responses; thus, answers displaying unusual creativity may result in nonrepresentative lower scores.

As mentioned earlier, product and process are so closely related that a theory of creativity that is placed in one category could likely fit in the other as well. Product theories are those that label an individual as creative by the physical actions or material evidence of his or her creativity; creative personality is inferred from the product, and the product is the result of a process that involves a combination of two or more previously unrelated items that are seen to have a relationship of some sort that allows them to be combined in a novel and meaningful way. A widely accepted, broad definition of creativity uses two criteria for assessing whether an act or a product is creative: originality and adaptation to reality (Barron, 1969). An important consideration when looking at creative product theories is that the creative product is socially-determined, and is connected as much with social value as it is with originality. Barron and Harrington (1981) point out that almost all research definitions of creativity usually reduce to one of two things: evidence of creativity taken from socially-valuable products, or performance on a psychometric scale designed to measure creativity relative to others' performance along precisely-defined dimensions. Each definition has its problems. Socially-valuable products are inherently culturally-defined according to criteria that vary with the passage of time (and thus provide an unreliable measure of creativity). Creativity scales measure specific abilities or traits that may or may not truly represent creative thinking. Some try to avoid this social-value criterion (at least in theory) by stating that creativity is simply the ability to create something new. Others (Gardner, 1993) suggest that the more appropriate question may be "Where is
creativity?" Gardner conceptualizes creativity as a dialectical process created through the interaction of the individual with the domain (expressive medium) in the context of a surrounding field that judges both the creation and the creator. Thus, an analysis looking only at the person or the product is incomplete and ignores the important dynamics of a process occurring between the creator, her discipline, and her ecology. In this study, the environmental component of the ecology --the environment surrounding being a Introductory Psychology research subject -- was held relatively constant (was presumably similar for all subjects) but was not specifically investigated.

Finally, Maslow (1968) draws a distinction between those who lead creative or adaptive lifestyles from those who exhibit special talent or creativity in a specific area; the former group he labels "self-actualized (SA)" creatives and the later "special talent (ST)" creatives. According to Maslow's (1954,1968) theory of personality, self-actualized individuals are autonomous, productive, spontaneous, expressive, integrators of different ideas, individualistic, self-accepting, and psychologically healthy. Thus, SA creative individuals are, by definition, mentally healthy individuals who flexibly and innovatively approach many different types of situations in their lives. Maslow holds that the second group of creative individuals, the special talent creatives, are distinguished by creative functioning within a certain modality or artistic pursuit; that is, a person may be a creative painter, or writer, but not approach the rest of their life with similar adaptability and flexibility. Special-talent creatives may or may not be psychologically healthy; Maslow (1968) acknowledges that there might be a slight correlation between mental health and ST creativity. Therefore, the theory would suggest that because SA creatives are by definition mentally healthy, special talent creatives are likely the creative population that has been sampled in prior research linking creativity to psychopathology.
Several studies have supported the connection between self-actualization and creativity. Recently, a study by Buckmaster & Davis (1985) found a correlation of .73 between the Reflections on Self and Environment (ROSE) scale, a measure of self-actualization, and a shortened version of How Do You Think (HDYT; Davis, 1975), a measure of creativity. The authors interpret this high correlation to suggest that, although the ROSE was developed to measure personality traits of self-actualized individuals, and HDYT was developed to assess creative personality characteristics, the tests identified the same group of individuals. Other studies suggesting a relationship between self-actualization and creativity include those of Craig (1966), who found that thirty personality characteristics used to describe creative individuals are very similar to Maslow's description of self-actualized individuals, and Yonge (1975), who reports that high scores on the Personal Orientation Inventory (Shostrum, 1963), a measure of self-actualization endorsed by Maslow (1971), correlated positively with scores on the Remote Associates Test (Mednick, 1962), and the Cr (creativity) Scale (Domino, 1970) for the Adjective Checklist (Gough, 1952), two measures of creativity.

Connections Between Creativity and Schizophrenia

Theoretical and Conceptual Overlap

Divergent/creative thinking bears many resemblances to processes found in schizophrenic-like "thought disorder" (Guilford, 1967; Barron & Harrington, 1981; Hasenfus & Magaro, 1976). Thought disorder is characterized by disturbances in the form, as opposed to the content, of thought. Manifestations of formal thought disorder relevant to creativity are: loosening of associations, speech which displays rapid shifting from subject to unrelated subject apparently without the speaker's conscious awareness; incoherence,
speech that is not understandable because of a lack of meaningful connection between words, phrases, and sentences; cognitive overincorporation, "inability to preserve conceptual boundaries, as a result of which distantly associated and even irrelevant ideas come to be regarded as essential parts of the concept" (Cameron, 1938); and flight of ideas, a continuous flow of speech with rapid shifts to related topics, based on distracting stimuli and plays on words (American Psychiatric Association, 1994). Hasenfus & Magaro (1976) have suggested that schizophrenic overincorporation and other aspects of thought disorder, and the ideational fluency of creativity are either the same phenomenon or are aspects of the same cognitive process. The apparent connection between formal thought disorder and creativity, as well as the age-old association of "genius" and "madness" has led researchers to draw a relationship between schizophrenia and creativity. Thought disorder is a "positive symptom" (a symptom of behavioral excess as opposed to a behavioral deficit) of schizophrenia (Andreasen & Olsen, 1981), and a strong indication for a diagnosis of schizophrenia (American Psychiatric Association, 1994).

A number of authors have supported a connection between the diagnosis of schizophrenia and creative functioning using both biographical and empirical methods (Buss, 1966; Davids, 1964; Lewis, 1971; Keefe & Magaro, 1980; Schulberg, French, et al., 1988; MacKinnon, 1961). Keefe & Magaro (1980) compared 10 paranoid and 10 nonparanoid schizophrenics, 10 nonpsychotic psychiatric controls, and 10 normal controls on several measures of creativity, and found that nonparanoid schizophrenics produced relatively more "highly creative" responses on the Alternate Uses Test than any other group. The authors suggested that the cognitive processes of creative and schizophrenic individuals may be very similar, possibly even "equivalent."
Research into creativity and psychopathology has generally taken one of three forms, psychiatric biographies of creative individuals, eminence studies, and clinical population studies. In addition, a third type of study looks at overlaps in traits between clinical and creative groups. The current work is in this latter category.

**Schizophrenia in Biographies of Creative Individuals**

Early psychiatric biographies of individuals noted for "genius" or creative accomplishment have adapted the historical idea that creatively eminent individuals are prone to disorders related to psychosis. Biographical accounts of such individuals as Van Gogh, Schumann, Wilde, Coleridge, Byron, Keats, Nietzsche, and others support the historical connection between eminence and psychopathology (although they do little to support the connection between creativity and psychopathology), and the form of psychopathology varies widely even across this short list. Some of these individuals have been presumed to be schizophrenic.

**Eminence Studies and Schizophrenia**

Eminence studies involve taking a group of individuals from a particular subpopulation assumed to require creativity for membership, (e.g. authors, artists) and testing for diagnostic indicators of schizophrenia or other mental disorders.

Research findings have indicated that eminent individuals, as a group, generally score higher on indices of schizophrenic features (Andreason & Powers, 1975). Another example of such a study would be some of the IPAR studies of creative individuals that found that members of creative groups...
received higher scores on scale 8 of the MMPI, indicative of schizophrenia-like experiences (Barron, 1961).

Clinical Population Studies and Schizophrenia

Finally, the third method involves testing a clinical population, such as diagnosed schizophrenics (or sometimes their relatives), for performance on tests of creativity or for creative attainments. Some studies have found that schizophrenics perform higher than the average population on tests of creativity, thus supporting the apparent anecdotal connections (Dykes & McGhie, 1976; Keefe & Magaro, 1990).

Criticisms of Categorical Studies of Creativity and Schizophrenia

A criticism of this type of research is that, with a few exceptions, creativity has been compared to a diagnostic category, schizophrenia, and not tied to the underlying psychological phenomena. By comparing a diagnostic group to the general population on a particular index, we receive information only about whether groups differ or are similar, but not the reason or the particular process by which the groups are differentiated or linked. Persons (1986) argues that research, especially in the area of schizophrenia, has usually been conducted without consideration given to the distinction between the symptoms and the specific underlying processes involved within a diagnostic category and the category or diagnoses itself. She contends that most experimental research concerning schizophrenia has focused on comparing diagnosed schizophrenics with non-schizophrenics on different measures. This type of design is inherently limited, as it yields studies that consider the diagnostic category of schizophrenia rather than, for example, the "overt manifestations of thought disorder." This method of inquiry ignores the important phenomena
involved and results in an inability to isolate the “single elements of pathology.” Similarly, studies that only consider categorical eminence or creativity are also likely to overlook important defining characteristics. Persons argues that the studying of diagnoses or categories instead of phenomena also perpetuates a failure to recognize a continuity between normal and clinical phenomena, and instead continues to support an artificial dichotomy between mental health and mental illness. This gross method of study contributed to creativity's tie to formal thought disorder as a psychological process being overlooked.

The present work (also Schuldberg’s) is in this latter area of looking at continua.

**Connections between Creativity and Affective Disorders**

**Theoretical and Conceptual Overlap**

While once taken as an exclusive indicator of schizophrenia, formal thought disorder is now also considered to occur in major mood disorders as well (Harrow & Quinlan, 1985). Evidence that creativity is related to affective disorders has been available for quite some time, although until relatively recently this evidence was not used to draw a connection between affective disorders and creativity because of the prevalent theory that creativity was a trait related to schizophrenia. An example of such discounting can be found in Karlsson (1970); despite findings that manic depressives had nearly twice as many relatives as schizophrenics listed in Iceland's Who's Who, Karlsson used a concept of a “schizophrenia spectrum” that included affective disorder and interpreted this connection as implying an association between creativity and schizophrenia rather than affective disorder, as the findings would suggest.

Several studies of psychological processes in non-clinical populations provide evidence that affect (not necessarily defined in clinical terms) is
implicated in creativity. For example, Isen et al. (1985, 1987) demonstrated that positive affect increases the number of unusual associations on a test of DT. The authors suggest that positive affect influences the interpretation and organization of cognitive material and results in a higher number of unusual associations. The authors also suggest that affect may directly influence the willingness to give unusual answers. Greene & Noice (1988) found adolescents' scores on Duncker's (1945) candle task improved following positive affect induction. In Duncker's task, the subject is presented with a candle, a box of matches, and several tacks. The subject is asked to fix the candle to the wall in a manner that allows the candle to burn evenly. A creative subject overcomes functional fixedness and tacks the box to the wall, using the box as a platform for the candle. Less creative subjects attempt to secure the candle to the wall with melted wax, or attempt to attach the candle to the wall directly using the tacks, overlooking the possibility that the matchbox may be used in a manner for which it was not designed. The researchers concluded that positive affect facilitated the ability to “relate and integrate divergent material, form new associations, and recombine cognitive elements.” Although the authors admit that the underlying mechanism has yet to be explained, they hypothesize that the induction of positive affect results in the activation of “semantic networks,” and thus increases the ability to simultaneous access many different ideas and concepts.

In the area of diagnostic studies, affective disorders and creativity have been found to have both individual and familial associations (Andreasen, 1978; Richards, 1981).
Affective Disorder in Biographies of Creative Individuals

As noted above, a number of the creative individuals mentioned earlier could have affective disorder diagnoses. Recent work by Goodwin & Jamison (1990), Andreason and Glick (1988) and others has suggested that Schumann, Blake, Lord Byron, Coleridge, Isaac Newton, and others suffered from bipolar affective disorders. William Styron (in Darkness Visible) provides a beautiful, painful description of a manic depressive episode in a creative writer.

Eminence Studies and Affective Disorders

The most well-known studies have been conducted by Andreason and colleagues. Andreasen and Canter (1974) found 67% of writers from the University of Iowa Writers' Workshop (an eminent group) to meet the criteria for a major affective disorder; they also found familial associations for creativity and affective disorder.

Clinical Population Studies and Affective Disorders

In a study by Andreasen and Powers (1975) comparing writers and clinically-diagnosed schizophrenics and manics, similarities in conceptual style were found for manics and writers in their tendency to be overinclusive and to sort objects in large groups. It should be noted that overinclusion has been taken as a sign of schizophrenic thought disorder (Andreason and Powers, 1975).

Creativity and Specific Forms of Affective Disorders

Although most of the research relating creativity to affective disorders has looked at the manic episode of bipolar affective disorder (bipolar I), creativity has also been related to subclinical features of hypomania (bipolar II), a
condition marked by the presence of manic features without marked social impairment. A strong tie between artistic ability and hypomania has been demonstrated by Andreasen (1980), and additional research indicates that hypomanic subjects actually score higher than manics or normals on tests of creativity (Richards, Kinney, Lunde, Benet, & Merzel, 1988). Richards, Kinney, Lunde, Benet, & Merzel (1988) have advanced an inverted U hypothesis regarding creative performance as a function of bipolar mood characteristics. This hypothesis states that subclinical mood elevations are likely to facilitate creativity; however, as the elevations increase they become more disruptive and less likely to enhance creativity, and may act as a barrier to creativity at their extremes.

Because hypomania is often a precursor of bipolar I disorders (Arieti, 1974; Slater & Roth, 1969; Zerssen, 1982) and is a condition that often goes undiagnosed (Akiskal, 1979), creative personality features could serve as useful early warning signs of the possible presence of hypomaniac features. Additionally, they could suggest useful strengths in bipolar-prone individuals that a therapist may be able to use to a therapeutic advantage. The high correlation between creative characteristics and bipolar symptomology suggests that bipolar-prone individuals share many of the personality characteristics of creative individuals, such as resourcefulness, willingness to try new perspectives, energy, and the ability to integrate new material, all of which could be useful resources in a therapeutic environment.

Depression’s Association with Creativity

An apparent connection between depression and creativity has been the subject of speculation since the time of Aristotle, with his observation that eminent individuals seemed often to be afflicted with melancholia. Although the
bulk of research considering the relationship between creativity and affective disorders has focused primarily on the bipolar disorders, a number of studies have looked at the relationship between creativity and unipolar depression (Kinney, Richards, Daniels, & Linkins, 1989; Andreasen, 1987; Jamison, 1980; Jamison, 1989). Jamison (1980) found that 36% of the depressed subjects in a study relating creativity to diagnosis of bipolar disorder or unipolar depression reported an "increase in sexual intensity, creativity, and productivity as a result of their depressive experiences."(p.201) In a later study, Jamison (1989) examined the rates of treatment for affective disorders in eminent British writers, poets, and artists. She found that, across groups, 38% had been treated for an affective illness, 23.4% had been treated for depression with antidepressants alone, 8.5% had been treated for depression with psychotherapy, and 6.4% had been treated for bipolar disorders. In the area of biographical research, Prentky (1992) provides a list of eminent writers, philosophers, artists, scientists, and composers with diagnoses of either bipolar or unipolar affective disorders.

While some studies have supported a relationship between depression and creativity, several authors (Richards, 1991, Kinney et al., 1989) have suggested that perhaps those labeled as "depressives" in these studies might actually have been more accurately diagnosed as subjects with bipolar III. Those with bipolar III exhibit symptoms of depression, but when placed on antidepressant medication develop manic symptoms as well (American Psychiatric Association, 1994). Kinney et al. (1989) suggest that those depressed subjects who demonstrate greater creativity may comprise a subtype of depressives that would more accurately be classified as bipolar III. They base their proposition on the high coincidence of a family history of bipolar disorder and cyclothymia found in these patients. Coryell et al. (1989) found that subjects with relatives diagnosed with unipolar depression were less likely
to excel academically or professionally than those subjects with first-degree relatives diagnosed with bipolar I or II. Richards (1991) believes that depression, by itself, is not linked to creativity, and that the presence of mood elevations (diagnosis of bipolar) better accounts for this historical connection, rather than depression alone. She questions whether depression itself is a major factor in creativity "if the underlying bipolar risk is not present." (p.11)

**Limitations of Earlier Studies**

With rare exceptions, previous studies linking creativity and measures of psychopathology exhibit either one or both of two problems limiting generalizability of their results. Either an individual’s membership in an eminent population, as judged by his or her accomplishments in a particular field presumed to require creativity, is used to predict psychopathological diagnostic features, or a diagnosed clinical population is used to predict higher scores on tests of creativity. In either case, arguments can be made that the particular connections observed between creativity and psychopathology could be due to factors relating to the non-normativeness of the sample; eminent individuals are likely to differ from the general population in more ways than just their creativity, and relevant differences between clinical and normal populations are also likely to exist. Following Person’s (1986) assertion that categorical classification may obscure the underlying processes involved in psychopathology, simple comparison of eminent and non-eminent groups of individuals does not provide much useful information about the underlying processes or phenomena by which the two groups are differentiated.
Creativity and Self-Actualization

Maslow's conceptualization of two distinct groups of "creative" individuals, one by definition psychologically healthy and the other showing special talent in one main area, raises some interesting questions regarding prior research in the field of creativity and psychopathology. In light of this theory, the anecdotal evidence relating creativity or genius to psychological illness may be based on samples of special talent creatives, because, by definition, the other group, self-actualized creatives, should be free from psychopathology. By the same token, studies that have relied on the testing of those diagnosed with a mental disorder and making inferences about creative ability have also not sampled this theorized group of creative individuals. If Maslow's theory is correct, a sub-sample of those who score high on tests of creativity should be more likely to be self actualized, and thus show a lower number of psychopathological characteristics from individuals who achieve a low scores on such tests. Prior research has demonstrated the connection between SA and creativity (Buckmaster & Davis, 1985; Yonge, 1975; Craig, 1966), although SA creativity's connection to psychopathology has not been directly empirically tested.

This study looked at a nonclinical college population, not distinguished for eminence or psychopathology, and made predictions about the presence of subclinical manic symptoms based on scores from several pencil and paper tests of creativity and measure of self-actualizing behaviors and beliefs, with the intent of establishing whether tests of creativity and self-actualization jointly allow some prediction concerning the presence of low-level subclinical traits of mania. These subclinical features may be related to risk for future psychopathology (Arieti, 1974; Slater & Roth, 1969; Zerssen, 1982).
The measure of self-actualization was included in order to determine whether a distinction actually exists within the population of individuals with greater creativity, and whether the distinction between SA creativity and special talent creativity shows a systematic relationship to scores on indices of psychopathology as theory would suggest. New features of this study are that a) it categorizes subjects based on scores from pencil and paper test of creativity to predict indices of psychopathology; b) it considers traits instead of diagnostic categories; c) it makes predictions from traits of creativity to traits of psychopathology in a non-clinical population, something that has never been done before; d) it includes a measure of self-actualization in an attempt to determine whether two distinct populations of creative individuals exist and to examine the effect that SA level has on creativity’s relationship to psychopathology; and e) it investigates the utility of creativity tests in defining interesting groups for future research.

As mentioned above, there are anecdotal, empirical, and theoretical connections between creativity and psychopathology. Past research suggests that creatively eminent individuals are more likely to exhibit pathological symptoms, that this pathology will most likely be affective, and that hypomanics appear to be more creative than normals. Other limited research suggests that, in at least one subgroup, creativity should correlate highly with self-actualization, and may therefore show a negative correlation with indices of psychopathology. Given these earlier findings, it was hypothesized that scores on creativity scales for those with low scores on SA should be most predictive of hypomanic personality features, although a weaker relationship should also exist between creativity scores and schizophrenia scale scores. Individuals with high creativity and high SA scores should have relatively low scores on measures of psychopathology.
HYPOTHESES

1. A main effect for SA was expected in predicting mean levels of psychopathology.

    Theory suggests that SA would be negatively associated with pathological symptomology.

2. An interaction between creativity and SA was expected.

    It was expected that high creativity groups with low SA scores would receive higher scores on scales assessing manic traits and schizophrenic-like traits; High creativity groups with high SA scores were expected to have relatively lower scores on manic and schizophrenic trait indices. Relative to the low creativity, high SA group, low creativity groups with low SA scores were expected to achieve higher scores on indices of psychopathology, although scores were expected to still be lower than the high creativity, low SA group.

3. A main effect for creativity was expected:

    High scores on measures of creativity were expected to be predictive of higher achieved scores on all measures of psychopathology.

4. Differential scoring on indices of psychopathology was expected:

    Manic traits were expected to occur at higher levels than schizophrenic traits (based on converted z-scores (standard scores) from several clinical measures of psychopathology) in those groups with higher scores on pathological indices.

5. A correlation between measures of pathology designed to measure similar symptomatology was expected:

    It was expected that high scores on scales 8 and 9 would correlate with high scores on the Per-Mag scale and the Hypomania scale, respectively. A weak correlation between dissimilar measures was expected.
Methods

Subjects

Subjects were 92 male and 147 female Introductory Psychology students who received class credit for participation in a psychology experiment. Subjects with missing data on any test were excluded from the analysis. The resulting sample consisted of 210 subjects, 75 males and 135 females. Average age of the participants was 21.70 years (SD ± 6.068), with subjects ranging from 17 years old to 68 years old. The participants had an average of 1.77 years of college education (SD ± 1.03, range 1.00 to 5.00). 238 of the 239 participants (99.6%) claimed English as their native language, and 225 participants (94.1%) indicated they were of Caucasian ethnicity. Other ethnicities represented in the sample are Asian (0.8%), Native American (0.4%), Other (0.4%), and subjects indicating more than one ethnicity (3.8%).

Table 1
Study participants broken down by gender:

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td>92</td>
<td>147</td>
</tr>
<tr>
<td>Age min.</td>
<td>18</td>
<td>17</td>
</tr>
<tr>
<td>Age max.</td>
<td>48</td>
<td>68</td>
</tr>
<tr>
<td>Age mean</td>
<td>21.32</td>
<td>21.93</td>
</tr>
<tr>
<td>Age SD</td>
<td>4.50</td>
<td>6.87</td>
</tr>
</tbody>
</table>

Table 2
Years in school, by gender:

<table>
<thead>
<tr>
<th></th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>min.</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>max.</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>mean</td>
<td>1.99</td>
<td>1.65</td>
</tr>
<tr>
<td>SD</td>
<td>1.18</td>
<td>0.91</td>
</tr>
</tbody>
</table>
Procedures

Testing consisted of two sessions. The initial session included instruments designed to define groups high and low in creativity (as measured by Alternate Uses, Barron-Welsh, and How Do You Think) and high and low in self-actualization (as measured by the POI). The subsequent session involved testing on several measures of clinical interest in this study. Subjects were tested in groups of ten to twenty-five. Following the first test session, subjects were asked to sign up for the second session occurring a week later. Each test was coded with an identifying number to allow reference to the face sheets to derive information necessary for linkage to the subject's second set of tests.

In the first session, brief instructions were given regarding filling out the consent form and personal information. (Appendix A) Alternate Uses (Guilford, Christensen, Merrifield, & Wilson, 1978), a timed test, was administered first, preceded by another series of brief instructions. Upon completion of this section, the face sheets and Alternate Uses were collected by an experimenter to make it clear that face sheet information would be separated from other data and to prevent later addition to answers already provided on Alternate Uses. Subjects were then instructed to complete the Barron Welsh Art Scale (Welsh & Barron, 1963) and How Do You Think (Davis, 1975; Davis & Subkoviak, 1975), two untimed creativity tests, the POI, and the Independent Activities Questionnaire (IAQ), a thorough creative activities checklist. Upon completion of the packet, subjects were assisted in signing up for a second testing session occurring during the following week, and were given a written reminder detailing the date, time, and place of the second session.

During the second testing session, subjects received a second packet, precoded with their experimental number and containing a second consent form, the Perceptual Aberration - Magical Ideation (Per-Mag) scale (Chapman &
Chapman, 1985), the Hypomania (Hyp) scale (Eckblad & Chapman, 1986), and the Minnesota Multiphasic Personality Inventory, 2nd Edition (MMPI-2; Hathaway & McKinley, 1989). The experimenter asked the participants to read over the consent form (presented for the second time), and once completed, to begin filling out answers. (Appendix B) After completion of the forms, subjects were thanked for their participation and dismissed. A debriefing session will take place after completion of all data collection to discuss the findings of this study, and will be announced by the Introductory Psychology instructors.

Subjects were assigned to one of four groups based on their scores on the three tests of creativity and a composite self-actualization (SA) score derived from summing the Time Competence and Inner Directedness scales of the POI. The four groups were as follows: High creativity - high SA; High creativity - low SA; Low creativity - high SA; and Low creativity - low SA. The high-creativity groups consisted of subjects who scored above the sample median on at least two of the three creativity tests. The low-creativity group consisted of subjects who scored at or below the sample median on at least two of the three creativity tests. The high SA groups consisted of subjects who scored above the sample median on the POI, and the low SA group consisted of those subjects who scored at or below the sample median on the POI.

The proposal for this study indicated that testing would continue until each group had at least 15 male and 15 female participants, for a study total of at least 120 participants. As data analysis would begin after all data was collected, a projected estimate of the number of screening subjects required to fill all cells was determined. Originally this number was speculated to be 300 subjects; time constraints necessitated reducing the number to at least 225 screening subjects, and actual testing session group size resulted in the
inclusion of 239 subjects. The final experimental cell composition consisted of the following:

Table 3
Experimental cell composition by gender

<table>
<thead>
<tr>
<th>Creativity</th>
<th>POI</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low</td>
<td>29 males</td>
<td>17 males</td>
</tr>
<tr>
<td>Creativity</td>
<td></td>
<td>49 females</td>
<td>26 females</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>18 males</td>
<td>28 males</td>
</tr>
<tr>
<td></td>
<td></td>
<td>24 females</td>
<td>47 females</td>
</tr>
</tbody>
</table>

Instruments

Creativity tests

Three creativity tests were selected in an attempt to provide a relatively broad-spectrum assessment of creative functioning within an individual. Alternate Uses (Guilford, Christensen, Merrifield, & Wilson, 1978), the Revised Art Scale (Welsh & Barron, 1963), and How Do You Think? (Davis, 1975; Davis & Subkoviak, 1975) measure three different but related facets of the creative person, cognitive functioning, perceptual qualities, and personality/biographical characteristics, respectively. An activities checklist, the Independent Activities Questionnaire (IAQ, Richards, Holland, and Lutz, 1967) was also included as an exploratory measure to provide clarification of creativity style.

Alternate Uses (Guilford, Christensen, Merrifield, & Wilson, 1978) measures a cognitive component of creativity mentioned earlier, Divergent Thinking. Subjects are asked to think of unusual uses for common objects, and are given four minutes to write down up to six uses for each of three objects; the test consists of two such sets. Using Harrington's (1975) protocol, subjects will be instructed to "be creative," and to generate solutions that are "unusual" and "worthwhile." Example items from the form to be used, Form B, that a subject
will be requested to think of "unusual and worthwhile uses" for are: SHOE (used as footwear), BUTTON (used to fasten things), and KEY (used to open a lock). Each novel and unusual use receives one point, and the total score is the average number of new uses over the set of nine objects. During initial development of this scale, reliability was found to be .75 for adults using Forms B or C (Guilford, Christenson, Merrifield, & Wilson, 1978).

The Revised Art Scale (Welsh & Barron, 1963) is an empirically-derived scale designed to measure perceptual preferences associated with creativity, such as preferences for novelty and complexity. The scale consists of a set of sixty figures to which the subject responds with either "Like" or "Dislike." Scores of subjects who endorse fewer than one eighth of the total items as "Like" or as "Dislike" will be dropped from the analyses, as suggested in the manual. Schuldberg (personal communication) found the internal consistency of this scale to be .92 based on a sample of 340 University of Montana undergraduates enrolled in Introductory Psychology. Validity has been demonstrated with groups such as artists, poets, musicians, architects, and writers achieving high scores on the scale compared to unselected adults and college students (Welsh & Barron, 1963). Some examples of items may be found in the appendices.

The How Do You Think (Davis, 1975; Davis & Subkoviak, 1975) is a 100-question self-report biographical and personality measure normed on a college population that samples beliefs, attitudes, traits, and behaviors associated with creative functioning, as well as affective and motivational aspects of creativity. Additionally, subjects provide information concerning real-life creative activities. Subjects respond to each item on a 5-point scale, and the total score is the sum of these self-ratings over all 100 items, with scores ranging from 100 to 500 points. Example items are "I am very curious," "My parents visit art galleries and
museums," "I enjoy the confusion of a big city," and "I would like to learn mountain-climbing." Davis (1974; cited in Davis & Subkoviak, 1975) found the Hoyt reliability of the test to be .94 based on the responses of 68 undergraduate students enrolled in a creativity course at the University of Wisconsin. The same study validated the instrument against operational criteria of creativity obtained from course requirements including an art project, creative writing, two inventions, and strategies for creative teaching. The correlation between creativity ratings based on operational criteria and test scores was .62 (p < .01) for men, .36 (p<.02) for women, and .42 (p<.01) across subject gender.

Finally, the Independent Activities Questionnaire (IAQ, Richards, Holland, and Lutz, 1967) was included as an exploratory measure to determine whether it could provide useful supporting information for the distinction between special talent creatives and those who lead a creative lifestyle. The IAQ was devised as a predictor of success in college. The types of questions asked and the measure's division into 13 subscales relevant to creatively eminent pursuits suggested its potential for assessing special talent creativity. The subscales sample accomplishments in the following areas: Leadership, Social Participation, Art, Social Science, Science, Business, Humanities, Religious Service, Music, Writing, Social Sciences, Speech and Drama, and Recognition for Academic Accomplishment. Example questions are "built scientific equipment of my own" (Science); "had poems, stories, essays, or articles published in a public (not college) newspaper, anthology, etc." (Writing); "had one or more leads in plays produced by my college" (Speech and Drama).

**Personality/Psychopathology scales**

The Perceptual Aberration-Magical Ideation Scale (Per-Mag; Chapman & Chapman, 1985) is a combination of two of the Wisconsin Scales of
Hypothetical Psychosis Proneness. The Perceptual Aberration Scale (Chapman, Chapman, & Raulin, 1978) is a 35-item scale that measures distortion of perceptual experience, particularly regarding one's own body. Examples of items are "My hands and feet have never seemed far away,"(keyed false) and "Occasionally it has seemed as if my body had taken on the appearance of another person's body."(keyed true) Chapman, Chapman, and Miller (1982) report coefficient alphas of .89 and .88 for 2500 male and 3067 female college students enrolled in introductory psychology classes. Chapman et al. (1980) report that high-scoring subjects tend to exhibit communication and speech deviancies and report more schizotypal and psychotic-like experiences than control subjects. The Magical Ideation Scale (Eckblad & Chapman, 1983) is a 30 item scale that samples superstitious and "mini-delusional" beliefs, some of which may have cultural or subcultural support. Examples of questions found on this instrument are "Good luck charms don't work,"(keyed false) and "Some people can make me aware of them by just thinking about me." (keyed true) Chapman, Chapman, and Miller (1982) report that the Magical Ideation scale correlates .70 with the Perceptual Aberration scale, and found a coefficient alpha of .84 for 2500 male college students, and .85 for 3067 female college students. Eckblad and Chapman (1983) report that high-scoring college students relate more psychotic-like and schizotypal experiences than a control group of low scoring subjects.

The Hypomanic Traits scale (Eckblad & Chapman, 1986) is a 48-item scale that measures experiences of being "up" or "hyper." The scales were designed to identify another hypothetically psychosis-prone high-scoring group. This is a relatively new scale, but predictive validity work has shown that high scorers may be at increased risk for mental disorders (Eckblad & Chapman, 1986). Coefficient alpha reliability was .87 for both 713 men and 806 women.
tested with the final version of the Hypomanic Traits scale. (Chapman & Chapman, 1986). This instrument has been demonstrated to have external validity using college men and women; high scores on the scale were found to be predictive of indicators of hypomanic personality based on interviews and related measures. (Eckblad & Chapman, 1986). Eckblad and Chapman (1986) report that 77.5% of the high scorers on the scale had experienced hypomanic episodes compared to none of the control subjects. Sample items from the Hypomanic Traits scale are as follows: “I feel tired a good deal of the time” (keyed false), and “ I often feel excited or happy for no apparent reason” (keyed true).

The Minnesota Multiphasic Inventory - 2nd edition (MMPI-2; Hathaway, McKinley, Butcher, Dahlstrom, Graham, Tellegen, and Kaemer, 1989) is included in this study as an additional instrument to support findings from the Per-Mag and Hypomanic trait scales, with scales 8 ("Schizophrenia") and 9 ("Hypomania") measuring schizotypal and hypomanic symptoms and traits. The MMPI-2, like its predecessor, is an empirically-derived measure of a wide array of psychopathological symptomology, and has been normed both on clinical and normal populations. Based on the normative sample for the MMPI-2, test-retest reliabilities for scales 8 and 9 over a one-week interval were .87 for 82 males and .80 for 111 females, and .83 for males and .68 for females, respectively. (Hathaway, McKinley, Butcher, Dahlstrom, Graham, Tellegen, and Kaemer, 1989). Graham, Smith, and Schwartz (1986) report that one-half to two-thirds of these subjects achieved scores that would place them in the same diagnostic grouping as the prior test. Alpha estimates for 1138 males for scales 8 & 9 and .85 and .58 , and for 1462 females, .86 and .61, respectively. (Hathaway, McKinley, Butcher, Dahlstrom, Graham, Tellegen, and Kaemer,
1989). In the present study, raw scores were used, except for the within subjects analyses where traditional (not "normalized") T-scores were used. It was expected that high scores on scales 8 and 9 would correlate with high scores on the Per-Mag scale and the Hypomania scale, respectively. It was also expected that high-scorers on tests of creativity would produce higher mean scale scores on indices of "pathology" in general.

**Measure of Self-Actualization**

The Personal Orientation Inventory (POI; Shostrum, 1963) is a 150 question inventory designed to measure those values and behaviors associated with development toward self-actualization. For each item, the participant is asked to indicate which of two statements seems most true of himself. Some example items from the POI are: "a. I am completely free of guilt, b. I am not free of guilt;" "a. I am able to risk being myself, b. I am not able to risk being myself;" "a. I regret my past, b. I do not regret my past," and "It is better to be yourself, b. It is better to be popular." Although the POI consists of four major scales and ten subscales representing related facets of self-actualizing beliefs and behavior, research (Shostrum, 1966; Knapp, 1965; Damm, 1969) supports the use of the Time Competence (Tc) and Inner Directed (I) combined raw scores as an accurate overall measure of self-actualization. In the original validation study, Shostrum (1965) demonstrated that the POI significantly differentiated a sample of clinically-nominated, "relatively self-actualizing" subjects (N=29) from those who had been nominated as "non-self-actualizing" (N=34). The mean differences between the self-actualized and non-self-actualized groups on the Tc and I scales were both found to be significant at the .01 confidence level. Maslow (1967) provides additional support for the POI in his endorsement of the POI as "a standardized test of self-actualization." Test-
retest reliability with 48 university students for Tc and I was found to be .71 and .77, respectively, over a one week interval (Klavetter & Mogar, 1967). This study will use a composite self-actualization score (CS) derived from the summation of raw scores from the Inner Directness (I) and Time Competence (Tc) scales. Knapp (1976) suggests that this composite score represents the best over-all measure of self-actualization based on large sample research conducted by Damn (1969, 1972).

It was expected that there would be a negative relation between SA scores and indices of manic and schizophrenic traits. Both theory and research findings support the existence of an interaction between SA and creativity. It was expected that those scoring high on SA and on creativity would achieve low scores on psychopathology, and those scoring low on SA and high on creativity would achieve relatively higher scores on psychopathology. Low scorers on creativity with low SA scores were predicted to show relatively higher level of pathology than low creativity scorers with high SA scores. In low SA scorers, creativity indices were expected to show a stronger relationship to bipolar indices than to schizophrenia indices, through a positive correlation between creativity scores and adjusted t-scores on measures of psychopathology.

Analyses

A 2(gender) x 2(creativity) x 2(SA) MANOVA was used. The dependent variables were the subjects' performance on the Hypomanic trait scales, the Per-Mag scale, and scales 8 & 9 of the MMPI-2. Following the omnibus MANOVA, additional univariate analyses of each of the scales by group and gender were conducted and examined in terms of means of the scores utilizing
univariate ANOVA. Post-hoc contrasts were used to evaluate the sources of these univariate differences.

Within subjects differences on measures of hypomanic vs. schizotypal characteristics were assessed with standard profile analytic techniques based on split-plot ANOVA.

Additionally, analyses of correlation between measures of pathology, creativity, and self-actualization were conducted. Intercorrelations between both measures of pathology and measures of creativity were also conducted to assess discriminative ability between instruments.

Descriptive analyses were conducted to provide relevant demographic information about the sample.

Results

1. A main effect for SA was expected, with SA negatively associated with pathological symptomology.

Multivariate tests of significance comparing subjects obtaining high scores on the POI with those obtaining low scores on the POI showed a significant main effect for the POI CS ($F[4,199] = 2.64; p = .035$). Univariate tests revealed a possible trend ($p = .096$) in subject's performance on scale 8 of the MMPI-2, with subjects with low scores on the POI obtaining higher scores on scale 9 of the MMPI-2. This finding is supportive of the inverse relationship between self-actualization and the psychopathology proposed in the literature and hypothesized in this study. Interestingly, while not significant in the univariate tests, scores for the other measures were in the opposite direction, with high scorers on the POI obtaining higher scores on the measures of pathology. (see Table 4)
The direction of these results is contrary to the hypothesis that self-actualization is associated with a psychological state free from pathology.

2. An interaction between creativity and SA was expected, with high creativity groups with low SA scores receiving higher scores on scales assessing manic traits and schizophrenic-like traits; high creativity groups with high SA scores were expected to have relatively lower scores on manic and schizophrenic trait indices. Relative to the low creativity, high SA group, low creativity groups with low SA scores were expected to achieve higher scores on indices of psychopathology.

The overall multivariate test of significance for the interaction of creativity (high and low) and self-actualization (high and low) was not significant at the .05 level ($F[4,199] = .714; p = .583$). Additional univariate analyses with Hypomanic Traits, Per-Mag, and scales 8 and 9 of the MMPI-2 also failed to meet the .05 level for significance (range $p = .146-.603$). The hypothesis that the interaction of creativity and self-actualization would form groups distinguished by varying levels of psychopathology was unsupported by the analysis.

3. A main effect for creativity was expected, with creativity positively associated with pathological symptomology.

The combined four pathology measures of principle interest, scales 8 and 9 of the MMPI-2 and the Hypomanic Trait and Per-Mag Scales, served as an overall index of psychopathological symptomology in this study. It should be noted that the use of these four scales alone ignores other specific forms of pathology (i.e., neurotic symptoms), and thus provides an incomplete index of global symptomology.
A very significant multivariate main effect (F[4,199] = 8.11; p < .0005) for creativity illustrates a very strong positive relationship between performance on measures of creativity and performance on measures of psychopathology.

4. Differential scoring on indices of psychopathology was expected, with manic traits occurring at higher levels than schizophrenic traits in those groups with higher scores on pathological indices.

Univariate F-tests comparing high-creativity subjects with low creativity subjects revealed significant differences in performance on Hypomanic Traits (F[1,202] = 16.61; p < .0005), Per-Mag (F[1,202] = 9.21; p = .003), and scale 9 of the MMPI-2 (F[1,202] = 14.59; p < .0005). In each case, higher scores on measures of creativity were predictive of higher scores on measures of psychopathological characteristics.

Table 4
Means by cells

<table>
<thead>
<tr>
<th>Creativity</th>
<th>POI</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Scale 9</td>
<td>20.28 ± 5.38</td>
<td>20.78 ± 5.76</td>
</tr>
<tr>
<td></td>
<td>Hypo Traits</td>
<td>16.22 ± 6.29</td>
<td>16.45 ± 6.93</td>
</tr>
<tr>
<td></td>
<td>Scale 8</td>
<td>23.42 ± 11.24</td>
<td>19.71 ± 12.34</td>
</tr>
<tr>
<td></td>
<td>Per-Mag</td>
<td>0.2739 ± 1.93</td>
<td>0.2886 ± 2.25</td>
</tr>
<tr>
<td>Low</td>
<td>Scale 9</td>
<td>23.25 ± 4.53</td>
<td>23.82 ± 4.70</td>
</tr>
<tr>
<td></td>
<td>Hypo Traits</td>
<td>19.48 ± 6.84</td>
<td>21.41 ± 6.88</td>
</tr>
<tr>
<td></td>
<td>Scale 8</td>
<td>23.18 ± 10.55</td>
<td>22.12 ± 10.54</td>
</tr>
<tr>
<td></td>
<td>Per-Mag</td>
<td>1.14 ± 2.08</td>
<td>1.53 ± 2.43</td>
</tr>
<tr>
<td>High</td>
<td>Scale 9</td>
<td>20.28 ± 5.38</td>
<td>20.78 ± 5.76</td>
</tr>
<tr>
<td></td>
<td>Hypo Traits</td>
<td>16.22 ± 6.29</td>
<td>16.45 ± 6.93</td>
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<td>Scale 8</td>
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</tr>
<tr>
<td></td>
<td>Per-Mag</td>
<td>0.2739 ± 1.93</td>
<td>0.2886 ± 2.25</td>
</tr>
</tbody>
</table>

These findings are ambiguous regarding the distinction between hypomanic and schizotypal traits, as significant group differences occurred for the Wisconsin measures of both hypomanic and schizotypal traits, as well as the MMPI-2 measure of hypomania, but not for the MMPI-2 schizophrenia scale.

A split-plot ANOVA design was used for comparison of T-scores on measures of pathology. T-scores were based on local norms for males and females on the Chapman scales (Schuldberg, personal communication) and on
the MMPI-2 manual norms for the MMPI-2 scales. Comparing T-scores derived from Hypomanic Traits and Per-Mag, a highly significant between subjects effect was evident ($F[1,208] = 21.74; p < .0005$), indicating that high creatives achieved higher scores on both measures of pathology. Although there was no interaction between level of creativity and scores on Per-Mag and Hypomanic Traits ($F[1,208] = 0.13; p = .724$), a within-subjects ANOVA indicated that for both high and low creatives, subjects achieved higher scores on the Per-Mag than on the Hypomanic Traits ($F[1,208] = 73.88; p < .0005$).

When comparing adjusted T-scores derived from scale 8 of the MMPI-2 with T-scores from scale 9, a between subjects ANOVA once again suggests that high creatives achieved higher scores on indices of pathology ($F[1,208] = 4.98; p = .027$). A within-subjects ANOVA revealed an interaction ($F[1,208] = 14.96; p < .0005$) between creativity group and MMPI-2 scale type, with low creatives achieving higher scores on scale 8 and high creatives achieving higher scores on scale 9 ($F[1,208] = 7.56; p = .006$). This indicates that, as expected, the high creatives show relatively more manic-like psychopathology than schizophrenic-like psychopathology when compared to low creativity.
subjects; however, this effect appears to be due to low levels of mania in low creativity subjects.

On measures from the MMPI-2, creative normals appear to score much higher than non-creative normals on scale 9, Hypomania. Both creatives and non-creatives score similarly on scale 8, Schizophrenia. While creatives achieve higher scores on measures of hypomania than schizotypy on MMPI-2 scales, both creatives and non-creatives achieve higher scores on the Per-Mag than on the Hypomaniac Traits.

5. It was expected that high scores on scales 8 and 9 would correlate with high scores on the Per-Mag scale and the Hypomania scale, respectively.

As seen in the following table, all of the measures of psychopathology were highly intercorrelated with each other, with all correlations being significant at the 0.01 level.

Table 5
Inter correlation of Measures of Psychopathology:

<table>
<thead>
<tr>
<th></th>
<th>Hypo. Traits</th>
<th>MMPI scale 9</th>
<th>Per-Mag</th>
<th>MMPI scale 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypomanic Traits</td>
<td>1.00</td>
<td>.649**</td>
<td>.548**</td>
<td>.478**</td>
</tr>
<tr>
<td>MMPI scale 9</td>
<td></td>
<td>1.00</td>
<td>.514**</td>
<td>.579**</td>
</tr>
<tr>
<td>Per-Mag</td>
<td></td>
<td></td>
<td>1.00</td>
<td>.612**</td>
</tr>
<tr>
<td>MMPI scale 8</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).
Gender Differences:

The analysis revealed a significant main effect for subject gender (F[4,199] = 3.99; p = .004). The effect is largely accounted for by scale 9 of the MMPI-2 for which males displayed a trend of higher scores than females (F[1,202] = 3.75; p = .054).

Table 6
Means by cells, broken down by gender

<table>
<thead>
<tr>
<th>Creativity</th>
<th>POI</th>
<th>Low</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>male</td>
<td>female</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scale 9 = 22.75 ± 5.17</td>
<td>Scale 9 = 18.91 ± 5.04</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hypo = 17.96 ± 6.33</td>
<td>Hypo = 15.11 ± 6.08</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scale 8 = 27.29 ± 9.36</td>
<td>Scale 8 = 21.26 ± 11.72</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Per-Mag = .0656 ± 2.17</td>
<td>Per-Mag = .4064 ± 2.19</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Low</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scale 9 = 23.71 ± 4.50</td>
<td>Scale 9 = 22.91 ± 4.63</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hypo = 17.56 ± 6.59</td>
<td>Hypo = 20.96 ± 6.79</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Scale 8 = 23.59 ± 9.19</td>
<td>Scale 8 = 22.87 ± 11.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Per-Mag = .7157 ± 2.12</td>
<td>Per-Mag = 1.46 ± 2.13</td>
</tr>
</tbody>
</table>

Intercorrelations/correlations of measures:

*Intercorrelations of creativity measures*

Several measures of creativity displayed significant intercorrelations. How Do You think? was correlated (p = 0.01) with each of the other creativity measures, showing a .227 correlation with the Barron-Welsh, .192 with Alternate Uses, and .279 with the Individual Activities Questionnaire. Additionally, Alternate Uses displayed a modest but significant correlation (r = .182, p = 0.01) with the Individual Activities Questionnaire. These correlations accounted for at most 6-8% of the variance.
Table 7
Creativity measure intercorrelation

<table>
<thead>
<tr>
<th></th>
<th>Barron Welsh</th>
<th>Alternate Uses</th>
<th>How Do You Think</th>
<th>Individual Activities Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barron Welsh</td>
<td>1.000</td>
<td>-.070</td>
<td>.227**</td>
<td>.048</td>
</tr>
<tr>
<td>Alternate Uses</td>
<td>1.000</td>
<td>1.000</td>
<td>.192**</td>
<td>.182**</td>
</tr>
<tr>
<td>How Do You Think</td>
<td>1.000</td>
<td>1.000</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Individual Activities Questionnaire</td>
<td></td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).

Correlations between POI scales and measures of creativity

The POI showed moderately strong correlations (p = 0.01) with How Do You Think for both the Composite score (r = .420) used in the ANOVAs as well the two individual scales, Inner Directness (r = .427) and Time Competence (r = .258), used to calculated the composite score. The Individual Activities Questionnaire was also correlated with the POI composite score (r = .139, p = 0.05) as well as the Time Competence scale score (r = .141, p = 0.05), but not with the Inner Directedness scale score (r = .125).

Table 8
Correlations of relevant POI scales with creativity tests

<table>
<thead>
<tr>
<th></th>
<th>Barron Welsh</th>
<th>Alternate Uses</th>
<th>How Do You Think</th>
<th>Individual Activities Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inner Directness</td>
<td>.054</td>
<td>.103</td>
<td>.427**</td>
<td>.125</td>
</tr>
<tr>
<td>(I)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time Competence (Tc)</td>
<td>-.001</td>
<td>.050</td>
<td>.258**</td>
<td>.141*</td>
</tr>
<tr>
<td>SA composite (CS)</td>
<td>.045</td>
<td>.099</td>
<td>.420**</td>
<td>.139*</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Correlations between POI scales and measures of psychopathology

There were also some interesting correlations of the POI with the measures of pathology. Hypomanic Traits was positively correlated with both the Inner Directness (r = .187, p = 0.01) and Composite Scales (r = .148, p = 0.05)
0.01) of the POI. Scales 8 and 9 of the MMPI-2 were also correlated with the POI. Scale 9 showed a modest but significant correlation with the Inner directness scale ($r = .184, p = 0.01$). Scale 8 displayed a strong negative correlation ($r = -.363, p = 0.01$) with Time Competence and a weaker but also negative correlation ($r = -.191, p = 0.01$) with the POI composite score. This degree of correlation would account for at most 2-4% of the variance.

<table>
<thead>
<tr>
<th>Hypomanic Traits</th>
<th>Inner Directness (I)</th>
<th>Time Competence (Tc)</th>
<th>Composite (CS)</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMPI scale 9</td>
<td>.184**</td>
<td>-.119</td>
<td>.123</td>
</tr>
<tr>
<td>Per-Mag</td>
<td>.121</td>
<td>-.097</td>
<td>.080</td>
</tr>
<tr>
<td>MMPI scale 8</td>
<td>-.126</td>
<td>-.363**</td>
<td>-.191**</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

**Correlations between measures of creativity and psychopathology**

Correlations were also observed between the measures of creativity and the measures of psychopathology. How Do You Think showed strong correlations with Hypomanic Traits ($r = .455, p = 0.01$), MMPI-2 scale 9 ($r = .377, p = 0.01$), and the Perceptual Aberration/Magical Ideation scales ($r = .366, p = 0.01$), and a weaker but still significant correlation with MMPI-2 scale 8 ($r = .161, p = 0.01$). The Individual activities Questionnaire was correlated with Hypomanic Traits ($r = .273, p = 0.01$), the Perceptual Aberration/Magical Ideation scales ($r = .194, p = 0.01$), and scale 9 of the MMPI-2 ($r = .159, p = 0.05$). Finally, the Barron Welsh was correlated with Hypomanic Traits ($r = .149, p = 0.05$), and Alternate Uses was correlated both with MMPI-2 scale 9 ($r = .141, p = 0.05$) and the Perceptual Aberration/Magical Ideation scales ($r = .151, p = 0.05$).
Table 10
Correlations of creativity measures with pathology measures

<table>
<thead>
<tr>
<th></th>
<th>Barron Welsh</th>
<th>Alternate Uses</th>
<th>How Do You Think</th>
<th>Individual Activities Questionnaire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypomanic Traits</td>
<td>.149*</td>
<td>.089</td>
<td>.455**</td>
<td>.273**</td>
</tr>
<tr>
<td>MMPI scale 9</td>
<td>.128</td>
<td>.141*</td>
<td>.377**</td>
<td>.159*</td>
</tr>
<tr>
<td>Per-Mag</td>
<td>.082</td>
<td>.151*</td>
<td>.366**</td>
<td>.194**</td>
</tr>
<tr>
<td>MMPI scale 8</td>
<td>.060</td>
<td>.008</td>
<td>.161**</td>
<td>.058</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

The IAQ was included in this study as an exploratory measure with the hope that it would provide data useful in clarification of the distinction between special talent and creative lifestyle individuals. Attempts at using this instrument to derive such data were unsuccessful. A portion of the difficulty may be attributed to the test's development as a measure for predicting college success and difficulties with translating the information contained in its subscales to a form useful for distinguishing between types of creative individuals. The IAQ data will be retained for further analysis in subsequent studies.

Discussion

This project represents the first example of a study that is an analog of an "eminence study", where creativity was the independent variable, using continuous psychological process measures rather than a dichotomous classification (the "diagnosis" of eminence). The results suggest that individuals from a sub-clinical, non- eminent college population with high scores on pencil and paper measures of creativity are more likely than low scoring individuals to produce high scores on tests measuring characteristics of bipolar and schizophrenic disorders, particularly those measuring hypomanic symptomology. These findings would appear to provide additional support for a link between creative and psychopathological thinking that has been previously supported by biographical research as well as empirical studies using

The results of the split-plot analyses of converted T-scores from the measures of pathology suggest that creative normals may differ from their non-creative counterparts in terms of presence of hypomanic features. This finding provides modest support for the more recent hypothesis that, although creativity is linked to both schizotypal and affective disorders, creative thinking and affective processes may be more closely akin to the thought processes found in those with subclinical characteristics of mood disorders (Richards, 1991; Andreasen, 1980; Richards, Kinney, Lunde, Benet, & Merzel, 1988, Akiskal & Mallya, 1987).

The results could also be interpreted as being supportive of the conclusion that certain aspects of bipolar, and to a lesser extent schizotypal, disorders are stronger in creative individuals than in non-creative individuals. This documentation of another connection between creativity and bipolar "spectrum" disorders within a subclinical population may serve as further support for the general theory of normality and psychopathology as processes generally along a continuum, rather than as diagnostically dichotomous conditions. This implies that healthy functioning and pathological functioning as regards creativity, bipolar disorders, and schizotypal disorders all exist along continua. The continuum notion allows the comparison of healthy and pathological processes and the identification of those characteristics which differentiate the two.

While there was a significant main effect for the POI that indicated that those grouped into the high category were different than those grouped in the
low category especially in terms of presence of schizotypal features as measured by scale 8 of the MMPI-2, univariate analyses did not support the distinction between self-actualized and special talent creative individuals. The lack of significant interaction effects between SA and creativity on scores of psychopathology could be the product of several factors; the POI may not reliably measure self-actualization, the relationship between creativity and self-actualization may be one that exists only at the extremes of self-actualization, or self-actualization as a construct may demonstrate little utility for differentiating groups of healthy creative from unhealthy creative individuals.

An unexpected and interesting finding of the study is the apparent discrepancy between two scales purportedly designed to measure the same construct, scale 8 of the MMPI-2 and the Perceptual Aberration/Magical Ideation Scales from the Wisconsin Scales of Hypothetical Psychosis Proneness. Chapman, Chapman and Miller (1982) found correlations between Perceptual Aberration, Magical Ideation, and a combined MMPI scale consisting of items from 2, 7, and 8. Schuldberg (personal communication) found a correlation ($r = .36$) between MMPI-2 scale 8 and the Per-Mag scale as computed in an earlier study ($n = 256$). In addition, in the present data, the Per-Mag scale and MMPI-2 scale 8 are correlated .61 Interestingly, although the scales are heavily correlated they produce very different results during the analyses. While features of psychopathology measured by both instruments assessing hypomanic features as well as the Per-Mag displayed differences according to level of creativity, scale 8 of the MMPI-2 was not close to achieving significance in the univariate analysis. Perhaps the two measures are assessing different degrees of schizotypal psychopathology, and produce different results within a subclinical population due to differences in sensitivity. Further research in this area should address differences in the construction of the two measures in an
attempt to assess which measure has greater utility when working with a subclinical college population.

Another unexpected finding involves the heavy intercorrelation between measures of psychopathology. Strong correlations were expected between measures assessing the same construct (hypomanic traits with scale 9, Per-Mag scales with scale 8), and were supported by the data. Less strong but still very strong correlations were also found between measures assessing different constructs (Hypomanic Traits with scale 8, Per-Mag scales with scale 9). This poses a problem for the discriminant ability of the measures used in the study as they appear to be measuring similar underlying processes. This could be related to the instruments' inability to make fine distinctions between persons from a subclinical population. These findings may support that both schizotypal and bipolar features have common underlying features that result in difficulty distinguishing between the two patterns of symptomology. This view is congruent with the fairly recent notion that both diagnoses share a common process of thought disorder (Andreason & Powers, 1974, Schuldberg, 1990). Additional support for a lack of differentiation between the two diagnostic categories could provide an argument for the re-examination of the two categories and a need for better understanding of the diagnostic similarities and differences of schizotypal and bipolar disorders.

It would be inaccurate to equate scores above the median on measures of psychopathology as equivalent to psychopathological process as the population that was studied is, as a group, functioning at a relatively high level (attending to college course responsibilities). That creativity scores are highly positively predictive of scores on sub-clinical measures of psychopathology does not necessarily support the classic genius thus insanity model of the artist. It may quite possibly be the case that at subclinical levels creatives share some
personality characteristics with hypomanics while experiencing few of the problems associated with this diagnosis.

The finding that creativity may be predictive of hypomanic traits has implications for the clinical environment (Goodwin & Jamison, 1990; Andreason and Glick, 1988). As former research indicates that hypomania is often a premorbid condition for Bipolar I, knowing that creative individuals may be more likely to exhibit hypomanic symptoms could aid a clinician in early diagnosis and treatment of a serious disorder.

Additional support for and clarification of the connection between mood disorders and creativity may provide therapists with a useful starting point when looking for strengths within clients experiencing a mood disorder. Some strengths found in creative individuals (Davis, 1983) that could possibly be used to their therapeutic advantage would be greater flexibility, sensitivity to problems, problem definition, imagination, ability to regress, transformation, intuition, prediction of outcomes, and resistance to premature closure. A sense of humor, self-confidence, and ample energy are other traits found in many creative persons that could be mobilized in the therapeutic process.

Additional documentation of the connection between creativity and bipolar and/or schizophrenia and these characteristics' relationship to SA could serve as the basis for further research into differentiation of the specific phenomena and underlying processes that separate those well-functioning individuals from those with diagnoses of bipolar and schizophrenia. The study's finding of no relationship between self-actualization as measured by the POI and creativity does not negate the possibility that the theory of self-actualization may provide a useful tool for differentiation of healthy and unhealthy creative process. Future research in this area might consider other tools for investigation of this distinction. While there was a main effect for the
POI, it is worthwhile to note that the POI failed to distinguish between high scorers and low scorers on indices of pathology (with the exception of a possible trend for schizotypal characteristics).

The use of a semi-rural college population, a group notably different from the general population in intelligence, education, age, and socio-economic status, could pose a problem for generalizability of the results to the population at large. It may be the case that different types of pathology and creativity may be more or less strongly represented in an academic environment, and perhaps more specifically in the pool of students taking Introductory Psychology. However, as most of the research in this area has been done on clinical or eminent populations, use of a college population will be an improvement in terms of generalizability as well as providing information on a population largely unstudied previously along these dimensions. Additionally, the context in which this data was collected, in an academic setting for course credit, could be criticized as being non-optimal for encouraging creative process. Research conducted in smaller groups of voluntary subjects in a more facilitative environment would possibly yield different scores on measures of creativity.

In conclusion, creativity is a characteristic considered by some theories to be related to mental illness, and by others to be a marker of mental health. Extensive research has documented the relationship between creativity and affective, specifically manic-depressive, disorders, as well as the relationship of creativity to thought disorder and schizotypal symptomology. Maslow's theory of two distinctly different populations of creative individuals, one with special talent in a specific area, and the other possessed with an ability to live adaptive and flexible lifestyles, poses important questions for the "creative thus mentally ill" approach found in much of the literature. While this study supported the association between bipolar and creative characteristics with a subclinical
population, it failed to support an interaction between creativity, psychopathology, and self-actualization.
References


Appendix A

Subjects were greeted as they came into the room and their name was checked against the subject sign-up sheet. At the scheduled time of the experiment, the experimenter read:

"Each of you has, on the desk in front of you, a packet of questionnaires. On the first page, you will find a numbered consent form. Please read this over, print your name in the space after "I," and then sign in the space marked "signature." On the second page, please print your name, student ID number, and the other information requested. This information will be separated from the information on the questionnaires to insure anonymity. Your responses will be associated with a number only, and record of your individual participation will kept in a separate, secure location. All data will be analyzed as a group. After you have completed the timed portion and finished filling out the other questionnaires, please approach the front desk and sign up for the second phase of the study; as noted on the original sign-up sheet, this is a two part experiment, and participation in both parts is required for full credit. If you have any questions, raise your hand and someone will help you out."

After responding to questions, the experimenter continued:

"Take out the first questionnaire in your packet, labeled Thinking Creatively, and read along silently while I read the directions."

Harrington's (1975) Protocol for Alternate Uses were read.

"INSTRUCTIONS:

"The following is a test of your ability to think creatively about uses for some common objects. Each of the objects you will be asked to think about has a common use which will be stated. Your
task is to list up to six other creative uses for which the object, or parts of the object, could serve. A creative use is one which is both unusual (a use which other people would be unlikely to think of) and worthwhile.

"In trying to be creative, therefore, you should try to list uses which are both unusual and worthwhile at the same time.

"(By the way, uncreative uses do not count against you, they just do not count for you.)"

"Consider an example.

"Given: A Newspaper (used for reading). You might think of the following other uses for a newspaper.

"a. Start a fire _________________

"b. Wrap garbage _________________

c. Swat flies _________________

d. Stuffing to pack boxes ______

e. Line drawers or shelves ______

"f. Make up a kidnap note ______

"While these uses are not of particularly high creative quality, notice that all of the uses listed are different from each other and different from the primary use of a newspaper. Each use should be different from others and from the common use, of course.

"Do not spend too much time on any one item. Write down those creative uses that occur to you and go on to the others in the same Part. You may return to the incomplete items in a Part if time for that Part permits. [Note: Do not go back to an earlier part.]

"There are two Parts to this test, with three items per Part. You will have 4 minutes for each Part.

"Try to be creative.

"If you have any questions, ask them now.

"Go ahead and begin part I."
Subjects were allowed four minutes to complete each set of uses.

After completion of Alternate Uses, the experimenter read:

"Please separate the consent form, information sheet, and the survey you just completed from the rest of the folder. Hand these materials to an experimenter."

An experimenter collected the forms from the seated subjects, and then read:

"You may now turn to the form marked How Do You Think?, read the instructions and begin. Continue on and do the rest of the questionnaires in the folder in the order that they are arranged. When you have finished the rest of your folder, please raise your hand."

Upon completion of the packet, an experimenter collected the forms, scheduled the subject for the second testing session, and then issued an appointment slip required for participation in the second phase and containing the time, date, and location of the second part of the study. The subject was reminded that they must attend the second phase of the experiment to earn experimental credits for their participation. The subject was then thanked for his or her participation in the study and dismissed.
Appendix B - Follow-up Session

Subjects arrived at the scheduled time. The experimenter checked the subject's name on the list of subjects scheduled for the particular test time, and handed a numbered folder to the subject containing a slip requesting the subject's name (to insure accurate 2nd session data recording - this slip was removed immediately after collection), Per-Mag scale, Hypomanic Traits scale, Independent Activities Questionnaire, and an MMPI-2, all coded with a number corresponding to an experimental number for the subject recorded on the attendance sheet. As subjects were checked in, the experimenter read:

"Read the instructions and begin. This packet will take about two hours to complete. Please answer every question."

After all participants were seated, the experimenter read:

"May I please have your attention. Welcome to the second part of our study. I would like to remind you that your responses will be associated with a number only, and record of your individual participation will kept in a separate, secure location. All data will be analyzed as a group only."

"Read each set of instructions carefully, and take care to answer every question. After you have completed the entire packet, bring the packet to the front and you will dismissed at that time. If you have any questions, raise your hand and someone will help you. Thank you."

Upon completion, subjects were thanked for their participation.