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Epistemological style and its relationship to creativity and depression.

Jennifer Jayne Scobie
University of Windsor

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UMI®
EPISTEMOLOGICAL STYLE AND ITS RELATIONSHIP TO CREATIVITY AND DEPRESSION

by
Jennifer Jayne Scobie

A Thesis
Submitted to the Faculty of Graduate Studies and Research through the Department of Psychology in Partial Fulfilment of the requirements for the Degree of Master of Arts at the University of Windsor

Windsor, Ontario, Canada

2003

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Abstract

The present study was undertaken to examine the relationship between epistemological style, creativity, and depression. A measure assessing epistemological styles was administered to 177 undergraduate students in different degree programs at the University of Windsor. The participants were divided into three groups based on their dominant epistemological style (empirical, rational, and metaphorical). The three epistemological style groups were then compared on measures of creativity and depression. Data analysis entailed the use of descriptive statistics, correlations, and multivariate statistics to test the hypothesis that epistemological style is related to creativity and/or depression. Results indicate statistically significant differences among epistemological style groups with regard to level of creativity, with predominantly metaphorical individuals scoring higher on the measure of creativity than predominantly empirical or rational individuals. No significant differences on creativity were found between the latter two groups. Measures of depression were not significantly different between the groups.
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Whenever the words "role model" come to mind, I will always remember such people.
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Chapter 1

INTRODUCTION

Epistemological Style and its Relationship to Creativity and Depression

The main objective of this study was to explore the possibility of a relationship between epistemological styles, creativity, and depression. It was proposed that measures of depression and creativity would be different between individuals exhibiting different epistemological styles. The general assumption was that particular ways of knowing the world (or epistemological styles) may create a psychological framework in which both creativity and depression are more likely to develop.

Overview of epistemological styles:

The study of epistemology has its origins in philosophy. Epistemology is the study of how we come to gain knowledge about the world around us. Two major epistemological styles, empiricism and rationalism, are represented in the works of philosophers who were major contributors to the development of psychology as a discipline (Hergenhahn, 1992, pp. 18). Helmholtz, Hume, and Locke are representative of the empiricist philosophy (Fancher, 1990, pp. 126). Empiricists claim that all knowledge is derived from sensory experience, which is registered and stored in the brain, and that the mind is passive in absorbing information (Hergenhahn, 1992, pp. 19). Spinoza and Leibniz are representative of the rationalist epistemology. Rationalists, while agreeing that sensory input is important, disagree that the mind is passive. Knowledge is seen as being attained by actively transforming the data from sensory experiences into concepts and principles (Hergenhahn, 1992).
The third epistemological style, that of metaphor, was not considered by early philosophers, but emerged instead out of the study of linguistics and semantics, as applied to poetic metaphors used in classical literature (Lakoff, 1993). The definition of metaphor was "a novel or poetic linguistic expression where one or more words for a concept are used outside of its normal conventional meaning to express a similar concept." However, it became apparent to many theorists (especially after the publication of one clear example by Michael Reddy, 1979) that metaphor was not just to be found in poetry, but in everyday use of the English language. Concepts like time, states, change, causation, and purpose, having turned out to be metaphorical in nature, show that metaphor is absolutely central to ordinary natural language semantics, and that the study of literary metaphor is merely an extension of the study of everyday metaphor (Lakoff, 1993; Turner, 1991).

The revolutionary philosophy of systems theory uses at its foundation the principles of the structure and nature of metaphor (Lakoff, 1993). Webster's Dictionary defines metaphor as "the application of a word or phrase to an object or concept which it does not literally denote, in order to suggest comparison with another object or concept." Metaphor is the main mechanism through which we comprehend abstract concepts and perform abstract reasoning. Metaphorical understanding is extrapolated from a more concrete foundation of nonmetaphorical ways of understanding, and is fundamentally conceptual, not linguistic in nature. In the systems perspective, a conceptual system contains thousands of conventional metaphorical mappings, which form a highly structured subsystem of the conceptual system. The system of conventional conceptual metaphor is mostly unconscious, automatic, and is used with no noticeable effort. Finally, our system of metaphors is central to our understanding of experience and to the way we
act on that understanding (Lakoff, 1993).

The study of epistemological styles until recently did not include the psychometric assessment of individual differences in styles, and was purely theoretical in nature. Based upon existing theory, the first attempt to measure the styles of individual subjects was made by Royce (1964, 1974, & 1975).

In examining the way humans know their worlds following from prior theories, Royce (1964, 1974, & 1975) posited three basic ways of knowing, or epistemological styles to be assessed psychometrically. The definitions used by these authors are identical to the definitions arrived at through other disciplines. According to Royce, although every person may use one style or another at different times, people have a dominant style on which they rely more heavily in judging the world around them. One such style is Metaphorism, where a person's view of reality is tested in terms of universality of the insight or awareness. The major cognitive process underlying this style is symbolizing, whether this is done consciously or not. Empiricism on the other hand is a style that relies heavily on sensory experience and active perception, where these perceptions are tested in terms of reliability and validity. The third epistemological style is Rationalism, whereby the person's view of reality is largely determined by it's logical consistency. Certain fundamental differences between the those in the fine arts and those in the academic sciences have been noted (Royce & Mos, 1980). Significant differences in dominant epistemological styles have been found to occur in university subject pools of students majoring in different subject areas. For instance, chemistry and biology majors are more likely to have a dominant empirical style, whereas math and physics majors are more dominant in rational style. Finally, music and drama majors are more likely to follow a more metaphorical style (Smith et
al., 1967). In other words, from this perspective science majors are primarily "perceivers," while
arts majors are primarily "symbolizers" in the way they learn about reality.

Another way of viewing epistemological style is from a developmental standpoint. An
illustrative analogy can be made by pointing to the realm of developmental literature which
documents the acquisition of various cognitive abilities (Beilin, 1971; Flavell, 1971). From this
view, ways of knowing or styles would not just differ qualitatively from one another, but earlier
styles would be foundational before more complex styles could be mastered. From infancy, we
are required to interact with objects in our world in order to survive. In order to know how to
deal with the objects we encounter, we must all be empiricists. In perceptual/cognitive terms, we
learn to predict the future effects of objects from our encounters with them in the past. During
this period of development there is no pragmatic necessity to understand why things work the
way they do, only to know their relational effects. After this style has been sufficiently mastered,
it is possible to question the "whys" or more abstract relations of the objects we encounter. The
objects from the perceived world can be placed in relation to one another in a more elaborate
system of representation. It is in this representational space where numbers and mathematical
applications can be done, and argumentative premises can be evaluated against the background of
the possible. These types of cognitive functions would be representative of a rational
epistemological style. Except for the ability to manipulate the objects mentally, it does not differ
substantially from the earlier empirical style.

Once one can symbolically represent objects, one becomes able to associate different
representations, and generate inferences about objects and their relationships which were never
actually encountered in direct experience. It is within this metaphorical realm that ideas can be
imagined that are no longer constrained by the background of the possible. This marks a substantial change in one's way of thinking, which is characterized by the ability to incorporate larger multiple representations of relationships into a condensed form. Whereas in the empirical style we can make numerous distinct observations about many things, in the metaphorical style one seemingly applies a rule which condenses multiple features of objects. However, in order to make these types of generalizations (condensations), one must have accumulated many discrete pieces of information. This means that this metaphorical way of thinking cannot be achieved without first having sufficiently mastered first the empirical way, and second, the rational way of knowing.

It is after one has passed into the metaphorical way of knowing that new ideas and concepts can be generated as downward or upward extensions of the generalizations. However, even if someone is capable of performing at the metaphorical level, it may sometimes be required for them to fall back on either of the previous methods. It is not certain then, that the developmental level of style people are capable of using is actually their most frequently utilized style. This may cause some problems in identifying a dominant style, as capable styles may sometimes seep through even if they are not commonly used. For the purposes of this study, dominant style would be the most frequently used style. From this it follows that only those who have attained the ability to utilize metaphorical style could possibly be dominant in this metaphorical way of knowing and only those who have attained a rational level could be dominant in a rational style. Regardless of capabilities then, in selected instances an individual could utilize the most appropriate style that matches the processing context.

Figure 1 shows the expansive capabilities that emerge with each developmental
cognitive/epistemological capacity. Note that each additional capability that is attained through development includes the ability to continue using earlier abilities. This model is offered as a visual simplification of general developmental trends and it can not be applied to the understanding of individuals.

It is important to recognize that the use of symbols does not occur exclusively among those people using a metaphorical style. The perspective of symbolic interactionism recognizes the use of symbols from the time of birth. An infant sees its mother as a symbol based on prior interactions with the mother. Symbols can have emotive and expectational attributes. Symbols are created from every interaction with objects, including people and actions, and are the main tool through which an individual gives the world meaning (Charon, 1992). Cultures themselves are based entirely on symbols, and symbols that emerge in one culture may differ from symbols that emerge in another. Because symbol use is present throughout the lifespan, there must be a quality of thinking beyond the mere use of symbols to give rise to the qualitatively different thought that emerges with metaphorical thinking. Perhaps it is the quantity of layers of symbols that can be held in mind at once.

Creativity:

Many prolific writers have been studied in case format in attempt to shed light on the mental processes and moods that accompany their creative productions. Common studies include the cases of Samuel Taylor Colleridge, Alfred Lord Tennyson, Percy Bysshe Shelley, and Ernest Hemmingway (Jamison, 1993). In a case examination of the life, works, and communications of Franz Kafka (Foulkes, 1967 pp. 33), comparisons are made between artists and nonartists on the way the mind processes information. Kafka describes a heightened
Figure 1. A developmental model of the acquisition of the ability to use progressively more complex epistemological styles.
awareness level as an “immutable condition, which the artist, because of his greater sensitivity, feels more sharply than other men.” He points out that creative productivity requires insight.

Kafka’s own descriptions of the creative process have been consistent with constructs that have been studied psychometrically. The connection between insight and creativity has been tested in quasi-experimental studies, where problems to be solved required a cognitive “leap” that was not obvious to participants. Weisberg and Alba (1981) used tests of insight such as the nine-dot problem, a matrix of 3 x 3 dots, where one is required to connect them all using only 4 straight lines, and the solution requires drawing lines outside the implied boundaries of the dots. Participant groups were either given hints or not about whether to consider drawing lines outside the boundaries, and less than 25% of the participants, even when given hints, could solve the insight problem. The giving of hints made no significant difference across groups in participants’ ability to solve the insight problem, which suggests factors internal to the participants, such as traits or styles, may be a better predictor of insight capabilities. Baker-Sennett and Ceci (1996) tested leaps of insight by giving varying numbers of cues about solutions to participant groups. Participants who “leaped” and needed the fewest cues scored highest on the insight measure. Again, the cues made little difference in participants tendency to make the cognitive leaps needed to solve the insight problems, which points to individual differences rather than amounts of information given as corresponding the most with insight scores. This would suggest that insight and creativity are internal characteristics of a person, and cannot be expanded by external factors.

Consistent with this notion (as well as with factors suggested by Kafka well before any studies were conducted) are the results from personality studies of creative people. Davis (1992,
pp. 69-72) in a meta-analysis of numerous other creative personality studies, concluded there are several personality characteristics found most commonly among creative people. Included in these characteristics are awareness of their own creativity, originality, independence, risk-taking, personal energy, curiosity, humour, attraction to complexity and novelty, artistic sense, open-mindedness, need for privacy, and heightened perception.

In addition to personality factors as internal determinants of creativity, cognitive styles and cognitive mechanisms have been studied to illuminate the internal process of creative production. Gabora (2002) approaches the task of explaining how creativity “happens” using basic cognitive principles of memory such as encoding and association.

On word association tests, creative individuals have been shown to demonstrate associative richness, generating many more words than uncreative individuals (Mednick, 1962). This quality is also termed as a flat associative hierarchy, in comparison with steep associative hierarchies shown by uncreative participants who generate very few words. Associative richness stems from a tendency to perceive more of the detail of a stimulus or situation (Gabora, 2002). The stimulus or situation becomes encoded in memory in overlapping cognitive spaces with memories already similar in concept or classification. Stimuli that defy straightforward classification as instances of one concept or another become etched more widely into memory. This causes storage regions for episodes and concepts to overlap more, resulting in greater potential for associations to be found amongst them.

Analysis of the cognitive features of “streams of thought” show how these associations can become linked together with current stimuli to form novel products (Gabora, 2002). The content addressability in the storing of events ensures that items with related meanings get stored
in overlapping locations. Items that are similar or relevant to the current experience are naturally retrieved, as the size of the region of activated memory is restricted to what has previously been encoded with similar meanings. Concepts stored in regions activated by current thought or experience provide "ingredients" for the next thought. The next thought combines both the memories that are associatively activated as well as the previous thought or experience. This slightly different thought, in turn, activates slightly different areas of memory, providing related but differing ingredients for the thought to follow. The more areas of memory that are evoked, the longer streams of thought last. The creative person has streams of thought with a quality called conceptual fluidity, where the memories evoked play a larger role in forming thoughts than external stimuli that activate them. When in a state of conceptual fluidity, if a stimulus does manage to attract attention, it will tend to be more thoroughly assimilated in the matrix of associations that constitutes the worldview (Gabora, 2002).

Gabora (2002) also examines insight and its relationship to productive brainstorming. In considering what happens in the mind of an artist or scientist who does something creative, Gabora identifies the first response to a problem as perceived inconsistency, or desire to express oneself or generate something that is aesthetically pleasing. A rational or deductive approach may first be considered by the artist or scientist, and when that does not work, there is a tendency to brainstorm. Brainstorming is the temporary loosening of one's internal model of reality, or the weakening of inter-concept relationships, so as to allow new insights to more readily percolate through, making one more receptive to new ways of perceiving the world (Gabora, 2002).

New ideas arise through a sort of "conceptual meltdown," in that the meanings of concepts and details of episodes merge or blend into one another more than usual, and are more
readily recombined to give rise to something unique (Gabora, 2002). Once brainstorming has resulted in ideas with potential usefulness, the unusual blends of stored items that emerged require a process of refocusing to transform them into relevant, pleasing, or useful productions. This focussing process involves weeding out aspects arrived at through brainstorming that are irrelevant, distasteful, or misleading, while considering a more firm consensus in reality, so that when the idea is presented it will be more widely understandable and less vulnerable to attack (Gabora, 2002).

Parallels of Gabora’s concepts of brainstorming and focussing are also to be found in many of the stage theories of creativity. Typically, these stage theories involve following the mental processes from beginning to end as the participant approaches a problem needing to be solved, and the process is divided into four to six phases or steps (Nickerson, 1999). Generally, these models (eg. Bransford & Stein, 1984; Hayes, 1989; Torrance, 1988; Torrance & Myers, 1970) begin with the process of finding, recognizing, defining and refining the problem, move through steps of making progress toward a solution, and end with evaluating the alternatives and picking the best among them.

Creativity has been studied in case format, and numerous theories have been generated about how the underlying mental processes function when engaging in creative production, but how does one go about measuring just how creative a person is? The diversity of psychometric approaches is matched only by the diversity of perspectives of the researchers conducting the investigations (Plucker & Renzulli, 1999).

Early approaches to the measurement of creativity were inseparable from measurement of general intelligence, and tests for each co-evolved from the same psychometric technique
(Plucker & Renzulli, 1999). The most likely reason for such parallels is that early researchers who became interested in the study of creativity were already approaching other cognitive phenomena from the psychometric perspective. They therefore continued with their methodological habits as they began to investigate creativity (Cramond, 1993; Gardner 1993a). Divergent thinking tests were first developed by Binet and Henri in the late 17th century, and batteries of divergent thinking tests have continued to be used throughout the quest to quantify the creative process (Plucker & Renzulli, 1999). Unlike most standardized tests of achievement or ability which require the subject to respond with one correct answer, tests of divergent thinking require the individuals to produce several responses to a specific prompt. Examples of widely used divergent thinking tests include Guilford’s (1967) Structure of the Intellect (SOI), Torrance’s (1974) Tests of Creative Thinking (TTCT), and tests by Wallach and Kogan (1965) and Getzel and Jackson (1962).

Although the use of tests of divergent thinking is a commonly used method of measuring creative ability, many researchers have concluded that the best way to more accurately measure creativity entails the use of self-reports (Plucker & Renzulli, 1999; Hocevar & Bachelor, 1989; Wallach, 1976). Recent criticisms of the divergent thinking tests focus upon the reliance of the perceived task-specific nature of creativity. Measurements of creativity, to be captured in more generalizable terms, need to reflect an individual’s activities and accomplishments of a creative nature. Numerous self-report measures have recently emerged, taking the place of divergent thinking tests (Plucker & Renzulli, 1999).

Creativity as related to epistemological style:

There are models of creative thought that apply equally to both scientific and artistic
creation. Here a linear model will be considered, in which the mental processes involved in
different stages of the creative production align rather fittingly with the processes the three
different epistemological styles utilize.

Wharton (1999) for example, provides a four phase linear model of creative problem-
solving. In Phase One, or “data collection,” the process involved is learning. This
involves the input of information about reality that is tangible and is arrived at via direct
perception. This method of gathering of information is a process that utilizes the same
mental processes involved in the empirically based epistemological style. In the same way as
in the developmental model, perceiving and evaluating perceptions based on previously
evaluated perceptions (which is acquiring an ability to predict the future performance of
objects based on their past performance) is the simple ability required to perform this phase.

Phase 2 or “Data Analysis” makes use of the process of definition. Since objects can
only be defined by comparison to other objects, one must have acquired the ability to hold
representations of them in mind, relating them to one another. In using a rational
epistemological style, one can make inferences about the truths of reality by comparing one’s
representations in a logical fashion.

This enables the problem to be defined at this stage. Data analysis and data collection
phases continue to be utilized in Phase 3, or “Solution Formulation.” A cognitive map of the
problem is generated in which simpler cognitions can be referenced by the use of symbols. In
using symbols, an exponentially larger capacity of cognitive events can be simultaneously
accessible for use and evaluation.
Because symbolizing is the main mental process that is employed by those with a metaphorical epistemological style, it follows that one cannot accurately represent a problem in order to formulate solutions without first having the ability to arrange symbols in relation to each other.

The act of creation then comes at Phase 4, or “implement a solution.” This phase can simply not occur without having completed the earlier three phases. First, one must have gathered information and empirically learned about the problem, then one must have defined its key components by creating categories through making comparisons. Only after these two have been completed, can one hold symbolic representations in mind, while associating them with a large number of other learned symbolic representations. It is during the mental process of searching through the generated associations with self-imposed expectations on what is possible that one arrives at the creative output or, in the case of problem-solving, the solution.

The parallels between Wharton’s (1999) linear model of creative problem solving and epistemological style are clear. It would follow from the defining criteria for the linear model of creative problem-solving that creative problem solving requires the ability for empirical, rational, and metaphorical modes of thought. However, important to keep in mind that, people who have attained the ability to metaphorize do not necessarily use that style in every instance. For example, it may not be the style which they are most comfortable using. Some such people with dominant styles of rational or empirical thinking may occasionally demonstrate creativity, and although the ability to use metaphorical thinking is present, they maintain a preference for the earlier style. This preference may be the result of habituation to the earlier style, or perhaps some discomfort when using a thinking style that is considerably
different from the familiar.

Previous research (Royce & Mos, 1980) failed to consider the possibility that many people engaged in scientific activities during the day often choose to pursue more artistic endeavors during their leisure time. It is also possible for someone whose occupation is in the arts to pursue more scientific interests on the side. It is important then to make a clear distinction between who is considered creative and who is not. The definitive criteria for creativity here are not academic discipline or occupation. It is more of a trait, and it can be exhibited by a select group within any academic discipline. Although from previous findings (Royce & Mos, 1980), it seems that more creative people are found within the fine arts than in other academic disciplines, pursuing a career in the arts does not qualify someone as creative. Similarly, some of the most creative people have their academic training within the sciences. Creativity as a trait, then, could be defined as a tendency to generate new ways of self-expression or new ways of solving problems, rather than following the most frequented or proven routes (Royce & Mos, 1980).

**Depression:**

Depression has been defined in many ways, and differentiated into several types according to particular symptom patterns (Blatt & Maroudas, 1992). Here, two aspects of depressive experience will be considered. The first component is the affective experience of depression, which can involve feelings of sadness, loneliness, helplessness, weakness, or guilt (Schmale, 1972). The second aspect of depressive experience to be considered is pessimistic expectancy, which can be described as a cognitive filter through which life experiences are interpreted (Norem & Cantor, 1983). Several studies have found that
depressed mood and pessimism are not quite the same, but since they are highly related, both aspects have been included in this study.

**Creativity as related to depression:**

The link between chronic depression and artistic genius has been made time and time again (Jamison, 1993). From composers to writers to painters, affective turmoil, suffering, and suicide are all too familiar within the artistic community. The lifetime prevalence rate in writers for affective disorder has been found to approximate 80 percent, while nonwriter controls have a lifetime prevalence of only 30 percent (Andreasen, 1987). The question is then, how do those with artistic inclinations view the world in a way that would lead them to be more vulnerable to such affective suffering? In directly answering to the connection between pessimism, depressed or suicidal mood, and the “plight of the artist,” Kafka postulates that other people do not really possess more pleasure, but they simply have less pain and less insight into the nature of being (Foulkes, 1967). From this it would follow that metaphorically oriented people, who have attained the ability to connect ideas in vast cognitive networks, will be the ones most sensitive in their perceptions, and will notice and process information in ways which result in more insight, and therefore more creativity, and in Kafka’s opinion, more emotional suffering.

In examining the link between creativity and depression, it is important to keep in mind that although the affective disorder diagnostic rate is higher among the creative, not all artistic people do suffer from depression. It is equally important to examine the nonartistic people who suffer from depressive disorders.

What are the possible factors for the increased prevalence rate of depression among
artists? There have been several theories posited. Some theories suggest that society's reactions to creative people enhance depression in the individual artist, as creative people are more likely to be isolated or subjected to criticism (Hansell, Mechanic, & Brondolo, 1986). Other theories suggest that it is the existence of depression that drives the individual to create, primarily out of a need for catharsis (Miall & Kuiken, 2002; Morris, 1944). Both of these perspectives may contribute partially to the understanding of depression among the creative. However, it is important not only to make comparisons in prevalence rates, but to examine the more qualitative differences that makes these prevalence rates so far apart. How do creative people learn to know their world and relate to it in a way that differs from the way nonartistic people encounter their world?

First, a comparison will be made between those who are exclusively scientists and those who are exclusively artists. This comparison refers not to just one's occupation, but to the total way of interacting with the world. The scientist follows a predetermined methodology, where he knows where to begin, and has a prediction about where he will end up after all the steps have been followed. The artist only knows pieces at a time as they "unfold", and has generally no idea at the beginning what the final product will be. There is always a state of uncertainty about the future creation, and prediction would not only be counterproductive, but also cause the creation to lack the spontaneity valued in artistic creations.

Artists would have to use metaphor as their dominant way of knowing their worlds, but not all artists are depressed. Therefore, epistemological style alone does not explain the tendency for more artists to be depressed, or the fact that scientists may also suffer from
depression. An additional factor, perhaps interacting with epistemological style may be able to account for these discrepancies.

**Design and hypotheses:**

The present study explored epistemological style as it relates to the constructs of creativity and depression. Specifically, it was hypothesized that (H1) participants with a metaphorical epistemological style would demonstrate a higher level of creativity than participants in either the rational or empirical epistemological style groups. The second hypothesis (H2) was that elevated levels of creativity would be significantly associated with higher levels of depression. Due to the relationship expected between creativity and depression, it was also expected that the metaphorical group would show higher levels of depression (H3).
Chapter II

METHOD

Participants

The participants consisted of 177 undergraduate students enrolled in courses at the University of Windsor during the Winter 1997 semester. Participants were recruited from courses in several departments, including psychology, English, philosophy, business, visual art, and the physical sciences. Participants enrolled in psychology courses received the allowable course credit in exchange for their participation.

Materials

Demographic Questionnaire. This is a five item questionnaire which categorizes participants according to gender, age, academic major, and avocational interests. An open ended question is included that asks what their ideal career is (see Appendix A).

Psycho-Epistemological Profile (PEP), (Royce & Mos, 1980). Epistemological style was assessed using this 90-item questionnaire. Thirty items correspond to each of the three epistemological styles: empirical, metaphorical, and rational (see Appendix B). This scale utilizes a 5-point Likert method, where participants can strongly agree on one end or strongly disagree on the other. Psychometric properties of the PEP were previously established on an undergraduate population, and significant relationships with the Strong Vocational Interest Blank, the Meyers-Briggs Type Indicator, and the Allport-Vernon-Lindzey study of Values appeared. Correlations have also been found between epistemological style and academic major, occupation, nationality, and religion.

Test-retest reliability coefficients were found to be .68 (rational), .66 (metaphorical),
and .87 (empirical) after nine months, and were calculated from a sample of 43 undergraduates. Split-half reliabilities are .77 (rational), .88 (metaphorical), and .77 (empirical).

For purposes of external validation, an additional six face-valid items (two to represent each style) have also been created (see Appendix C).

**Depressive Experience Questionnaire** (DEQ), (Zuroff, Quinlan, & Blatt, 1990). The psychometric properties of the DEQ were established on a sample of 779 women and 373 men in university undergraduate courses. The questionnaire consists of 66 items which load on to three scales: dependency, self-criticism, and efficacy (see Appendix D). Internal consistencies (Cronbach's alpha) for the scales are .81 (dependency), .75 (self-criticism), and .73 (efficacy) for females, and .80, .77, and .69 respectively for males. Interscale correlations were insignificant except for the correlation between self-criticism and efficacy for men, which indicates the relative independence of the three measures.

**Optimism - Pessimism Scales** (Dember & Brooks, 1989; Hummer, Dember, Melton, & Schefft, 1992). The questionnaire consists of 56 items of which 20 are filler (see Appendix E). Optimism and pessimism scores are calculated independently with 18 items loading on to each. Test-retest reliability coefficients were found to be .75 for optimism and .84 for pessimism based on a sample of 106 undergraduates. Correlations between the two scales have ranged from -.52 to -.64, indicating a partial independence of these measures. Significant correlations have been found between optimism and religious commitment, happiness, locus of control, and social desirability. Significant correlations have been found positively between pessimism and problem solving approach, locus of control, anxiety, and
negatively with social desirability.

Creativity measure. Participants were asked to define creativity in their own words. They then were asked to rate from 1 to 10 how creative they believe they are according to their own definition (see Appendix C).

Procedure

Participants were recruited from undergraduate courses during their regular class time. They signed up for the experiment at that time, and were tested at a later prescheduled time in groups of about 30. After participants signed the informed consent forms (see Appendix F) and all questions were addressed, the experimenter verbally read through the instructions, and demonstrated the method of answering the questionnaires on an overhead projector that contained sample questions.

Confidentiality was maintained through the use of random number codes. Names did not appear on the test materials. Each participant was given experimental bonus credits if they were enrolled in psychology courses that allow for them. General feedback about the results of the study was made available to the participants when the analyses have been done. To obtain feedback they were asked to leave a request in the experimenter's departmental mailbox. All ethical requirements were met in this study and it passed the ethics committee of the Psychology Department.
CHAPTER 3

RESULTS

Demographic information: Of 177 participants, 46 were male, and 131 were female. They ranged in age from 17 to 59 years, though 85% of the participant pool lies between the ages of 18 to 24 years.

The breakdown of academic majors are as follows (See Table 1): Of the 177 participants, 88 participants (49.7%) majored in psychology, anthropology, or sociology. Nine participants majored in communication studies, geography, history, or economics, and four majored in religious studies or philosophy. Majors in English, drama, music, and art accounted for 21 participants (11.9%), as did also majors in biology, chemistry, physics, and geology (11.9%). Computer science, math, and engineering were the majors of nine participants, and nursing or human kinetics were the major of seven participants. Four participants majored in business or law, and the remaining 14 participants indicated a major of “other” or undecided.

Avocational interests that were indicated by the participants were representative of scientific, rational, and artistic pursuits (see Table 2). Fifty-one participants played video games, interests in astronomy and lay-person scientific reading were indicated by 50 participants, reading mysteries and detective stories were indicated by 44 participants, while drawing, painting, composing music, writing, and keeping a journal were indicated by 110 participants. These interests are not mutually exclusive, and some participants indicated interests in more than one area. The distributions of avocational interests were examined across academic major categories. Significant differences between academic
Table 1

**Academic majors of participants (N=177)**

<table>
<thead>
<tr>
<th>Major</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychology, Anthropology, Sociology</td>
<td>88</td>
</tr>
<tr>
<td>English, Drama, Music, Art</td>
<td>21</td>
</tr>
<tr>
<td>Biology, Chemistry, Physics, Geology</td>
<td>21</td>
</tr>
<tr>
<td>Computer Science, Math, Engineering</td>
<td>9</td>
</tr>
<tr>
<td>Nursing, Human Kinetics</td>
<td>7</td>
</tr>
<tr>
<td>Business, Law</td>
<td>4</td>
</tr>
<tr>
<td>Other/Unclassified</td>
<td>14</td>
</tr>
<tr>
<td>Major left blank</td>
<td>13</td>
</tr>
</tbody>
</table>
Table 2

Avocational interests of participants (N=177)

<table>
<thead>
<tr>
<th>Interest</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Video Games</td>
<td>51</td>
</tr>
<tr>
<td>Astronomy, lay-person scientific</td>
<td>50</td>
</tr>
<tr>
<td>Reading mysteries / detective stories</td>
<td>44</td>
</tr>
<tr>
<td>Drawing, painting, composing music, writing,</td>
<td>73</td>
</tr>
<tr>
<td>journal-keeping</td>
<td>37</td>
</tr>
</tbody>
</table>

\(^1\text{Note: some participants indicated more than one avocational interest.}\)
majors were found only for activities of drawing, painting, composing music, and writing ($F = 2.6$, $p < .01$). Figure 2 (see page 29) displays the significant differential distribution of this avocational activity across academic majors.

**Epistemological Style:** Scores for each epistemological style were calculated using the scoring key provided by the authors of the PEP. Participants were then assigned to one of three groups, empirical, rational, or metaphorical, based on which score was highest. Because these groups required members representative of the use of one epistemological style as dominant, participants whose two highest epistemological styles were in close approximation, i.e. within 5 points, were dropped from the analysis. This resulted in a total of 139 participants who were categorized according to their dominant epistemological style, and 38 participants who were not categorizable and were therefore dropped from the analysis. Of the remaining 139 participants, 55 were categorized as empirical, 33 were categorized as rational, and 51 were categorized as metaphorical.

**Creativity measure:** Creativity scores were assessed with a combination of two variables. The first variable was the participants' own definitions of the word creativity, which were scored out of a possible five points based on five criteria found in dictionary definitions. The second variable was a self-ratings measurement as to how creative the subject believes him or her self to be, with scores ranging from one to ten. The overall creativity measurement is a combination of the two variables, which assigns penalties or bonuses to the self-ratings based on the accuracy of the definition measure. Specifically, those with definition scores of 0 were penalized by 50% of their self-ratings, those with a score of 1 on the definition were penalized by 25% of their self-ratings, those with a score
Figure 2. Participation levels in drawing, painting, composing music, and writing by different academic majors.
of 2 or 3 were equal to their self-ratings, those with a score of 4 were given a 25% increase
to their self-ratings measurement, and those with definition scores of 5 were awarded 50%
to their self-ratings score.

This resulted in a computed creativity variable, with scores ranging from 0 to 15,
with 15 being the highest creativity score, obtained only by those with self-ratings of 10 and
definitions with an accuracy of 5. For the 139 participants in the analysis, the mean
creativity score was 8.21 (SD = 3.03) with scores ranging from 0 to 15.

**Depression measure:**

The score for overall depression is the aggregate of three subscales, lack of self-
efficacy, self-criticism, and dependency (see Table 3). For the 139 participants in the
analysis, the mean overall depression score was 200.2, with a range from 119 to 259 and a
standard deviation of 29. Properties of the subscales were also calculated. Scores in lack
of self-efficacy ranged from 16 to 46, with a mean of 29.6 (SD = 5.8). Scores for self-
criticism ranged from 38 to 117, with a standard deviation of 16.6 (M = 76). The subscale
for dependency had scores ranging from 49 to 129, with a mean of 95 (SD = 14.2).

Scores for optimism and pessimism are included here as alternate indexes of a
depressed or nondepressed mood (see Table 3). Optimism scores ranged from 34 to 83 with
a mean of 54.75 (SD = 8.2), while pessimism scores ranged from 21 to 65 with a mean of
41 (SD = 7.8). Means for creativity and depression scores can be seen in Table 4.

**Epistemological style as related to creativity measures:**

An ANOVA was performed to examine trends in creativity within the three
different epistemological-style-based groups (see Table 4). Using the computed creativity
Table 3

Means and standard deviations of depression measures: (N = 139)

<table>
<thead>
<tr>
<th>Scale</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall depression</td>
<td>200.2</td>
<td>29</td>
</tr>
<tr>
<td>Lack of self-efficacy</td>
<td>29.6</td>
<td>5.8</td>
</tr>
<tr>
<td>Self-criticism</td>
<td>76</td>
<td>16.6</td>
</tr>
<tr>
<td>Dependency</td>
<td>95</td>
<td>14.2</td>
</tr>
<tr>
<td>Optimism</td>
<td>54.8</td>
<td>8.2</td>
</tr>
<tr>
<td>Pessimism</td>
<td>41</td>
<td>7.8</td>
</tr>
</tbody>
</table>
index, comparisons were made across the groups of Empiricals, Rationals, and Metaphoricals. The overall analysis showed a significant main effect for differences in creativity across groups (\(F = 13.6, p < .001\), see Table 5).

Further analyses were made through T-tests to compare differences between individual pairs of groups. No significant difference was found between Empiricals and Rationals. A significant difference was found between Empiricals and Metaphoricals, (\(t = -4.6, p < .001\) two tailed), with Empiricals having a mean creativity score of 7.3 and the Metaphoricals having a mean of 9.8 (see Table 5). A significant difference was also found between the Rational and Metaphorical groups (see Table 5), with the mean of the Rationals being 7.12 compared to the Metaphoricals’ mean of 9.8 (\(t = -4.33, p < .001\) two tailed). These findings were supportive of the first hypothesis that higher creativity would be found in the metaphorical group.

**Creativity as related to depression:**

Correlations for the entire sample show creativity is not significantly related to overall depression (\(r = -.128\)). Correlations between creativity and specific subscales of the depression measure and optimism/pessimism measure yielded some significant results. Lack of self-efficacy correlates negatively with creativity (\(r = -.253, p < .01\)), and optimism correlates positively with creativity (\(r = .152, p < .05\)). These findings do not support the second hypothesis that higher creativity would be a predictor of higher depression levels.

**Epistemological style as related to depression:**

ANOVAs were computed for the overall depression score, as well as optimism and
Table 4

Means of creativity and overall depression scores for each epistemological style group.

(N = 139)

<table>
<thead>
<tr>
<th></th>
<th>Creativity</th>
<th>Depression</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Empirical</td>
<td>7.31</td>
<td>196.45</td>
<td>55</td>
</tr>
<tr>
<td>Rational</td>
<td>7.21</td>
<td>197.60</td>
<td>33</td>
</tr>
<tr>
<td>Metaphorical</td>
<td>9.83</td>
<td>200.68</td>
<td>51</td>
</tr>
</tbody>
</table>
Table 5

ANOVA and t-tests for differences between epistemological style groups on creativity measure. (N = 139)

<table>
<thead>
<tr>
<th></th>
<th>t</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main effects</td>
<td></td>
<td>13.6</td>
<td>.001**</td>
</tr>
<tr>
<td>Empirical Vs Rational</td>
<td>.164</td>
<td></td>
<td>.870</td>
</tr>
<tr>
<td>Empirical Vs Metaphorical</td>
<td>-4.59</td>
<td></td>
<td>.001**</td>
</tr>
<tr>
<td>Rational Vs Metaphorical</td>
<td>-4.33</td>
<td></td>
<td>.001**</td>
</tr>
</tbody>
</table>

Note. Empirical group’s n = 55, Rational group’s n = 33, Metaphorical group’s n = 51.
pessimism, to assess the possibility of differences between the three different
epistemological style groups. A MANOVA was also run on the group of subscales (self-
criticism, lack of self-efficacy, dependency) of the depression measure to check for more
specific differences.

No significant differences were found on the overall depression score between
groups. No significant differences were found between groups on the lack of self-efficacy,
self-criticism, and dependency subscales. Neither pessimism nor optimism displayed any
significant differences between the three epistemological style groups. These findings do
not support the third hypothesis that higher depression would be found in the metaphorical
group.
CHAPTER IV

DISCUSSION

The purpose of the present study was to examine the relationship between epistemological style, creativity, and depression. Participants were divided into three groups (empirical, rational, and metaphorical) based on their dominant epistemological style. The three groups were then compared on the basis of creativity and depression. Participants with a metaphorical style had significantly higher scores in creativity than participants with empirical or rational styles. Creativity and depression were not correlated overall. The three groups did not differ significantly on depression.

The finding that people with a dominant metaphorical epistemological style are more creative than those with dominant rational or empirical epistemological styles is consistent with existing theoretical literature about both epistemological style and creativity, though no previous studies exist that examine the relationship between the two. As is creativity (Gabora, 2002), epistemological styles are theoretically related to a number of cognitive processes (Royce & Powell, 1983).

Individuals with an empirical epistemological style rely on the cognitive process of perceiving, and the validity of one’s knowledge is evaluated in terms of the accuracy of one’s perceptions (Royce & Powell, 1983). People with a dominant epistemological style that is rational, rely primarily on conceptualization, and evaluate truth in terms of what is logical versus illogical (Diamond & Royce, 1980). Finally, people with a metaphorical epistemological style rely primarily on symbolizing, and evaluate the validity of information in terms of generalized universal principles rather than idiosyncratic awareness,
and tend to construct cognitive representations of experience that have the greatest degree of generality (Royce & Powell, 1983). It is important to examine just how a metaphorical epistemological style is more conducive to creativity than an empirical or rational epistemological style.

A person's epistemological style acts as a cognitive filter through which new information is processed, and determines how the information is integrated with existing knowledge. The kinds of information people attend to and synthesize into their existing world view aligns with their epistemological styles. The chain of associations that are then triggered in thought upon this new information depends on the cognitive mapping in place based on prior experience. People with a metaphorical style, who have in place a vast cognitive network of symbols representative of generalizations may have many more associated thoughts triggered than those whose styles are empirical or rational. Creativity has historically been measured by the quantity of associations given in divergent thinking tasks (Plucker & Renzulli, 1999). If a metaphorical epistemological style is more conducive to larger quantities of associations, this would explain the higher levels of creativity that were found in the present study among metaphorical thinkers.

The arrangement of conceptual cognitive maps created during the encoding of memory plays a large role on how this information resurfaces upon encountering similar kinds of information (Gabora, 2002). When encoding occurs in generalized principles (as with the metaphorical style), it may create broader conceptual cognitive maps, which overlap larger numbers of concepts, causing more associations to be triggered in response to new stimuli. The more associated thoughts that occur, the greater the odds that some
will be novel or creative. In phase models of creative problem solving, metaphorical thinkers may generate many more solutions in the brainstorming phase because their cognitive mappings have a greater degree of associative richness due to the generality of principles during encoding.

While experiences of empirical and rational thinkers are primarily encoded as specific idiosyncratic instances, the experiences of metaphorical thinkers tend to be encoded as broad generalizations, giving way to greater overlap between encoded concepts. This overlap in concepts causes a greater number of associations to be triggered upon exposure to a new stimulus. Creative people have longer streams of thought than noncreative people (Gabora, 2002), and the chain of associations triggered in metaphorical thinkers would be conducive to lengthy streams of thought, as where concepts overlap, a bridge to the thought-to-follow is found. A greater number of overlapping concepts would provide many more bridges linking one thought to the next, slightly differing thought.

People with a metaphorical epistemological style may generate more ideas during brainstorming than people with empirical or rational styles, but does that mean that those ideas are more likely to be viewed as creative in the cultural context in which they emerge? Are these ideas going to be accepted as novel and useful by a society, or as simply bizarre? When creativity is viewed from a systems perspective, it is a phenomenon that is constructed through an interaction between producer and audience (Csikszentmihalyi, 1998). Expert judges within a culture do not have objective criteria by which to assess whether or not an idea is creative. They approach their assessment of new ideas with their own values and expectations based on past experiences, cultural biases, political ideology,
and idiosyncratic preferences. In the sciences and the arts, creativity is as much a result of changing standards of a society and new criteria for assessment of ideas as it is of individual novel achievements (Csikszentmihalyi, 1998). Within any domain of expertise, these expert judges act as "gatekeepers" deciding what ideas may be admitted into the realm as acceptable. The ideas that are accepted as creative, may in turn change the assessment criteria used by expert judges within a domain of knowledge, allowing certain types of ideas to be more or less acceptable by future contributors. Many creative and novel ideas are often rejected by expert judges at one point in history, but are later accepted as valuable when cultural biases have evolved. Such is the case with Galileo’s solar centred galaxy and Darwin’s evolutionary theories. It is therefore important not to discount ideas that are offered as creative new knowledge that may seem out of line with current cultural expectations, as there is a chance that when expectations change, the ideas will be recognized for their valuable contributions. Unfortunately, many ideas that are offered ahead of their time in terms of cultural acceptability are dismissed as unorthodox or bizarre, and may never resurface for reassessment by future cultures.

When expert judges are deployed to determine the value of a novel or creative idea, many truly creative ideas may not be accepted. However, the expert judges do weed out genuinely bizarre ideas. The present study did not use expert judges in the assessment of creativity, and relied instead on subjective self-reports. Self-ratings allow for higher creativity scores based on ideas that are creative but incompatible with current cultural expectations. On the other hand, these self-ratings may also include elevated scores based upon novel ideas that are simply bizarre. Ideally, the measurement of creativity levels
would include recognition of genuine creative contributions made ahead of the cultural acceptability of those ideas, while weeding out simply bizarre ideas. No existing assessment techniques accomplish both. Future developments in the measurement of creativity could be made that use a combination of self-ratings and external judges to yield scores reflecting both types of ideas.

Although a significant relationship was found between epistemological style and creativity scores, with metaphorical thinkers scoring higher in creativity, depression scores were not found to be related to creativity. Participants with a metaphorical epistemological style were no more likely to be depressed than participants with empirical or rational styles. In fact, the present study found significant correlations between self-efficacy and creativity, with creative participants higher in self-efficacy. As well, a significant correlation was found between optimism and creativity. These findings are not consistent with literature suggesting more emotional suffering among the creative (Foulkes, 1967; Andreason, 1987; Jamison, 1993). The higher self-efficacy scores found among the creative are however compatible with some personality research studies conducted on creative participants. Personality attributes that have been identified among the creative include self-efficacy, a willingness to overcome obstacles, take sensible risks, and tolerate ambiguity (Lubart, 1994; Sternberg & Lubart, 1991 and 1995).

Factors other than creativity itself may be responsible for higher depression scores found among the creative in previous literature, such as lifestyles in which the creative are more isolated, or more frequently subjected to criticism. However, before concluding that creativity itself is not related to depression, further investigations need to be conducted.
One approach that could be considered for future research would be to compare clinically depressed and nondepressed participant samples on the basis creativity and epistemological style.

The present study exhibits some limitations that future research could be adapted to overcome. Participants were categorized into groups according to their dominant epistemological style, while participants with two equally dominant styles were dropped from the analysis. Although this method of categorization was a required process in order to make use of multivariate statistics to compare groups, the measurement of epistemological styles was originally intended to create a profile which includes scores on all three epistemological dimensions for each participant (Royce & Mos, 1980). By retaining the original profile configuration, more qualitative information would be available for the examination of epistemological cognitive trends in individual participants. A re-analysis of the current sample data can be performed by categorizing participants into groups on the basis of six epistemological style profiles, reincorporating previously omitted participants into the analysis.

According to theories found in perspectives such a symbolic interactionism, the methods employed in a study should be consistent with the subject matter under examination (Charon, 1992). Due to the subjective and qualitative nature of epistemological style, creativity, and depression, perhaps a qualitative analysis of individual participants could lead to a more thorough trend analysis of the relationships between the three constructs measured.

Although many researchers believe that self-reports, as used in the present study, are
the best way to measure creativity (Plucker & Renzulli, 1999), this measurement fails to weed out self-ratings based upon ideas which are bizarre, and would never be accepted as valid by the surrounding culture. Future research assessing the creativity of individuals could employ external judges to rate ideas that have been put forward, and combine these ratings with self-ratings to yield a more accurate creativity index.

Additional tests of metaphorical ability could also be included in future research to validate participants scores on the metaphorical epistemological style. One such test that might be considered for inclusion is an analogy metaphor production task (Sticht, 1993) which provides participants with a section of text about bars of different types, their diameters, lengths, and uses, followed by a table that breaks the information down into cells with titles. Appearing next on the task is a section of text about edible plants, which parts are edible, where they can be found, and the seasons in which they grow. It is the task of the participant to produce a table analogous to the table provided about bars, that displays the information contained within the text using appropriate cell contents and titles. Sticht (1993) suggests that this test of metaphorical ability reflects metacognitive skills of categorization that are fundamental in metaphorical thinking. Furthermore, he suggests that the development of the metacognitive skill of categorization stimulates “knowledge invention” as opposed to simply knowledge retention, and would therefore also assess creativity in addition to metaphorical thinking. By the inclusion of this or similar measures in future research assessing epistemological style and creativity another validating score of metaphorical ability can be generated, which could provide additionally useful information about how participants process information.
Future research including qualitative and quantitative examinations of epistemological style profiles, adjusted creativity measures which reflect the weeding out of bizarre ideas, and metacognitive categorization tasks, might yield results that contribute to a more thorough understanding of the connection between creativity and metaphorical thinking. In assessing the connection between creativity and depression, future studies should consider the interaction between creative individuals and the society that judges, criticizes, or isolates them, and in successful cases rewards them, rather than simple subjective accounts of general mood.

The present study found significantly higher levels of creativity among participants with a metaphorical epistemological style. The implication of this finding is that the cognitive processes underlying metaphorical thinking are similar to the cognitive processes involved in creativity. This finding contributes substantially to the understanding of the conceptual cognitive mappings and underlying cognitive processes and properties (such as associative richness) to be found among creative and metaphorical thinkers.
References


Smith, W., Royce, J. R., Ayers, D., & Jones, B. (1967). Development of an
inventory to measure ways of knowing. Psychological Reports, 21, 529-535.


- February, 57-63.


Appendix A

Demographic Questionnaire
Please mark an X in the correct category for the following:

Gender:  ____ male  ____ female

Age:  ____ 17 to 20
       ____ 21 to 24
       ____ 25 to 29
       ____ 30 to 39
       ____ 40 to 49
       ____ 50 to 59
       ____ 60 and over

Academic major:

____ psychology, sociology, anthropology
____ communication studies, geography, history, economics
____ religious studies, philosophy
____ classical studies, English, dramatic art, music, visual art
____ biology, chemistry, biochemistry, physics, geology
____ computer science, mathematics, statistics, engineering
____ nursing, human kinetics
____ business, law
____ undecided
____ other (please specify): ____________________________

Avocational interests: (things you do in your spare time)
Mark ALL that apply:

____ playing video games
____ astronomy, watching stars
____ reading lay-person scientific material
____ reading mysteries and detective stories
____ reading romance novels
____ drawing, painting, composing music, writing
____ keeping a journal / diary
____ other ______________________________

What is your ideal future career:
Describe in your own words: __________________________________________________________
Appendix B

Psycho-Epistemological Profile Survey

(Royce & Mos, 1980)
General Preference Survey

Directions

For each of the following statements, you are to indicate your personal agreement or disagreement on the scale provided on the RED ANSWER SHEET. 'A' means complete disagreement with the statement, 'B' means moderate disagreement, 'C' means neutral, 'D' means moderate agreement, and 'E' means complete agreement.

Here is a sample question:

The Roman Empire fell because of moral degeneration of its rulers.

\[ \begin{array}{cccccc}
A & B & C & D & E \\
\circ & \circ & \circ & \bullet & \circ \\
\end{array} \]

In this example, the person agrees with the statement, but not entirely, so they have filled in the 'D' -- moderate agreement.

Your personal preference alone is required. There are no right or wrong responses. Be sure to clearly mark the appropriate space for each question. Use a pencil and erase any extra marks. Trust your first impression. There is no time limit.
1. A good teacher is primarily one who has a sparkling entertaining delivery.

2. The thing most responsible for a child’s fear of the dark is thinking of all sorts of things that could be "out there".

3. Most people who read a lot, know a lot because they come to know of the nature and function of the world around them.

4. Higher education should place a greater emphasis on fine arts and literature.

5. I would like to be a philosopher.

6. A subject I would like to study is biology.

7. In choosing a job I would look for one which offered opportunity for experimentation and observation.

8. The Bible is still a best seller today because it provides meaningful accounts of several important eras in religious history.

9. Our understanding of the meaning of life has been furthered most by art and literature.

10. More people are in church today than ever before because they want to see and hear for themselves what ministers have to say.

11. It is of primary importance for parents to be consistent in their ideas and plans regarding their children.

12. I would choose the following topic for an essay: The Artist in an Age of Science.

13. I feel most at home in a culture in which people can freely discuss their philosophy of life.

14. Responsibility among men requires an honest appraisal of situations where irresponsibility has transpired.

15. A good driver is observant.

16. When people are arguing a question from two different points of view, I would say that the argument should be resolved by actual observation of the debated situation.

17. I would like to visit a library.

18. If I were visiting India, I would be primarily interested in understanding the basis for their way of life.

19. Human morality is molded primarily by an individual's conscious analysis of right and wrong.

20. A good indicator of decay in a nation is a decline of interest in the arts.

21. My intellect has been developed most by learning methods of observation and experimentation.

22. The prime function of a university is to teach principles of research and discovery.

23. A good driver is even tempered.

24. If I am in a contest, I try to win by following a pre-determined plan.

25. I would like to have been Shakespeare.

26. Our understanding of the meaning of life has been furthered most by mathematics.

27. I like to think of myself as a considerate person.

28. I would very much like to have written Darwin’s "The Origin of Species".

29. When visiting a new area, I first try to see as much as I possibly can.
30. My intellect has been developed most by gaining insightful self knowledge.
31. I would be very disturbed if accused of being insensitive to the needs of others.
32. The kind of reading which interests me most is that which creates new insights.
33. The greatest evil inherent in a totalitarian regime is alienation of human relationships.
34. Most atheists are disturbed by the absence of factual proof of the existence of God.
35. In choosing a job I would look for one which offered the opportunity to use imagination.
36. In my leisure I would most often like to enjoy some form of art, music, or literature.
37. The kind of reading which interests me most is that which stimulates critical thought.
38. I prefer to associate with people who are spontaneous.
39. In my leisure I would like to play chess or bridge.
40. Most people who read a lot, know a lot because they develop an awareness and sensitivity through their reading.
41. When visiting a new area, I first pause to try to get a "feel" for the place.
42. Many T.V. programs lack sensitivity.
43. I like to think of myself as observant.
44. Happiness is largely due to sensitivity.
45. I would be very disturbed if accused of being inaccurate or biased in my observations.
46. A good teacher is primarily one who helps his students develop their powers of reasoning.
47. I would like to be a novelist.
48. The greatest evil inherent in a totalitarian regime are restrictions of thought and criticism.
49. More people are in church today than ever before because theologians are beginning to meet the minds of the educated people.
50. The most valuable person on a scientific research team is one who is gifted at critical analysis.
51. Many T.V. programs lack organization and coherence.
52. I like country living because it gives you a chance to see nature first hand.
53. Upon election to Parliament I would endorse steps to encourage an interest in the arts.
54. It is important for parents to be familiar with theories of child psychology.
55. The prime function of a university is to train the minds of the capable.
56. I would like to have written Hamlet.
57. Higher education should place a greater emphasis on mathematics and logic.
58. The kind of reading which interests me most is that which is essentially true to life.
59. A subject I would like to study is art.
60. I feel most at home in a culture in which realism and objectivity are highly valued.
61. The prime function of a university is to develop a sensitivity to life.
62. When playing bridge or similar games I try to think my strategy through before playing.

63. If I were visiting India, I would be primarily interested in noting the actual evidence of cultural change.

64. When buying new clothes I look for the best possible buy.

65. I would like to visit an art gallery.

66. When a child is seriously ill, a good mother will remain calm and reasonable.

67. I prefer to associate with people who stay in close contact with the facts of life.

68. Many T.V. programs are based on inadequate background research.

69. Higher education should place greater emphasis on natural science.

70. I like to think of myself as logical.

71. When people are arguing a question from two different points of view, I would say that each should endeavour to assess honestly his own attitude and bias before arguing further.

72. When reading an historical novel, I am most interested in the factual accuracy found in the novel.

73. The greatest evil inherent in a totalitarian regime is distortion of the facts.

74. A good driver is considerate.

75. Our understanding of the meaning of life has been furthered most by biology.

76. I would like to have been Galileo.

77. My children must possess the characteristics of sensitivity.

78. I would like to be a Geologist.

79. A good indicator of decay in a nation is an increase in the sale of movie magazines over news publications.

80. I would be very disturbed if accused of being illogical in my beliefs.

81. Most great scientific discoveries come about by thinking about a phenomenon in a new way.

82. I feel most at home in a culture in which the expression of creative talent is encouraged.

83. In choosing a job I would look for one which offered a specific intellectual challenge.

84. When visiting a new area, I first plan a course of action to guide my visit.

85. A good teacher is primarily one who is able to discover what works in class and is able to use it.

86. Most great scientific discoveries come about by careful observation of the phenomena in question.

87. Most people who read a lot, know a lot because they acquire an intellectual proficiency through the sifting of ideas.

88. I would like to visit a botanical garden or zoo.

89. When reading an historical novel, I am not interested in the subtleties of the personalities described.

90. When playing bridge or similar games I play the game by following spontaneous cues.
Appendix C

Validation Measure for PEP &

Creativity Measures
strongly disagree 1...2...3...4...5...6...7...8...9...10 strongly agree

___ Using logic is the best way to arrive at the truth.

___ I understand new things best when I relate them to things I already know.

___ I don't believe anything unless it has been proven scientifically to be true.

___ A lot can be learned about life through art and literature.

___ Government funding shouldn't be given to artistic endeavours when there are many worthwhile research projects needing financial support.

___ If one has very effective reasoning skills, one can understand the world better than most people.

Describe in your own words what creativity is:

__________________________________________________________________________

How creative are you? (circle one number)

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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
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<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
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<tr>
<td></td>
<td>Not at all</td>
<td></td>
<td></td>
<td></td>
<td>Moderately</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Very much</td>
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Appendix D

Depressive Experience Questionnaire

(Zurlof, Quinlan, & Blatt, 1990)
DEPRESSIVE EXPERIENCES QUESTIONNAIRE

Listed below are a number of statements concerning personal characteristics and traits. Read each item and decide whether you agree or disagree and to what extent. If you strongly agree, circle 7; if you strongly disagree, circle 1; if you feel somewhere in between, circle any one of the numbers between 1 and 7. The midpoint, if you are neutral or undecided, is 4.

1. I set my personal goals and standards as high as possible.

2. Without support from others who are close to me, I would be helpless.

3. I tend to be satisfied with my current plans and goals, rather than striving for higher goals.

4. Sometimes I feel very big, and other times I feel very small

5. When I am closely involved with someone, I never feel jealous.

6. I urgently need things that only other people can provide.

7. I often find that I don't live up to my own standards or ideals.

8. I feel I am always making full use of my potential abilities.

9. The lack of permanence in human relationships doesn't bother me.

10. If I fail to live up to expectations, I feel unworthy.

11. Many times I feel helpless.

12. I seldom worry about being criticized for things I have said or done.

13. There is a considerable difference between how I am now and how I would like to be.

14. I enjoy sharp competition with others.

15. I feel I have many responsibilities that I must meet.

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16. There are times when I feel "empty" inside.  
17. I tend not to be satisfied with what I have.  
18. I don't care whether or not I live up to what other people expect of me.  
19. I become frightened when I feel alone.  
20. I would feel like I'd be losing an important part of myself if I lost a very close friend.  
21. People will accept me no matter how many mistakes I have made.  
22. I have difficulty breaking off a relationship that is making me unhappy.  
23. I often think about the danger of losing someone who is close to me.  
24. Other people have high expectations of me.  
25. When I am with others, I tend to devalue or "undersell" myself.  
26. I am not very concerned with how other people respond to me.  
27. No matter how close a relationship between two people is, there is always a large amount of uncertainty and conflict.  
28. I am very sensitive to others for signs of rejection.  
29. It's important for my family that I  
30. Often, I feel I have disappointed others.  
31. If someone makes me angry, I let him (her) know how I feel.  
32. I constantly try, and very often go out of my way, to please or help people I am close to.  
33. I have many inner resources (abilities, strengths).  
34. I find it very difficult to say "No" to the requests of friends.  
35. I never really feel secure in a close relationship.
<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
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</thead>
<tbody>
<tr>
<td>36. The way I feel about myself frequently varies: there are times when I feel extremely good about myself and other times when I see only the bad in me and feel like a total failure.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>37. Often, I feel threatened by change.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
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<tr>
<td>38. Even if the person who is closest to me were to leave, I could still &quot;go it alone.&quot;</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
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<tr>
<td>39. One must continually work to gain love from another person: that is, love has to be earned.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
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<tr>
<td>40. I am very sensitive to the effects my words or actions have on the feelings of other people.</td>
<td>1 2 3 4 5 6 7</td>
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<tr>
<td>41. I often blame myself for things I have done or said to someone.</td>
<td>1 2 3 4 5 6 7</td>
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<tr>
<td>42. I am a very independent person.</td>
<td>1 2 3 4 5 6 7</td>
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<td>43. I often feel guilty.</td>
<td>1 2 3 4 5 6 7</td>
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<tr>
<td>44. I think of myself as a very complex person, one who has &quot;many sides.&quot;</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
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<tr>
<td>45. I worry a lot about offending or hurting someone who is close to me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
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<tr>
<td>46. Anger frightens me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>47. It is not &quot;who you are,&quot; but &quot;what you have accomplished&quot; that counts.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>48. I feel good about myself whether I succeed or fail.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>49. I can easily put my own feelings and problems aside, and devote my complete attention to the feelings and problems of someone else.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>50. If someone I cared about became angry with me, I would feel threatened that he (she) might leave me.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>51. I feel uncomfortable when I am given important responsibilities.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
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<tr>
<td>52. After a fight with a friend, I must make amends as soon as possible.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td>53. I have a difficult time accepting weaknesses in myself.</td>
<td>1 2 3 4 5 6 7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Strongly Disagree</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>---</td>
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</tr>
<tr>
<td>54.</td>
<td>It is more important that I enjoy my work than it is for me to have my work approved.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>55.</td>
<td>After an argument, I feel very lonely.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>56.</td>
<td>In my relationships with others, I am very concerned about what they can give to me.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>57.</td>
<td>I rarely think about my family.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>58.</td>
<td>Very frequently, my feelings toward someone close to me vary: there are times when I feel completely angry and other times when I feel all-loving towards that person.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>59.</td>
<td>What I do and say has a very strong impact on those around me.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>60.</td>
<td>I sometimes feel that I am &quot;special.&quot;</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>61.</td>
<td>I grew up in an extremely close family.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>62.</td>
<td>I am very satisfied with myself and my accomplishments.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>63.</td>
<td>I want many things from someone I am close to.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>64.</td>
<td>I tend to be very critical of myself.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>65.</td>
<td>Being alone doesn't bother me at all.</td>
<td>1 2 3 4 5 6 7</td>
</tr>
<tr>
<td>66.</td>
<td>I very frequently compare myself to standards or goals.</td>
<td>1 2 3 4 5 6 7</td>
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Appendix E

Optimism - Pessimism Scales

(Dember & Brooks, 1989)
The 56 statements printed below represent individual differences in viewpoint. Using the scale shown below, please respond with your own point of view by filling in the corresponding circles on the red computer sheet. Do not spend a lot of time thinking about each one; just indicate your first impression.

A = strongly disagree  B = disagree  C = agree  D = strongly agree

1. I like people I get to know.
2. It is best not to set your hopes too high since you will probably be disappointed.
3. There is so much to be done and so little time to do it in.
4. I have a tendency to make mountains out of molehills.
5. Rarely do I expect good things to happen.
6. Everything changes so quickly these days that I often have trouble deciding which rules to follow.
7. All in all the world is a good place.
8. When it comes to my future plans and ambitions in life, I expect more to go wrong than right.
9. My hardest battles are with myself.
10. I believe there's not much hope for the human race.
11. It does not take me long to shake off a bad mood.
12. If you hope and wish for something long and hard enough you will eventually get it.
13. People get ahead by using "pull" and not because of what they know.
14. Even when things in my life are going okay, I expect them to get worse soon.
15. With enough faith, you can do almost anything.
16. I enjoy myself most when I am alone, away from other people.
17. When I undertake something new, I expect to succeed.
18. Honesty is the best policy in all cases.
19. I generally look at the brighter side of life.
20. If I make a decision on my own, I can pretty much count on the fact that it will turn out to be a poor one.
22. It is always a good thing to be frank.
23. Where there's a will, there's a way.
24. I have a tendency to blow up problems so they seem worse than they really are.
25. All in all, it is better to be humble and honest than important and dishonest.
26. As time goes on, things will most likely get worse.
27. He is the slow, steady worker who usually accomplishes the most in the end.
28. When I go to a party I expect to have fun.
29. Times are getting better.
30. Everyone should have an equal chance and an equal say.
31. Better to expect defeat: then it doesn't hit so hard when it comes.
32. It is wise to flatter important people.
33. I expect to achieve most of the things I want to in life.
34. It seems the cards of life are stacked against me.
35. What is lacking in the world today is the old kind of friendship that lasted for a lifetime.
36. When the weatherman predicts 50% chance of rain, you might just as well count on seeing rain.
37. Before an interview, I am usually confident that things will go well.
38. Sometimes I feel down, but I bounce right back again.
39. The future seems too uncertain for people to make serious plans.
40. When I have undertaken a task, I find it difficult to set it aside even for a short time.
41. Tenderness is more important than love.
42. When gambling, I expect to lose.
43. Anybody who is willing to work hard has a good chance for success.
44. The future looks very dismal.
45. If I had to choose between happiness and greatness, I'd choose greatness.
46. Minor setbacks are something I usually ignore.
47. In general, things turn out all right in the end.
48. It is better to be a dead hero than a live coward.
49. Give me 50/50 odds and I will choose the wrong answer every time.
50. It is hard to get ahead without cutting corners here and there.
51. If I were in a competition and contestants were narrowed down to myself and one other person, I would expect to be runner-up.
52. April showers bring May flowers.
53. I can be comfortable with nearly all kinds of people.
54. The worst defeats come after the best victories.
55. In the history of the human race there have probably been just a handful of really great thinkers.
56. Every cloud has a silver lining.
Appendix F

Consent Form
Department of Psychology
University of Windsor
Information Form For Subject Participation

Researcher: Jennifer Scobie
Supervisor: Dr. Ray Daly (253-4232 x2229)

This study examines general attitudes and beliefs. Participation involves rating how much you agree or disagree with several statements, and reading and answering questions about twelve very short stories. It should take a total of about an hour to complete all of these tasks. Participation in this study is completely voluntary, and you have the right to withdraw from this study at any time, or refrain from answering questions you are uncomfortable with. All information you give is confidential, and your anonymity will be maintained through numerical coding.

If you are enrolled in an undergraduate psychology course, bonus points for participation will be given if your course instructor permits them.

Feel free to ask any questions you may have about this study before or during your participation. If you have questions later, or would like a copy of the findings of this study, I can be contacted via my mailbox in the Psychology Department.

This study has been cleared by the Psychology Department’s Ethics Committee. Concerns may be addressed to the Chair of the Ethics Committee, Dr. S. Voelker (253-4232 ext.2249). Thanks for your participation.

Consent Form For Subject Participation

I have read and understood the above information, and voluntarily consent to participate in this study, though I may discontinue my participation at any time. The information attached above has been left with me.

________________________________________  ________________________________________
Date                                      Name (please print)

________________________________________
Signature
VITA AUCTORIS

NAME: Jennifer Jayne Scobie

PLACE OF BIRTH: Chatham, Ontario

YEAR OF BIRTH: 1973

EDUCATION:
- University of Windsor, Windsor, Ontario 1991-1994 B.A.
- University of Windsor, Windsor, Ontario 1995-2003 M.A.