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The Relationship Between Creativity and Psychiatric Vulnerability: A Meta-Analysis of Empirical Studies

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The Relationship Between Creativity and Psychiatric Vulnerability: A Meta-Analysis of Empirical Studies

by
Charity Benham, MA

Presented to the Faculty of the Graduate School of Clinical Psychology
George Fox University
in partial fulfillment of the requirements for the degree of Doctor of Psychology in Clinical Psychology

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April 18, 2004
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The Relationship Between Creativity and Psychiatric Vulnerability: A Meta-Analysis of Empirical Studies

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Abstract

The belief that creativity and madness are interrelated has endured across the centuries. Artists, poets, and philosophers have been perceived as special individuals blessed or cursed with "divine madness" beginning in the days of Socrates. Many of the great minds of classical western civilization have believed that artists are qualitatively different than average people (Becker, 2001). Psychology and psychiatry have addressed the creativity/madness question utilizing a wide variety of approaches. There are numerous review articles, psychobiographical works, empirical studies, and theoretical papers which attempt to determine the nature of creativity and how it relates to psychiatric functioning.

This study utilized meta-analytic techniques to examine the empirical body of literature addressing the creativity/madness connection and statistically scrutinized the empirical literature examining the relationship between creativity and psychopathology. Additionally, this meta-analysis explored the degree of homogeneity across findings.
Primary studies in the creativity/madness literature were statistically heterogeneous, and moderating variables for statistical methodology, sampling techniques, artist type, and psychopathology type were evaluated.

It was determined that a small main effect size exists relating psychopathology and creativity. However, studies utilizing suicide for a dependent variable, proportional techniques without controls, and psychobiographical or retrospective data yield significantly higher results than studies utilizing more objective or rigorous methodology.
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Chapter 1
Introduction

For centuries, great minds of western civilization have postulated that creativity and madness are closely interrelated. In the twentieth century, psychiatry and psychology have investigated the assumed relationship between creativity and psychopathology utilizing theoretical, psychobiographical, and empirical methods. The results of empirical studies have been disparate. Some studies suggest a positive relationship (Andreasen, 1987; Andreasen & Canter, 1974; Jamison, 1993; Ludwig, 1992a, 1994, 1995; Richards, 1993; Post, 1994, 1996). Others suggest a negative relationship (Arasteh & Arasteh, 1976; Maslow, 1976; Rogers, 1976; Rothenberg, 1990; Simonton, 1994).

Many studies focusing on the relationship between creativity and psychiatric vulnerability have methodological problems. Some studies fail to develop clear operational definitions for creativity or psychopathology. Other studies utilize inadequate or inconsistent methods for measuring psychopathology. Most of the primary studies have failed to control for rating bias by researchers. Additionally, many of the studies use biographical and retrospective data to determine if eminent artists experience psychiatric difficulties.

The study reported below investigated the creativity/psychopathology dilemma using the technique of meta-analysis, first introduced by Smith and Glass (1977). Meta-
analytic technique applies systematic and statistical scrutiny to an identified body of literature, allowing for formalized research synthesis.

Rosenthal (2001) discusses the evolution of meta-analysis, which began as a response to the many difficulties inherent in traditional literature reviews. “Authors of narrative reviews consciously or unconsciously select and describe studies to support their own understanding of the literature” (Rosenthal, 2001, p. 2). Thus, the procedure of formal research synthesis, by nature and design, requires the meta-analyst to be extremely thorough and exhaustive in the search for literature. Additionally, meta-analysis prevents our reliance on the significance test of any one finding as a measure of its value and helps realize that repeated results in the same direction across several studies, even if not one is significant, are much more powerful evidence than a single significant result. (Rosenthal, 2001, p. 2)

In this study, meta-analysis identified the magnitude of the relationship between creativity and psychiatric vulnerability. It also allowed the extreme variability in research findings to be analyzed and compared according to carefully selected coding criteria, providing a quantitatively defensible theoretical position when evaluating the creativity/madness debate.

Historical Origins

The creativity/madness hypothesis finds its roots in Ancient Greece. Plato referred to creativity as a divine madness, or a gift from the gods (Langsdorf, 1900). Seneca quotes Aristotle as having stated “No great genius was without a mixture of insanity” (Langsdorf, 1900). In contrast to the modern day understanding of psychopathology, “divine madness” referred to possession by a benevolent demon, a
semi-deity that bridged the gap between the artist and the gods of antiquity. The term "enthusiasmos" (which is the etymological root of "enthusiasm") referred to the energy that divinely inspired poets, philosophers, and artists to do their work. According to this religious system, only a few select individuals were granted the gift of "madness" (Becker, 2001). Socrates himself ascribed his knowledge to his "demon" (Cahan, 1911). It was believed that the poet or philosopher was not the source of talent or inspiration, but only an agent and servant of the gods (Rosen, 1969).

During the Medieval period, creative endeavors were constrained to religious focus, and closely regulated by the church. There is little historical discussion of specific artists and their personalities or behavior. The focus of this period was on the art and worship, not on the idiosyncrasies of the artist.

During the Renaissance, artists were given the title "genio," meaning genius. Scholars in this time period described "genio" as being subject to "pazzia," or madness. However, this term was qualitatively different from the Renaissance concept of insanity or mental illness. Rather, "pazzia" in combination with "genio" described a type of temperament that enabled an individual to be inspired (Becker, 2001).

Later, during the Romantic period, "genius" was defined as the ability to defy social class and societal expectations. An eighteenth century genius was an individual deprived of wealth and privilege who nonetheless achieved higher status in his or her society through creative endeavors (Becker, 2001). As the Romantic period progressed, the madness/genius relationship was culturally inflamed due to the expectation that a genius, by definition, would act in a manner that was outside of the societal norms. To achieve further distinction, successive generations of artists felt compelled to outdo their
predecessors, participating in increasingly outlandish behavior. The "tortured artist" archetype became embedded in the culture of the day. Thus, mental illness became a self-fulfilling prophecy for many artists (Becker, 2001).

In addition to cultural expectations, the lifestyles of many artists during the Romantic period led to malnutrition, addiction, and syphilis. Further, many of the chemicals and substances contained in common art materials were toxic, including lead and mercury in paints (Ochse, 1991). The impressionist Vincent Van Gogh, whose outlandish behaviors included ingesting paint and cutting off his own ear and sending it to a prostitute, was likely the victim of poisoning resulting from his addiction to alcoholic beverages laced with thujone. After increasing amounts of thujone ingestion, individuals can suffer severe epileptic-like seizures, a condition well documented in Van Gogh's later life (Arnold, 1988).

As science progressed in the late nineteenth century, the Italian criminologist Cesare Lombroso equated genius with degeneracy. He characterized creative artists and geniuses as emerging from a maladaptive gene pool, sharing traits with criminals and "lunatics." In 1891, Lombroso published his life's work, The Man of Genius, suggesting that genius was often a "degenerative psychosis of the epileptic group."

In the twentieth century, the psychoanalytic community continued to pursue evidence for the proposed relationship between creativity and psychopathology. Freud suggested that art was essentially a defense mechanism of sublimation used to cope with anxiety (Freud, 1908). Since that time, the traditional and modern psychoanalytic schools have developed a number of theories to explain the meaning of creativity and
how it relates to psychopathology (Kris, 1964; Kubie, 1958; Storr, 1972; Rothenberg, 1990).

Creativity Defined

Given the considerable breadth of creativity literature, it is not surprising to note that creativity is defined in a variety of ways. Creativity is sometimes defined behaviorally, referring to individuals that pursue creative or artistic occupations. These occupations include the visual or performing arts, architecture, science, writing, musical performance or composition, theatre, mathematics, design, and other pursuits. There is, however, some debate regarding what constitutes creativity, and some studies have compared artistic ability and eminence in science or architecture, and treated the results differently (Barron, 1969, 1972; Becker, 1978; Hall & Mackinnon, 1969; Juda, 1949, Karlsson, 1970; Ludwig, 1998; and others). This behavioral definition of creativity operates under the assumption that the best predictors of creativity are past and present creative behaviors.

In other studies, creativity is broadly defined as originality or divergent thinking, a factor that is postulated to be normally distributed in the population. A number of theorists have attempted to operationally define creativity as a construct that can be psychometrically measured (Mednick, 1962; Barron, 1969; Guilford, 1967; Torrance, 1974).

Davis (1986) designed an instrument to measure creativity, entitled “How Do You Think” (HDYT). This is an instrument that evaluates personality features, attitudes, and historical events that are believed to be related to creativity. Theorists supporting a trait
instrument suggest that creativity is best measured by identifying unique and original personality traits and life experiences.

Richards (1993) proposed that researchers should note the difference between “eminent creativity,” and “everyday creativity.” Richards defines eminent creativity as high achievement and productivity in an artist’s given field. Everyday creativity is defined as “real-life accomplishment at work and at leisure . . . selected on clinical criteria and not for recognized creativity” (p. 213). Richards, Kinney, Lunge, Bennet, and Merkel (1988) developed “Lifetime Creativity Scales” in an attempt to further define and measure everyday creativity. The scales achieved limited psychometric value.

Psychiatric Vulnerability Defined

Definitions of psychopathology or psychiatric vulnerability are also diverse in scope throughout creativity literature. Some define psychopathology using extreme responses on measures including psychiatric interviews, Rorschach scores, Thematic Apperception Test (TAT) scores, Minnesota Multiphasic Personality Inventory (MMPI) or MMPI-II scores, the California Personality Inventory, or scales from the 16 Personality Factors (16 PF). Some studies have also used rates of suicide among creative artists, utilization of mental health services, and psychobiographical evaluations of possible psychiatric symptoms. Measures used to determine psychiatric vulnerability often have questionable reliability and validity, particularly when subjective methods are used. Suicide is a particularly problematic measure for psychiatric vulnerability, because it can only utilize retrospective data, and prevalence data for suicide are variable from year to year and also between geographical locations, thus making a consistent comparison group difficult.
One popular measure of both personality and psychopathology in creative artists has been Eysenck’s psychoticism factor (1993). Eysenck distinguishes “psychoticism” from psychosis, suggesting that psychoticism is a major dimension of personality that “is a trait, normally distributed in the population, predisposing people with high ‘P’ [psychoticism] scores to psychosis” (pg 157). Eysenck associates creativity with a weakening of “higher centers,” and a consequent disinhibition of lower, more primitive functions of the mind and brain, a condition also found in individuals with high levels of the personality trait of “psychoticism.” Recently, a meta-analysis was completed synthesizing reliability data on the Eysenck Personality Questionnaire. This study determined that the “P” factor has a mean reliability of .66, lower than the suggested .70 for use in research (Caruso, Witkiewitz, Belcourt-Dittloff, & Gottlieb, 2001).

Sass (2001) suggests that highly creative persons may share traits with individuals in the schizoid, schizotypal, and schizophrenic realm, but often at a subclinical level. Kris (1964) suggests a psychoanalytic perspective of creativity that describes the creative process as “regression in service of the ego.” Jamison (1993) suggests that creative persons suffer from an increased sensitivity to affect, thus leading to vulnerability for affective disorders, particularly in the Bipolar spectrum.

**Modern Research**

The struggle to operationally define creativity has contributed to a split in the preferred methodology utilized to determine the relationship between creativity and psychopathology. One body of research uses a behavioral definition of creativity, obtaining professional artists for the experimental group. These artists are then matched with a control group, and both groups are tested on a variety of measures for
psychopathology. The resulting “psychopathology” scores are then statistically compared between groups.

A second body of research identifies creative subjects by using one of the aforementioned psychometric measures for creativity. Normal subjects (often undergraduates) are tested for both creativity and psychopathology. Some studies within this body of research compare the scores from both constructs. Other studies create comparison groups by utilizing cut scores on either the creativity or psychopathology measures.

A third body of research uses psychiatric patients for subjects, measuring them for creativity levels by utilizing psychometric instruments. These studies often hypothesize that psychiatric patients (of varying diagnoses) will receive higher scores on measures of creativity than normal subjects. Some of the studies using psychiatric populations also create a range of psychopathology, thus dividing subjects into extreme groups (i.e. high vs low psychopathology) to determine which level of pathology correlates most highly with creativity. This body of research has also examined the art of psychiatric patients, using expert raters to determine if psychiatric patients have a higher level of creativity than the general population.

A completely separate body of research involves the utilization of biographical materials of historically significant individuals. These retrospective studies provide interesting information regarding the nature of the relationship between creativity and psychopathology, but are also problematic. Utilizing biographical material for research is an inherently biased procedure. Additionally, many use the biographies of artists from
differing time periods, thus failing to account for culturally prevalent causes of mental illness, such as syphilis, lead or mercury poisoning, poor nutrition, and other factors.

The Present Study

Despite the large body of research on this topic, there is considerable controversy surrounding the relationship between creativity and madness. A number of empirical studies have suggested high rates of mental illness among creative artists (Andreasen, 1987; Jamison, 1995; Ludwig, 1992a, 1992b; Post, 1994, 1996). However, Rothenberg (1990) strongly resists the interpretation of the data and criticizes the earlier studies for severe methodological weaknesses and inappropriate uses of data. Additionally, Schubert and Biondi (2002) vehemently criticize empirical studies examining the creativity/madness relationship, suggesting that some authors have misrepresented their data. In a more even-handed manner, Waddel (1998) reports on the varying types of methodology used in supporting or denying the existence of a relationship between creativity and psychopathology. She mentions that despite seemingly strong evidence for a high rate of mood disorder among artists, there are many alternative ways to interpret the statistical findings. Additionally, there are several unpublished doctoral dissertations with strong empirical rigor, which most authors have failed to cite. Many of these studies suggest a small or negligible relationship between creativity and psychopathology (Ambers, 1993; Cox, 1997; Hale, 1997; Orwoll, 1997; Readett, 1998; Carson, 2001; Cipriani, 2001).

The current study utilized meta-analytic techniques in an attempt to explain the disparate results of primary studies. Since the three bodies of research utilize inherently different techniques, it was not deemed appropriate to combine all three designs. As a
result, this study focused on primary studies utilizing psychopathology as the dependent variable. A wide variety of psychopathology measures were compared, and coded. Additionally, this meta-analysis included studies utilizing both eminent and everyday artists to determine if artist status moderated the final result. Meta-analytic technique then allowed comparisons between creative productivity and severity of symptoms.

Possible Moderating Variables

Moderating variables are trends in research that can account for variability in findings. In the development of the coding system for a meta-analysis, the researcher must select criteria that vary across studies. In a private consultation, meta-analysis specialist T. Bodner (personal communication, April 19, 2003) suggested that an initial coding strategy be in place at the beginning of the process. However, coding systems evolve throughout the process as the researcher becomes better acquainted with each study, and the body of literature as a whole. Heterogeneity of study effect sizes might suggest that statistical artifacts moderate the results of the meta-analysis, and evaluation for possible moderating variables can help to explain divergent findings in a given body of research. This meta-analysis evaluated and coded primary studies for four possible moderating variables.

The first moderating variable involved within-study research methodology. Studies were evaluated for the presence of a control group, selection method of subjects, and “blinding” of the experimenters. Studies using retrospective or biographical data were separately coded. It was expected that non-blinded studies would indicate a stronger relationship between psychopathology and creativity than studies implementing blinding procedures. Similarly, it was expected that studies utilizing psychobiographical
data would indicate a stronger relationship between psychopathology and creativity due to the highly biased nature of biography.

The second possible moderator was the type of instrument utilized for the measurement of psychopathology. Items were coded for the type of instrument (i.e. structured interview, outcome measure, personality test) and for the recorded reliability and validity of the instrument. It was expected that interviews (particularly if conducted by non-blinded experimenters) would more likely fall victim to expectancy/observer bias than more objective instruments.

The third possible moderator was the type of artist used in the subject pool. It is possible that there are some types of professions among the visual and performing arts that involve lifestyles that could lead to more symptoms of psychopathology. If an inherent connection between creativity and psychopathology exists, this moderator would determine if the connection was stable across creative endeavors. This category also included separate coding for studies measuring everyday creativity as opposed to eminent creativity.

The fourth moderator variable was type of pathology measured or reported. This approach would determine what type of pathology, if any, is more likely to occur in creative populations and artistic communities. Severity of pathology was initially selected for coding, but was dropped as a variable due to insufficient and inconsistent reporting in primary studies.

_Hypotheses_

The following hypotheses were generated:
1. The meta-analysis results will indicate a global positive relationship between creativity and psychopathology. After an informal review of the literature, several primary studies suggest a powerful relationship between the two variables, and when included, these studies will aggregate to indicate a positive, yet small, correlation that is likely to be heterogenous in scope due to the aforementioned diversity of findings within the literature.

2. Studies utilizing interviews to measure psychopathology will yield higher effect sizes than studies using objective measures because interviews are generally more biased than objective measures, thus resulting in an overall inflation of identified psychopathology by researchers wishing to validate their own hypotheses.

3. Studies utilizing psychobiographies will yield larger effect sizes than studies using living subjects recruited from the artistic community because authors of biographies cannot be seen as objective reporters of artists' lives. Additionally, to add interest to the reader, symptoms might be inflated or exaggerated stylistically. Biographies also tend to be written about people who have lives that are perceived as interesting or unusual. Additionally, psychobiographical studies utilize expert raters to determine the existence of psychopathology, thus adding similar bias to the sample as previously described studies utilizing interview procedures.

4. Creativity and substance abuse will have a stronger relationship than alternative psychiatric diagnoses. Informal review of studies indicates that several of the eminent artists previously described as mentally ill, (e.g. Vincent Van Gogh), actually were exhibiting behavior that was secondary to intoxication and rampant substance abuse.
5. Performing artists will have higher scores of psychiatric vulnerability than visual or graphic artists due to lifestyle factors, as the performing arts community involves a schedule and level of activity that is qualitatively different than daily activities within the lives of non- eminent individuals.

6. Studies using eminently creative subjects will yield larger effect sizes than studies using individuals from the normal population that score highly on standardized measures for everyday creativity, because the definitions of eminent creativity and everyday creativity are measuring different constructs involving behavior versus intrinsic personality factors. Eminent individuals, as a result of self- fulfilling prophecy and being the center of public eye, will be seen as qualitatively different and thus, more often diagnosed as mentally ill. Additionally, the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV; American Psychiatric Association, 1994) lists one of the diagnostic criteria for hypomanic episode as increased goal directed activity, a behavior that contributes to the production of creative works.
Chapter 2

Method

Selection of Studies

Studies were located by conducting searches of computerized databases including PsychInfo, MEDLINE, ERIC, Sociological Abstracts, and Dissertation Abstracts. Searches were conducted using the terms artist, creativity, art, author, writer, or performing artist in combination with psychopathology, mood disorder, or mental illness. Reference sections from studies obtained were manually searched for additional studies. Major authors in the field were written and asked for possible additional unpublished data. Both published and unpublished studies fitting inclusion criteria were included to control for publication bias.

Inclusion Criteria

Studies included in this meta-analysis (a) indicated a measure for creativity, (b) had a measurable outcome of psychopathology, (c) were in English, and (d) contained sufficient information for effect sizes to be computed.

Studies were excluded that (a) recruited subjects from a psychiatric population, and (b) did not use at least one measurable outcome for psychopathology.

Meta-Analysis Procedures

Studies were coded for several methodological characteristics including the sample size, statistical procedures used, sampling procedures, comparison procedures,
blinding procedures, and type of dependent variable. The studies were also coded for information including the age, sex, and occupation or creative endeavor of participants, the main types of psychopathology being measured, the range of psychopathology, and method by which researchers defined creativity. See Appendix A for coding system details.

This meta-analysis implemented the most recent meta-analytic methods outlined by Bodner (2003) in a private consultation consisting of (a) estimating the population mean effect size and variance, (b) correcting for statistical artifacts, (c) testing for homogeneity of findings, and (d) determining the existence and magnitude of possible moderating variables. The more recent methods of meta-analysis include a quantitative weighting of effect sizes by utilizing the inverse of the standard error of the effect size. This is in contrast to the Hunter and Schmidt (1990) method that includes a subjective weighting of studies according to study quality, which becomes problematic due to the likelihood for bias. Instead, this meta-analysis coded for study quality characteristics which were evaluated as possible moderating variables.

Effect sizes were calculated using effect size $r$, a Pearson Product Moment suggested by Lipsey and Wilson (2001) for meta-analyzing studies that examine the association between two variables. Effect sizes reported in $r$ were transformed by implementing Fisher’s $Z_r$ transformation due to the undesirable statistical properties of $r$, as suggested by Lipsey and Wilson (2001), Hedges and Olkin (1985) and Rosenthal (1994).

After the initial computation, effect sizes were weighted according to the inverse standard error of the effect size, because
In the most up-to-date methods of meta-analysis, we tend to weight effect sizes by the inverse of that effect size's standard error. Standard error reflects how much sample-to-sample variability we can expect to see in statistics like effect sizes. Standard error is strongly related to sample size such that larger sample sizes give smaller standard error. So, we give greater weight to studies with smaller standard errors because these effect sizes are more precisely estimated. (Bodner, personal communication, May 8, 2003)

The corrected effect sizes were then aggregated to compute a weighted mean. Both weighted and unweighted means were calculated. After the overall average effect size was computed, upper and lower confidence intervals were also computed. The homogeneity test ($Q$ statistic) was computed, which is a chi-square with a $df$ of $k-1$ (where $k$ = total number of studies in group).

Heterogeneity suggests that the set of effect sizes significantly differ from one another, and may not represent a common population. Moderating variables were examined to account for effect sizes in excess of expected sample-to-sample variation. Moderating variables included within-study methodological issues, sampling, types of artists, and type and severity of psychopathology. Each moderating variable was separated, analyzed in a “sub meta-analysis,” and compared utilizing the analog to the ANOVA as suggested in Lipsey and Wilson (2001) to determine if the total aggregate of studies represents more than one population, thus accounting for variability between studies.

The coding was entered into a database specifically designed for this project, which allowed studies to be sorted according to different possible moderators (see
Appendix A). Coding for all items was tested for inter-rater reliability by having 25% of included studies randomly selected and coded by three separate researchers after a brief training.

Finally, a “Failsafe $N$” analysis was calculated for the entire aggregate and each categorical moderator. This is a formula suggested by Orwin (1983) that estimates the number of unretrieved studies with effect sizes equal to zero that would be needed to bring the observed effect size to a small or negligible level.
Chapter 3

Results

A total of 201 articles were initially identified; of 201, 46 met inclusion criteria. Other articles were rejected due to lack of measurable reporting of psychopathology, lack of sufficient data for effect sizes to be computed, or utilization of subjects from psychiatric populations.

Effect sizes were computed from correlational coefficients (30.4%), $T$-tests (19.6%), $F$-tests (8.7%), Chi-Square (13%), and simple dichotomous proportions (24%). Of all designs, simple proportions were the most problematic because they failed to report or utilize a comparison group. Effect sizes were computed by comparing reported proportions of mental illness to data gleaned from the World Health Organization (2001) for lifetime prevalence of mental health conditions. Due to the instability of reporting methodology and lifetime prevalence rates, the proportional studies were included with caution and coded to determine if the effect sizes yielded were comparable to other studies which implemented more rigorous statistical methodology.

The range of yielded effect sizes was $Z_r = -0.182$–$1.027$. The total number of subjects in both control and experimental groups was $N = 27,954$. The total number of experimental subjects was $n = 26,451$. The overall unweighted mean effect size was $Z_r = .251$. When weighted by the inverse standard error of the effect size squared (a function of sample size and the magnitude of the correlation itself), the weighted mean
effect size was .153, CI = .141 – .165. When transformed from a Fisher z to a Pearson Product Moment correlational coefficient, the weighted mean yielded $r = .15$. The observed weighted mean effect size ($r = .15$) indicates a small, yet significant, relationship between creativity and psychopathology (Lipsey & Wilson, 2001). See Table 1 for details. See Figure 1 for a stem and leaf display of all effect sizes.

The homogeneity analysis yielded $Q = 829.996$, indicating extreme heterogeneity within the sample ($p < .0000$). A non-significant $Q$ would indicate that study-to-study variability could be accounted for by sampling error alone. As a result, the sample was evaluated for moderating variables. See Figure 2 for a scatter plot depicting the variability in effect sizes.

**Suicide Studies**

The first analysis for moderating effects included separately aggregating studies utilizing suicide as a dependent variable. These studies were large in proportion (three studies yielding a Total N of 20,377), and were included in the suicide sub-sample. Studies utilizing suicide alone as a dependent variable yielded a simple mean effect size of .246 and a weighted mean effect size ($ES_{wr}$) of .130 with a CI of .117–.144. Because of the small number of studies, the stability of the finding is less secure. However, even with the similarity of structure and dependent variable, the homogeneity $Q = 500.289$, ($p < .0000$). This indicates that the three studies utilizing suicide as a dependent variable are yielding extremely diverse results (range of effect sizes is .05 to .485). These studies were omitted from the entire sample because the large sample sizes dominated the remaining studies. Additionally, many of the suicide studies are based on proportional
Table 1

*All Articles Included in Meta-Analysis with Respective ES, Weight, and Sample Size*

<table>
<thead>
<tr>
<th>Author</th>
<th>Date</th>
<th>$Z_r$</th>
<th>$W_i$</th>
<th>$N$</th>
<th>$n$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andreasen, N.C.</td>
<td>1987</td>
<td>0.51</td>
<td>57.39</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>*Beal, S.W.</td>
<td>1989</td>
<td>0.02</td>
<td>104.12</td>
<td>108</td>
<td>72</td>
</tr>
<tr>
<td>*Carlsson, I</td>
<td>2002</td>
<td>0.40</td>
<td>21.04</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>*Carson, S.H.</td>
<td>2001</td>
<td>0.22</td>
<td>78.32</td>
<td>82</td>
<td>82</td>
</tr>
<tr>
<td>*Carson, S.H.</td>
<td>2001</td>
<td>0.32</td>
<td>43.86</td>
<td>47</td>
<td>21</td>
</tr>
<tr>
<td>*Carson, S.H.</td>
<td>2001</td>
<td>0.18</td>
<td>35.86</td>
<td>39</td>
<td>13</td>
</tr>
<tr>
<td>Cipriani, D.C.</td>
<td>2001</td>
<td>0.15</td>
<td>96.12</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>*Cox, A.J.</td>
<td>1997</td>
<td>0.20</td>
<td>61.04</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>*Cox, A.J., Leon, J.L.</td>
<td>1999</td>
<td>0.19</td>
<td>113.17</td>
<td>116</td>
<td>116</td>
</tr>
<tr>
<td>*Eysenck, H.J.</td>
<td>1994</td>
<td>0.17</td>
<td>96.12</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>*Fleming, J.T.</td>
<td>1995</td>
<td>0.07</td>
<td>67.19</td>
<td>70</td>
<td>35</td>
</tr>
<tr>
<td>*Framton, C., Sherman, M.F.</td>
<td>1999</td>
<td>0.26</td>
<td>51.02</td>
<td>54</td>
<td>54</td>
</tr>
<tr>
<td>*Gotz, D.O., Gotz, K</td>
<td>1979</td>
<td>0.12</td>
<td>452.69</td>
<td>447</td>
<td>147</td>
</tr>
<tr>
<td>*Gotz, D.O., Gotz, K</td>
<td>1979</td>
<td>0.07</td>
<td>416.49</td>
<td>418</td>
<td>110</td>
</tr>
<tr>
<td>*Hale, C.S.</td>
<td>1996</td>
<td>0.07</td>
<td>53.28</td>
<td>56</td>
<td>28</td>
</tr>
<tr>
<td>*Hall, W.B., MacKinnon, D.W.</td>
<td>1969</td>
<td>0.37</td>
<td>59.17</td>
<td>62</td>
<td>62</td>
</tr>
<tr>
<td>*Hall, W.B., MacKinnon, D.W.</td>
<td>1969</td>
<td>0.20</td>
<td>59.17</td>
<td>62</td>
<td>62</td>
</tr>
<tr>
<td>Jamison, K.R.</td>
<td>1989</td>
<td>0.24</td>
<td>43.86</td>
<td>47</td>
<td>47</td>
</tr>
<tr>
<td>Juda, A.</td>
<td>1949</td>
<td>0.23</td>
<td>110.80</td>
<td>113</td>
<td>113</td>
</tr>
<tr>
<td>Juda, A.</td>
<td>1949</td>
<td>0.44</td>
<td>177.78</td>
<td>181</td>
<td>181</td>
</tr>
<tr>
<td>*Kline, P, Cooper, C</td>
<td>1986</td>
<td>0.11</td>
<td>74.32</td>
<td>77</td>
<td>77</td>
</tr>
<tr>
<td>*Kline, P, Cooper, C</td>
<td>1986</td>
<td>0.07</td>
<td>92.46</td>
<td>96</td>
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</tr>
<tr>
<td>Ludwig, A.M.</td>
<td>1992a</td>
<td>0.35</td>
<td>976.56</td>
<td>1005</td>
<td>555</td>
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<tr>
<td>Ludwig, A.M.</td>
<td>1994</td>
<td>0.47</td>
<td>115.62</td>
<td>118</td>
<td>59</td>
</tr>
<tr>
<td>*MacKinnon, D.W.</td>
<td>1962</td>
<td>0.35</td>
<td>37.18</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Author</td>
<td>Date</td>
<td>$Z_r$</td>
<td>$W_i$</td>
<td>$N$</td>
<td>$n$</td>
</tr>
<tr>
<td>---------------------------------------------</td>
<td>-------</td>
<td>-------</td>
<td>---------</td>
<td>-----</td>
<td>-----</td>
</tr>
<tr>
<td>*Marchant-Haycox, S. E., Wilson, G.D.</td>
<td>1992</td>
<td>0.15</td>
<td>229.57</td>
<td>235</td>
<td>162</td>
</tr>
<tr>
<td>Martindale, C.</td>
<td>1972</td>
<td>0.28</td>
<td>39.06</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td>McNeil, T.F.</td>
<td>1971</td>
<td>0.41</td>
<td>46.91</td>
<td>50</td>
<td>30</td>
</tr>
<tr>
<td>*Orwoll, L.</td>
<td>1997</td>
<td>0.07</td>
<td>61.04</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Post, F.</td>
<td>1994</td>
<td>0.52</td>
<td>287.27</td>
<td>291</td>
<td>291</td>
</tr>
<tr>
<td>Post, F.</td>
<td>1996</td>
<td>1.03</td>
<td>96.12</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Preti, A., De Biasi, F. Miotto, P.</td>
<td>2001</td>
<td>0.20</td>
<td>2267.57</td>
<td>2259</td>
<td>2259</td>
</tr>
<tr>
<td>Preti, A, Miotto, P</td>
<td>1999</td>
<td>0.48</td>
<td>3086.42</td>
<td>3093</td>
<td>3093</td>
</tr>
<tr>
<td>*Rushton, J.P.</td>
<td>1990</td>
<td>0.27</td>
<td>48.90</td>
<td>52</td>
<td>52</td>
</tr>
<tr>
<td>*Rushton, J.P.</td>
<td>1990</td>
<td>0.46</td>
<td>66.10</td>
<td>69</td>
<td>69</td>
</tr>
<tr>
<td>*Rushton, J.P.</td>
<td>1990</td>
<td>0.17</td>
<td>210.04</td>
<td>211</td>
<td>211</td>
</tr>
<tr>
<td>*Rushton, J.P.</td>
<td>1988</td>
<td>0.18</td>
<td>76.95</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>*Schuldberg, D.</td>
<td>1990</td>
<td>0.04</td>
<td>625.00</td>
<td>625</td>
<td>625</td>
</tr>
<tr>
<td>*Schuldberg, D.</td>
<td>2000</td>
<td>0.19</td>
<td>1111.11</td>
<td>1108</td>
<td>1108</td>
</tr>
<tr>
<td>Singh, R.</td>
<td>1981</td>
<td>-0.18</td>
<td>198.37</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Singh, R.</td>
<td>1981</td>
<td>0.10</td>
<td>594.88</td>
<td>600</td>
<td>600</td>
</tr>
<tr>
<td>*Sitton, S.C., Hughes, R.B.</td>
<td>1995</td>
<td>-0.08</td>
<td>62.99</td>
<td>66</td>
<td>66</td>
</tr>
<tr>
<td>Srinivasan, T.</td>
<td>1984</td>
<td>0.95</td>
<td>106.28</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>Stack, S</td>
<td>1996</td>
<td>0.05</td>
<td>15625.00</td>
<td>15025</td>
<td>15025</td>
</tr>
<tr>
<td>Walker, A.M., Koestner, R, Hum, A</td>
<td>1995</td>
<td>0.32</td>
<td>45.04</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Wills, G.I.</td>
<td>2003</td>
<td>0.12</td>
<td>37.18</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

*Note.* Italics indicate a separate ES gleaned from study listed immediately above. $Z_r =$ Fisher’s $Z$ transformed Pearson Product Moment effect sizes. $W_i =$ weight (inverse standard error of the $ES^2$). An asterisk (*) denotes articles included in final aggregate after omission of outliers and methodologically weak studies.
Figure 1. Stem and leaf display of study effect sizes. Stem depicts first digit of the effect size presented in even increments. Leaf presents the second digit of all effect sizes sharing the digit presented in the stem.

Figure 2. Scatter plot depicting distribution of effect sizes.
data alone, as any world wide estimate of suicide varies from year to year and is an unstable constant.

After omitting studies using suicide as a dependent variable, the unweighted mean effect size of the 43 remaining studies was .251. The weighted mean effect size was .217 with a C.I. of .194 to .240. The homogeneity $Q = 288.538$ ($p < .0000$), indicating that suicide studies alone accounted for approximately 65% of the variability in the sample. However, the remaining studies were still too diverse to represent one population of studies.

The aggregates of the total 46 studies and the 43 remaining studies after suicide omission were compared utilizing the analog to the A.N.O.V.A ($Q_b$) to determine if the yielded effect sizes from each group were significantly different. The comparison yielded $Q_b = 415.56$ ($p < .0000$) indicating that the samples represent different populations. The remaining 43 studies yielded $Q_w$ of 288.538 ($p < .0000$), indicating remaining variability.

**Methodological and Outlier Moderators**

The remaining 43 studies were re-evaluated according to methodological design and omissions were made systematically in attempts to account for the variability within the sample. Table 2 outlines all omissions in order, including the sub-sample unweighted $(ES)$ and weighted $(ES_w)$ means, the between sample variability $(Q_b)$ with corresponding $p$-value, and the remaining sample variability $(Q_w)$ with corresponding $p$-value.

As evidenced in Table 2, as bias decreased, within sample variability also decreased. Psychobiographical and retrospective studies were first omitted due to inherent bias in biographical material that may or may not be an accurate representation
of pathology in a particular individual's life. Additionally, studies utilizing biographical material involve expert rating, a less objective means of evaluating psychopathology.

Table 2

<table>
<thead>
<tr>
<th>Omission</th>
<th>$MES$</th>
<th>$MES_w$</th>
<th>$Q_b$</th>
<th>$Q_w$</th>
<th>$k$</th>
<th>$N$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychobiographical or Retrospective</td>
<td>.223</td>
<td>.166</td>
<td>244.657</td>
<td>163.841</td>
<td>36</td>
<td>5.951</td>
</tr>
<tr>
<td>Srinivasan, 1984</td>
<td>.202</td>
<td>.152</td>
<td>147.077</td>
<td>97.293</td>
<td>35</td>
<td>5.841</td>
</tr>
<tr>
<td>Proportional Studies</td>
<td>.186</td>
<td>.138</td>
<td>117.122</td>
<td>77.621</td>
<td>31</td>
<td>5.450</td>
</tr>
<tr>
<td>D.V. Based on Interview Only</td>
<td>.165</td>
<td>.126</td>
<td>92.303</td>
<td>56.046</td>
<td>29</td>
<td>5.272</td>
</tr>
</tbody>
</table>

Note. Each descending cell indicates the noted omission in addition to the omission in the previous row. $MES$ denotes mean effect size. $MES_w$ denotes weighted mean effect size. $Q_b$ denotes variance between total studies and omitted studies. $Q_w$ denotes remaining variance within the sample after omission is made. $k$ denotes number of studies remaining after omission.

The next omission involved an outlier, the study done by Srinivasan (1984). This study yielded a large effect size of $Z_r = .9595$. Upon review of the study, it was noted that a possible reason for such a large and distinctively different effect size is related to an unusual definition creativity involving the concept of Originality alone. Thus,
Srinivasan (1984) might be measuring a different construct than other studies. Lipsey and Wilson (2001) highly recommend completely omitting outliers because

the purpose of meta-analysis is to arrive at a reasonable summary of the quantitative findings of a body of research studies. This purpose is not usually served well by the inclusion of extreme effect size values that are notably discrepant from the preponderence of those found in the research. (p. 107)

The next omission involved removal of studies utilizing dichotomous proportional data alone, based on the previous discussion of methodological problems inherent in proportional studies (see discussion on pg. 18 of this document).

Finally, the study completed by Singh (1981) was omitted as an outlier as it yielded a total effect size of -.1820. Upon review of the study, it was apparent that this study utilized high school students from India, possibly suggesting a differing population. A second effect size of .103 from the same study (Singh, 1981) was also omitted due to the differing nature of the population as a possible confound.

After the above omissions were made, the remaining studies achieved homogeneity ($Q = 35.461; p = .10$).

Comparison of Research Type

Biographical studies, while less rigorous empirically, provide interesting information. Additionally, several studies omitted due to research methodology are studies that are frequently cited in the literature. As a result, Table 3 represents sub meta-analyses sorted and aggregated by type of research design. As is evidenced in the table, studies utilizing biographical or proportional methodology yield weighted mean effect sizes that are significantly larger than studies utilizing correlational or experimental
methodologies, even before other omission criteria are implemented. The only sub-set with sufficient homogeneity were studies implementing correlational design. Additionally, correlational design yields the smallest weighted mean effect size.

Table 3

*Separation of Aggregate Findings by Research Design*

<table>
<thead>
<tr>
<th>Type</th>
<th>$MES$</th>
<th>$MES_w$</th>
<th>CI</th>
<th>$Q$</th>
<th>$k$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biographical</td>
<td>.396</td>
<td>.405</td>
<td>.356 - .455</td>
<td>53.845</td>
<td>7</td>
</tr>
<tr>
<td>(p &lt; .0000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Proportion</td>
<td>.380</td>
<td>.441</td>
<td>.377 - .505</td>
<td>54.313</td>
<td>9</td>
</tr>
<tr>
<td>(p &lt; .0000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>.243</td>
<td>.217</td>
<td>.187 - .247</td>
<td>144.922</td>
<td>20</td>
</tr>
<tr>
<td>(p &lt; .0000)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Correlational</td>
<td>.180</td>
<td>.121</td>
<td>.079 - .163</td>
<td>22.216</td>
<td>14</td>
</tr>
<tr>
<td>(P &lt; .05)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Above studies were sorted from the primary sample with suicide studies omitted.

Some studies implementing biographical sampling, but utilizing experimental designs are included in more than one of the above sub-sets. $MES$ denotes mean effect size. $MES_w$ denotes weighted mean effect size. $CI$ denotes confidence interval. $Q$ denotes variance in the sample distributed as a chi-square. $k$ denotes number of studies remaining after omission.

* denotes statistical significance.

Type of Artist

Table 4 displays the findings of sub-aggregates of studies sorted by artist type.

While many studies indicated the type of artist included in the study, several did not
include sufficient information for separate effect sizes to be calculated by sub-group. As a result, several groupings could not be effectively calculated. Sub-sets of eminent subjects, architects, and visual artists each displayed sufficient homogeneity.

Additionally, when studies using eminent vs. everyday artists were compared by analog to the ANOVA, scores indicate that the two groups are significantly different from one another ($Q_b = 42.335; p < .0000$). When separated, each display significant homogeneity.

Table 4

**Separation of Aggregate Findings by Artist Type**

<table>
<thead>
<tr>
<th>Type</th>
<th>$MES$</th>
<th>$MES_w$</th>
<th>CI</th>
<th>$Q$</th>
<th>$k$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everyday</td>
<td>.185</td>
<td>.152</td>
<td>.114 - .190</td>
<td>22.762</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>($p = .03$)</td>
<td></td>
</tr>
<tr>
<td>Eminent</td>
<td>.175</td>
<td>.131</td>
<td>.083 - .178</td>
<td>11.820</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>($p = .54)^*$</td>
<td></td>
</tr>
<tr>
<td>Architects</td>
<td>.307</td>
<td>.301</td>
<td>.144 - .458</td>
<td>.922</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>($p = .63)^*$</td>
<td></td>
</tr>
<tr>
<td>Visual Artists</td>
<td>.117</td>
<td>.101</td>
<td>.040 - .161</td>
<td>1.910</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>($p = .75)^*$</td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Above studies were sorted from the 27 primary articles remaining after all omissions. $MES$ denotes mean effect size. $MES_w$ denotes weighted mean effect size. $CI$ denotes confidence interval. $Q$ denotes variance in the sample distributed as a chi-square. $k$ denotes number of studies remaining after omission. * denotes that $p$-value reaches statistical significance.
Additionally, when architects and visual artists are compared, the two groups also display significantly different results indicating that they do not share a common population ($Q_b = 13.652, p < .0000$). However, the comparison between architects and visual artists should be interpreted cautiously due to the small number of studies.

Type of Psychopathology

The nature of the primary studies included broad and diverse definitions of mental illness. As a result, it was difficult to code precisely for psychopathology definitions that have changed drastically over time. Two trends became apparent, involving reports of symptoms within the psychotic spectrum, and symptoms of mood disorders. Other types of psychopathology were generally unspecified, utilized outdated symptomatology, or did not include sufficient information for separate effect sizes to be computed. Additionally, interrater reliability for psychopathology type was poor due to the inconsistency in reporting styles among primary studies. It is important to note that “psychotic spectrum” symptoms were most often defined by the Psychoticism scale from the Eysenck Personality Questionnaire (10 studies utilized this), which has notably poor reliability ratings (Caruso, et al., 2001). Other psychotic spectrum instruments include the Schizotypy Personality Scale (3 studies), the Rust Inventory of Schizotypal Conditions (1 study), the MMPI-II (1 study), and two studies using several measures for symptoms seen by the authors as measuring psychosis proneness. All studies determining the relationship between creativity and psychosis proneness measured mild subclinical traits. When sub-sets sorted by psychosis proneness and mood disorder are compared, they yield $Q_b = 10.982 (p = .001)$ indicating a significant difference in the occurrence of these two types of psychiatric vulnerability. Each subgroup has sufficient homogeneity,
although the aggregate for mood disorder should be interpreted cautiously due to small $k$.

See Table 5 for details.

Table 5

*Separation of Aggregate Findings by Psychopathology Type*

<table>
<thead>
<tr>
<th>Type</th>
<th>$MES$</th>
<th>$MES_w$</th>
<th>CI</th>
<th>$Q$</th>
<th>$k$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Psychotic Spectrum</td>
<td>.174</td>
<td>.140</td>
<td>.107 - .172</td>
<td>23.846</td>
<td>15</td>
</tr>
<tr>
<td>Mood Disorder Spectrum</td>
<td>.109</td>
<td>.124</td>
<td>.018 - .230</td>
<td>3.676</td>
<td>3</td>
</tr>
</tbody>
</table>

* Note. Above studies were sorted from the 27 primary studies remaining after omissions. $MES$ denotes mean effect size. $MES_w$ denotes weighted mean effect size. CI denotes confidence interval. $Q$ denotes variance in the sample distributed as a chi-square. $k$ denotes number of studies remaining after omission.

Publication Bias

Studies were also sorted according to publication status. Published and unpublished studies yielded significantly different weighted mean effect sizes ($Q_b = 16.833, p < .0000$). The difference in effects might be an indication of publication bias, as unpublished studies tend to yield significantly lower effect sizes. Additionally, of the initial 46 studies, 51% of the published studies were eventually omitted due to methodological weaknesses, while only 11% of the unpublished studies were omitted for methodological weaknesses. See Table 6 for details.
Table 6
Separation of Aggregate Findings by Publication Status

<table>
<thead>
<tr>
<th>Type</th>
<th>MES</th>
<th>MESw</th>
<th>CI</th>
<th>Q</th>
<th>k</th>
</tr>
</thead>
<tbody>
<tr>
<td>Published</td>
<td>.195</td>
<td>.145</td>
<td>.114 -.177</td>
<td>30.330</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(p = .03)</td>
<td></td>
</tr>
<tr>
<td>Unpublished</td>
<td>.145</td>
<td>.129</td>
<td>.042 -.217</td>
<td>4.610</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(p = .71)*</td>
<td></td>
</tr>
</tbody>
</table>

Note. Above studies were sorted from the 27 primary studies remaining after omissions.

MES denotes mean effect size. MESw denotes weighted mean effect size. CI denotes confidence interval. Q denotes variance in the sample distributed as a chi-square. k denotes number of studies remaining after omission.

* denotes that p-value reaches statistical significance

"Failsafe N" Analysis

Orwin (1983) presented a formula that estimates the number of unretrieved studies with an effect size equal to zero that would be needed to bring the observed effect size to some small or negligible level. Using Cohen’s (1988) description of .10 as a small observed effect size, 12 unretrieved studies with an effect size equal to zero would be needed to diminish the observed weighted mean effect size for the 27 remaining studies from the present $ES_{wr} = .14$ to .10, a negligible level. Given the difficulty obtaining unpublished studies, there is a possibility that such 12 studies exist, suggesting the present meta-analysis findings could be subject to change with further methodologically rigorous research.
Interrater Reliability

Twelve studies were randomly selected from the initial 46 studies. These twelve studies were coded for twenty categorical variables by a separate trained coder and compared for interrater reliability. The initial coder was an individual untrained in advanced psychopathology, statistical procedures, or research methods. Upon comparison, the total percent agreement between coders was 80.3%. The same randomly selected studies were separately coded by two additional trained researchers who are doctoral students in clinical psychology, having studied advanced psychopathology, statistical procedures, and research methods. Graduate student researchers earned a total of 91% agreement.
Chapter 4
Discussion

Hypothesis 1

The meta-analysis results will indicate a global positive relationship between creativity and psychopathology.

The weighted mean effect size for the entire sample (including all 46 studies) indicated a small (Cohen, 1988) positive relationship between creativity and psychopathology that would require only 12 studies with effect sizes equal to zero to drop below significance. The initial main aggregate included all studies indicating a relationship between creativity and psychopathology, and utilized several diverse means for identifying both creativity and psychopathology. There was extreme heterogeneity within the sample, indicating that it is inappropriate to globally state that a relationship exists between creativity and psychopathology, and that the literature is diverse in nature and scope.

Hypothesis 2

Studies utilizing interviews to measure psychopathology will yield higher effect sizes than studies using objective measures because interviews are generally more biased than objective measures.

When studies using interview procedures to determine psychopathology symptomatology were removed from the total sample, the overall effect size significantly
decreased. This indicates that any study utilizing non-blinded interview procedures is highly vulnerable to yield skewed results in favor of the initial hypothesis. Several of the frequently cited studies (Andreasen, 1987; Jamison 1989; Ludwig, 1994) suggesting a strong incidence of affective disorder among authors utilize interviews to measure psychopathology.

_Hypothesis 3_

_Studies utilizing psychobiographies will yield larger effect sizes than studies using living subjects recruited from the artistic community._

When studies using biographical sampling techniques were removed from the study, comparisons indicate an extremely large difference between yielded effect sizes. These biographical and retrospective studies, while interesting, represent a different sample or population than other empirical studies measuring the relationship between creativity and psychopathology. It is of interest that Ludwig’s (1994) large and often cited study utilizes biographical information, and is often quoted in support of the creativity/madness connection. However, all retrospective studies when aggregated represent a different population than studies utilizing living artists. The statistical evidence in this meta-analysis suggests that biographical material cannot be considered equivalent to measuring living subjects utilizing well-validated, objective instruments.

_Hypothesis 4_

_Creativity and substance abuse will have a stronger relationship than alternative psychiatric diagnoses._

Due to difficulty reliably coding the type of psychopathology, Hypothesis 4 was not evaluated. However, several studies are attempting to connect creativity with sub-
clinical aspects within the psychotic spectrum, particularly schizotypal symptoms. In an attempt to uncover the process of creativity, recent studies indicate that creative persons have increased latent inhibition, indicating that creative individuals remain in contact with the extra sensory information that is often screened out by individuals with higher levels of latent inhibition (Peterson, Carson, & Higgins 2003). Carson (2001) suggests that the brain regions involved in schizotypal vulnerability, specifically latent inhibition, might be responsible for both fluency and originality, as well as sub-clinical schizotypal experiences. The weighted mean effect size for the psychotic spectrum subset \( r = .14 \) might indicate further validity to the latent inhibition hypothesis.

**Hypothesis 5**

*Performing artists will have higher scores of psychiatric vulnerability than visual or graphic artists due to lifestyle factors.*

The hypothesis suggesting that performing artists would yield higher rates of psychopathology was not measured due to insufficient data within primary studies. Only one study included in the final sample of 27 studies utilized primarily performing artists. That one study yielded an effect size of \( r = .14 \), comparable with other effect sizes.

**Hypothesis 6**

*Studies using eminently creative subjects will yield larger effect sizes than studies using individuals from the normal population that score highly on standardized measures for everyday creativity.*

Eminent artists (as defined by employment within the profession of choice) achieved significantly lower effect size magnitude than everyday artists (defined utilizing a variety of creativity measures). Each group was sufficiently homogeneous. This is
counterintuitive to the colloquially held notion that artists (defined behaviorally as those engaging in art as employment) are significantly more likely to suffer from mental illness. However, psychometric measures used to tap into originality, fluency, and other aspects of creative personality correlate with measures used to determine symptoms of psychiatric vulnerability. It is interesting to be reminded that one of the symptoms for Hypomania in the Diagnostic and Statistical Manual – IV (DSM-IV, American Psychiatric Association, 1994) involves “increased goal directed activity” (pg. 338). It is tautological that creative persons will appear more mentally ill when creative production, which involves intense goal directed activity, in and of itself is considered a symptom of a psychiatric condition.

Conclusions

The broad diversity of creativity literature suggests that creativity is a multi-faceted and rich topic that cannot easily be reduced into a single correlational coefficient. The Romantic image of the suffering artist is both true and false. It is clear when reading a biography about the anguished Edgar Allen Poe, or the earless Vincent Van Gogh, that many geniuses and artists have suffered greatly. However, the preceding meta-analysis indicates that creativity in and of itself has only a small relationship with psychopathology in a global sense. The passionate and powerful demonstrations of psychopathology in specific eminently creative individuals does not allow for a broadly generalizable statement about creativity and psychopathology.

Implications for Clinical Practice

Creative persons, while not categorized as mentally ill in this meta-analysis, are unique individuals with the capacity to view the world in fresh and original ways.
Unfortunately, the psychiatric community’s long held postulate that creativity and madness are related holds the danger of alienating suffering artists from seeking out treatment.

The unwitting practitioner might also unconsciously accept the Romantic notion of the suffering artist and thereby unknowingly cause harm or alienate his or her artist client. Rather than categorizing artistic behavior as symptomatic, the psychiatric and psychological communities would benefit from focusing on the unique individual experiences of their artist clients. Additionally, practitioners should remain aware of the possibility of discrimination in the lives of artists resulting from prejudice connected to colloquial beliefs about the sanity of creative individuals. Practitioners choosing to serve artist clients should be familiarized with the previously reported research suggesting the tendency of artists towards schizotypal symptoms, primarily in the area of latent inhibition. It is also important to differentiate between sub-clinical tendencies and severe or debilitating symptoms.

Artists living in today’s society have been exposed to frequent messages about how their creativity might cause or be caused by fragile mental health or a vulnerable self. Creative clients may at times be victim to self-fulfilling prophecies regarding their own emotional and mental states. Practitioners serving this special population of artists should educate creative clients that, contrary to popular culture, the neurological process that leads to creativity is not necessarily related to mental health or illness, but is a unique individual characteristic that can lead to increased creativity or emotional fragility, depending on other life circumstances. Like any client, negative beliefs and devaluing
self-representations can cause ongoing symptoms that are the result of the self-representations, not of creativity.

Research on everyday creativity suggests that creativity is a trait normally distributed in the general population. As a result, practitioners might benefit from being aware that clients who don’t participate in professional art production might be equally creative within their given professions. Helping all individuals realize their own creative potential can promote healing and wellness.

Limitations

Because of the widely diverse scope of creativity literature, it is possible that not all relevant studies were located and included in this meta-analysis. As it is nearly impossible to completely measure each member of a population, it is also nearly impossible for a meta-analysis to locate an entire population of studies. This meta-analysis included a substantial sample of studies, but not the entire population. Additionally, the broad definitions of creativity and psychopathology in the included studies might indicate questionable generalizability of findings. Many of the primary studies were statistically and methodologically problematic, and the comparison between the published and unpublished studies indicate potential for publication bias.

Implications for Further Research

Any future research investigating creativity and psychiatric vulnerability should utilize methodological rigor. Additionally, researchers should be aware that using retrospective data will yield rates of pathology that are significantly higher than studies using living subjects. Future studies differentiating types of artists should provide more understanding about the generalizability of findings. Further retrospective, proportional,
or interview-based studies might provide theoretical interest, but will not provide a better understanding of the intrinsic magnitude of the relationship between creativity and psychopathology. Operational definitions for both creativity and psychopathology should be clearly indicated.

Researchers wishing to focus on wellness might further evaluate the personality characteristics and strengths of creativity, rather than focusing on illness. Researchers interested in latent inhibition would benefit from further pursuing the neurological and biological uniqueness of creative individuals.
References

References marked with an asterisk indicate studies included in the meta-analysis.


* Psychological Reports, 89(3), 719-727.


Appendix A

Example of FileMaker Coding Database
Appendix B

Curriculum Vita
CURRICULUM VITA
June 2004

Charity J. Hiebert-Benham, M.A.
309 W. 5th
Newberg, OR 97132
Mobile: (503)750-4774
e-mail: cjbenham@georgefox.edu

EDUCATION

1999 - Present
Graduate School of Clinical Psychology: **APA Accredited**
George Fox University, Newberg, OR
Student in Clinical Psychology Psy.D. Program

April, 2001
Graduate School of Clinical Psychology: **APA Accredited**
George Fox University, Newberg, OR
**MA. in Clinical Psychology**

1996
George Fox University, Newberg, OR
**B.S. in Psychology**

CLINICAL TRAINING

9/03-Present
**Extended Practicum:** Oregon Psychoanalytic Society and Institute;
**Psychotherapy Seminar:** Portland, OR
Population: Adult outpatient treatment in private practice setting, one client seen twice weekly for a minimum of one year, applying psychodynamic psychotherapy principles.
Supervisors: Harold Boverman, M.D.; Kelly Reams, L.C.S.W.; Kurt Free, Ph.D.
**Total Hours:** 144
- Long-term psychodynamic psychotherapy
- Biweekly individual supervision
- Biweekly group supervision/didactic

9/02-4/03
**Preinternship Oversight:** George Fox University; Graduate School of Clinical Psychology: Newberg, OR
Population: First and second year graduate students in Psy.D. training program.
Oversight of supervision: Clark Campbell, Ph.D., Wayne Adams, Ph.D.
**Total Hours:** 64
- Supervision of first and second year graduate students
- Video/audio tape review
- Formal evaluation of trainee skills
**Preinternship:** Tualatin Valley Centers: Beaverton, OR  
Population: Adult outpatient mental health, primarily low-income, emphasis on solution-focused time limited treatment in a Community Mental Health setting.  
Supervisor: Ken Ihli, Ph.D.  
**Total Hours:** 752.25  
- Individual therapy  
- Couples therapy  
- Multidisciplinary treatment planning  
- Specialized training in ethical issues and managed care treatment settings  
- Crisis intervention  
- Consultation with multidisciplinary treatment team  
- Weekly individual and group supervision

**Practicum II:** Caremark Behavioral Health Child & Adolescent Program  
Population: Sexually reactive children ages 4-6 in a hospital-based outpatient clinic.  
Supervisor: Kelley Carmichael, Psy.D.  
**Total Hours:** 102.5  
- Facilitation of group for sexually reactive children: Ages 4-6  
- Group curriculum development  
- Play therapy  
- Family therapy  
- Multi-family group therapy  
- Weekly individual supervision

**Practicum II:** Legacy Emmanuel Hospital: Project Network, Portland, OR  
Population: African American women in residential Alcohol and Drug Treatment; emphasis on women with young children. Paid position.  
Supervisor: Kelley Carmichael, Psy.D.  
**Total Hours:** 653  
- Facilitation of chemical dependency process groups  
- Facilitation of parent training classes  
- Individual therapy  
- Play therapy  
- Crisis intervention  
- Milieu management  
- Psychosocial assessment  
- Family therapy  
- Consultation with chemical dependency staff on the interpretation of psychological evaluations in a culturally sensitive manner  
- Intensive training on African American culture and issues with current mental health system  
- Consultation with multidisciplinary treatment team  
- Weekly individual supervision
**Practicum II: Hazelden Springbrook, Newberg, OR**
Population: Middle-Upper SES adults with Substance Abuse Disorders: adult males with an emphasis on gender specific treatment, chronic pain, body image issues, issues for medical professionals, and spirituality.
Supervisor: Shane Haydon, Ph.D.
**Total Hours: 200**
- Co-facilitation of chemical dependency process group
- Co-facilitation of men’s issues group
- Co-facilitation of grief/loss/spirituality group
- Individual therapy
- Psychosocial assessment
- Neuropsychological assessment
- Psychodiagnostic assessment: emphasis on integration of MMPI-II data
- Comprehensive chemical dependency treatment planning
- Weekly individual supervision

**Practicum I: Multnomah County Corrections: Juvenile Detention Hall, Portland, OR**
Population: Adjudicated Adolescents
Supervisor: Steve Huggins, Psy.D.
**Total Hours: 376.5**
- Individual therapy
- Psychosocial assessment
- Cognitive Assessment (WISC-III)
- Personality Assessment (MMPI-A)
- Consultation with multidisciplinary treatment team
- Crisis intervention
- Weekly supervision

**Practicum Clinical Trainee: Graduate School of Clinical Psychology, George Fox University, Newberg, OR**
Practicum Trainee Experience
Supervisors: Carol Dell’Oliver Ph.D., Wayne Adams, Ph.D.
**Total Hours: 28**
- Participation in group supervision, case presentation, clinical didactic, and consultation
- Individual simulated psychotherapy

**RELATED EXPERIENCE**

**Mental Health Contractor: Hazelden Springbrook, Newberg, OR**
Supervisor: Shane Haydon, Ph.D.
- Administration of neuropsychological assessment instruments
- Integrated psychological assessment: test administration, interpretation, and report writing
- Coordination of care
5/03-8/03 Mental Health Therapist: Tualatin Valley Centers, Tigard, OR
Supervisor: Ken Ihli, Ph.D.
- Intake assessments: adult mental health
- Individual/couples therapy: adult mental health
- Multidisciplinary treatment planning

3/02-5/03 Admissions Coordinator: Caremark Access, Portland, OR
Supervisors: Brenda Bretz, B.A., John Custer, L.C. S.W.
- Crisis telephone counseling
- Face to face mental health evaluations in Emergency Department
- Level of care determination
- Psychiatric admission coordination
- Assessment and referral of patients in psychiatric crisis

7/01-11/02 Child and Family Therapist: Legacy Child and Adolescent Treatment Program, Portland, OR
Population: Children Ages 5-17
Supervisors: Kenneth Ensroth, M.D., John Custer, L.C.S.W.
- Family therapy
- Group therapy: sexually reactive children, boundaries skills training
- Individual play therapy

11/00-5/01 Mental Health Therapist: Pacific Gateway Hospital, Portland, OR
Population: Adults and adolescents in private inpatient hospital setting.
Supervisor: Margaret Edwards, R.N., Administrator
- Milieu management
- Group facilitation
- Individual client contact

5/00-8/00 Testing Technician: Riverside Publishing, Itasca, IL
Population: Adult Volunteers
Stanford-Binet Intelligence Scale-5th Ed. Try-out project
Coordinator/Trainer: Gale Roid, Ph.D.
- Administration of try-out version of the revised Stanford-Binet 5th edition (30 Administrations)

2/00-6/00 Scheduling Coordinator: Chehalem Youth and Family Services, Newberg, OR
Supervisor: Stephen Haney, Human Resources Director
- Coordinating and facilitating scheduling needs and facilitating team organization among staff members
- Performing basic managerial duties for relief staff

11/98-7/99 Shift Leader: Chehalem Youth and Family Services, Newberg, OR
Population: At-risk adolescents in residential treatment
Supervisors: Noelle Carrol, House Coordinator, Stephen Haney, Human Resources Director
- Leading staff teams in milieu setting
- Training new staff members
10/97-5/00  **Case Manager/Youth Treatment Specialist:** Chehalem Youth and Family Services, Newberg, OR  
Population: Seriously emotionally disturbed adolescents in residential treatment center.
Supervisors: Noelle Carroll, House Coordinator, Stephen Haney, Human Resources Director
- Milieu management
- Treatment planning
- Weekly, monthly, and quarterly progress reports
- Treatment team participation
- Individual mentoring
- Tutoring
- Development of positive behavior support plans
- Aftercare planning

7/96-7/97  **English Conversation Instructor:** Century Language Services, Pusan, South Korea  
Population: Adults, adolescents, and children
- English instruction
- Curriculum development

### TEACHING EXPERIENCE

9/03-6/04  **Graduate Teaching Assistant:** George Fox University, Graduate School of Clinical Psychology  
Professor: Clark Campbell, Ph.D.
- Supervision of first-year graduate students in initial practicum experience.
- Lab instruction: tape review, supervision of dyadic mock therapy experience

9/02-5/03  **Adjunct Professor:** George Fox University  
PSY 150: Introduction to Psychology (2 sections)

9/01-4/02  **Lab Instructor:** George Fox University  
PSY 300: Counseling  
Professor: Clark Campbell, Ph.D.

9/01-6/02  **Graduate Teaching Assistant:** George Fox University, Graduate School of Clinical Psychology  
Professor: Carol Dell'Oliver, Ph.D.
- Administrative duties to assist Director of Clinical Training
- Management of student files

10/01  **Guest Lecturer:** George Fox University  
Personality Theory: Abraham Maslow

3/01  **Guest Lecturer:** George Fox University  
Personality Theory: Abraham Maslow
RESEARCH EXPERIENCE

9/00-5/04

**Research Vertical Team Member:** George Fox University
Team Focus: Cognitive/memory assessment, learning disorders, childhood disorders, academic achievement
Academic Advisor: Wayne Adams, Ph.D.
- Research Collaboration
- Mock preliminary/final defense

Dissertation: **Artistic Creativity and Psychiatric Vulnerability: A Meta-Analysis**
Dissertation Chair: Wayne Adams, Ph.D.
Team Members: Kathleen Gathercoal, Ph.D.; Susan O’Donnell, Ph.D.
Completed: June, 2004

PRESENTATIONS


ADDITIONAL PROFESSIONAL TRAINING

**Psychodynamic Seminar:** Monthly consultation group focusing on psychodynamic diagnosis and treatment, Newberg, OR. September 2002-April 2004
Student facilitator: September 2003-April 2004
Facilitator: Kurt Free, Ph.D.

**Contemporary Psychoanalytic Diagnosis and Treatment Implications:** The Northwest Center for Psychoanalysis, Seattle, Washington. March, 2002.
Presenter: Nancy McWilliams, Ph.D.

**Substance Use Disorders: Diagnosis and Treatment and Related Topics:** George Fox University, Newberg, Oregon. March, 2001.
Presenter: Shane Haydon, Ph.D.

**Integration in the Free Church Traditions: Quakers and Mennonites**
Presenter: Alvin C. Dueck, Ph.D.

**Psychotherapy with African American Clients:** George Fox University, Portland, Oregon. January, 2000.
Presenter: Kumea Shorter-Gooden, Ph.D.

**Geropsychology:** George Fox University, Newberg, Oregon. September, 1999.
Presenter: Cliff Singer, M.D.
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RELEVANT COURSEWORK

Scientific Foundations of Psychology
Theories of Personality and Psychotherapy
Psychopathology
Learning and Cognition
Social Psychology
Child Development
Adult Development
History and Systems of Psychology
Human Sexuality/Sexual Dysfunction

Professional Sequence
Ethics for Psychologists
Cognitive/Behavioral Psychotherapy
Psychodynamic Psychotherapy
Family and Systems Psychotherapy
Object Relations Psychotherapy
Psychopharmacology
Multicultural Psychotherapy
Spanish for Mental Health Professionals
Biological Basis of Behavior
Group Psychotherapy
Geropsychology
Psychology of Shame
An Academic Career in Psychology
Professional Issues

Assessment Sequence
Personality Assessment
Intellectual/Cognitive Assessment
Neuropsychological Assessment
Projective Assessment
Comprehensive Assessment
Forensic Assessment

Research Sequence
Statistical Methods
Psychometrics
Research Design

G.P.A.: 3.8