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Psychopathology and Creativity Among Creative and Non-Creative Professions

Victor Kwan
San Jose State University

PSYCHOPATHOLOGY AND CREATIVITY AMONG CREATIVE AND NON-CREATIVE PROFESSIONS

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Victor W. Kwan

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By

Victor W. Kwan

APPROVED FOR THE DEPARTMENT OF PSYCHOLOGY

SAN JOSÉ STATE UNIVERSITY

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Dr. Gregory Feist	Department of Psychology
Dr. Erin Woodhead	Department of Psychology
Dr. Robert Cooper	Department of Psychology

ABSTRACT

PSYCHOPATHOLOGY AND CREATIVITY AMONG CREATIVE AND NON-CREATIVE PROFESSIONS

By Victor W. Kwan

The mad genius debate has been a topic that has been discussed in both popular culture and academic discourse. The current study sought to replicate previous findings that linked psychopathology to creativity. A total of 165 biographies of eminent professionals (artists, scientists, athletes) were rated on 19 mental disorders using a three point scale of not present (0), probable (1), and present (2) for potential symptoms. Athletes served as an eminent but not creative comparison group in order to discern whether fame, independent of creativity, was associated with psychopathology. Comparison of proportion analyses were conducted to identify differences of proportion between these three groups for each psychopathology. Tests for one proportion were calculated to compare each group's rates of psychopathology to the rates found in the U.S. population. These analyses were run twice, where subjects were dichotomized into present and not present categories; first, "present" included "probable" (inclusive) and second where it included only "present" (exclusive). Artists showed greater frequency rates of psychopathology than scientists and athletes in the more inclusive criteria for inclusion, whereas both artists and athletes showed greater frequency rates than scientists in the stricter criteria. Apart from anxiety disorder, athletes did not differ from the U.S. population in rates of psychopathology whereas artists differed from the population in terms of alcoholism, anxiety disorder, drug abuse, and depression. These data generally corroborate previous research on the link between creativity and psychopathology.

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Introduction

The stereotype of the mad genius has been a popular notion for quite some time. Brilliant, yet mad artists such as Vincent van Gogh, innovators such as Howard Hughes, and mathematicians such as Isaac Newton have upheld this view throughout history (Brownstein & Solym, 1986; Jeste, Harless, & Palmer, 2000; Perry, 1947). The list of geniuses with mental illness could go on and on. But is there truly a legitimate link between psychopathology and brilliance? Indeed this idea may ring true as research uncovers support for a relation between mental illness and extraordinary people.

Creativity

Creativity can be described as consisting of two qualities, originality and usefulness (Amabile, 1996; Feist, 1998; Runco & Jaeger, 2012; Sternberg, 1998). A creative endeavor must not only be different from what has been previously performed in a given domain but also useful. In this case, the term "usefulness" can also mean beautiful or provocative for artwork and literature. Some have argued that the term "usefulness" could be replaced by the word "meaningful" (Feist, in press). With this change in terminology, the need to qualify "useful" as also beautiful or provocative is no longer necessary. Products of both art and science can be meaningful, whereas a piece of artwork would not necessarily be useful. This results in a simpler, yet more accurate, definition.

Furthermore, a distinction can be made between creative achievements produced by eminent people compared to those of non-eminent people. This distinction is known as "Big C" and "little c" (Kaufman, 2009; Richards, 1990). The former changes history and

forges widespread change in a given domain, whereas the latter has a much smaller circle of impact. “Little c” creativity may yet be relevant to this topic due to its importance to the cognitive processes that underlie creativity as a whole; however, the intention of the following study is, generally, to describe and further advance our understanding of “Big C” creativity.

Models of Creativity

Different methods for studying original thoughts are made possible through cognitive approaches. Creative output seems to have a complex process with multiple steps and phases (Rothenberg, 1990). Among the most notable cognitive approaches to creativity is Campbell’s (1960) proposal of the Blind Variation and Selective Retention (BVSR) model of creativity. The idea behind this model is that a person in the creative process generates ideas randomly without prior knowledge of their utility and then follows with a selective retention phase where only the best ideas are kept and used. Simonton (2013) recently updated this model with quantitative variables. These variables were number of solution sets, each solution’s probability of fruition, and each solution’s utility. Simonton’s argument is that as the utility goes up so does creativity. Also, as each solution’s probability of being thought of increases, creativity decreases. If a solution has a high probability of being generated by a large number of people, then the solution is considered “sighted.” A solution that is “sighted” is not creative. If a person knows that a solution is going to work beforehand, then nothing novel is going to come out of using it.

Casting a wide cognitive net and producing many solutions is not enough for a successful creative work; the solution must also be useful or meaningful. Many answers

to a problem are not useful if none are correct. Zabelina and Robinson (2010) attempted to address this second requirement by proposing that creative people are better at controlling their cognitions than others. According to this theory, a successful creative person could broaden and narrow their perception at will to complete the task at hand. This theory of flexible cognitive control posits that a creative individual could be, at times, unfocused perceptually, in order to generate less sighted ideas. Then, when necessary, this same person could narrow their focus in order to refine their ideas to the greatest efficacy.

Generating Novel Concepts

The ability to generate novel concepts in the BVSR model is how well a person is able to produce ideas that are low in sightedness. Latent inhibition (LI) is a selective process that may relate to sightedness. Latent inhibition is conceptualized as a person's tendency to filter or screen information as irrelevant. Someone who is low in LI will typically associate a broader set of stimuli with a single idea (Carson, 2011). Thus, solutions that are less sighted are more likely to be cultivated by someone who is low in LI. It is possible that different psychopathologies may either reduce or increase a person's inhibition. Some researchers have found low levels of latent inhibition to be associated with creative achievement and psychopathology (Carson, Peterson, & Higgins, 2001; Fink, Slamar-Halbedl, Unterrainer, & Weiss 2012). However, others, such as Wuthrich and Bates (2001), found no link between creativity and the related construct of psychoticism, which attempts to measure subclinical precursors to mental illness.

Psychopathology and Creativity

Despite these findings, the details of the relationship between creativity and psychopathology remain unclear. This is, in part, because psychopathology is difficult to objectively assess (Barron, 1963). The most recent edition of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.), otherwise known as the *DSM-5*, requires that diagnoses concerning psychopathology include impairments to a patient's personal, social, academic, or occupational functioning (American Psychiatric Association, 2013). Practitioners performing a diagnosis must also consider if the patient's symptoms are dysfunctional, deviant, or distressing. However, the *DSM* has been revised through several iterations and has modified its definition of what constitutes a psychopathological disorder multiple times (Stein et al., 2010). The difficulties in acquiring objective measures of mental disorders have provided ample challenges to the study of psychopathology and creativity.

In addition to diagnosable mental disorders, subclinical precursors of psychopathology can also be measured through scales of psychoticism. Generally, psychoticism attempts to measure these symptoms by testing for hostility, aggressiveness, and impulsiveness. These scales, such as Eysenck, Eysenck, and Barrett's (1985) psychoticism scale, were developed in an attempt to measure the nuances of subclinical and clinical madness in different individuals. By no coincidence, psychoticism has also been the subject of investigation in its relation to creativity (Eysenck, 1993).

The literature on psychopathology and creativity is extensive but with mixed results. For example, a review by Ludwig (1992,1995) of over 1000 eminent

professionals, including, but not limited to, artists, writers, scientists, and musicians revealed that extremely creative individuals were more likely to suffer from psychopathology than their less gifted counterparts. A similar review conducted by Post (1994) also drew a similar conclusion where a creative sample was found to exhibit more neurotic features than what was observed in the population. The sample in this study was restricted to deceased subjects of biographies reviewed by the *New York Times*. These biographies were then examined for signs of psychopathology in each eminent professional and correlated with each domain of expertise. The results showed that people who excelled at creative endeavors such as poetry and fiction writing suffered from higher rates of psychopathology.

In hindsight, seeing whether predispositions towards unsociability and psychopathology were associated with creativity was a justifiable endeavor. After all, highly creative and dramatic works of literature could easily be seen as the result of extreme suffering (Silvia & Kaufman, 2010). Some evidence came to light to support this finding, such as Cox and Leon's (1999) finding of unsociable traits, which were measured through scales of psychoticism, being associated with the onset of fully diagnosable psychopathology in creative people.

However, any association between these psychoticism and creativity have been mixed with only limited support for this sort of link (Acar & Runco, 2012). Nonetheless, it may be too soon to write off psychoticism completely. Recent evidence shows that creative people are more likely to not only score higher on over inclusive thinking, a

measure of schizotypy, but also are more likely to claim that they had felt experiences from previous lives that they had lived (Meyersberg et al., 2014).

Oddly enough, despite Ludwig's (1992, 1995) findings, the exploration between creativity and psychopathology became much more puzzling as time went along. Although Ludwig (1992) argued that psychopathology explained very little variance in terms of scientific achievement, Ko and Kim (2008) made the case, in a review of 66 scientific geniuses, that psychopathology contributed a strong moderator effect. An implication of this study is that psychopathology may not be as detrimental to scientific endeavors as previously thought. Kyaga et al. (2011) reported that people suffering from schizophrenia and bipolar disorder were overrepresented in creative professions. Yet Silvia and Kimbrel (2010) argued that anxiety and depression predict very little in the way of creativity. They found that anxiety and depression could only explain 3% of the variance in creative thinking. It must be noted, however, that the subjects who were examined in Silvia and Kimbrel's (2010) study were not in fact eminent or extraordinarily talented. They were drawn from the university's undergraduate convenience sample and thus were fundamentally different from the people examined in the Ludwig (1992, 1995) study.

Because anxiety and depression cannot be used to predict creativity, these findings would imply that psychopathologies do not in fact cause creativity. Two alternative explanations are that it is more likely that psychopathology either co-occurs or is caused by creativity. It is also possible that other factors influence both creativity and psychopathology separately. Alternatively, the stresses of producing creative works may

induce psychopathology in different people (Silvia & Kaufman, 2010). Although the findings from non-eminent people did not reflect that of the highest levels of creativity, it is not as if nothing can be learned from ordinary people such as your local undergraduate participant.

Research Questions

The field of creativity and psychopathology is rich with opportunities for further research. However, the purpose of this current study was to update the data set that was published over 20 years ago by Ludwig (1992, 1995). Not only is the reported sample itself over 20 years old, but the subjects examined were required to be deceased, further distancing them from their contemporaries. Therefore, an update and extension of the study is now in order. Additionally, the professional categories proposed in Ludwig (1992, 1995) required reworking. For instance, several of the professions listed under social sciences, such as historian and philosopher, are not actually sciences at all and are frequently grouped with humanities. The current study also improves upon the previous methodology, which was vulnerable to researcher bias due to the investigator's awareness of the hypothesis (Ludwig, 1992).

However, one main goal of the current study is to see whether Ludwig's findings from 20 years ago and with a different sample still hold and replicate in a somewhat broader sample. Additionally, as consistent with Simonton (2014), we predict that scientists will suffer particularly little from lifetime rates of psychopathology whereas the other professions, especially the arts, will suffer more compared to base rates in the general population. This finding was also replicated in a population of African-American

scientists and artists (Damian & Simonton 2015). Jonason, Richardson, and Potter (2015) also found that people who are high in psychopathological traits, tend to report lower scholarly skills and higher performance skills. A sample of athletes, who are eminent yet non-creative, who have had biographies written about their lives, will serve as another comparison group. These athletes, who are equally eminent but not creative, can be used to determine whether it is fame or creativity that is most strongly associated with psychopathology.

Method

Subjects

Rankings in dictionaries, encyclopedias, and best of lists were used to compile an original list of 766 potential creative, eminent scientists and artists for potential inclusion in the study. To prevent overlap with Ludwig's (1992) sample, subjects must have either died after 1950 or been born before 1980 if they were still alive.

The original sample of eminent/creative subjects was selected from a compilation of lists for each respective career domain. Each list was ranked on a 3 point scale for trustworthiness, with a 1 being of questionable validity, 2 being more subjective, and a 3 being very trustworthy. An example of a list ranked 3 for trustworthiness is the list of Nobel laureates for chemistry. A list given the rank of two 2 was the list of biographies of psychologists in the *Encyclopedia Britannica* and a list given the rank of 1 was the List of Some of the Most Famous Sociologists found on the website www.about.com. An index of eminence was calculated for each potential subject within their respective domain. The 45 most eminent professionals were selected into the sample. Individuals who tied for the

45th most eminent position were included in the sample. This procedure led to 766 potential subjects. Professionals in multiple domains were sorted in the category to which they contributed the most. The current sample was validated against *Time* Magazine's top 100 most influential people list and other rankings of eminent artists and scientists.

Of these 766 potential subjects, 391 did not have biographies written about them, leading to a potential sample of 375. Of these, biographies were purchased on 194 subjects. Of these 194 biographies, 165 of them have been fully rated by two raters. Of these 165 subjects, 143 were male and 22 were female. Scientific domains were defined as technology/invention, mathematics, physics, chemistry, biology/medicine, psychology and social sciences (anthropology and sociology). The other domains fell under creative arts-visual arts, fiction writing, poetry, acting, musical performance, and musical composition. Geological scientists were excluded due to a lack of biographies. These professions were also sorted into larger groups of artists (n = 85), STEM (Science, Technology, Engineering, & Math) scientists (n = 59), and athletes (n = 21). The group sizes from each domain are detailed in Table 1.

Table 1

Specific Domains and Group Sizes

Domain	Group Size
Artists	**85**
Visual Arts	7
Fiction Writing	28
Poetry Writing	13

Acting	15
Music Performance	19
Music Composition	3
Scientists/STEM	**59**
Technology/Invention	15
Mathematics	7
Physics	10
Biology/Medicine/Chemistry	12
Psychology	9
Social Sciences	6
Comparison Group	**21**
Athletes	21
Total	**165**

Materials and Apparatus

Biographies. One hundred and ninety-four biographical sources were purchased for study, some of which were paperbound and the rest of which were in eBook format (Kindle). To be included, biographies must have included information on the creator's personal life and were not solely intellectual or work biographies. Autobiographies, biographical chapters, letters, and memoires were excluded.

Coding of the biographies required the books first to be in electronic format. For books that could not be purchased electronically, a guillotine paper trimmer was utilized to remove the spines from the pages of books (Appendix A). A document scanner was

then used to scan the remaining pages. Optical character recognition (OCR) software, Adobe Acrobat X Pro was used to identify the letters within the scanned pages of these books. This allowed for electronic keyword search throughout the entirety of each book.

Procedure

Digitally converted paper books and eBooks were used to code for the following demographic variables: profession/career, date of birth, date of death (if deceased), year of mother's death, year of father's death, birth order, race/ethnicity, gender, year of marriage (first), year of marriage (second), country of birth. Copies of these biographies were then abbreviated to include only paragraphs that contained any one or more keywords that pertain to psychopathology and were searched for by using an automatic search function that is compatible with plain text. These keywords were based on a list used by Ludwig (1995) and then expanded through a discussion between the investigators after a review of the *DSM-5*. A list of the keywords can be found in Appendix B. The specific illnesses that were searched for are detailed in Table 2 below. After computer selection of paragraphs by key words, two graduate student raters further narrowed the paragraphs to include only paragraphs where the keywords were clinically significant and were describing the creator in question. These were the paragraphs that ended up being rated for the presence or absence of psychopathology.

Table 2

Psychopathologies of Interest

Psychopathologies	
Adjustment disorder	Alcoholism
Anxiety disorder	Autism spectrum disorder
Bipolar disorder	Conduct disorder
Depression/depressive disorders	Drug use/dependency
Eating disorder	Gambling disorder
Kleptomania	Obsessive compulsive disorder
Paraphilia	Personality disorder
Posttraumatic stress disorder	Schizophrenia
Sleep disorder	Somatic disorder
Suicide/suicide attempt	Synesthesia

Seven raters were selected and trained to identify possible psychopathologies in each biography. Subjects were coded for lifetime prevalence of any of the listed psychopathologies. Psychopathologies were rated on a scale of not present (0), probable (1), and present (2) at any time during the life. Data from Ludwig's (1992, 1995) study were used as training material for training new raters on reliability. Potential raters were given paragraphs selected from a biography, then asked to code the given reading material for the psychopathologies described above. Ratings were compared against the original coding data from Ludwig's study. Inter-rater reliability was measured using

GWETS AC_1 (Gwet, 2008). GWETS AC_1 is a measure of inter-rater reliability that is similar to, yet more stable and reliable than, the Kappa statistic (Wongpakaran, Wongpakaran, Wedding, & Gwet, 2013). However, GWETS AC_1 differs from Kappa in the way the probability of chance agreement is calculated. This difference is intended to create a robustness to trait prevalence and marginal probabilities (Gwet, 2008). Kappa also does not accommodate multiple rating categories, whereas GWETS AC_1 does. This makes GWETS AC_1 a more appropriate method of measuring reliability for this study. Each trained rater surpassed a GWETS reliability of .80 and were considered for reliable coding work. Each rater independently coded for psychopathologies in eight different biographies of different individuals. Following training, each rater read an abbreviated version of each biography where the names of the subjects are replaced with the word CREATOR to keep the raters blind and free of any previous bias that may exist. These abbreviated biographies were then coded for psychopathologies by individual raters. Two independent raters rated each biography. Any disagreement was adjudicated by a senior rater (project faculty member) in order to establish the final rating.

Results and Analyses

Comparison of proportions tests were performed to determine whether there were differences in mental health among the professions. The comparison of proportions test uses a chi-squared distribution to evaluate significance. An individual could be rated as either mentally healthy or unhealthy, within these same data, depending on whether or not a rating of probable was considered as sufficient to qualify for inclusion in the unhealthy group. Thus, the comparisons of proportion tests were conducted twice. These

analyses were run once, less strictly, with the rating of both probable and present qualifying an individual for inclusion, and again, more strictly, including only those with the rating of present. The comparison of proportions tests results and rates of psychopathologies between groups and among professions, using the more inclusive criterion (i.e. including "probable" scores) are detailed in Table 3.

Table 3

Lifetime Rates of Psychopathology (%) - Inclusive

	Artists (%)	Scientists (%)	Athletes (%)	χ^2
Alcoholism	30.59	6.77	9.52	14.13***
Anxiety	31.76	16.95	9.52	6.89*
Autism	2.35	5.08	0	1.64
Bipolar	2.35	5.08	4.76	.83
Conduct	3.53	5.08	9.52	1.32
Drug Abuse	17.65	5.08	9.52	5.31
Depression	58.82	40.68	14.28	14.74***
Eating	7.06	1.69	0	3.53
Gambling	8.23	5.08	2.86	10.18**
Kleptomania	2.35	1.69	0	.53
OCD	5.88	3.39	0	1.60
Paraphilia	2.35	0	0	1.91
Personality	3.53	5.08	4.76	.22
PTSD	2.35	0	0	1.91

Schizophrenia	2.35	1.69	4.76	0.62
Sleeping	11.76	3.39	9.52	3.18
Somatic	4.70	3.39	9.52	1.27
Suicidality	7.05	8.47	0	1.83
Synesthesia	0	0	0	*N/A*
Any Illness	87.06	61.02	61.90	14.47***

Note: OCD = Obsessive Compulsive Disorder, PTSD = Post Traumatic Stress Disorder

* $p < .05$, ** $p < .01$, *** $p < .001$

Overall, significant proportion differences were found between artists, scientists, and athletes. Scientists and athletes had nearly identical lifetime frequencies of psychopathologies, with 61.02% of scientists and 61.90% of athletes expressing some form of psychopathological symptoms. However, a much greater proportion of artists, 87.06%, showed symptoms of psychopathology than both scientists and athletes. This indicates that artistic creativity is more strongly associated with psychopathology than other professions. This effect also seems to be independent of eminence, as fame was held constant between all three groups.

More specifically, significant frequency differences between groups were found between groups in the ratings of alcoholism, anxiety, depression, and gambling. Artists were found to be more prone to alcoholism than scientists and athletes. Additionally, athletes possessed lower frequency rates of depression and anxiety than both scientists and artists, supporting previous research. No significant differences were found between groups in the autism spectrum disorder, bipolar disorder, conduct disorder, drug abuse,

eating disorder, kleptomania, OCD, paraphilia, personality disorder, PTSD, schizophrenia, sleeping disorder, somatic disorder, suicidality, or synesthesia categories of psychopathology. Results using more strict guidelines are detailed in Table 4.

Table 4

Lifetime Rates of Psychopathology (%) - Exclusive

	Artists (%)	Scientists (%)	Athletes (%)	χ^2
Alcoholism	21.18	5.08	4.76	9.33**
Anxiety	17.65	6.78	4.76	5.09
Autism	0	0	0	*N/A*
Bipolar	0	3.39	0	3.64
Conduct	3.52	1.69	9.52	2.72
Drug Abuse	16.47	3.39	9.52	6.18*
Depression	38.82	20.34	9.52	10.09**
Eating	0	0	0	*N/A*
Gambling	4.71	3.39	19.05	7.23*
Kleptomania	0	0	0	*N/A*
OCD	1.18	0	0	.95
Paraphilia	2.34	0	0	1.91
Personality	0	3.39	4.76	3.41
PTSD	1.18	0	0	.95
Schizophrenia	1.18	1.17	4.76	1.22
Sleeping	7.05	0	9.52	4.90

Somatic	1.18	0	9.52	8.27*
Suicidality	2.35	1.69	0	.53
Synesthesia	0	0	0	*N/A*
Any Illness	62.35	38.98	57.14	7.78*

Note: OCD = Obsessive Compulsive Disorder, PTSD = Post Traumatic Stress Disorder, * $p < .05$, ** $p < .01$, *** $p < .001$

In the more exclusive analyses, frequency rates fell for artists, from 87.06% to 62.35%, scientists, from 61.02% to 38.98%, and athletes from 61.90% to 57.14%. The rate of psychopathology dropped a particularly large amount for scientists, indicating that scientists possess a larger amount of mild symptoms of psychopathology than artists and athletes. Significant differences were still found between groups, and yet, the difference between artists and athletes became much smaller. Although artists still possessed greater frequency rates of psychopathology, after conducting a post hoc comparison of two proportions test between artists and athletes, no significant differences were found between the two groups ($\chi^2 = 0.18$, $p > 0.66$). This indicates that the differences were due to the lower rates of psychopathology only among scientists, which is consistent with previous findings as reported in previous studies (Damian & Simonton, 2015; Simonton, 2014).

Drug abuse and somatic disorder switched from being non-significant to significant and anxiety switched from being significant to being significant. Additionally, in the stricter interpretation, no subjects qualified to be included in the autism, eating, and kleptomania categories.

Tests for one sample proportion were conducted for each group of professions to determine whether or not the rates of psychopathology in the U.S. population differed from the current sample. Due to a lack of recent data available for the U.S. lifetime prevalence rates of certain illnesses, the following have been excluded from analysis: autism spectrum disorder, eating disorders, gambling disorder, kleptomania, paraphilia, personality disorders. Comparisons between the U.S. population and the current sample were also excluded because the overall U.S. prevalence rates, as reported in previous literature (Kessler, 2005, 2007), comprised of a different combination of illnesses than those found in this study. The results to these analyses using more inclusive guidelines are detailed in Table 5.

Table 5

Test for One Sample Proportion - Inclusive

	Population U.S. (%)	Artists (%)	Scientists (%)	Athletes (%)
Alcoholism	13.2[b]	30.59***	6.77	9.52
Anxiety	31.0[a]	31.76	16.95*	9.52*
Bipolar	3.9[b]	2.35	5.08	4.76
Conduct	9.5[b]	3.53	5.08	1.32
Drug Abuse	7.9[b]	17.56***	5.08	9.52
Depression	16.6[b]	58.82***	40.68***	14.28
OCD	1.6[b]	5.88**	3.39	0
PTSD	6.3[b]	2.35	0*	0

Suicidality	.00[cd]	7.05***	8.47***	0

Note: OCD = Obsessive Compulsive Disorder, PTSD = Post Traumatic Stress Disorder, [a]Kessler (2007), [b]Kessler (2005), [c]Xu et al (2016), [d]13 suicides per 100,000,

* $p < .05$, ** $p < .01$, *** $p < .001$

Significant differences were found between artists and the U.S. population in rates of psychopathology for alcoholism, drug abuse, depression, and OCD. Scientists were found to be significantly different from the U.S. population for depression and anxiety. Athletes were found to be significantly different from the U.S. population in only anxiety. However, since the rates of psychopathological symptoms in both scientists and athletes were lower than those found in the U.S. population, it can be inferred that these differences were not due to a high occurrence psychopathology.

The tests for one sample proportion using more inclusive criterion for psychopathology were also conducted. Due to a lack of recent data available for the U.S. lifetime prevalence rates of certain illnesses, the following have been excluded from analysis: autism spectrum disorder, eating disorders, gambling disorder, kleptomania, paraphilia, personality disorders. Comparisons between the U.S. population and the current sample were also excluded because the overall U.S. prevalence rates, as reported in previous literature (Kessler, 2005, 2007), comprised of a different combination of illnesses than those found in this study. These analyses are detailed in Table 6.

Table 6

Test for One Sample Proportion - Exclusive

	Population US (%)	Artists (%)	Scientists (%)	Athletes (%)
Alcoholism	13.2[b]	21.18*	5.08	4.76
Anxiety	31.0[a]	17.65**	6.78**	4.76*
Bipolar	3.9[b]	0	3.39	0
Conduct	9.5[b]	3.52	1.69*	9.52
Drug Abuse	7.9[b]	16.47**	3.39	9.52
Depression	16.6[b]	38.82***	20.34	9.52
OCD	1.6[b]	1.18	0	0
PTSD	6.3[b]	1.18	0*	0
Suicidality	.00[cd]	2.35***	1.69	0

Note: OCD = Obsessive Compulsive Disorder, PTSD = Post Traumatic Stress Disorder, [a]Kessler (2007), [b]Kessler (2005), [c]Xu et al (2016), [d]13 suicides per 100,000,

* $p < .05$, ** $p < .01$, *** $p < .001$

Compared to the U.S. population in general, artists were not significantly different in frequency rates of OCD. Scientists also were not significantly different from the U.S. population in frequency of depression and suicidality. All other comparisons between the U.S. population and the stricter proportions retained their previous significance.

Discussion

The intention of the current study was to further establish prior findings on the relationship between psychopathologies and their interaction with creative and non-

creative professions. In order to do this, the findings described in Ludwig's (1992) biographical review were updated and replicated with improvements to the previous methodology. Our expectation was that artistic creative professions would possess higher levels of psychopathology than both scientists and athletes. We also predicted that scientists and athletes would not differ from the base rates found in the U.S. population, whereas artists would.

Strengths and Findings

The current study controlled for researcher bias by removing the biographical material of its subjects' identities. The previous study conducted by Ludwig (1992) was executed with the researcher knowing the identity of each subject, and may have been biased by previous working knowledge of each professional. Certain professions that were given new classifications as the older categorizations, as designated in Ludwig (1992, 1995), may have been incorrectly assigned. For example, historians and philosophers were considered scientists by Ludwig. Although history and philosophy are scholarly subjects, they are not typically considered sciences.

The current study also sought to streamline the process of finding relevant information in books by digitizing each biography into a searchable digital media. This would allow for the researchers to operate at an increased pace by eliminating irrelevant text very quickly. Transforming each book into a digital format also made it possible to censor the names of each creator to limit any previous knowledge that could bias the rating group.

The results of this study generally corroborate the findings reported in previous studies, lending further support to previously established hypotheses. Despite using an entirely new set of subjects, not included in Ludwig's (1992) sample, artists still possessed higher rates of psychopathological traits than scientists, athletes, and the U.S. population in general. These results held true in both inclusive and exclusive requirements for classification into the mentally ill group. However, the differences between artists and athletes was not significant in the more exclusive interpretation of the data. Drug abuse and anxiety also differed in statistical significance depending on whether inclusive or exclusive criterion were used to define what constituted psychopathology. In both cases, fewer subjects qualified for inclusion into the mentally ill group when exclusive criterion were used. However, the differences between groups grew larger in the case of anxiety and smaller in the case of drug use, thus varying the results of the analyses.

Fame did not seem to greatly affect athletes and scientists in terms of psychopathology. In the analyses conducted, only frequency rates of anxiety among athletes differed from the U.S. population. This could be explained by certain situations produced by professional sporting events that could induce anxiety, such as performing in front of large crowds during important games. Scientists were consistently rated lower on symptoms of psychopathology than artists, despite equal eminence.

Artists also showed greater rates of alcoholism, drug abuse, depression, and OCD than those found in the U.S. population. Again, statistical significance changed for a small amount of psychopathologies depending on the strictness of criterion for inclusion.

Anxiety among artists was considered lower in the stricter assessment but still gained significance due to the high rate of anxiety reported in the U.S. population. Rates of OCD also fell for artists and scientists under stricter criterion and detectable differences were no longer found.

Caveats and Limitations

A number of confounding variables may have skewed the results of this study. One such caveat is sample bias. In the case of the current study, writers and publishers may be more inclined to pursue biographies for particularly interesting people in order to tell more compelling stories. Since someone with a history of psychopathology may serve as a more desirable subject for a biography than someone who is not, healthier professionals may have fewer books written about them. This study also contained a much smaller number of scientists than artists. This may be due to writers and publishers favoring more artists rather than scientists who may be perceived as boring or hold less recognition in the general public.

Fame may not have been held constant through all three groups. Although some scientists such as Stephen Hawking and Richard Feynman are particularly well known, not all eminent scientists are easily recognizable. Athletes, while more recognizable than scientists, tend to dwindle in fame after retirement. Because the careers of most athletes are particularly short, their highest point of fame tends to come earlier in their lives rather than later. This is incongruent with scientists as fame for their achievements tend to come later, after their work has been recognized. Both athletes and scientists may also possess lower levels of fame than performance artists such as musicians and actors.

The biographies of men in the sample outnumbered women 143 to 22. However, this may be due to a lack of eminent women in certain fields during the middle to the end of the 20th century. For example, women have been underrepresented in mathematics and sciences. Only 8.8-15.8% of tenure track positions among top universities are held by women in math-centric domains (Ceci & Williams, 2011). This underrepresentation may be due to gender bias, favoring men, on the part of science faculty. In a nationwide study, biology, chemistry, and physics professors were found to consider men as both more hirable and competent (Moss-Racusin et al., 2012).

Determining how to interpret historical and biographical texts is not a new challenge for psychological study (Citlak, 2016; Czechowski, Miranda, & Sylvestre, 2016). Biographies still require interpretation as historians of certain types of professions may differ from others in what they look to report. Some professions may encourage exaggerated stories, particularly of drug use, in order to sell their fame (Lucijanić et al., 2010). Musicians such as rappers and rock stars may benefit from rumors of psychopathology as increased notoriety would increase exposure and thus raise the likelihood of album sales. Scientists do not typically benefit from fame in the same way artists do, as they typically work to discover new knowledge rather than sell products, thus there is less incentive to exaggerate claims of illness or drug use.

First person reports are common diagnostic tools in the clinical assessment of a wide variety of psychopathologies (Haravuori et al, 2016; Helpgul et al., 2016). However, personal chapters and autobiographies were excluded as an effort to increase objectivity and avoid any bias introduced by the subjects themselves. These reports were

not typically taken in clinical contexts, thus bias may exist in order to preserve or exaggerate an image. But a consequence of this is that information may be received from second, third, or even fourth hand sources, possibly increasing the degrees of separation between what is reported and what is true. As information passes hands, it may become extremely distorted before it is recorded.

The current study utilized a truncated sample due to time constraints. The effects of the limited amount of data is reflected in the conflicting results in the analyses from one set of criterion to another. A larger sample size may stabilize these results as more data are collected and analyzed. The sample sizes between groups was also disparate, as artists had many more biographies than scientists and athletes. This adversely affects the power of the statistical analyses employed by this study. Males also greatly outnumbered females making comparisons between genders difficult.

The use of keywords to search the biographical texts may have excluded several medically relevant paragraphs. Because the keywords were determined subjectively by the investigators through discussion, biases may exist in how the list was constructed. If a symptom of a psychopathology was described without using a keyword, then that segment of the biography would not have been reviewed by any of the raters. Additionally, some psychopathologies may have been easier to search for than others. Some, such as major depressive disorder, may be easier to identify than others, such as personality disorders. These difficulties arose from the subjective nature in which the keywords were generated. Since these keywords were compiled through discussion, the list may hold biases present in this study's investigators.

Future Directions

The researchers of this study will continue to review and rate additional biographies until the sample groups are of an adequate and appropriate size. Due to the restricted sample size, certain analyses were not possible among smaller groups and specific professions. For instance, no comparisons could be made for fiction writers against non-fiction writers, limiting the amount of conclusions that could be made. Thus, more specific examinations of individual professions can be made as the dataset grows larger.

Additional demographic variables that may influence professional vocation and creative output will also be collected. These variables include, birth order, religious affiliation, ethnicity, and marital status of parents. Due to time constraints, the collection of these data lay beyond the scope of the current study.

In conclusion, the preliminary results of this study indicate that previous findings hold true in a replication using contemporary eminent professionals. The use of digital resources allowed for the researchers to limit bias through the use of censors in order to hide the identity of each creator. The classification and grouping of each profession was also reworked for further accuracy. Further study is needed in order to provide a more robust sample size and more equivalent sample groups.

References

Acar, S., & Runco, M. A. (2012). Psychoticism and creativity: A meta-analytic review. *Psychology of Aesthetics, Creativity, and the Arts, 6*(4), 341-350.

Amabile, T. M. (1996). *Creativity in context: Update to 'The Social Psychology of Creativity.'*. Boulder, CO, US: Westview Press.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders: DSM-5*. Washington, D.C: American Psychiatric Association.

Andreasen, N. C. (1987). Creativity and mental illness: Prevalence rates in writers and their first-degree relatives. *Am J Psychiatry, 144*(10), 1288-1292. doi:10.1176/ajp.144.10.1288

Andreasen, N. C. (2008). The relationship between creativity and mood disorders. *Dialogues in Clinical Neuroscience*, 10(2), 251–255.

Barron, F. (1963). *Creativity and psychological health*. Oxford, England: D. Van Nostrand.

Brown, T. A., & Barlow, D. H. (2001). *Casebook in abnormal psychology (2nd ed.)*. Belmont, CA US: Wadsworth/Thomson Learning.

Brownstein, M., & Solyom, L. (1986). The dilemma of Howard Hughes: Paradoxical behavior in compulsive disorders. *The Canadian Journal of Psychiatry / La Revue Canadienne de Psychiatrie*, *31*(3), 238-240.

Campbell, D. T. (1960). Blind variation and selective retentions in creative thought as in other knowledge processes. *Psychological Review, 67*(6), 380-400. doi:10.1037/h0040373

Carson, S. H., Peterson, J. B., & Higgins, D. M. (2003). Decreased latent inhibition is associated with increased creative achievement in high-functioning individuals. *Journal of Personality and Social Psychology*, *85*(3), 499-506. doi:10.1037/0022-3514.85.3.499

Carson, S. H. (2011). Creativity and psychopathology: A shared vulnerability model. *The Canadian Journal of Psychiatry / La Revue Canadienne De Psychiatrie*, *56*(3), 144-153.

Ceci, S. J., & Williams, W. M. (2011). Understanding current causes of women's underrepresentation in science. *PNAS Proceedings of the National Academy of*

Sciences of the United States of America, *108*(8), 3157-3162. doi:10.1073/pnas.1014871108

Citlak, A. (2016). The Lvov-Warsaw School: The forgotten tradition of historical psychology. *History of Psychology*, *19*(2), 105-124. doi:10.1037/hop0000029

Cox, A. J., & Leon, J. L. (1999). Negative schizotypal traits in the relation of creativity to psychopathology. *Creativity Research Journal, 12*(1), 25-36.

Czechowski, K., Miranda, D., & Sylvestre, J. (2016). Like a rolling stone: A mixed-methods approach to linguistic analysis of Bob Dylan's lyrics. *Psychology of Aesthetics, Creativity, and The Arts*, *10*(1), 99-113. doi:10.1037/aca0000045

Damian, R. I., & Simonton, D. K. (2015). Psychopathology, adversity, and creativity: Diversifying experiences in the development of eminent African Americans. *Journal of Personality and Social Psychology*, *108*(4), 623-636. doi:10.1037/pspi0000011

Eysenck, S. B. G., Eysenck, H. J., & Barrett, P. (1985). A revised version of the psychoticism scale. *Personality and Individual Differences, 6*(1), 21-29.

Eysenck, H. (1993). Creativity and personality: Suggestions for a theory. *Psychological Inquiry*, *4*(3), 147-178. doi:10.1207/s15327965pli0403_1

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review*, *2*(4), 290-309. doi:10.1207/s15327957pspr0204_5

Feist, G.J. (in press). The creative personality: Current understandings and debates. In J. Plucker (Ed.). *Creativity and Innovation: Current Understandings and Debates.* Austin, TX: Prufrock Press.

Furnham, A., Batey, M., Anand, K., & Manfield, J. (2008). Personality, hypomania, intelligence and creativity. *Personality and Individual Differences, 44*(5), 1060-1069.

Goclowska, M. A., Crisp, R. J., & Labuschagne, K. (2013). Can counter-stereotypes boost flexible thinking? *Group Processes & Intergroup Relations, 16*(2), 217-231.

Guilford, J. P. (1967).The nature of human intelligence. New York, NY: McGraw-Hill

Gwet, K. (2008). Computing inter-rater reliability and its variance in the presence of high agreement. *British Journal of Mathematical and Statistical Psychology*, *61*(1), 29-48. doi:10.1348/000711006X126600

Haravuori, H., Kiviruusu, O., Suomalainen, L., & Marttunen, M. (2016). An evaluation of ICD-11 posttraumatic stress disorder criteria in two samples of adolescents and young adults exposed to mass shootings: Factor analysis and comparisons to ICD-10 and DSM-IV. *BMC Psychiatry*, *16*

Hepgul, N., King, S., Amarasinghe, M., Breen, G., Grant, N., Grey, N., & ... Cleare, A. J. (2016). Clinical characteristics of patients assessed within an Improving Access to Psychological Therapies (IAPT) service: Results from a naturalistic cohort study (Predicting Outcome Following Psychological Therapy; PROMPT). *BMC Psychiatry*, *16*

Jonason, P. K., Richardson, E. N., & Potter, L. (2015). Self-reported creative ability and the dark triad traits: an exploratory study. *Psychology of Aesthetics, Creativity, and the Arts*, *9*(4), 488-494. doi:10.1037/aca0000037

Jeste, D. V., Harless, K. A., & Palmer, B. W. (2000). Chronic late-onset schizophrenia-like psychosis that remitted: Revisiting Newton's psychosis?. *The American Journal of Psychiatry*, *157*(3), 444-449. doi:10.1176/appi.ajp.157.3.444

Kaufman, J. C., & Beghetto, R. A. (2009). Beyond big and little: The four c model of creativity. *Review of General Psychology*, *13*(1), 1-12. doi:10.1037/a0013688

Kessler, R. C., Angermeyer, M., Anthony, J. C., De Graaf, R., Demyttenaere, K., Gasquet, I …Bedirhan Ustun, T (2007). Lifetime prevalence and age-of-onset distributions of mental disorders in the world health organization's world mental health survey initiative. *World Psychiatry*, *6*(3), 168–176.

Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime Prevalence and Age-of-Onset Distributions of DSM-IV Disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62*(6), 593-602. doi:10.1001/archpsyc.62.6.593

Ko, Y., & Kim, J. (2008). Scientific geniuses' psychopathology as a moderator in the relation between creative contribution types and eminence. *Creativity Research Journal*, *20*(3), 251-261. doi:10.1080/10400410802278677

Kyaga, S., Lichtenstein, P., Boman, M., Hultman, C., Långström, N., & Landén, M. (2011). Creativity and mental disorder: family study of 300 000 people with severe mental disorder. *The British Journal of Psychiatry*, *199*(5), 373-379. doi:10.1192/bjp.bp.110.085316

Lucijanić, M., Breitenfeld, D., Miletić, J., Buljan, D., Ozimec-Vulinec, Š., & Akrap, A. (2010). Rock musicians' Club 27. *Alcoholism: Journal on Alcoholism and Related Addictions*, *46*(2), 109-113.

Ludwig, A. (1992). Creative achievement and psychopathology - comparison among professions. *American Journal of Psychotherapy, 46*(3), 330-356.

Ludwig, A. (1995). *The price of greatness: Resolving the creativity and madness controversy*. New York: Guilford Press.

Mednick, M. T., Mednick, S. A., & Mednick, E. V. (1964). Incubation of creative performance and specific associative priming. *Journal of Abnormal and Social Psychology*, *69*(1), 84–88.

McCrae, R. R. (1987). Creativity, divergent thinking, and openness to experience. *Journal of Personality and Social Psychology, 52*(6), 1258-1265.

Nettle, D. (2006). Schizotypy and mental health amongst poets, visual artists, and mathematicians. *Journal of Research in Personality, 40*(6), 876-890. doi:http://dx.doi.org/10.1016/j.jrp.2005.09.004

Meyersburg, C. A., Carson, S. H., Mathis, M. B., & McNally, R. J. (2014). Creative histories: Memories of past lives and measures of creativity. *Psychology of Consciousness: Theory, Research, and Practice, 1*(1), 70-81.

Moss-Racusin, C. A., Dovidio, J. F., Brescoll, V. L., Graham, M. J., & Handelsman, J. (2012). Science faculty's subtle gender biases favor male students. *PNAS Proceedings of the National Academy of Sciences of the United States of America*, *109*(41), 16474-16479.

Nusbaum, E. C., & Silvia, P. J. (2011). Are intelligence and creativity really so different? fluid intelligence, executive processes, and strategy use in divergent thinking. *Intelligence, 39*(1), 36-45.

Perry, I. H. (1947). Vincent Van Gogh's illness. *Bulletin of the History of Medicine*, *21*146-172.

Petry, N. M., Stinson, F. S., & Grant, B. F. (2005). Comorbidity of DSM-IV Pathological Gambling and Other Psychiatric Disorders: Results From the National Epidemiologic Survey on Alcohol and Related Conditions. *Journal of Clinical Psychiatry*, *66*(5), 564-574. doi:10.4088/JCP.v66n0504

Post, F. (1994). Creativity and psychopathology: A study of 291 world-famous men. *The British Journal of Psychiatry*, *165*(1), 22-34. doi:10.1192/bjp.165.1.22

Pretz, J. E., & McCollum, V. A. (2014). Self-perceptions of creativity do not always reflect actual creative performance. *Psychology of Aesthetics, Creativity, and the Arts,*

Richards, R. (1990). Everyday creativity, eminent creativity, and health: 'Afterview' for CRJ issues on creativity and health. *Creativity Research Journal*, *3*(4), 300-326. doi:10.1080/10400419009534363

Rothenberg, A. (1990). *Creativity and madness: New findings and old stereotypes*. Baltimore, MD, US: Johns Hopkins University Press.

Runco, M. A., & Acar, S. (2012). Divergent thinking as an indicator of creative potential. *Creativity Research Journal*, *24*(1), 66-75. doi:10.1080/10400419.2012.652929

Runco, M., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal, 24,* 92–96. doi:10.1080/10400419.2012.650092

Silvia, P. J., & Kaufman, J. C. (2010). Creativity and mental illness. In J. C. Kaufman, & R. J. Sternberg (Eds.) *The Cambridge handbook of creativity*, (pp. 381-394). New York, NY US: Cambridge University Press.

Silvia, P. J., & Kimbrel, N. A. (2010). A dimensional analysis of creativity and mental illness: Do anxiety and depression symptoms predict creative cognition, creative accomplishments, and creative self-concepts? *Psychology of Aesthetics, Creativity, and the Arts, 4*(1), 2-10.

Simonton, D. K. (2013). Creative thought as blind variation and selective retention: Why creativity is inversely related to sightedness. *Journal of Theoretical and Philosophical Psychology, 33*(4), 253-266. doi:10.1037/a0030705

Simonton, D. (2014). More method in the mad-genius controversy: A historiometric study of 204 historic creators. *Psychology of Aesthetics, Creativity, and the Arts*, *8*(1), 53-61. doi:10.1037/a0035367

Stein, D. J., Phillips, K. A., Bolton, D., Fulford, K. W. M., Sadler, J. Z., & Kendler, K. S. (2010). What is a mental/psychiatric disorder? from DSM-IV to DSM-V. *Psychological Medicine, 40*(11), 1759-1765.

Sternberg, R. J. (1988). A three-facet model of creativity. In R. J. Sternberg, R. J. Sternberg (Eds.) , *The nature of creativity: Contemporary psychological perspectives* (pp. 125-147). New York, NY, US: Cambridge University Press.

Ward, T. B. (2007). Creative cognition as a window on creativity. *Methods, 42*(1), 28-37.

Wongpakaran, N., Wongpakaran, T., Wedding, D., & Gwet, K.L. (2013). A comparison of Cohen's Kappa and Gwet's AC1 when calculating inter-rater reliability coefficients: A study conducted with personality disorder samples. *BioMed Central Medical Research Methodology, 13,* 61. Doi: 10.1186/1471-2288-13-61

Wuthrich, V., & Bates, T. C. (2001). Schizotypy and latent inhibition: Non-linear linkage between psychometric and cognitive markers. *Personality and Individual Differences, 30*(5), 783-798.

Zabelina, D. L., & Robinson, M. D. (2010). Creativity as flexible cognitive control. *Psychology of Aesthetics, Creativity, and the Arts, 4*(3), 136-143.

APPENDIX A: Guillotine Paper Trimmer

APPENDIX B: List of Keywords Used for Paragraph Selections

abuse, abused, abusing, addict, addiction, adjustment problem, aggression, aggressive, alcohol, alcoholic, alcoholism, aloof, anal, anger, anorectic, anorexia, anti-social, antisocial, anxieties, anxiety, anxious, apnea, arrested, Asperger, Asperger's, autism, autistic, beer, bipolar, bipolar disorder, bondage, booze, briquet's, bulimia, bulimic, bullied, bully, compulsion, compulsive, compulsive gambling, conversion, cruel, cyclothymic, deceitful, delinquent, delusions, dependency, depressed, depression, depressive, disorder, disorganized thinking, distress, drinking, drug, drug abuse, drugs, drunk, dysthymic, eccentric, emotional disturbance, emotions, empathy, excessive drinking, exhibitionist, explosive, fetish, fights, flashbacks, gambling, gambling problem, grandeur, hallucinations, hear voices, hearing voices, hypochondria, hypochondriac, hypochondriasis, hysteria, hysteric, impairment, impulsive, insane, insanity, insomnia, intrusive memory, jail, kleptomania, lack of empathy, lacks empathy, liquor, low self-esteem, madness, mania, manic, manic-depression, manipulative, masochism, mind-blind, mind-blindness, mood disorder, neat, neatness, nerd, nervous, nervous breakdown, neurosis, neurotic, nightmares, obsessed, obsession, obsessive, obsessive-compulsive, odd person, odd personality, panic, panic attack, paranoia, paranoid, paraphilia, pedophilia, personality, phobia, phobias, phobic, physical, physical symptoms, post traumatic stress, psychopath, psychopathic, psychosis, psychotic, ptsd, rape, ruthless, sad, sadism, sadness, schizoid, schizophrenia, schizotypal, seeing visions, seizure, seizures, sex with boys, sex with girls, sexual assault, sleep, sleeping, socially awkward, spasms, steal, stealing, stole, stress, substance abuse, suicidal, suicide, symptoms, synesthesia,

synesthete, synesthetic, theft, thief, trauma, traumatic stress, truant, uncontrollable, uncontrollably, under-age, underaged, violent, vomit, voyeurist, voyeuristic, whiskey, wine, worthless