Links Between Creativity and Mental Disorder

Erika Lauronen, Juha Veijola, Irene Isohanni, Peter B. Jones, Pentti Nieminen, and Matti Isohanni

A link between mental disorder and decreased ability is commonly assumed, but evidence to the contrary also exists. In reviewing any association between creativity and mental disorder, our aim is not only to update the literature but also to include an epidemiological and theoretical discussion of the topic. For literature retrieval, we used Medline, PsycINFO, and manual literature searches. Studies are numerous: most are empirical, many having methodological difficulties and variations in definitions and concepts. There is little consensus. However, some trends are apparent. We found 13 major case series (over 100 cases), case-control studies, or population-based studies, with valid, reliable measures of mental disorders. The results of all but one of these studies supported the association, at least when concerning particular groups of mental disorders; the findings were somewhat unclear in two studies. Most of the remainder that are not included in our more detailed examination also show a fragile association between creativity and mental disorder, but the link is not apparent for all groups of mental disorders or for all forms of creativity. In conclusion, evidence exists to support some form of association between creativity and mental disorder, but the direction of any causal link remains obscure.

INTRODUCTION

Folklore asserts that too much wisdom can be a bad thing, and that madness and genius are, somehow, interrelated. In scientific research, the relationship between creativity and psychic vulnerability is largely unresolved. A large literature on the topic exists, much of it undermined by methodological difficulties. Many creative people with mental disorder have been described (Goodwin and Jamison 1990); most have bipolar disorder, but some have depression, personality disorder, substance use disorder, or even schizophrenia. Despite the great interest on the topic, the association between creativity and mental disorder is difficult to study epidemiologically—both being difficult to define absolutely and relatively uncommon as a human feature.

Waddell (1998) made an outstanding attempt to clarify the issue in her review,

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where she found only limited support for the association. Our aim is to update this work and critically analyze the link in different diagnostic groups. We confine ourselves to epidemiological investigations and to the most significant case series and case control studies with standardized definition of mental disorder. We present a theoretical discussion about the possible explanatory factors for the association, and discuss some methodological and ethical challenges concerning the research of highly creative persons with psychopathology.

WHAT ARE CREATIVITY AND MENTAL DISORDER?

Creativity

There is no universal or psychometrically standardized definition of creativity, though many authors have tried to define and explain it (Andreasen and Glick 1988; Drevdahl & Cattell 1958; Goodwin and Jamison 1990; Jamison 1989; MacKinnon 1965; Oremland 1997; Post 1994; Terman et al. 1925). For example, three dimensions of creativity can be found: the creative person themselves, the creative process and the product of creativity (Ludwig 1989). Drevdahl and Cattell (1958) studied creative artists and writers from “Who’s Who in American Art,” and they found creative people to be intelligent, adventurous, radical, and to have good ego strength, but also to be emotionally sensitive. They were less compliant to social standards when compared with the normal population. Andreasen and Glick (1988) added introspectiveness and independence as creative attributes. They also adduced measures of output as evidence of creativity. According to study of Jamison (1989), creative British writers and artists had experienced creative episodes with increased enthusiasm, energy, mood, self-confidence, and speed of mental association. Post (1994) suggested that creative and famous men had special abilities, scrupulousness, and persistence; they were sociable and obedient, with an urge to create. On the other hand, he noted that they were isolated in their working lives and were often misunderstood by those around them.

It is difficult to separate creativity from other special capacities: it may be mixed with intelligence, talent, recognition, or fame, and somewhere near these is genius. Terman et al. studied in 1925 children with high intelligence (IQ scores at least 140) and found them in many ways to be “better” than normal children. They were healthier physically and mentally, and were socially successful in later life. The difference between creativity and high IQ is apparent in Terman’s study: his intelligent children did not end up in creative occupations (e.g., writers and artists). MacKinnon (1965) also stressed an important separation between intelligence and creativity. He suggested that intelligence is usually a prerequisite for creativity but, alone, is not sufficient to produce it. Oremland (1997) separated talent from creativity. Whereas talent implies special abilities, skills, and making of fine distinctions, creativity stands for originality and producing something new. He considered that creativity has something in common with play.

Recent studies have used various methods for defining creativity: creativity scales or IQ tests (Andreasen 1987; Kinney et al. 2000-2001; Ludwig 1992, 1994; Richards et al. 1988), success at school (Isohanni et al. 1999; Karlsson 1983, 1999; Noreik and Ödegård 1966; Wrede 1984) or recognition and fame (Karlsson 1983; Ludwig 1992; Post 1994, 1996). These measures are very different, and they usually do not measure creativity clearly. Creativity scales may be the most detailed method for definition, but there must be at least some forms of creativity or special ability among people who have achieved recognition and world fame, though society and politics may have influence in acknowledgement of creative products (Ludwig 1989). In this article, we have mainly used the term creativity, but also parallel words such as giftedness, ability, intelligence, and even fame.

Mental Disorder

Mental disorder also presents difficulties in terms of definition. Many recent studies
presented in this review have used standardized, categorical definitions of mental disorders derived from the American Psychiatric Association’s Diagnostic and Statistical Manuals (DSM) or the World Health Organization’s International Classification of Disease (ICD) systems (Isohanni et al. 1999; Kinney et al. 2000-2001; Ludwig 1992, 1994; Noble, Runco & Ozkaragoz 1993; Post 1994, 1996; Richards et al. 1988). Attempts to solve problems in definition are based on descriptive diagnostic systems and agreed criteria that have increased the reliability but not necessarily the validity of categories. In the DSM (APA 1994), mental disorder is defined as a behavioral or psychological syndrome which is clinically significant and which is associated with distress, disability or risk of suffering or losing freedom. The ICD (WHO 1992) describes the term disorder as a clinically manifesting set of behavior or symptoms with distress or disturbance of personal functions. Thus, most operational definitions of mental illnesses are syndromal, based on a convergence of signs and symptoms usually linked with some form of disability. Even so, assessing diagnosis can be problematic, especially in atypical or mild conditions. Even severe illnesses like schizophrenia or bipolar disorder may sometimes be difficult to diagnose, although usually there is an extensive consensus of clear-cut deviation or illness (Isohanni et al. 1997).

The multi-axis classification in DSM system divides mental disorders and stressors along five different axes that are created to help in describing and formulating a person’s psychopathology. The relationships we are exploring in this review have to do with disorders in Axis I (clinical syndromes), and because of few studies relevant to the other axes, such as axis II (personality disorders).

METHODOLOGICAL PROBLEMS

Besides the difficulties in definition of creativity and mental disorder, linking the two poses further, considerable methodological problems. There is much speculation about a possible link, but there are few methodologically sound studies. Creativity and severe mental disorder are both quite rare phenomena so it is, naturally, exceptional that the two may coexist in the same person. This makes it difficult to examine subjects from epidemiological and population-based samples with sufficient statistical power.

Early anecdotal studies did not indicate how common the association between creativity and mental disorder actually was—merely that it existed in some people. These studies tended to begin by identifying cases that already had this association, and the lack of controls could not answer the question as to whether creativity is a risk for mental disorder or a protective factor (Andreasen 1978). More information exists for some individuals: gifted, visible and efficient persons preferentially get recorded in historical documents, thus biasing the information available for anecdote.

Some studies are based on biographical or autobiographical writings (Juda 1949; Ludwig 1992; Post 1994, 1996; Schildkraut, Hirshfeld, & Murphy 1994). They assessed psychopathology at a distance, through lay reports or through material produced by the participants themselves.

There can be many types of creativity, divided, for example, by profession (Jamison 1989). Results may be biased if a sample is too heterogeneous, as was demonstrated by Post (1994) who presented results concerning psychopathology in creative writers. Later analysis suggested that prevalence of psychopathology varied between writers of different genres (Post 1996).

ETHICAL PROBLEMS

Creative and able people are often eminent people in the public eye. Is it ethically acceptable to study them? Does psychiatric evaluation or diagnosis undermine or somehow taint their creativity? Do relatives and friends of artists, and the people themselves see the setting of diagnosis as disparaging, pejorative, and labeling? Furthermore, concealment and protection of privacy limit the
### TABLE 1. Summary of the Studies on the Association between Creativity and Mental Disorder

<table>
<thead>
<tr>
<th>Authors</th>
<th>Study Design and Sample</th>
<th>Assessment of Mental Disorders</th>
<th>Definition of Creativity</th>
<th>Findings</th>
<th>Comments</th>
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</thead>
<tbody>
<tr>
<td>Noreik &amp; Ødegård</td>
<td>Follow-up in Norway 12,843 persons graduated from high schools between 1916 and 1925</td>
<td>Hospitalization for psychosis</td>
<td>Graduating from high school</td>
<td>Male graduates under 35 years of age had lower rates of admission than the general population; No difference above 35 years of age. Female graduates had higher rates of admission than the general population.</td>
<td>Population-based sample; No standardized definition of creativity; No differentiation between psychoses</td>
</tr>
<tr>
<td>Karlsson 1983</td>
<td>Family study in Iceland Records of 171,000 persons</td>
<td>Hospitalization for psychosis</td>
<td>Graduating from high school Relates listed in Who’s Who?</td>
<td>Psychotic patients more often than other population graduated from high school or had close relative in Who’s Who?</td>
<td>Unique register data and population-based sample; No standardized definition of creativity; Part of the sample chosen more by eminence than creativity; No differentiation between psychoses</td>
</tr>
<tr>
<td>Wrede 1984</td>
<td>Longitudinal high-risk study in Finland 104 15-years-old children born to schizophrenic mothers between 1960–1964</td>
<td>Mothers admitted to psychiatric clinic; hospital records of mothers used</td>
<td>Adjustment to school rated by Wrede Peer Rating Scale, Lambert–Hartsough–Wrede Adjustment Difficulty Scale, Hahnemann High School Behavior Rating Scale Some ratings made by peers and teachers</td>
<td>Children of non–chronic paranoid mothers were rated superior to children of other schizophrenic mothers and controls.</td>
<td>Standardized assessment of creativity; The results may be based on chance and multiple comparisons; Not replicated</td>
</tr>
<tr>
<td>Isohanni et al. 1999</td>
<td>Population-based birth cohort in Finland, 31-year follow-up 54 schizophrenia cases (all boys) and 5,245 persons with no hospital treated psychotic disorder</td>
<td>Diagnoses validated for DSM-III–R criteria</td>
<td>Giftedness measured by school grades at the age of 16</td>
<td>11 % of pre–schizophrenic boys had excellent mean scores for school grades, compared to 3 % of healthy boys.</td>
<td>Population-based sample; Diagnoses validated; Theoretical explanations are given: cerebral differentiation and deviation from the norm in both directions as a risk to schizophrenia; May be a change finding; Not replicated</td>
</tr>
<tr>
<td>Karlsson 1999</td>
<td>180 (7 women) mathematically successful persons in Iceland born between 1911–1940</td>
<td>Hospitalization for psychosis</td>
<td>For the 180 mathematically successful persons scores from the final mathematics examination in college at the age of 20</td>
<td>3.3% of mathematicians and 2.7% of their full siblings were hospitalized compared to 0.8% of general population.</td>
<td>Population-based sample; Unique register data; No differentiation between psychoses</td>
</tr>
<tr>
<td>Kinney et al. 2000–2001</td>
<td>36 (19 male) index adult adoptees of schizophrenic biological parents and 36 (19 male) control adoptees of parents with no psychiatric hospitalization</td>
<td>Diagnosed by DSM-III–R</td>
<td>Lifetime Creativity Scale Overall Peak Creativity rating</td>
<td>When compared in groups, no difference in lifetime creativity was found. When groups were combined, nonschizophrenics with schizotypal signs or personality or schizoid personality had higher creativity compared to the rest of index and controls.</td>
<td>Standardized assessment of creativity</td>
</tr>
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</table>
Mood Disorders

Andreasen 1987
- Prospective 15-year follow-up, case-control study in the United States
- 30 creative writers (27 men), 30 matched controls
- Structured interviews
- Research Diagnostic Criteria (RDC)
- Verbal and visual intelligence measured by WAIS IQ test
- Non-verbal intelligence measured by Raven Progressive Matrices IQ
- 80% of writers ($p = 0.001$) had affective disorder (43% bipolar disorder), compared to 30% of controls (10% bipolar)
- 30% of writers and 7% of controls had alcoholism
- Standardized assessment of creativity

Richards et al. 1988
- Case-control study in Denmark
- 17 manic-depressives, 16 cyclothymes, 11 normal first-degree relatives, 33 controls (13 healthy, 18 other diagnosis)
- DSM-II diagnoses
- Creativity measured by Lifetime Creativity Scales
- Creativity higher among ill and their normal relatives compared to controls
- Higher creativity among normal relatives compared to manic-depressives
- No difference between normal and ill controls
- Standardized assessment of creativity

Ludwig 1994
- 59 female writers, 59 matched comparison group
- DSM-III-R diagnoses
- Lifetime Creativity Scales
- Depression in 56% of the subjects and 14% of the comparison group
- Mania in 19% of subjects and 3% of controls
- Only study with women sample
- Standardized assessment of creativity

Personality Disorders, Substance Use Disorder, And Neuroses

Noble, Runco & Ozkaragoz 1993
- 19 families with recovering alcoholic father with a family history of alcoholism (A+), 18 families with non-alcoholic father with family history of alcoholism (NA+), and 19 with nonalcoholic father with no family history of alcoholism (NA–)
- DSM-III-R
- IQ measured by the Wechsler Adult Intelligence Scale and the Wechsler Intelligence Scale for Children-Revised
- The How Do You Think Test
- The Creativity Personality Scale
- The parents evaluation of children's creativity
- Ongence/Intelligence Scale
- Divergent Thinking Test
- A+ fathers had significantly lower IQ compared to NA–fathers, and IQ of NA+ fathers was between these groups.
- No difference in IQ between sons of families.
- Sons of A+ families had significantly lower scores on the Creativity Personality Scale when compared to NA+ and NA– sons.
- Standardized assessment of creativity
- Only study clearly showing no association between creativity and mental disorder

Post 1994
- Biographical post-mortem study
- 291 world-famous men in science, thought, politics and art
- Data transformed into DSM-III–R diagnoses when appropriate
- Persons selected by eminence and international fame
- None fulfilled DSM personality disorder criteria
- 14% had seriously affecting personality traits
- Depression in 72% of writers
- Alcoholism in 28% of writers and 29.2% of artists
- Selected sample
- No standardized assessment of creativity

Post 1996
- Biographical post-mortem study
- 100 American and British poets, prose fiction writers and playwrights
- Data transformed into DSM-III–R diagnoses when appropriate
- Persons selected by eminence and international fame
- Affective psychopathology in 82% of the sample
- Alcohol dependence or abuse in 40% of the sample
- Selected sample
- No standardized assessment of creativity
<table>
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<tbody>
<tr>
<td>Ludwig 1992</td>
<td>• Biographical post-mortem study</td>
<td>• Psychopathology assessed by ICD–9</td>
<td>• Persons from different professional groups were selected by eminence.</td>
<td>• Persons among creative arts (art, music, theatre, and writing) had higher prevalence of psychopathology than persons in other professions (business, military, politics, and physical sciences).</td>
<td>• Selected sample</td>
</tr>
<tr>
<td></td>
<td>• 1,005 persons whose biographies were reviewed in <em>The New York Times Book Review</em> between 1960–1990</td>
<td></td>
<td>• Creative Achievement Scale</td>
<td>• In sample, proportion of depression among poets 37–66% and among military personnel 3%.</td>
<td>• Comparisons among creative professions</td>
</tr>
</tbody>
</table>

*Note. Only major case series (over 100 cases), case–control, or population–based studies with accurate assessment of mental disorders are presented.*
assessment of living persons and persons who have been treated. According to ethical directions approved by the World Psychiatric Association in 1999, “Psychiatrists shall not make announcements to the media about presumed psychopathology on any individuals” (www.wpanet.org/home.html).

Psychological biographies and psychiatric assessments may be defendable. Creative persons with mental illness often are historical figures, already deceased, who merit discussion and thought. In these cases, much relevant information is already in the public domain, and any psychopathological analyses are an accepted part of scientific research. Study of historical cases may inform the future development or application of treatments, including prevention.

Some case studies in this context may involve those who have used their creativity for bad purposes, instigating or acting in crimes against humanity. Is it wise to extend psychiatric concepts to study evil, inhumanity, immorality, and cruelty? Psychopathological knowledge can bring a new dimension to our understanding of the darker side of human nature and its history.

ARE CREATIVITY AND MENTAL DISORDERS INTERRELATED?

Even in pre-Grecian myths a close relationship between the creators, gods, and madness was described. The possible link between genius and madness was suggested very early; Aristotle thought that great artists, philosophers, writers, and politicians are vulnerable to melancholy. However, systematic studies about the association started only in nineteenth century when a romantic myth about the relationship between genius and madness was created (Goodwin and Jamison 1990).

A strong interest in the relation between creativity and mental illness arose right after Lombroso’s The Man of Genius (1891), where he suggested that genius was a “degenerative psychosis.” He also suggested that genius and mental illness might run together within families. The subjects of Lombroso’s study were from anecdotal case histories of the lives of well-known geniuses. Another prominent study, Galton’s Hereditary Genius (1892) observed familial association between mental disorder and creativity. Galton had a hypothesis that genius was usually heritable and that it tends to be familial. In the twentieth century, the possible link between creativity and mental disorder was approached in psychoanalytical literature and empirical research.

Waddell (1998) has systematically reviewed the literature on the relationship between creativity and mental illness. She evaluated 29 studies about the possible link; in fifteen studies, there was no link, in nine, relation was found, and in five, the findings were unclear. There were numerous gifted persons or selected groups with a mental disorder, but many studies showed no association (Drevdahl and Cattel 1958; Lucas and Stringer 1972; Noreik and Ødegård 1966; Terman et al. 1925). Waddel described the methodological difficulties and pitfalls concerning the studies. She considered that most of them were based on methodically insufficient case series and case-control studies. She concluded that scientific evidence of the positive relationship is limited, but that it cannot be rejected.

CURRENT LITERATURE SEARCH

We systematically explored the scientific literature concerning creativity and mental disorder using Medline (from 1966 to March 2003) and PsychINFO (from 1887 to March 2003) on-line databases. We restricted the search to English-language articles. In addition, other relevant literature and journals were scanned. We used the following search terms: creativity, mental disorders, schizophrenia, mood disorders, personality disorders, alcoholism, neurotic disorders, and anxiety disorder. Combining creativity and mental disorders, we obtained 53 hits from Medline and 96 hits from PsychINFO. The combination of creativity and schizophrenia resulted in 31 hits from Medline and 102 from
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PsycINFO; creativity and mood disorders, 9 from Medline and 25 from PsycINFO; creativity and personality disorders, 9 from Medline and 30 from PsycINFO; creativity and alcoholism, 12 from Medline and 16 from PsycINFO; creativity and neurotic disorders, 11 from Medline and 3 from PsycINFO; creativity and anxiety disorder, none from Medline and 8 from PsycINFO.

Studies were selected with respect to following characteristics: study population, design and assessment of creativity, and mental illness. The main focus was to review epidemiological studies and major case series and case-control studies. Altogether, we selected for closer examination 21 original studies concerning the link between creativity and mental disorder and an additional 50 reviews or other articles.

From the 21 original studies we selected 13 relevant studies of creativity and mental disorder for closer exploration (Table 1). This was done by selecting studies that were major case series (at least 100 cases), case-control studies or population-based studies, with valid measures of mental disorders. We included standardized diagnostics and hospital diagnoses, the latter probably being accurate for psychotic disorders since the 1980s and the advent of reliable, modern definitions (Isohanni et al. 1997).

In Table 1, eight studies were the same as in Waddell’s research, with three studies being published subsequently (Isohanni et al. 1999; Karlsson 1999; Kinney et al. 2000-2001). It seems that many earlier studies had a looser definition of mental disorder, and varying study methods: this is the reason for our selection of different studies compared with those of Waddell (1998). Reports (mainly small case series or case reports) excluded from Table 1 are cited selectively later in this article.

All but one (Noble, Runco & Ozkaragoz 1993) of the studies in Table 1 supported the association between creativity and mental disorder. In two studies, the findings were somewhat unclear (Kinney et al. 2000-2001; Noreik and Ödegård 1966). The results from the studies excluded from the table also show some support for the association.

Studies reviewed later in this article confirm that, at least in selected populations, the relation between creativity and mental disorder exists (Andreasen 1987; Gelade 1997; Heston 1966; Isohanni et al 1999; Jamison 1989; Juda 1949; Karlsson 1983, 1999; Ludwig 1994; Parfitt 1956; Post 1994, 1996; Richards et al. 1988; Schildkraut, Hirshfeld and Murphy 1994; Wrede 1984). However, in these studies, the link was not necessarily seen in all groups of mental disorders or in all forms of creativity. When we compared our results (presented mainly in Table 1) with those of Waddell (1998), the view and conclusions are somewhat different, though there is considerable common ground. Considering only the most recent studies, the association seems to be even more likely than Waddell concluded.

CREATIVITY AND SCHIZOPHRENIA

Schizophrenia is a severe mental disorder which usually causes a decrease in level of functioning—for example, educational outcome (Isohanni et al. 2001). The risk of schizophrenia increases with lower IQ (David et al. 1997; Gilvarry et al. 2000; Jones et al. 1994; Russell et al. 1997) and limited educational or social performance in the pre-morbid phase (Aro et al. 1995; Isohanni et al. 1999; Jones et al. 1994). However, most people who develop schizophrenia during their adult life have scholastic performance within the broad, normal range (Isohanni et al. 1998).

There are few reports of creative people who have schizophrenia or—which is clearly more common—who develop schizophrenia after the creative period. One classical example was Daniel Paul Schreber, whose case was presented by Sigmund Freud in 1911 (Freud 1958). Schreber was a top lawyer and high government official who developed a schizophrenic psychosis. He describes his illness in detail in his biography published in 1903. The Finnish national writer, Aleksis Kivi, is sug-
gested to suffer from psychosis (Achté 1982). For Kivi, creative giftedness—and also unusual personality and lifestyle—existed mostly before developing psychosis. John F. Nash, a mathematician and 1994 Nobel laureate in economics, has had schizophrenia for over thirty years. His talented, mathematician son has the same illness (Jeste 1997; Nasar 1998).

**Main Studies from the Systematic Review**

Noreik and Ödegård (1966) found no association between high educational achievement and admission to psychiatric hospitals due to psychosis among male graduates. They found less schizophrenia among the graduates when compared with the general population, while affective psychoses were overrepresented. Among female subjects, the admission rates were higher than among general population.

Karlsson (1983) showed that psychotic patients were more likely than the remaining population of Iceland to graduate from college or have a first-level relative listed in *Who’s Who?* In his later study, Karlsson (1999) presents support for the link between mathematical success and psychosis. He found that 3.3% of mathematically able and 2.7% of their full siblings were hospitalized because of psychosis, while in general the population the hospitalization rate was 0.8%. Wrede (1984) found in Finland that children of non-chronically ill schizophrenic mothers with paranoid symptoms were persistently rated superior in social adjustment at school compared to children of other schizophrenia mothers and even controls. In Post’s (1994) study of 291 creative men, only 14 of them had schizophrenic relatives. Kinney et al. (2000-2001) found no difference in creativity between adoptees of schizophrenic parents and adoptees of parents without psychiatric hospitalization.

In the prospective, population-based Northern Finland 1966 Birth Cohort, Isohanni et al. (1999) found that boys with excellent school performance at the end of compulsory schooling had a four-fold risk of later developing schizophrenia when compared with boys having normal school performance. It was difficult to estimate whether excellent scholastic performance here reflected creativity, intelligence, motivation, concentration on school, kindness, or obedience.

**Other Studies**

In one of the earliest empirical study about the subject, Ellis (1926) examined 1,020 eminent British persons in politics, arts, and science. He found that 4.2% of these persons had either schizophrenia or bipolar disorder. Juda (1949) studied the psychopathology of 113 gifted artists and 181 scientists. In the group of artists, 2.7% had schizophrenia, compared with 0.8% in the average population. None of the scientists had schizophrenia. Parfitt (1956) found that 10 of 61 schizophrenia patients had performed excellently at school and 7 of them were exceptionally able in music or art. The case series comprised selected hospital patients.

Children and close relatives of schizophrenia patients have been described as having exceptional ability, for example, artistic giftedness (Heston 1966) or other capacity (Karlsson 1983; Wrede 1984). Heston (1966) studied adopted children of schizophrenic mothers and found that many clinically normal high-risk children had unusually creative hobbies or interests. Mäkikyrö et al. (1997) also studied the North Finland birth cohort and showed that children of highly educated first social class parents (fathers) had a two-fold risk of developing schizophrenia.

Sass (2000-2001) argues for a role of schizoid and schizotypal conditions in some highly creative individuals, although an empirical basis of these speculations is lacking. For example, the writer James Joyce had schizoid and schizotypal personality features and hallucinations following heavy drinking after his daughter developed schizophrenia (Ellman 1959). Kinney et al. (2000-2001) showed that persons with schizophrenia spectrum (but without schizophrenia) had higher
creativity when compared to healthy persons and patients with other disorders.

**Comment**

To summarize, some creative people can develop schizophrenia, but in most cases schizophrenia is associated with lower ability. There is no convincing evidence, but some methodologically limited or non-replicated studies showing that creativity or special abilities may be a risk factor for developing schizophrenia. It is possible that the risk of becoming ill increases at the extreme end of ability. Association between creativity and schizophrenia is not as clear as it is between creativity and affective disorders, but among the relatives of schizophrenic persons, there may be an exceptional accumulation of talented persons.

**CREATIVITY AND MOOD DISORDERS**

Decreased cognitive ability (van Os et al. 1997) or low IQ is proposed to precede later affective disorder, especially unipolar depression (Sigurdsson et al. 1999). However, Cannon et al. (2002) found that persons destined to develop mania performed better on motor performance at ages 3 through 9 than healthy controls. Affective psychotic patients have higher IQ when compared with schizophrenic patients, but no difference was found between affective psychotic patients (Gilvarry et al. 2000) or non-psychotic affective patients and healthy controls (Amminger et al. 2000). Aro et al. (1995) found no difference in educational level between affective disorder patients and the general population.

Mood disorders usually include deviation of mood, in most cases towards depression, but also leading to a rise of mood. Creative, labile persons are in “God’s swing,” as is expressed by Eino Leino, the Finnish national poet who had an unusual, Bohemian way of life with alcoholism and an early death. These people might be vulnerable to rise of mood as well as to depression especially during and after creative crises. Many composers, writers, artists, or poets have suffered from bipolar disorder (Goodwin and Jamison 1990; Jamison 1993), such as Robert Schumann, Anne Sexton, and Virginia Woolf. A remarkably high number of writers have committed suicide: Ernest Hemingway, Sylvia Plath, John Berrymore, Anne Sexton, and Virginia Woolf (Andreasen 1987).

Some hypomanic people are exceptionally efficient and they might apply for leading and visible positions. Many political leaders are considered to have bipolar disorder, cyclothymia, or at least hypomania with expansive mood and efficient behavior, including: Alexander the Great, Oliver Cromwell, Napoleon Bonaparte, Lord Nelson, Winston Churchill, Benito Mussolini, and Theodore Roosevelt (Goodwin & Jamison 1990).

**Main Studies from the Systematic Review**

Andreasen (1987) investigated 30 successful writers from the University of Iowa Writers’ Workshop and compared them with 30 controls. Her study was based on structured interviews, systematic diagnostic criteria, and matched controls. Andreasen found an extraordinarily high rate of affective illness among writers (80%) when compared with controls (30%). Similar results were presented by Post (1996) who found that 82 of 100 writers had some kind of affective psychopathology and that 48% had been through major depressive episodes. Another major investigation by Ludwig (1994) was the only one to concentrate on psychopathology in creative women. Ludwig found that 54% of writers suffered from depression compared with 14% of controls. They also had more suicide attempts and mania (19% of subjects vs. 3% of controls).

Bipolar disorder has a familial aggregation and close relatives are suggested to have minor signs of disorder. There are visible and successful families that have an increased rate of mood disorders. For example, relatives of people with literary gifts have an excess of mood disorders (Andreasen 1987). Richards et al. (1988) investigated creativity in 33
manic-depressive and cyclothymic patients with their 11 healthy relatives and 33 controls who were healthy or who had unrelated psychiatric diagnosis. In this study, more creativity was found among the manic-depressive and cyclothymic persons and their normal relatives compared to control subjects. Higher creativity was found among the normal, index relatives, and cyclothymic patients than in manic-depressive persons. These findings suggest that people who show milder expressions of potential liability to bipolar disorder may be more creative than those with more severe mental disorder or persons with no liability to bipolar disorder at all.

Other Studies

According to Juda (1949), 3.9% of scientists had manic-depressive illness, compared to 0.4% among general population. She did not find any manic-depressive persons among artists, but she showed that cyclothymic temper was common among the family members of creative people. Schildkraut, Hirshfeld and Murphy (1994) presented results about high prevalence of depressive disorders among 15 mid-twentieth-century artists. According to Jamison (1989), 38% of 47 acknowledged British writers and artists had been treated for an affective illness.

Comment

There are fewer studies of creativity and affective disorder than schizophrenia, but the methods of most of these studies have included standardized assessment of creativity, which can be seen as a considerable strength. From results of case reports and case-control studies, it is obvious that the association between creativity and mood disorders in particular is stronger than in schizophrenia. The association is most clearest in bipolar disorder and especially in hypomania, cyclothymia, or in sub-clinical or clinically normal gene expression. Mood disorder, or liability to it, also seems not to destroy creativity as often and as easily as does schizophrenia.

CREATIVITY AND PERSONALITY DISORDERS, SUBSTANCE USE DISORDERS, AND NEUROSES

People with narcissistic, egocentric personality disorder often see themselves as better than others (APA 1994). These persons do not have an ability to feel empathy, and for them other people usually are servants and echoes of their excellence. Eminent and intelligent narcissistic persons often have an interest in power and they may also have a skill of manipulating or charming. In some cases, these persons may be in political or other powerful positions and be among persons of publicity. One example, and one of the most notorious leaders studied was Adolf Hitler. During World War II, three top American psychoanalysts explored his personality and found narcissistic pathology, messiah complex, and sexual perversion (Langer 1972).

The clinical state of a person with a suspicious personality, in particular, can approach the boundary of psychotic disorder. One example is paranoid personality. This personality—or even paranoid psychosis—is suggested to be behind the actions of some political figures; Stalin, for instance, was highly suspicious and ordered bloody persecutions of immense proportions (Radzinsky 1997).

A great deal of nineteenth and early twentieth-century British literature was composed under the influence of narcotics. This was also true of the early development of psychoanalysis. Many writers have used alcohol or drugs to enhance creativity and to stimulate brain functioning (Hare 1987; Post 1994). Charlotte Bronte’s consumption of opium and cocaine use by James Joyce and Freud are examples (Hare 1987).

Main Studies from the Systematic Review

Post’s (1994) analysis of the personalities of 291 world-famous men revealed many abnormal personalities among them. Ninety percent of creative writers had traits of DSM personality disorders, though none had symp-
Symptoms severe enough for diagnosis of personality disorder.

Substance-use disorder may be related to creative personality (Andreasen 1987; Post 1994). Andreasen (1987) found that 30% of writers were diagnosed with alcoholism. Artistic creativity especially seems to be connected to high risk of substance abuse. In his 1994 study, Post found that it was mainly visual artists and creative writers who suffered from alcoholism, and in 1996, he stated that 40% of writers suffered from alcohol dependence or abuse. Contrary results are presented by Noble, Runco, and Ozkaragoz (1993) who found that alcoholic fathers and their sons scored lower than non-alcoholic fathers and their sons in most tests measuring creativity and intelligence.

Post (1994) noted that neurotic characteristics are more common among creative persons than in the general population. According to Ludwig (1994), creative women writers had more panic attacks (22% vs. 5%) and generalized anxiety (14% vs. 2%) than the comparison group.

Other Studies

Rothenberg (1990) found that alcoholics are not usually creative, but that creative persons may sometimes be alcoholic. It seems that results depend considerably on the study setting. If we consider alcoholics as a study sample, there is no great amount of creativity, but if we start by examining creative people, we can find an excess of alcoholism among them. Maybe long-term alcohol abuse destroys creativity and causes other harm, which could partly explain these results.

Gelade (1997) studied persons working in creative commercial occupations. He observed that people working in advertising and design occupations showed higher levels of neuroticism when compared to other professionals working in noncreative occupations. Neuroticism and a vulnerability to developing psychological symptoms in conflict and stress situations are not a risk to creativity in the same way as is a psychotic disorder.

Comment

Some case reports and case control studies support links between creativity and personality disorder, alcoholism, or anxiety disorders, with the association being strongest in alcoholism. The results are still somewhat confusing. Only Andreasen (1987) and Noble, Runco, and Ozkaragoz (1993) have comparison groups, and they show contrary results.

HOW MIGHT POSSIBLE ASSOCIATIONS BETWEEN CREATIVITY AND MENTAL DISORDER BE EXPLAINED?

Different causal and mechanistic links between creativity and psychopathology have been proposed. Psychopathology may cause creativity and vice versa, and a third variable, such as stress or excitement, may cause both. In addition, other plausible models involving multiple factors have been presented (Prentky 2000-2001). There is considerable evidence that many mental disorders are associated with cognitive disruption during illness (Taylor Tavares, Drevets and Sahakian 2003) and, with the link between disability built in to modern operational diagnostic criteria, explanatory models for the link are likely to be necessarily complex.

Advantage in Evolution

Psychotic disorders are particularly harmful to a person’s mental and social capacity, and are in part hereditary. There are some suggestions that psychotic individuals might have fewer offspring or a fecundity disadvantage (Crow 1997), especially men (McGrath et al. 1999). So why don’t these harmful diseases disappear through natural selection? Why have the genes that cause mental disorders not disappeared? There must be some important strengths that outweigh the weaknesses.

Evolutionary psychology can partly explain the continued existence of these mental
disorders, but it also can clarify the possible link between creativity and mental illness. One explanation could be the development and lateralization of human brain: Decreased lateralization is suggested to associate to both creativity and mental disorders. Studies have shown a decrease of hemispheric asymmetry in schizophrenia (Sommer et al. 2001) and relation between some creative characteristics as well as delusional thinking and decreased lateralization or increased right hemispheric activity (Leonhard & Brugger 1998). On the other hand, association between equal hand skills and decreased cognitive ability is shown (Crow et al. 1998). Crow’s hypothesis (1997) suggests that language and psychosis have a common evolutionary origin back at the time of the “speciation event,” the genetic origins of homo sapiens. Crow maintains that severe mental disorders are the price human beings have to pay for complex brain development.

It is possible that natural selection has preferred an active, efficient, and highly differentiated central nervous system and that this “third variable” has caused not only unique performance in nature but also risk of dysfunction. The ability to form symbols has led not only to the success of humanity, but to a vulnerability to mix inner-world and external reality. This is partly what happens in psychosis. The human brain is able to undertake complex cognitive functions (e.g., thinking and use of abstraction), and developed human brains can also easily create different brain-ghosts, fantasies and thoughts. Are severe mental disorders the price and injurious effect we have to pay for these efficient but complex brains?

When studying the role of natural selection in mental disorder and creativity, we must distinguish its effects on human evolution thousands of years ago versus its possible impact on our modern society. A behavior or survival mechanism that succeeded in natural selection during ancient times may now be more like a disadvantage. In other words, we were built in a certain way in order to survive in ancient times (e.g., avoiding predators), but today, when our environment is so vastly different and changes so rapidly, there may be functions (e.g., anxiety) that cease being advantages and instead become dysfunctional (Cosmides & Tooby 1999).

What, then, could be the present-day advantage of genes predisposing us to mental illnesses? There is some suggestion that creative accomplishment and intelligence increase sexual attractiveness and would be subjects of sexual selection (Miller 1994). According to Buss (1985), males and females value different personality traits when selecting mates. Males appreciate physical attractiveness (indicating youth and fertility), while females value earning capacity and success (for supporting offspring). This could support the finding of increased success in sexual selection of intelligent and maybe also creative men. If creativity and mental disorders are interrelated, the advantage in sexual selection and success in reproduction could be one explanation for why mental disorders have not disappeared from society.

In most studies on creativity and mental disorders, the samples have been men. There are probably many reasons for this, including the study methods used or women’s position in earlier society. However, could there also be an evolutionary reason for the predominance of men in the studies? Could creativity and mental disorders have different associations among men and women? Or could evolution support this association more for men than for women?

The sibling advantage hypothesis assumes that unaffected susceptibility gene carriers may have non-clinical gene expression and favorable psychological attributes. First-degree relatives may have advantageous attributes that have, in the past, had benefits for the whole family (e.g., successes in hunting or fighting). Persons with genetic risk may also be sensitive to environmental influences—both “good” and “bad”—as demonstrated by Wahlberg et al. (1997). They found that high-risk adoptees (biologic mother had schizophrenia) were more sensitive than controls to react to the lack of communication deviations in the family. These adoptees reacted to the “good” environment with well-developed thinking abilities (cognitive
functions). The control adoptees did not react on the communication environment at all.

The social advantage hypothesis argues that even extreme and deviant behavior may have led to high social status or achievements, especially in the past. A person who shows unusual thinking, (divergent from the norm), vulnerability for psychosis, or talent can succeed as a mystic, shaman, saint, prophet, or leader. In religion and politics, many latent or openly psychotic or otherwise seriously disturbed persons have achieved remarkable success (Allen and Sarih 1988; Rosenthal 1971), and the line between religious experience and psychosis might be arbitrary and flexible.

There may be some traits that are common to schizophrenia and artistic creativity. Those affected both view reality and use language in an unusual way, and both may have unusual thought processes. There exists, at least, an apparent similarity between the production of novel ideas in creativity and the unusual thoughts and behaviors in schizophrenia (Schuldberg 2000-2001). However, there is one important, but relative difference. Creative persons, contrary to those with only schizophrenia, have their thought processes under control and have a healthy way to express them through creative products and outcomes (Torrey 1983).

**Exceptional Creativity as a Stress and Strength**

In early history, some creative, highly capable people were able to survive and produce more offspring—and thus were favored by natural selection. Today, our social environment has changed dramatically, and social pressure has become an important factor affecting human behavior. People whose behaviors are different from others in their cultural environment are exposed to intense social pressures (Stevens and Price 2000). As a result, mental disorders often affect those creative people in a special way.

In general, deviance from the norm—in either direction—may have become a stressor in society. At school, a highly creative student may be different from the others. It might be hard for a very creative person to adapt to other people’s thinking and their rhythm of work. In working life, an exceptionally creative person in science and art might end up being a rebel, a dissident, a reformer, or a person in charge. A person who tries to create something new may face opposition and be kept silent. Creative, exceptional people may concentrate completely on their lifework and overemphasize the importance of setbacks.

There is some evidence that creative individuals show signs of both health and psychopathology (Schuldberg 2000-2001). This supports a two-factor theory regarding the relation between creativity and psychopathology. Arieti (1976) defined creativity as a tertiary process, being a kind of combination of the primary process (the unconscious part of the psyche, arising in dreams and psychosis) and secondary process (a part of the psyche which works logically and while the person is awake). Thus, a part of artistic giftedness might be caused by a neurotic person’s sensitive way to experience things, with a healthy way to express an inner outcome. Contrary to Arieti, Kubie (1958) posed that neurosis, instead of being a motivational factor to creativity, seems to inhibit it. However, the experience of depression, anxiety, and serious life crises can also act as a material for artistic creativity (Goodwin and Jamison 1990).

The activity and flight of imagination that may be part of symptomatology in mental disorder can also increase activity and acrobatics of speech and thoughts. Being hypomanic may, in particular, bring some advantage if activity is controlled and a person is gifted. There may be some overlap between inspiration and hypomania. For example, both include increased self-confidence, mood, and flight of thoughts (Jamison 1989). It is possible that hypomanics, with somewhat controlled activity, can utilize their psychopathology as a form of creativity, while uncontrolled mania leads to severe consequences.
CONCLUDING REMARKS

In conclusion, the suggestion remains that some form of positive association between creativity and mental disorder exists, and that creative people have more psychopathology, especially affective disorders, than is found in the general population. The relation between creativity and mental disorder is, however, neither clear nor epidemiologically obvious. Our results do not extensively differ from those presented by Waddell (1998), but support more strongly the positive association between the two characteristics. One reason for this is likely to be our emphasis on recent epidemiological studies and on the main case series and case-control studies.

It seems that instead of a single link, there are different types of links between creativity and mental disorder: Creativity and special abilities can be associated to both mental health and on the other hand, to psychopathology. In addition, links may exist and exert various effects in different groups of mental disorders and in different forms of creativity.

In the future, more epidemiological investigations and studies with large sample size and controls are needed when examining the putative associations between creativity and mental disorder. For reliable results to be more easily interpreted, a standardized definition and measurement of creativity are required. It would be also useful to study the associations between different forms or types of creativity and psychopathological symptoms or traits (e.g., neurotic, depressive, or delusional), instead of disorders. Last, studies should also take into account the possible link in women, for whom there is presently a dearth of evidence of sufficient quality.

REFERENCES


Crow, T.J., Crow, L.R., Done, D.J., & Leask, S.


Sigurdsson, E., Fombonne, E., Sayal, K., & Checkley, S. (1999). Neurodevelopmental ante-


