

## Conundrums of the Association between Creativity and Psychopathology

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### Abstract

**Background:** Creativity has been historically linked with psychopathology. Creativity is a complex phenomenon and is a more emergent quality of living systems. Numerous scientific papers devalued creativity as being a psychopathological phenomenon. The present trend in psychiatry of medicalising all unusual behaviour is counter-productive to fostering creativity among children. Consequently, creative children are at risk for being both mislabelled and misdiagnosed. Psychiatry is using a 'brain disease model' to understand creativity.

**Aim:** To evaluate the different psychological and psychopathological views as well as some of the future directions, and to suggest new lines of research.

**Method:** Selective survey of the literature including previous reviews to collect different interpretations which also help to form a framework to study creative process. Psychological, psychopathological and biological views separately analyzed.

**Results:** Psychopathology is only a mediator and not the producer, and creativity can be cathartic. The association between genius and mental illness is a social belief and partly this confusion has a journalistic origin. It is always the healthy part of the mind that generates outstanding creative works, whilst creativity of the highest order is more a product of laborious intellectual work. The scientific literature does not substantiate the reported high incidence of mental illness among the creative people that exceeds chance expectation. Inspiratory part of creativity remains an enigma.

**Conclusions:** Let alone that we do not know the true aetiology of schizophrenia and bipolar disorder, but we do not have even an approximate model of the brain-mind-consciousness complex. So, it would be prudent to suspend our psychopathology linked views of creativity until we know more about psychiatric conditions that may have phenomenological similarities with creative minds. Creativity continues as a permanent mystery.

**Keywords:** creativity, psychopathology, substance abuse, inspiration, biological correlates

### Introduction

The creative process is an enigma; there are conflicting opinions about creativity and creative people. Research studies on creativity have produced contradictory results. The long-standing belief that creativity results from a strange clairvoyant state is still occasionally associated with psychiatric disorders.<sup>1</sup> Although a decline in creativity with aging indicates that it is biologically based, a relationship between creativity and psychopathology is overstated in both print and media. Reductionism tends to misconstrue creativity as a product of psychopathology. Nonetheless, whilst psychopathology can facilitate creativity, it does not produce creativity. The inspirational characteristics of creativity remain shrouded in mystery.

Methodological issues that include both a definition and an evaluation of creativity impede the research into creativity. These challenges make the correlations between the studies problematic, and they deliver opposing outcomes. Although there is no confirmed relationship between psychopathology and creative accomplishment, the search for such a relationship hinders our understanding of human potential and the deeper levels of consciousness. Early detection of creative talents in

children might enable providing them with special guidance, thereby averting potential psychiatric problems.

The superficial reductionism of 20th century biological psychiatry compressed all mental phenomena, including creativity, into compact neurobiological compartments, and the only way to achieve this was to medicalise it. Any assumed correlations between creativity and mental disorders will be clarified only when we gain a greater understanding of the creative process. In cases where creativity and mental illness indeed coexist, a psychiatric understanding of creativity may provide insights into patient functioning and assist in defining both normalcy and psychopathology.

Whilst human beings have existed on this planet for millions of years, the technological advancements of the last few centuries transpired without any perceptible changes in the development of the human brain. Historically, our ancestors were drawing two-dimensional pictures until just a few centuries ago. No one has hitherto been able to explain this sudden burst of creativity. An expanded model of brain-mind-consciousness that can appreciate the wonder of creativity is needed.

## Defining Creativity

Researchers have long been interested in a potential connection between creativity and mental illness. The major challenge here is to define creativity and establish measurable indicators. Creativity has been described as the process of bringing something new into existence. It involves the capacity to take unrelated structures and combine them harmoniously in different ways for new purposes. The creative mind is alert to unexpected connections. An individual with a rich reservoir of knowledge is regarded as intelligent, whereas an individual who uses that knowledge in an original and constructive way is considered creative.<sup>2</sup> The creative process is not fully understood; some even feel that a precise definition is unattainable.<sup>3</sup> Nonetheless, creativity can be described as the process of bringing something new into being where the outcome is larger than the input received by the creative mind.<sup>4,5</sup> Creative individuals are sensitive to gaps in human knowledge and these voids act as catalysts in their search for solutions. This is the highest form of human adaptation; whether to a greater or a lesser degree, it may exist in all people.

The creative process can be likened to a four-stage computer process.<sup>6</sup> If information processing and storage is the primary process, the second stage is the incubation or pondering phase, during which ideas germinate at a subconscious level. The third phase involves illumination, or flashes of insight, and the fourth is the period of elaboration during which the new idea is developed and tested. These stages can be additionally likened to the biological rhythm of conception, gestation, birth and infancy. This pattern is not strict. As a rule, the process of illumination is gradual with countless small bursts of insight, such as with Charles Darwin's elaborations on his theory of evolution.

Dream processes shed some light on creativity. As with poetry, dreams are replete with visual and highly idiosyncratic metaphors. Dreams are the art of the unconscious; whilst dreaming, we tap into a creative source. The dreaming psyche has seemingly unlimited creative potential. An anecdote about Kekule, the chemist, recounts that he conceived the benzene ring after a dream in which he saw a serpent biting its tail.

## The Creative Personality

Creative people must be assessed on an individual basis. Not all persons of superior intelligence are creative, and not all creative people have superior intelligence. Although creative potential is dependent on intelligence, actual creative achievement is independent of intelligence (e.g. one does not have to be tall to be a successful basketball player). Highly intelligent people are prone to self-criticism, which has an inhibiting effect on the development of creativity. A combination of high intelligence and special aptitudes appears to promote creativity. Unconventionality, egocentrism, flexibility, tolerance for ambiguity and a preference for complexity are among the

attributes of creative individuals.<sup>7</sup> Psychological testing has shown that creative individuals are frequently more emotionally troubled than are non-creative individuals; however, they also have more ego strength for dealing with problems. Their personal qualities include imagination, persistence, perseverance, dedication and stamina. Creative children tend to be egotistic and gullible. This egotism provides them with the confidence to believe that they are capable of unique achievements, whilst momentary gullibility enables them to break through scepticism and into creativity.

McClelland illuminated a controversial notion when he described the creative individual as one who is characterised by competition, either with an external standard of excellence or with his or her own internal aspirations.<sup>8</sup> Driving absorption, the ability to ignore failure and adversity and tremendous curiosity are noted as a predictive set of personality traits.<sup>9</sup> Although creative individuals are difficult to live with, whether their creativity flourishes or not frequently depends on the support that they receive from others.<sup>10</sup> Among the characteristics of creative people, Tarlaci (2014) included openness to experimentation and change, rebelliousness, individuality, sensitivity, playfulness, self-assertiveness, curiosity and simplicity.<sup>11</sup>

Although there is a compulsion for order, symbolisation and communication are at the core of creativity. Intelligence, domain-specific knowledge/expertise, motivation and adaptive traits such as openness, broad interests and self-confidence are closely associated with creativity (Feist 1999).<sup>12</sup> Despite the fact that these characteristics of creative people are obviously independent of psychopathology, they point towards better mental health. Research on creativity in neuroscience has revealed that creativity is associated with 'ordinary' rather than psychopathological brain processes.<sup>13</sup>

## Psychopathology

Since the time of Plato, philosophers have debated a conceivable connection between creativity and psychopathology. He proposed a logical paradox when he stated that a poet does not know what he is going to write, and yet he cannot produce a poem if he has no picture of what he describes. As a Greek philosopher, Plato was a reincarnationist. He obviously solved his own riddle by attributing hidden creative knowledge to remembrances of a previous life and to springing from 'Divine madness'. Aristotle noted the predisposition of great artists and poets to melancholia, but he perceived creativity as a rational process. Shakespeare repeated the older perspective through one of his characters who states, 'the lunatic, the lover, and the poet are of imagination, all compact'. During the 20th century, systematic investigations into this relationship were unable to either support or refute this association. Cesare Lombroso failed to clarify this confusion in his book, *Genius and Mental Illness*. Nonetheless, his

influence led to speculation that genius is an ‘ancestral gift’ transmitted in families in the same manner as mental disorders.

Recent empirical research has shown that creative individuals have a higher tendency towards psychopathology than those in non-creative professions. This propensity is expressed in personality traits, behaviours and experiences similar to those identified in clinically ill patients (Jamison 1989). The evidence has not clarified whether the psychopathology linked to creativity relates more closely to features of schizophrenia or affective disorders. Countless novelists and dramatists have family histories of psychiatric disorders. Severe personality deviations have been observed among visual artists and writers and possibly among thinkers and scholars as well. Jamison noticed mood disorders among writers and artists.<sup>14</sup>

Bipolar disorder may be more frequent among creative individuals than in the normal population. One study reported a higher incidence of depression and bipolar disorder among creative people, and especially among writers.<sup>15</sup> Another study noted a higher incidence of depression and alcoholism among writers and artists. Following recent epidemiological studies with large samples, Kyaga et al. (2013) argued in favour of an association between professional authors and psychiatric disorders.<sup>16</sup> They illuminated familial associations between the creative professions and schizophrenia, bipolar disorder, anorexia nervosa and possibly autism.<sup>16</sup> They noted that this association was more evident in cases of self-employed artists and less so in scientific creativity, where the subjects had passed through several professional screening procedures.

In another epidemiological study, Parnas et al. (2019) found that the relatives of academics have a significantly increased risk of suffering from schizophrenia or bipolar disorder.<sup>17</sup> In another study, they suggested that ‘creativity and an increased risk for mental disorders seem to be linked by a shared vulnerability that is not manifested by clinical mental disorders in the academics.’<sup>18</sup> The literature has made significant connections between bipolar disorder and creative accomplishment, with much of the thinking inspired by biographical accounts of poets and musicians who presented with signs of bipolar disorder.<sup>19</sup> Studies by Burkhardt et al. (2018) suggest that, in persons at-risk for bipolar disorder, their mood swings are strongly associated with creativity, but whilst there is evidence of increased creativity, there is no evidence of higher creative achievement.<sup>20</sup>

Observations of the bipolar mood domain identify a high prevalence of changes in intuition, empathy, appreciation of danger and predictive capacity. However, these changes do not necessarily include supra-sensory changes in the primary senses of smell, taste, vision, touch or hearing. Parker et al. (2018) suggested that clinicians should be aware of non-psychotic, supra-sensory phenomena in patients with bipolar disorder and that the identification of such features could explain the increased creativity evident in those with a bipolar condition.<sup>21</sup>

After examining the life of Charles Dickens, Longworth and Carlson (2018) maintained that there was very little historical evidence for the suggestion that he experienced bipolar disorder.<sup>22</sup> However, they did suggest that he displayed characteristic bipolar symptoms. They also maintained that his childhood was an outstanding example of personal resilience and that his own story was just as fascinating, if not even more intriguing, than any of those that he had created. Their investigations concluded that Dickens’ story confirmed the connection between writers, creativity and mood disorders. Retrospective psychiatric assessment of historical figures and the slotting of these celebrities into biological compartments may be risky. Biographical studies of creative people are criticised for having possible recall, interviewer, selection and cultural sampling bias.<sup>23</sup>

The suicide rate is high among artists, and this has been linked to manic depression. Adverse financial circumstances and disappointments due to the rejection of their artistic productions are sufficient to explain this apparently high rate. In contrast, musicians have a low suicide rate, very likely reflecting the healing effect of music. In addition to alcohol, opium has been a historical favourite addictive drug of writers, of which Charles Dickens is an example; opium addiction was partially responsible for his death.<sup>24</sup> Ludwig’s study on 1000 outstanding individuals found an upsurge in alcohol abuse in artists, especially writers.<sup>25</sup> Post (1994) found a similar result among prose writers and playwrights.<sup>26</sup> Although Ernest Hemingway, the Nobel Prize winner for literature, may be a good example of this phenomenon, he committed suicide later in his life. Creative individuals may be notorious for their alcohol and drug misuse; however, it is not clear whether drug induced psychopathology promotes their creative expression. Whilst it is possible that the disinhibiting influence of mild psychopathology and the judicious use of alcohol or drugs could facilitate creativity, this phenomenon has potentially contributed to the confusion in which psychopathology is described as the ‘producer’ of creativity.

### Absence of Psychopathology

Alongside these studies, other reports glorify the mental health of geniuses and eminent individuals. The Stanford 35-year follow-up study of over 1000 geniuses, the MacKinnon study of creativity in architects and Havelock Ellis’s psycho-biographical study of eminent men all emphasised the absence of psychopathology among these creative individuals.<sup>27</sup>

In an investigation on the prevalence of psychopathology, in a sample of 291 famous men, Post (1994) noted that they all excelled by virtue of their abilities, originality, drive, perseverance, industry and meticulousness.<sup>26</sup> Even though most of them had unusual personality characteristics and minor neurotic abnormalities, all of the subjects in this study were emotionally warm, with a gift for friendship and sociability. Post additionally noted that, among creative individuals,

scientists show the fewest psychological abnormalities. Functional psychoses are less frequent than epidemiology would suggest. Depressive conditions, alcoholism and possible psychosexual problems are more prevalent than expected in some professional categories, particularly among writers. Hare (1987) noted that banning stimulant drugs in sports did not lower the achievements significantly, and that the same should be true of creativity. Poetic vision has been equated with psychedelic experiences.<sup>28</sup> Creative activity has been observed to be at its highest level in patients who are moderately ill, and at its lowest level in groups identified as severely ill.<sup>29</sup>

Although there is no significant difference in the incidence of psychotic illness among males and females, there is less creativity among the latter. If the hypothetical connection between creativity and psychopathology were valid, the incidence of creativity should be proportional to gender. Historically, unfavourable social pressures and opposing cultural factors have represented major explanations for the lower incidence of creativity among women. This disparity points towards the fact that creativity has to be nurtured and is not automatically generated by psychopathology. Despite an equal incidence of mental illness in men and women, there have been few female geniuses in any culture; this challenges the probability of a clear connection between psychopathology and creativity. The same argument may be used against a pure biological view of creativity; both men and women have the same biological make up, yet fewer geniuses have been identified among female population.

### Psychodynamic Perspectives

Psychoanalysts have postulated dynamic psychopathologies for the creative process. Analysts incline towards seeing artists as neurotics and their productions as sublimations of sexuality and regression in the service of the ego.<sup>30</sup> They consider the motives for creative activity as impulses that compensate for dissatisfaction and as defences against depression. Some perspectives differ from traditional psychoanalytical ideas, emphasise the crucial role of synthetic ego operations and draw distinctions between psychopathology and creativity.<sup>31</sup> Analysts suggest that novel ideas exist in the subterranean regions of the mind. Whilst the conscious mind has no access to these hidden areas in the normal state, it is easier for a disturbed mind to tap information from the unconscious or preconscious.<sup>32</sup> Sims suggests that the psychotic and the creative states are subjectively indistinguishable and that delusions arrive in the minds of the mad in the same manner that ideas drop into the minds of the creative.<sup>33</sup> In contrast, Slater and Meyer report only minor psychiatric disorders among creative people.<sup>34</sup> Although it would appear that psychopathology does not preclude creative activity, it may release it. In general, the creative person enjoys conflict free intimacy with the preconscious and is a model of psychological health.<sup>35</sup>

### Orderly Mind

The neurobiological model of schizophrenia suggests that a deficit in the systems involved in information-processing could contribute to its symptomatology.<sup>36</sup> It has been hypothesised that such a deficit could favour the creative association between information units.<sup>37</sup> Psychopathology linked creativity has even been associated with abstract disciplines such as mathematics. If these views were accepted, creativity and schizophrenia would be separated only by a 'neurological difference'. Andreasen challenged the hypothesis of a connection between creativity and schizophrenia.<sup>38</sup> He argued that the bizarre nature of schizophrenic experiences is far from original, and that the cognitive impairment of such patients inhibits their creativity.

The creative intelligent person experiences an attention surplus, whereas a schizophrenic patient suffers from an attention deficit. As a case in point, a creative child may figure out in two seconds what the teacher is going to say, after which he may be looking around, waiting for the teacher to finish and appearing as if he is not paying attention. In contrast, because of a failure in the normal filtering of stimuli, schizophrenics tend to make unusual associations that result from over-inclusive thinking in which countless disconnected elements are included in their reasoning.<sup>39</sup> Although higher cognitive individuals also demonstrate 'pseudo over-inclusive thinking', this is due to their capacity to conceive and utilise two or more contradictory concepts simultaneously.<sup>40</sup>

Bleuler (1950) described intellectual ambivalence as both characteristic of schizophrenia and as superficially similar to the janusian process of oppositional thinking that involves conceiving of two or more opposites simultaneously.<sup>41</sup> The Kent-Rosanoff word association test has been used to assess this process.<sup>42</sup> In contrast to the creative thinker who is fully aware of logical contradictions, the schizophrenic patient is unconscious of the contradictory nature of his or her utterances. For example, when Albert Einstein derived his theory of relativity, derived from the fact that a man falling from the roof of a house was both in motion and at rest, he was fully aware of the contradictory nature of his thinking.<sup>43</sup> Another example is Frank Lloyd Wright's revolutionary design of Falling water, in which nature and interior space coexist. The janusian process was initially identified in highly creative writers, visual artists and scientists. The fluency of association observed among creative individuals can be mistaken for over-inclusive thinking.<sup>44</sup> Since their brains process increased sensory input effectively without cognitive overload, creative individuals derive an advantage from their higher levels of associative thinking.

Contrary to popular belief, in their cognitive and conceptual style, creative writers resemble those suffering from the manic phase of affective disorders, rather than schizophrenics. However, whereas the over-inclusiveness of maniacs is based on bizarre associations, that of writers is due to an imaginative

recognition of original associations. Whilst writers are capable of controlled flights of fancy, manic imaginations are bizarre and based on personalised reason. The racing thoughts of a creative intellect are productive, whereas those of the manic are destructive. Albert Einstein claimed that he discarded a new idea every two minutes.

Creative thinking is polythetic and should not be confused with flight of ideas. Schuldberg (1990) investigated the overlap between schizotypal and hypomanic traits and suggested that affective symptoms may be more important than primary process thinking in determining creativity within the general population.<sup>45</sup> The fluctuation of thoughts experienced by higher cognitive ability individuals can be mistaken for mood swings. Fink et al. (2014) challenged the connection between creativity and psychopathology and proposed that the domains of artistic and scientific creativity should be analysed separately.<sup>46</sup>

Although the creative potential of autistic people has been recognised, they differ from over perceptive children in many respects. One fundamental difference is that the creative potentials of the latter are polythetic, whereas such potentials of the of autistic individuals are generally monothetic. A key diagnostic criterion for autism—restricted and repetitive behaviours and interests—combined with a small number of research studies, suggest that generating original ideas or artefacts may be challenging for autistic individuals.<sup>47</sup> Nonetheless, a minority within this population has exceptional artistic gifts, and a wider group embraces activities typically associated with creative expression, including visual art, music, poetry and theatre.

A three-level multilevel meta-analytic approach investigated the relationship between creativity and schizophrenia. The analyses of Acar et al. (2018), with 200 effect sizes gathered from 42 studies, detected a mean effect size of  $r = -0.324$ , 95%CI  $[-0.42, -0.23]$ .<sup>48</sup> When the analyses focused on the moderators, they found that the relationship between schizophrenia and creativity was moderated by the type and content of the creativity measure, the severity of the schizophrenia and the patient status. The negative mean effect size was firmer with semantic-category or verbal-letter fluency tasks than the divergent thinking or associational measures. They submitted that when these findings are analysed along with previous meta-analyses on the association between creativity, psychoticism and schizotypy, creativity and psychopathology appear to have an inverted-U relationship. Whilst a mild expression of schizophrenia symptoms may support creativity, a full demonstration of the symptoms challenges it.

Schizophrenia and schizotypy have frequently been associated with above average creativity; nonetheless, empirical studies on the relationship between schizophrenia spectrum disorders and enhanced creativity have generated inconsistent results.<sup>49</sup> Even though some mental processes may appear to be similar in

creative and psychotic thinking, the current literature challenges this conclusion.<sup>50,51,52</sup> Psychopathology does not play a role in the genesis of higher order creativity; nonetheless, the psychological defence mechanism of overcompensation goes some distance towards explaining the high achievements of mentally or physically disabled individuals.<sup>53</sup>

### The Myth of Drug Induced Creativity

The belief that brain alone is the source of creativity led to the idea that altering brain chemistry could make people more creative. The truth may be that the gentle psychopathology created in the brain might serve as a facilitator of creativity rather than a producer of creativity. The psychopathology generated by the psychedelic drugs might help to open Aldous Huxley's 'doors of perception.' Huxley (1954) proposed "Doors of Perception" to illustrate the enlightenment induced by LSD etc.<sup>54</sup> Interestingly, such a proposal is close to Zizzi and Pregolato's depiction of 'very fast switches from the quantum logic of the unconscious to the classical logic of consciousness' (Zizzi & Pregolato, 2012).<sup>55</sup> Those who glorify such drug induced creativity are unaware that long term substance misuse can only kill creativity as the 'switches' become permanently damaged and lead to psychopathological states.

When one's sense of self is suspended and space-time sense dissolves, psychedelic experiences occur, and such experiences should not be confused for true mystical experiences. Psychedelic experiences are pseudo-mystical experiences. True mystical perceptions and cognitions relate to what is essentially ineffable, pertaining to the nature of existence rather than being limited to familiar objects that are intrinsic to everyday experience. The hallucinating drug user or alcoholic is functioning at the level of impaired consciousness, while the mystic is operating at a higher level of consciousness. Mystics have full awareness of their altered state of consciousness and they are also in a position to switch back to their ordinary mode of perception, unlike a hallucinating patient. It may be true that psychedelic experience has created an interest in artistic activity and the raw materials obtained in such experience may be useful in eventual artistic creation, but the psychedelic experience as such is not a creative experience because motor functioning is impaired during psychedelic experience and information flow to the hands and fingers are affected.<sup>56</sup> The natural state of a relaxed, happy, and well-adjusted person is more creative rather than the perplexed psychedelic state. There may be 'psychedelic artists,' but not psychedelic scientists indicating the difference in the creative process of scientific generativity and artistic.

Drug induced creativity is a conundrum that need serious clarification as many young people are trapped in such faulty perceptions. Cannabis is the most widely used illegal substance globally. Schafer et al (2011) suggested that cannabis produces psychotomimetic symptoms, which in turn might lead to connecting seemingly unrelated concepts.<sup>57</sup> Such divergent thinking is considered primary to creative thinking. They argue



that a drug induced altered state of mind may indeed lead to breaking free from ordinary thinking and associations, thereby, increasing the likelihood of generating novel ideas or associations. But the harmful effects of cannabis use have been extensively evaluated.<sup>58,59,60,61,62,63</sup> Cannabis abuse is quite unlikely to generate any sustainable creativity-‘the creative Big Bang’ would soon end up as a big crunch.

If creativity is a neurological phenomenon, creative people should have additional neural pathways, but psychedelic drugs have not been proven to create such new neural pathways. Speculations about specific brain regions promoting creativity is of great scientific interest. Creativity involve an architect and a set of engineers. According to Amit Goswami, quantum unconscious domain is the architect and the real source of creativity if brain does the engineering works.<sup>64</sup> Psychoactive substances do not act directly on the quantum consciousness but may help to open the gates to the hidden dimensions of consciousness. When quantum views of creativity are given due significance, the neurologically based psychedelic promotional views of creativity crumble. If not having creative abilities is deemed as a ‘brain deficit,’ use of illegal drugs to promote creativity can be compared to using medications to treat ADHD. But only if we use the ‘brain disease model’ of psychiatry, the argument of ‘brain deficit model’ will hold water. It may be even true that psychedelic drugs may have a quick and transient destressing effect and that could promote a creative mental state, but the production of any direct creativity through the use of such drugs is questionable.

### Problematic Childhood

Some children of superior intelligence attempt to mask their creativity by being over-talkative and overactive. Such children run the risk of being misdiagnosed as ADHD. Creative children frequently have a unique sense of humour that their peer group cannot appreciate. Creative children are every so often resented by peers because of crazy or unusual ideas and their forcefulness and passion in presenting them or for pushing their ideas on others. Their divergent thinking is not helpful in school examinations, which require convergent thinking, and this could explain the poor academic achievement of several geniuses. The divergent thought processes of creative children must be differentiated from inattention and underachievement. For example, a highly intelligent child might fathom out what the teacher is going to say next and become inattentive. Although creativity is associated with divergent thinking, this alone does not correlate well with creative achievement.<sup>65</sup> Creative children overflow with ideas and play with new ideas and concepts. They are not motivated or even concerned about high grades and need individualized attention lest they might fall on the wayside. There is nothing more frustrating than being a creative intelligent and become underachieved.

Creative children demonstrate certain unusual traits such as daydreaming, wanting to work alone, sharing bizarre thoughts and conflicting opinions. These qualities will not please the traditional teachers and bring them in conflict with them and their lack of conformity to the classroom structure can be even confused with attention deficit hyperactivity disorder. Highly critical parents kill creativity; unfortunately, countless creative individuals have chaotic childhoods leading to psychological problems in their adult lives. Mismatching due to variation in I.Q could lead to mismatching with parents and siblings. Mother and father may be of average intelligence, but the child can be above average intelligence, and could cause mismatching leading to behavioural problems.

There is a special group of children around the world who have high intelligence and intuition, healing abilities, and a strong spirituality and they are grouped as Indigo people in appropriate cultures. It can be stated that Indigo is people with high sensitivity level, unique creativity, high intuition ability, healer, and people with their own charisma for those around.<sup>66</sup> According to the proponents of these new ideas, these children are often mislabelled as having behaviour disorders. Little is known from scientific research about the Indigo phenomenon. Indigenous populations are familiar with Indigo-like children. The purpose of studying these children when they are adults is to better understand these children when they are older and advance behaviour health sciences by increasing awareness of the Indigo phenomenon and learning about their lived experiences. There has been hardly any serious scientific study on the Indigo phenomenon.

A phenomenological study looked at the lived experiences of 10 adult Indigos. The study explored the lived experiences of 10 adult Indigos on the island of Oahu, Hawai'i (> or = 18+ years old-7 females, 3 males; mean age = 52.4 + SD).<sup>67</sup> Through in-depth semi-structured personal interviews, the experiences of these adults were analysed and interpreted to identify the common experiences faced during childhood, what worked for their assimilation into society, and recommendations for parents, educators, and health professionals on how to work with Indigos. Bioenergy field photographs of each participant were also taken. Statements related to the phenomenon were placed into themes, coded, and categorized as the investigators reached a consensus of common themes. Seven primary themes and nine secondary themes emerged from the findings.

The primary themes were: grandmother/mother had a similar gift; guided by a higher power to heal self and others; felt ‘different’ or misunderstood; did not openly share their unique abilities; having challenges with partner relationships; history of abuse/violence or frequently disciplined; and use of intuition at work and/or school. Secondary themes included: Using Hawaiian and cultural healing methods; everyone has a degree of intuition and the use of intuition to know when to see a doctor or not; various unique abilities from body and multiple

careers; mental health institutions, and financial struggle. Self-reports on participants' life purpose, their unique abilities, and being misunderstood were also collected. It was concluded that Indigos felt mislabelled or misunderstood throughout their lives despite their belief that their life purpose was to help humankind.

Academic psychologists are sceptical about Indigo phenomenon and argue that the phenomenon is a cover up to normalise the odd behaviour of children who could otherwise be included under the category of attention deficit disorder, attention deficit hyperactivity disorder, autistic spectrum disorders and learning disabilities. Health experts are concerned that labelling a disruptive child an "indigo" may delay proper diagnosis and treatment that could help the child or investigate the parenting style that may be causing the behaviour.

### Inspiration and Perspiration

Creativity is regarded as the product of inspiration or creative imagination combined with meticulous, disciplined effort. The Edisonian perception of invention as 1% inspiration and 99% perspiration is explained by the hypothesis of interactive creativity; it assumes that the inspirational aspect has a paranormal component. In his thesis on interactive creativity, Laszlo supported his hypothesis with observations on cultural creativity.<sup>68</sup> These observations included the collective advance of entire populations through the typical creative activity of their members and by documented incidents in modern science in which different investigators developed scientific insights simultaneously, without any known contact.<sup>68</sup> Early cultures developed similar tools; calculus was discovered simultaneously by Newton and Leibni and biological evolution was described independently by Darwin and Wallace. Similarly, Graham Bell and Elisha Grey both applied to patent the telephone on the same day. The Rubic's cube was conceived simultaneously and designed both by Rubic and a Japanese inventor. Nylon was discovered in both New York and London, hence, the name NyLon.

Jung's research into the phenomenon of creative synchronicity helped him to formulate his concept of the collective unconscious. Psychological disturbances may represent the consequences of creative endeavour and Jung (1973) considered them the price to be paid for persistent exploration of the unknown.<sup>69</sup> Polayni (1994) suggested that scientific discovery is informed by the imagination and integrated by intuition, and vice versa.<sup>70</sup> This statement is close to the Edisonian perception of creativity: If imagination is a property of the brain, intuition occurs in the unconscious realm. Whilst Laszlo's views are not definitive, they indeed supplement our existing knowledge about creativity. The inspirational aspect can be better explained by an expanded model of brain-mind-consciousness, and Xavier suggests a para-psychodynamic.<sup>71</sup>

### Biological Perspectives

Particularly gifted individuals have determined the evolution of civilisation. Karlsson (1984) commented regarding creative individuals: 'Without their genes, men might still live in caves'.<sup>72</sup> Nonetheless, countless gifted individuals have a very ordinary family background, with no ancestral history of creativity. For example, Newton came from an undistinguished family. Genetics researchers look for the biological roots of creativity, with some believing that the mind is reducible to chemistry. Whilst intelligence may be a trait that can be cloned, creativity may not be attached, and it may prove even more complex than genetic manipulation. Kelly et al. (2007) suggested that creative inspiration is akin to mysticism.<sup>35</sup>

Responses to both dopamine inhibiting drugs and to the psychoses triggered by the drugs that increase dopamine activity underlie the dopamine hypothesis of psychosis. However, dopamine over-activity in psychosis should not be confused with dopamine fluctuations in creative individuals. Dopamine diminishes with aging, which may explain the decreasing powers of creativity after the age of twenty.<sup>73</sup>

The relationship between age and outstanding achievement has captured the attention of researchers into creativity. Whilst Lehman maintained the perspective that creative achievement has a curvilinear single-peak function for age, other researchers have described two separate age-peaks.<sup>74</sup> Outstanding contributions among mathematicians after the age of fifty are exceptions. The age-related observations support a biological basis for creativity.

### Future Directions

Study of creativity is an important area of research where consciousness studies and psychopathology meet each other. Cognitive scientists have pondered over the link between psychopathology and creativity for a long time without making any firm conclusions and appear to be barking at the wrong trees. The very process of creativity ought to be explored before any progress in this area of research could be achieved and the current reductionist model of mind stands as a hindrance. The following suggestions may be helpful for future researchers.

1. Establish the psychopathology of psychotic disorders
2. Creativity linked genetic studies are warranted, biological correlates of creativity need further elucidation.
3. Expand the current model of brain-mind-consciousness complex so as to explain the inspirational element of creativity.
4. More longitudinal, international and multicultural studies recommended.
5. Given the affinity of psychosis-proneness to the artistic creativity domain,
6. studies should be focussing artistic creativity and scientific creativity separately.

## Clinical Implications

The study of creativity has clinical implications: A) Psychiatric understanding of creativity provides a better picture of patient functioning that could assist in clarifying the definitions of both normalcy and psychopathology. B) Early detection of creative talents in children might help to give special guidance for such children and thereby prevent potential psychiatric problems. C) When they coexist, differentiating creativity and mental illness is useful: The former might require nurturing and the latter warrant clinical intervention.

## Discussion

Whilst it is true that investigators have observed a high incidence of psychiatric symptomatology of an affective nature among creative writers and artists, it is debatable whether this relationship is causal, an effect or a contributory factor. The increased psychopathological states observed in artistic creative individuals suggest that art and science reflect two different arenas of creativity. The mechanism of generation of novel ideas may be identical in art and scientific creativity, but they are evaluated differently by the two groups resulting in different types of products. Creativity and mental illness can coexist, and the creative impulse has a therapeutic effect on the psychiatric condition. Creativity can be therapeutic for those who are already suffering from mental illness; creative art therapies applied in clinical and psychiatric settings report positive health-related outcomes.<sup>75</sup> Even in rare cases of psychopathology induced creativity, the individual will require highly developed intellectual protective factors. It is the disciplined portion of the mind that enables outstanding creative achievements. Creativity of the highest order is a product of laborious intellectual effort. When they coexist, psychopathology is a mediator, not the producer of creativity, and the creativity may be cathartic.

There is no scientific consensus regarding the association between psychopathology and creative achievement. The literature does not substantiate the high reported incidence of mental illness among creative people. It is possible that predispositions to mental illness and creativity tend to co-occur because they reflect an underlying personality and cognitive style predisposed to both creativity and mood disorder. The high reported incidence of mental illness potentially signifies an 'occupational hazard' and creativity stands independent of psychopathology. The normal creative person can swing back to reality from a transient 'creative psychical shift' (e.g. such as a diver who searches for diamonds in the deep sea and then returns to the shore). The sensitivity and intensity that facilitate creative expression may additionally make highly creative people more susceptible to depression.

Early investigations of geniuses were retrospective. Formal meta-analyses were not considered justifiable. All forms of creativity were mixed in the studies, without distinguishing the

different domains of creativity. Most of the studies were confined to English speaking people, whilst creativity is a global phenomenon. A multiplicity of literature does not mean that the ideas expressed are established scientific truth. This is true of creativity, which may be as mysterious as creation itself. The prevailing model of the mind may be inadequate for a full appreciation of the creative process. It would be easier for a 'camel to pass through the eye of a needle' than to explain creativity from a reductionist perspective. The inspirational component of creativity continues to be an enigma. It is my contention that creativity is essentially an inner, psychic phenomenon. We do not have even an approximate model of the brain-mind-consciousness complex, let alone know the true aetiology of schizophrenia and bipolar disorder. Therefore, it would be prudent to suspend our psychopathology allied perspectives of creativity until we develop a deeper understanding of consciousness. The association between creativity and psychopathology has soared to the level of cultural myth and this is evident in many films in which mentally ill persons are portrayed as extraordinarily creative.<sup>76</sup>

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## References

1. Corliss RW. A search for Anomalies. *Journal of Scientific Exploration* 2002; 16:453
2. Mussen PH, Conger JJ, Kagan J. *Child Development and Personality* (5th edn). pp. 262- 264. New York: Harper & Row, 1979.
3. Abra J. Changes in creativity with age: data explanation, and for further predictions. *International journal of aging and human development* 1989; 28:105-126
4. Koestler A. *The Three Domains of Creativity*. In: Dutton D., Krausz M. (eds) *The Concept of Creativity in Science and Art*. Martinus Nijhoff Philosophy Library, vol 6. Springer, Dordrecht, 1981.
5. Bronowski J. The creative process is scientific in scientific genius and creativity. *Readings from Scientific America*, New York, W.H. Freeman and Co. p3-8, 1987.
6. Ludwig AM. Reflections on creativity and madness. *American Journal of Psychotherapy* 1989; 43:4-14.7.
7. Jauk E, Benedek M and Neubauer AC. The road to creative achievement: a latent variable [www.frontiersin.org](http://www.frontiersin.org) October 2014;5 (3): 1211.



8. McClelland D, Atkinson J, Clark R., et al. The Achievement Motive. New York: Appleton-
9. Csikszentmihalyi M and Csikszentmihalyi IS. Family influences on the development of giftedness. In *The origins and Development of High Ability* (Ciba Foundation Symposium (eds G.R.Bock & K.Akrill)1993 ; pp.187-206 Chichester: Wiley
10. Gardner H. *Creating Minds*. New York: Basic Books, 2011.
11. Tarlaci S. Neuroquantology, Quantum physics in the Brain. New York: Nova Science Publishers, 2014.
12. Feist, G J. A meta-analysis of personality in scientific and artistic creativity. *Pers. Soc. Psychol* 1998; Rev.2, 290–309. doi: 10.1207/s15327957pspr0204
13. Fink A, and Benedek, M. EEG alpha power and creative ideation. *Neurosci. Biobehav* 2014; Rev. 44, 111–123. doi: 10.1016/j.neubiorev.2012.12.002
14. Gitlin MJ, Swendsen J, Heller TL, Hammen C. Relapse and impairment in bipolar disorder. *Am J Psychiatry*1995; 152:1635-40.
15. Richards R and Kinney DK. Mood swings and creativity. *Research Journal* 1990; 3 (3): 202-217.DOI: 10.1080/10400419009534353
16. Kyaga S, Landén M, Boman M, Hultman CM, Långström N, and Lichtenstein, P. Mental illness, suicide and creativity: 40-year prospective total population study. *J. Psychiatr* 2013; Res. 47, 83–90. doi: 10.1016/j.jpsychires.2013.09.010
17. Kyaga S., Lichtenstein, P., Boman, M., Hultman, C., Långström, N., and Landén, M. Creativity and mental disorder: family study of 300,000 people with severe mental disorder. *Br. J. Psychiatry* 2011; 199, 373–379. doi: 10.1192/bjp.bp.110.085316 Merten
18. Parnas J, Sandsten KE, Vestergaard CH, Nordgaard J. Schizophrenia and bipolar illness in the relatives of university scientists: An epidemiological report on the creativity-psychopathology relationship. *Frontiers in Psychiatry* 2019; 10:175.
19. Johnson SL, Murray G, Fredrickson B, Youngstrom E A, Hinshaw S, Bass J M, Deckersbach T, Schooler J, Salloum I. Creativity and bipolar disorder: Touched by fire or burning with questions? *Clinical Psychology Review*; 2012; vol. 32 (no. 1); p. 1-12
20. Burkhardt E, Pfennig A, Breidling G, Pfeiffer S, Sauer C, Bechdorf A, Correll CU, Bauer M, Leopold K. Creativity in persons at-risk for bipolar disorder—a pilot study. *Early Intervention in Psychiatry*; Oct 2018
21. Parker G, Paterson A, Romano M, Granville S. Supra-sensory phenomena in those with a bipolar disorder. *Australasian Psychiatry*; Aug 2018; vol. 26 (no. 4); p. 384-387
22. Longworth G, Carson J. Recovery heroes from the past: Charles Dickens (1859:2003): "it was the best of times it was the worst of times". *Mental Health & Social Inclusion*; Apr 2018; vol. 22 (no. 2); p. 78-8.
23. Jaswant ST, Hans G. A narrative review of creativity and mood disorders. *Indian Journal of Psychiatry*; 2019; vol. 61 (no. 9)
24. Reddy IR, Ukrani J, Indla V, Ukrani V. Creativity and psychopathology: Two sides of the same coin? *Indian Journal of Psychiatry* 2018; Volume 60, Issue 2, April-June.
25. Ludwig AM. *The Price of Greatness: Resolving the Creativity and Madness Controversy*. New York, USA: Guilford Press; 1995.
26. Post F. Creativity and Psychopathology. *British Journal of Psychiatry* 1994; 165; 22-34.
27. MacKinnon DW. The nature and nurture of creative talent. *American psychology* 1962; 17:484-495.
28. Hare E. Creativity and mental illness. *British Med Journal* 1987; 295, pp 1587-89.
29. Ghadirian AM, Gregoire P, Kosmidis H. Creativity and the Evolution of Psychopathology, *Creativity research journal* 2001;13(2) 145-148.
30. Freud S. Leonardo da Vinci and a memory of his childhood, in *Complete Psychological works*, New York, Hogarth Press, vol 11, pp63-137,1957.
31. Klein R: Creativity and Psychopathology. *Journal of Humanistic Psychology* 1971; 11(1):40-52
32. Kubie L. *Neurotic Distortions of the Creative Process*. University of Kansas Press, Lawrence, 1958
33. Sims A. *Symptoms in the mind*. London: Bailliere, Tindall, 1988.
34. Slater E, Mayer A & Robert S. *Contribution to pathography of musicians*.
35. Kelly EF, Kelly E W, Crabtree A, Gauld A, Grosso M & Greyson B. *The Irreducible Mind: Toward a psychology for the 21st Century*. New York: Rowman & Littlefield Publishers, 2007.
36. Combalt BA & Kellp JG. Impaired attention, genetic, and the psychophysiology of schizophrenia. *Schizophrenia Bulletin* 1994; 20:31-46.
37. Hansefus N. & Magaro P. Creativity and schizophrenia in equality of empirical constructs. *British Journal of Psychiatry* 1976; 129:346-349.
38. Andreasen NC, Canter A. The creative writer: Psychiatric symptoms and family history. *Compr Psychiatry* 1974; 15:123-131
39. Braff DL and Greyer MA. Sensorimotor gating in schizophrenia. *Arch.Gen. Psychiatry* 1990; 47,181-188.
40. Rothenberg A. The process of Janusian thinking in creativity. *Arch.Gen. Psychiatry* 1971; 24:195-205.
41. Bleuler E. *Dementia Praecox or the group of schizophrenias*, Zinkin J(Trans); New York: International University Press, 1950.
42. Schwartz S. *Language and cognition in Schizophrenia*; Hillside, NL Lawrence Erlbaum, 1978
43. Rothenberg A. Einstein's creative thinking and the general theory of relativity: A documented report, *American Journal of Psychiatry* 1979;136:38-43
44. Gathercole CE. A note on some tests of over inclusive thinking, *British Journal of Medical Psychology* 1965; 38:59-62.
45. Schuldborg D. Schizotypal and hypomanic traits, creativity, and psychological health. *Creative research journal* 1990; 3(3):557-56
46. Fink A, Benedek M, Unterrainer Human-F, Papousek I, Weiss M. Creativity and psychopathology: are there similar mental processes involved in creativity and in psychosis-proneness? *Front. Psychol* 2014; 5:1211. <https://doi.org/10.3389/fpsyg.2014.01211>
47. Iona R. Autism, Creativity and Aesthetics, *Qualitative Research in Psychology*, DOI: 10.1080/14780887.2018.1442763
48. Acar S, Chen X, Cayirdag N. Schizophrenia and creativity: A meta-analytic review *Schizophrenia Research* 2018; 195: 23-31.
49. Wang L, Xu X, Wang Q, Healey G, Su L, Pang W. Are individuals with schizophrenia or schizotypy more creative? Evidence from multiple tests of creative potential. *Creativity Research Journal*; Apr 2017; vol. 29 (no. 2); p. 145-156
50. Dietrich A. The myth conception of the mad genius. *Front. Psychol* 2014; 5:79. doi: .3389/fpsyg.2014.00079
51. Simonton DK. More method in the mad genius controversy: a historiometric study of 204 historic creators. *Psychol. Aesthet. Crea. Arts* 2014; 8, 53–61. doi: 10.1037/a0035367
52. Schlesinger J. Creative myth conceptions: a closer look at the evidence for the "mad genius" hypothesis. *Psychol. Aesthet. Crea. Arts* 2009; 3, 62–72. doi: 10.1037/a0013975
53. Pandarakalam JP. Psychopathology of creativity: an analysis. *Irish Psychiatrist*. 2005;6(3):117-121.
54. Huxley A. *The Doors of Perception: The Heaven and Hell*. New York: Vintage Publication, 1954.
55. Zizzi P, Pregolato M. Quantum Logic of the Unconscious and Schizophrenia. *Neuroquantology* 2012; 10(3): 566-574.
56. Krippner S. Psychedelic Drugs and Creativity. *Journal of Psychoactive Drugs*.1985;17 (4): 235-245.
57. Schafer, G., Feilding, A., Morgan, C.J. A., Agathangelou, M., Freeman, T., & Curran, H. V. Investigating the interaction between schizotypy, divergent thinking and cannabis use. *Consciousness and Cognition*, 21, 292-298. doi:10.1016/j.concog.2011.11.009
58. Cohen K, Weinstein AM. Synthetic and non-synthetic cannabinoid drugs and their adverse effects - a review from public health prospective. *Frontiers in Public Health* 2018; 6: 162. doi: 10.3389/fpubh.2018.00162.

59. Di Forti M, Quattrone D, Freeman T, Tripoli G, Gayer-Anderson C, Quigley H, et al. The contribution of cannabis use to variation in the incidence of psychotic disorder across Europe (EU-GEI): A multicentre case-control study. *The Lancet Psychiatry* 2019; 6 (5): 427–36. doi: 10.1016/S2215-0366 (19) 30048-3.
60. Myles H, Myles N, Large M. Cannabis use in first episode psychosis: Meta-analysis of prevalence, and the time course of initiation and continued use. *Australian and New Zealand Journal of Psychiatry* 2016; 50 (3): 208–19. doi: 10.1177/0004867415599846.
61. Gage SH, Hickman M, Zammit S. Association between cannabis and psychosis: Epidemiologic evidence. *Biological Psychiatry* 2016; 79 (7): 549–56. doi: 10.1016/j.biopsych.2015.08.001.
62. Hasan A, von Keller R, Friemel CM, Hall W, Schneider M, Koethe D, et al. Cannabis use and psychosis: A review of reviews. *European Archives of Psychiatry and Clinical Neuroscience* 2019. [Epub ahead of print] doi: 10.1007/s00406-019-01068-z.
63. Foster BC, Abramovici H, Harris CS. Cannabis and cannabinoids: Kinetics and interactions. *The American Journal of Medicine* 2019; 132 (11): 1266–70. doi: 10.1016/j.amjmed.2019.05.017.
64. Goswami A. *Quantum Creativity*. London: Hay House, 2014.
65. Gardner H. Creativity: an interdisciplinary perspective. *Creativity research journal* 1988 ;1. 8-26.
66. Rosenshein J.B. *Parenting the highly sensitive child: A guide for parents and caregivers of ADHD, Indigo and highly sensitive children*. Bloomington: Balboa Press, 2013.
67. Bagnol L, Alexander J, Ewing H, Chu D. Indigos in Hawai'i: a phenomenological study of the experience of growing up with spiritual intelligence. *Pacific Health Dialog*; Mar 2011; vol. 17 (no. 1); p. 83-98.
68. Ervin L. "The Genius Hypothesis": Exploratory concepts for a scientific understanding of unusual creativity. *The Journal of Scientific Exploration* 1994; 18, No. 2: 257-267.
69. Jung C.A. Synchronicity, an acasual connecting principle. *Collective Works*. Vol.viii, Princeton, N.J., Princeton Press, 1973.
70. Polayni M. The Creative Image. Ibid p91-108 Post Felix. *Creativity and Psychopathology*. *British Journal of Psychiatry* 1994; 165; 22-34.
71. Play fair LG. *Medium of the Century*. London: Roundtable Publishing Co. 2010.
72. Karlsson J: Creative intelligence in relatives of mental patients. *Hereditas* 1984; 100: 83-86
73. Wang Y, Chan GLY, Holden JE, Dobko T, Mak E, Schulzer M, Huser JM, Snow BJ, Ruth TJ. Age dependent decline of Dopamine D1 receptors in human brain. *Science* 1998; 30:56-61
74. Lehman HC. *Age and achievement*. NJ: Princeton University Press, 1953.
75. Abt HA. At what ages do outstanding American astronomers publish their most cited papers? *Publication of the astronomical Society of the Pacific* 1983; 95, 113-116
76. Degmeþiü Dunja. *Schizophrenia and Creativity*. *Psychiatria Danubina*, 2018; Vol. 30, Suppl. 4, pp S224-227.



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