



Creativity, Evolution and Mental Illnesses.

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Abstract

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Abstract

Mental representations, or memes, transform the space in which they evolve. Their survival is dependent on the survival of the individuals and the groups hosting them. Creativity - the production of new and useful ideas - is closely linked to the social dynamics of the individuals expressing creative ideas: without social confrontation new memes cannot become diffuse. Creative individuals tend to be emotionally unstable, and many are affected by mental disorders. Studies on the link between creativity and mental illnesses show that it is exactly the characteristics of the mental disorder which also confer some advantage on afflicted individuals. These advantages extend to the groups to which the creative, mentally ill individuals belong. The group comprising the most creative personalities will therefore acquire an adaptive advantage which maintains the integrity of the group as a whole, in spite of the vulnerability of the individual.

Key words: creativity, evolution, meme, mental representation, mental disorders, bipolar disorders, schizophrenia, natural selection, information processing

1 Introduction

Mental representations, or memes, transform the space in which they evolve. In a recent paper on this topic, Liane Gabora stated: "*culture not only affects biological fitness through its effects on behaviour... but it dramatically modifies the biological world*" [7]. Creativity - the production of new and useful ideas - is closely linked to the social dynamics of the individuals expressing creative ideas: without social

confrontation new memes cannot become diffuse: "*creativity is a collective affair*" [7].

The majority of studies on creativity have focused on the characteristics which favour it at an individual level, but all researchers are conscious of the social nature of the creative process. It is not easy to define exactly what creativity actually is. To create, per se, implies the production of something new and original. However the qualities which make an individual able to produce new entities are not well understood. As is also the case with the concept known as "intelligence", it is unlikely there is a general creativity factor unevenly distributed across the population. Rather, creativity can be conceived as a complex of qualities that allow some people more easily than others to produce new objects or ideas. As a consequence creativity is often described in relation with the end product, in a way that can occasionally be tautological: creativity is often conceived as that which has lead to results considered creative by general consensus.

Measuring creativity is not an easy task: the methods used in the evaluating of creative aptitude and ability are numerous and as ingenious the argument investigated demands them to be. Summarizing the different criteria used for measuring creativity Dennis Hocevar [10] reviewed ten main categories:

1. Tests of divergent thinking
2. Attitude and Interest inventories
3. Personality inventories
4. Biographical inventories
5. Teacher nominations
6. Peer nominations
7. Supervisor ratings
8. Judgment of products
9. Eminence
10. Self-reported creative activities and achievements

Most of these techniques are based on third person rating. Although inter-rater agreement is generally obtained, the problems of "*who judges the judges*", and what the judges should be looking for, remain unresolved.

A minority of methods rest on independent tests of measurement: these tests, like the tests of divergent thinking, are based on specific models of what creativity is, so any consideration of their results is biased by the personal view of the researcher who reported them. However, as in the case of "intelligence", there is probably no way to avoid this dilemma. Ultimately, any discourse on creativity, or any other conceptual construct, must involve a description of the boundaries of the concept discussed.

The description of creativity that is now generally accepted identifies creativity as the ability to create products or ideas which are original and which posses a strong social usefulness. Frank Barron [2], one of the most authoritative researchers in this field, notes that a creative product or idea should be new or original and be acknowledged as such by social consensus: a criterion of usefulness is implied by, although not essential to this definition. In this view "Creations" are products which appear new and are also considered valuable by consensus. To introduce an innovation requires the comparison of the new idea or product with the pre-existing alternative, and the evaluation of the innovative product with respect to existing needs. A creative result can serve to resolve a problem or to satisfy an unconscious aesthetic drive: although this can be experienced at an individual level, in the majority of cases the problem or the aesthetic impulse operates on a social level, and the creative solution must be communicated to others if it is to produce some effect.

Many factors contributing to the expression of creative potential are a reflection of this essential

dimension of the creative process: i.e. the need for social testing of the creative product. The proper elaboration of the primary creative effort requires the development and the testing of the new idea against scientific and aesthetic standards, which are, of course, of a social nature [15]. There are many studies which explore the link between creativity itself and the psychological characteristics of creative individuals, and which, in so doing, shed light on this argument [2,12,13,21].

Generally, creative people tend to emerge as both sociable and popular with their peers; they appear to welcome social contact and show interest in social activities. Creatively gifted people more than their peers also show risk-taking and novelty-seeking tendencies. While this grants them greater independence and unconventionality, it also leads to emotional instability, and in fact one of the most surprising psychological characteristics of creative individuals is their proneness to mental illnesses [10, 11, 12, 13].

2 Creativity and Mental Illnesses

Most studies show that there is a link between creative ability and the risk of mental disorder: in fact the prevalence of mental problems among creatively gifted people is significantly higher than in the general population [2, 11, 12, 13, 15, 21]. A link between eminence in the arts and science, leadership qualities and mental problems was even suggested by the author of the fragment known as "*Problemata XXX*", now part of the aristotelian canon. In this text, many behavioural characteristics are indicated which are peculiar to patients suffering from manic-depressive illness. This would suggest that eminence as result of creative aptitude and madness are linked by a non-casual link.

In the positivistic era, the Italian Cesare Lombroso illustrated this thesis in a circumstantial way referring to the "genius" and the "lunatic" related, in his opinion, by a shared genetic basis [14]. Most studies performed in the positivistic era, in order to either confirm or refute Lombroso's hypothesis, rest on biographical evidence, raising the suspicion that these studies claiming a higher prevalence of psychopathologies among creative or eminent people were biased by overexposure. However even the later studies, performed using methods applying specific nosographic categories and direct confrontation with the candidate through interviews and inventories yielded similar results, with a higher prevalence of mental disorders among gifted people than among the general population [12, 13]. In the majority of studies disorders with an affective (mood) component, in particular those characterized by melancholy (severe depression), were associated with creative achievement, just as the author of the *Problemata XXX* asserted [1, 11].

The disorders most implicated are those with a bipolar trend: i.e. disorders characterized by the alternation of depressive episodes with other episodes with an opposite euphoric mood. In the period between episodes those who are suffering from these disorders have a highly adaptive life style, with generally very high levels of social functioning, thanks to the tenacity, tirelessness and social ease that are typical of these individuals [8]. Nevertheless the disorders can be highly impairing: bipolar patients are often inconstant at work and their affectionate and social relationships tend to be stormy; their divorce rates are higher than those of the general population, and there is a very high prevalence among them of misuse of alcohol and other drugs, which bipolar patients may take either as auto-therapy to lessen anxiety and depression, or during impulsive euphoric periods [8].

Studies on the relationship between creativity and mental illnesses suggest that it is the same characteristics of the disorder, in their less severe manifestations, which confer some advantage on afflicted individuals and their relatives. Ruth Richards, who extensively studied this aspect of bipolar disorders, found a high propensity among bipolar patients and their relatives for the development and

expression of creative potential in every field [19]. These abilities were evident mainly among individuals with less impairing or subclinical forms of the disorder.

Among the characteristics that favour creative achievement among bipolar individuals there are some that are specifically related to ability in social intercourse. People with bipolar mood disorders tend to be more emotionally reactive, which gives them greater sensitivity and acuteness. A lack of inhibition permits them unrestrained and unconventional forms of expressions, less limited by accepted norms and customs. This makes them more open to experimentation and risk-taking behaviour, and, as a consequence, more assertive and resourceful than the mean. Sensitivity and lack of inhibition make these subjects warmer and more friendly in social intercourse. Both aptitudes also represent a clear advantage on a professional level, particularly when competition is greater. Being more sociable and less inhibited in expressing themselves, individuals prone to bipolar disorders may manage to spread their ideas with greater ease, allowing their ideas to prevail over others competing for predominance.

3 Creativity, Memes and Evolution

These observations show the importance of the social side of creativity. Creative ideas, like other memes, reflect the dynamics of the individuals who host them. New ideas can therefore find success only when their hosts, and the groups to which these individuals belong, are also successful. In his studies Cavalli-Sforza showed that the diffusion of grain cultivation was directly linked with the spread of the population which elaborated the technique [5]. Another example is the heroin abuse epidemic: where there are no drug abusers there is no heroin to be sold.

As Liane Gabora asserts in her paper: "*the bottleneck in cultural evolution is the capacity for innovation*". Groups whose members possess the ability to make innovative mental associations can take advantage from this, even if the ability is linked to maladjusted behaviour at the individual level. Examples deriving from the studies on the relationship between creativity and bipolar disorders are suggestive. The high suicide rate (10% of patients) and the low fertility of bipolar patients, who tend to marry less than the general population and have less children than the mean, suggest that, both now and in the past, the carriers of the genetic burden of the disorder must have some compensatory advantage in order for a relatively high percentage of affected individuals (more than 1%) to be maintained in the general population [24]). Bipolar disorders have a strong genetic component [16]: people who suffer from them, and their relatives, share some genetic factor which is transmitted from one generation to the next.

Propensity to develop a bipolar disorder can be conceived as a hitch-hiker allele which confers no compensatory advantage per se, but which endures because it is linked to creative abilities important for survival. The bipolar gene may contribute to its own survival in the gene pool by virtue of the resistance, tenacity and energy it confers on the individual, or may favour behaviour which contributes to its replication. If creative individuals are more likely to assume leading positions in various fields, then hitch-hiker alleles that contribute to creativity would also spread. There are many creative individuals with associated mental problems in the artistic field [11]. Poets and writers seem to be particularly prone to developing mental problems, generally of a depressive type, and it has even been asserted that one cannot write with success without being "exposed to the Dark Sun of Melancholy" [15]. Joseph Schildkraut, one of the fathers of the biological approach to the study of mental disorders, put forward a very suggestive hypothesis attributing a decisive role to artistic symbolism in the favouring of social cohesion of groups. Thus the group containing the most creative personalities will acquire an adaptive advantage which maintains the integrity of the group as a whole, in spite of the vulnerability of the

individual who is subject to depressive breakdowns [21]. This explanation derives from the concept of inclusive fitness, according to which a behaviour pattern under genetic control is selected for its ability to favour the production of successful offspring both by the individuals displaying the behaviour pattern and by their genetic relatives. Group selection has often been thought to favour traits that are individually disadvantageous but evolve because they benefit the wider group [22, 23].

The same results could also be associated with memes (such as respect of agreements or the stifling of revenge) that may be detrimental to the individual but clearly offer an advantage to communal life. Well known example are the prisoner's dilemma and the TIT for TAT strategies*1.

4 Creativity, Schizophrenia and Information-processing

Studies on the relationship between creativity and mental illnesses also throw light on the role of the gating systems involved in information-processing. The creation of new ideas requires combinations and transformations of old ones: we can only hypothesize about what we do not yet know. However, information processing is not a fixed, mechanical procedure. The flow of inputs is guided by centralized systems which regulate the amplitude and length of oscillations in the canals that transfer the information.

Like schizophrenic patients, creative individuals often report odd sensory and perceptual experiences, feelings of restlessness and the inclination towards impulsive outbursts in association with rejection of common social values [4, 6, 25].

Highly creative "normals" also tend towards over inclusive or "allusive" thinking and, as pointed out by Albert Rothenberg [20], demonstrate a capacity to conceive and utilize two or more opposite or contradictory ideas or concepts simultaneously, without being disturbed by this simultaneity of opposition, as is also the case with schizophrenics. It seems that creative individuals, like schizophrenics, are subject to a widening of selective attention, which makes them more aware of and receptive to experience, with more intensive sampling of environmental stimuli [9, 19]. In fact ideational fluency and a preference for complex and asymmetrical designs, two of the main factors contributing to creativity, could derive from higher levels of arousal and faster stimulation of discrete cerebral areas. Schizophrenic thought processes tend to allow unusual associations which result in over inclusive thinking, with many irrelevant elements being included in reasoning: this peculiar style of thought is assumed to derive from a failure in the filtering of stimuli by dysfunctional gating systems [3, 18]. Creative individuals, conversely, may gain advantage from higher levels of associative thinking, since they are capable of effectively processing these increased inputs without the risk of cognitive overload. Since to create consists essentially of the making of new combinations of associative elements [3], any ability which serves to bring together otherwise remote ideas will facilitate a creative solution [9, 17]. The favouring of associations implies an extended knowledge of the argument under study (memory of ideas to be associated) and a restriction of inhibitory influences on stimulation of remote cerebral areas. The more associations evoked by an element, the more likely it is that another element will be combined with it in a manageable form. Since inhibition or suppression (by anxiety or other more powerful competitory stimuli) would limit awareness and openness to both internal and external stimuli, freedom from these forces would favour associative thinking, and so creativity.

5 Conclusion

One should not ignore that the stereotype of the eccentric artist or of the mad scientist also plays a protective role in the collective imagination. It acts against the fear and suspicion that excellence and the diversity of others always engenders in the majority. The image of madness linked to genius has been repeatedly expressed in the history of the western world. It was codified during the Renaissance in the figure of the melancholic genius afflicted by Saturnian acedia, and underwent a resurgence during Romanticism in the figure of the tormented artist. Creativity is, after all, a challenge to an existing meme pool, since it leads to the creation of competing memes. The stigma attached to diversity may lead individuals to assume even more eccentric behaviour: the definition of such behaviour in terms of "mental illness" may result from "strategies" defensive towards existing memes. In fact it is the pool of existing memes that decides what is good and healthy, i.e. coherent with its own criteria. In addition, some temperamental traits, like eccentricity, uneasiness or propensity to excess and experimentation, which are widespread among creative people, could be a reflection not only of an underlying mental disorder, but also, and above all, of the tolerance on the part of society of the behaviour of famous individuals. In these cases deviant behaviour is tolerated because it allows the expression, by third parties, of dissenting demands which the majority of people are not able to express.

Many issues concerning the "dark side" of creativity remain unresolved. Equally, the same contribution of new memes to their own diffusion is only partially understood. A particular set of productive memes, for example, may exert a selective influence on the appropriate neuronal groups which in turn lead a particularly creative individual to produce creative things. We hope this paper will achieve this same end, conferring a competitive advantage towards an understanding of the creative process and cultural evolution on the memes detailed herein.

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