KEYWORDS: ***Palaeolithic – Cave art – Bipolar disorder – Gene***

CREATIVITY, MENTAL DISORDER AND UPPER PALAEOLITHIC CAVE ART

Margaret Bullen

Abstract. This paper will address the tantalising question of why, about thirty five thousand years ago, people living in western Europe produced pictorial art of extraordinary beauty and symbolism. Did it really arise out of nowhere and what changed? Modern science is beginning to provide answers to some of the questions but many remain.

> The painted caves are remarkable expressions of artistic talent because they were created by unusual people: those with specific kinds of mental disorders — mood disorders — that drove them mad yet, at the same time promoted their genius (Whitley 2009: 243).
>
> I believe it [the art] is the product of mad geniuses suffering from the mood disorders that, historically (and likely prehistorically) were the defining characteristics of shamanism (ibid.: 244).
>
> … the first religion and art appeared not simply when the rational human mind finally evolved and not simply due to an unidentified social circumstance that at some point in our history developed. These traits instead appeared when the mutations that cause this form of madness and creative genius — changed our genome and forever altered the path of the human spirit (ibid.: 260).

These statements in David Whitley's 2009 book, entitled *Cave paintings and the human spirit*, prompted me to ask myself several questions. To what extent did I agree or disagree with these statements and what were my reasons for the agreement or disagreement? If I disagreed with Whitley's arguments did I have a hypothesis of my own? It would not necessarily be any more or less accurate than that of Whitley. After all neither of us has any personal experience of the cultures of western Europe thirty to forty thousand years ago.

This paper will look critically, but not necessarily negatively, at the arguments raised by Whitley and raise some other possibilities about the enigma that is the apparently sudden efflorescence of art in the Upper Palaeolithic of western Europe.

The painters

No one would argue that the cave paintings are the work of highly talented individuals and, as will be discussed later, they would have needed the support of other members of their community to carry out major projects; scaffolding to reach ceilings and high walls, torches to light the deeper caves, pigments to create the art, all would have been required.

The unusual people who made the paintings were, according to Whitley, suffering from a mood disorder which drove them mad but also promoted their genius. Several ideas are embedded in that statement. The artists suffered from a mood disorder; the mood disorder was one which drove them mad; the mood disorder was linked to and promoted their genius. What made Whitley write that the artists suffered from a mood disorder? Could he read this from their art? No, behind these statements lie further assumptions by Whitley; that the artists were shamans and therefore they suffered from the 'shaman's disease' (ibid.: 220) the latter being identified as bipolar disorder.

That the Palaeolithic art in deep caves such as Chauvet and Lascaux and open air sites such as Côa was created by shamans is a contested hypothesis, argued for and against in the pages of many journals and books. *Inter alia,* this is not the place to argue whether or not the art was created in the Upper Pleistocene or the Holocene. The shaman, as interlocutor for his or her society between this and other worlds, is present in all societies including our own, and societies capable of great art such as that we are discussing no doubt had their own ritual specialists. They all play or played the role of interpreters of mysteries beyond normal comprehension. Siberian and American Indian shamans, Greek and Egyptian high priests, San trance healers and Australian men and women of high degree all bridged the void between this reality and the other. They were not constrained by the boundaries imposed on 'normal' people. They commanded respect, awe

and sometimes fear. But, were they painters and were they crazy?

Mental disorders

The hard and fast boundaries between different mental disorders are disappearing. Therapies cross boundaries and current medications such as the atypical antipsychotics are used to treat the hallucinations and disordered thinking of the schizophrenic, to stabilise the mood of the manic depressive and to stop the re-iterative thinking of the PTSD (post traumatic stress disorder) sufferer. The common pathway is disturbance, in the production and maintenance, of the level in the brain's synapses of neurotransmitters such as serotonin, noradrenaline and dopamine.

The diagnostic criteria for mental disorders are constantly changing. Symptom complexes acquire different labels as there is a greater understanding of the biochemical imbalances associated with different manifestations. Diseases now have spectra rather than being single entities with clear diagnostic boundaries.

The spectrum of bipolar disorders ranges from bipolar 1, previously known as manic-depression, to the cyclothymic individuals that are 'temperamentally normal with varying degrees of extroversion, high energy and creativity (Quinn 2007: 3).

Episodes of mania and of major depression in various combinations and timing characterise BP 1. It is a serious disorder causing major disruptions in an individual's life. What does it mean to be manic? Typically mania is characterised by heightened mood, faster speech, quicker mental and physical activity, decreased need for sleep, heightened sexuality and impulsivity. What does it feel like?

> When you're high it's tremendous. The ideas and feelings are fast and furious and frequent like shooting stars and you follow them until you find brighter and better ones. Sensuality is pervasive and the desire to seduce and be seduced is irresistible … but somehow this changes ... you are irritable, angry, frightened, uncontrollable and enmeshed totally in the blackest caves of the mind (Goodwin and Jamison 1990: 18).

A diagnosis of bipolar II is based on a history of recurrent major depressive episodes and episodes of hypomania. In hypomania the symptoms are less severe than in mania and have less severe consequences for the individual concerned. While recent studies have shown an incidence of bipolar 1 of 2% Bipolar II is much more common at 5–7% (Quinn 2007: 3)

One of Whitley's arguments for the shaman's disease being bipolar disorder is that both run in families and, quite often, in the same family (Whitley 2009: 220). There is certainly good evidence from twin studies for the heritability of affective (mood) disorders. The studies show that the concordance rate for these disorders is higher in identical than in fraternal twins. For example, in one study, if one individual of identical twins has bipolar 1 there is an 80% chance the other will also suffer from it, while the likelihood is only13% in non-identical twins. For bipolar 2 the figures are 78% and 31% (Goodwin and Jamison 1990: 377). Following the family trade is less clearly due to genes. In many societies it is extremely difficult for a person not to follow in the footsteps of their parent whether it is as boot maker, fiddler or as butcher and it is no different in the professions. Student doctors and teachers, engineers and pharmacists tend to come from families in which those skills are practiced. Nurture clearly plays a large part in the 'inheritance' of industry and interests. Goodwin and Jamison make an interesting point that, in their own and in other studies, people born in the decades starting around the 1940s have a higher life time prevalence of affective disorders, both mania and depression, than people born earlier. They suggest that the increase is due to cultural influences and note that the rate remains elevated in relatives, indicating that whatever the cause it interacts with the familial vulnerability (ibid.: 380). How common was unipolar depression or bipolar disorder 40 000 years ago?

In the older literature schizophrenia was the classic diagnosis applied to people who were not considered normal and frequently that included the seers and shamans. Features of the illness include hallucinations, delusions, disorganised thoughts and speech and affect flattening. Manic and schizophrenic thought disorders are contrasted by Holzman, quoted by Richards, suggesting why being bipolar might confer a creative advantage.

> Manic thought disorder manifests itself as loosely tied together ideas that are excessively and immoderately combined and elaborated. Often there is a playful, mirthful and breezy quality to their production ... Schizophrenic thought disorder shows little if any, of the exuberant, jocular, frivolous elaborations of the manic patient (Richards 1994: 58).

The work of George Devereux is referred to at length by Whitley as supporting the thesis of the shaman as mentally deranged (Whitley 2009: 218). Devereux was an American psychoanalytically orientated anthropologist who worked for many years with the Mohave Indians. He was careful not to apply rigid diagnostic formulation to the shaman. He considered that schizophrenia was rare among the Mohave, writing that 'due to cultural differences, also reflected in differences in ethnic character, far too many Indians are wrongly diagnosed as schizophrenics' (Devereux 1961a: 223). Devereux described the Mohave as 'characterologically cyclothymic' and that mood swings had to be excessive before they were considered abnormal (ibid.: 244). He suggested that Mohave culture 'helps normal individuals to understand that — in a rather extreme way — his psychology is not altogether different from that of the psychotic. Devereux emphasised the importance of dreaming to the Mohave, describing it as a 'dream culture' (ibid.: 494). He also noted their tolerance of extreme sexual behaviour. While not denying the shaman their unusual qualities, such as an even greater pre-

occupation with dreams than other members of the society and even more extreme sexual behaviour, Devereux stressed the importance of not confusing 'cultural practice with clinical syndromes' (Devereux 1961b: 1089).

He does not discuss Mohave creativity, so we do not know whether he had any insight into the relation between the shaman and Mohave rock art such as that illustrated by Whitley at Grapevine Canyon (Whitley 2009: 218).

Creativity and bipolar disorder

Highly creative people frequently show some or even all of a set of special characteristics. These are (Dacey and Lennon 1998: 97):

- Tolerance of ambiguity
- Stimulus freedom
- Functional freedom
- Flexibility
- Risk taking
- Preference for disorder
- Delay of gratification
- Freedom from sex-role stereotyping
- Perseverance
- Courage

Being inventive and imaginative, taking the risk to do something when the outcome is uncertain or just trying a new way of approaching a task are all aspects of being creative.

Aristotle wondered 'Why is it that all men who are outstanding in philosophy, poetry and the arts are melancholic' (Goodwin and Jamison 1990: 333). His opinion was based, no doubt, on observation of his associates. William James, writing in the days before diagnosticians had the assistance of brain scans and knowledge of neurotransmitters, also observed a connection between psychopathology and genius:

> Borderland insanity, crankiness, insane temperament, loss of mental balance, psychopathic degeneration (to use a few of the many synonyms by which it has been called), has certain peculiarities and liabilities, which when combined with a superior quality of intellect in an individual, makes it more probable that he will make his mark and affect his age, than if his temperament were less neurotic (James 1982: 22).

James observed that while there is no special affinity 'between crankiness as such and superior intellect whatever the intellect the psychopathic temperament brings with it ardour and excitability' (ibid.). In other words they are the people who get things done. To quote James again:

> Thus when a superior intellect and a psychopathic temperament coalesce — as in the endless permutations and combinations of human faculty they are bound to coalesce often enough — in the same individual, we have the best possible condition for the kind of affective genius that gets into the biographical dictionaries. Such men do not remain mere critics and understanders with their intellect. Their ideas possess them, they inflict them for better or worse, upon their companions or their age (ibid.: 23–24).

Many of those with James' 'psychopathic temperament' would today probably be diagnosed as bipolar. It is relatively easy to prepare a catalogue of poets, novelists, composers and artists, alive and dead, who have either been diagnosed with bipolar disorder or have a very suggestive history. However, it is impossible to know what proportion they represent of the total population of poets, novelists, composers and artists of their time. That is, we do not know the prevalence of such mental disorder in either the community of creative individuals or in their wider community (Goodwin and Jamison 1990: 335). Nor do we know how representative they were of their community.

Rothenberg justifiably criticised separate studies by Andreason and Jamison who published data on the prevalence of bipolar disorder in living writers and artists. Andreason, who studied the incidence of bipolar disorder in a relatively small group of thirty writers in a creative writers course and had a control group of thirty non-writers, made the diagnostic formulations herself while knowing which subjects were the writers, in other words it was not a blind study (Rothenberg 1990: 150). Jamison's study had no control group and, as Rothenberg notes, the number of subjects was too small for any valid statistical interpretation. Jamison studied forty-seven outstanding British poets, novelists and artists finding that almost 20% of the eighteen poets had been treated for manic depression, while 6% of eight artists had suffered a depressive illness.

There is a difference between the kind of everyday creativity that people possess who make wonderfully inventive birthday cakes or design their own clothes and gardens and the eminent creativity of an individual who makes a discovery or designs something that has a profound and widespread effect on the world (Richards 1994: 45). Richards' own study at Harvard University was based on a hypothesis that a genetic vulnerability to manic depression was associated with increased creativity. The study used a tool that measured everyday creativity and originality rather than eminent creativity. The study population consisted of three groups; patients with manic depression, cyclothymic patients and relatives of both groups. They were compared to a normal control group and a group of patients with a psychiatric history not including an affective or schizophrenic diagnosis. The results showed that the manic depressives, the cyclothymic patients and the normal relatives all had a higher creativity score than did the controls but the relatives had a higher score than the manic depressive patients with the cyclothymic patients closer in score to the normal relatives (Goodwin and Jamison 1990: 351). Similarly, Bowden suggests that 'bipolar disorder may be unique among psychiatric disorders in that, in some cases, it confers advantages on persons who have it. These advantages largely show up in the areas of

creativity and work performance' (Bowden 1994: 73)

While there is little hard data to link bipolar disorder to creativity in the historical past and in the present, there is a good deal of circumstantial evidence to that effect. Certainly it seems that having a close relative with bipolar disorder confers a creative advantage. However, there are a lot of creative people who do not suffer from an affective disorder and there are many people with affective disorders who are not particularly creative.

Are we any nearer to knowing how it all started?

Whitley gives credit for the flowering of art in the Upper Palaeolithic to the entry into the human genome of the gene for bipolar disorder (Whitley 2009: 260). He is painting a scenario in which a sudden genetic event produced humans who were different from their forbears in genetic make up and were specially gifted and also mentally unstable. They became shamans and they painted their visions in the dark caves. This presupposes that genes relating to affective disorders were not previously present in the hominin genome.

Sapolsky, who studied changes in blood levels of hormones and chemical messengers caused by stress in Kenyan baboons became aware that the individual primates he studied showed major differences in personality, temperament and coping styles (Sapolsky 2004: 113) He observed that these differences affected the incidence of physiological changes and stress-related disorders and commented that 'the lessons learned from some of these animals can be strikingly relevant to humans' (ibid.). He observed that some animals seemed to adopt a behaviour of 'learned helplessness' and quotes Seligman as arguing that animals suffering from learned helplessness share many psychological features with depressed humans (ibid.: 301).

Sapolsky reports on a study by Capri, of Kings College London, who identified a gene in humans that increases the risk of depression.

> More specifically it is a gene that comes in a few different 'allelic versions' — a few different types or flavours that differ slightly in function; have one of these versions and you're at increased risk … the key thing is that having version X of the gene Z doesn't guarantee you get depression, it just increases your risk … Amazingly, the same has been shown with studies of some non-human primate species who carry a close equivalent of that gene Z (ibid.: 293).

Genes work by coding for specific proteins and there are multiple genes which influence mood through aspects of neurotransmitter production, transmission, re-uptake and breakdown. The particular gene identified by Capri codes for the protein 5-HTT or serotonin transporter and influences the re-uptake of serotonin from the synapse. Different alleles of this gene vary in efficiency at removing serotonin from the synapse and through the action of stress hormones on the expression of the gene external events and internal stressors influence mood and behaviour.

It is not a matter of a gene suddenly coming into the genome, causing a quantum leap in human thinking and behaving. Hundreds of genes are involved and we clearly share a great deal with our primate relatives.

It is possible to observe that an animal appears to be low in mood, withdrawn and less involved with normal activities and possibly depressed in affect. It is not possible to ask it how it feels. Hypomanic behaviour in humans is often not seen as pathological; the individual and others may just evaluate the bubbling, active, energetic behaviour as their norm as opposed to periods of more recognisable depression. It is possible to ask the individual how they feel but again a primate which may be observed to be dominating and highly active cannot be asked about its sense of mental wellbeing. Genetic studies will hopefully elucidate more about the inheritance of the affective disorders.

So it would seem that *Homo sapiens sapiens*, living in the Upper Palaeolithic, already carried genes which differentially exposed them to being vulnerable to mood disorders. 'Genes are rarely about inevitability, especially when it comes to humans, the brain or behaviour. They're about vulnerability, propensity, tendencies' (Sapolsky 2004: 293). From the studies discussed earlier in this paper it would seem that having a variant of the genetic profile for an affective disorder could not only have made some of our hominin forebears more inclined to flattening in mood and irritability under stress but, depending on other variables, it may also have conferred upon them a creative advantage.

Being creative was only a part of the equation. The painters had to have artistic skills. We have no idea how universal such a skill was in the Upper Palaeolithic, nor if being a good painter was highly regarded in that society. Just as we recognise that there was no sudden genetic singularity causing affective disorders to appear in the hominin community so there was no sudden change in brain structure that made it possible for humans to recreate their internal imagery on structures such as cave walls, pebbles and bones.

Alfred Russell Wallace, who shared the idea of natural selection with Darwin (but not the glory), was troubled by the question of how mathematical and musical skills arose. He could not see them arising by blind chance. It seemed as if the potential was present before the need, but how to rationalise that with the understanding that evolution has no foresight. Wallace solved the problem by introducing the divine grace of God (Blakeslee and Ramachandran 1998: 191). This was not a satisfactory answer for Darwin nor would it be for most modern scientists.

It is well recognised that evolution is parsimonious and perhaps the pre-eminent recycler. Dehaene did not turn to God to solve the question he set himself of the reading paradox 'Why does our primate brain read? Why does it have an inclination for reading although

this cultural activity was invented only a few thousand years ago?' (Dehaene 2009: 4) He asks how could the primate cortex, which is the outcome of millions of years of evolution in a world without writing, adapt to the specific challenges posed by written word recognition. Using modern brain imaging techniques he showed that there is a specific cortical area for written words, which seems to be identical in readers of English, Japanese and Italian (ibid.: 51) and that this is located in what he calls the 'letter box area' on the edge of the left occipito-temporal fissure (ibid.: 70).

Dehaene turned to research on macaque monkeys and found that this same area was used by monkeys for the visual identification of objects (ibid.: 125). Extraordinarily precise research looking at single neurone activity is discussed by Dehaene to answer how our temporal cortex encodes any visual image even when seen for the first time. It exploits an alphabet of elementary shapes (ibid.: 136) and Dehaene observed that many of the preferred shapes such as thin lines and object contours closely resemble our letters, symbols and elementary Chinese characters (ibid.: 137). Experiments showed that an object could be reduced to a small component of the outline and still elicit a response (ibid.: 136).

Responses by individual neurones recombine through a pyramid of synaptic connections to reach from the primary visual cortex to the temporal pole (ibid.: 130).

The human brain is not just a large monkey brain (Changeux 2005: 73). The capacity to create culture and transmit it has depended on the enormous increase in the number of synaptic connections in the human brain compared to that of the monkey. That increase has come about through the extended post-natal period of stage 3 synaptogenesis in the human infant (ibid.: 88).

Conclusion

A journey to understand the origins of the great cave art may start with the capacity of the human brain to respond to a certain alphabet of shapes and to visual elements within objects such as the unmistakeable curve of the neck of a mammoth or the edge of a bison's moulting coat. We can next factor in some people with special gifts, the genetics of which are as yet unknown, to see images and to reproduce them in various levels of abstraction. Some of those people may have been genetically endowed such that they were more prepared than most in the community to take risks and to stand out as innovators. Whether the artists were young or old is a further question not appropriately pursued here.

Creativity does not flower in a vacuum; it happens in a cultural domain and a social field (Csikszentmihalyi 1998: 39). The culture of the Upper Palaeolithic allowed the art to happen. Most creativity is reactive, responding to external demands from difficult situations such as wars, climatic disasters and epidemics. Proactive creativity is more often internally motivated (Heinzen 1991: 140).

Cave art may have been proactive or reactive, or perhaps both, but in any case it is hard to imagine how art such as that found in the caves of Chauvet and Lascaux could have been created if it were not socially and politically sanctioned. As Leroi-Gourhan pointed out the time spent on supportive activities such as felling trees for scaffolding, preparing paints and collecting grease for the necessary lighting represented a significant communal investment (Leroi-Gourhan 1982: 75).

A creative individual was described earlier as someone who could tolerate uncertainty and had the courage to take risks. By investing in the actions of perhaps only a small number of such individuals the society also had the collective courage to take risks.

Whitley is almost certainly correct in saying that the great paintings were done by unusual people. There have been a few great artists in all periods of history, artists whose work lives on long after they are dead. Just as today there are many everyday artists whose work fades into obscurity, so not all art which has survived from the Palaeolithic is outstanding and probably the greater part of that which was produced has gone for ever.

The gifted painters may well have included individuals who had inherited from their primate ancestors genes that gave them an extra edge in trying out new ideas and pushing boundaries. They may have been rather more moody than their fellows but it is very unlikely they were mad.

Perhaps at that particular time in western Europe, pro-active creativity in individuals was met with reactive creativity on the part of the society. Brilliant as the result was, art did not begin with the painted caves of western Europe nor did affective disorders suddenly arise forty to fifty thousand years ago. Both have much longer pedigrees, which are gradually being revealed as modern science unravels the layers of history and the secrets of the mind.

Dr Margaret Bullen
191 Rae Street
North Fitzroy, VIC 3068
Australia
E-mail: *margaret.bullen@mh.org.au*

Final MS received 5 July 2010.

REFERENCES

Blakeslee, S. and V. S. Ramachandran 1998. *Phantoms in the brain*: *human nature and the architecture of the mind.* Fourth Estate, London

Bowden, C. 1994. Bipolar disorder and creativity. In M. P. Shaw and M.A. Runco (eds), *Creativity and affect*, pp. 73–86. Ablex Publishing Company, Norwood/New Jersey.

Changeux, J.-P. 2005. Genes, brains and culture: from monkey to human. In S. Dehaene, J.-R. Duhamel, M.

D. Hauser and G. Rizzolatti (eds), *From monkey brain to human brain. A. Fyssen Foundation Symposium,* pp 73–94, MIT Press, Cambridge Mass.

Csikszentmihalyi, M. 1998. Creativity and genius. In A. Steptoe (ed.), *Genius and the mind: studies in creativity and temperament*, pp. 39–66. Oxford University Press, Oxford.

Dacey, J. S and K. H. Lennon 1998. *Understanding creativity: the interplay of biological, psychological and social factors*. Jossey Bass, San Francisco.

Dehaene, S. 2009. *Reading in the brain. The science and evolution of a human invention.* Viking Penguin, New York.

Devereux, G. 1961a. *Mohave ethnopsychiatry and suicide: the psychiatric knowledge and the psychic disturbance of an Indian tribe*. Smithsonian Institution Bureau of American Ethnology Bulletin 175, Government Printing Office, Washington.

Devereux, G. 1961b. Shamans as neurotics. *American Anthropologist* 63: 1088–1096.

Goodwin, F. K. and K. R. Jamison 1990. *Manic depressive illness.* Oxford University Press, New York

Heinzen, T. E. 1991. Situational affect: proactive and reactive creativity. In R. M. Milgram (ed.), *Counseling gifted and talented children*, pp 130–147. Ablex, Norwood/New Jersey.

James, W. 1982. *The varieties of religious experience* (1902). Penguin Classics, New York.

Leroi-Gourhan, A. 1982. *The dawn of European art: an introduction to Palaeolithic cave painting.* Cambridge University Press, Cambridge.

Quinn, B. 2007. *Bipolar disorder*. John Wiley & Sons, Hoboken, NJ.

Richards, R. 1994. Creativity and bipolar mood swings. In M. P. Shaw and M.A. Runco (eds), *Creativity and affect,* pp. 44–72. Ablex Publishing Company, Norwood/New Jersey.

Rothenberg, A. 1990. *Creativity and madness: new findings and old stereotypes.* Johns Hopkins University Press, Baltimore.

Sapolsky, R. M. 2004. *Why zebras don't get ulcers.* Henry Holt & Co., New York.

Whitley, D. 2009. *Cave paintings and the human spirit.* Prometheus Books, Amherst, NY.

RAR 28-998