

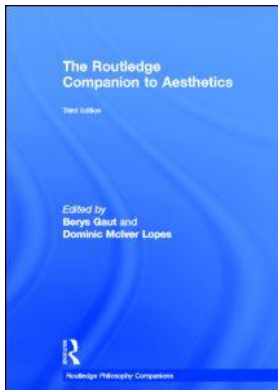
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CREATIVITY

Margaret A. Boden

Philosophers and psychologists have offered many definitions of creativity, and many explanations (Krausz *et al.* 2009; Gaut 2010). The core notion, however, is that creativity is the capacity to generate ideas or artifacts that are both new and positively valuable.

“Valuable” can mean many different things. For instance, a drama or a novel may be valuable because it throws light on human nature and/or experience. A painting may be valuable because it is beautiful and/or implicitly condemns an act of war. An art installation may be valuable because it makes us think. A biochemical discovery may be valuable because it cures disease, and an invention because it is useful. Moreover, an idea or artifact can be valuable in several ways simultaneously.

In the context of the arts, a large part of what is meant is that the new structure is aesthetically valuable. It follows that one’s theory of aesthetics will affect one’s criteria of creativity. Even if a philosopher discussing “beauty” (or any other aesthetic concept, such as harmony, elegance, sublimity, expression, communication of emotion, etc.) never mentions creativity, judgments about it will be tacitly implied. For this reason creativity is an appropriate topic for a handbook of aesthetics, not just for handbooks of psychology or art history.

Intentionalist philosophers in general would agree. But formalist and structuralist critics deny this (Gaut and Livingston 2003). They argue that psychological facts about the author are irrelevant to the artwork itself. However, their writings stress the audience’s reaction, which (they say) is to recognize the creativity shown in the artwork or to respond to it in a creative way themselves. Even on their account, creativity cannot be ignored.

We take it for granted that art is a Good Thing. Plato did not. He thought it frivolous at best and dangerous at worst (Plato 1961). He saw the arts as irrational: instead of leading people to the truth, they aim to excite emotion – which is not even directed at “real” people or events. Although they sometimes depict worthy role models, they often encourage unethical behavior. A work of art is valuable if it orients its audience toward the Forms. But since only metaphysics can lead us to them, only that is intrinsically worthwhile. So aesthetics, considered as the study or justification of the intrinsic value of art, is either trivial or impossible.

As for artistic creativity, Plato famously attributed this to divine inspiration: “a poet is holy, and never able to compose until he has become inspired, and is beside

himself and reason is no longer in him ... for not by art [i.e. skill] does he utter these, but by power divine" (*Ion* 534a–b). If that's so, then a naturalistic (scientific) explanation of creativity is impossible.

Many since have made similar claims, attributing the artist's inspiration not to the Muses but to some other supernatural force. Faced with an extraordinary talent such as Mozart's, people today often imply that he was literally superhuman. This "inspirational" theory even appeared in *The Times*, when the critic Bernard Levin commented on the play *Amadeus*. Comparing the conscientiously competent Salieri with his socially undisciplined contemporary Mozart, Levin said – and clearly meant it – that Mozart was divinely inspired.

Divine creativity is a philosophical mystery. The medieval theologians spent a great deal of time discussing God's creation of the material world. The core problem was that God was supposed to be immaterial. How, then, could he create something material – in other words, something utterly novel? Some said that he created the world out of nothing (*ex nihilo*). Others argued that this was impossible, sometimes inferring that the creator of nature somehow shares nature's properties. But with no essential distinction between creator and created, can we really speak of "creation" at all? In short, the concept seemed intractable.

Aesthetics faces similar puzzles. For that theological problem is a special case of a paradox that faces aestheticians and psychologists too. How can truly creative, truly novel, ideas possibly arise? Any adequate account of creativity must address that question – which appears to be beyond the reach of science. (Karl Popper, for instance, argued that the "context of discovery" is not only irrelevant to the philosophy of science but also an insuperable stumbling block to a scientific psychology – Popper 1965.)

Immanuel Kant saw the theological version of the question as unanswerable, being one of the four metaphysical "antinomies." Where human creativity was concerned, he focused on the value, not the novelty. In his *Critique of Judgment* (1987), he argued that beauty is the core aesthetic value and artistic creativity is the ability to produce beautiful things. This is not a strictly rational activity, nor (*pace* Plato) is it wholly spontaneous and undisciplined either.

For Kant, judgments of beauty are disinterested and in a sense universal. In other words, to say that this object is beautiful "to me," as one might say that the taste of this cheese is pleasant "to me," is "laughable" (*ibid.*: §7). Although in fact people disagree about which things are beautiful, Kant argued that disinterested *contemplation* would eventually lead to agreement and therefore that it is sensible to try to persuade someone that they should find an artwork beautiful. (By contrast, one would not say that someone should like a particular cheese – although one might urge them to try it again, hoping that they will acquire a taste for it.) But that is not to say that anyone can be forced, on pain of contradiction, to accept a given aesthetic judgment. In general, the appreciation of beauty involves a mentally harmonious recognition of formal harmony in the object (spatial in the visual arts, temporal in music).

Nature, for Kant, held a special place in aesthetics: "nature is beautiful because it looks like art, and art can only be called beautiful if we are conscious of it as art while yet it looks like nature" (*ibid.*: §45). This remark is most readily applied to the representational paintings and sculptures that were the accepted Western styles

when Kant wrote. Applying it to, for example, Islamic decorative art or to abstract art is more problematic. An abstract canvas or sculpture may, in some sense, look like nature. But to apply Kantian aesthetics across the board would require that one see all examples of formal harmony, all examples of beauty, as reminiscent of nature.

In addition, it would involve decisions about whether the paintings of Piet Mondrian or Jackson Pollock, the *objets trouvés* of Marcel Duchamp or the conceptual art of Tracey Emin or Damien Hirst, show the type of beauty or formal harmony posited by Kant. If they do not, then on his view they are not genuinely beautiful and are not really art.

Of course, there have been many redefinitions – and repudiations – of the concept of art since Kant's time. For example, both John Ruskin and R. G. Collingwood offered highly influential accounts (directed on Nature and emotional expression respectively), which imply that certain types of modern art are highly problematic in aesthetic terms (Boden and Edmonds 2010; Boden forthcoming a, b). (These disputes are further complicated by twentieth-century changes in the financial marketing and social contexts of art.) What is relevant here is that if one defines creativity in terms of some specific theory of aesthetics – in other words, if one insists that the “positive value” mentioned in the definition above is this one or that one – then objects regarded by some people as creative works of art will not be classified as creative, never mind as art.

Kantian aesthetics did not explain why we so often find craftwork beautiful. Or rather, it seemed to imply that we never do find it genuinely beautiful. Craftspeople, he said, simply follow rules, whereas artists, even though they may follow rules, add spontaneity (freedom, unpredictability), which is essential for beauty (ibid.: §§43–46). It would seem to follow that the pleasure felt in considering craftwork has more of what he called “sensibility” than of “understanding” or aesthetic “contemplation.”

Besides offering a philosophical basis for seeing fine art as entirely distinct from the crafts, Kant gave an account of artistic “genius” that influenced the Romantics. They promulgated the myth of the Romantic genius, someone – a member of a tiny elite – blessed with some extraordinary and inexplicable faculty of creativity. And, like Plato, they stressed the “irrational” aspects of creativity. So whereas Kant himself had pointed out that even genius requires effort and training and that creative imagination must sometimes yield to disciplined judgment (ibid.: §§47–50), the moral popularly drawn from Romanticism was that effort, training and disciplined judgment have little or nothing to do with creativity.

This is a myth in three senses: it is still very widely believed, it is often used to excuse behavior that would otherwise be unacceptable and it is almost certainly false. There is no good psychological or neuroscientific evidence that some humans are endowed with a special faculty denied to the rest of us (Boden 2004: ch. 10). On the contrary, creativity appears to be based in everyday cognitive abilities: memory, perception, recognition, attention, noticing, reminding, comparing and so on (Perkins 1981). At most, some individuals – such as Mozart – may have been born with a more efficient version of an ability we all share. (The explanation for this might at base be very boring: for instance, increased storage capacity for short-term memory or higher speed of neuronal communication.)

One should not forget, however, that even the child prodigy Mozart (like other renowned composers) had to devote himself relentlessly to music for twelve years

before composing anything musically interesting, as opposed to precociously competent (Kunkel 1985). The reason for this is that it takes many years and much repetitive effort to learn the dimensions of an interestingly complex style of thinking or conceptual space. It also takes many years to discover what types of structure (e.g. what types of music) the space will and will not allow – and, crucially, to develop a sense of where the limits of the space can be most fruitfully *pushed* or altered so that the entire space is transformed. As a result of this learning process, the cognitive structures and processes in the person’s head will naturally differ from Everyman’s. Nevertheless, the difference between creative geniuses and the rest of us probably has more to do with motivation than with *inborn* cognition.

That last claim is supported by Howard Gardner’s (1993) study of the driven personalities of seven twentieth-century creators drawn from various fields, including painting, poetry, music and dance. Gardner suggests that they share a general profile of motivation and morals. The “exemplary creator” comes from a family that is outside the centers of social power and influence and values education, without necessarily being educated. But it is soon outgrown and the young person finds a group of peers (often in a city) who share the same interests. This social support is crucial, especially when the creator (typically after many years of committed apprenticeship) comes up with an idea so different from those currently valued that it is not easily understood, still less accepted.

Self-confidence, stubbornness and exceptionally hard work are then needed, to persevere with and to polish the new insight. Energy and commitment are essential and the creator expects very high standards of himself or herself and others. But these apply to the creative work: they do not normally include high moral standards. Egotism, selfishness and ruthless exploitation of others are common. Gardner (1994: 150) speaks of “a legacy of destruction and tragedy” attending the friends and family of the creative person.

Seven case studies, admittedly, is not very many. However, there is a large body of psychometric evidence drawn from studies covering thousands of individuals to support Gardner’s general conclusions (Sternberg 1999: chs 2–4). Reviewing this evidence, Hans Eysenck (1994) has shown that creativity is linked with a common cognitive style called “psychoticism,” which includes psychotics at one extreme of the scale. Psychoticism is defined as a general tendency to widen or overgeneralize conceptual categories. It is not surprising to find it statistically associated with creative thinking, since creative ideas often involve an unusual analogy or a combination of dissimilar concepts. What may be more surprising is that this tendency can be encouraged or inhibited by specific psychotropic drugs and that explanations in terms of basic neuronal functions can suggest why this should be so. (Explanations of creativity couched in terms of psychoticism are very different from the psychodynamic explanations offered in Freud 1963.)

The relevance of this to Gardner’s work is that cognitive overinclusiveness (psychoticism) is associated with particular personality traits. To give the good news first, it correlates highly with being imaginative, unconventional, rebellious, individualistic, independent, autonomous, flexible and intuitive. The bad news is that it also correlates strongly with being conceited, cynical, disorderly, egotistical, hostile, outspoken, uninhibited, quarrelsome, aggressive, asocial and – in some cases – psychopathic.

Some modern versions of “nature” aesthetics can be found in a surprising place: evolutionary psychology. Evolutionary psychologists have discussed a number of aesthetic values, seeking to show (1) that they are universal and (2) that they carry some adaptive benefit.

To support point (1) is not to deny that there are huge cultural differences in aesthetic values, nor even that these may sometimes swamp or cancel the *natural* universal preference. Rather, it is to say that, all things being equal, people from any culture will tend to prefer certain (visual, musical, etc.) features to others. And to support point (2) is not to claim that a visit to an art gallery is adaptive now, still less that we decide to visit the gallery because that is an adaptive thing to do (although it often is according to Miller 2000). Rather, it is to say that in our hominid and prehomid past it was adaptive to be attracted by those features in today’s artworks that are *universally* valued.

Whether points (1) and (2) are correct is an empirical question and a very tricky one. There is a significant body of evidence, however, that certain aspects of art – and of artistic creativity as such – are explicable in evolutionary terms.

For instance, the “biophilia” hypothesis cites evidence that we are naturally drawn to certain visible aspects of landscape and therefore of visual art (Orians and Heerwagen 1992; Kellert and Wilson 1993). The explanation is that wandering animals (including early humans) need to be able to recognize places that are suitable habitats and having recognized them they need to stay in them (they need to prefer them, to find them attractive). Such places provide water, greenery, shelter and escape routes. These features are commonly preferred in paintings and photographs of landscapes. And they reach beyond depictions of landscape: the attractiveness of shiny things, from rich satins to silver lurex (and the polished chrome on cars), is due to our inborn preference for the light-reflective properties of sheets of still water.

Another evolutionary hypothesis is that the crafts differ from the fine arts in that their basic value, or aesthetic, is carried by the perceptual “affordances” for action built into human minds (Boden 2000). An affordance is a feature that is naturally recognized as providing (affording) an opportunity for doing something: walking, eating, holding, fighting, courting and so on (Gibson 1977). That is why crafts are universal across cultures, relatively unvarying as compared with fine art and appreciated by all. There is no acceptable definition of “craft” that would distinguish it clearly from “art” (Harrod 1999: 10). This is not surprising, because the psychological processes involved in creating and appreciating art can occur together with those involved in responses to perceptual affordances. (With respect to Kant’s aesthetic, craftwork does not exploit unpredictability or stimulate contemplation, but its attractiveness or beauty is grounded in natural proclivities evolved in response to nature.)

As for creativity itself, Geoffrey Miller (2000) sees this capacity as being due to Darwin’s second evolutionary principle, sexual selection. In a nutshell, females prefer males who produce surprising (though still intelligible) patterns. Miller argues that many familiar aspects of the creative behavior of artists – and countless examples of people’s everyday behavior – can be explained in this way. Some critics see Miller’s theory as an unverifiable, perhaps even implausible, “Just-So Story.” However, he provides a huge, and widely diverse, body of data (and much subtle argumentation) in support of his view.

Motivation, personality and evolution are just some of the many dimensions of creativity. The others include the sociocultural context of the creative individuals or groups concerned. This can influence both the generation of ideas and their evaluation or acceptance.

The sociocultural context (ranging from the creator's personal friends and acquaintances to the wider society) provides the styles of thought and most of the specific ideas required for an individual to think creatively. Mozart did not invent music or musical instruments either. And Pablo Picasso did not invent *Las Niñas* – he reinvented it. In general, an individual's peer group is much more important in the generation of his or her ideas than is recognized by heroic, neo-Romantic, accounts of creativity.

This is especially clear in science, where people often work in groups, where the development of theory and experimentation is meticulously recorded in notebooks and where care is taken to acknowledge previously published ideas. A scientist's peer group includes laboratory technicians too. Many creative ideas have arisen from them, yet their contribution is systematically downplayed (Schaffer 1994).

But artists have their peer groups too and the stimulation of fellow artists can be important – both in bolstering motivation and in exploring ideas. The Salon des Refusés in the Paris of 1863 is an illustration. The art-establishment figures choosing the paintings to be shown in the established Salon rejected every Impressionist canvas. The Impressionists' response was to mount their own exhibition, its defiant title celebrating its difference. Besides getting their pictures seen by the public, this reinforced their sense of being involved in an aesthetically valid activity.

Mihaly Csikszentmihalyi (1999) distinguishes cultural, social and individual influences on creativity. These three are systematically and reciprocally linked. They result in an integrated phenomenon that cannot be identified only as happenings inside individuals' heads.

The artist's materials and physical environment are crucial too. "Cognitive technologies" in general enable people to think in ways they could not have done otherwise. Indeed, some philosophers argue that all-pervasive technologies – writing, computers, architecture, road signs and the like – are not merely aids to the mind but part of it: the mind is "extended" into/over the environment (Clark 1997, 2008). On that view, the artist's easel and atelier are as important as their ideas. The role of the physical material (or, for a writer, the visible written trace) in prompting sophistication in execution and changes in design has long been noted. Those design changes are gradual redefinitions – or, more accurately, an incremental definition – of the artist's purpose (Tomas 1958; Harrison 1978).

If creativity is not only ideas in individuals' heads, it does crucially involve ideas in individuals' heads. For that is where all ideas are actually generated. So some psychologists choose to focus on that dimension of creativity, asking just how novel (and valuable) ideas can arise. This is a question about concepts or cognition: the person's motivation and their social context are bracketed. The key question is how it is possible for new ideas to arise in someone's mind.

Nearly all psychologists who have discussed this question have defined creativity as a matter of novel combinations (or extensions) of familiar ideas. Even Freud, primarily interested in the underlying motivation, focused on associations between

already-present thoughts. Experimental studies of this type of creativity try to measure individual differences in (associative) creativity or to discover how various influences – from brainstorming to drugs – affect it (Sternberg 1999: chs 2–4).

Interesting questions arise also about just how such associations can happen. This question was addressed informally by Samuel Taylor Coleridge and his commentator John Livingston Lowes (1951). Now it can be tackled with more rigor, though less subtlety, by using recent ideas about how concepts can be compared in the brain (Boden 2004: ch. 6). In addition, ideas from cognitive science about the internal structure of concepts can help us understand how combinational thinking can happen (Fauconnier and Turner 2002) and how analogies can be formed (Hofstadter and the Fluid Analogies Research Group 1995). Besides verbal associations and analogies, there are visual examples too (Schwitters's collages, for instance).

Combinational creativity is both constrained (mere chaotic ramblings are not aesthetically valuable) and unpredictable. The same applies to the two other forms of creativity defined below. Kant stressed both rules (constraints) and unpredictability, ascribing the latter to transcendental human freedom. But someone who adopts a naturalistic analysis of freedom can allow that free action – and creative thought too – is unpredictable. There are various, interestingly different reasons for this (Boden 2004: ch. 9). Here, what is important is that to regard creativity as explicable by science is not necessarily to believe that it is predictable.

Combinational creativity is not the only type of creativity. Two others are rarely investigated by experimental psychologists, but are the focus of much art criticism and art history and of most work in the computer modeling of creativity (Boden 2004: chs 6–8, 12). These are exploratory and transformational creativity (Boden 2004: 1–10, chs 3–5).

Both arise within some existing style of thought, artistic tradition or “conceptual space.” Conceptual spaces are learnt from one's culture or borrowed from some alien culture. Examples include styles of painting, architecture, music, choreography, poetry and novel-writing ... all the way to millinery and makeup.

In exploratory creativity, one explores a space, or aesthetic style, by moving through it along various pathways to see what previously undiscovered structures (“places”) one can find, what the general potential of the style is, and what – and where – its limitations are. Andrew Lloyd Webber's musical *Joseph and the Amazing Technicolour Dreamcoat*, for instance, involves a series of pastiches exploring a number of familiar musical styles. (Tim Rice's lyrics rely more on combinational creativity, using punchy language and slang to relate the familiar biblical story.)

To explore a space, one follows the constraints that define the style concerned: while painting a picture in the Impressionist manner, one does not switch over to cubism. This need not be conscious, although evaluation (self-criticism) is usually conscious. As with other mental capacities, including seeing and speaking, creative thinking is largely unconscious. (If it were not, we would suffer paralyzing information overload.)

Exploratory creativity is not to be sneezed at: the vast majority of professional artists engage only in (combinational or) exploratory creativity. If the style is aesthetically valued in their culture, their exploratory maneuvers within it will find an appreciative audience. And there is plenty of room for surprises. In an interestingly

complex space, many previously unseen – and some previously unsuspected – structural possibilities exist. Moreover, the constraints or rules are sometimes marginally adjusted or tweaked. For example, a dress designer who is familiar with skirts with a frill at the base may add twenty frills, not just one – resulting in a flamenco skirt.

A minority of artists (and scientists), however, go further. Having mastered the existing style and having explored it to discover its potential and – significantly – its limits, they transform the space by altering or dropping one or more of its defining constraints. So the Pointillists, for instance, altered the constraint that a picture is painted with brushstrokes (large or small, crude or dainty) to one specifying brush points. Having done that, they spent some years exploring the newly transformed style to see just what they could, and could not, do within it. The new style had made new paintings possible – but it took a while to discover just what those possibilities were.

That is largely why it is rare for an artist to generate more than one major stylistic transformation in his/her lifetime (Picasso is an exception). In a retrospective exhibition, where a painter's canvases are hung chronologically, the evolution of the artist's creativity is visible. Typically, a transformative idea is followed by a spate of paintings exploring its potential and testing its limitations. Similarly, Arnold Schoenberg transformed Western music by passing from tonality to atonality, but then concentrated on exploring various different compositional rules or possibilities (Rosen 1976).

By definition, transformational creativity breaks the accepted rules. Things that were previously impossible – that is, unthinkable – are now possible. In short, this type of creativity – which can be modeled in self-transforming computer programs (Sims 1991; Todd and Latham 1992; Boden forthcoming c) – both exemplifies and demystifies the paradox mentioned earlier, of how something can apparently come from nothing.

But that is not to say that the newly possible ideas will be aesthetically acceptable. Indeed, it is transformational creativity that leads to the deepest disputes. For people have to be persuaded to accept the rule-breaking. They have to learn to value the new (“impossible”) structures by situating them with respect to previous styles or by becoming familiar with them in their own right. Even for fellow artists of the avant-garde, this may take some time. Picasso kept his canvas of *Les Femmes d'Alger* rolled up unseen for several years, so shocking was it to the aesthetic sensibilities even of his progressive friends.

Aesthetic appreciation, then, is partly a matter of knowledge. One needs to become familiar with a certain style and to be able to relate it to other already-valued styles. But this is not an exact science. Indeed, at base it is not a science at all. Aesthetic values are not proven by objective empirical evidence. Nor are they deduced from axioms – or if they are, as in highly formalist art, the axioms themselves have to be seen as valuable first. Rather, they are open to choice and agreed by social negotiation. This is true even if, as suggested earlier, they are partly rooted in our biology.

It follows that philosophical theories about aesthetic values (such as beauty, integrity, emotional expression, humanity, realism, abstraction, rationality, simplicity and complexity) are an essential aspect of our understanding of creativity. Science can tell us how new ideas can arise, in one of the three ways distinguished earlier. It can

allow for social as well as individual factors. And it can study the influence of motivation and personality. What it cannot do, in principle, is tell us whether we should or should not value beauty (for example) – nor what beauty is. Moreover, “what beauty is” is itself an aesthetic question, whose answer will engage dialectically with the values the philosopher chooses to adopt.

In sum, psychologists can teach us a great deal about creativity. Without them, we cannot understand how it is possible. They can (or rather, they will) explain how novel ideas can arise. They can tell us why certain types of people are motivated to make the effort to produce them and to endure the suspicion and even scorn that often follows. They may even show us some of the evolutionary bases of our natural (pre-cultural) aesthetic responses. Similarly, the art historians and anthropologists can enlighten us about the historical ancestries and cultural varieties involved. But the philosophers of aesthetics will always be needed. For it is their arguments that analyze, and try to justify, the values we adopt, given our particular culture and subculture.

See also Plato (Chapter 1), Medieval aesthetics (Chapter 3), Kant (Chapter 5), Definitions of art (Chapter 21), The aesthetic (Chapter 24), Aesthetic universals (Chapter 26), Value of art (Chapter 28), Beauty (Chapter 29).

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