

Why Creativity is Sexy: A Review of the Evidence of Sexual Selection for Creative Abilities in Humans

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abstract

Creativity is an essential human trait, yet there is no consensus among scholars as to why our species have developed creative abilities. Most evolutionary explanations rely on the survival value of such abilities, but generally fail to explain why other species have not evolved similar capacities or why so many human products of creativity have little to no practical value. Sexual selection is an evolutionary force which has the potential to shed new light on this investigation by regarding creativity as a fitness indicator that has evolved for the purposes of courtship and mating. The paper at hand reviews the empirical evidence in support of this hypothesis.

Keywords: creativity, sexual selection, the cultural courtship mode, fitness indicator theory, evolutionary psychology

Creativity can be defined as the ability to produce work that satisfies two conditions: originality and usefulness (Sternberg & Lubart, 1999). Creative efforts typically result in tangible products. To satisfy the originality condition, such products must have unusual and novel properties and, to satisfy the usefulness condition, they must aptly serve their purpose. Within this framework, works of art, which are seldom practically useful, are considered creative if they evoke in the viewer a desired

emotional reaction, thereby fulfilling their purpose (Andreasen, 2005).

Creativity has undoubtedly played a role in the advancement and expansion of the human species, allowing resourceful humans to develop tools, build houses, domesticate plants and animals, and, generally, make valuable improvements to all facets of human existence. It is, therefore, no surprise that researchers have wondered how the ability responsible for the light bulb, the atom bomb, and the Mona Lisa has developed in our species. Darwin's (1859) theory of the evolution of species by natural selection sets the stage for this investigation, by prompting scientists to describe and explain the evolution

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of various human traits in terms of the reproductive advantages that such traits may lend their owners.

Evolutionary accounts of creativity have generally followed two lines of investigation. One group of researchers has explored the potential adaptive value of creative abilities (e.g. it may be useful to invent an ingenious hunting tool or fashion a way of using animal skins for clothing), viewing creativity as an adaptation for survival and for the successful navigation of elaborate social systems (e.g. Byrne, 1995; Cosmides & Tooby, 1992; Dunbar, 1998). It has been challenging, however, to show in what ways art, music, or humor might be adaptive and, if they are, why other species have not evolved abilities in these domains (Miller, 2000a).

Another group of researchers has hypothesized that creativity may have been a fortuitous byproduct of the development of other adaptive brain functions, such as general intelligence, memory, and language (Carroll, 1995; Diamond, 1992, 1995; Gabora, 2005; McBrearty & Brooks, 2000; Pinker, 1997). Still, neither the adaptation, nor the byproduct views of creativity seem to aptly account for the wide variability within our species in the ability to produce imaginative artwork or speak and write in ornamented language. Presumably, if such skills were strictly adaptive or linked to an adaptation, the variability would have been attenuated through natural selection (Miller, 2000a).

Sexual Selection

An alternative evolutionary force that may have played a role in the evolution of creativity and other high-level cognitive abilities is sexual selection. In "The Descent of Man and Selection in Relation to Sex" Darwin (1871) argues that aesthetics is largely the result of selection pressures driven by female mate choice. Darwin suggested that in a species such as ours, where individuals have room to be selective in choosing a mate, ornamentation plays an important role in attracting the attention of mates. Consequently, the ability to create attention-grabbing ornamentation may have been an object of sexual selection.

The wider implications of this theory for the development of human cognitive abilities were somewhat neglected throughout the twentieth century, but are now coming back into the focus of mainstream evolutionary psychology (Miller 1999, 2000, 2001).

One recent theory implicating sexual selection as the main force in the evolution of creativity is Geoffrey Miller's Cultural Courtship Model (Miller, 1998, 1999, 2000b, 2001). Miller (2001) asserts that creativity may be construed as a fitness indicator for the benefit members of the opposite sex, akin to the peacock's tail: the tail has little to no practical value and requires biological resources to be created and sustained, but it is attractive to peahens. The costs that the peacock incurs are part of the reason its tail is a reliable indicator of genetic fitness; "unhealthy, weak peacocks cannot grow very large, colorful, symmetric, well-preened tails" (Miller, 2001, p. 4). A manifest characteristic thus becomes an indicator of the individual's ability to produce and sustain it despite the costs. This ability, in turn, is a reflection on the quality of the individual's genes (Zahavi, 1975; Zahavi & Zahavi, 1997). Within the Cultural Courtship Model, culture can be viewed as a stage for courtship displays, many of which are expressions of creativity and indicators of fitness.

Miller's model makes a number of useful, testable predictions, which implicate sexual selection as a potent force in the evolution of creativity. If creative cultural expressions are meant to attract potential mates, then creativity should be a desirable trait and individuals who produce more output and are more successful in the creative occupations should attain higher reproductive success. Further, the amount of cultural output should vary with age (with a pronounced increase after the onset of puberty and a slow decline after the period of young adulthood, when sexual competition and reproductive potential are at their highest; Miller, 1999). Finally, males should produce more creative cultural output than females because male intrasexual competition tends to be higher and female mate choice tends to be more influential (Darwin, 1871; Miller, 1999).

The present article reviews the empirical support for each of these predictions, exploring the question of whether sexual selection has played a part in the evolution of creativity, the extent of its likely involvement.

Method

To investigate the suggested effect of sexual selection on creativity in humans, a systematic search was conducted for peer-reviewed articles listed in EBSCOhost databases (PsycARTICLES, PsycINFO), using the keyword “creativity” in combination with “sexual selection”, “mating”, “desirability”, and “reproductive success”. The search yielded twenty-three publications, twelve of which did not report on primary research and were, therefore, excluded. The resulting eleven articles which tested one or more of the above predictions are included in this review.

Evidence of Sexual Selection for Creativity

The Desirability of Creativity

A consistent preference for creative individuals would be suggestive of the trait's evolution by mate choice. Indeed, creativity appears to be a highly desirable trait in humans. Buss (1989) and his colleagues asked more than 10000 people from 37 cultures what traits they desired in a partner. Creativity was among the top ten most desired traits for both sexes. Likewise, Li, Bailey, Kenrick, and Linsenmeier (2002) showed that in evaluating potential mates, when the bare necessities for both men and women had been covered (physical attractiveness for men and resources and status for women), creativity was the next most desirable trait. In looking for evidence that creativity may be a fitness indicator, Haselton and Miller (2006) found that during the most fertile days of their menstrual cycle, women showed a pronounced preference for creative men over wealthy men for short-term mating. In contrast to Haselton and Miller's (2006) experiment, however, Prokosch et al. (2009) found the preference existed both in the long and the short-term mating conditions, regardless

of the women's menstrual cycle phase. Finally, perceived creativity was reported to be better predictor of male desirability than intelligence in a study by Prokosch, Coss, Scheib, and Blozis (2009). On the whole, the evidence is now quite suggestive that both genders prefer creative partners.

Gender- and Age-related Differences in Creativity

In his study of animal species, Darwin (1971) noticed that in most animals there exist strong sex differences in mating displays. It is usually the males in a species who perform courtship displays and the females who choose mates on the basis of the quality of such displays. If creativity is the object of sexual selection in humans, sexual dimorphism as a result of selection pressures may be expressed in disparate amounts of creative output in males and females.

To investigate this prediction, Miller (1999) examined the gender of the authors of a sample of 16000 cultural items from diverse media (e.g., music albums, paintings, books). In his sample, males were the authors of around 10 times more items than females. For example, men had produced around 20 times as many jazz albums as women, around 8 times as many paintings, and around 3 times as many books (Miller, 1999).

Another curious gender difference was revealed by Bressler, Martin, and Balshine (2006) in their investigation of the desirability of mates with a sense of humor. Humor production requires creativity and intelligence - some of the same mental capacities needed to produce art, music, or literature (Kaufman, Kozbelt, Bromley, & Miller, 2008; Miller, 2000a). Indeed, the ability to produce humor has been found to be a reliable indicator of intelligence and is a significant predictor of mating success (Greengross & Miller, 2011). Bressler, Martin, and Balshine (2006) showed that while both women and men express a preference for a partner with a sense of humor, women favor potential mates who can produce humor, whereas

men appear to have a preference for partners who are receptive to humor. This finding lends further evidence to the gender difference predicted by sexual selection: the tendency of males perform and of females to appraise. Additionally, significant sex differences were observed in most research linking creative output to reproductive success (Beaussart, Kaufman, & Kaufman, 2012; Clegg, Nettle, & Miell, 2008, 2011; Griskevicius, Cialdini, & Kenrick, 2006; Kanazawa, 2000; Nettle & Clegg, 2006).

Age. There has been some empirical support for the age distribution of creative output as predicted by a sexual selection perspective on the evolution of creativity. In Miller's (1999) 16000 item sample, the productivity of individuals in the creative occupations tended to rise swiftly after adolescence and peak at approximately the age of 30. Productivity in later life declined most rapidly between the ages of 40 and 60, at which time, Miller (1999) suggests, the interest in attracting mates declines and may be replaced by a focus on child rearing.

Kanazawa (2000) tested the age-related predictions further on a sample of 280 scientists. Scientific discoveries are yet another example of great feats of creativity. What is more, they are in the public's eye and they are costly in terms of time, energy, and education, which renders them a potential evolutionarily novel indicator of phenotypic aptitude (Kanazawa, 2000). As predicted, the peak achievements of scientists' careers were most commonly around the age of 30 (97.5% of scientists in the sample were male), declining sharply after age 40. Kanazawa (2000) additionally tested the prediction that mating interests played a role in the age-distribution of scientific achievements by investigating the differences between married and unmarried scientists. He found that the same characteristic peak at around age 30 and the rapid decline after the age of 40 only held true for scientists who had married at least once in their lifetime. Scientists who never married showed a prolonged period of high productivity well into their mid-forties. Presumably, the married scientists had successfully mated and reproduced, which means their interest in attracting additional mates may

have been lowered. Conversely, the unmarried scientists (who, presumably, may not have mated or reproduced) had no reason to reduce their creative output until much later in life.

Creative Behaviors in Response to Mating Cues

If creative displays are intended to attract potential partners, then it would be most beneficial to engage in such displays when in sight of potential mates, who can take notice and appreciate them. Therefore, a sexual selection view of creativity predicts an increase in creative behaviors when mating prospects are made more salient. Upon this assumption, Griskevicius, Cialdini, and Kenrick (2006) explored whether cues designed to activate mating behaviors in humans would drive people to display increased levels of creativity. The four studies Griskevicius et al. conducted largely supported their hypothesis. Participants showed higher levels of creativity after seeing pictures of attractive mates and imagining courtship scenarios with them, compared to controls primed with neutral stimuli. There were also gender differences in the courtship priming effects on creative displays. Females only showed an increase in creativity when asked to imagine attracting long-term committed and dependable mates, whereas men displayed increased creativity indiscriminately.

Creativity and Reproductive Success

The bottom line of evolution is differential reproductive success (Miller, 2000a). Thus, the most compelling evidence of creativity having been shaped by mate choice would be heightened reproductive success in creative individuals. There are abundant historical accounts of highly creative people with very active sexual lives involving large numbers of sexual partners. Lord Byron was notoriously promiscuous, Picasso had countless mistresses, Van Gogh favored prostitutes, Honore de Balzac engaged in recurrent love affairs, Alexandre Dumas and Victor Hugo had numerous lovers, Charlie Chaplin

was married four times and had 11 children (Wallace, Wallace, Wallechinsky, & Wallace, 2008). Popular culture suggests that highly creative individuals have unusually dynamic sexual lives.

To explore the truth of this view empirically, Nettle and Clegg (2006) studied a sample of contemporary British poets and artists and compared reported features of their sexual lives to those of a control group. In their study, people in the creative professions tended to have significantly more sexual partners. Moreover, the amount of creative output was correlated with the number of sexual partners. This fits well with the view of creativity as a fitness indicator: individuals able to devote the most time, effort, and resources to creative activities had the highest reproductive success.

There is some evidence of differences in reproductive success not only between people in creative professions and those outside them, but also among the individuals in creative occupations. Clegg, Nettle, and Miell (2008) asked females to estimate the creativity, attractiveness, and other characteristics of six males after observing an example of the men's visual art. The researchers found evidence that women were able to infer some of the characteristics of artists based on their art, and rated themselves more likely to date those they believed to be more talented. These findings prompted a larger study by Clegg, Nettle, and Miell (2011), who gaged the mating success and the artistic success of 236 artists. Clegg et al. (2011) hypothesized that the quality of the artists' creative displays (artistic success) should correlate with the number of sexual partners they have (mating success). They showed that this was indeed the case, but only with males. A composite measure of artistic success was a significant predictor of the number of sexual partners the artists had. Thus, even within the ranks of creative individuals, those who are more productive and more accomplished tend to have heightened reproductive success.

Discussion

Summary of Main Findings

This article's aim was to review the empirical evidence in support of the hypothesis that human creativity has evolved through selection by mate choice. The review was guided by the predictions that, if the hypothesis is correct, (1) creativity should be a cross-culturally desirable trait in a potential mate, (2) there should be significant gender- and age-related variability in creative displays as per the Cultural Courtship Model, and (3) heightened creativity should be linked to increased reproductive success.

A preference for highly creative partners has been observed across a great variety of cultures, which suggests it may be universal (Buss, 1989). Sex differences and age patterns in creative productivity are also suggestive of selection by mate choice (Bressler et al., 2006; Kanazawa, 2000; Miller, 1999). Most importantly, recent research reveals a connection between creativity levels and reproductive success, showing that creative individuals tend to have more sexual partners than laypeople (Nettle & Clegg, 2006) and that differences in the amount of creative output and success in creative occupations are associated with differences in reproductive success (Clegg et al., 2008, 2011).

Limitations and Suggestions for Future Research

One salient limitation of the present literature review is its one-sided presentation of empirical evidence *for* the evolution of creativity by mate choice. This is in part justified by the relative novelty of this view, as attempts to disprove it have yet to be made. Moreover, the evidence itself may not be so compelling and widely accepted as to warrant such attempts.

An important limitation of the findings presented is that, with the notable exception of Griskevicius et al. (2006), the reviewed literature shows a conspicuous lack of

experimental findings. This is unfortunate, as the predictions that follow from the view of creativity as an object of sexual selection may find much more unequivocal support or refutation in experimental studies. Results derived from controlled experiments would likely eliminate some of the alternative explanations that the findings above may be subject to. For example, the increased reproductive success of the more successful individuals in creative occupations revealed by Clegg et al. (2008, 2011) may be a function of the well-established preference for potential mates with access to resources (Buss, 1989). Similarly, creativity may be desirable because of its association with intelligence or because it is representative of some altogether different trait. Researchers in the future may sidestep such objections by conducting carefully designed experiments.

Further research using experimental paradigms will be of great value in establishing sexual selection as a factor in the evolution of creativity. Griskevicius et al. (2006) showed that priming subjects for courtship temporarily increases their levels of manifest creativity. Similarly, it could be useful to explore whether chemically altering mating motivations (e.g. by increasing levels of testosterone) has similar effects, as well as whether manipulations of the quality and quantity of an individual's creative displays would change their desirability in the eyes of the opposite sex.

It is essential that scientists continue to explore the effects of sexual selection on the evolution of creativity, gathering evidence from diverse fields, including evolutionary psychology, anthropology, neuroscience, paleontology, and genetics, as this line of work has the potential to show whether creativity as well as other important human cognitive skills may have evolved for reasons other than survival and under what conditions such skills may develop in other species.

Conclusion

In contemplating how creative thinking and creative abilities have evolved in humans, it is intuitively appealing to assume that such skills were selected for because they improved our ancestors' chances of survival. Indeed, no one can dispute the practical value of all the tools and devices humans have developed in the time we have inhabited this planet. But the question remains: why did humans acquire these skills to such a degree, and other species, especially our closest primate relatives, did not?

The present article reviewed the empirical findings in support of one potential answer to this question: sexual selection. While these findings are not yet conclusive, they do strongly suggest that selection through mate choice has played at least a part in the evolution of human creative abilities. Sexual selection is a potent evolutionary force which does not obviously improve the survival chances of individuals; instead, it brings about relatively pronounced phylogenetic changes through differential reproductive rates. The problem, as it were, is choice. Individuals throughout human evolutionary history have always been motivated to choose the highest-quality mates so as to produce high-quality offspring. Any characteristic one could perceive to exist in a prospective partner was a potential indicator of genetic quality. Creativity may have been one such characteristic.

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