

The sexual nature of culture

Benjamin P. Lange

Department of Medical Psychology and Medical Sociology, Center for Psychosocial
Medicine, Faculty of Medicine, University of Goettingen, Germany

Sascha Schwarz

Department of Psychology, University of Dortmund, Germany
&
Department of Psychology, University of Wuppertal, Germany

Harald A. Euler

Department of Psychology, University of Kassel, Germany

Address all correspondence to Dr. Benjamin P. Lange, Department of Medical Psychology
and Medical Sociology, University of Goettingen, Waldweg 37, 37073 Goettingen, Germany,
Phone: +49 / (0)551 / 39-6486, Fax: +49 / (0)551 / 39-8194, Email:
benjamin.lange@med.uni-goettingen.de

The nature of human culture

Traditionally, religion, art and other human achievements are subsumed under the term 'culture,' whereas other aspects of human life, like mate choice and reproduction in general, are considered to be merely a part of 'human nature.'

We emphasize, like others before us (e.g., Miller, 1999, 2000), that literature, religion and presumably other cultural achievements may be placed within an evolutionary framework to understand the underlying nature of human culture. We further emphasize especially the role of sexual selection and thus the asymmetry among the sexes with respect to the degree of obligatory parental investment (Darwin, 1871; Trivers), which consequentially predicts sex differences in non-monogamous species like *Homo sapiens*. Our proposal is thus, at least partially, different from some of Miller's ideas in *The Mating Mind*, as Miller (2000) attaches special value to mutual mate choice (94-7) and fitness matching (201-3), which from our point of view explain some general mate choice preferences that both sexes have (e.g., the preference for an intelligent mate in long-term mating), but are not as helpful in explaining specific phenomena that follow the rule of male supply and female demand and are especially relevant in short-term mating. And we We consider cultural achievements to be such phenomena.

First, we will outline the evolutionary process of sexual selection (Darwin, 1871) and then show that individual success in cultural achievement is closely related to mating effort and thus to reproductive success. We will emphasize that because intrasexual and intersexual competition in men is greater than in women, men strive harder than women to be culturally successful.

Sexual selection

Darwin's (1859) theory of natural selection was a milestone in the history of science, but it was not, much to Darwin's agitation, able to explain the existence of seemingly excessive, luxurious, and wasteful traits which impeded survival. To explain these astonishing phenomena, Darwin (1871) devised sexual selection theory, where competition within and between the sexes drives selection.

Mate choice produces sex differences because males and females invest differently in offspring. In all mammalian species, females spend more time and energy to produce offspring. As a result, they are choosier about mates (Andersson). In males, reproductive success is constrained only by the number of fertile females they are able to mate with. Male reproductive effort should thus be mainly mating effort (Mealey; Trivers). Hence, if a trait is under sexual selection, males should develop and advertise it, and females should choose males displaying these characteristics (Darwin, 1871; Miller, 1999, 2000).

Of course, like false promises, males can fake their reproductive assets. A costly signal is more believable than a cheap signal, and a signal which entails a handicap (Zahavi; Zahavi and Zahavi) is an even costlier, fake-proof indicator of good genes. The classical example of a sexual ornament following the handicap principle is the peacock's plumage, which is not only physiologically and metabolically costly to produce, but also easily visible to predators (Andersson). It is said that Darwin got sick at the sight of the peacock's plumage as it seemed to have no survival value at all. However, the more eyes a peacock has on his tail, the more mates he has (Petrie et al.). These eyes serve as a fitness indicator, that is, a hard to fake and therefore honest signal about the reproductive value of the peacock. Male peacocks strut their costly trains on catwalks, called leks. Leks are specific, fixed places where males gather to perform competitive mating displays and females choose the winner as a mate (Höglund and Alatalo).

Fitness indicators are essential to understanding how sexual selection works. They vary significantly between individuals and require the concerted operation of many different genes. When females choose males who successfully display fitness indicators, they thus select for genetic quality (Miller, 1998, 2000; Miller and Todd). At the proximate level, male displays of assertiveness and sexual desire appear to be related primarily to testosterone (Archer; Dabbs; Regan).

A vivid example of a sexually-selected trait in humans is the so-called young male syndrome (Wilson and Daly). Young men more often than women commit and are victims of violent crime. Interestingly, the distribution of homicides with respect to age and sex is strikingly similar to the distribution of cultural production (e.g., music, paintings, literature, or science; Hayes; Miller, 1999; Kanazawa, 2000). This is likely because male competition for young women of high reproductive value is greatest during this stage of life. Men murder at a younger age than they make culture, because it takes longer to learn how to make a cultural product, like a symphony, than to learn how to kill someone (Kanazawa, 2003; Miller, 1999).

Having established some basic principles about sexual selection, we turn now to creativity and its impact on mate choice. Then we show that specific cultural activities like writing literature, founding religions, and holding records can be understood with the handicap theory (Zahavi; Zahavi and Zahavi). Specifically, we present evidence that men produce more culture than women, and that this production peaks between 30 to 40 years of age and decreases slowly thereafter.

Culture and sexual selection

Creativity

Creativity, or the ability to develop both novel and useful things (Kaufman et al.), obviously promotes culture. Hence, before we discuss specific cultural achievements, it is useful to examine creativity and its role in mate choice.

What do we know about the attractiveness of creative people? Are creative people preferred as mates? At first glance, little seems to be known about these questions, because most empirical research about mate selection criteria has focused on social status, resources, and physical attractiveness. However, in one of the most cited cross-cultural studies on mate selection preferences (Buss et al.), participants also ranked their preference for a “creative and artistic” partner in a long-term relationship. A “creative and artistic” partner ranked 7 out of 13 for men and 6 for women (average) across 33 countries, whereas “good earning capacity” (rank 9) and “college graduate” (rank 10) were less important for women around the world than a “creative and artistic” partner! Haselton and Miller further found that women with the highest probability of conception prefer a creative but poor man over a rich but non-creative man for a short-term relationship. Poor but sexy! Additionally Nettle and Clegg showed that in a sample of contemporary artists, serious and professional artists had significantly more mates over the lifespan than hobby artists or non-artists.

Thus, displaying creativity seems to increase one’s value on the mating market. However, it also works the other way. If displays of creativity have evolved because of their advantage in mating, cues to activate mating motives may also trigger displays of creativity. In a series of studies, Griskevicius, Cialdini and Kenrick found support for this prediction. When presented with attractive members of the opposite sex, a procedure to prime the mating motive, both men and women were indeed more creative. They wrote more creative stories or performed better on a standardized creativity test.

The fact that both men and women prefer a creative partner (Schwarz and Hassebrauck) and become more creative after a mating prime would seem to contradict the

idea that sexual selection has shaped how men and women pursue cultural achievement. As we discuss in greater detail later, creativity is not the best indicator of cultural achievement. Rather, we will now show that men are more prone to produce and display cultural products in a manner consistent with sexual selection.

Literature

Writing is a handicapping activity. Producing literature is time-consuming. A writer must have the energy, motivation, and endurance to finish the work. Writers need about one decade of preparation before a major literary work can be accomplished (Kaufman and Kaufman; Wishbow). Indeed, the amount of time spent writing a piece of literature influences consumers' judgment. Kruger et al. showed that readers perceived the same poem to be of higher quality when they thought that it took 18 rather than 4 hours to write.

Apart from the mere time invested, writing world class literature is cognitively demanding. Elaborate language skills are necessary. Rhymes and meter in lyric poetry are obvious linguistic handicaps because they require command over a large vocabulary (Miller, 2000). Language is a highly polygenic assembly of traits and is thus a large target for harmful mutation. An elaborate command of language is thus a good fitness indicator. Not surprisingly, linguistic skills, like vocabulary, are substantially heritable (Bratko; Stromswold, 2001, 2005).

Do we find sex differences in producing literature that sexual selection theory would predict? Yes, men seem to be more motivated than women to write books (Lange, 2011), whilst women, compared to men, are more motivated to read them (Garbe). In a sample of English-language books published in the 20th century, Miller (1999) found an overrepresentation of men with an age peak of about 40 years of age. This finding was

recently replicated with respect to 18th to 20th century German and 20th century American literature (Lange, 2012).¹

Furthermore, Lange (2012) found substantial correlations between literary success and mating success for male writers, especially with respect to extramarital relationships. So, not only do rock stars have their fans, admirers, and groupies--writers have theirs too! Most women would probably agree that, for instance, the 20th century writer Bertolt Brecht (the writer of *The Threepenny Opera*) was not exactly a beau. Nevertheless because of his exceptional writing abilities he was a notorious womanizer who had a dozen extramarital relationships while being married twice.

If writing increases mating success because of the large linguistic handicaps, writing lyric poetry should positively affect mating success more than writing non-poetry (Miller, 2000). There is indeed evidence that lyric poetry is lexically more diverse than non-poetry and thus linguistically more handicapping. However, the data are not clear on whether lyric poets are more successful in mating than pure novelists or playwrights (Lange, 2012).

Guinness World Records

One function of male displays is to demonstrate fitness. But in order to demonstrate something, one must first attract attention. If a male cannot display a culturally valuable behavior, he may resort to unusual behaviors to attract attention. Male chimps, for instance, do this by demonstratively shaking tree branches. The Guinness World Records is a compendium of largely futile feats accomplished simply to attract attention.

We examined the sex distribution of the record holders in the German editions of the Guinness Book of Records from 2000 to 2008. From a random selection of 66 records, 51 record holders were male and 15 were female. The frequency difference was highly significant according to the chi-square test. The 66 records were rated by 14 university

students (8 women, 6 men, age range 20-34) as to the degree to which the activity was considered a typical male (-2) or a typical female (+2) activity (0 = no gender preference). Altogether, 40 of the 66 activities were rated as typically male (e.g., pulling a 4-ton truck as far as possible with hooks in the back skin), 26 activities typically female (e.g., making the smallest waist by wearing continuously a lace-up corset). Of the 51 male records holders, 15 records were achieved in activities rated as typically female (e.g., knitting the longest knitting hose with a knitting Jenny; length: 18 km!). Of the 15 female record holders, only two records were in activities rated as typically male (e.g., swallowing simultaneously as many swords as possible). Thus, if you are asked whether the record holder of the longest scarf ever knitted was male or female or if the longest bout of continuous ironing was by a male or a female, you should probably place your bet on a male.

Religion

Male cultural displays, from ridiculously weird records to cherished artistic works, do not stop short of the sacred. Artistic and religious activities are similar in that both are time-consuming without necessarily producing survival benefits, like food, shelter, protection or the like. Why should someone foster an irrational belief in a supernatural being which runs counter to rational behavior that does have survival benefits? We do not intend to explain why religious behavior evolved except to state that religious behavior is not an adaptation in its own right, but the necessary consequence of a constellation of adaptations which evolved for other purposes, like causal thinking, detection of vital agents, reading the minds of others and attributing intentions, attachment, and a representation of time and space (Atran; Boyer; Dennett). Therefore, religions are culturally universal. We cannot but foster beliefs in netherworlds and supernatural agents.

Sexual selection can help explain the foundations and social consequences of religiosity (Euler). If religion is defined psychologically rather than theologically, the minimal requirement is a group of people who congregate in a joint effort to humbly and devoutly worship a supernatural being by obeying rules and performing rituals. According to insider estimates, thousands of such religions are founded in Germany alone each year, and similar estimates are made for the United States (Dennett). Obviously, these religions are almost all short-lived, and unfortunately we do not have any strong data on who founds religions at which ages. But these data are available for established religions.

We searched for information about the sex of religious founders and their ages at foundation. For 61 religions, the targeted information could be obtained. The sex and age distributions are the same as those for other cultural achievements. With a few exceptions, the religious founders are male (93.4 %), and in their thirties.

Recall that it is common in sexual selection for males to display and females to choose. If men found religions to broadcast their fitness, are women more receptive to religion than men? Euler asked several hundred undergraduate students how much they believed in a variety of 18 parapsychic and spiritual phenomena, including life after death, the effects of prayer, and miracles (5-point rating from "strong disbelief" to "strong belief"). With two exceptions women showed higher belief scores than men, with 13 comparisons significant. Notably, women scored significantly higher in two measures representative of traditional religiosity, belief in life after death and belief in the effect of prayers.² These findings thus provide some preliminary support for the claim that women are more receptive to religion than men.

Discussion

Cultural activities as lekking behavior

We proposed that human cultural achievements may be considered as sexually-selected phenomena. The presented findings add the colourful array of human cultural production to the broad palette of mating behaviors throughout the animal kingdom. Not only does a peacock have more mates the more eyes he has on his tail (Petrie et al.) or a male bird the more mates the larger his song repertoire is (Hasselquist et al.) The same might apply to men who produce culture (e.g., literature; Lange, 2012). We thus want to go as far as to claim that each of the presented areas of cultural activities is a lek. Leks are traditional places, and lekking species (e.g., peafowls) always meet at the same places. So do writers or musicians when producing and publishing new works. They strive to compete against other creators even though their areas of activity might only be places in a metaphorical sense (e.g., the literary market) and the male competition not necessarily direct. So it is with World Record books and churches as well. Also any edition of the World Records books would be a lek then as well as religion's house of prayers. People gather at the same place to perform and judge difficult and thus handicapping forms of religious rituals. The originally Swedish term 'lek' translates as 'play' and matches very well the nature of cultural activities. They are playful, creative, and entertaining.³

Conclusion

We reviewed a growing body of evidence that supports our assertion that culture is shaped by sexual selection. This evidence evinces a common and specific pattern (male supply, female demand) that follows from sexual selection theory and cannot be explained by other models. There is one exception, though, namely for creativity. In the studies by Griskevicius et al. and Nettle and Clegg, no sex differences were found. Why? First, there does not seem to be a clear sex difference in creative ability to start with (Baer and Kaufman). Second, creativity is necessary but not sufficient on its own for cultural achievements. The

motivation to display creative achievements is necessary too (Hayes). And it might simply be that men are more motivated than women to display their creative abilities, with testosterone being one possible proximate mechanism (Dabbs, Regan). Third, creativity is a very general and fuzzy term compared to concrete cultural achievements. In support of this, we presented specific sex differences for several concrete cultural areas.

We may thus conclude that as much as the peacock's plumage seems a hindrance to survival, many manifestations of human culture appear to be total waste from the perspective of natural selection as well. Producing paintings, psalms, or poems does not primarily promote survival but appears to be a luxury. As much as Darwin was puzzled by the apparent anomaly of the peacock's plumage, one might as well be puzzled when taking a sober look at religious rituals or awestruck admirers of Picasso. We cannot and do not want to rule out that aspects of culture can be explained by natural selection, but we propose that cultural production shows several features which are typical for traits shaped by sexual selection.

Notes

1. However, it has to be kept in mind that the suppression of women over the historical periods, which made it very difficult for women to be taken seriously as writers, let alone successful ones, might be a valid explanation too.
2. The statistics for these sex differences were: belief in life after death ($M = 3.31$ vs. 2.77), belief in the effect of prayers ($M = 3.07$ vs. 2.43 ; for both phenomena, $p < .001$, $d = 0.46$).
3. The basic idea of cultural phenomena being kind of leks has already been proposed by Saad (2007, 76; 2011). He, however, also emphasizes conspicuous consumption of cultural artefacts as status symbols in the context of what biologists refer to as leks (Saad 2007, 69; 2011), whereas we solely focus on male conspicuous

production of cultural goods and the subsequent but not necessarily conspicuous consumption of these goods by women.

References

- Andersson, Malte B. *Sexual selection*. Princeton, NJ: Princeton University Press, 1994. Print.
- Archer, John. *The behavioural biology of aggression*. Cambridge: Cambridge University Press, 1988. Print.
- Atran, Scott. *In gods we trust. The evolutionary landscape of religion*. Oxford: University Press, 2002. Print.
- Baer, John, and Kaufman, James C. "Gender differences in creativity." *Journal of Creative Behavior* 42 (2008): 75-105. Print.
- Boyer, Pascal. *Religion explained: The evolutionary origins of religious thought*. New York: Basic Books, 2002. Print.
- Bratko, Denis. "Twin study of verbal and spatial abilities." *Personality and Individual Differences* 21 (1996): 627-24. Print.
- Buss, David M., et al. "International preferences in selecting mates. A study of 37 cultures." *Journal of Cross-Cultural Psychology* 21.1 (1990): 5-47. Print.
- Dabbs, James M. *Heroes, rogues, and lovers: Testosterone and behaviour*. New York: McGraw-Hill, 2000. Print.
- Darwin, Charles R. *On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for life*. London: John Murray, 1859. Print.
- - -. *The descent of man and selection in relation to sex*. London: John Murray, 1871. Print.
- Dennett, Daniel C. *Breaking the spell: Religion as a natural phenomenon*. New York, NY: Penguin, 2006. Print.

- Euler, Harald A. "Sexuelle Selektion und Religion [Sexual selection and religion]". *Darwin und Gott. Das Verhältnis von Religion und Evolution* [Darwin and God. The relationship between religion and evolution]. Eds. Lüke, Ulrich, Jürgen Schnakenberg and Georg Souvignier. Darmstadt, Germany: Wissenschaftliche Buchgesellschaft, 2004. 66-88. Print.
- Garbe, Christine. "Geschlechterspezifische Zugänge zum fiktionalen Lesen. [Sex-specific approaches to fictional reading]" *Lesen in der Mediengesellschaft, Stand und Perspektiven der Forschung* [Reading in the media society, current state and perspectives of research]. Eds. Bonfadelli, Heinz and Priska Bucher. Zürich: Pestalozzianum, 2002. 215. Print.
- Griskevicius, Vladas, Robert B. Cialdini, and Douglas T. Kenrick. "Peacocks, Picasso, and Parental Investment: The effects of romantic motives on creativity." *Journal of Personality and Social Psychology* 91.1 (2006): 63-76. Print.
- Haselton, Martie G., and Geoffrey F. Miller. "Women's fertility across the cycle increases the short-term attractiveness of creative intelligence compared to wealth." *Human Nature* 17 (2006): 50-73. Print.
- Hasselquist, Dennis, Staffan Bensch, and Torbjörn von Schantz. "Correlation between male song repertoire, extra-pair paternity and offspring survival in the great reed warbler." *Nature* 381 (1996): 229-32. Print.
- Hayes, John R. "Cognitive processes in creativity." *Handbook of creativity*. Eds. Glover, John A., Royce R. Ronning and Cecil R. Reynolds. New York: Plenum, 1989. 135-46. Print.
- Höglund, Jacob, and Rauno V. Alatalo. *Leks*. Princeton, NJ: Princeton University, 1995. Print.
- Kanazawa, Satoshi. "Scientific discoveries as cultural displays: a further test of Miller's courtship model." *Evolution and Human Behavior* 21.5 (2000): 317-21. Print.

- Kanazawa, Satoshi. "Why productivity fades with age: the crime–genius connection." *Journal of Research in Personality* 37 (2003): 257-72. Print.
- Kaufman, Scott B., et al. "The role of creativity and humor in human mate selection." *Mating intelligence*. Eds. Geher, Glenn and Geoffrey F. Miller. New York: Lawrence Erlbaum, 2008. 227-62. Print.
- Kaufman, Scott B., and James C. Kaufman. "Ten years to expertise, many more to greatness: An investigation of modern writers." *Journal of Creative Behavior* 41.2 (2007): 114-24. Print.
- Kruger, Justin, et al. "The effort heuristic." *Journal of Experimental Social Psychology* 40 (2004): 91-8. Print.
- Lange, Benjamin P. "Male proneness to verbal display production." *Acta Linguistica* 5.2 (2011): 97-104.
- - -. *Verbal proficiency as fitness indicator. Experimental and comparative research on the evolutionary psychology of language and verbal displays*. Saarbrücken: Südwestdeutscher Verlag für Hochschulschriften, 2012. Print.
- Mealey, Linda. *Sex differences: Development and evolutionary strategies*. San Diego, CA: Academic Press, 2000. Print.
- Miller, Geoffrey F. "How mate choice shaped human nature: A review of sexual selection and human evolution." *Handbook of evolutionary psychology: Ideas, issues, and applications*. Eds. Crawford, Charles B., and Dennis Krebs. Mahwah, NJ: Erlbaum, 1998, 87-130. Print.
- - -. "Sexual selection for cultural displays." *The evolution of culture. An interdisciplinary view*. Eds. In Dunbar, Robin I. M., Chris Knight and Camilla Power. Edinburgh: Edinburgh University Press, 1999, 71-91. Print.

- - -. *The mating mind. How sexual choice shaped the evolution of human nature*. New York: Doubleday, 2000. Print.
- Miller, Geoffrey F., and Peter M. Todd. "Mate choice turns cognitive." *Trends in Cognitive Sciences* 2.5 (1998): 190-8. Print.
- Møller, Anders P., and Marion Petrie. "Condition dependence, multiple sexual signals, and immunocompetence in peacocks." *Behavioral Ecology* 13.2 (2002): 248-53. Print.
- Nettle, Daniel, and Helen Clegg. "Schizotypy, creativity and mating success in humans." *Proceedings of the Royal Society B* 273 (2006): 611-5. Print.
- Petrie, Marion, Tim Halliday, and Carolyn Sanders. "Peahens prefer peacocks with elaborate trains." *Animal Behaviour* 41 (1991): 323-31. Print.
- Regan, Pamela C. "Hormonal correlates and causes of sexual desire: A review." *Canadian Journal of Human Sexuality* 8.1 (1999): 1-16. Print.
- Saad, Gad. *The evolutionary bases of consumption*. Mahwah, NJ: Lawrence Erlbaum, 2007. Print.
- - -. "Songs lyrics as windows to our evolved human nature." *The Evolutionary Review: Art, Science, Culture* (Volume 2). Ed. Andrews, Alice and Joseph Carroll. Albany, NY: SUNY Press, 2011, 127-33. Print.
- Schwarz, Sascha, and Manfred Hassebrauck. "Sex and age differences in mate selection preferences." *Human Nature* (in press). Print.
- Stromswold, Karin. "The heritability of language: A review and metaanalysis of twin, adoption, and linkage studies." *Language* 77.4 (2001): 647-723. Print.
- Stromswold, Karin. "Genetic specificity of linguistic heritability." *Twenty-first century psycholinguistics: Four cornerstones*. Ed. Cutler, Anne. Mahwah, NJ: Erlbaum, 2005, 121-40. Print.

- Trivers, Robert L. "Parental investment and sexual selection." *Sexual selection and the descent of man*. Ed. Campbell, Bernard G. Chicago, IL: Aldine, 1972, 136-79. Print.
- Wilson, M., and Martin Daly. "Competitiveness, risk taking, and violence: The young male syndrome." *Ethology and Sociobiology* 6 (1985): 59-73. Print.
- Wishbow, Nina A. "Creativity in poets." Doctoral dissertation, Carnegie Mellon University, Pittsburgh, Pennsylvania, 1988. Print.
- Zahavi, Amotz. "Mate selection – a selection for a handicap." *Journal of Theoretical Biology* 53 (1975): 205-14. Print.
- Zahavi, Amotz, and Avishag Zahavi. *The handicap principle. A missing piece of Darwin's puzzle*. New York: Oxford University Press, 1997. Print.