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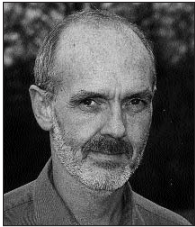
## REVIEW

### The Mind by Moonlight

*The Mating Mind*

by Geoffrey F. Miller

Reviewed by David Sherry



*About the Reviewer:*

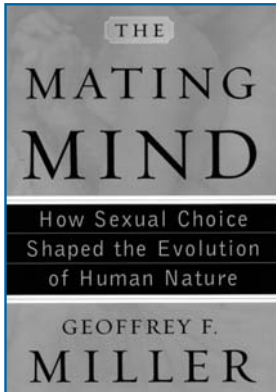
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## REVIEW

**The Mind by Moonlight**

*The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature*

By Geoffrey F. Miller

Doubleday, 2000

503 pp. \$27.50 paperback

**Reviewed by David Sherry, Ph.D.**

“The sight of a feather in peacock’s tail, whenever I gaze at it, makes me sick!” Darwin wrote in 1887. Darwin’s problem was that brilliant colors, melodious songs, conspicuous ornaments, and elaborate displays (usually found in males and not in females) impose a cost on their bearers. At a minimum they require energy and nutrients to produce and maintain. They also impose delays in development, attract predators, compromise foraging, impose time costs for display, and have other consequences that would be expected to reduce, not increase, survival and reproduction. In short, elaborate, costly displays and conspicuous appearance are the

sort of thing natural selection ought to rapidly eliminate.

Yet, such displays and striking appearance are widespread in animals. Darwin recognized that while the theory of natural selection could explain a wide range of adaptations for survival and reproduction, there remained traits that made no sense from a strictly functional point of view. The theory of sexual selection, developed in *The Descent of Man and Selection in Relation to Sex*, was Darwin’s attempt to solve this problem. Sexual selection, he wrote, results from “the advantage which certain individuals have over other individuals of the same sex and species in exclusive relation to reproduction.”

Sexual selection comes in two forms. Some displays and anatomical traits provide an advantage in direct competition with members of the same sex; they are used for fighting or for intimidating rivals. Male scarab beetles use their horns to lever male competitors out of position. Male tephritid flies use stereotyped wing displays in a jousting contest accompanied by wing buzzes and proboscis-to-proboscis wrestling. The fitness benefit of having a better display or more effective weaponry is clear. The winner is left with exclusive access to mates or to a resource such as a territory that is attractive to potential mates.

But male peacocks do not use their tails in combat. Their tails are the result of the second form of sexual selection. Many displays and ornaments seem intended not for rivals of the same sex but for members of the opposite sex. This is where theory and research on sexual selection becomes

most interesting. If we suppose that such displays and conspicuous appearance evolved because they were attractive to the opposite sex, we must sooner or later ask, what is so attractive? To put it more formally, what selective advantage does the intended audience, usually female, gain by paying attention to these displays—and choosing a mate on the basis of his colorful appearance or elaborate display?

Research on sexual selection experienced explosive growth during the 1980s and 90s. Reexamination of old theoretical problems, development of new ideas, and assiduous work in the field and laboratory moved sexual selection to center stage in modern evolutionary biology. Geoffrey Miller's new book, *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature*, is part of this trend.

#### WHY ARE FEMALES CHOOSEY?

One reason for the trend is that sexual selection, long regarded as a problematic bit of Darwinian thinking, may be the key to much of the spectacular diversity we see around us in animal form and behavior. The new scientific interest in sexual selection centers on precisely this problem. How has sexual selection produced in females the preference to mate with males exhibiting a particular appearance or display?

We find fascinating puzzles and questions. If female choice is responsible for the evolution of elaborate male displays, and males with the most attractive displays are preferred as mates, then the most attractive display should increase in frequency in the population each generation as genes

responsible for the display spread. But the eventual outcome of such a female preference will be that all males display in the same way and are equally attractive, leaving a female with no reason to choose. She need not even look, because choosing at random will have the same consequences as a choice made after a careful comparison among males. If exercising choice makes no difference, why should female preferences persist, as they clearly do?

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One way out of this impasse is to suppose that the quality of a display correlates with male traits that actually matter, like the ability to collect food, escape predators, or fight infection. Then, choosing a mate on the basis of his display would benefit a female because she may choose among potential mates that differ in how well they will feed her young or with what advantageous genes they will provide her young. The empirical question becomes, do sexually selected displays convey reliable information about traits that matter?

There are further complications. If females choose mates on the basis of which male appears brightest or sings most melodiously because these displays convey

information about male fitness, what is to prevent males from cheating? Would not sexual selection produce spectacular but unreliable displays that give females no information about male fitness? Perhaps sexual selection tends to favor the evolution of displays that are reliable indicators of male fitness while eliminating displays that are easily faked.

Some researchers propose that if females attend only to displays that impose a significant cost on males in energy or time, so the quality of the display depends on the male's condition, then at the very least a display could indicate whether a male is well fed and parasite-free. Other researchers have abandoned this line of reasoning and asked if it is necessary for displays to indicate anything at all about male fitness. Perhaps elaborate displays evolved simply because they exploited pre-existing perceptual sensitivity to color, form, sound, and movement, thereby enhancing detection by females, seizing attention, and leading to successful courtship and mating.

These questions have been intensely examined and debated in evolutionary biology over the past 20 years. Some have been resolved, some have yielded to mathematical analysis but await convincing empirical tests, and some are still open.

### THE MIND AS MATING DANCE

In *The Mating Mind*, Miller proposes that the cognitive and intellectual capacities unique to the human mind are the outcome of sexual selection, that they evolved as displays performed by males and were shaped over the course of human evolution

by female choice among potential mates. The theory of sexual selection has been used before to explain human behavior, cognition, and the brain. Sexual competition and mate choice obviously do occur in humans, and sex differences in spatial ability, mathematical skill, language proficiency, and social behavior all have been interpreted as the outcome of sexual selection.

Miller's claim, however, is a bold departure. His idea is that most mental traits that define us as human, not just a few specialized abilities, are the outcome of sexual selection by female choice. Warmth, wit, creativity, generosity, kindness, charity, intelligence, language, poetry, humor, ideology, storytelling, gossip, self-consciousness, grace, logic, sports, jazz, and religion are sexually selected cognitive traits (or the outcome of cognitive traits) that originated in the same way as the complex song repertoires of birds and the bright courtship colors of fish.

As Miller shows, many features that make the human mind seem a puzzlingly non-adaptive excess of cognitive endowment are the very features to be expected in a sexually selected display. Our minds are costly, and seem to go far beyond what would be required of a successful adaptation for survival and reproduction. Our mind's products, like decorative art and music, are among the most beautiful things in nature, but seem far too useless to be adaptations produced by natural selection. The mind, in other words, has many properties that a sexually selected trait ought to have. This is a brilliant idea, and may even be correct.

Why should hominid females have evolved preferences for displays of cognitive ability by males? Miller invokes three ideas widely used to explain female choice in animals. R. A. Fisher's theory of runaway sexual selection proposes that seemingly capricious female preferences can drive male traits to extreme forms. Not only can male traits be pushed to exaggerated forms by runaway sexual selection, but female preferences for exaggerated forms are carried along, too. Runaway sexual selection can drive display and preference to the point where penalties imposed by natural selection (in terms of energetic cost or predation risk) halt its progress.

A second explanation for female preference for cognitive display by males is that such displays indicate something about the quality of the male that has direct consequences for the female's reproductive success. Displays of intellect may be honest indicators of a male's fitness, the resources he can provide, and the genes he will contribute to children.

Finally, male cognitive displays may be influenced by pre-existing sensory biases. The displays are pleasing, comforting, entertaining, or captivating because they trigger perceptual and cognitive responses already in place in females as adaptations for other, more mundane functions. Miller proposes that whispered endearments, charming remarks, blandishments, funny stories, sparking, spooning, and special moments were pivotal in the evolution of the human mind.

#### FROM NATURAL HISTORY TO THE MET

I tried hard to like *The Mating Mind*. There is no question that Miller can write. He opens with a description of New York City's Central Park and environs, the American Museum of Natural History on Central Park West and the Metropolitan Museum of Art on Fifth Avenue. He then poses the book's central question in vivid and memorable terms: How did our hominid ancestors make the evolutionary trek out of the natural history museum and into the museum of art?

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There are lovely turns of phrase. Miller writes that his essential thesis is that "the mind evolved by moonlight." ("Our ideologies are a thin layer of marzipan on the fruitcake of the mind" and a few other tropes are less successful.) He describes his own style as "playful and irreverent." It is also self-referential when he reminds us that this book is itself a display of male verbal virtuosity, and self-deprecating when he remarks that science writers may feel obliged to show off their familiarity with fine art by opening a chapter with a reference to Renaissance sculpture, as he has just done.

Led Zeppelin, Bob Marley, Frank Sinatra, management consultants, the

Microsoft Corporation, Sigourney Weaver, *The Simpsons*, *South Park*, and *Curious George* all make appearances, along with plenty of references to sexual foreplay and such passages as, “Sexual choice is mediated by the senses. We cannot use telepathy to pick sexual partners. We have to rely on the evidence of our eyes, ears, noses, tongues, and skin.” (I would venture to suggest that by the tongue stage, a partner choice has been made.) Miller even warns off critics

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with the comment that science itself is a channeling of our sexually selected instincts and that scientists are trained to derogate armchair speculation and entertaining narratives, including “popular science books that try to present serious ideas in attractive form.”

Well, there are drawbacks to this charming way of presenting serious ideas. Much of the discussion stays at the surface when Miller describes sexual selection and human behavior. He relies on plausible analogies to everyday experience to support crucial points; often, he is content to bolster his arguments with evidence like, “David Buss, Don Symons, Margo Wilson, Martin Daly, Laura Betzig, and many other evolutionary

psychologists have gathered a mountain of data from diverse cultures documenting these sex differences and showing how they can be explained by Darwinian sexual selection.” It would be nice to get a glimpse of the mountain. That is probably why most passengers boarded the train in the first place.

At times, reading Miller, it is hard to avoid the feeling that the intellectual and scientific excitement is tucked away in his bibliography, and never made it onto the page. One expects to come away from good popular science writing better informed. Sexual selection presents many marvelous theoretical puzzles and good, new, empirical research to marshal in support of competing ideas. Most readers will understand the argument Miller is making (and it is an interesting one) but come away with but superficial understanding of the building blocks of the theory.

#### **PLEISTOCENE COURTSHIP**

Miller succeeds best when he lets the reader hear the arguments taking place offstage. A section on Alfred Russell Wallace’s critique of sexual selection, one on Rowe and Houle’s model of genic capture—whereby sexually selected traits become increasingly costly and thus better indicators of male fitness—and another on sexual selection under monogamy are especially good. But a chapter on courtship in the Pleistocene is seriously silly. Little is known, of course, about human courtship in the Pleistocene, although anthropologists have made a few plausible inferences. Miller elaborates his speculations about Pleistocene courtship with analogies to contemporary middle-class life.

Much mate choice, he suggests, was done by single mothers who probably required some level of approval from their children before taking a new mate. Females of reproductive age may have introduced prospective mates to their families at gatherings that resembled Thanksgiving dinners. Perhaps kin groups organized coming-of-age rituals, like bar mitzvahs and debutante balls, for eligible youngsters. The resemblance between these Pleistocene scenarios and the lives of modern humans is then used to bolster the case that today's social norms and customs evolved by sexual selection during the Pleistocene. The circularity of this reasoning and the projection of contemporary cultural practices into our evolutionary past unnecessarily weakens Miller's case for an audacious idea.

#### THE MESSAGE IN EVERYDAY ART

I dispute a few of Miller's scientific points. He offers a surprisingly uncritical endorsement of *g*, the purported measure of general intelligence in humans, and a similarly uncritical acceptance of the idea that anatomical symmetry is a reliable indicator of fitness. The two are combined, at one point, with the reported correlation between general intelligence and anatomical symmetry in humans taken as evidence that intelligence is a fitness indicator. Such disagreements are few, however, because Miller leaves most of the research supporting or disputing his claims to the footnotes.

When Miller deploys his central idea to analyze art, morality, language, and creativity, things become more interesting. Here he succeeds, I think, because his

goal is no longer to make a sound scientific argument, but to enable the reader to see the familiar in a new light. An example is the chapter on art as a sexually selected display. The subject here is not fine art, but everyday art: the decoration of implements, body painting, furniture, weaving, and carving. This art, he argues, is an ideal fitness indicator. Creating it imposes costs in time and energy and requires skill. It can be attempted by anyone, and done with passable skill by most, but there will inevitably be wide variation among individuals in the quality of the finished product. This will provide the opportunity to evaluate skill and, perhaps, make a mate choice.

Pleasing form, repeating pattern, smooth surfaces, bright colors, and convincing representation are hard to achieve. They require a good eye, good hands, and time to practice. Here, the digressions on Pablo Picasso, William Morris, bowerbirds, and handaxes are informative and persuasive because the goal is simply to show that treating art as a sexually selected display leads to new insights and ideas. Even conventional complaints about abstract art take on meaning. People often respond to abstract art with complaints like "Any fool could paint that." "My 2-year old could do better." Or: "Looks like a monkey took hold of a paintbrush." What they may mean is that they cannot determine whether or not the work demonstrates skill, was made by a sexually mature adult, or permits any inferences about the artist—information that we would normally expect to obtain if, at some level, we expected art to serve as a display of fitness.

## WOMEN AS CONNOISSEURS OF MALE MINDS

How convincing is Miller's basic idea that the human mind—its wit, warmth, imagination, kindness, and the rest—is the outcome of sexual selection by mate choice? Many features of the mind indeed look like sexually selected displays. Human cognitive elaboration seems to go far beyond anything required by natural selection, and our cognitive apparatus and its brain are indeed costly, whether measured in energy, time, or trade-offs against mere survival. Most people would agree that courtship engages and focuses our creativity, use of language, and cognitive faculties as does nothing else in life that we attempt. Furthermore, we are finely attuned to the courtship displays of others, even the most covert and implicit displays, and readily make inferences about what these reveal.

An observation that runs counter to Miller's hypothesis, however, is that we would normally expect sexually selected displays to be found in one sex and not the other—and usually more developed in males. Miller defends the idea that displays of verbal ability, creativity, and intellect are performed much more by men than women, but rejects the idea that men have greater language ability, are more creative, or smarter. He suggests several ways around the problem.

If cognitive elaboration is the focus of sexual selection in males, females obviously require cognitive elaboration themselves to appreciate these displays. If men were selected to display warmth, wit, humor, generosity, and intelligence, sexual selection requires women to be connoisseurs of warmth, wit,

humor, generosity, and intelligence. The best way, possibly the only way, to be a connoisseur of these traits is to be oneself warm, witty, humorous, and intelligent. That is, the trait and the preference may be the same thing. Producing the trait requires a tremendous elaboration of cognitive function and the brain, but so does having a preference for males with these features.

In fact, women on average perform better than men on tests of linguistic ability. This need not be a problem for the theory, argues Miller, because tests of linguistic

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ability are tests of comprehension, not tests of production. If women choose among men who display by speaking, we would expect women to be better at comprehending. Women know what "azure" means. The important question for his theory is whether men use the word more (even when they do not know what it means). Another reason for the absence of conspicuous sex differences in cognition in humans, Miller suggests, is that under monogamy, or mutual selection practiced by both sexes, the trait in question can become elaborated in males and females.

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**MATE CHOICE OVER CAPPUCCINO?**

A second problem for the theory of the sexually selected mind also bedevils the theory of natural selection itself. Granted that a rich creative intelligence could be used as a courtship display, what selective advantage would there be in an incipient creative intelligence? Miller uses the arbitrariness of runaway sexual selection to propose that sexual selection can provide the raw material on which natural selection can act. If sexual selection can produce eyes in the tails of peacocks, it can produce rich evocative language or any conspicuous attention-grabbing cognitive display. Once language is present, it can be further modified by natural selection for the sort of functions we normally associate with language. But language (or art, morality, or creativity), even if sexually selected, has to start somewhere, just as the peacock's tail must have started with a tiny glimmer of iridescence in the feathers of an otherwise nondescript pheasant. What was the first glimmer of iridescence in the evolution of language, art, wit, and the rest?

This problem is more difficult than the peacock's tail, because for the peacock all the first step had to do was shine in the sunlight. The first step in the sexual selection of human cognition had to do something more, as Miller argues the case. It had to look like a charitable act, create a pleasing word picture, or embellish a household implement. Any of these seem cognitively complex at the outset. "Once the rudiments of language started to evolve, for whatever reason, our sexually motivated ancestors would probably have used their heritable language abilities in courtship." *"For what-*

*ever reason"* is revealing, because it suggests that Miller does not regard sexual selection as the origin of language after all. If it was not the origin, but instead a modification for sexual display of an existing cognitive trait, then some of the power of Miller's theory is lost.

In animals, it is difficult to identify behavior or appearance that originated as a sexually selected display and later acquired a functional role, in the way Miller is proposing for human cognition. Much more common are sexually selected displays that originated as functional behavior or anatomical structures. Courtship in many ducks involves exaggerated movements based on preening, drinking, and bathing. Sexual selection has exaggerated these behaviors and added colorful decoration on the feathers that are exposed by these actions. Miller's theory of the human mind proposes that cognitive evolution ran in the opposite direction, from sexual selection of exaggerated displays to later natural selection for more practical functional purposes.

Finally, there is the nagging feeling that Miller is seeking the evolutionary basis of courtly love in the 21st century. I am not persuaded by his account that charming conversation, warmth, intelligence, and wit play quite the role in mate choice that he supposes they do, either now or during the span of human evolutionary history. Some mate choice undoubtedly does take place over cappuccino after the film, and by other culturally equivalent processes, but I suspect we are talking about one of the many calculations that enter into mate choice.

*The Mating Mind* is an extended discussion of a bold and interesting proposal about the evolutionary origin of the human mind. Its playful and irreverent tone, although it carries the reader along to a point, unfortunately also tends to diminish the importance of an idea that the author, I assume, takes quite seriously. Readers may come away with the impression that the application of evolutionary thinking to the human mind and human behavior depends more on amusing examples drawn from popular culture and contemporary life than

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on the natural science strategy of testing hypotheses. Readers unfamiliar with recent ideas about sexual selection may find the book an entertaining place to start but will want to look to other sources (such as Malte Andersson's *Sexual Selection*, Princeton University Press, 1994) to get a clearer picture of the details. ■

#### EXCERPT

From *The Mating Mind: How Sexual Choice Shaped the Evolution of Human Nature*. ©2000 by Geoffrey F. Miller. Reprinted with permission of Doubleday.

WE GET CONFUSED ABOUT THE HUMAN MIND'S BIOLOGICAL functions because of a historical accident called human history. The courtship ornaments that our species happened to evolve, such as language and creativity, happened to yield some completely unanticipated survival benefits in the last few thousand years: agriculture, architecture, writing, metalworking, firearms, medicine, and microchips. The usefulness of these recent inventions tempts us to credit the mind with some general survival advantage. From the specific benefits of specific inventions, we infer a generic biological benefit from the mind's "capacity for culture." We imagine evolution toiling away for millions of years, aiming at human culture, confident that the energetic costs of large brains will someday pay off with the development of civilization. This is a terrible mistake. Evolution does not have a Protestant work ethic. It does not get tax credits for research and development. It cannot understand how a costly investment in big brains today may be justified by cultural riches tomorrow.

To understand the mind's evolution, it is probably best to forget everything one knows about human history and human civilization. Pretend that the last ten thousand years did not happen. Imagine the way our species was a hundred thousand years ago. From the outside, they would look like just another group of large primates foraging

around Africa, living in small bands, using a few simple tools. Even their courtship looks uneventful: a male and a female just sit together, their eyes meet, and they breathe at each other in odd staccato rhythms for several hours, until they start kissing or one gives up and goes away. But if one could understand their quiet, intricately patterned exhalations, one could appreciate what is going on. Between their balloon-shaped skulls pass back and forth a new kind of courtship signal, a communication system unlike anything else on the planet. A language. Instead of dancing around in physical space like normal animals, these primates use language to dance around in mindscapes of their own invention, playing with ideas.

Talking about themselves gave our ancestors a unique window into one another's thoughts and feelings, their past experiences and future plans. Any particular courtship conversation may look trivial, but consider the cumulative effects of millions of such conversations over thousands of generations. Genes for better conversational ability, more interesting thoughts, and more attractive feelings would spread because they were favored by sexual choice. Evolution found a way to act directly on the mental sophistication of this primate species, not through some unique combination of survival challenges, but through the species setting itself a strange new game of reproduction. They started selecting one another for their brains. Those brains won't invent literature or television for another hundred thousand years. They don't need to. They have one another.

The intellectual and technical achievements

of our species in the last few thousand years depend on mental capacities and motivations originally shaped by sexual selection. Trained by years of explicit instruction, motivated by sophisticated status games, and with cultural records that allow knowledge to accumulate across generations, our sexually selected minds can produce incredible things such as Greek mathematics, Buddhist wisdom, British evolutionary biology, and Californian computer games. These achievements are not side-effects of having big brains that can learn everything, but of having minds full of courtship adaptations that can be retrained and redirected to invent new ideas even when we are not in love. ■