

Darwin's Minds

Psychologists probe the descent of the human psyche

First in a two-part series

By BRUCE BOWER

Many social scientists take a dim view of evolutionary theories of human behavior. The evolutionary approach, they argue, makes all sorts of unsupported assumptions about our ancient ancestors and comes dangerously close to scientific surrender to mind-controlling genes. Our actions are shaped by family, social and economic forces, not by biological imperatives handed down over the millennia, an army of skeptics contends.

In the past decade, however, a small but increasingly visible group of researchers has challenged the social science status quo. These investigators, known as evolutionary psychologists, argue that the human psyche and social behavior emerge from biology rather than circumventing it. Their guiding concept — some critics might call it their Holy Grail — comes from 19th-century naturalist Charles Darwin.

Darwin proposed that humans and all other organisms evolved through natural selection, the preservation of genetically based traits that best contributed to survival and reproduction in a particular environment. Today, evolutionary theorists in biology and psychology maintain that natural selection automatically produces physical and mental "adaptations"

that help individual members of a species boost their survival and reproductive success and that of their genetic relatives.

This process has profound implications for understanding the human mind, asserts Martin Daly, an unabashed evolutionary psychologist at McMaster University in Hamilton, Ontario. Research inspired by natural selection now finds its way into prominent psychology journals and addresses such issues as parental affection and rejection, sibling rivalry, sex differences in mating, homicide and warfare, facial attractiveness and the human capacity for language.

Well-known scientific contemporaries of Darwin's, such as psychologist William James, wholeheartedly welcomed an evolutionary approach to the human mind. But behaviorism — with its emphasis on actions molded through reinforcement over relatively short time periods — dominated psychology in the United States throughout the first half of the 20th century.

During the 1960s, psychologists turned toward the study of internal mental processes, such as memory, as well as specific situations that orchestrate social behavior (such as Stanley Milgram's famous studies of obedience to a demanding authority figure). Darwin's ideas remained the property of biologists.

The evolutionary perspective gained notoriety — but few adherents in psychology — during the 1970s, when sociobiologist Edward O. Wilson of Harvard University intimated that human morality springs from biological roots. Critics argued that sociobiology, the study of biological influences on the social behavior of animals, presented

a warped view of human nature in which devious genes yank the behavioral strings of helpless, flesh-and-blood marionettes.

Daly labels the oft-repeated charge of genetic determinism, which still dogs evolutionary psychology, "a phony issue." Sociobiologists and evolutionary psychologists seek to identify human mental tendencies that evolved to produce adaptive behavior on average, not in all situations or in every person, he maintains. Biological evolution set the stage on which more immediate actors — such as an individual's unique genetic characteristics, past experiences and culture — raise the curtain on thought and behavior.

Still, a genuine rift does exist between evolutionary theorists and mainstream social scientists, according to psychologist David M. Buss of the University of Michigan in Ann Arbor. Evolutionary models assume that the human mind consists of numerous specialized mechanisms assembled by natural selection to perform different adaptive functions, whereas most psychologists see only a few, general-purpose devices coordinating mental activity, Buss says.

Although evolutionary psychology comprises more speculation than data, empirical studies now point toward several evolved psychological mechanisms that help shape the human condition, the Michigan psychologist notes. These include:

Sex differences in jealousy. A series of studies directed by Buss indicates that sexual jealousy represents a basic human emotion, but one triggered for different reasons in men and women. Male jealousy focuses on a part-

ner's sexual infidelity, whereas female jealousy revolves around the loss of emotional commitment from a partner, proposes Buss, who presented his group's findings at the August meeting of the American Psychological Association in San Francisco.

These differences stem from adaptive problems typical of all mammals, he argues. Unless a male can cordon off his mate from other males, he faces a nagging uncertainty about whether he has fathered her child, whose rearing demands tremendous sacrifices. Females obviously harbor no doubts about maternity, but they do risk the loss of a mate's resources and, in the human species, his help in child rearing.

In one study, Buss asked 202 men and women whether it would upset them more if a sexual partner had sexual intercourse with someone else or if the partner formed a deep emotional attachment to someone of the opposite sex. Nearly two out of three men said sexual infidelity would distress them most, whereas 85 percent of the women deemed emotional infidelity the most upsetting.

Physiological arousal stoked by jealousy follows the same sex-based pattern, Buss says. In a study of 30 men and 30 women, heart rate and electrical activity in the skin and the forehead "frown muscle" skyrocketed when the men imagined a sexual betrayal by a partner, but not when they imagined emotional infidelity, he reports. The opposite pattern held for the women.

A third study, involving 309 men and women, revealed that women viewed emotional infidelity as more distressing than sexual infidelity regardless of whether they had ever experienced a long-term sexual relationship with one partner. In contrast, men who had such a relationship became far more upset at the thought of sexual infidelity than did men with no prior extended romance.

Moreover, in a study of 10,047 people in 37 cultures worldwide, Buss and his colleagues found that men, compared with women, place much greater importance on a partner's sexual chastity before marriage in two-thirds of the societies. However, cultures

varied tremendously in the degree to which men and women emphasize premarital chastity, the researchers report in the March 1989 *BEHAVIORAL AND BRAIN SCIENCES*.

Overall, these investigations suggest that "sex differences in the activation of jealousy are evolutionary adaptations than can be modified or even overridden by culture," Buss says.

Far from a sterile, theoretical concept, evolved masculine jealousy lurks behind many instances of spouse murder, contend Martin Daly and Margo Wilson, also from McMaster University, in their book *Homicide* (1988, Aldine de Gruyter) and in an analysis of homicide data published in the Oct. 28, 1988 *SCIENCE* (SN: 11/5/88, p.300). From North America to Africa and India, spouse murders — whether a husband kills his wife or vice versa — often follow the husband's violent reaction to the wife's real or imagined sexual infidelity or desertion, Daly and Wilson say.

In the small, nonindustrial societies that have typified most of human evolution, male competition for fertile women and the guarding of mates aided survival and reproduction, they note. In modern societies, however, the same tendency creates a sometimes deadly conflict between men's attempts to control their mates and women's resistance to coercion, the Canadian psychologists conclude.

Sex differences in mating. Married couples generally share many similarities, yet men tend to marry women younger than themselves and women often seek out older men. Social scientists usually ascribe this phenomenon solely to cultural influences. For instance, one theory holds that American society and its "advertising culture" overvalue male economic success and female physical attractiveness, leading older men with established careers and younger women who more closely match media images of femininity to gravitate toward one another.

Such theories received a jolt when Buss' cross-cultural study showed that men worldwide preferred younger, physically attractive mates, while women placed greater value on slightly older mates possessing ambition, an industrious nature and good financial prospects. Although this pattern appeared nearly universal, the size of the sex difference varied greatly from culture to culture, Buss notes.

The evidence reflects mate-competition patterns observed in a wide variety of mammals, he maintains. Males compete for mates by acquiring and displaying signs — such as personal and material resources — of their ability to provide for a family. Females accentuate their fertility by trying to appear youthful and attractive.

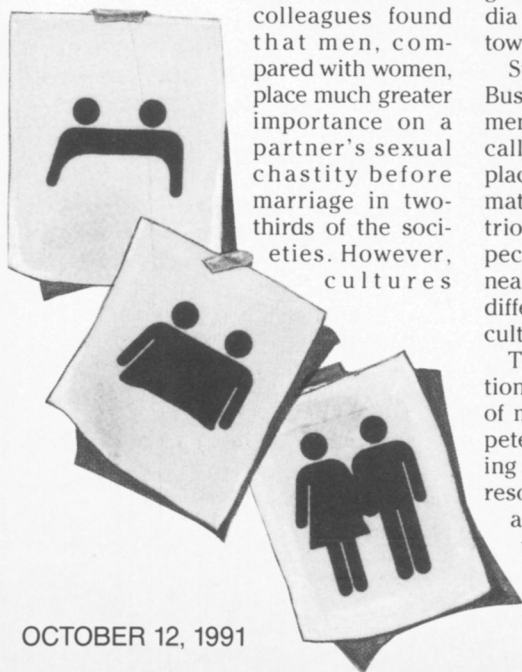
Another Darwinian concept, known as sexual selection, addresses the evolution of these sex differences, Buss says. For males, this principle holds that genetically based characteristics that best attract or procure mates — for example, the peacock's colorful plumage — will show up in succeeding generations in spite of the threats they may pose to individual survival. Female mate choices thus determine which inherited characteristics will persist through the generations as potent sexual attractors, Darwin proposed. Since females spend more time caring for offspring, they have more incentive to comparison-shop before picking a partner.

Additional evidence supporting an evolutionary basis for older men-younger women marriages, gathered by Douglas T. Kenrick of Arizona State University in Tempe and Richard C. Keefe of Scottsdale Community College, will appear next year in *BEHAVIORAL AND BRAIN SCIENCES*. To analyze age preferences for mates, the Arizona psychologists examined six sources: all marriages in Seattle during January 1986; a random sample of marriages in Phoenix in January and May of 1986; 100 marriages in Phoenix recorded in 1923; all marriages from 1913 to 1939 on the isolated Philippine island of Poro; "singles ads" published in the United States and the Netherlands, including ads placed by wealthy, professional women in *WASHINGTONIAN* magazine in Washington, D.C.; and marriage advertisements in India, where caste and religion guide mate selection.

In each sample, women of all ages tended to marry or seek out men slightly older than themselves, usually by no more than 10 years, Kenrick and Keefe report. Men in their teens and 20s showed no preference for younger mates; men in their 30s married women an average of several years younger than themselves; and for older men, the age gap widened progressively as they advanced in years. Sex differences in age preferences showed up most strongly among the men and women of Poro, a fishing community with no television and little contact with outsiders.

This pattern stems from a universal biological constraint, the researchers argue. A woman's reproductive capacity declines after her 20s and ends with menopause, but even a man in his 70s retains the ability to father children "if his wife can wake him up," Kenrick notes sardonically.

Thus, women generally seek unions with slightly older men who have achieved greater wealth and social status than younger suitors, whereas older men — because of their own advancing age — favor younger women showing signs of attractiveness and fertility. Other studies directed by Kenrick support this point, indicating that men show strong preferences for physical attractiveness when



evaluating potential mates, while women pay more attention to a man's social status and material resources.

Evolutionary influences on age preferences in mates operate largely outside of consciousness and are subject to major changes based on an individual's background or culture, Kenrick and Keefe point out. For instance, both men and women may find their mating tendencies constrained by the availability of members of the opposite sex and by social rules specifying appropriate ages for partners.

Graceful aging also alters the mating equation. In industrial societies where women show fewer physical signs of aging, women in their 40s may be more likely to marry younger men, Kenrick and Keefe suggest. Conversely, the investigators propose that men in their 30s who marry older women may generally possess less physical attractiveness than peers who marry women slightly younger than themselves.

Whether or not these speculations prove correct, says Kenrick, disregarding the evolutionary forces that animate mate choices "is akin to studying geography using only local road maps and refusing to look at the atlas."

Facial attractiveness. "The human ideal of a pretty face varies relatively little from culture to culture," states psychologist Michael R. Cunningham of the University of Louisville (Ky.). "Beauty may be in the eyes of the beholders, but those eyes are more similar than different."

One evolutionary explanation for the widespread agreement over who qualifies as handsome or pretty holds that the most attractive facial features approach the mathematical average of all faces in a given population (SN: 5/12/90, p.298). Preliminary evidence suggests that people almost always rate computer-generated composites of up to 32 faces as more attractive than the individual faces used to produce the composites. Psychologist Judith H. Langlois of the University of Texas at Austin, who directed the study, says humans may have evolved to respond most strongly to extremely typical or "average" faces, which send the clearest social signals through facial expressions.

Although average faces appear relatively good-looking, truly stunning faces contain some not-so-typical features, argue Cunningham and psychologist Thomas R. Alley of Clemson (S.C.) University in the March PSYCHOLOGICAL SCIENCE. For that reason, they contend, a few individual faces in Langlois' study garnered more attractive ratings than any of the composites.

Cross-cultural studies of Asians, Hispanics, and blacks and whites in the United States — reported by Cunningham

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at the August American Psychological Association meeting — reveal that men and women prefer female faces with the childlike features of large eyes, small nose and small chin, the sexually mature features of high cheekbones and narrow cheeks, and the expressive features of a large smile and eyebrows set clearly above the eyes. A full, thick head of hair also increased female facial beauty.

"The ideal female face is young but sexy, friendly but of high social status," Cunningham concludes.

The ideal male face looks much like an ideal female face, with the addition of a larger chin and nose, and thicker eyebrows. Attractive males appear more mature and socially dominant than attractive females, a finding that plays into Kenrick and Keefe's theory of sex-based mating preferences.

Although people apparently harbor shared mental pictures of ideal male and female faces, the evolutionary significance of the facial features comprising each ideal remains unclear, Cunningham says.

Language capacity. Human language, like any complex biological ability, evolved through natural selection, propose psychologists Steven Pinker of the Massachusetts Institute of Technology in Cambridge and Paul Bloom of the University of Arizona in Tucson. Their argument, which clashes with accepted linguistic theories, appears in the December 1990 BEHAVIORAL AND BRAIN SCIENCES.

All human languages contain an elaborate grammar for the communication of messages with shared meanings, and natural selection provides the only scientific explanation for the origin of a brain geared for such a complex ability, Pinker and Bloom maintain. Language may have emerged in some form among the earliest members of the human evolutionary family, they contend. Human ancestors probably lived in cooperative groups that fostered increasingly intricate communication and thinking skills among inter-

dependent individuals concerned with attracting mates, obtaining maximum resources, avoiding manipulation and deception, and forging beneficial alliances (SN: 4/28/90, p.266).

Even before human-like creatures came along, hand and posture preferences among early prosimians, monkeys and apes paved the way for a human brain that accentuates right-handedness and contains structures within the left side of the brain exploited for speech and language comprehension by natural selection, theorize psychologist Peter F. MacNeilage of the University of Texas at Austin and his co-workers (SN: 1/7/89, p.10).

Many scientists, inspired largely by linguist Noam Chomsky of MIT, see no biological precedents for the brain structures governing human language. Rather than evolving through natural selection, language appeared as a by-product of other evolutionary developments, such as increases in brain size, they argue.

For now, evolutionary psychologists forge ahead with new studies in the knowledge that many of their colleagues consider natural selection and adaptation "dirty words," note psychologists John Tooby and Leda Cosmides of Stanford University in a commentary accompanying Pinker and Bloom's article. Much of the Darwinian disdain, the Stanford pair says, stems from a 1979 paper by geneticist Richard C. Lewontin and paleontologist Stephen J. Gould, both of Harvard University.

Lewontin and Gould argued that scientists cannot discern after the fact whether physical or mental features represent adaptations molded by natural selection. A particular characteristic might result from random genetic drift, the novel use of a feature adapted for a different function, or could occur as an incidental by-product of an adaptation, Lewontin and Gould pointed out.

The Harvard scientists provided a justified dose of caution for evolutionary theorists, who indeed have sometimes contrived "just-so stories" that explain all sorts of human traits as adaptations with little or no supporting evidence, Tooby and Cosmides observe. But the Darwinian approach works when researchers develop testable predictions based on a view of adaptations as biological systems with complex parts that together solve important problems of survival and reproduction, they conclude.

That includes mental adaptations, Martin Daly emphasizes. "Sociality has no meaning outside of the biological world," he asserts. "All the adaptive characteristics of living creatures have been shaped by selection, the human mind no less than the stag's antlers." □

Next week: Oedipus Wrecked