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Talking Evolution and Selling Difference

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Are women and men bipolar opposites in perpetual discord over conflicting interests? Did we evolve to be this way? Does this reach the extent of an evolutionary, genetic basis for sexual aggression? The publication of *A Natural History of Rape: Biological Bases of Sexual Coercion* by Thornhill and Palmer (2000) answered these questions largely in the affirmative and vaulted the debate into national prominence. This volume offers consideration of these questions from the perspective of a variety of scientific and scholarly disciplines and highlights the complex issues about gender, sexuality, evolution, and violence involved in understanding the intersection of evolution, gender, and rape. The account of rape as evolutionary offered by Thornhill and Palmer (2000) is given detailed analysis.

Gender politics are nowhere more profound than in the area of sexual aggression. The significance of rape was first brought to widespread public attention by the defining work of Susan Brownmiller (1975). A key feature of her analysis was to point out that sexual aggression was sustained by differential status and power and that it carries social meanings that express issues beyond sexuality. These ideas were elaborated and affirmed by other scholars (e.g., Holmstrom and Burgess 1980). Careful, quantitative field studies validated the perspective that status (i.e., the ability to access resources and to exert choice) is a basic feature of sexual violence (Baron and Strauss 1989). These works challenged the common myth that rape was a rare event perpetrated by mentally weak sociopaths on careless victims and suggested instead that dynamics of power and status might touch the lives of ordinary women and men. Indeed, it was found that ordinary cultural discourse included commonly held beliefs and rape myths that foster and help sustain sexual aggression (Burt 1980). It was a shocking

discovery that rape might be much more frequent than supposed and that it might invade ostensibly normal dating relationships (Koss et al. 1987). Understanding the acquisition and development of sexually aggressive behavior and the factors that are likely to elicit and to sustain it have been topics of extensive and careful study (Crowell and Burgess 1996; Hall 1996; Heise 1998; Malamuth 1983; Malamuth and Check 1981; Malamuth, Haber, and Feshbach 1980).

If one hopes to make use of evolutionary theory to understand gender differences and to understand sexual aggression in particular, it is necessary to take a considered look at basic principles of evolution and it is necessary to examine assumptions about gender in general. Far from being "anti-evolution," this volume illustrates the care that must be taken in making use of evolutionary theory and includes some attention to how evolutionary theory might guide empirical research. Evolutionary theory is not sexist. The basic principles of evolutionary theory have helped to organize information, to understand some phenomena, and to generate hypotheses. The number of scholarly disciplines, such as evolutionary anthropology, evolutionary biology, evolutionary ecology, and evolutionary psychology, that have emerged evidences the appeal and usefulness of the theory. Because applications of evolutionary principles to human relationships are frequently characterized by grandiose overgeneralization and by political philosophy thinly disguised as evolutionary science, this chapter begins with a short primer of basic concepts. Later chapters introduce more complex questions of theory and methodology.

However, the overgeneralization and grandiosity that has characterized popularized and simplistic accounts of gender and sexuality cannot be dismantled merely by clarifying the tenets of evolutionary theory. One must recognize the cultural context that supports and invites such accounts. Therefore, a second section in this chapter entitled "Media, Culture, and Science" discusses the reciprocal and mutual influences of culture and science as these are played out in the media. The reciprocal link between a cultural predilection for dichotomies and a gender science that supports this predilection can be seen in the media attention given not only to *A Natural History of Rape: Biological Bases of Sexual Coercion,* but to a number of studies focused on biological gender differences. I argue that there should be a broad understanding of gender and of sexuality as phenomena that are as much social as biological.

A final section of this chapter offers the reader a brief overview of the entire volume and serves as an introduction to the major parts of the book. These parts offer useful discussions of some of the more difficult problems one must solve in order to make productive use of evolutionary theory. The second part is focused particularly on the proposal that rape is best understood in terms of evolution, and the final third part of the volume offers a range of other perspectives and models.

A Short Primer

The persistent misapplication and misuse of evolutionary principles has generated an understanding of human maleness and femaleness as categorically opposite, universal, and invariant. Early political renderings of evolutionary theory by politically conservative philosophers resulted in a social Darwinism that served as an account of the disease and poverty of worker classes. Other, pop sociobiology, accounts of human psychology and culture were also loosely formulated in the language of evolution. The pop sociobiology accounts of gender difference based on evolution are often what Stephen Jay Gould (Gould and Lewontin 1970) called "just-so stories," because things *might* have happened as hypothesized. Ethel Tobach and Rachel Reed in this volume point out that simplistic evolutionary models of human behavior are sometimes advanced zoomorphizing (the inappropriate interpretation of human behavior in terms of animal models). Jerry Coyne in this volume makes it clear that the misuse of evolutionary principles invokes the resentment of evolutionary biologists who do work carefully to meet exacting standards. I have elaborated elsewhere (Moore and Travis 2000; Travis and Yeager 1991) on problems of sociobiological approaches that emphasize inherent gender-based conflict as a key to sexuality.

In these "just so stories," sexuality is cast in a one-dimensional and somewhat problematic light. In this popularized view, sex is almost exclusively a matter of reproduction and is fraught with conflict and danger. However, others suggest quite different perspectives and propose that much of what is understood about sex and sexuality is socially constructed (Boyle 1994; Tiefer 1995; Travis and White 2000). Scholars from a variety of disciplines have developed this idea of knowledge as socially constructed; it is not simply an antiscience philosophy promulgated strictly

within feminism (Gergen 1985; Lewontin 1992; Parker and Shotter 1990; Simon 1996). The history of sexology research (Tiefer 2000) illustrates the changeable nature of the facts of sexuality and how these are understood among scientists. In studies involving a wide range of animal species, biologist David Crews (1994) has demonstrated a wide range of permutations in reproductive anatomy, physiology, and behavior. Whether sex among primates is largely about reproduction can be questioned. For example, primatologist Frans de Waal (with F. Lanting, 1998) offers a quite different picture of sexuality from field observations of one of our nearest evolutionary neighbors, the bonobo chimpanzee, for whom sexual encounters are largely a form of social exchange and a basis for cohesion rather than reproduction.

When evolutionary theorizing is used to inform a general audience about the nature of sexuality, as well as many other phenomena, there are a lot of references to natural selection, fitness, and environment. But often the connection between these terms and the conclusions about sexual behavior are accomplished only by linguistic fiat. Basic assumptions and corollaries often remain implicit and without empirical corroboration. To read these accounts with a critical eye, a very short primer may be helpful.

Principles of evolution rest on three tenets and involve the ideas that: individuals vary; some variations are more favorable for survival and reproduction than others; some of this variation is genetically based and therefore can be inherited. Most evolution (i.e., differing gene frequencies in successive generations) is due to differential reproductive success as a function of these variations. It is also possible for evolution to occur through genetic drift and other mechanisms that might seem almost to be matters of happenstance. Evolution does not ensure that only adaptive or beneficial traits will occur; nor does it result in an ever-upward move toward perfection. From a biological perspective, the process should be viewed as the elimination of the grossly unfit and those who have met with an unlucky moment. Individuals who are marginally fit may continue to reproduce as long as they do not meet with an unlucky moment. Fitness and natural selection are important conceptual ideas of evolutionary theory that must be understood in terms of gene-environment interaction.

Fitness The unit for evaluating evolutionary "success" is genetic fitness. Specifically, the bottom line of fitness is the representation of genes in successive generations of offspring that themselves reproduce. Contrary to

popular notions, fitness does not necessarily mean that the individual will have a long or prosperous life of ease. Mutualism in the immediate instance can result in greater general and inclusive fitness than immediate exploitation. In some cases, the increased representation of an individual's genes in successive generations may actually be enhanced by what appears to be altruism. W. D. Hamilton (1964) first described this seeming anomaly, whereby individual fitness may be enhanced because genetic relatives in future generations carry an increased frequency of genes carried in the altruistic individual. Thus, fitness is measured not only in the number of direct offspring, but also in the offspring of genetic relatives, what is known as *inclusive fitness*. The process by which these altruistic behaviors are retained in successive generations is termed *kin selection*. Any argument about the evolutionary fitness derived directly from a behavior or trait must show that the behavior or trait results in an increased gene frequency in several succeeding generations. That is, there must be grandchildren and great grandchildren that reproduce these genes. Fitness is always shaped by environmental, ecological, and social context as well as genetic factors. Natural selection is the process by which this interaction may evolve differing gene frequencies. Patty Gowaty in this volume emphasizes that natural selection should be understood as consisting of many components and elaborates on a "components-of-fitness" model in her chapter.

Natural selection Natural selection operates to increase (or diminish) characteristics or behaviors that result in greater reproductive success among *future* generations. Only those traits having genetic components and some implication for reproductive success are subject to natural selection. Natural selection may operate on a wide range of adaptive patterns, such as offspring behaviors, foraging behaviors, predator defense, social behavior within a group, mate selection, reproductive and gestation patterns, parenting behaviors, and so on. If a behavior, no matter how beneficial, has no genetic component, it is not subject to natural selection. Further, those genetic characteristics likely to be expressed in life stages *after* reproductive effort and parenting are less likely to be subject to natural selection. This explains in part why, after thousands of years of evolution, humans continue to suffer from heart disease and cancer. They are conditions that for the most part express themselves after reproduction and child rearing, when the relevant genes have already been transmitted to the next generation.

Although new genes can be introduced by mutation or by the inward migration of new individuals, adaptations largely reflect the range and limits of the initial gene pool. Thus, in some ways it is better to think of adaptations as ways of "making do" rather than as expressions of increasingly refined solutions. Whether one or another adaptation persists in being expressed depends on its effectiveness relative to other competing permutations. However, in circumstances of reproductive isolation with weak or no competition, less than optimal patterns may be sustained. In these circumstances, entire populations may carry forward a less than optimal genetic condition, sometimes referred to as *founder effects*. These founder effects can accrue merely by entering a certain ecological niche first when there are no competitors and not necessarily because the trait has unique adaptive benefits.

Gene-environment interaction In every case, natural selection occurs in a gene-environment context. That is, the benefit (if any) of a genetic component for a characteristic depends on the environment. Environment includes not only physical ecology, but also the behavior patterns of conspecifics and other species. (If the termite changed its behavior what would happen to the aardvark?) In many cases, whether a behavior pattern is adaptive or not may depend on the frequency of the behavior relative to similar but competing strategies that might be displayed by peers. Maynard Smith (1977; Maynard Smith and Price 1973) has referred to this balancing of relative frequencies among different solutions to a similar problem as an *evolutionarily stable strategy* (ESS). For example, whether or not cooperation or competition will accrue benefits to the individual depends on the behavioral strategies of other members of the group. Being cooperative in a group of similarly inclined individuals is likely to produce benefits for the individual and related kin. Reciprocal altruism can best evolve where there is opportunity for repeated interactions over time and where helpful acts can be repaid, either directly to the original helper individual or to the helper's related kin. Similarly, the fitness associated with a given reproductive strategy may depend in part on the strategies of other members of the group. Thus, where the reproductive norm is that of bonded, genetically invested adults, strategies that depend on deception and manipulation are not likely to be associated with long-term success.

Environment is a complex that includes not only the surrounding physical ecology, but also the interactive, social ecology. This is particularly im-

portant for species that live in groups. The expectations, beliefs, and habits of one's peers and partners constitute a social environment that can elicit and sustain, or extinguish, certain behaviors as well as the feelings and rationale that support such behaviors. For humans, group living has facilitated foraging, predator defense, and care of offspring. Indeed, one may argue that the survival of humans depended on the ability to sustain group integration. Among other things, the recognition of individuals and memory for their past behavior and personal traits would have been key to the formation and maintenance of group living among early humans. It would be functional to be able to sort other individuals in terms of privilege and hierarchy with respect to the self. But the ability to recognize dominance and power would be only one way of mentally marking other individuals in one's group. It also would be functional to remember who was generous and who stingy, who trustworthy and who nefarious.[1] Rogues who were disruptive to group welfare were probably excluded from most beneficial social exchanges, and they and their offspring would have suffered the consequences of such exclusion. One might suppose that this winnowing process would have produced a predilection for affiliation and an emotional desire to belong to a group, even if it involved restraint on immediate self-interests.

Other chapters in this volume discuss additional complexities of evolutionary theory, gender, and sexuality. Despite this complexity, discussions of genetics in human ability and behavior can take on a remarkably simplistic tone. These discussions do not reduce simply to matters of confirmed or unconfirmed fact. The same errors of exaggeration, oversimplification, and overgeneralization are repeated over a wide range of topics. Part of the reason lies in not only in casual misuse of evolutionary concepts, but also in cultural bias about gender and difference.

Media, Culture, and Science

Grandiosity in the misuse of evolutionary theory does not occur simply because someone forgot basic evolutionary principles. There is a cultural readiness to locate causes for human events in biology and a cultural receptivity for the idea that gender roles are the product of orderly laws. Scientific reports consistent with this cultural bias receive high-profile coverage in the media. *A Natural History of Rape* is part of this cultural phenomenon. It is not simply an explication of an idea. Although it is

couched in scientific terms, it can be understood as a product not of science but of culture. The emphasis on a supposedly "natural" link between sexuality, danger, and violence might in fact reflect less about scientific empiricism and more about cultural beliefs that emerge from Western Christianity linking sex with sin (Pagels 1999, Ruth 1987) and the more recent moralizing by conservative religious leaders that HIV/AIDS is punishment for sexual sin (John 1995).

The fundamental ideas of biological determinism and categorical sex differences resonate with long-standing cultural biases. There are ongoing tensions about the study of gender differences: how big are they; how consistent are they; how significant are they; how amenable are they to change; and what implications do they have for social politics? Similar tensions also exist in studies of racial politics and IQ (Gould 1981). Gender differences in math, verbal, spatial, and other cognitive functions, even when small by scientific standards, remain topics of extensive study and continue to be reported as important news. Gender differences in psychological qualities such as anxiety, depression, intuition, and aggression are of similar interest. There is, in addition, a general predilection to see differences as located within individuals and thus "natural," uniform, and invariant. The framing of such questions in terms of a homogeneous group difference simultaneously reflects and contributes to a cultural understanding of the genders as dichotomous and categorically opposite. When explanations for these different qualities and roles invoke brain function, hormones, or evolution they are made to seem even more "natural," more invariant, and more permanent.

Western, occidental views of sex and sexuality are built around categorical dichotomies, where the creation and celebration of sex differences are understood to be crucial to social order. One gains the impression from this dichotomous view that society would pretty nearly collapse without the orderliness derived from these differences. Such differences are extolled, as if orderliness in the presumed "natural" social arrangements were a completely value-neutral condition.

Stereotypic notions of gender roles are by and large cherished in American culture. Popular books trade quite successfully on the same notion of inherent, fixed gender differences. The idea that women and men are effectively from different planets was such a successful marketing idea that it was reiterated in a book series and even became the basis for a one-man

Broadway show. Such books provide reassurance about the natural, and therefore rightful, divisions of labor. They also offer reassurance about the natural basis for unequal political privilege[2] that goes along with these gender differences.

In harmony with this cultural value system, much of the research on sex and gender has focused on difference. This is despite the fact that an extensive body of research based on statistical techniques of meta-analysis, developed by Eagly, Hyde, and others (Eagly and Steffen 1986; Hyde 1984), has shown that, compared to individual variability *within* a gender, many of the presumed differences between genders fall in the moderate, small, or nonexistent range. Jacob Cohen (1994) argued that the ritualized testing of difference is flawed by numerous logical errors. As an alternative, he advocated an emphasis on estimating effect sizes and the use of confidence intervals. This approach is important because it prompts us to question not only whether there is a difference between groups, but to ask about the practical size of differences.

The focus on difference carries with it a number of implications and value judgments outlined by Dale Miller (Miller, Taylor, and Buck 1991). The first point is that research on difference begins with an implicit normative case and tacitly seeks to explain differences from this norm. The thing that needs explaining is, by implication, abnormal, difficult, or puzzling. Exceptions to the norm are seen as problematic, and explanations of the problem tend to target internal, person-based causes while ignoring interactive, contextual factors. This tradition of looking for differences is related to the fact that science occurs in a cultural context and is in part a product of that cultural context. The history of science is replete with instances where flawed and highly improbable ideas have been advanced as science, a science that just happened to be congruous with cultural beliefs of the time. The influence is reciprocal, and culture in turn is informed and perpetuated by confirmatory distillations of science. The penchant for conceptualizing male and female gender as opposites continues to characterize popular culture as well as scholarly publications. This is especially apparent in renderings of research results for public consumption in news media.

These cultural biases are normalized and reinforced by selective reporting of findings, overgeneralization, and social constructions found in news stories. In this framework, it makes cultural sense that groups with such

categorically and uniformly different qualities should have different social roles, obligations, and privileges. It follows that men and women frequently will find themselves with conflicting interests and that what benefits one may be anathema to the other. The phenomenon is not specific to ideas about rape and is illustrated here by the media treatment of three other studies of sex differences.

Gender Science in the News

Dozens of news stories covered discussions of *A Natural History of Rape: Biological Bases of Sexual Coercion,* in part because sex sells and ideas about inherently conflicted roles for men and women are of considerable interest. But the book is only one example of this cultural interest. Nowhere has cultural and scientific bias been more evident than in research on gender and brain function. There's a long history of efforts to use brain size and function as a basis for prejudicial discrimination, not only involving gender but also involving color and race (Gould 1981). Research selected for high media coverage is interpreted as validating common stereotypes about femininity and masculinity. The media chooses to highlight scientific findings that confirm stereotypes because they think people will attend to them. People do attend to these stories, because they are easily integrated with preexisting concepts (stereotypes).

In particular, significant media attention is paid to science studies that lend themselves to a discussion of brain differences between women and men. Brain differences seem to be an especially favored topic in these representations on the natural and universal aspects of gender differences. News stories seem to promote the idea that women and men are different and have the brains to prove it. Common flaws in these news stories include distortion and exaggeration of differences, pejorative labeling, and overgeneralization. Findings are extrapolated by the media to aptitudes and abilities not relevant in the least to the study being reported. Labels, meaning, and interpretations are regularly presented in judgmental terms that focus on women's deficits and limitations. Further, the news stories often locate the origins of these differences in deterministic genes and evolution. Three examples illustrate this reciprocal and confirmatory relationship between culture and science.

Listening with Half a Brain A good example of this reciprocal relationship can be seen in a study presented at the radiological meetings at Chicago in fall of 2000, by Dr. Joseph Lurito and his colleagues at Indiana University medical school. They used functional magnetic resonance imaging to track blood flow in the brains of ten women and ten men as they listened to a voice reading passages from a John Grisham thriller. Both men and women had the greatest increase in blood flow on the left side of the brain. Both men and women also showed some increase in blood flow on the right side. Differences between left and right brain activity were relatively larger for men who showed significantly more increase in the left-brain. The left-right hemisphere differences for women were less striking and suggested a more even pattern of blood flow and activation. The authors suggested that this even pattern of activation might allow women to more readily recover language functions following a stroke.

Thirteen news stories depicted the differences between women and men as more categorical than in fact they were reported in the original study. In these stories, the difference in blood flow while listening to the Grisham thriller was extrapolated to mean something about quality of thinking style, about general reasoning, and about emotion. A flippant analysis might lead one to suggest that men listen with only half a brain. However, a number of stories took care to protect male worthiness. Lurito was quoted in several stories as stating that the observed difference did *not* indicate that women were better listeners. He additionally was quoted in several of the news stories as suggesting that women might even find listening more difficult. He suggested that this might be so because women used more of their brain to accomplish the same task. The implications of the study for potential deficits in women and their brains were reiterated in several stories. The general implication was that listening is difficult for women. That is, women try harder to achieve the same result that men accomplish with relative ease.

Navigating with Half a Brain The journal *Nature Neuroscience* published a research study conducted by Mathias Riepe and his colleagues at the University of Ulm in Germany (Groen et al 2000) that used MRI methodology similar to that of the paper by Lurito on listening. This study presented 12 women and 12 men with 3 computerized virtual 3-D mazes, each maze containing several potentially successful pathways. This task is

not unlike computer games in video arcades, a recreational setting frequented by boys more often than by girls. The study found that the average score for the 12 men to complete a maze was 54 seconds faster than the average score required for the 12 women. Functional magnetic resonance imaging was used to measure activity in a number of different brain regions in both the left and right hemispheres and *multiple comparisons* were later conducted to assess sex differences. In four regions, women and men both showed bilateral activation. In two brain regions men showed bilateral activation and women unilateral, and in one region women showed bilateral activation while men had unilateral activation. In three other regions one gender showed unilateral activation while the other showed no elevated activation at all. If you're counting, that's at least ten comparisons.

Out of these similarities and differences, only the differences were noted, namely that men had higher activation for the hippocampal regions in both left and right hemispheres, whereas women showed higher activation in only the right hippocampal regions. Men showed more bilateral activation while women showed more unilateral activation. This is a situation similar, but in reverse, to that reported by Lurito in the listening study, that is, ostensibly women were using half their brain to accomplish the task, while men needed to work hard with both sides of their brain.

Reports on the Riepe study credited men's 54-second superiority in part to the fact that compared to women they were using more of their brain. For example, one headline read "Men really don't need to ask for directions: Men's brains specially wired for navigation, new research suggests," while another headline reassured readers that "You Know Where You Are With a Man." Yet another made a more direct allusion to the battle of the sexes by proclaiming that "Maps of the Mind Reveal Why Women Navigators Drive Men Round The Bend." Most of the stories distorted the findings and overgeneralized findings from the computerized maze to statements about men's superior ability to read and understand maps and to find their way in unfamiliar settings—though the study did not assess map-reading skills or navigational skills in natural settings.

Gray Matter and Computer Science In May of 1999, Ruben Gur[3] and several co-authors published an article in the journal *Neuroscience* reporting that a study of 40 women and 40 men found that compared to

men, women have proportionately more gray matter (GM). The men not only had a lower percentage of GM, their GM was distributed asymmetrically, with relatively more GM in the left than the right hemisphere. Women showed no asymmetries. Women and men in the study were of comparable age and education and had equivalent IQ test scores. Participants were administered verbal subtests from the revised WAIS adult intelligence scale and a vocabulary test from the California Verbal Learning Tests. They also received two spatial tests, a block design subtest from the WAIS and a Judgment of Line Orientation test, which requires subjects to identify the true vertical or horizontal of a stimulus line. Percentage of gray matter and white matter were moderately correlated with verbal and spatial performance for both women and men, that is, the more GM the better the score. Women and men had similar scores in verbal performance. Men did have higher scores on the block design test and on judging vertical and horizontal orientation of lines. However, the higher test scores on spatial tasks reported for the men were not associated with the lateral variation in GM. Men with more uneven lateral distribution of GM than other men (or women) did not score better on these spatial-perception tasks. Nor was laterality of GM associated with any of the verbal measures. Thus, the distribution of GM was not associated with any of the performance measures, any more, say, than a study of gender difference in pickle eating and in cognitive measures. Gur and his colleagues conservatively and appropriately noted that "These conclusions should be considered tentative because these correlations could be spurious, pending replication in other samples and across a wider range of cognitive measures" (Gur et al. 1999, p. 4070). Nevertheless, media accounts distorted, exaggerated, misinterpreted, and overgeneralized the findings. Media coverage forgot to mention there was no association between the distribution of gray matter and any of the measures, but instead supported a vague notion that differences in cognitive function were produced by differences in gray matter. Not only did these errors occur in the press, Gur himself eventually repeated them.

Press representations of the study and later press interviews with Gur expanded significantly on the implications and the "facts." The *Independent,* a London-based paper, reported that women have smaller brains than men, but use what they have more efficiently, thus accounting for why women and men perform equally well on IQ tests. Two days later the same

story was picked up by the *London Guardian,* and the results were said to explain why women perform better on verbal tasks while men perform better on spatial tasks, though Gur found no gender differences in verbal test scores.

A week or so later the story moved to the United States, and the *Washington Post, Buffalo News,* and *Pittsburgh Gazette* ran virtually identical stories reporting sex differences in gray matter and white matter. These stories incorrectly noted that gray matter is used for communication and white matter is used for computation.[4] This is a case where prevailing gender stereotypes, not the facts, become the basis for allocating meaning to the findings. Since stereotypes are that women are better than men in language skills, if women have more gray matter it must be associated with language and communication. Since men are thought to be better at math, then brain differences in white matter are interpreted as the anatomical basis for a math propensity. In these stories gray matter is associated specifically with communication, a stereotypic feminine quality, rather than with general intelligence, thinking, logic, or problem solving; these "tough-minded" qualities are not part of the feminine stereotype.

One might ignore these extrapolations and overgeneralizations as simply sloppy writing by reporters who understand little about science. However, in July of 2000, a full year later, the *Ottawa Citizen* carried excerpts of an interview with Gur where he elaborated on the possible social and educational implications. He noted that women's brains are structured in a way that can put them at a disadvantage when it comes to learning computer skills, despite the fact that Gur did not assess women's ability to learn computer skills. In the interview Gur further suggested that the difference in brain tissue could provide a biological reason for why so few women in North America take an interest in computer science. What the news stories imply is that having more gray matter and having it relatively evenly available in the brain makes it harder for people, or at least women, to think systematically.

Despite the flaws in such logic, there is a ready home for such "expert" reports of stereotypic gender in the general culture. The cultural desire for ordered gender differences sets a context for the formulation of research questions and for the interpretation of research findings. What passes for science is often merely a reiteration of cultural myth. The same desire provides an impetus for the media attention that gives added significance to group differences. In some cases differences are reported where none were

found. The Thornhill and Palmer thesis on rape as a product of evolution was partly granted a flurry of media attention because it is a story that easily can be seen as part of this larger cultural context. It was welcomed in a cultural context where ideas about the biological and fixed nature of sex differences are already widely accepted.

Theory, Research, and Alternative Models: An Introduction to the Rest of the Volume

Remaining chapters in this volume are organized in three major parts and address the evolutionary account of rape from the perspectives of animal behavior, ecology, evolutionary biology, cultural anthropology, philosophy, primatology, psychology, and sociology. Contributors reflect varying academic backgrounds, different research traditions, and a range of personal philosophies. None finds the evolutionary account of rape to be in any way compelling.

The first part offers a collection of additional chapters that elaborate and greatly extend the consideration of evolutionary theory. Discussion includes problems of methodology, as well as nosology and logic that plague efforts to apply evolutionary theory to human social behavior. The second part of the volume gives specific and detailed attention to the ideas, reasoning, and data relevant to the proposition that rape is the product, or by-product, of evolution as these were presented in *A Natural History of Rape: Biological Bases of Sexual Coercion*. The final part of the volume offers alternative models and frameworks that include evolutionary, psychological, and cross-cultural perspectives.

I Evolutionary Theory and Sociobiology Theory

Initial chapters raise a variety of theoretical and methodological issues for evolutionary models and pop sociobiology. Chapters 2 and 3 point to ways in which evolutionary theory can be useful to feminist analysis. Christine Drea and Kim Wallen unveil the widespread androcentric focus of much theorizing about gender relations. Using primate data, they demonstrate the significant role that females play in reproductive decisions. Females are vested with significant sexual control. They not only are active agents with respect to their own sexual behavior, but it may be argued from empirical data that female interests and strategies also have an significant role in shaping and controlling male sexual behavior. This analysis is consistent

with the observation of Patricia Gowaty in chapter 3 that feminists and evolutionary biologists have interesting things to say to each other. Gowaty points to the concepts of the environment of evolutionary adaptation (EEA) as one such fruitful area of discussion. Rather than seeing a categorical divide between "nature" and "nurture" positions, she observes that most ideas in evolutionary ecology assume that the mechanisms of heredity are not just genes, but environments, cultures, and development.

Chapters 4 and 5 address methodological concerns and the ways in which methodology is linked to theory. Stephanie Shields and Pamela Steinke discuss the distinction between proximate and ultimate explanations and the use of self-report data. For example, sociobiological explanations often make inferences about human feelings and motivations and rely on self-report data to confirm hypotheses about ultimate evolutionary causes. Shields and Steinke argue that investigations of "ultimate explanations" need to rely on data that can differentiate proximate from ultimate. Investigatory techniques or data, such as self-report, that are derived from proximate variables do not qualify as valid for testing ultimate explanations.

Tobach and Reed elaborate on these methodological problems. They point out that in retrospective "what if" accounts, much theorizing and data analysis is characterized by anthropomorphic interpretations wherein human expectations, motives, and feelings are imposed arbitrarily on animal behaviors. There also is a reciprocal phenomenon of zoomorphizing, whereby the apparent causes and effects of the behavior of other animals is taken as sufficient for the understanding of human behavior. Specific considerations are raised with respect to violence, including a review of the diverse sources of information, definitions, and data concerning rape.

Vicker and Kitcher conclude the first section and point out that behavioral and mathematical ecology have pursued evolutionary questions about behavior in nonhuman animals. They contrast this careful and painstaking work with the casual storytelling of pop sociobiology and the putative evolutionary advantages claimed for certain forms of human behavior. Vicker and Kitcher argue, along with others, that model building requires attention to the details, and mathematical modeling uncovers and refines hidden presuppositions. They further discuss the importance of intraspecific variability and the role of cultural transmission, especially in discussions of human behavior.

II Research Data and Rape

The second part contains a collection of short papers that directly address the data and theory relevant to the thesis that rape evolved as a result of natural selection and that rape therefore has a genetic component. Jerry Coyne, an evolutionary biologist, offers a no-holds-barred critique. He points out that most of the media coverage has pitted Thornhill and Palmer against feminists as science vs. politics. Coyne, instead, focuses on the science that lies behind, or does not lie behind, the evolutionary account of rape. Coyne argues that the scientific errors in this evolution-rape thesis are far more inflammatory than are its ideological implications.

Mary Koss, whose work is challenged by Thornhill and Palmer, raises points about the social construction of science and inherent flaws of measurement in every study. She focuses on the question of who exactly suffers emotionally from rape and sexual aggression. This is a key piece of scientific data, because an important source of reasoning for the rape-evolution account is that victims of rape suffer distress in accord with the degree to which rape diminishes their reproductive interests. The rape-evolution account rests to a large extent on the secondary analysis of data initially published by McCahill, Meyer, and Fishman (1979) on responses of rape survivors who made use of a Philadelphia hospital emergency room. Koss questions the relevance of this data for assessing constructs developed in the rape-evolution proposal long after the original data were collected. She further notes that the respondents of the original study represented probably only 5 percent of rape victims. She directly challenges the assessment of distress and long-lasting impact of rape as most serious among women of reproductive age with a number of empirical sources documenting distress, fear, and long-lasting impact among other groups of women.

I have indulged myself with a second chapter in this volume to give detailed consideration to the data and logistics relevant to scientifically evaluating the rape-evolution hypothesis. I first consider the hypothesis that rape is a by-product of selection for oversexed males and discuss the unexamined concepts of sexuality and gender underlying this proposition. I next consider the proposal that rape is itself an adaptation subject to natural selection. Among other key data, pregnancy rates associated with rape are reviewed, and I offer some observations on the evolutionary (social and ecological) environment where this behavior supposedly evolved. In addition, for rape to be an evolutionarily based adaptation, rapists

should differ genetically from the nonrapists *in the same category,* that is, the category of youths or of misfits *assumed* by Thornhill and Palmer to be the most likely characters to perpetrate rape.

Michael Kimmel concurs that the account of rape as the product of evolution constitutes bad science. He notes that the supposed natural conflict between males and females is based on assumptions that females, especially female primates, are coy and careful in their sexual behavior. However, primatologist Sarah Blaffer Hrdy (1977) has effectively refuted this notion. She observed that females often exhibit a natural propensity toward promiscuity, while it is males who may work hard to ensure monogamy and parental certainty for themselves. Kimmel additionally observes that the hypothesized male propensity for rape is an unacknowledged form of male bashing where all men are painted with a common brush as violent, rapacious predators.

In the final chapter of this part Elisabeth Lloyd takes issue with the public discussions of Thornhill and Palmer regarding the conflict between their position, construed by them as science, and that of feminist criticisms, construed as antiscience politics. This is the "Galileo Defense," the claim that their true conclusions are the result of excellent science, and that most critics, and especially feminists, are ignorant and politically motivated. Lloyd chooses to argue the merits of the rape-evolution proposal by carefully examining the necessary assumptions. For example, necessary assumptions would require that men have special psychological adaptations for recognizing female vulnerability, a preference for raping women of peak fertility, and a psychological adaptation to be sexually aroused by gaining physical control over an unwilling sexual partner. Further assumptions are that men have a psychological adaptation to rape wives and girlfriends if they believe their women are cheating on them and an evolved psychological tendency to be paranoid about women's claims of being raped.

All the chapters in this part are critical of the shallow and limited treatment given to the reduction of rape in Thornhill and Palmer's proposal. The rape reduction programs are trivial, and this is in itself a problem because the authors purport to be motivated by a desire to reduce this heinous act and the grief and suffering that follow from it. They offer five pages about educational programs for young men and two pages on barriers to rape, such as keeping women from any social situation that might

permit rape. Nothing in the book suggests that something needs to be done about the sense of entitlement derived from being male in a patriarchal society. Nothing suggests that it might be useful to challenge the common cultural understanding of rape as sex and of sex as overwhelming biological desire. Nothing offers a way for women to feel a greater sense of agency and entitlement. Nothing addresses the construction and limitations of traditional gender roles.

III Alternative Models

The challenge is to go beyond discussing, yet again, the limits of sociobiological storytelling and to offer ways to think about the problem that can suggest useful questions, other methodologies, and different theoretical models. Recognizing variability among individuals and among cultures is a starting point. For example, not all men engage in rape behavior, even when in positions that would permit rape. Thus, there are different developmental outcomes and variation among individuals. Some of this variation may be cultural context and learning.

Alice Eagly and Wendy Wood argue that the status of women's roles within varying cultures and contemporaneous social conditions accounts for a significant amount of variance in individual behavior patterns, romance, attraction, and gender relationships. They further argue that forms of sexual control emerge along with the development of particular socioeconomic structures and that these structures have had particular utility for men. For example, men's concern with paternity and the associated sexual jealousy is strongest under conditions of intensive agriculture, ownership of private property, patrilineal inheritance, and community stratification (Schlegel and Barry 1986; Whyte 1978). Eagly and Wood offer a re-analysis of data on mate preferences from 37 countries initially presented by David Buss and find significant cross-cultural variation in the understanding of gender and women's status. These cultural factors support a social structural account of sex differences in mate preferences. From this perspective, sex differences in behavior reflect the greater power and status associated with men's roles and from the sex-typed division of labor and of gender.

Wade Mackey argues directly against the assumption that men are less emotionally invested in the outcomes of their sexual encounters than are women. Instead he offers cross-cultural analyses supporting the

contention that men do have affiliative, nurturing orientations toward their own children and that this is a key element in the well-being of children. Absence of this supporting and affiliative connection harms the child and the community, and offers no genetic advantage to men. Mackey provides evidence from physical as well as cultural anthropology. For example, he notes that among species where there is active paternal involvement and dual provisioning of young, there is also limited physical sexual dimorphism. Notably, human evolution shows a pattern whereby sexual dimorphism decreased significantly. As dimorphism declined, it is likely that the roles of males and females were beginning to converge. He further argues that psychological traits among men (potential fathers), such as honesty, reliability, and trustworthiness, would have become increasingly salient. These traits would have been desirable not only from the perspective of the individual woman, but would have increasingly become of interest to her genetic relatives, the kin group, and eventually her larger cultural group.

Emily Martin and Peggy Reeves Sanday argue for a cross-cultural, sociological, and anthropological understanding of rape. Martin proposes that rape can be understood only in a cultural context. She reminds us that human behavior is complex, context-dependant, and often changes through time and across space. Intentional actions, such as rape, cannot be separated from the contexts in which they occur. The understanding, meaning, and significance accorded actions are derived not from biological features, but from society and culture. She points out that rape is not simply a physical "thing in the world," such as an eye with a fixed anatomy. It can be understood only as it is constructed in social discourse. Martin suggests that the "thick description" used in qualitative research is more appropriate than relying on questionable sociobiology.

In her field studies, Peggy Sanday has found that the incidence of rape varies across 95 band and tribal societies. She and other researchers have reported that rape is absent or rare in 50 to 60 percent of these groups. This finding directly undermines at least some of the support for the proposal that rape evolved among men more or less universally. Findings from these societies collectively point out an inverse correlation between the incidence of rape and the social status of women. Societies where rape is rare are characterized by significant roles of authority and power for women as managers not only of their immediate families but also as personages of consequence in society at large. Rape-prone societies are characterized by

interpersonal violence in general and by an emphasis on male dominance as part of the natural way of things and on beliefs that male dominance is important for the existence of an orderly society. Where cultural beliefs call for men to be dominant, it additionally becomes important for men to "stick together." Her accounts of gang rapes in the context of American college fraternities additionally point out that sexual gratification (if any)[5] was secondary to the celebration of fraternity bonding and group pride in the conquest of the young woman's body. Sanday's extensive and ongoing work with the Minangkabau of West Sumatra, where rape is extremely rare, has further clarified the cultural belief structures that foster peaceable relationships.

Jackie White and Lori Post offer a multivariate model of rape. Their chapter builds on White and Kowalski's (1998) integrative contextual developmental model of violence against women. The model focuses on social development and argues for the study of behavior in context. Data on violence against women, and rape in particular, are conceptualized as a function of five interacting factors proposed by the model: sociocultural (including historical, cultural, and community traditions and values); social networks (including the family and peer group); dyadic; situational; and intrapersonal. Results of the analysis support the proposition that sociocultural, socialization, and socioemotional experiences of men provide a compelling and comprehensive account of variations in men's violence toward women.

Notes

1. Kin recognition is relevant for altruism and for exploitation and has been found to be important in many other species, including other primates, squirrels, bees, and wasps.

2. It *is* unequal; it *is* political; and privilege to some at the expense of others *is* one of the consequences.

3. The news stories that referenced Gur's study include the following: Connor, S. (1999, May 18), "In brains, size doesn't matter," *Independent (London),* p. 5; (1999, May 31), "How men's and women's brains differ," *Pittsburgh Post-Gazette,* Sooner edition, p. A10; Quan, D. (2000, July 13), "Women's brains aren't wired for computer work," *Ottawa Citizen,* final edition, p. A1; (1999, May 20), Science Update: "How to pack a thinking cap: Men have bigger heads," Science Page, *Guardian (London),* p. 103; (1999, May 30), "Shades of gray and white," Science section, *Buffalo News,* final edition, p. 6H.

4. White matter is most likely to reflect (almost literally) the myelin sheath surrounding axons. It functions in part to prevent the equivalent of electrical interference when impulses are discharged along the axon. There is likely to be no functional or specific cognitive process performed in this tissue.

5. Some of the participants reported later that they could not "get it up."

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