

Sexually Explicit Media, Gender Differences, and Evolutionary Theory

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Research findings on gender differences in response to sexually explicit media¹ can be explained by theory derived from evolutionary psychology. This theoretical approach contends that how people respond to current environments is shaped by mental mechanisms that evolved in response to problems faced by our ancestors. In many respects this approach is a paradigm that may shift ways that we think and conduct research in the social sciences.

Media scholars often resist the use of the evolutionary paradigm for reasons not unique to mass media researchers, but rather characteristic of many social scientists. I will discuss two problems: (a) an overly simplistic view of evolutionary models, and (b) a distrust of ideological implications.

A primary reason many researchers resist this framework is that they have, in my view, an oversimplified and erroneous view of evolutionary models and associated concepts. Such researchers incorrectly believe that any theory that emphasizes learning, culture, or socialization must necessarily de-emphasize evolution-based mechanisms, genes, or related concepts. These are thought to be opposite ends of a continuum. Any theory that incorporates concepts derived from evolutionary theory is incorrectly viewed as suggesting that humans are "hardwired," that stimulus and response connections in humans are rigid or inflexible. Although there may be a need to beware of some simple models, such as some versions of sociobiological models that received much publicity in the 1970s (Lewontin, 1991; Rose, Kamin, & Lewontin, 1984), we should not assume that any theory incorporating evolution or genetics is necessarily a model of this type. Indeed, many inherited psychological mecha-

nisms are highly flexible and responsive to environmental stimuli and cultural or other variations.

Also suspect is the belief that biological explanations are necessarily linked to a conservative ideology that justifies the status quo as natural. In response to this concern, it is important to emphasize that references to evolutionary jargon or principles have been historically co-opted to justify such opposing ideologies as Marxism, socialism, women's liberation, women's oppression, and capitalism. As Richards (1986) notes:

though evolutionary theory is not compatible with every social and moral philosophy, it can accommodate a broad range of historically representative doctrines. Thus, in order for evolutionary theory to yield determinate conclusions about appropriate practice, it requires a mediating social theory to specify the units and relationships of concern. . . . An evolutionary approach to the moral and social environment does not inevitably support a particular ideology.
(p. 252)

Buss (1995) makes related important distinctions among the metatheory of evolution, middle-level evolutionary theories, specific evolutionary hypotheses, and specific predictions derived from such hypotheses. Although there is sufficient scientific support for the metatheory of evolution for social scientists to accept it as fact, there may also be various competing evolution-based theories, middle-level theories, and minitheories, as well as empirically testable predictions derived from them.

The naturalistic fallacy is relevant to the concern that evolutionary concepts can be used to justify certain ideologies. This fallacy assumes that because a phenomenon occurs in nature, it "ought to" be this way. This would be akin to believing that if cancer is the natural result of interactions between our physiological system and environmental influences, it is justified, and we, therefore, should not use accumulated medical knowledge to prevent it. A related fallacy would be to conflate what occurs in nature with what is inevitable. To avoid such fallacious thinking, it is worth noting that various types of power relationships between females and males are clearly within the range of human potential, but not equally desirable within a given value system.

Resistance to Evolution-Based Models in Pornography Research

Mass media scholars generally believe that their focus should be on nurture, rather than nature, because the mass media are, after all, part of the environment. Thus, we are essentially constructed by environmental or outside inputs—by the influences of family, peers, schools, the media, and other aspects of society. It is also often assumed that views that include nature as an explanation must assert that each person's brain is preprogrammed to function in a fixed way, irrespective of the environment.

Such a "social construction" view, as well as many versions of other social influence theories common in the social sciences, is illustrated by this recent introduction to an edited book on pornography:

¹ The terms *sexually explicit media*, *pornography*, and *erotica* are used interchangeably herein to refer to depictions for which a central purpose is to sexually arouse the consumer. Some writers have made meaningful distinctions among such terms, and the ability to distinguish such media from other types may reveal gender differences (e.g., it is easier to label male-oriented materials as specifically designed to be sexually arousing). This may be precisely because, as argued here, male and female sexuality mechanisms differ in the extent to which they can be separated from other aspects of social relationships.

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Biological arguments assume that what exists is supposed to exist as a result of evolution. . . . That which is normative—constructed and enforced by society through socialization of the young and through social sanctions against deviants—begins to appear as normal, that which is designed by nature. . . . In contrast to these biological arguments, many social scientists understand our sexuality to be a social construction, a fluid assemblage of meaning and behaviors that we construct from the images, values, and prescriptions in the world around us. . . . If our sexuality were biologically programmed, it would be a scientific invariant, like gravity. If gravity fails to work once, the entire theory must be revised. (Kimmel, 1990, pp. 4–5)

From the perspective of the evolutionary paradigm, Kimmel's quote reveals several misunderstandings.² He writes as if the social environment can construct a feeling, thinking, behaving person out of nothing. When he talks of construction "by society," he fails to ask who constructs society and why it is so constructed. When he indicates that "we construct from the images, values, and prescriptions in the world around us," he fails to consider who he means by "we." Is there a human nature that characterizes the "we" and provides the tools used for constructing? How and why did that nature come about? How can we better understand, predict, and affect our social environments by studying the evolved psychological mechanisms used to process, select, and construct social and other information comprising cultures? These types of questions addressed by the paradigm of evolutionary psychology are typically ignored.

The Evolutionary Framework

Evolutionary psychology applies current knowledge of evolutionary processes to understanding the human mind and behavior. Darwin's (1859, 1871) evolutionary theory posits that living organisms are formed by natural selection. Evolution is a continuous process of differential reproductive success, or fitness, whereby certain design differences are transmitted to subsequent generations.

The question is not whether evolutionary principles apply to human behavior and its psychology, but which evolutionary model is more accurate (Symons, 1992). The only alternatives offered to the metatheory that humans evolved by the same principles as other species is the belief that God created us or that we were planted here by some extraterrestrial beings (Buss, 1990). As indicated earlier, within the evolutionary framework, there are various alterna-

tives at the levels of middle-level theories and minitheories that generate testable evolutionary hypotheses and predictions. Some, for example, conceptualize the human mind primarily as a general information-processor, and others emphasize the importance of including specific psychological mechanisms³ relevant to particular domains. In recent years, there has been growing support for models emphasizing the importance of specific modules of the mind.

A comprehensive theory needs to incorporate the design of the mind, as formed by evolutionary processes, and its interaction with the physical and social environments, including the cultures created by those minds (Buss, 1990, 1995; Tooby & Cosmides, 1990a, 1990b). Using the analogy of a computer program, it is only possible to understand how the input to the program affects the output by understanding the underlying rules of the program governing how input may be processed. The human mind was designed by natural selection operating over many generations.⁴ To understand the influences of current environments, it is essential to consider the psychological mechanisms that are part of that design and are the result of an interactive blend of nature and nurture. These mechanisms process the information from our social and physical environments. They do not elicit rigid, fixed behaviors, but are typically highly sensitive to environmental inputs.

To understand emotions, thoughts, and behaviors in contemporary environments, we must analyze the function of the psychological mechanisms that evolved in ancestral environments. The mechanisms and the type of environmental input they can process are not two separable causal processes, but elements of the same evolved package (Tooby & Cosmides, 1990a). The function of psychological mechanisms cannot be understood solely in terms of current environments. Modern technological societies have created environments that are radically different in many respects from the relatively stable environment that existed during most of human evolutionary development. Although evolutionary processes continue, of course, in current environments, the processes of natural selection typically take many generations to significantly change features of the human mind. Therefore, evolutionary psychology contends that it is particularly important to historically contextualize the development of the mind within ancestral environments, because the mind's mechanisms developed to their present form in those environments and have undergone only minor changes since then (Cosmides & Tooby, 1987).

³ The concept of an *evolved psychological mechanism* refers to an organism's processes that exist in a particular form because they (or other mechanisms that reliably produced them) recurrently solved a specific problem of individual survival or reproduction in evolutionary history. Mechanisms process only certain input or information (e.g., sexual cues) and based on a decision rule result in certain output or responses (Buss, 1995).

⁴ The idea that fitness is the bottom line that resulted in the design of the mind may seem too simplistic. Consider as an imperfect analogy the statement that to understand the workings of a business in a capitalistic economy one must look to the profit motive as largely underlying all its activities. This applies even to activities that initially appear incongruous with this goal, such as giving away money to charities or sponsoring expensive events that do not have obvious benefits for the company.

² Such misunderstandings are not rare among researchers focusing on sexually explicit media. As another example, Fisher (1983) misinterprets an evolutionary perspective as suggesting that men are hypersexual and women are asexual. He believes, therefore, that "it follows that men should enjoy erotica and be aroused by it while females should show no interest or enjoyment in such material" (p. 264). This inaccurately presents a model that actually argues that gender differences exist in some conditions with a straw man model that ostensibly suggests that women do not respond to any sexually explicit media.

Researching the architecture of the mind with this paradigm helps us understand why one design was selected rather than another (Cosmides & Tooby, in press). Adaptations are responses that were naturally selected in the evolutionary history of our species. Just because a behavior may have been adaptive in evolutionary environments, and thus might have contributed to the current structure of the mind, does not mean that such a behavior contributes to reproductive success in current environments, nor does it indicate that it is desirable, moral, or inevitable. Typically, people do not consciously choose their actions in order to promote fitness. In short, we are mechanism activators, not fitness strivers (Tooby & Cosmides, 1990b).

Consider, for example, taste buds for sweetness, which evolved in ancestral environments as a way to increase the likelihood that we would eat scarce substances that provided nutritious value, for example, ripe fruit. These taste buds respond as strongly to processed sugar, which also activates our sweetness mechanisms, but this reaction may actually be harmful rather than beneficial to our health. After some limited experience with such sugars and similar substances, we may come to crave them. In a modern environment with an overabundance of artificial sweets, the craving stimulated by the sight of candies may create difficulties in maintaining good health. To understand such craving clearly requires us to examine the role of evolved psychological mechanisms as well as experience.

Variability in Human Behavior

Some critics erroneously assume that evolutionary approaches do not allow for variability. Evolutionary psychologists have generally assumed that selective pressures—natural selection favoring particular characteristics—have been essentially the same for all humans in most, but not all, domains where problem-solving adaptations have occurred, for example, in regulating heat or detecting cheaters. These human mechanisms are generally universal, that is, species-typical (Tooby & Cosmides, 1990a).

Although the mechanisms are fundamentally the same, some variability occurs in degree. For example, all humans have noses, but these differ in size and shape. These differences result from genetic variability within the species.

Mechanism differences among certain subgroups of the human species have resulted from natural selection of different solutions to adaptive problems in evolutionary history. These include some gender differences.

Environmental differences, both developmentally and contemporarily, provide different input to the evolved mechanisms. These may manifest themselves very differently, even though the underlying mechanisms are the same. For example, all humans have callous-producing mechanisms, but, depending on the environment, they may or may not have visible callouses. Other members of our species who provide a rich source of social stimulation to evolved mechanisms specifically designed for such input also are important environmental influences. Socialization is an integral part of the evolutionary paradigm.

Not only do such environmental influences contribute to variability throughout the lifespan, but the development of, and sometimes the "fixing" of, various

evolved mechanisms at certain levels (and their underlying brain neurology or circuitry) is strongly influenced by the environment, particularly at certain critical periods early in life. The evolutionary paradigm provides insights into the reasons that various mechanisms have different periods of neurological plasticity and degrees of flexibility in response to environmental input (e.g., Gazzaniga, 1992).

I should emphasize two additional points that will be particularly relevant to the later discussion of socialization as a explanation for gender differences. First, sources of variability interact, and, second, inherited differences may systematically affect how people select their environments (Plomin, DeFries, & Loehlin, 1977). For example, children of different physical size or strength may be differentially reinforced for choosing diverse strategies for dealing with conflict, for example, compromise or aggression. These early experiences may help shape lifelong patterns.

Sex Differences

Evolutionary metatheory provides a framework for predicting when gender differences are or are not expected, the direction of the differences, and why these differences are predicted—a set of testable predictions typically not made in advance by other sex differences theories (Buss, 1995). We expect males and females to have the same psychological mechanisms in those domains where natural selection has favored the same solutions to adaptive problems for all humans regardless of their gender. Correspondingly, in some domains, males have faced problems in evolutionary history that have not been identical to those faced by females. In these cases, we expect mechanisms to have evolved differently, because the identical solution for the different sexes would not have been optimal for dissimilar problems.

One of the areas where sex differences in evolved mechanisms is predicted is sexuality. In this domain, the differing natural selection processes for males and females have resulted in sexual dimorphism in relevant psychological mechanisms. These are often referred to as differing sexual strategies for males and females (Buss & Schmitt, 1993)⁵. A strategy may be thought of in the context of interactions with another, wherein one's actions are influenced by the anticipation of the other's responses and are designed to gain the maximum payoff for oneself (i.e., strategic interactions). Strategies therefore typically involve a series of points wherein decisions, guided by underlying algorithms, are made.

The psychological mechanisms governing male sexuality are not the same as those guiding female sexuality because of the different reproductive consequences of sexual behavior for the two genders in ancestral environments.

⁵ Although it is useful to broadly distinguish between male mating strategies and female mating strategies, this is an oversimplification for the sake of the core ideas discussed here. For example, it is insufficient to consider only one type of male and female mating strategy since in many species there may be alternative strategies available to each gender, depending on various factors, such as relative position within a hierarchy, ability to attract mates, and so on.

These created differences in which type of mating strategies were most adaptive for each gender (Symons, 1979). As Buss and Schmitt (1993) indicate, the concept of sexual strategies connotes "the goal-directed and problem-solving nature of human mating behavior and carries no implication that the strategies are consciously planned or articulated. . . . Mating strategies are context dependent, and in particular, highly sensitive to the temporal context of short-term versus long-term mateships" (p. 205).

Gender differences in orientation to mating strategies can be traced to the minimum parental investment required to produce an offspring (Trivers, 1972). In humans the parental investment required to produce offspring is much greater for females (e.g., 9 months vs. 9 minutes). Given that females can produce a maximum of about 20 offspring in a lifetime, having sex with a relatively large number of males is unlikely to have adaptive advantages. It is generally far better to invest more in each offspring by carefully selecting a mate with successful characteristics, one who will participate in raising of offspring. For males, having intercourse with a larger number of fertile females is likely to be correlated with reproductive success,⁶ because in ancestral environments, contraceptive devices were not available, and the upper limit for siring offspring is in the thousands. Even totally uninvested sex may, therefore, have favorable reproductive consequences (Buss, 1994). However, there are other selection pressures that are likely to have counteracted inclinations toward promiscuity, such as female selection of males who make long-term commitments and the importance to reproductive success of long-term bonding that enables nurturing of young. Also, the most reproductively effective strategy may depend on ecological conditions. Some environments might favor a quantity strategy that attempts to maximize the number of offspring, whereas other environments favor a quality strategy that involves heavier investment in fewer offspring (Draper & Harpending, 1982). Certain strategies that may have been particularly successful in many environments may have involved elements of both approaches, mixing short-term mating with multiple women with investing highly in the offspring of one or a relatively small number of females.

In light of the gender differences described above, the evolutionary model suggests that men and women differ considerably in their orientation, or in their underlying algorithms, to short-term mating. In contrast, females and males are not generally expected to differ much in their orientation toward taking advantage of long-term mating opportunities. In a species where the development of infants benefits greatly from long-term care, males' mechanisms are expected to favor taking advantage of both opportunities for a range of long-term mating (i.e., personal sex involving bonding emotions such as love) and also short-term mating. Although females are clearly capable of taking advantage of short-term

mating opportunities, and in some environmental conditions are particularly likely to do so (Thiessen, 1994), their psychological mechanisms are relatively more consonant with a long-term sexual strategy or personal sex involving some relationship context, emotional bonds, or potential ties.

One cannot consider either gender's mechanisms superior or inferior to the other (Buss, 1995). Rather, they form a co-evolved strategy, with some correspondence, but also with elements that represent the evolution-based interests of those involved. These elements either complement or compete with the strategies of others of both genders. Although one would expect considerable individual differences in some aspects of female versus male sexual strategies, they should be considered gender-linked differences, such as height, rather than gender-absolute, such as the ability to give birth. These may be described best as differences in threshold levels (Money, 1986).

Evolutionary Psychology and Pornography

I develop in this article an evolutionary model that proposes that gender differences in sexual media can be understood within the framework of sexual strategies that evolved differently (Ellis & Symons, 1990; Faust, 1980). I argue that the consumption of sexually explicit media is, in part, the result of inherited differences in evolved sexuality mechanisms interacting with environmental forces, and not the exclusive byproduct of differences in other evolved mechanisms or differences in environmental input (e.g., socialization), or both. (As noted below, it is feasible to formulate alternative evolutionary models that make such assertions.) The type of sexually explicit media more frequently consumed by males largely reflects elements of the short-term part of male sexual strategy. Sexually explicit media more frequently consumed by females reflect the relatively long-term orientation of their mating strategy.

Sexual strategies may be considered within the framework of a set of interrelated mechanisms designed to process a particular set of inputs in order to yield, under a particular set of circumstances, specific outputs. In trying to understand such mechanisms, we should consider (a) what particular inputs they are designed to read, (b) how the various elements of the mechanisms process the information, so as to (c) maximize the likelihood of intended output in the form of particular behaviors. Such understanding should provide insights not only on how the mechanisms work as constructed by natural selection, but also on how they may be capitalized on, parasitized, or "tricked" by stimuli sufficiently similar to the "intended" input that they elicit similar behaviors.

Consider again the mechanisms of taste (Churchland, 1995). It is not equally possible to raise a child to like certain bitter tastes and dislike sweetness as it is to develop the opposite preferences. However, our environments, including media advertisements for sweet candies, can influence our appetites for products such as candy that capitalize on the inclinations of our taste buds. Just as the candy industry capitalizes on the evolution-based mechanisms of taste, mass media capitalize on the evolution-based male and female mechanisms of

⁶ These generalizations are, of course, oversimplifying some complexities by implicitly assuming that everything else is kept constant. For example, females may prefer to mate with males who show signs of willingness to commit to monogamous relationships. Therefore, a man who develops a reputation for being highly promiscuous may not be chosen as a mate by some females, thereby creating a selection pressure for males who are not taking advantage of every mating opportunity.

sexuality. Although this paper focuses on sexually explicit media, I believe that this approach of considering evolved mind mechanisms will prove fruitful in analyzing many other areas of the mass media.

In current environments, we would expect the expression of sexual strategies to be moderated by interaction with other mechanisms that can override sexuality mechanisms.⁷ For heterosexual males, constraints may include the fear of venereal diseases, damage to reputation, or rejection by females; a need to find a suitable compromise with female sexual strategy in order to attract and retain a desired woman; competition and threats from other men; or limited resources. Without these constraints, sexuality mechanisms would result in relatively frequent sexual encounters with many fertile women. Some of these encounters would likely involve long-term mating, while others would be short-term. However, attraction to sexually explicit media, in contrast to sexual behavior,⁸ is not constrained to the same degree by compromises imposed by other mechanisms.

Strategies, Stages, and Associative Networks

In explaining gender differences relating to sexually explicit media, there are two interrelated constructs that may be useful if incorporated into the strategy framework. The first concept is that of stages in the sexual sequence (see Schein & Hale, 1965, for a description in many animal species). In humans, at least four stages are relevant to the present focus: (a) broadcasting of sexual attractiveness, availability, or interest; (b) making a decision regarding whether to enter actual physical contact; (c) having physical contact; and (d) deciding whether to enter similar situations. Male and female sexual mechanisms may vary at each stage. Greater female reticence, for example, may be particularly evident in the first two stages, but not necessarily once a woman has reached stage three. From the evolutionary perspective, each act of intercourse carries greater consequences for females. Thus, we would expect both the elicitation of sexual arousal and its consequences on current and potential behavior to involve a greater number of avoidance algorithms designed to prevent rash

⁷ Ellis and Symons (1990) make the same assertion, except that they point to the interaction between sexuality mechanisms and real life exigencies. In contrast, I suggest that interaction should be considered at the level of differing mechanisms.

⁸ Even when females and males engage in what appear to be identical behaviors, there may be differing underlying motives and reactions reflecting different sexual strategies. For example, Townsend (1995) studied male and female reactions to casual sex. In contrast to males' reactions, even when choosing to have short-term sex, women reported feeling emotionally vulnerable and anxious about partners' willingness to invest in a relationship. For females, having more partners was associated with a greater incidence of these feelings and thoughts, whereas for males these correlations were in the opposite directions. Women who continued having casual sex when they desired more invested sex felt exploited and degraded, even when they had liberal attitudes regarding such sex. Finally, multiple-partner females frequently tested their partners for signs that they would be willing to invest. Similarly, Glass and Wright (1992) found that men were more likely than women to justify extramarital relationships for sexual gratification alone, whereas women used more emotional justifications.

decisions that lead to more involvement. These algorithms may be experienced in the form of negative affect⁹ that can occur independently of sexual arousal. As noted below, such a model may help explain why women report more negative affect in research using erotica and are less likely than men to volunteer for studies of erotica, even when showing similar levels of arousal once they are in the study itself (Thiessen, 1994).

Associative networks are interconnected perceptions, affect, cognition, memories, and motor tendencies (e.g., Berkowitz, 1993) designed to increase the likelihood of certain actions (i.e., output) consistent with the strategy. If men are designed by natural selection to be more likely than women to take advantage of short-term mating opportunities, then they should be more easily primed by their associative networks, and the decision rules or algorithms underlying them, to attend to and to process information that leads them to engage in such behaviors. Women's associative networks should incline them to generally be more reticent than men to engage in short-term mating. We would expect attraction and responses to sexually explicit media to reflect the associative networks underlying female or male strategies. These strategies can be described as involving unconscious cost:benefit calculations conducted within the framework of the mechanisms calibrated by evolutionary processes.

Form and Content of Associative Networks

In terms of the form, the model suggests that evolutionary processes "designed" men to be more visually attracted to and aroused by sexual stimuli (Symons, 1979). This design feature is part of the relatively approach-oriented strategy that increases the likelihood that males enter situations leading to mating. Visual stimulation can occur frequently in response to seeing strangers as well as acquaintances, even from a distance. Such arousal is relatively unlikely to be accompanied in men by negative affect designed to generate caution. Women, in contrast, are expected to be relatively more attracted by auditory and tactile stimulation (Money, 1986), which is more likely to be a means of communicating a feeling and to occur with more familiar persons.

With respect to content, men are more likely than women to become aroused by physical appearance per se (e.g., the sight of a nude, shapely woman of reproductive age), the display of a sexually available mate and of sexual acts. If a male responded to such a display of a fertile, available woman by engaging in sexual intercourse, in many ancestral situations his reproductive success would be increased. Women are more likely than men to become aroused by the inclusion of the interactive elements (e.g., the desire and passion experienced by the participants) of sexuality, since simply mating because of the availability of a physically attractive partner would constitute in

⁹ In contrast, positive affect is a largely independent mechanism designed by evolution to lead to further approach tendencies. The role of negative affect is illustrated in individuals who have some specific brain damage that prevents them from "feeling bad" after making bad decisions. This results in their repeating mistakes even though they are aware cognitively of the error of their decisions (e.g., Damasio, 1994).

most environments a bad decision in the evolutionary currency of reproductive success. Desire and passions are emotions designed by evolution to signal a better mating decision, using the reproductive success criteria. Evolved female mechanisms are attuned to the emotional nuances in which sex can take place, because those nuances can provide highly relevant information regarding the advisability of sexual encounters and the likelihood of more than a fleeting encounter. Moreover, there should be less of a simple correspondence in women than in men between physical attraction or physiological arousal and a desire to mate. This prediction has been supported by research findings (Quinsey, Rice, Harris, & Reid, 1993). Evolutionary theory suggests that women should be more vigilant to potential risks and threats¹⁰ at various stages of sexual interactions. For example, females should be particularly sensitive to elements such as context. Men's sex mechanisms make them more responsive to sexual display in various contexts. For men, becoming sexually aroused can be gratifying even in a context that does not stimulate feelings of desire for another person (e.g., viewing sexual scenes alone as compared to with an established sexual partner).

Evidence Pertaining to the Evolutionary Paradigm

Before summarizing findings of other survey and experimental studies yielding data consistent with the evolutionary analysis presented here, I believe it is particularly interesting to examine the correspondence between the content of sex strategies and the recurring formulas of sexually explicit media. Buss and Schmitt (1993) described the major evolutionary adaptive problems leading to the development of male and female sexual strategies. Here is a brief summary: In ancestral environments, a man's reproductive success would have increased (other things being equal) if he had been able to (a) gain sexual access to a larger number of women, particularly women who were highly fertile, and (b) minimize commitment and investment in any single woman, so as to enable access to other fertile women. Those males who evolved mechanisms that

¹⁰Such vigilance and its interaction with other aspects of associative networks are well illustrated in the recent findings of Lewis and Linder (1995). These investigators reasoned, on the basis of evolutionary theory, that the adaptive response for females encountering a stranger is different than that for males. They reasoned that when males encounter an attractive female, the dominant response elicited is sexual attraction. Therefore, if they see such a female when they are more generally aroused, their attraction should be increased further. For females, however, it was expected that the dominant response when encountering an unfamiliar male would involve an assessment of the potential threat posed. Therefore, that perception of threat should be heightened when generally aroused. In three studies, these investigators had male and female subjects rate two targets (a stranger and a current dating partner) under different levels of physiological arousal. In support of a dominant response perspective, males' sexual attraction toward a stranger increased with arousal. However, females rated unfamiliar male targets as less friendly and more threatening when females' arousal was heightened. As expected, females' rating of a familiar target, their current mate, was not adversely affected by arousal.

Table 1. Similarity between evolutionary adaptive problems and content of sexually explicit media

Males' Short-Term Mating Problems	Content, Male-Targeted Sexually Explicit Media
(1) Partner number problem	⇒ (1) Numerous women depicted
(2) Sexual access to women problem	⇒ (2) Women eager to "service" men sexually
(3) Identifying fertile women problem	⇒ (3) Youthful women with "shapely" bodies (cues associated with fertility)
(4) Minimizing investment problem	⇒ (4) Casual sex without investment
Females' Long-Term Mating Problems	Content, Female-Targeted Sexually Explicit Media
(1) Problem of identifying man who is able and willing to invest in her	⇒ (1) High status man who desires and eventually loves only her
(2) Physical protection problem	⇒ (2) Man is powerful, often "brutish" toward others
(3) Problem of identifying man with good parental abilities and skills	⇒ (3) Man becomes kind and gentle with her by end of story

Note: Arrows show correspondence between adaptive problems and media content.

increased their sexual mating with a larger number of fertile, sexually accessible women were more likely to become our ancestors who, in turn, transmitted such evolved mechanisms to subsequent generations of male offspring.

Our female ancestors did not face these same problems, and the same strategy would not have had the same reproductive consequences. Partly because men's reproductive ability is less highly correlated with a particular age, a strategy that emphasized short-term mating with many young men could actually have been quite disadvantageous. This may have been particularly the case if men's sexual strategy had been inclined to monopolize female sexuality and might have resulted in aggression against promiscuous females (Malamuth, 1996; Smuts, 1995; Wilson & Daly, 1992). Instead, females' adaptive problems included identifying men who had the ability (e.g., relatively high status) and willingness to successfully invest in them and their offspring. It was also important that such men provide physical protection, particularly during the period of increased vulnerability associated with pregnancy and child rearing. At the same time, it was important to mate with a man who possessed such attributes as sensitivity and kindness, which suggest potential parental abilities and the skills to help nurture offspring.

The left-hand side of Table 1 lists these major evolutionary adaptive problems leading to the development of male and female sexual strategies. The top part, describing males' mating problems, is directly taken from Buss and Schmitt (1993); the bottom part, describing females' adaptive problems, is based on their article, but is modified here for stylistic reasons. The right side of this table presents the recurring content themes of male- and female-oriented sexually explicit media. The male-oriented content is taken from the analysis conducted by Brosius et al. (1993) and the female-oriented from Faust (1980). Other

content analyses have shown similar findings (e.g., Cowan, Lee, Levy, & Snyder, 1988; Garcia & Milano, 1991; Palys, 1986; Smith, 1976; Winick, 1985; Yang & Linz, 1990; Zillmann & Bryant, 1982).

The table reveals an uncanny correspondence between the major adaptive problems defined by evolutionary psychologists and the content of sexually explicit media described by media researchers. Today's sexually explicit media geared to males correspondingly portray primarily casual sex with numerous, accessible women who display fertility cues through their age, body shape, and so on. In contrast, media geared to, and primarily consumed by, women feature content corresponding to the major adaptive problems faced by our female ancestors. The formula recurrently found here depicts the struggles involved in finding and securing a relatively involved relationship with a high status, that is, dominant, man who has the ability and (eventually) the willingness to be devoted to her, to successfully compete with other men and to be a good parent.

It is important that research pertaining to the evolutionary paradigm not only demonstrate the type of correspondence described above, but also test the prediction that the type of physical attributes recurrently featured in sexually explicit media are likely to have been associated with reproductive success in ancestral environments. Considerable evidence supports this assertion (see Barber, 1995, for a review), but I will consider briefly only two examples, both of body shape. Singh and associates (Singh, 1995; Singh & Luis, 1995; Singh & Young, 1995) have shown that the type of "waist-to-hip" ratio featured regularly in male-oriented sexually explicit media such as *Playboy* (i.e., a 0.70 ratio) corresponds exactly to the ratio found most attractive by men of various ethnic and cultural backgrounds. Moreover, such a ratio is the most reproductively optimal across the range of female body weight and size. This criterion is revealed in such relevant dimensions as current estrogen or testosterone hormonal levels, other health characteristics predictive of fertility, and actual current fertility rates. In addition, there is considerable support for the hypothesis that humans, just like many other species, consciously and unconsciously perceive subtle variations in body symmetry, and that these are predictive of attractiveness. Such symmetry is an index of heritable resistance to parasites and viruses (e.g., Thornhill & Gangestad, 1994)¹¹ Although I am not aware of studies examining this dimension in sexually explicit media portrayals, one of many testable predictions that can be generated from the evolutionary model is that a

relatively high degree of body symmetry will be found in the models chosen for such portrayals.

Although in future studies it will be important to test additional novel predictions derived from the evolutionary model, considerable current data fit very well with this model's analysis of sexually explicit media. These reveal many gender differences, including differences in the motivation to have access to sexual stimuli, the type and form of content that is more gratifying, the effects of context and novelty, and approach and avoidance reactions:

Many survey and laboratory studies focusing on various media, including magazines, movies, and the Internet, find that, in comparison to women, men are more likely to seek out (even when alone or with a same-sex friend), to consume more regularly, to be more sexually aroused by, to have more favorable attitudes towards, and to react with less negative affect to portrayals featuring nudity of the opposite sex or sexual acts devoid of relationship context, or both (Abelson, Cohen, Heaton, & Suder, 1971; Bryant & Brown, 1989; Kinsey, Pomeroy, Martin, & Gebhard, 1953; Hsu et al., 1994; Laumann, Gagnon, Michael, & Michaels, 1994; Mann, Sidman, & Starr, 1971; Rimm, 1995; Stauffer & Frost, 1976). For example, magazines featuring female nudity and the simple "conjunction of bodies" (Faust, 1980) sell about 35 million copies a month, primarily to men; similar magazines featuring male nudity have much lower circulation, with many of the consumers being gay men (e.g., Janus & Janus, 1993). In contrast, men are much less likely to consume novels that "... explore all the emotional nuances that transform the simple conjunction of bodies" (Faust, 1980, p. 152). Those are read primarily by many millions of females each month (e.g., Graham, 1995; Krentz, 1992; Lawrence & Herold, 1988; Perse, 1994). When presented with a story containing both erotic and romantic elements, women recall the romantic elements better than men, who primarily remember the erotic content (Geer & McGlone, 1990).

Men are more likely to be motivated to have access to sexual stimuli as an end in itself, reporting wanting to "see great bodies," and to use them to "release sexual frustrations" and as a stimulant for masturbation (Perse, 1994). In the laboratory, too, seeing a slide of a sexually explicit act is more likely to function as a positive reinforcer for men than for women (Griffitt & Kaiser, 1978). After exposure to various explicit films, men are more likely to indicate that they would want to see more sex films (Mann et al., 1971). Even when equating sexual arousal levels in response to a sexual film, men are much more likely than women to indicate that they would participate in a similar experiment in the future (Saunders, Fisher, Hewitt, & Clayton, 1985). Indeed, the approach orientation is shown in volunteering data, where among men, there do not appear to be differences between those who volunteer for erotica studies and those who volunteer for nonsexual studies. Among women, self-selection is evident; those volunteering for erotica research are more erotophilic (i.e., they exhibit more favorable reactions to sexually explicit media) and have less negative affect to sexual films (Saunders, Fisher, Hewitt & Clayton, 1985) than those volunteering for nonsexual studies. Women are less likely to volunteer for studies involving sexually explicit media, regardless of whether de-

¹¹ One of the misconceptions about the evolutionary paradigm is that it only predicts cross-cultural uniformity. This is due to the false belief, discussed earlier, that this approach assumes rigid mechanisms not sensitive to environmental variations. In fact, the evolutionary paradigm can be used to specify which types of mechanisms are likely to be relatively rigid and which types are likely to be highly flexible. For example, research on perceptions of attractiveness of women's bodies has shown that, in predictable ways, some cues, such as "waist-to-hip" ratios, are relatively cross-culturally invariable. Other cues show considerable historical and cross-cultural variability. The relationship between perceptions of women's attractiveness and body weight, for example, has varied considerably as a function of such factors as food availability in various geographical regions. Similarly, the relationship with body symmetry has varied as a function of the frequency of pathogens in different regions (Gangestad & Buss, 1993).

scribed as hard- or soft-core, but they choose more often than men to view a "loving" erotic film as compared to a hard-core "lustful" film (Kenrick, Stringfield, Wagenhals, Dahl, & Ransdell, 1980). Furthermore, consistent with a short-term mating strategy involving numerous women, men become more aroused sexually than women by films showing novelty consisting of different actors, but less aroused by the same actors performing different acts (Kelley & Musialoski, 1986).

Not only are there gender differences in the content of what is sought out, remembered, and responded to sexually, but men are generally more aroused than women by visual portrayals (Symons, 1979). In keeping with the argument that an increased orientation to visual stimulation will increase the likelihood of eliciting approach tendencies, national survey data show that men "think about sex" much more frequently than women (Laumann et al., 1994). Differences in degree of arousal by visual means are also supported by various other sources of data, including the far more frequent visually based sexual pathologies in men (Money, 1986).

Mosher and Maclan (1994) included in their study films specifically developed to appeal to women in an attempt to show that women could respond just as favorably to visual sexual stimuli as men. To try to accomplish this, however, they had to select different content (mirroring the typical formulas) rather than simply reversing the content of the films to feature the opposite sex. For example, a film geared for women included scenes in which "... the insecurities of the man and woman were portrayed through soliloquies and their feelings were discussed" (p. 103). As expected, women were more responsive to the films specifically made to suit female audiences than to conventional X-rated videos intended for men. The reverse preference was found for men. However, men reported more sexual arousal than women by both types of films, possibly because this was a visual medium, and the content even of the female-oriented films included considerable stimuli likely to arouse men (e.g., nudity). Overall, in comparison to men, women also experienced more negative affect, less positive affect, and became less absorbed in the films. In the 48 hours after watching the films, the men masturbated more and experienced more orgasms. In keeping with other studies, men reported more frequent weekly masturbation, sexual fantasy, and the use of pornography during masturbation as typical behavior. It seems, then, that even when the content is controlled by using films designed to appeal to women, there are considerable gender differences in the uses of and gratifications derived from sexually explicit visual media.

Contradictory Evidence?

In contrast to the studies reporting findings consistent with the evolutionary model presented here, there are a few studies that at first glance appear to contradict expected predictions. These report that when men and women are exposed in the laboratory to casual sex themes, women are as sexually aroused as men. Interestingly, reviewers writing for general audiences (e.g., Athanasiou, 1993), undergraduates (e.g., Hyde, 1994), and academics (e.g., Fisher, 1983;

Lott, 1987; Griffitt, 1987) typically emphasize only these few arousal studies, despite the existence, as described above, of powerful data showing gender differences in various responses. This may be attributable to an ideological commitment to emphasize lack of gender differences in the belief that their existence somehow justifies discrimination, or to the lack of the theoretical model that can explain the data patterning across the variety of measures.

It is instructive to consider what research conditions might yield data that could be appropriately used to challenge the evolutionary model developed here, and the extent to which the studies emphasized by these reviewers meet these criteria. First, it would be important to obtain a representative sample of males and females. This is particularly important in light of the findings that female volunteers for erotica research differ from volunteers for nonsexual studies, whereas the same difference is not found in men. Since the differences predicted are gender-linked¹² rather than gender-absolute, it is always possible to select a nonrepresentative sample that would fail to show the expected differences or even show the opposite effect. While most studies involving sexual stimuli have to rely on volunteers, these studies differ greatly in the extent to which the samples are representative. In addition, attrition rates must also be considered, particularly in multiple session research, because initially representative samples may become less representative. Second, the medium of presentation is relevant, since the evolutionary model predicts that studies using visual media would be more likely to reveal differences than studies using auditory or written depictions. Third, content is important. Researchers would expect simple sexual displays, such as physical nudity or sexual presentation, to yield the largest differences, followed by those showing noncontextualized physical sex (e.g., lacking any plot or information about emotions such as desire, interest). Fourth, the number of presentations and the type of novelty portrayed are relevant. Initial curiosity and the novelty of a first exposure to sexual acts may lead to relatively high levels of sexual arousal for both men and women. However, men are relatively more likely to continue to be aroused upon repeated exposure to sexual stimuli (as long as they are not the same stimuli). Fifth, researchers must consider the context of presentation. If the sexually explicit media are presented in the presence of strangers, particularly those of the opposite gender, one would expect larger gender differences. In contrast, married couples are less likely to differ in their responses to sexually explicit media when such stimuli are presented to the couple (e.g., Byrne & Lamberth, 1971). Finally, the type of dependent measures used is relevant. Negative affect would be likely to reveal the strongest gender differences,

¹² Although the focus here is not on the processes that result in gender differences, I must make brief mention of the role of hormones. Men and women generally have the same hormones, but often have considerably different amounts of certain hormones (e.g., testosterone vs. estrogen). Even before birth, the entire brain is awash in sex hormones. Hormones can exert powerful influences, particularly during certain critical periods, on brain development and activity (Money, 1986). Leitenberg and Henning (1995) describe considerable evidence that hormonal differences contribute to gender differences in sexual fantasies. (For an evolutionary-based analysis of sexual fantasies, see Ellis & Symons, 1990.)

followed in decreasing order by future participation in similar research, positive affect, and sexual arousal. Although these dimensions (i.e., sample, content, medium, context, number and novelty of presentations, and type of dependent measures) are listed separately, they may have an interactive rather than a simple additive impact because the relevant mechanisms may cause the information to be processed interactively. Other factors, such as age (which is correlated with hormone levels), also could influence the degree of gender differences expected.

Space constraints do not permit a detailed discussion of all the studies mentioned by reviewers to support their assertions about a lack of gender differences. Suffice it to say that virtually none of the studies meet the criteria described above. Consider, for example, Heiman's (1975a, 1975b, 1977) frequently cited research. This study (a) used highly unrepresentative samples of volunteers, and the female participants were distinguished by their high rates of sexual activity; (b) had an unusually high attrition rate for females (22%) versus males (7%); and (c) used sexual stories described as devoid of romance that, in fact, contained many elements of the formulas used in depictions typically designed for female audiences. For example, the following are typical excerpts from Heiman's (1975b) Erotic Tape 1: "he was really easy to talk to . . . the kindling caught and soon the room was warm and noisy with crackling logs . . . they continued to talk and soak in the fire's warmth . . . their bodies snuggle together creating more warmth" (pp. 299-300).

Cultural Socialization as Explanation

The gender differences described here are often explained by the socialization of our cultural roles and institutions that create differing social environments for females and males. These environments could include messages from parents, peers, media, and other cultural institutions, including messages about the dangers inherent for girls in sexuality. They could also include cultural barriers, such as laws and norms that channel males and females into different careers, lifestyles, or behavioral patterns. Although such cultural factors are obviously important in explaining many gender differences, such a model would need to consider the reasons that certain roles, norms, and laws emerge or are enacted. As Barkow (1987) emphasizes "culture is not a 'thing,' . . . It is not a cause of anything. To describe behaviour as 'cultural' tells us only that the action and its meaning are shared and not a matter of individual idiosyncrasy" (p. 142). Using culture to explain gender differences may move the level of analysis from the individual to that of the group, but it cannot function as the end point. It does not address the question of why humans have recurrently developed certain types of cultures, including ones in which the social environments differ for males and females. For example, why have humans created cultures that pressure males and females to behave different sexually? Why has patriarchy been a common type of social construction, but matriarchy has been rare?

Explanations that emphasize culture could be advanced within the evolutionary paradigm by addressing such questions. They might or might not invoke

gender dimorphism in evolved sexuality mechanisms. One model might hypothesize that the different social environments for males and females emerged as an indirect result or byproduct of gender dimorphism in evolved mechanisms or characteristics other than the type of sexuality mechanisms emphasized here. These could include gender differences in physical strength and size, which are phenomena well explained by evolutionary theory. Some boys, for example, may discover early in life that their relatively high physical strength is a powerful tool. This awareness may contribute to a bolder orientation in novel situations, which affects later willingness to take risks. Such a relatively bold orientation may increase volunteering for erotica studies, feelings of ease in allowing oneself to become sexually aroused, and experiencing little negative affect in risky situations. For girls, their relative size and strength may result in a different pattern of experiences resulting in a generally more cautious orientation.

The viability of such models requires clear specification of the mechanisms for and explanations of socialization rather than simply referring to the idea of socialization. These researchers must be able to account for the wide range of findings, rather than for only a segment at a time. It is not apparent, for example, how the "caution explanation" noted above would explain the variance in genres women and men find appealing, as well as the correspondence between these formulas and the adaptive problems faced by our ancestors. How do explanations that rely on socialization alone account for gender differences in responsiveness to media forms (e.g., visual)? Also, there are close similarities between findings in the area of gender differences in sexually explicit media and data in other areas (e.g., self-generated sexual fantasies, visits to strip shows, fetishes, sexual jealousy.) that provide data supporting gender dimorphism in sexuality mechanisms (Buss & Schmitt, 1993; Symons, 1979). How are these explained by a model that does not include such dimorphism? Whether informed by an evolutionary paradigm or not, researchers arguing against sexual dimorphism need to address these questions.

Effects of Exposure

Although an evolution-based perspective can provide us with a relatively clear model regarding the functions of sexually explicit media (e.g., why they exist in both content and form), predictions regarding the effects of such media portrayals are far less clear. Some evolution-based minimodels may argue that a desire for various types of male-oriented pornography and female-oriented romance novels simply reflects sexuality mechanisms, and that exposure to these media is a form of fantasy that has no impact on subsequent responses. Others may argue that the content of such exposure is likely to influence subsequent reactions in a variety of ways. They might suggest that since mass media did not exist in our ancestral history, our mechanisms for discriminating fantasy versus reality may not be sufficiently sharp to totally avoid any long-term impact of exposure on our feelings, thoughts, and behavior. Knowledge of the relative power of potentially counteracting relevant mechanisms (e.g., discriminating

fantasy from reality versus assessing the degree of availability of sex partners in our environments) is quite limited. As is the case with many evolution-based competing hypotheses, the issue needs to be put to appropriate empirical tests.

Gender Differences and Personal and Public Policy

This discussion should not be misunderstood as justification for inequities in personal relationships or in public policy. For example, some men could use knowledge of the evolutionary basis for gender differences to justify being unfaithful in their monogamous relationships. Others may realize that when they are attracted sexually to women other than their long-term mates, it does not reveal any inadequacy in their relationship but would occur with any similar relationship, no matter how wonderful. If they have the desire to maintain a long-term relationship, they may use this realization to feel more comfortable in their relationship and take protective steps to insure that they do not behave in ways that in current environments may be contrary to the relationship's interests.

In writing about the inaccurate denial of gender differences in various areas of research, Eagley (1995) states:

The common description of empirical research as showing that sex-related differences are small . . . and inconsistent with gender stereotypes arose in part from a feminist commitment to gender similarity as a route to political equality. It also arose from piecemeal and inadequate interpretations of the relevant empirical research. (p. 155)

Although Eagley did not include reactions to media portrayals in her survey, I believe that such conclusions also apply to sexually explicit mass media stimuli. Although it is important to recognize that there indeed is a danger that some of the theory discussed here could be misused by misogynistic groups in society, it may also be used by feminists. Knowing the conditions that facilitate different types of relations may provide power to facilitate the type of social relations considered more desirable. Just as we have created buildings, warm coats, and nutritional guidelines to enable us to live comfortably in environments that our bodies were not designed for, knowledge of the mechanisms of the mind can help us develop psychologically in ways that can enrich our social lives. Those who stubbornly blind themselves to such knowledge may be undermining the goals they have set for themselves, individually or as a group (Brown, 1991; Buss, 1995; Smuts, 1994; Tooby & Cosmides, 1992). Indeed, whereas early feminist theorizing attempted to minimize gender differences, more recent feminist theorists often have accepted the existence of important gender differences (Moore, 1995). As Crosby (1992) notes, "The challenge is not to purify women's studies or the academy, but to question constantly our most powerful concepts" (p. 143). Questioning the origin of certain gender differences in media uses and gratifications can enable researchers to develop

models that incorporate knowledge about the origins and architecture of the mind. Such models can lead to more successful interventions for those desiring changes.

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