

A Cross-Cultural Analysis of the Behavior of Women and Men: Implications for the Origins of Sex Differences

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This article evaluates theories of the origins of sex differences in human behavior. It reviews the cross-cultural evidence on the behavior of women and men in nonindustrial societies, especially the activities that contribute to the sex-typed division of labor and patriarchy. To explain the cross-cultural findings, the authors consider social constructionism, evolutionary psychology, and their own biosocial theory. Supporting the biosocial analysis, sex differences derive from the interaction between the physical specialization of the sexes, especially female reproductive capacity, and the economic and social structural aspects of societies. This biosocial approach treats the psychological attributes of women and men as emergent given the evolved characteristics of the sexes, their developmental experiences, and their situated activity in society.

What causes sex differences in human behavior? If this question could be answered with a simple scientific principle, it would not continue to be debated in psychology and other social and biological sciences. When psychologists have addressed this causal question, they have primarily considered the immediate, proximal causes for sex-differentiated behavior, such as gender roles and socialization experiences (see Deaux & LaFrance, 1998; Ruble & Martin, 1998). Many psychological theories of sex differences have been silent with respect to ultimate, distal causes such as biological processes, genetic factors, and features of social structures and local ecologies.¹

To produce adequate explanations of sex differences, psychologists need to relate the proximal causes of psychological theories not only to predicted behaviors and other outcomes but also to the distal causes from which these proximal causes emerge. Understanding the distal causes of sex differences constrains psychological theorizing to the extent that it enhances the plausibility of some proximal causes and diminishes the plausibility of others. In this article, we show how psychologists' theories of the immediate predictors of sex-differentiated behavior can be located within

broader models that account for the origins of these proximal states and processes.

The task of explaining the origins of sex differences challenges scientists because theories of origins involve multiple levels of analysis in which proximal causes are embedded within more distal causes. Integrating knowledge from these differing levels of causality therefore requires interdisciplinary investigations that do not rely solely on constructs at a psychological level. The integrative approach of the present article places psychological theories of sex differences within a broad cross-cultural framework. We evaluate the plausibility of alternative origin theories of sex differences, given the evidence of some cross-cultural universals that appear to exist in men's and women's behavior as well as the evidence of cross-cultural variation. To take into account the widest possible range of social arrangements in which human behavior occurs, we draw our conclusions about cross-cultural variability mainly from anthropological investigations of female and male behavior in nonindustrial societies.

As a first step in our analysis, we briefly describe the theories that psychologists have used to account for the origins of sex differences. We then review anthropological research on the cross-cultural uniformity and variability of sex differences. In this review, we focus on two aspects of sex-typed social arrangements that have been extensively studied in anthropological research: (a) the division of labor between women and men and (b) the greater status and power of men than women that often emerges in the control of women's sexuality and other aspects of their behavior. From the evidence that this review provides, we argue that a biosocial theory of the origins of sex differences is most adequate

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¹ In this article, the term *the sexes* denotes the grouping of people into female and male categories. The terms *sex differences* and *similarities* are applied to describe the results of comparing these two groups. The term *gender* refers to the meanings that societies and individuals ascribe to female and male categories. We do not intend to use these terms to give priority to any class of causes that may underlie sex and gender effects.

to account for the cross-cultural patterning of male and female behavior.

Psychological Theories of the Origins of Sex Differences

Psychologists have not been completely silent about the issue of ultimate causation. Most theorists who have considered the origins question have taken an essentialist or a social constructionist perspective (see Anselmi & Law, 1998; Bohan, 1993). Essentialist perspectives emphasize the basic, stable sex differences that arise from causes that are inherent in the human species such as biologically-based evolved psychological dispositions.² In contrast, social constructionist perspectives emphasize the variation in sex differences across social contexts that emerges from the meanings of male and female within particular contexts. After reviewing these two approaches to explaining the basic causes of human sex differences, we present our own integrative biosocial origin theory.

Essentialist and Social Constructionist Accounts of Sex Differences

Although a number of scholars have offered essentialist accounts of particular aspects of sex-differentiated behavior (e.g., Rossi's, 1984, analysis of parenting), we confine our analysis to evolutionary psychology in this article because it is the most developed essentialist theory of the origins of a broad range of sex differences (e.g., Buss & Kenrick, 1998; Geary, 1998; Mealey, 2000). According to evolutionary psychologists, the essential attributes responsible for sex-differentiated social behavior are the sex-specific psychological dispositions that presumably were built into the human species through genetically mediated adaptation to primeval conditions (Buss & Kenrick, 1998). Evolutionary psychologists reason from evolutionary principles, especially from assumptions about sexual selection pressures (Trivers, 1972), and link current sex differences in behavior to the different reproductive pressures that they maintain that ancestral males and females encountered in the history of the human species (Buss & Kenrick, 1998; Gangestad & Simpson, 2000). Caporael (2001) thus labeled this approach "inclusive fitness evolutionary psychology" (p. 608) and characterized it as an application of sociobiological principles to human behavior.

Evolutionary psychologists reasoned that the sexual selection pressures that shaped psychological sex differences emerged from an asymmetry in the sexes' parental investment. Women, as the sex that invested more in offspring (e.g., through gestation and nursing), became choosier about potential mates than men, the sex that invested less in offspring. As a result, ancestral men competed with other men for sexual access to women, and men's evolved dispositions came to favor aggression, competition, and risk taking. Ancestral women developed a proclivity to choose mates who could provide resources to support them and their children. Some evolutionary psychologists have argued that sexual selection in humans also emerged from women's competition with other women to attract marriage partners and men's selection of long-term mates for fecundity and faithfulness (e.g., Geary, 1998). Furthermore, because of females' internal fertilization, ancestral males could not be certain about the paternity of their offspring. To increase paternity certainty and gain fitness benefits from investing resources in their biological descendants, ancestral males developed a disposition to control women's sexuality and to experience

sexual jealousy. In summary, for evolutionary psychologists, much of the sex-differentiated behavior that occurs in contemporary societies emerges from these evolved psychological dispositions that are "fossils" of the selection pressures that shaped the human species in the evolutionary past (Buss & Kenrick, 1998, p. 983).

Contrasting sharply with evolutionary psychology are social scientific theories that treat sex differences as a social construction. Mead (1935, 1949/1977) provided early advocacy for this approach by arguing that culturally defined sex is an arbitrary, "artificial distinction" (Mead, 1935, p. 322). Mead's (1935) well-known conclusion from her observations of behavior in three societies was that

many, if not all, of the personality traits which we have called masculine or feminine are as lightly linked to sex as are the clothing, the manners, and the form of head-dress that a society at a given period assigns to either sex. (p. 280)³

From this perspective, gender has no logic whereby predictable patterns emerge cross-culturally. Instead, gender is constructed within cultures in response to the particulars of the local situations and histories.

Constructionist traditions of theorizing took root throughout the social sciences and reflect the influence of many scholars (see Gergen, 2001b). Within psychology, this approach has been expressed in postmodernist analyses of the variety of meanings of male and female within and across societies (e.g., Bohan, 1993; Gergen, 2001a; Hare-Mustin & Marecek, 1990). Psychological constructionists consider the gender system in a society to be a product of relations between people and the language that they use to describe their world. The social inequalities inherent in the language (e.g., use of male pronouns as generic) frame societal understanding of male and female and thereby produce and maintain gender inequality. These constructionists expect few traitlike sex differences that are uniform across contexts, and they have interpreted psychological research findings as supporting this position (e.g., Bohan, 1993). From this viewpoint, biological differences between the sexes do not produce any general patterns of psychological sex differences. For example, Marecek (1995) maintained that biological differences do not "have a single, fixed meaning and salience . . . from one culture to another" (p. 162). Any impact of biology thus emerges in its social meaning.

In sociology, social constructionist scholars emphasize societal role assignments and self-selection into social roles as the primary determinants of behavioral sex differences (e.g., Lorber, 1994). As explained by West and Zimmerman (1987), men and women *do* gender as a set of sex-typed behaviors that they learn to display in social interaction. Also, considerable research in anthropology is compatible with these social constructionist themes—for example, E. Martin's (1987) analysis of masculinist assumptions in medical textbooks and Sered's (1999) analysis of the symbolism by which religions have maintained patriarchal social structures. Across

² A variety of analyses that postulate sex differences in behavior or personality in limited domains, such as that of Gilligan (1982), have sometimes been labeled as *essentialist* (e.g., by Bohan, 1993). However, these theories do not consider the ultimate origins of the sex differences they postulate and therefore are not considered in this article.

³ The data on which Margaret Mead based these and other claims have been extensively questioned, and controversy continues about the validity of her observations (e.g., Côté, 2000; Freeman, 2000).

these social science disciplines, constructionist theorists incorporate the general assumptions of cultural relativism (see Stein, 1996) and do not acknowledge cross-cultural universals. Instead, they highlight variability in the behavior of men and women across contexts and cultures.

Although the social constructionist themes that span the social sciences are loosely connected, they offer a distinct perspective on the origins of sex differences. As articulated by Geertz (1973, 1974), an anthropologist whose ideas contributed to this tradition, a central assumption of constructionism is that attempts to identify universal laws of behavior and culture have met with little success and have generated false "reductive formulas" (Geertz, 1974, p. 29) that purport to account for cultural patterns. From this view, gender is a construction in response to local contexts, and little can be gained from a search for cross-cultural regularities in sex differences. In this article, we use this strong version of constructionism to address the question of the origins of sex differences.

Despite these many contrasts between evolutionary psychology and social constructionist perspectives, some evolutionary psychologists also recognize that sex differences vary according to context. Contextual variation in evolutionary psychology theorizing emerges in "conditional universals" that reflect contingent evolved dispositions, with alternative forms of a disposition triggered by particular environments and developmental experiences. These contingent dispositions are thought to be a product of the variable environments of the human species during the period when it emerged in its modern form. Contingent behavioral patterns proved to be adaptive because the optimal fitness-producing behaviors shifted reliably with environmental changes (Gaulin, 1997). For example, assumptions about contingencies are important features of Buss and Schmitt's (1993) analysis of the strategies of long-term versus short-term mating and Gangestad and Simpson's (2000) and Geary's (2000) analyses of the strategies of mating versus parenting. As others have noted (e.g., Caporael, 2001), this approach assumes that the various phenotypic possibilities for behavioral tendencies are preformed in the genes and that environmental factors merely evoke them.

Evolutionary psychologists also endorse the abstract principle that environmental factors such as culture and developmental experiences can shape the expression of evolved dispositions. However, they have given limited attention to variation of sex differences in response to individual, situational, and cultural conditions, except insofar as these factors are assumed to trigger alternate forms of contingent evolved dispositions. Although evolutionary psychologists recognize contextual influences on sex differences in the ways that we have indicated, most social constructionists do not give any priority to biologically grounded human constancies. One exception is Mead (1935), whose early cross-cultural work emphasized the arbitrariness of the assignment of activities to each sex. However, in later years Mead (1949/1977) acknowledged a number of across-society constancies that presumably reflect innate characteristics of humans. These constancies include a division of labor whereby women bear children and men develop and elaborate the structure in which children are reared. In Mead's later view, this structure emerged to make masculine contributions comparable in importance to feminine reproductive contributions, and this social system underlies men's greater need for achievement and the higher prestige attached to their occupations.

Biosocial Model of the Origins of Sex Differences

In this article, we develop a biosocial theory of sex differences and similarities that blends essentialist and social constructionist perspectives. This theory focuses on the interactive relations between the physical attributes of men and women and the social contexts in which they live (Eagly, 1987; Eagly & Wood, 1999). This biosocial perspective shares with social constructionism an emphasis on the social roles of the sexes and the embeddedness of these roles in social and ecological contexts. Specifically, sex differences in social behavior arise from the distribution of men and women into social roles within a society. In current industrial and postindustrial economies, women are more likely than men to assume domestic roles of homemaker and primary caretaker of children, whereas men are more likely than women to assume roles in the paid economy and to be primary family providers (Reskin & Padavic, 1994; Shelton & John, 1996). In addition, the sexes tend to be concentrated in different paid occupations (U.S. Bureau of Labor Statistics, 2001). Unlike classic functional theorists (e.g., Parsons & Bales, 1955), we do not assume that these roles of women and men necessarily are mutually exclusive or have particular expressive or instrumental content. Instead, we assume that these roles change in response to alterations of the domestic and nondomestic tasks typically undertaken by each sex.

The different placement of men and women in the social structure yields sex-differentiated behavior through a variety of proximal, mediating processes. One such process is the formation of gender roles, by which people of each sex are expected to have psychological characteristics that equip them for the tasks that their sex typically performs. These gender roles emerge from the productive work of the sexes; the characteristics that are required to carry out sex-typical tasks become stereotypic of women and men. To the extent that women more than men occupy roles that involve domestic activities (e.g., cooking, provision of emotional support), the associated skills, values, and motives become stereotypic of women and are incorporated into the female gender role. To the extent that men more than women occupy roles that involve economically productive activities (e.g., resource acquisition, construction of goods for exchange), the associated skills, values, and motives become stereotypic of men and are incorporated into the male gender role. Gender roles, along with the specific roles occupied by men and women (e.g., provider, homemaker), then guide social behavior (see Eagly, Wood, & Diekmann, 2000). This guidance is mediated by various socialization processes (e.g., Bussey & Bandura, 1999; Carlo, Koller, Eisenberg, Da Silva, & Frohlich, 1996; Ruble & Martin, 1998) as well as by the social psychological processes of expectancy confirmation (Deaux & Major, 1987) and self-regulation (e.g., Cross & Madson, 1997; Gabriel & Gardner, 1999; Wood, Christensen, Hebl, & Rothgerber, 1997). Although we assume that these processes are important to the proximal mediation of sex-differentiated behavior, we do not review them in this article.

Biological processes, especially hormonal changes, also are implicated in the performance of social roles. The sensitivity of hormonal processes to the demands of social roles has been demonstrated by studies showing that testosterone levels in male participants rise in anticipation of athletic and other competition and in response to insults, presumably to energize and direct their physical and cognitive performance (e.g., Booth, Shelley, Mazur, Tharp, & Kittok, 1989; Cohen, Nisbett, Bowdle, & Schwarz, 1996;

Gladue, Boechler, & McCaul, 1989). Hormonal changes, particularly increases in cortisol, also are implicated in initiation of the parental role. Such changes in mothers accompany childbirth and evidently stimulate nurturing (Corter & Fleming, 1995; Fleming, Ruble, Krieger, & Wong, 1997). Although some of these hormonal effects are presumably sex specific and emerge because of the activating effects of sex-typed hormones, other hormonal changes are common to both sexes. For example, fathers' anticipation and vicarious experience of childbirth appear to stimulate hormonal changes in estradiol, cortisol, and prolactin, parallel to the changes that occur in mothers, as well as a drop in testosterone (Berg & Wynne-Edwards, 2001; Storey, Walsh, Quinton, & Wynne-Edwards, 2000). We assume that such biological processes work in concert with psychological processes, such as sex-typed social expectations and self-concepts, to orient men and women toward certain social roles and to facilitate their performance of these roles.

In the present biosocial theory, these various proximal causes of psychological sex differences in turn arise from a set of distal causes that define the positions of women and men in the social structure. The most important distal determinants of sex-typed roles within a society are (a) the essential sex differences represented by each sex's physical attributes and related behaviors, especially women's childbearing and nursing of infants and men's greater size, speed, and upper-body strength and (b) the contextual factors represented by the social, economic, technological, and ecological forces present in a society. Physical sex differences, in interaction with social and ecological conditions, influence the roles held by men and women because certain activities are more efficiently accomplished by one sex. It can thus be easier for one sex than the other to perform certain activities of daily life under given conditions. The benefits of this greater efficiency emerge because women and men are allied in complementary relationships in societies and engage in a division of labor.

The Possibility That Sexual Selection Has Similar Effects on Bodily Dimorphism and Psychological Sex Differences

Our biosocial model does not assume that any sexual selection pressures that contributed to physical dimorphism between the sexes are major influences on sex-typed psychological attributes such as men's aggressiveness and competitive dominance. Our view contrasts with evolutionary psychologists' accounts in which men became more aggressive than women because sexual selection pressures yielded a reproductive advantage for males who were more aggressive and dominant than other males as well as bigger and stronger (e.g., Buss & Kenrick, 1998; Geary, 2000). Males' competition for mates and the consequent selection pressures that are assumed by this theory would emerge primarily in species with polygynous mating systems, in which some males can have multiple mates while others have none.

Raising questions about these assumptions, comparative research on primate species is consistent with our idea that in humans psychological sex differences do not necessarily covary with physical ones or reflect the same causal antecedents. For example, Plavcan and van Schaik (1997a, 1997b) reported strong relations between the intensity of male-male competition and the magnitude of sex differences in body weight and canine tooth size across 86 anthropoid primate species.⁴ Yet, these researchers also showed that the magnitude of body weight dimorphism in humans is "low" within this grouping of species (Plavcan & van Schaik,

1997a, p. 351). Humans also have minimal canine dimorphism. These data might be regarded as evidence that humans evolved with minimal competition between males and a monogamous rather than a polygynous mating system, both of which are consistent with humans' low operational sex ratio (i.e., the ratio of adult males to sexually available females, Wrangham, Jones, Laden, Pilbeam, & Conklin-Brittain, 1999). However, this and other conclusions from such comparisons across primate species are undercut by the considerable range of social behavior among species with low levels of dimorphism. Noting this variability, Plavcan (2000) concluded that "modest or low degrees of canine or size dimorphism can be found among species with a wide variety of mating systems and competition levels" (p. 338). Thus, in relation to other primates, humans' physical dimorphism is small in magnitude, and such levels have unclear implications for male aggressiveness and mating patterns.

An additional reason to question the view that dispositional aggression or other psychological tendencies evolved by the processes that produced size dimorphism follows from evidence that sex differences in size are generated through selection pressures on females as well as males. For example, although Plavcan and van Schaik (1997b) showed that male-male competition in primates is correlated with body weight dimorphism, they concluded that "it is virtually certain that interspecific variation in weight dimorphism is at least partly a function of variation in female body size" (p. 55). In support of this view, the lesser size dimorphism as hominids evolved from the earlier *Australopithecus* to *Homo* was due to an increase in the size of females relative to males (McHenry & Coffing, 2000). Specifically, the fossil evidence revealed that the mean female body weight of four *Homo* species was 1.53 times that of the mean from three australopithecine species, whereas mean male body weight increased by a factor of only 1.21 (McHenry & Coffing, 2000). Evolutionary pressures toward larger female size and lesser dimorphism may have derived from the sexes' convergence in their resource use (Frayer & Wolpoff, 1985) or the increase in available food energy from the invention of cooking (Wrangham et al., 1999). Also relevant to increased female size and other physical changes in human evolution is the pressure on females to accommodate to the longer gestation period and the larger-brained fetuses characteristic of *Homo* compared with *Australopithecus* (Brace, 1999; Ruff, 1995). Additionally plausible, at least at some points in hominid evolution, are pressures toward smaller female size that may have derived from smaller females' greater resistance to resource stress as well as their earlier maturation limiting their growth but producing earlier breeding (e.g., Fedigan, 1992; Karubian & Swaddle, 2001; R. D. Martin, Willner, & Dettling, 1994). Thus, it appears that human size dimorphism likely arose from a variety of selection pressures on females in addition to any pressures on males.

⁴ Interpretation of the relation between physical dimorphism and competition is compromised to some extent by the use of different indicators of competition across species. Plavcan and van Schaik (1997b) classified all pair-bonded species as having low male-male competition because such a pattern would be consistent with the predictions of sexual selection theory. Thus, low levels of competition in their analysis represent a heterogeneous category composed of those primate species with low intensity and low frequency of male aggression toward other males along with those who established pair bonds.

In summary, research with primates reveals that the extent of sexual dimorphism found in humans is not associated across species with any particular level of dispositional aggression or mating strategy. Furthermore, in the history of the human species, sexual dimorphism has been controlled in part by pressures on female size. For these reasons it is inappropriate to interpret size dimorphism as an indicator that specific evolutionary processes associated with sexual selection theory (i.e., male-male competition) produced particular human sex-differentiated evolved dispositions or mating systems. Moreover, as we show in this article, it is not necessary for a theory of the origins of psychological sex differences to adopt as its central assumptions the sexual selection processes featured in evolutionary psychology.

Three Contrasting Origin Theories

In summary, the three theories that we have reviewed on the origins of sex differences in human behavior provide divergent accounts of the distal causes that are responsible for contemporary behavioral sex differences. To illustrate the distinctive features of these theories, we note that all three can be applied to explain a well-established sex difference in human societies, the tendency for men and not women to hunt large game in societies that rely on hunting for subsistence (Murdock & Provost, 1973). In evolutionary psychology, men's hunting emerged from sexual selection processes (Geary, 1998). One component of this argument is that ancestral men's size and strength enabled their success at hunting. The second component, critical to assumptions about heritable psychological traits, is that hunting yielded fitness-related benefits for men in the form of mating opportunities enabled by gifts of meat and the provisioning of hunters' children. These advantages fostered a psychological disposition in men to acquire meat and other valued, scarce resources in competition with other men. In contrast, the social constructionist analysis of hunting evaluates how the cultural meanings associated with hunting in particular societies encouraged men, but not women, to engage in this activity. In this spirit, C. J. Adams (1990) analyzed the symbolic and linguistic links between men and hunting (e.g., man the hunter) and between masculinity and meat (e.g., meat and potatoes as hearty, he-man food). Finally, from our biosocial perspective, men were likely to assume the role of hunter within certain social structures and local ecologies to the extent that hunting could be more efficiently accomplished by men than women. Men's greater efficiency at hunting could reflect their greater physical size, strength, and speed as well as the conflict between hunting and women's reproductive activities of bearing and nursing infants.

Cross-Cultural Investigations of Uniformity and Variability in Sex Differences

We now proceed to evaluate the plausibility of psychologists' assumptions about the origins of sex differences by reviewing cross-cultural studies that have examined sex-typed social behaviors across broad samples of human societies. As evolutionary psychologists also have argued (e.g., Buss, 1989; Geary, 2000; Kenrick & Keefe, 1992), cross-cultural studies provide the best insight available into the variability in human social organization with respect to sex and thereby provide important clues concerning the essential and the socially constructed components of sex differences.

The comparative studies of societies in our review are based on ethnographic records of nonindustrial societies that have been archived and made available for cross-cultural analyses (see Ember & Ember, 2001). Several cross-cultural samples were organized by George P. Murdock, including the *Ethnographic Atlas* of 1,264 societies (Murdock, 1967) and the *Atlas of World Cultures* of 563 societies (Murdock, 1981), and all of these samples include precoded variables. Especially widely used is the Standard Cross-Cultural Sample, a set of 186 societies selected to be representative of the distribution of societies across world geography and to be documented by sufficient ethnographic records (Murdock & White, 1969). By selecting culturally dissimilar societies for this sample, anthropologists designed it to minimize the spurious associations that might emerge in cross-cultural investigations from the sharing of traits across neighboring societies through diffusion or common histories.

The data that underlie these cross-cultural samples are the ethnographic records of anthropologists who visited the societies and recorded their observations. The investigations in our review typically report summaries of the researchers' coding of various aspects of these ethnographic records. Cross-cultural researchers established criteria for coding categories on the variables of interest and then proceeded to place each society in a category on each variable for which sufficient ethnographic records were available. The codings relevant to our present interest are assessments of the activities performed by men and women within the reviewed societies and of societies' socioeconomic systems and local ecologies.

The hypotheses tested in the present review concern the extent and form of cross-cultural uniformity and variability in sex-differentiated behavior. In general, the sex differences that emerge uniformly across societies despite substantial diversity in their economic, environmental, and technological attributes suggest essential biological and psychological attributes of humans. The sex differences that emerge more variably suggest dispositions that are less essential or that depend for their expression on moderating factors that vary across societies.

Predictions of Social Constructionist Theory

Particularly important to establishing the plausibility of social constructionist claims is evidence of considerable variability in sex-typed behavior across societies. If sex differences take particular form because they are embedded in specific social contexts, they would differ considerably with variation in societal arrangements. Social constructionists thus anticipate limited cross-cultural uniformity that suggests essential sex differences. Furthermore, given the range of contextual factors presumed to be associated with sex differences, certain patterns of sex differences across societies are compatible with this perspective. In particular, given that power and status are important determinants of gender within societies, findings that sex differences vary with the power relationships within societies are congenial to social constructionist views. For example, power imbalances favoring men would be expected to influence sexual behavior, resulting in phenomena such as rape and sexual harassment directed by men toward women (e.g., Lorber, 1994).

Predictions of Evolutionary Psychology

The cross-cultural patterning of sex differences in behavior also provides a test of some of the principles of evolutionary psychology. These investigators have maintained that psychological adaptations that are unique to men or women can be identified through an overall pattern of sex differences across societies that reflects early humans' attempts to maximize fitness in the context of sexual selection pressures in early environments (e.g., Buss, 1989; Geary, 1996; Kenrick & Keefe, 1992; Wilson & Daly, 1992). Especially for sex-typed evolved dispositions that are held to be "universal or near-universal" (Buss, 1998, p. 421), evolutionary psychologists anticipate a coherent pattern across societies of behaviors that correspond to these dispositions. The specific nature of these activities might vary with social and ecological factors so that, for example, competition between men would emerge in relation to those skills and resources that define success within the wider culture (Geary, 1998).

Evolutionary psychologists assume that the activities of men across societies reflect competitive acquisition of resources in order to attract women, especially reproductively valuable women, given women's evolved preference for mates who can provide resources to support them and their children (Buss, 1996; Buss & Kenrick, 1998). In cross-cultural research, women's reliance on men should be reflected in men devoting greater effort to the activities that produce a society's subsistence, although the specific activities that are relevant to subsistence will vary across societies. In addition, men's desire to be certain about paternity and to acquire defensible resources should emerge in an overall cross-cultural tendency for them to control women's sexuality (Wilson & Daly, 1992). For example, Geary (1998) claimed that "male sexual jealousy appears to be a near universal influence on the dynamics of male-female relationships" (p. 148). Also, men's evolved dispositions to acquire resources and to control women sexually and women's disposition to seek men with resources should be expressed in gender hierarchies of power, status, and resources that are universal or near-universal features of human social organization (Buss, 1996).⁵

In discussing how sex differences may vary with societies' socioeconomic development, evolutionary psychologists have taken into account the extent to which contemporary environments match the early environments in which humans evolved (e.g., Crawford, 1998; Pérusse, 1993). These *matching* theories highlight the extent to which people in a society are presented with cues that are the same as those of the environments in which humans' characteristics evolved. If a society's cues match those of the primeval environments, the effects of evolved dispositions on behavior should be the same as they were in these early environments. Pérusse (1993) reasoned further that evolved dispositions can be derailed by mismatches generated by technology and other developments in industrial and postindustrial societies. In an empirical test of this idea, Pérusse demonstrated that men's social status, which he interpreted as reflecting an evolved disposition toward dominance that emerges from sexual selection pressures, was associated in nonindustrial societies with men's reproductive success in terms of greater numbers of children. However, in postindustrial societies the positive relation between men's status and their reproductive success was obscured, presumably by developments such as contraception. In general, matching theorists reason that developments in more complex societies have derailed

the effects of some sex-typed evolved dispositions on behavior, and therefore the simpler societies should provide the strongest, most consistent evidence of evolved sex-typed dispositions. However, Crawford (1998) also argued that for at least some adaptations the relevant developmental and contextual cues in modern societies probably do match those in the earlier environments of adaptedness and that the social relations typical of these modern societies can accommodate to the full expression of evolved dispositions. This reasoning suggests that in the present review some sex-typed evolved dispositions will be evident across simpler and more complex societies.

Predictions of Biosocial Theory

According to our biosocial analysis, consistency across societies should be found in the performance of activities most closely enabled or constrained by sex-typed physical attributes and reproductive activities. In this view, sex-differentiated social arrangements emerge because women's childbearing and nursing of infants enable them to efficiently care for very young children and cause conflict with roles requiring extended absence from home and uninterrupted activity. Similarly, men's greater speed and upper-body strength facilitate their efficient performance of tasks that require intensive bursts of energy. Thus, the cross-cultural pattern of each sex's activities should reflect women's reproductive roles and men's size and strength.

The biosocial analysis also anticipates considerable variability in sex-typed activities. In this view, sex-typed behavior emerges from the efforts of biologically specialized individuals to maximize the rewards and minimize the costs of the outcomes available to them within a particular society and local ecology. Specifically, behavioral sex differences should vary systematically across cultures with societal and ecological conditions that diminish or enhance the impact of reproduction on women's activities or of size and strength on men's activities. For example, in societies that practice early supplemental feeding of infants, women should be freed to perform some tasks characteristic of men in other societies.

From this biosocial perspective, patriarchal social structures reflect the fit between the biological specialization of the sexes and the activities that yield status within a society. To the extent that men and women are biologically specialized to efficiently perform different activities, the sex that can more readily perform the activities that yield status and power is advantaged in a gender hierarchy. Thus, patriarchy is not a uniform feature of human societies but instead emerges to the extent that, for example, women's reproductive activities conflict with the behaviors that

⁵ The predictions about sex differences across cultures are less clear for the sex-typed evolved dispositions that evolutionary psychologists maintain are expressed contingently depending on the features of current environments that match the environments of evolutionary adaptedness (e.g., Buss & Schmitt, 1993; Gangestad & Simpson, 2000). Although we were not able to test these contingent patterns in our review, we note that, even for these kinds of evolved dispositions, the overall organization of sex differences across cultures should reflect the fitness outcomes associated with the presumed sexual selection pressures in early environments. Thus, contingent sex-typed evolved dispositions are not likely to significantly modify the effects of the universal dispositions that we test in this article with our review of the cross-cultural literature.

yield status in a society. Finally, given the cross-cultural variability in sex differences that is anticipated by our biosocial model, it is likely that extensive socialization is required to orient boys and girls to function differently insofar as they are expected to occupy different social roles within their society.

Cross-Cultural Testing of the Origin Theories

Although evolutionary psychology and our biosocial model offer sharply different explanations, the overall pattern of sex differences in the cross-cultural literature may prove in some instances to be congruent with both approaches. For example, we noted above that both analyses can account for the tendency across societies for men rather than women to hunt large animals. The critical test of these analyses therefore lies in the pattern of moderating variables that emerges across societies. In particular, the cross-cultural evidence would counter evolutionary psychology perspectives if the behavioral sex differences assumed to have emerged from sexual selection pressures on humans' ancestors occur in limited contexts unlikely to correspond to early environments, such as societies with modern developments (e.g., complex economic structures). Such a pattern would suggest that evolutionary psychologists have inappropriately interpreted attributes of contemporary relations between the sexes as reflecting essential psychological features of men and women that evolved in primeval environments. In contrast, the cross-cultural evidence would counter our biosocial model if women's reproductive activities and men's size and strength did not have the predicted effects on behavior across societies in response to the social, economic, and ecological conditions that diminish or enhance the impact of these biological influences. Finally, if few systematic cross-cultural regularities could be discerned, it would be fair to conclude that male and female behavior originates in socially constructed responses to the particulars of local contexts.

Cross-Cultural Research on the Division of Labor

We now proceed to review the cross-cultural studies that are most germane to examining the stability and variability in sex differences in behavior. Then, we consider the extent to which the patterning of behavior across societies corresponds to each of the theoretical perspectives we have considered. This review is organized according to the two main principles that anthropologists have shown underlie the activities of men and women when they are viewed across societies (e.g., Ember, 1996; Mukhopadhyay & Higgins, 1988). The first principle is the existence of a division of labor by sex and the second is patriarchy, or the greater power, status, and access to resources possessed by men than by women in many societies. In this article, we treat the division of labor and patriarchy separately because they appear to be relatively independent (e.g., Leacock, 1978). This independence was demonstrated empirically in Broude's (1990) analysis of 93 nonindustrial societies from the Standard Cross-Cultural Sample (Murdock & White, 1969). She defined a society's division of labor as the tendency for productive tasks to be performed by one sex and not the other (e.g., only men work metal, only women make baskets). The extremity of this division between male and female labor was essentially unrelated to patriarchy across societies, with *patriarchy* defined as the extent to which the women of a society lacked power, control, and authority and were regarded as inferior to men. In our review

of cross-cultural evidence, we first consider the division of labor and then patriarchal social arrangements, including the sexual control of women, a behavioral pattern that is important to the evolutionary psychology account of sex differences.

Universality and Variability in the Division of Labor

The cross-cultural literature provides strong evidence of the universality of a sex-typed division of labor. This division of tasks can be merely a casual arrangement whereby hunters (primarily men) kill animals for the food and other products that they yield and nonhunters (primarily women) gather food and undertake hearth tasks and infant care. In other societies, the division of labor involves explicit designation of each sex's tasks and the appropriate socialization experiences to equip children to assume sex-typed roles. Given this pattern of divided labor, many anthropologists have concluded that the division between male and female tasks is an essential feature of human social organization in the sense that it either reflects innate attributes of the human species or is a widely shared social convention (e.g., Bradley & Moore, 1996; Mukhopadhyay & Higgins, 1988; but see Leibowitz, 1983).

The form of the division of labor across societies can be seen in Murdock and Provost's (1973) classic analysis of men's and women's productive activities in the Standard Cross-Cultural Sample. A partnership between the sexes in the performance of tasks of daily living was evident in the finding that some productive activities were carried out exclusively or primarily by men and others by women (see also Murdock, 1937; Schlegel & Barry, 1986). As shown in the left half of Table 1, the activities that were performed exclusively or predominantly by men included hunting large aquatic fauna, smelting ores, metalworking, lumbering, and clearing land. Additionally, political leadership and warfare emerged as activities performed almost exclusively by men in Whyte's (1978) analysis of 93 nonindustrial societies. The far right columns in Table 1 display the activities that were performed mainly by women, and these included preparation of vegetal foods, cooking, and water fetching.

The cross-cultural literature also provides evidence of variability in the specific activities undertaken by men and women across societies. Murdock and Provost (1973) identified a substantial minority of tasks as "swing activities" because in some societies they were responsibilities mainly of men, in other societies mainly of women, and in others were performed interchangeably by both sexes. As can be seen in Table 1, these swing activities included bodily mutilation, crop planting, harvesting, crop tending, and burden carrying. Although few activities were assigned exclusively to one sex or the other when considered across cultures, the division of labor is evident in that, within societies, most activities were performed primarily by one sex. Sanday (1981a) estimated that the incidence of activities that were performed interchangeably by the sexes within societies ranged from 0% to 35% of the total set of activities studied.

We now give more detailed attention to cross-cultural findings concerning providing resources and caring for children. These two behavioral domains are particularly relevant to testing the evolutionary psychology assumption that selection pressures in early environments underlie men's orientation to provide resources and women's decisions concerning child care (e.g., Buss & Kenrick, 1998; Geary, 2000; Kenrick & Luce, 2000; Mann, 1992).

Table 1

Average Percentage of Male Participation in Activities in Societies From the Standard Cross-Cultural Sample

Predominantly masculine activities	Index (%)	Quasi-masculine activities	Index (%)	Swing activities	Index (%)	Quasi-feminine activities	Index (%)
Hunting large aquatic fauna	100	Butchering	92.3	Generation of fire	62.3	Fuel gathering	27.2
Smelting of ores	100	Collection of wild honey	91.7	Bodily mutilation	60.8	Preparation of drinks	22.2
Metalworking	99.8	Land clearance	90.5	Preparation of skins	54.6	Gathering of wild vegetal foods	19.7
Lumbering	99.4	Fishing	86.7	Gathering small land fauna	54.5	Dairy production	14.3
Hunting large land fauna	99.3	Tending large animals	82.4	Crop planting	54.4	Spinning	13.6
Work in wood	98.8	Housebuilding	77.4	Manufacture of leather products	53.2	Laundering	13.0
Fowling	98.3	Soil preparation	73.1	Harvesting	45.0	Water fetching	8.6
Making musical instruments	97.6	Netmaking	71.2	Crop tending	44.6	Cooking	8.3
Trapping	97.5	Making rope and cordage	69.9	Milking	43.8	Preparation of vegetal food	5.7
Boatbuilding	96.6			Basketmaking	42.5		
Stoneworking	95.9			Burden carrying	39.3		
Work in bone, horn, shell	94.6			Matmaking	37.6		
Mining and quarrying	93.7			Care of small animals	35.9		
Bonesetting	92.7			Preservation of meat or fish	32.9		
				Loom weaving	32.5		
				Gathering small aquatic fauna	31.1		
				Manufacture of clothing	22.4		
				Pottery-making	21.1		

Note. Data are from Tables 1–5 of "Factors in the Division of Labor by Sex: A Cross-Cultural Analysis," by G. P. Murdock and C. Provost, 1973, *Ethnology*, 12, pp. 207–210. Copyright 1973 by the University of Pittsburgh Press. Reprinted with permission. Each index represents the average percentage of male participation in each activity, as calculated by Murdock and Provost (1973) from 185 societies of the Standard Cross-Cultural Sample (Murdock & White, 1969). Each index was calculated for a given activity such that each society received a weight indicating whether the activity was exclusively male (1.0), predominantly male (0.8), equally performed by both sexes (0.5), predominantly female (0.2), or exclusively female (0). The weights were summed across societies in which the activity was performed and then divided by the number of societies. Murdock and Provost identified the four clusters of activities on the basis of this index and the variability in the index across geographic regions. The swing activities were more variable than the quasi-masculine or quasi-feminine activities, which were more variable than the strictly masculine ones.

Provision of resources. Men's tendency to provide resources can be evaluated with investigations of the contributions of men and women to subsistence (e.g., gathering, hunting, fishing) in nonindustrial societies. These studies reveal that the contribution of each sex varies greatly with the types of resources available in different regions of the world. For example, Ember's (1978) analysis of 181 foraging societies revealed that in approximately 60% of the societies in Sub-Saharan Africa and 50% of the societies in the Insular Pacific, gathering is the most important subsistence activity. In these societies, women were the primary gatherers, and they contributed more than men to subsistence. However, hunting and fishing were important subsistence activities in the societies in East Eurasia, North America, and South and Central America; in only 1% of these societies were women found to contribute more than men to subsistence. Because the majority of Ember's (1978) sample was composed of North American societies, aggregating across societies yielded a strong tendency for men to contribute more than women to subsistence (i.e., in 83% of these societies). Aronoff and Crano (1975) examined subsistence in a broader sample of 862 societies, which included societies that engaged in intensive agriculture and animal husbandry as well as those that relied on foraging. This investigation determined that women contributed, on average, 44% of the food produced within societies, with this contribution ranging from 32% in the Circum-Mediterranean region to 51% in the Insular Pacific (see similar data in Schlegel & Barry, 1986; Whyte, 1978).

The conclusion that the relative subsistence contribution of the sexes varies with the food acquisition strategies typical of a society also emerged in Kaplan, Hill, Lancaster, and Hurtado's (2000) detailed estimates of the calories acquired per day by men and women in 10 foraging societies. These researchers attempted to

generate precise estimates of the daily production of meat, roots, fruits, and other food by, for example, aggregating data on the edible weight of foodstuffs acquired in each society. Women produced the majority of calories in two of the three societies in which gathering was the primary subsistence activity, whereas men produced the majority of calories in the six societies in which hunting was the primary subsistence activity and in the one society in which hunting and gathering were codominant.⁶ To evaluate more precisely the relation between women's contribution to subsistence and food acquisition strategies in the nine societies in Kaplan et al.'s sample for which data were available, we determined that the correlation between the percentage of daily calories provided by women and the percentage of calories produced from nonmeat sources was .94 ($p < .01$). Although Kaplan et al. emphasized the aggregate tendency for men to provide more calories than women in these societies, their data and other studies reveal that women contribute as much or more than men in societies that depend on gathering as a primary means of subsistence.

This empirical evidence of variability across societies in the sex that is the primary food provider challenges other, more impressionistic analyses that assumed a universal role for men as provider (e.g., Gilmore, 1990; see also Cohen, 2001). Such conclusions

⁶ We determined the primary subsistence activities in these societies from the percentage of calories obtained from gathering, represented by collection and extraction, versus hunting (see Table 3 of Kaplan et al., 2000). Because foraging of small animals and some insects was classified as hunting (K. Hill, personal communication, April 24, 2001), this breakdown differs from some other anthropological analyses.

have not taken into account the full range of evidence from foraging societies.

Child care. The cross-cultural record also is informative about the relative contribution of men and women to child care. To some extent, the demands of child care are linked to childbirth patterns within a society. Family size varies considerably with a society's economic system and is higher in agricultural societies than in foraging or horticultural groups (e.g., Bentley, Goldberg, & Jasienska, 1993). Yet, considerable variability is apparent even among foragers. Across four foraging groups, Bentley (1996) reported that the average age at which women gave birth to their first child ranged from 18 to 22 years, the length of time infants nursed ranged from 2 to almost 4 years, the mean number of children per woman ranged from 5 to almost 10, and the mean interbirth interval ranged from 2.1 to 3.7 years (see also Hill & Hurtado, 1996). Despite this variability in childbirth patterns, most women in nonindustrial societies appear to have borne children and lactated throughout their reproductive years and menstruated considerably less frequently than women in industrialized societies (Harrell, 1981; Strassmann, 1996).

Mothers' responsibility for child care lessened as children matured and was greatest with infants, presumably because of the importance of lactation for infant feeding (Barry & Paxson, 1971; Crano & Aronoff, 1978; Weisner & Gallimore, 1977). Although evaluations of child care in the Standard Cross-Cultural Sample have estimated that mothers almost always provide more infant care than other people, in only about half of the societies was care of infants exclusively by the mother with others having only minimal roles (see Table 2). Moreover, in early childhood, interpreted as the period between the child's development of walking and the ages of 4 or 5, mothers were never the exclusive or almost exclusive caretakers (see Table 2). Instead, young children were

cared for principally by their mothers in only about one quarter of the societies, and in the majority of the societies, young children were away from their mother half or more of the time. Thus, across societies, child care was not the sole province of mothers, and especially after infancy, mothers shared this responsibility with others.

Older children performed child care tasks in many nonindustrial societies. Beginning at young ages, children carried their siblings for substantial portions of the day, gathered and prepared food, and performed household maintenance activities (Zeller, 1987). Indeed, older children, especially older girls, were the primary caretakers and companions during early childhood in 28% of the nonindustrial societies reviewed by Weisner and Gallimore (1977; see also Weisner, 1996). Older maternal relatives also were an important resource to assist with child care and provisioning (Hawkes, O'Connell, Blurton Jones, Alvarez, & Charnov, 1998; Hurtado, Hill, Kaplan, & Hurtado, 1992). For children beyond infancy, fathers often contributed substantially to child care, at least for male children (Barry & Paxson, 1971; Crano & Aronoff, 1978), and they often acted as disciplinarians (Broude, 1995). Finally, to some extent the adult community as a whole took some responsibility for socializing children in many nonindustrial societies (Broude, 1995). These patterns of maternal care supplemented with care provided by others were confirmed by Ivey's (2000) careful documentation of child care among the Efe, a foraging group in the Democratic Republic of the Congo. Using a time-sampling design, Ivey recorded the duration of all caretaker interactions with 20 infants of slightly over 1 year of age. Mothers provided a mean of 59% of the total care time, with the remaining care undertaken by others.

Summary of cross-cultural patterning of division of labor. The research that we have reviewed reveals that a universal feature of nonindustrial societies is a sex-typed division of labor or coordination between men and women in the performance of daily life tasks. This division is evident in that, within societies, the majority of tasks were performed primarily by one sex. However, which sex performed a particular task varied substantially across societies. The allocation of specific tasks across societies appears to be flexible, with the majority of tasks not uniquely associated with one sex. Yet, across societies some activities were almost always performed by men (e.g., hunting of large animals), and other activities were almost always performed by women (e.g., cooking of vegetal food).

The data also revealed systematic patterns of sex-typed contributions to subsistence and child care. Although men on the average contributed more to subsistence than women in nonindustrial societies, women contributed a substantial amount (e.g., Aronoff & Crano, 1975, estimated 44%). Furthermore, the relative contributions of the sexes varied with the local ecology, and women contributed more than men in societies dependent primarily on gathering. For child care, mothers predominated in the care of infants, but they substantially shared the care of young children with others in the family and the community. Fathers contributed to child care more than to infant care, but their contributions were almost universally less than those of mothers (Crano & Aronoff, 1978).

Explanations for Consistency in the Sex-Typed Division of Labor

The sex differences we reviewed from the cross-cultural record challenge the social constructionist account of sex differences. The

Table 2
Importance of the Mother and Other Caretakers During Infancy and Early Childhood, As Rated From Ethnographic Sources

Coding categories	Societies (N = 186)	
	n	%
Infancy		
Almost exclusively by mother	5	3.1
Principally mother; others have minor roles	81	50.0
Principally mother; others have important roles	63	38.9
Mother provides half or less of care	10	6.2
Mother's role is significant but less than all others combined	2	1.2
Most care except nursing is by others	1	0.6
Practically all care, including nursing, is by others	0	0
Early childhood		
Almost exclusively by mother	0	0
Principally mother; others have important roles	36	26.4
Child spends half or less of the time with mother	60	44.1
Majority of time is spent away from mother	38	27.9
Practically all the time is spent away from mother	2	1.5

Note. Data tabulated from Barry and Paxson (1971), Table 1, Column 13, based on the societies of Murdock and White's (1969) Standard Cross-Cultural Sample. Infancy information was unavailable for 24 societies, and early childhood information was unavailable for 50 societies.

strong evidence of some universal sex differences, especially in the existence of a division of labor and the consistent assignment of some activities to one sex, argues against a strict constructionist view in which sex differences are merely the product of particular contexts and interactions.

The evidence from the cross-cultural record also challenges evolutionary psychology accounts. Women's substantial overall contributions to subsistence and their role as primary providers in most gathering societies raise questions about some of the essentialist assumptions of evolutionary psychology, especially that men evolved a disposition to acquire resources and women evolved a disposition to seek men with resources to support them and their children (Buss & Kenrick, 1998). These psychological dispositions suggest a universal or near-universal tendency for women to rely on men for subsistence. Although men's main role in industrialized economies has been to provide resources in the nuclear family, in which the wife is engaged primarily in domestic work (Bernard, 1981), this pattern is far from universal in nonindustrial societies.

In addition, evolutionary psychologists' assumptions about the implications of maternal care for sex-typed dispositions warrant scrutiny because of evidence that mothers substantially share child care responsibilities with other family and community members, especially after infancy. This variability in maternal involvement raises questions about theories assuming that women became biologically and psychologically specialized to avoid overt aggressive reactions because selection pressures favored mothers who avoided danger for themselves and their children (Campbell, 1999; Taylor et al., 2000). The cross-cultural findings suggest a more limited role for maternal involvement because a variety of caregivers are likely important in children's survival, particularly beyond infancy.

The explanation offered by our biosocial model is similar to classic anthropological approaches in that it considers the division of activities between the sexes to be a product of environmental and social conditions in conjunction with the sex-typed physical differences of women's pregnancy and lactation and men's greater size, muscle-to-fat ratio, oxygen-carrying capacity, and capability for activities involving speed and upper-body strength (e.g., Bradley & Moore, 1996; J. K. Brown, 1970; Ember, 1996; Ember & Levinson, 1991; Mukhopadhyay & Higgins, 1988; Murdock & Provost, 1973; Schlegel, 1989). In these explanations, biological factors advantage men's performance of certain tasks or hinder women's performance. One also could speculate that for certain activities biological factors advantage women's performance and hinder men's performance, although few theorists have framed biological influences on role performance in this way. For example, women's ability to lactate enables them to engage in an important aspect of infant care, and men's larger hands and lesser manual dexterity may tend to disqualify them from activities such as spinning that require delicate manual manipulations (Murdock & Provost, 1973).

From these anthropological perspectives men, on average, are likely to perform better than women at productive tasks that are highly demanding of speed and physical strength, especially brief bursts of force and upper-body strength (M. Harris, 1993; Murdock & Provost, 1973). Murdock and Provost's (1973) data provide partial support for this idea, given that many of the activities performed predominantly by men are physically demanding (e.g., lumbering, mining and quarrying, clearing land; see Table 1). In further agreement with this idea, men's greater physical strength is

a commonly offered lay explanation for the sex-typed division of labor not only by people in developed nations but also by those in a number of nonindustrial societies (Mukhopadhyay & Higgins, 1988). Nonetheless, the strength and endurance requirements of tasks likely represent only loose constraints on role performance (Burton, Brudner, & White, 1977). Some activities typical of women appear to require considerable strength. Of the female-dominated activities reported by Murdock and Provost (1973; see Table 1), water fetching is highly strength-intensive, and laundering and fuel gathering also can require substantial strength. Moreover, there is little empirical evidence that characteristically male activities across societies require more strength than characteristically female activities (Ember & Levinson, 1991). Therefore, anthropologists have ordinarily given less emphasis to male size and strength than female reproductive activity in explaining the division of labor (e.g., Schlegel, 1989).

In the view of many anthropologists, women's nursing and care of infants limit women's ability to perform tasks that require speed, uninterrupted periods of activity, or long-distance travel away from home (J. K. Brown, 1970; Burton et al., 1977; Friedl, 1978; Murdock & Provost, 1973; Schlegel, 1977). For example, women do not hunt large animals in most societies because of the difficulties they encounter when carrying infants along on hunting parties or when separated from nursing infants for the extended periods required by hunting (Friedl, 1978; Kaplan et al., 2000). Instead, women specialize in activities that are readily performed simultaneously with infant care. Thus, the activities performed primarily by women in Murdock and Provost's (1973) analysis (e.g., spinning, food and drink preparation; see Table 1) were largely carried out close to home, could be performed despite interruptions, and could be easily resumed if interrupted.⁷

In addition, anthropologists working within an evolutionary framework have explained the activities of women and men as manifestations of the presumed reproductive and survival values of sex-typed activities in particular environments. Although they have generally not identified sex-typed evolved psychological dispositions as underlying these activities, such assumptions would not be incompatible with this perspective. Illustrative of such reasoning is the argument that women's heavy nutritional needs during pregnancy and lactation caused them to develop a strategy of gathering because this method of subsistence generally provided a stable, reliable food supply for women and their children (Dahlberg, 1981; Friedl, 1978). Furthermore, given that meat represents a concentrated source of protein, fat, calories, and possibly of trace minerals (Knight, 1991; Stanford, 1999), men's hunting may have developed because of the fitness advantages that meat yielded for the hunter and his offspring (Kaplan et al., 2000; Lee & DeVore, 1968) and because of the mating opportunities and social power that successful hunting conferred (Hawkes, 1993, 1996). However, anthropologists continue to debate the fitness benefits of hunting, given that in contemporary foraging societies meat typically is not allocated preferentially to successful hunters' families and that the welfare of hunters' children appears to

⁷ Although the majority of highly male- or female-dominated activities fit our analysis, a few of the male-dominated activities shown in Table 1 do not seem to be especially strength intensive, dangerous, or demanding of absence from home (e.g., making musical instruments; work in bone, horn, and shell; bonesetting).

depend on the foraging skills of their mothers (Bird, 1999; Hawkes, O'Connell, & Blurton Jones, 2001).

In our biosocial theory, sex-differentiated perceived utilities contributed to the formation of a division of labor in resource acquisition, especially the benefits conveyed by gathering as a stable, reliable food source for women and their families. In this account, the survival and reproductive advantages of certain activities emerged because individual women and men within a society attempted to maximize the benefits and reduce the costs that they perceived as they performed various productive tasks. The constraints and the opportunities imposed by each sex's physical attributes and reproductive activities framed their decision making as they strove to perform the daily activities that they perceived to be important within a given society and local ecology. Through cultural constructions, these constraints and opportunities became defined for men and women in general according to the activities that can be performed efficiently by each sex. Therefore, even physically atypical women (i.e., those who are relatively large and strong or who are childless) and physically atypical men (i.e., those who are relatively small and weak) usually adhere to the sex-typed division of labor prescribed by their society.

Explanations for Variability in the Sex-Typed Division of Labor

The three origin theories that we consider in this article diverge in their accounts of cross-cultural variation in the division of labor. Social constructionists anticipate variability across contexts because the meaning of male and female varies with contextual factors. Despite this recognition that sex differences vary across societies, the constructionist perspective does not provide a theoretical structure to explain why particular differences emerge systematically from societies' socioeconomic organization and local ecology.

As we explained in the prior section of this article, analyses of the likely match between current social environments and the environments in which humans evolved led some evolutionary psychologists to reason that sex-typed evolved dispositions are more likely to be expressed in simpler societies without technological and other developments that might derail the effects of these dispositions (e.g., Pérusse, 1993). However, with respect to male provision of resources, Schlegel and Barry's (1986) analysis of the Standard Cross-Cultural Sample did not find that men in foraging societies were especially likely to be responsible for subsistence activities and to competitively acquire resources to provision women and children. Instead, simple societies revealed both the greatest amounts of provisioning by men (in hunting and fishing societies) as well as the least amounts of male provisioning (in gathering societies), with intermediate levels of male provisioning found in the more complex societies (i.e., those with animal husbandry, intensive agriculture). Thus, simple societies do not appear especially likely to yield the sex differences in subsistence activities anticipated from assumptions about sexual selection pressures.

From our biosocial perspective, the observed cross-cultural variability in sex-typed behavior is a product of the sexes' reproductive activities and physical attributes in conjunction with the organizational demands of societies and the local environments. Because these activities and attributes influence the efficiency and ease of task performance, sex-typing of tasks is minimized when

societal and environmental circumstances reduce efficiency constraints (Burton et al., 1977; White, Burton, & Brudner, 1977; Williams & Best, 1990). Therefore, in a few societies women have been found to perform activities such as hunting that are assumed by men in the vast majority of other societies. For example, although it is common for women in foraging societies to contribute to meat acquisition through the collection of small animals and insects, in a small percentage of societies women also regularly hunted large game (e.g., the Matsigenka of Peru, the Aborigines of Western Australia, see Goodman, Griffin, Estioko-Griffin, & Grove, 1985; the Dahomeans of West Africa, see Alpern, 1998; D'Almeida-Topor, 1984). The best-known example is the Agta of northeastern Luzon and Cagayan provinces of the Philippines. In this society, women of all reproductive statuses (except late pregnancy and the early months of nursing) hunted assisted by dogs, with wild pigs and deer being the principal prey (Estioko-Griffin & Griffin, 1981; Goodman et al., 1985; Headland & Headland, 1999). In some areas, the women hunted with machetes, and in other areas, they preferred bows and arrows. Whereas men in this society generally hunted alone, women hunted in groups, with the hunting parties typically composed of female relatives but sometimes including men. Because the Agta lived in a relatively resource-rich environment with game available in close proximity to home, hunting and child care were not incompatible and could be performed in conjunction with one another. Women took infants along with them on the hunt, and others took care of weaned children until they were old enough to join the hunt.

The pressure to maximize efficiency also can explain a number of lesser known features of the division of labor, such as the tendency for the sex that performs an activity at the beginning of a sequence of tasks (e.g., soil preparation) to continue by completing activities later in the sequence (e.g., harvesting; Murdock & Provost, 1973; Segal, 1983; White et al., 1977). Given that adjacent tasks in a sequence often involve similar technologies and are performed in similar contexts, economy of effort is maximized if the same sex performs those tasks. These task sequence effects thus can be explained in terms of the constraints that male and female biology place on efficient role performance.

Bidirectional relation between biology and social structure. The cross-cultural record does not suggest a unidirectional influence of biology on social structure but rather a reciprocal relation whereby social and environmental factors also influence the expression of biological functions. In particular, women's reproductive activities are to some extent adjusted to the prevailing economic demands within societies (Mukhopadhyay & Higgins, 1988; Nerlove, 1974; Schlegel & Barry, 1986). Illustrative of such adjustment is the finding that societies in which women contribute substantially to the subsistence economy also tend to have longer postpartum sex taboos (Schlegel & Barry, 1986). These taboos increase birth spacing and reduce the number of dependent children, thus freeing women for other types of activities. In addition, in societies in which mothers are routinely involved in important production tasks, supplemental foods are introduced to infants early in life (Nerlove, 1974). Early supplemental feeding reduces the demands of nursing and facilitates nonmaternal care of infants. Therefore, across the Standard Cross-Cultural Sample, the early introduction of supplemental foods was associated with women's greater contribution to certain agricultural subsistence tasks and their lesser contribution to domestic activities such as net weaving and basket making (Burton et al., 1977). Moreover, the widespread

use of wet nurses by middle-class urban mothers in 18th- and 19th-century Europe likely reflected the need for mothers' paid and unpaid labor to ensure their families' economic survival (Hrdy, 1999; Sussman, 1982). These findings support the view that biology, social structure, and the environment interact reciprocally to produce the sex-typed roles that constitute the division of labor within a society.

Socialization for divided labor. Cross-cultural research also provides insight into the mechanisms through which societies achieve flexibility in the allocation of life tasks to men and women. This flexibility is grounded, first of all, in humans' evolved capacity for complex social learning (Flinn, 1997) and the unique human adaptation to acquire culture (Tomasello, 1999). Building on children's readiness to learn their culture, societies undertake extensive socialization of boys and girls to prepare them for their life roles within their society. Socialization processes that foster sex-typed behavior are many sided (Ruble & Martin, 1998) and include reinforcement, observational learning, and role modeling. Furthermore, these socialization influences emanate from such sources as parents, the extended family, peers and other members of the community, and religion and other complex social institutions.

Evidence of sex-typed socialization pressures in the form of parents' rewards and punishments emerged in Barry, Bacon, and Child's (1957) classic study of child rearing in 110 cultures. In several behavioral domains, these societies varied in whether stronger socialization pressures were directed toward girls or boys. For example, in 82% of the societies, girls were encouraged more than boys to be nurturant, and in the remaining societies the pressures to be nurturant did not differ between the sexes. Similarly, the structuring of childhood activities to give girls greater practice in nurturing was a clear-cut finding in the Six Cultures Project, which involved the collection of extensive new data on children's lives in diverse cultures (Whiting & Edwards, 1988; Whiting & Whiting, 1975). Societies thus arrange socialization to foster women's accommodation to mothering as one of their important adult roles. More generally, the preferences typical of each sex within a society emerge through boys' and girls' responses to socialization, and these preferences then are elaborated in cultural traditions so that they become part of social institutions.

In summarizing the cross-cultural evidence for the influence of parental socialization on children's behavior, evolutionary psychologists maintained that these influences are only of small to moderate magnitude (Geary, 1998; Low, 1989). Of greater importance in their accounts of sex-typed childhood behavior are children's evolved tendencies to seek environments that allow them to express their sexually selected dispositions (see also Scarr & McCartney, 1983). In this view, for example, males' proclivity for competition leads boys to be attracted to rough-and-tumble play, and females' proclivity to nurture leads them to be attracted to play mothering. Geary (1998) thus argued that these self-initiated responses would produce sex differences in children's play even if socialization processes such as assigned roles and parental restrictions were absent. Empirical support for such claims is of course not available, given that all children develop in a cultural context. Instead, the empirical evidence is consistent with the idea that sex differences in children's behavior develop as an emergent property of their evolved disposition to learn sex-appropriate culture, the ecological and social settings in which children are situated, and the sex-differentiated socialization experiences offered by their

society. As we have argued in our biosocial model, these socialization pressures prepare boys and girls to perform certain social roles within the framework provided by their sex-typed physical attributes.

Cross-Cultural Research on Patriarchy

When sex differences occur in power, status, and the control of resources within a society, there is an overarching cross-cultural tendency for women to be disadvantaged relative to men (e.g., Pratto, 1996; Rosaldo & Lamphere, 1974). Anthropological research on patriarchy, which we consider in this section of our article, has examined the distribution of patriarchal control in a wide range of nonindustrial societies. In addition, many social scientists have examined the subordination of women in contemporary nations, where it can take a variety of forms (e.g., Rhoadie, 1989; Stewart & Winter, 1977; United Nations Development Programme, 1995). Commonly observed in modern nations are women's lack of political representation as well as their lesser education and literacy, access to health care, and sexual autonomy. Women also can be disadvantaged in their control of economic resources, wages for paid labor, and access to professional and managerial employment.

The three theoretical positions that we consider yield different predictions for the origins and prevalence of patriarchy across societies. Although social constructionists expect that men's and women's behavior reflects sex differences in power and status within societies, their analysis of the embedding of gender within particular contexts does not yield specific predictions across cultures. In contrast, evolutionary psychologists expect all societies to be organized in patriarchal fashion because of humans' sex-differentiated evolved dispositions. These dispositions include men's orientation to participate in dominance contests, women's orientation to choose mates who offer resources and protection, and men's orientation to ensure paternity certainty through control of women's sexuality. Although the universality of these dispositions is a key assumption of evolutionary psychology, the expression of them would vary across societies in response to external conditions. For example, men's orientation to compete for dominance might foster physical aggression in many nonindustrial societies and the acquisition of resources including money and other indicators of success in industrialized societies (Geary, 1998).

Offering a view that is different from both social constructionism and evolutionary psychology, our biosocial theory treats patriarchy as emerging under predictable circumstances and not having universal distribution across world societies. Like other sex-typed features of social organization, patriarchy emerges from the interaction between the sexes' biological specialization and the demands of the activities that people carry out within certain types of social systems and local ecologies. Specifically, patriarchy emerges in societies in which the efficient performance of tasks that yield the most status and power is facilitated by men's size and strength and is in conflict with women's reproductive activities.

Social scientists have disagreed about whether patriarchal social structure is a universal attribute of human societies. Arguing for nonuniversality, some anthropologists have pointed to evidence of particular sexually egalitarian societies (e.g., Endicott, 1999; Leacock, 1978; Schlegel, 1977). Also, Marxist theorists have maintained that patriarchy emerged only with societal develop-

ments of the ownership of private property and economic classes (e.g., Engels, 1902/1972). Arguing for universality, other scholars have held that patriarchy is characteristic of all human societies (e.g., Buss, 1995; Goldberg, 1993; M. Harris, 1993; Ortner & Whitehead, 1981; Rosaldo & Lamphere, 1974). As we explain in the next subsection, anthropologists have moved toward some resolution of this disagreement. More subtle theoretical analyses and more detailed empirical investigations have revealed that societies vary in their extent of patriarchy and that patriarchy is multifaceted in the sense that it is composed of a variety of relatively independent components.

Variability in Extent of Patriarchy Across Societies

The question of whether patriarchy and more generally, social inequality, are common to all human societies has spurred attempts to locate societies that exist without social hierarchies. These efforts have met with success. Illustrative of such research are investigations of pastoral groups, who live by grazing livestock on natural pastures that typically are held as common property. Although anthropologists have generally characterized these groups as egalitarian, evidence of inequalities in livestock holdings, labor patterns, and wealth in some pastoral groups (Borgerhoff Mulder & Sellen, 1994) led to charges that egalitarianism is a "pastoral myth" (Fratkin, Roth, & Galvin, 1994, p. 9). Salzman's (1999a) detailed review of pastoral societies then demonstrated that they range from egalitarian to hierarchical, depending on factors such as the prevailing political system. Following R. L. Kelly's (1995) widely accepted ideas, Salzman defined (1999a) egalitarian societies as those in which members have equal access to resources and power and have individual autonomy; it is not necessary that all members possess exactly the same amount of goods and authority. Using these criteria, Salzman (1999a) identified a number of egalitarian pastoral societies that are relatively free of state control and organized into decentralized groups (i.e., segmentary organization). Salzman (1999b) further observed that these egalitarian structures extended to gender relations. Despite gender complementarity in task assignments in these societies, he concluded that "gender inequality does not appear to be substantial or pronounced" (Salzman, 1999b, p. 57).

Additional evidence of egalitarianism in simple societies emerged in Knauff's (1991) sample of 39 societies that (a) had nomadic foraging economies with few recognizable leadership roles and status differentials among adult men and (b) lacked the developments of agriculture, animal domestication, and reliance on fishing. These decentralized groups had shifting, open, and flexible social arrangements characterized by cooperative sociality. Few displays of dominance occurred among adult men, sexuality was rule governed in a way that minimized conflict, and intergroup conflict was mild or nonexistent. Although Knauff's investigation did not focus specifically on women's status, he noted a general lack of differentiation of status by sex or age and concluded that "it is quite possible that patterns analogous to those of [these] simple societies characterized a significant portion of our evolution as *H. sapiens*" (p. 397).⁸

Given that not all societies are patriarchal, readers may wonder about the prevalence of nonpatriarchal societies. In samples of foraging societies, researchers have estimated that approximately one third have egalitarian relations between the sexes (Hayden, Deal, Cannon, & Casey, 1986; Sanday, 1981a). In seeming con-

tradiction of these estimates is Hendrix's (1994) conclusion from a sample of 93 nonindustrial societies originally compiled by Whyte (1978) that no society was truly egalitarian in all of the kinds of status relations that exist between men and women in the societies (e.g., inheritance rights, sexual control). The most egalitarian society showed equality or superiority of women on 84% of the indicators of status, and on the remaining 16% of the indicators demonstrated superiority of men. However, this pattern would reflect equal, but complementary roles of men and women if men's superiority on some dimensions was balanced by women's superiority on others (Ortner, 1996). Unfortunately, Hendrix did not estimate the percentage of indicators on which women were superior in status (L. Hendrix, personal communication, July 13, 1998). Yet, such a pattern of complementary equality is consistent with Whyte's (1978) own conclusion that relations between the sexes in this sample of societies ranged from egalitarian to strongly patriarchal.

Readers desiring to understand the details of male-female relations in nonpatriarchal societies can consult Lepowsky's (1993) study of the Vanatinai, a small-scale foraging and horticultural society located on a small, remote island southeast of New Guinea. In this society, "there are no ideologies of male superiority and female inferiority" (Lepowsky, 1993, p. viii). The matrilineal kinship structure of this society gives women considerable access to material resources and significant participation in activities that are economically and ritually important. The bilocal residence pattern of this group, by which couples and their children alternate their residence between the hamlets of the wife's and husband's families, gives both sexes sources of social and kin support. Although there are no chiefs with formal authority, both sexes have access to a "big man" or "big woman" role of *gia*, which confers informal authority and influence. In addition, "men have no formal authority or powers of coercion over women except for the physical violence that both sexes abhor and that is rare in the extreme" (Lepowsky, 1993, p. viii). Despite considerable overlap of male and female roles, the Vanatinai, like other societies, have a division of labor—for example, with women having more responsibility for domestic chores in and around the family hamlet and men engaging in more extensive hunting activities. Lepowsky's field work thus provides insight into the functioning of nonpatriarchal societies.

Variability in Types of Status

Anthropological analyses demonstrating that status is multidimensional have helped elaborate the conclusion that patriarchy is not a universal feature of human societies. Schlegel (1977, 1989) thus argued that power in small societies is generally dispersed,

⁸ Scholars have proposed differing answers to the general question of the extent to which human nature is expressed in dominance hierarchies or egalitarian relations. For example, even though Boehm (1999) acknowledged the tendency toward egalitarian social structures in simple societies, he maintained that these emerged because the pressures of a moral community and personal desires for autonomy held in check the basic human dispositions to dominate and subordinate others. Closer to our own position that perceived costs and benefits underlie behavior is R. L. Kelly's (1995) conclusion that social structures of inequality arise from "innate attributes of humans trying to maximize fitness, rather than innate attributes of dominance" (p. 330).

with neither sex superior, given that women control decision making in some institutions and men in others. Even Ortner (1974; Ortner & Whitehead, 1981), who is known for having once claimed that in every identified culture women are to some degree inferior to men, later acknowledged that some societies are egalitarian when considered across the full range of domains of male and female dominance (Ortner, 1996).

The most comprehensive empirical study of the various dimensions of patriarchy is Whyte's (1978) examination of 52 indicators of sex-linked status in 93 nonindustrial societies from the Standard Cross-Cultural Sample. Ten relatively independent dimensions of status emerged from Whyte's analysis: (a) property control by women; (b) power of women in kinship contexts; (c) value placed on the lives of women (e.g., sex of child preference); (d) value placed on the labor of women; (e) domestic authority of women; (f) ritualized female solidarity (e.g., female initiation ceremonies); (g) absence of control over women's marital and sexual lives; (h) absence of ritualized fear of women; (i) male-female joint participation in warfare, work, and community decision making; and (j) women's indirect influence on decision makers.

The sex differences found on any one of the 52 indicators of status in Whyte's (1978) analysis favored men more often than women. Thus, women usually possessed fewer resources than men, had lives that were less highly valued, were subjected to greater control of their marital and sexual behavior, and were subordinated in other ways. For example, in 67% of the cultures in Whyte's sample, men were expected to dominate their wives, in 30% an approximate equality existed on this status indicator, and in only 3% were women expected to dominate their husbands. Status differences in property inheritance yielded a similar pattern, with 63% of cultures according men a preference in inheritance, 31% giving the sexes equal inheritance rights, and 6% giving women preference. Subsequent investigations of specific indicators of status in slightly different samples of societies have revealed similar distributions of male and female status (Hayden et al., 1986; Sanday, 1981a). Although these data thus confirmed that, when viewed cross-culturally, power tilts toward men, the research also demonstrates the multidimensionality of power and status relations between the sexes. Consistent with the relative independence of these dimensions, even in strongly patriarchal societies, women typically held some degree of power over men on one or more dimensions.

In conclusion, the three origin theories that we consider in this article have varying success in accounting for the cross-cultural evidence on the form and distribution of patriarchy. Social constructionists anticipate variability in the phenomenon of patriarchy and the way that it emerges within and between societies, but they have not addressed the cross-cultural conditions under which it emerges. Evolutionary psychologists anticipate that patriarchy is universal (e.g., Buss, 1996), but their assumption is disconfirmed by anthropologists' documentation of societies without gender hierarchies. Our biosocial model is compatible with evidence that patriarchy is prevalent but not universal. As we explain in the next subsection, patriarchy emerges with a variety of social and ecological conditions because they interact with the sexes' physical attributes to influence their performance of tasks that yield status and power within a society. Examination of the specific conditions that foster patriarchy yields additional tests of the three perspectives.

Explaining Patriarchy

Research on the determinants of patriarchy comes from the work of social scientists and historians who have associated patriarchy with a wide range of societal attributes. These scholars have located the emergence of patriarchy in hunting, warfare, attributes of the local ecology such as resource stress, technological developments such as intensive agriculture, economic developments such as ownership of private property, social relations such as patrilocality and the exchange of women, and political developments such as centralized government (Boehm, 1999; Ehrenberg, 1989; M. Harris, 1993; Leacock, 1978; Lerner, 1986; Lévi-Strauss, 1949/1969; Low, 1990; Sanday, 1981a). To illustrate how scholars have reasoned about the origins of patriarchy, we focus on the primary factors discussed by anthropologists, the advent of warfare, agriculture, and certain socioeconomic developments, as well as a factor highlighted in many evolutionary psychologists' theories, control of women's sexuality.⁹

Warfare. Most discussions of the consequences of warfare for the development of patriarchal social structures begin with the question of why men and not women typically assume warrior roles. The incidence of female participation is notably low: Women participated in warfare in only 12% of the societies in Whyte's (1978) sample. Moreover, men did most of the fighting in societies with female warriors (e.g., Creek, Comanche, Delaware, Maori, and Navaho; D. B. Adams, 1983; Low, 2000). Organized female combat units have been very rare in world societies, with the "Amazon Corps" of the Dahomey Kingdom of West Africa in the 18th and 19th centuries being the best-known example (Alpern, 1998; D'Almeida-Topor, 1984; Goldstein, 2001; Maroukis, 1974).

In anthropological accounts of the male dominance of warfare that are compatible with evolutionary psychology, the preponderance of male warriors arises from male competition for reproductive success (e.g., Chagnon, 1988). In one version of this argument, male intergroup aggression can yield mating opportunities for men through the acquisition of women from other groups, especially in the cross-culturally common patrilocal societies, in which women join their husband's families (Manson & Wrangham, 1991). Such accounts imply that evolved psychological dispositions underlie the male control of warfare.

These dispositional accounts of male warfare imply that intergroup violence should be endemic to humans and, by the matching argument (Crawford, 1998; Pérusse, 1993), evident in very simple foraging societies. However, the prevalence of warfare, especially in early human societies, remains a contested point among scholars

⁹ The typical investigation identified a relation between patriarchy and a potential determinant (e.g., warfare) by comparing the status of women in societies that do and do not have the hypothesized determinant. Therefore, as with correlational research in general, causality is indeterminate in studies in this domain. Patriarchal social structures could be a direct consequence of factors such as warfare, agriculture, and economic development; these factors could have emerged as a consequence of patriarchy, or patriarchy and these other factors may have co-occurred as aspects of still other, unknown variables. Also, the clustering of social developments makes it difficult to interpret the effects of any one factor independently of those that occur with it. However, until scholars have better understanding of the specific combinations of interrelated factors that foster gender hierarchies, interpretation of the individual determinants is likely to be the most informative.

(see Goldstein, 2001). In a detailed analysis of this issue, Knauff (1991) argued that

simple human societies contrast with both great-ape and middle-range human societies in exhibiting a relative absence of competitive male dominance hierarchies and of systematic violence between closed social groups, while being more egalitarian among adult males politically, sexually, and in terms of resource sharing. (p. 391)

In this view, the middle-range societies in which intergroup violence is common include more complex hunter-gatherer groups and tribal societies, and therefore such violence is common in the ethnographic record. However, warfare and intergroup violence may well have been uncommon in the very simple societies that most approximate the conditions under which humans evolved. Moreover, male reproductive gains from warfare may not have been routinely present even in more complex, middle-range societies. In particular, Chagnon's (1988) evidence of the reproductive advantages experienced by aggressive, active warriors in foraging societies has been questioned in subsequent analyses of these data (Ferguson, 1995).

In contrast to the dispositional accounts of male warfare that are compatible with evolutionary psychology, social constructionists have outlined how the male dominance of warfare arises from societies' symbolic values, especially the cultural link that is forged between warfare and masculinity (C. J. Adams, 1990; Oyama, 1997). Societies that engage in warfare link manhood to bravery in battle, and this construction of war as a masculine domain of activity then fosters the construction of the domestic arena as a nurturing, feminine domain (Goldstein, 2001).

From the perspective of our biosocial theory, one of the root causes of the male dominance of warfare is men's greater size, speed, and upper-body strength, which would have facilitated their performance. A second fundamental cause lies in women's reproductive activities, which reduce the ease with which they can travel far from home or engage in intensive training to develop military skills. The constraints inherent in these activities also may leave women vulnerable to serving as sexual rewards for superior warrior performance. Also relevant is the practice of patrilocality in many societies (i.e., women residing with their husbands' families), which can make women unreliable warriors because their loyalties might be divided if their husbands' families wage war against their family of birth (D. B. Adams, 1983; Burton et al., 1977; Divale & Harris, 1976; Friedl, 1975; M. Harris, 1993). Given these biosocial determinants of the male dominance of warfare, gender roles are then socially constructed in societies engaging in warfare to incorporate good-warrior qualities into the male gender role. This effort must be intense to induce men to engage in the very dangerous activities that these roles entail (Gilmore, 1990). This male role, together with societies' broader cultural resources of norms, values, and religion, helps sustain this aspect of the male-female division of labor (Goldstein, 2001).

The importance of women's reproductive activities as a deterrent to their participation as warriors is illustrated by the social practices established for female combat units in the precolonial West African kingdom of Dahomey (Alpern, 1998; D'Almeida-Topor, 1984; Goldstein, 2001; Maroukis, 1974). These warriors were forbidden under threat of death to have sex with men and were segregated from other members of the society. In addition, the women selected to be warriors received intensive physical training to prepare them for battle, suggesting the importance of

strength to warriors' performance. Social psychological preparation was built on a culturally elaborated ethic of heroism and rivalry with male military cadres as well as practices that one researcher labeled "insensitivity training" (Alpern, 1998, p. 102; e.g., service as executioners). These unusual customs among world societies may have reflected the Dahomeans' inadequate supply of male warriors, given the dependence of the society on military exploits to gain hegemony over neighboring groups and to further its participation in the slave trade. Under these social circumstances, certain women were barred from reproduction, were prepared physically and psychologically for military service, and were given warrior roles.

Regardless of the causes of men's greater participation as warriors, the cross-cultural record shows that warfare tends to be associated with women having lower status than men (M. Harris, 1993; Leacock, 1978; Lerner, 1986; Sanday, 1981a). Societies that engage in very frequent warfare are particularly marked by gender inequality (Goldstein, 2001). Consistent with our biosocial theory, this relation may hold because men assume authority roles when the lives of group members depend on warriors' decision making and assessment of social and political conditions (Hayden et al., 1986). Also, the social construction of warrior roles in terms of dominance and aggressive masculinity may restrict women's opportunities to engage in a variety of leadership roles outside of the domestic sphere. Women's activities are then focused on home and family, where their responsibilities no doubt are intensified because of men's frequent absences from home. This tendency of warfare to heighten women's domestic responsibilities is substantiated by cross-cultural evidence that warfare does not show a negative relation to all aspects of women's status. Whyte (1978) found that consistent endemic local warfare was associated with high levels of domestic authority of women, whereas such warfare was associated with low levels of joint participation of the sexes in decision making outside the home. Furthermore, Whyte found that warfare was unrelated to other dimensions of women's status.

Intensive agriculture. The societal transition to intensive agricultural farming was associated with marked changes in the roles of men because they were the primary operators of plow technology. Men's size and strength presumably allowed them to perform this task more efficiently than women (M. Harris, 1993). In addition, in regions with a long dry season and highly time-restricted growing seasons, men were able to intensify their agricultural activities at appropriate times, whereas women found it difficult to assume the additional tasks because of the constraints of their reproductive activities and related domestic work (Burton & White, 1984). Men's control of agricultural technology yielded status through a variety of mechanisms, including the profits from production and the economic and other benefits of using plow animals for transportation to local markets (M. Harris, 1993).

Additional implications of intensive agricultural technologies for women's status stem from their channeling of a large proportion of women's productive activities into domestic work rather than the broader economy (Ember, 1983). Because of the extensive processing required by cereal crops and the rise in birth rates that followed from the increased value of child labor, agriculture increased the proportion of women's work that was domestic (Ehrenberg, 1989). The performance of additional domestic chores may have lowered women's status because women who stay home are not in the public view and lack the opportunities to form social ties necessary for high-status positions. They also lack opportuni-

included women as a commodity to be exchanged with other groups. Although this and other kinship analyses of patriarchy have been influential, some scholars have criticized them for their failure to offer a clear account of why only women's status is threatened by trade, ownership of people as property, and mating exchanges between groups. For example, Collier and Yanagisako (1987) complained that kinship theory locates its explanation in the dichotomy between women's domestic sphere and men's public sphere, without explaining how these spheres came to be constituted in the first place. Similarly, economic and Marxist analyses of patriarchy have been criticized for not providing a convincing account of why male heads of families were able to appropriate female labor and reproduction, whereas female heads of families were not able to appropriate male labor (Coontz & Henderson, 1986a, 1986b). We address these criticisms in the following *Biosocial Explanation for Patriarchy* section, where we argue that the lower status of women in societies with complex economies emerged because women's reproductive activities hindered their performance of economic roles that yielded power and status in these societies.

Sexual control of women. Some evolutionary psychologists have argued that male sexual control is the root of patriarchy—that is, that “male power over women so often revolves around female sexuality” (Smuts, 1995, p. 2; see also Wilson & Daly, 1992). If sexual selection pressures shaped men to be concerned about paternity, to control female sexuality, and to be sexually jealous, social structures should be arranged to favor male control of female sexuality. This control should be evident in simpler societies that lack technology and other developments that can derail the effects of evolved psychological dispositions. In the social constructionist and biosocial analyses, sexual control does not have the same causal importance in relation to patriarchy. Although social constructionists do not address the origins of men's sexual control, they anticipate that the meaning of women's sexuality within a society is generally shaped by status and power differences between the sexes (e.g., Tiefer, 1997). Our biosocial theory assumes that, like other components of patriarchy, sexual control is not a stable feature of human societies but instead emerges with the development of particular socioeconomic structures within which this sexual control acquires special utility.

Although evolutionary psychologists have argued that male control over female sexuality is, as Daly, Wilson, and Weghorst (1982) wrote, “cross-culturally universal” (p. 11), the anthropological literature indicates that greater restriction of women's than men's sexuality is not uniform across societies. For example, in Whyte's (1978) coding of 75 nonindustrial societies from the Standard Cross-Cultural Sample, 43% had an extramarital double standard favoring men, 55% had equal restrictions for men and women, and 3% had restrictions that were more severe for men than women. Although Daly et al. disputed these data, they provided evidence that Whyte misinterpreted the ethnographic data only for the 3% of societies he classified as having a reversed double standard. They merely asserted, without presenting evidence, that Whyte was “mistaken” (p. 20) about the societies classified as egalitarian. However, Broude and Greene's (1976) more detailed analysis, conducted independently of Whyte's research, produced evidence that the double standard was missing in approximately one third of the 116 societies they evaluated from the Standard Cross-Cultural Sample. Thus, a sexual double stan-

dard that restricts women more than men, although common in world societies, is far from a cross-cultural universal.

Also relevant to the claim that men's desire to control women's sexuality to assure paternity is an evolved disposition is evidence that women's extramarital sex not only is widespread in world societies but also is often legitimized within the social structure (Broude & Greene, 1976; Hrdy, 2000; Whyte, 1978). For example, in some societies extramarital sexual relations take the form of socially sanctioned wife sharing, in which wives have sexual intercourse with the husband's male relatives or even with his friends and allies (e.g., Becher, 1960; Elam, 1973; Weltfish, 1965). In Broude and Green's (1976) study, 35% of 110 nonindustrial societies represented with sufficient information were classified as allowing wife sharing under at least some circumstances. Although wife sharing is for the most part controlled by men, husbands typically do not have the right to refuse this sexual access to the culturally appropriate group of men, and of course, husbands lose paternity certainty when they share their wives with other men. In other instances, women's extramarital relationships yield normatively prescribed economic benefits for women and their children. For example, in lowland Amazonian societies that practice *partible paternity*, the men in addition to the husband who had sexual relations with a mother during the year prior to her child's birth served as secondary fathers and had some obligation to provide resources for the child, who then had a greater chance of survival (Beckerman et al., 1998; Conklin & Morgan, 1996; Hill & Hurtado, 1996; Hrdy, 1999, 2000).¹¹ In sum, the evidence that women's extramarital relations are socially sanctioned in a substantial percentage of nonindustrial societies challenges evolutionary psychology assumptions that men's evolved disposition to ensure paternity certainty underlies a universal tendency for men to control women's sexuality.

Congenial with our biosocial perspective are findings suggesting that men's concern about paternity certainty and their expression of sexual jealousy emerged with particular socioeconomic developments, specifically with societal practices that imbued child bearing with economic implications for men. Whyte's (1978) analysis of 93 nonindustrial societies revealed that sexual control over women was associated with aggregated indexes of societal complexity as represented in the development of intensive agriculture, the ownership of private property, technological developments, and community stratification. Although Whyte failed to identify the critical aspect of societal complexity, Gaulin and Schlegel's (1980) analysis of the Standard Cross-Cultural Sample provided an economic explanation for this relation (see also Hartung, 1985; Johnson & Hendrix, 1982). That is, paternity certainty acquires economic impact when property is inherited through male lines, and control over women's sexuality becomes one way for men to ensure such certainty and consequent economic advantage. This relation between sexual control and economic investment through patrilineal inheritance (i.e., transmission of property) is especially interesting because Gaulin and Schlegel set out to test a different hypothesis, consistent with evolutionary psychology, that sexual control emerges from men's evolved disposition to maxi-

¹¹ Given this system, the optimal number of fathers no doubt depends on various conditions of demography and ecology. Hill and Hurtado (1996) determined that for the Aché, a society in lowland Amazonia, the optimal number of fathers was two, a primary father and one secondary father.

mize their reproductive success through investment specifically in genetically related offspring. However, paternal investment other than economic inheritance did not vary with societies' sexual control of women. In societies with high sexual control and therefore high paternity certainty, men were not especially likely to provide the noneconomic benefits of caretaking and educating their wives' children nor were they especially likely in societies with low sexual control and low paternity certainty to provide these benefits to their sisters' children. These findings are consistent with our biosocial argument that control over women's sexuality became important with societal developments in which children yield economic benefits for men.

This economic interpretation of male sexual control receives additional support from Reiss's (1986) finding in 80 societies of the Standard Cross-Cultural Sample that several indexes of patriarchy (e.g., patrilineal inheritance, patrilocal residence, importance of private property) predicted the tendency of husbands to manifest sexual jealousy (see also Hupka & Ryan, 1990). Furthermore, although Daly et al. (1982) argued that across cultures, men's sensitivity to experience sexual jealousy yields a tendency for men more than women to commit homicide due to sexual jealousy, C. R. Harris (in press) demonstrated that this pattern is an artifact of the greater overall homicide rate of men than women. When Harris recalculated the cross-cultural incidence of homicides attributable to sexual jealousy after controlling for the sex differences in overall homicide rates with each culture, sexual jealousy did not appear to be a stronger motivator of homicide among men than women. Of course, given that sex is a valuable resource, sexual jealousy on the part of women and men has frequently been noted by anthropologists in a wide range of societies. However, in societies that legitimize extramarital relationships, jealousy is often discouraged (e.g., Crocker & Crocker, 1994; Siskind, 1973).

Rape also can be understood as an aspect of the sexual control that men exert over women in some patriarchal societies. Rape is rare or absent in about half of the societies of the Standard Cross-Cultural Sample (Broude & Greene, 1976; Sanday, 1981b) and appears to have emerged in societies marked by various forms of patriarchy. As Sanday (1981b) demonstrated in an analysis of 80 societies of the Standard Cross-Cultural Sample, rape was more prevalent in societies with certain attributes—specifically, a greater incidence of warfare and interpersonal violence, a stronger ideology of male dominance, lesser female political and economic power, and greater segregation of men and women. In addition, Schlegel and Barry (1986) found in the Standard Cross-Cultural Sample that rape was more common to the extent that female contribution to the subsistence economy was low. Reiss (1986), also analyzing the Standard Cross-Cultural Sample, found that rape was correlated with macho attitudes and belief in female inferiority, which are ideological tendencies that he found were associated with indicators of patriarchy, such as extent of agriculture, class stratification, and the power of male kin groups.¹² In general, where men have greater political and economic power relative to women, they are better able to control female sexuality in a number of ways, including forced sex.

To understand the findings on sexuality that we have presented, readers need to appreciate how profoundly different the sexual practices of some nonindustrial societies are from those in the Western, industrialized societies with which they are most familiar. A useful example of a society that is especially divergent from

these familiar sexual practices is the Canela of the Timbira nation-tribes in Brazil. As Crocker and Crocker (1994) noted,

The Canela sociocultural system is remarkably complex and varied with regard to extramarital sex activities. It ranges from private trysts arranged by individuals, to private trysts sanctified and carried out according to ceremonial customs, to group sequential sex which takes place on ceremonial occasions and even within the daily cycle of events. In the third case, women have sex sequentially with a number of men in prescribed situations. A woman may even have sex with three or four men sequentially in a completely casual and chance situation. (p. 143)

In this society, extensive extramarital relations are usual and accepted, sexual jealousy violates social values, and paternity confusion is the rule rather than the exception.

The casualness about paternity that follows in many societies when women's extramarital relationships are prevalent and legitimized can reflect the lack of importance of the genetic father in determining a child's place within a kinship group. As Cassidy and Lee (1989) explained,

Western scholars frequently have failed to realize that the identification of the genetic father is usually not as important in nonindustrial cultures as in industrial societies. What is important is the determination of a child's kin group membership and, in turn, the network in which the child will automatically establish a web of interlocking rights and obligations. . . . For a variety of reasons, however, this does not necessarily entail specific or accurate identification of the child's biological father. (p. 3)

However, as we have shown, paternity does become important with the development of private property in more complex economies, especially with the inheritance of property along male lines.

In summary, the variety of sexual practices encountered in nonindustrial societies do not support the claims of some evolutionary psychologists that patriarchy is a product of men's evolved disposition to control female sexuality, which in turn produces a sexual double standard and sexual jealousy (e.g., Smuts, 1995; Wilson & Daly, 1992). Across world societies, women's extramarital sexual relationships are not uncommon and are sometimes legitimized despite their obvious threat to paternity certainty. The behavioral patterns that evolutionary psychologists believe are intrinsic to human nature, including greater restriction of women's than men's sexuality, greater sexual jealousy expressed by men than women, and the prevalence of rape (Betzig, 1989; Thornhill & Palmer, 2000), are not human universals but tendencies that emerged as by-products of the patriarchal forms of social organization that developed under particular socioeconomic conditions.

Biosocial Explanation for Patriarchy

Our review reveals that patriarchy emerged across societies with the development of warfare, intensive agriculture, and complex economies. These social and economic developments compromise the status of women because they differentially impact the activ-

¹² Analogous findings emerged in a study using panel data from 109 U.S. cities over 3 decades, 1970–1990 (Whaley, 2001). The long-term effect of greater gender equality was a decrease in rape rates even though the short-term effect was an increased rape rate, presumably due to a backlash against women's increasing power.

ities of women and men. This differential impact occurs because societal developments such as warfare, agriculture, and production activities that contribute to the accumulation of wealth and status in the public economy share the common attribute of not being "geared to the rhythms of domestic activity" (Schlegel, 1977, p. 35). Women's reproductive activities constrain the time and energy they can devote to warfare, intensive agriculture, hunting, and other tasks requiring extensive training and skill development, high energy expenditure, and extended absences from home. To the extent that work in these intensive time- and energy-consuming domains yields benefits to others outside the immediate family or produces outcomes that can be traded in the marketplace, then men accrue the economic and social rewards of these activities more than women (Huber, 1990). In this account, the gender equality found in some foraging societies follows from socioeconomic structures in which the "pull between production and procreation is not so strong" (Schlegel, 1977, p. 26).

Our biosocial perspective anticipates that women's reproductive activities interfere with the performance of nonreproductive tasks to the extent that these other tasks require time-consuming, intensive skill development and labor by specialized workers. Support for this argument can be found in the sex differences that emerge across societies in the use of and control over new technology. Murdock and Provost's (1973) review of societies in the Standard Cross-Cultural Sample revealed that, "when the invention of a new artifact or process supplants an older and simpler one . . . the [new] activities tend more strongly to be assigned to males" (p. 212). Furthermore, they noted that societies that had developed a complex economy with skilled occupations tended to assign specialized tasks to male but not to female skilled workers. This pattern emerged even though, in neighboring societies with less complex economic organizations, women often performed the same activity that was performed by men in the more complex societies. Murdock and Provost noted that "even the most feminine tasks in the entire list, namely cooking and the preparation of vegetal foods, tend to be assumed by specialized male bakers, chefs, and millers in the more complex civilizations" (p. 213). An important consequence of this intensive performance of tasks primarily by male specialized workers is that men disproportionately accrue the economic benefits of the products and services traded in the general economy.

The acquisition of economic and political benefits by individual men yields a patriarchal social structure because characteristics that are common in each sex come to be regarded as typical of that sex. In an account of the emergence of female subordination that elaborates social-psychological mediational processes, inequalities between individual group members bias the development of influence hierarchies in encounters between members of the two groups (Ridgeway, 2001a, 2001b). Men's influence advantage in these encounters then transforms the inequalities in resources and knowledge experienced by some men and women into widely shared beliefs in men's greater status and power. These beliefs ground hierarchy and inequality in the sex distinction itself and not in causal factors at the individual level such as particular women's reproductive activities or particular men's service as warriors. Therefore, patriarchy disadvantages all women and advantages all men within a society, regardless of women's reproductive status or other attributes of individual men and women.

Socialization for patriarchy. Socialization practices in patriarchal societies appear to encourage boys to enact and value a more

dominant style of social behavior and encourage girls to value a more subordinate style. In Barry et al.'s (1957) study of socialization in 110 nonindustrial societies, boys generally appeared to be under more pressure to be aggressive and girls to be nurturing, responsible, and obedient (see also reanalysis by Low, 1989). Yet, larger differences in the socialization of girls and boys were associated with societies that engaged in the productive activities that anthropologists have shown are critical to the emergence of gender hierarchies—especially intensive agriculture (i.e., grain crops) and animal husbandry. Moreover, warfare and the prevalence of physical violence within societies were associated cross-culturally with harsh socialization practices that are thought to inculcate aggressiveness in boys (Ember & Ember, 1994; see also Ross, 1992). Furthermore, path models indicating that socialization practices were primarily a consequence, rather than a cause, of warfare (Ember & Ember, 1994) suggest that socialization is responsive to features of societal structure. Also, egalitarian tendencies for women to own resources and exercise power (e.g., inherit property, possess power within families, hold political offices) were correlated with socializing girls to be more aggressive and less obedient (Low, 1989). Finally, the practice of polygyny, which fostered patriarchy by establishing marriages between one man and more than one woman, was correlated with training boys more intensely for fortitude, aggression, self-reliance, and industriousness (Barry et al., 1957; Low, 1989). Although these findings have been taken as evidence that children's self-initiated sex differences in behavior are channeled within societies in ways that maximize their reproductive success (Geary, 1998; Low, 1989), these relations are interpretable as well in terms of men's acquisition of psychological tendencies appropriate for powerful roles in patriarchal societies. In summary, patriarchal social structures are associated with the intensification of efforts to socialize girls and boys to be psychologically different in order that women accommodate to their relatively subordinate adult roles and men to their relatively more dominant roles.

Viewed in a cross-cultural perspective, it is likely that in modern postindustrial societies socialization is less differentiated by sex because these societies have relatively greater gender equality than most world societies (United Nations Development Programme, 2001). Consistent with this expectation, research in North American and other Western nations suggests minimal effort by parents to reward and punish girls and boys differentially. This generalization was offered by Maccoby and Jacklin (1974) in their review of psychological research on child rearing, although sharply criticized by others (e.g., Block, 1978). However, support for Maccoby and Jacklin's conclusion emerged in Lytton and Romney's (1991) meta-analysis of parental socialization in numerous domains. This review produced little evidence that parents differently reward and punish boys and girls, although it did find an important difference in the encouragement of gender-typed activities and interests—for example, gender-typed toys, games, and chores. As Bussey and Bandura (1999) argued, some sex-typing by these means as well as by observational learning and self-regulatory processes remains prevalent in Western industrialized societies, although parents differ widely within these societies in the extent to which they foster traditional or more egalitarian gender roles. In general, consistent with our biosocial model, the specialization of men for dominance and women for subordination that emerged in patriarchal societies has eroded with the weakening of gender hierarchies in postindustrial societies.

Conclusion

The cross-cultural evidence on sex differences that we have reviewed informs the psychology of gender in several important ways. This research contributes to a theory of the origins of sex differences by pointing to the ways in which the behavior of each sex is constrained by essential sex-typed attributes and the ways in which the sexes' behavior is flexible and responsive to contextual influences. Our central conclusion from this review is that the origins of sex differences are best understood from a biosocial perspective that gives priority to the interaction between the bodily specialization of each sex and the attributes of societies' economy, social structure, and ecology.

Our review identified sex-differentiated behaviors that emerged universally or near-universally in nonindustrial societies, along with other sex-differentiated activities that varied considerably across societies. In particular, all of the cultures in our review revealed an alliance between men and women in a division of labor, which appeared to be organized primarily to enable mothers to bear children and nurse and care for infants and secondarily to take advantage of men's size, strength, and speed. Nonetheless, the specific tasks that were most efficiently performed by men and women within this division varied with the local ecology and socioeconomic structure, with the result that tasks characteristic of men were performed by women under circumstances that reduced the constraints of women's reproductive activities. For example, women hunted in societies in which this activity did not unduly restrict their reproductive and child care activities (Goodman et al., 1985). Furthermore, social and environmental factors also moderated the impact of reproductive constraints so that, for example, early supplemental feeding of infants enabled mothers to perform other important production tasks. These findings suggest that biology, social structure, and the environment interact reciprocally to produce the sex-typed roles that constitute a society's division of labor. Despite the role constraints inherent in women's reproductive activities and to some extent in male size and strength, both sexes appear to possess sufficient psychological flexibility to accommodate to a wide range of socioeconomic roles.

The cross-cultural literature also provided insight into the determinants of patriarchy. The greater power and status of men emerged from the trade-offs within societies between women's reproductive and other domestic contributions, which benefited women and their immediate families, and women's contributions in the form of other productive tasks, which yielded benefits outside of the domestic sphere. The limitations posed by women's reproductive behavior appear to interfere with their performance of activities that require intensive training and skill acquisition and drain women's energy and time to perform such activities. In more developed societies, it is these activities that yielded status and power in the broader society. Patriarchy thus emerged in large part from the difficulties women experienced in efficiently combining their reproductive activities with skilled tasks of production, which maximally contributed to power and status in more complex societies.

Another universal feature of social organization in our review is the effort of parents and other caregivers to socialize children to contribute in sex-appropriate ways to the society's division of labor as well as to the patriarchal social structures that characterize many societies. Societies' differential response to boys and girls, in conjunction with children's orientation to learn features of their

culture (Tomasello, 1999), prepare children for the sex-differentiated aspects of their life roles. In general, socialization experiences in nonindustrial societies appeared to have been arranged to ensure women's accommodation to the mothering role. Also attesting to the importance of socialization to the emergence of sex differences is the finding that, within societies, sex-differentiated socialization appears to be tailored to the unique features of male and female roles. Thus, in societies with patriarchal social structures, boys were especially likely to be trained in dominant styles of social behavior and girls in subordinate styles. In general, the specific sex-typed socialization practices within each society appear to facilitate the social coordination between the sexes in the division of labor and also can foster hierarchical relations between the sexes.

Although the aspects of behavior and social organization that are relatively invariant cross-culturally can be considered essential characteristics of humans, this interpretation does not necessarily assume direct, hard-wired coding of the attributes. As D. E. Brown (1991) noted, some universal human attributes "are cultural conventions that have come to have universal distribution" (p. 6). In our biosocial model, the biological factors of men's size and strength and women's reproductive activities interact with cultural conventions to yield the sex differences that were universally or near-universally displayed in the societies in our review. In general, our biosocial model treats behavioral sex differences as repeatedly constructed or emergent given the evolved attributes of the human species, the developmental experiences of the sexes, and the social and ecological structures affecting men and women within a society.

Evidence Addressing Social Constructionist and Evolutionary Psychology Perspectives

Several aspects of the data we reviewed are congenial to the social constructionist view. The importance of power and status as influences on sex-differentiated behavior is compatible with social constructionists' emphasis on the variation in gender in response to power relations within a society. In like manner, the symbolic and metaphorical descriptions of sex-typed social behaviors such as hunting, warfare, and mating that are shared among members of a culture provide important insight into the significance of these life events within a society (C. J. Adams, 1990; Oyama, 1997; Tiefer, 1997). As social constructionists argue, these meanings structure and maintain sex-typed behaviors. In addition, our findings agree with social constructionism in demonstrating the importance of socialization to sex-typed social organization within a society and the importance of gender roles and other social roles to the maintenance of sex differences in behavior. Despite these strengths, social constructionist perspectives do not provide clear guidelines to predict the circumstances under which behavior varies according to sex. For this reason, few cross-cultural predictions can emerge from this approach unless constructionist ideas are accompanied by principles borrowed from other theories such as our biosocial theory.

The cross-cultural data were not very supportive of evolutionary psychology analyses of the origin of sex differences. Specifically, we failed to find any universal or near-universal patterns across cultures in support of the sex-specific psychological tendencies that evolutionary psychologists assume evolved in relation to sexual selection pressures in ancestral environments. Consider the

ideas that women are intrinsically oriented to seek mates with resources who can support them and their children and that men are oriented to accrue such resources to compete with other males in dominance contests and to provision their families (Buss, 1996; Buss & Kenrick, 1998; Geary, 1998). These ideas are challenged by the findings that women contributed substantially to subsistence activities in most societies and were the primary food providers in societies that relied mainly on the gathering of vegetal foods. These ideas are further brought into question by the evidence that patriarchy is not a universal feature of human societies and instead appeared to emerge along with a variety of economic and social developments, including warfare and intensive agriculture.

The cross-cultural data also dispute the ideas that men have evolved to control women's sexuality to ensure paternity certainty and that this control is manifested in the social institution of patriarchy (Smuts, 1995; Wilson & Daly, 1992). A sexual double standard reflecting greater control of female than male sexuality was certainly not a universal or near-universal tendency in the nonindustrial societies studied by anthropologists (Broude, 1980; Whyte, 1978). Moreover, in some societies the social structure legitimized sexual relations between women and multiple partners. The varying levels of control over women's sexuality apparent across societies do not provide much support for the evolutionary psychology claim that men have evolved an essential disposition to ensure that they invest resources in biologically related offspring (see Buss & Kenrick, 1998).

In general, the cross-cultural research comparing more and less complex societies provided the most direct challenge to evolutionary psychology theorizing about evolved dispositions that correspond to sexual selection pressures on human ancestors. Such dispositions appear to be more characteristic of men and women in societies with advanced economies and technology than in simpler societies. In particular, a division of labor in which men serve as the primary resource providers for their families and women seek resource provision from men is characteristic of agricultural and industrial societies, but among foragers more variable subsistence patterns emerged. Also, even though modern societies tend to be patriarchal, evidence for patriarchy is less uniform among foraging societies, as is evidence for intergroup violence. Furthermore, male sexual jealousy and male control over female sexuality have emerged with particular economic structures, especially those in which inheritance rules run through male lines. All of these patterns are consistent with the possibility that evolutionary psychologists have reasoned from modern social conditions and inadvertently applied these to their understanding of the evolved dispositions of men and women.

Despite these challenges to the interpretations offered by evolutionary psychologists (e.g., Buss & Kenrick, 1998), the cross-cultural data that we reviewed are potentially consistent with alternative evolutionary models that conceptualize the interaction between the environment and evolved attributes as a dynamic process. Sex-differentiated behaviors thus emerge from the interaction between the developmental experiences of each sex, their current environments, and their evolved physical and reproductive capacities (e.g., Hrdy, 1997, 1999). These alternative evolutionary theories do not replace the psychological theories that treat sex-differentiated behaviors as a product of the proximal causes associated with personality, social, and developmental processes. Instead, such evolutionary theories treat the distal biological and

social structural causes of sex differences as a framework in which to place psychological theories of proximal causes.

Individual Psychology Underlying the Sexes' Behavior Across Cultures

From our biosocial perspective, the individual psychology that underlies the cross-cultural patterning of female and male behavior is best represented by the proximal causal processes that have traditionally been studied by psychologists. Thus, sex-typed behavior reflects culturally shared social expectations and self-related processes, which are shaped by socialization and accompanied by biological processes, especially hormonal changes. These psychological and hormonal processes that serve as proximal predictors of behavior reflect the attempts of individual men and women within each society to maximize their perceived utilities as they strive to perform the activities of daily living. Men's physical attributes and women's reproductive activities frame this decision making by affecting the costs and benefits that are associated with behaviors for each sex given particular societal contexts and local ecologies.

The considerable cross-cultural variability that was evident in women's and men's behaviors suggests that a variety of developmental and socioeconomic factors influence the perceived costs and benefits of sex-typed behavior within the general framework provided by men's physical attributes and women's reproductive activities. Although this variability was apparent in the majority of behaviors that have been studied by anthropologists, our review also identified a few behaviors that were universally or near-universally characteristic of men or of women in the cross-cultural record. One example of such sex-typed activities is mothers' tendency to serve as the primary caretaker of infants, although in some societies this activity was shared with others (see Table 2) and in other societies many biological mothers transferred this activity to other mothers (i.e., wet nurses; Hrdy, 1999). Mothers' ability to lactate and in many societies the efficient combination of lactation with other infant caretaking activities provide the framework behind the perceived costs and benefits of this behavior for women. In addition, behaviors that were highly male-dominated across cultures included the hunting of large animals, warfare, metalworking, and a few other activities that were strength intensive and had training and performance requirements that for women could not be combined efficiently with infant care. Yet, as we demonstrated, even the highly sex-typed activities of hunting and warfare were shared between the sexes in ecologies in which women were likely to perceive them as possessing utility, given that they could be efficiently performed in conjunction with infant care or that a subgroup of women were relieved of reproductive responsibility in order to undertake the activity.

The presence of such sex-typed activities raises the question of whether men and women became psychologically specialized in response to evolutionary pressures to perform these behaviors. In answering this question, it is important to keep in mind the considerable cross-cultural variability in the behavioral manifestations of the sex-typed attributes that evolutionary psychologists assume to have emerged from sexual selection pressures (e.g., the tendency for men to acquire resources to provision women and offspring). Furthermore, we believe that the products of evolution are unlikely to correspond to lay people's understanding of sex-typed behavior at a linguistic or perceptual level. As Caporael

(2001) maintained, evolved dispositions are likely to be modular components that evolved relatively independently in adaptively relevant environments. For example, the activity of walking is composed of numerous modular components such as the ability to support body weight on legs, the ability to move legs in alternating patterns, and intentionality. The evolution of such proclivities is thus a "mosaic, jury-rigging process" (Caporael, 2001, p. 617). When viewed from this perspective, complex sex-typed human activities require a mosaic of qualities. For example, hunting large animals might be facilitated by personality attributes such as risk taking and cognitive skills such as spatial and targeting abilities; gathering vegetal foods might be facilitated by personality traits such as patience and cognitive abilities such as good spatial location memory and perceptual speed (see Halpern, 2000; Kimura, 1999). Also, the psychological components underlying the alliance of women and men in societal task performance could include factors such as women's orientation toward stable food sources for themselves and dependent children that emerge in certain forms given particular social organizations and local environments.

At a general level, the cross-cultural data are not the only source of evidence concerning sex-typed evolved dispositions. It is important to consider whether physiological studies have provided evidence consistent with direct hard-wired coding of sex differences in psychological dispositions and behavioral patterns. In traditional accounts, sex differentiation of the brain and other aspects of an organism's phenotype are a result of sex-typed hormonal secretions, which in turn emerge from gonadal sex and ultimately from genetic sex. Although sex-typed brain structures and functions are a promising source of hypotheses concerning sex-typed evolved psychological dispositions, even in nonhuman animals these aspects of development are more complex than implied by the traditional model. For example, demonstrating the role of environmental factors in hormonally influenced brain development, rat mothers' anogenital stimulation of their male offspring aids the development of brain mechanisms that control aspects of male sexual function and ultimately sexual behavior (see reviews by Breedlove, Cooke, & Jordan, 1999; S. J. Kelly, Ostrowski, & Wilson, 1999). Research with humans, although somewhat less definitive, also suggests that sex-differentiated behavior does not emerge in a simple manner from the organizing effects of prenatal and neonatal hormones (see review by Collaer & Hines, 1995). For example, some of the most consistent evidence of hormonal influences comes from girls with congenital adrenal hyperplasia who were exposed to unusually high levels of androgens and who exhibit masculinization and defeminization of some aspects of their behavior (specifically, sexual orientation and juvenile play). However, it is difficult to rule out some contribution from psychosocial environmental causes because these syndromes produced mild to extensive virilization of the external genitalia, which would have alerted these girls and their parents to their atypical status. Furthermore, as Berenbaum and Hines (1992) noted with respect to children's play preferences, sex-typed hormones do not necessarily directly influence behavior through such mechanisms as sex-typed evolved psychological dispositions (e.g., girls' orientation to nurture). Instead, hormones may indirectly affect behavior through their influence on such factors as boys' and girls' activity levels, abilities, or general temperament.

In summary, the likelihood that the organizing effects of gonadal hormones emerge in concert with environmental influences

suggests that sex-typed evolved psychological dispositions and related behavior cannot be inferred in any simple, direct way from sex-typed hormonal process. Instead, the research findings are consistent with an interactive model that is only partially captured by the influence of sex-typed hormones on behavior. The other important component of this model is the influence of sex-typed behaviors and social contexts on hormonal processes as occurs, for example, when hormones are recruited in the service of social roles associated with competition and parenting (Gladue et al., 1989; Storey et al., 2000).

Investigating the Distal Causes for Sex Differences in Behavior

The present article demonstrates the advantages of evaluating theories of the distal causes for sex differences by relying on investigations of cross-society variability in the behavior of men and women. Our strategy of conducting a descriptive review of this literature addresses Tinbergen's (1963) well-known complaint about psychologists. He argued that they typically move too quickly from the observation of a few phenomena to the formulation of theories that they claim are general, even though they have skipped the preliminary descriptive stage of data collection typically undergone by other sciences (see also Rozin, 2001). Too often scientists studying sex differences have relied on observations from societies that are highly developed socioeconomically and are relatively patriarchal in gender relations.

Despite the focus of the present article on understanding sex differences across societies that vary widely in social, economic, political, and technological factors, the data we reviewed provide a particular perspective on the origins of human sex differences. These data reflect anthropologists' observations of behaviors and their interviews with native informants, and as with all empirical observations, the orientation of these scientists presumably influenced the data they collected. The researchers as a group tended to be male, to represent particular cultural backgrounds, and to endorse certain scientific theories. Although such factors can influence observations, it could be argued that these biases are diverse and typically make it more difficult to identify cross-cultural patterns in the data. More serious limitations would involve systematic biases, as suggested by Leacock's (1978) assertion that anthropologists have overlooked women's unique circumstances in world societies and made Westernized assumptions about the role of women. We believe that the most likely effect of such a bias would be to reduce the observed cross-cultural variability in women's behavior and thus to limit ability to identify the patterning of this behavior across societies. It is also worth considering, as a potential bias in the data themselves, that the observed societies were not independent of Western culture but were, to varying extents, incorporated into and influenced by world economic and political systems. Although trade with developed societies and exchange of members with them may have a variety of effects on foraging peoples (R. L. Kelly, 1995), one plausible result is again to reduce the variability in cross-cultural observations and our ability to detect cross-cultural patterns. In our view, then, these potential limitations do not seriously compromise the conclusions we draw in this article.

An additional limitation stems from the fact that the cross-cultural data address behavior and do not directly provide evidence of the psychological states and motives that underlie behavior. A

largely missing element is cross-cultural analyses of psychological variables that are important to evaluating origin theories of sex differences. Although many kinds of psychological variables that are relevant to sex differences could be examined cross-culturally, interest has centered on people's preferences for mates with certain attributes. In an earlier collaboration examining the social structural factors that influence mating preferences (Eagly & Wood, 1999), we reasoned that these preferences become less differentiated by sex as the traditional division of labor weakened in industrial and postindustrial societies and the societies became more sexually egalitarian. To test these ideas, we reanalyzed the mate selection data of Buss's (1989; Buss et al., 1990) 37 cultures study by relating men's and women's reports of mate preferences in the 37 cultures with societal-level indicators of the extent of sexual equality in those countries (United Nations Development Programme, 1995). As expected, in patriarchal, traditional societies, women tended to prefer older mates and mates with resources, and men tended to prefer younger mates and mates with housekeeping and cooking skills. The sex differences in mate preferences were less pronounced in more egalitarian societies. Providing additional evidence that the preferences of men and women were a common response to social structural factors, the sex differences in mate preferences tended to coexist within societies; those societies in which women expressed especially strong preferences for mates with resources and for older mates were also those in which men expressed especially strong preferences for mates with domestic skills and for younger mates. In addition, Kasser and Sharma's (1999) reexamination of the 37 cultures study produced related findings—specifically, that women were less likely to prefer men with good provider potential to the extent that their culture gave women reproductive freedom and good educational opportunities.¹³

Finally, we note the popularity of cross-species comparisons that examine the extent to which human sex differences mirror those observed in other animals, a strategy popular among evolutionary scientists (e.g., Buss & Kenrick, 1998; Geary, 2000; Wrangham & Peterson, 1996). Such research builds on the logic that aspects of human behavior that parallel those found among other primate groups may originate in common physical or psychological characteristics that evolved in shared ancestors as solutions to reproductive and survival problems. Cross-species similarities are therefore often taken as evidence of inherent, essential differences between the sexes that can be interpreted independently from the social constructions that characterize human societies (e.g., Mealey, 2000). However, as we argued in the beginning of this article in relation to cross-species correlations of sexual dimorphism with behavioral tendencies, caution is appropriate in interpreting such comparisons. In view of the considerable diversity in social behavior among primate species—even among chimpanzees and bonobos, which are the two species most genetically similar to humans (see Parish & De Waal, 2000)—scientists' conclusions can vary with the comparison species selected (Fedigan, 1992; Strier, 1994). Furthermore, because nonhuman primate groups, like humans, vary their social relations according to features of their physical and social environments such as the sex ratio in the local troupe, social behavior is a product of these factors in interaction with a species' genetic predispositions. Given that culture and the local environment are relevant to interpreting behavior of nonhuman primates as well as humans (Boesch & Tomasello, 1998), cross-species comparisons do not provide an

unclouded window through which researchers can identify characteristics inherent in the human species.

Roles of Women and Men in Industrial and Postindustrial Societies

Although our biosocial model of sex differences was tested in the present review against the patterns of sex-typed behavior apparent in the nonindustrial societies typically studied by anthropologists, we believe that our conclusions are also applicable to more complex societies. The principle that the origins of the division of labor and patriarchy lie primarily in female reproductive activity and secondarily in male size and strength explains why profound changes occurred in the status of women in the 20th century in most industrialized countries. Weakening both the traditional division of labor and patriarchy are women's increased control over reproduction through contraception and relatively safe abortions, the marked decline in birth rates, and the decrease in the proportion of productive activities that favor male size and strength. Because of these changes, women have greatly increased their participation in the paid labor force (Reskin & Padavic, 1994), and women's rates of school and university education now exceed those of men in the United States and some other nations (United Nations Development Programme, 2001). Even though the tendency for men to increase their responsibility for child care and other domestic work is modest (Bianchi, Milkie, Sayer, & Robinson, 2000; Shelton & John, 1996), these changes in the division of labor, especially women's decreased child-care obligations and increased entry into paid employment, are associated with a redefinition of the patterns of behavior that are appropriate to women and men.

Given our biosocial analysis, it is not surprising that research tracking sex differences across recent time periods in the United States suggests that psychological attributes and related behaviors of women have changed in concert with their entry into formerly male-dominated roles. Research has documented the erosion of sex differences in a range of attributes over varying time periods beginning as early as the 1930s and extending to the present. Among these changes are the following: (a) The value that women place on job attributes such as freedom, challenge, leadership, prestige, and power has increased to be more similar to that of men (Konrad, Ritchie, Lieb, & Corrigan, 2000); (b) the career aspirations of female university students have become more similar to those of male students (Astin, Parrott, Korn, & Sax, 1997); (c) the

¹³ Findings that more egalitarian societies show larger sex differences in emotions (Fischer & Manstead, 2000) and personality (Costa, Terracciano, & McCrae, 2001) remain ambiguous because these studies did not link particular psychological states with specific sex-differentiated roles that vary between more egalitarian and more patriarchal societies. For example, because egalitarian relations in these societies are not generally reflected in men adopting the caretaking aspects of women's roles (Shelton & John, 1996), the nurturance or emotional expressiveness associated with these roles would not be expected to decrease in women relative to men. Furthermore, variation across societies in sex-typed psychological states is associated with a variety of cultural attributes in addition to patriarchal social structures, including the extent to which societies are individualistic (i.e., members oriented toward personal rather than group interests). In addition to patriarchy, these other attributes can affect societal-level findings of sex-typed emotions and personality traits (Costa et al., 2001).

amount of risky behavior in which women engage has become more similar to that of men (Byrnes, Miller, & Schafer, 1999); (d) the tendency for men rather than women to emerge as leaders in small groups has become smaller (Eagly & Karau, 1991); (e) women's self-reports of assertiveness, dominance, and masculinity have increased to become more similar to men's (Twenge, 1997, 2001); and (f) the tendency for men to score higher than women on tests of mathematics and science has declined (Hedges & Nowell, 1995; Hyde, Fennema, & Lamon, 1990; U.S. Department of Education, 2000). Such findings suggest some convergence in the psychological attributes of women and men in traditionally masculine domains, consistent with women's increasing labor force participation and lesser concentration on child care and other domestic activities (see Eagly & Diekmann, in press).

Despite evidence of substantial social change toward egalitarian social structures in Western industrialized societies, patriarchy remains partially in place. As social dominance theorists have argued (Pratto, 1996; Sidanius & Pratto, 1999), dominant groups tend to maintain their hegemony by creating institutional practices and fostering legitimizing beliefs that support the status quo. Thus, men's political and economic power in patriarchal social structures is perpetuated through male privileges that are incorporated into family structures, organizational practices, and political processes. These varied influences make it more difficult for women than men to move into positions of power and influence (see Eagly & Karau, 2002). Therefore, patriarchal structures are maintained for a longer time than predicted from the underlying changes in birth rates and labor force participation. That the traditional division of labor and patriarchy are maintained in addition by the innate psychological tendencies postulated by evolutionary psychologists has not been convincingly demonstrated. Although Browne (1998) and others have argued that such psychological specialization does explain women's continued lesser wages and lower status in organizations, from our biosocial perspective, the behavior of women and men is sufficiently malleable that individuals of both sexes are potentially capable of effectively carrying out organizational roles at all levels. This conclusion is substantiated by the considerable variability that we found across societies in the activities performed by men and by women.

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