

Sex Differences in Sex Drive, Sociosexuality, and Height across 53 Nations: Testing Evolutionary and Social Structural Theories

Richard A. Lippa

Received: 4 September 2006 / Revised: 14 June 2007 / Accepted: 14 June 2007
© Springer Science+Business Media, LLC 2007

Abstract By analyzing cross-cultural patterns in five parameters—sex differences, male and female trait means, male and female trait standard deviations—researchers can better test evolutionary and social structural models of sex differences. Five models of biological and social structural influence are presented that illustrate this proposal. Using data from 53 nations and from over 200,000 participants surveyed in a recent BBC Internet survey, I examined cross-cultural patterns in these five parameters for two sexual traits—sex drive and sociosexuality—and for height, a physical trait with a biologically based sex difference. Sex drive, sociosexuality, and height all showed consistent sex differences across nations (mean d s = .62, .74, and 1.63). Women were consistently more variable than men in sex drive (mean female to male variance ratio = 1.64). Gender equality and economic development tended to predict, across nations, sex differences in sociosexuality, but not sex differences in sex drive or height. Parameters for sociosexuality tended to vary across nations more than parameters for sex drive and height did. The results for sociosexuality were most consistent with a hybrid model—that both biological and social structural influences contribute to sex differences, whereas the results for sex drive and height were most consistent with a biological model—that evolved biological factors are the primary cause of sex differences. The model testing proposed here encourages evolutionary and social structural theorists to make more precise and nuanced predictions about the patterning of sex differences across cultures.

Keywords Evolutionary theory · BBC Internet study · Sex differences · Sex drive · Sociosexuality · Social structural theory

Introduction

Cross-cultural research provides an important testing ground for both evolutionary and social structural theories of sex differences in sexuality. Proponents of evolutionary theories argue that cross-culturally consistent sex differences in traits such as sociosexuality (i.e., restricted versus unrestricted sexual attitudes and behavior), sexual activity levels, and the characteristics preferred in mates (e.g., physical attractiveness) constitute strong evidence that evolved biological dispositions underlie these sex differences—dispositions that show through the “noise” of cultural variations (Buss, 1989, 2005; Schmitt, 2005). In response, proponents of social structural theories note that there are strong associations, across societies, between indices of gender equality and sex differences in sexuality, and these associations constitute powerful evidence that social and cultural factors contribute to these sex differences (Eagly & Wood, 1999, 2005; Wood & Eagly, 2002).

Despite the either-or tone that often colors the debate between evolutionary and social structural theorists, these two approaches are not necessarily mutually exclusive, and it is likely that both have valid domains of application (Lippa, 2007; Schmitt, 2005). Cross-cultural consistencies in sex differences (e.g., in all countries and cultures studied to date, men score higher than women on sociosexuality) may indeed constitute evidence that there are biological components to these sex differences. At the same time, the power of indices of gender equality to predict sex differences in sexuality across cultures suggests that some sex

R. A. Lippa (✉)
Department of Psychology, California State University,
Fullerton, Fullerton, CA 92834, USA
e-mail: rlippa@fullerton.edu

differences are highly sensitive to cultural ideologies and social ecologies. In a sense, what constitutes the “figure” to one theoretical approach (e.g., explaining systematic cross-cultural variation in sex differences is of primary interest to social structural theory) is background noise to the other (cross-cultural variation is sometimes regarded by evolutionary theory as error variance masking the “main effect” of evolved sex differences).

Recent attempts to test the relative power of evolutionary and social structural theories to account for cross-cultural data on sex differences have been inconclusive, in part because the data to be explained do not decisively distinguish between the two theoretical approaches. To use a statistical metaphor, the models proposed by the two approaches are under-identified by the data that have been used to test them. For example, evolutionary theorists argue that the consistent finding that men score higher than women on sociosexuality in all cultures surveyed to date is strong evidence for evolved sex differences in sociosexuality (Buss, 2005; Schmitt, 2005). Social structural theorists counter that all modern societies display patriarchal social structures, albeit to varying degrees, and thus it is not surprising that all societies show unidirectional sex differences in traits such as sociosexuality, sexual activity levels, and preferences for particular traits in mates (Eagly & Wood, 2005). Thus, the very same findings—unidirectional sex differences in sociosexuality that vary across cultures—can be explained, post-hoc, by both evolutionary and social structural theories.

One goal of the current research was to generate better identified models that could more clearly distinguish between the predictions of evolutionary and social structural theories. One route to achieving this goal is to provide more “data points” to be fitted to the theories’ proposed models. To accomplish this goal, in the research reported here I focused not only on the ability of evolutionary and social structural theories to predict *sex differences* across cultures, but also on their ability to predict the pattern of male and female *mean trait levels* and the pattern of male and female *trait standard deviations (SDs)* across cultures. By attempting to predict the patterns of these additional parameters, researchers may be able to generate better identified models that can discriminate more conclusively between evolutionary and social structural theories. Researchers can also evaluate the predictive power of hybrid models that assume both biological and social structural contributions to sex differences.

To illustrate the promise of these methods, I analyzed a large cross-cultural dataset generated by a recent BBC Internet survey of over 200,000 participants, and I focused particularly on two sexual traits—sex drive and sociosexuality. My goal was to demonstrate that cross-cultural patterns of sex differences, male and female trait means,

and male and female trait SDs were different for these two traits. I argue, based on these findings, that different models of biological and social structural influence are needed to account for the cross-cultural patterns of results for these two sexual traits. Thus, in addition to applying new methods to the cross-cultural study of sex differences, I also examine the possibility that the relative power of evolutionary and social structural theories to explain sex differences may vary depending on the trait under consideration.

In addition to analyzing data on sex drive and sociosexuality, I also conducted parallel analyses on a third, nonsexual trait—self-reported height. Because it seems noncontroversial to assume that sex differences in height are largely determined by evolved genetic differences between the sexes (see Gaulin & Boster, 1985), results for height provide a pure example of the pattern of results that might be expected for a sex difference that is largely biological in origin. This pattern of results can then be compared with the corresponding patterns of results for sex drive and sociosexuality.

Five Hypothetical Cross-National Patterns of Sex Differences, Male and Female Means, and Male and Female SDs

The following sections present five models of how biological and cultural factors might contribute to sex differences, trait means, and trait SDs in psychological traits. It is important to note that these models are not exhaustive. Rather, they constitute a small subset of a large universe of possible models.

The Pure Biological Causation Model

Some sex differences result largely from biological causes. Possible examples are sex differences in height, fundamental voice frequency, waist-to-hip ratios, and individuals’ degree of sexual attraction to men and to women. In the pure biological model, sex differences are constant across cultures and countries, and male and female trait SDs are assumed not to vary across cultures. Male and female trait means may vary across cultures—for example, men’s and women’s mean heights could vary across cultures as a result of biological factors (e.g., genetic differences between ethnic groups) and environmental factors (national and cultural differences in diet and health care). However, if men’s and women’s means vary across cultures, they are assumed to do so in a parallel fashion (e.g., genetic or nutritional factors in given cultures would equally depress or elevate male and female mean heights). Because men’s and women’s means vary in a parallel fashion and men’s and women’s SDs are constant across

cultures, sex differences (whether they are assessed as absolute differences between male and female means or as d statistics) do not vary across cultures.

The relative magnitudes of male and female SDs might vary depending on the particular trait under study. For some traits, such as height, male and female SDs may be almost equal. For other traits, male SDs may be higher than female SDs. Research suggests, for example, that men show more variability than women do in certain cognitive abilities, in their levels of physical aggressiveness, and in their preferences for certain traits in a mate (Archer & Mehdikhani, 2003; Deary, Thorpe, Wilson, Staar, & Whalley, 2003). Other traits, in contrast, may show higher female than male variation. For example, girls often show greater variability in their preferences for sex-typed toys than boys do (Zucker, 2005). Sex differences in trait variability could result from both biological factors (e.g., sexual selection) and environmental factors (stronger cultural influences on one sex than the other).

It is worth noting that consistent sex differences across nations could result from both social structural and biological factors. However, for social structural theories to account for cross-culturally consistent sex differences, culture and social structure would have to have their impact *only* in ways that were perfectly confounded with biological sex, and not at all in ways that produced systematic differences across cultures or sex-by-culture interactions. While theoretically possible, such scenarios seem implausible. They also are inconsistent with recent applications of social structural theory to sex differences. For example, the centerpiece of Eagly and Wood's (1999) reanalysis of Buss' data on sex differences in mate preferences was their demonstration that culture moderated the magnitude of sex differences, i.e., that there were sex-by-culture interactions.

The Pure Social Structural Model with Bidirectional Sex Differences

Some sex differences may result entirely from social structural and cultural factors. The most dramatic and clear-cut demonstration of this would be when sex differences occur equally in both directions and assume varied magnitudes—sometimes men exceed women, sometimes women exceed men, and sometimes there are no sex differences. It is hard to think of substantive examples of psychological traits that follow such a pattern. One hypothetical example is the extent to which boys and girls are dressed in pink versus blue clothing. Some historians and social scientists have argued that associating blue with boys and pink with girls is a social construction that emerged during the 20th century in some western societies (Paoletti & Kregloh, 1989).

I have recently found evidence for a more substantive sex difference that occurs in both directions across countries (Lippa, 2007). In some countries, women value intelligence in a mate more than men do, whereas in other countries the reverse is true. The first kind of countries tend to be traditional, nonaffluent, and characterized by gender inequality, whereas the second kind tend to be modern, affluent, and characterized by gender equality. Intriguingly, this cross-cultural pattern of sex differences results primarily from variations in the importance that *men* assign to a mate's intelligence.

Figure 1 illustrates the pure social structural model with a hypothetical graph that plots, across cultures, the parameters of interest: male means, female means, male SDs, female SDs, and sex differences. Cultures at the right and left ends of the x -axis are “gender polarized” cultures that strongly assign one color to boys and the other color to girls. Cultures in the middle are “gender nonpolarized” cultures, in which pink and blue are not associated with a child's sex. In the pure social structural model, boys' and girls' levels of pink-versus-blue clothing show a crossover effect across cultures—in “boy pink, girl blue” cultures girls are dressed largely in blue and boys in pink, and increasingly, as we move to “boy blue, girl pink” cultures, the reverse is true. Sex differences (d statistics for boys' degree of “blueness” minus girls' degree of “blueness”) range from negative to positive.

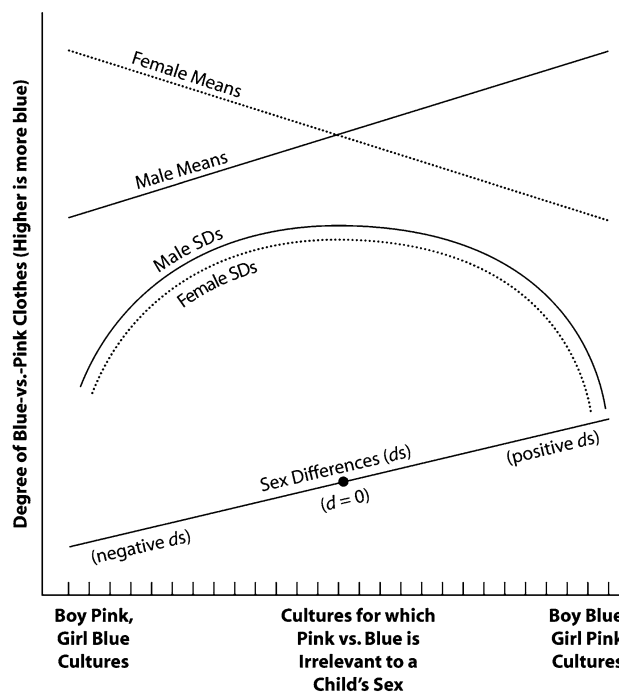


Fig. 1 Patterns of means, SDs, and sex differences across cultures in the pure social structural model with bidirectional sex differences

SDs for both boys and girls are related curvilinearly to the cultural dimension plotted on the x -axis. In gender-polarized cultures, the pink-versus-blueness of children's clothing shows little within-sex variance. In the gender nonpolarized cultures in the middle of the x -axis, however, boys and girls are dressed more variably and, thus, show more within-sex variation on the pink-versus-blue dimension.

The Social Structural Model, with All Societies Patriarchal to Varying Degrees: Version A—Cultural Factors Polarize Men and Women

Social structural theorists have argued that it is often unrealistic to assume that sex differences, even those that are entirely generated by social structural and cultural factors, occur equally in both directions (Eagly & Wood, 2005). The reason is that all modern societies are patriarchal, albeit to varying degrees. Figure 2 illustrates this model with a hypothetical graph that plots across cultures the five parameters of interest: male means, female means, male SDs, female SDs, and sex differences. An example of a behavioral trait that might conform to this model is the percent of individuals' non-recreational time spent as employed workers versus homemakers.

In Fig. 2, the x -axis arrays cultures along a dimension that ranges from low-patriarchal cultures with liberal gender roles

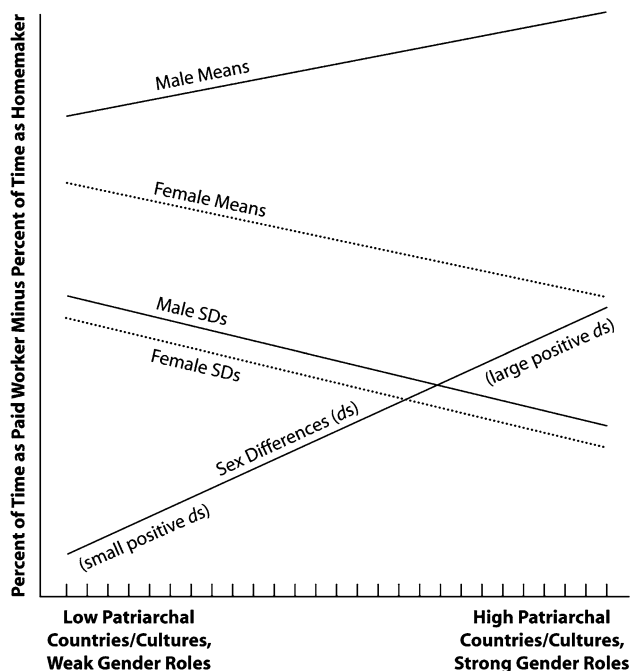


Fig. 2 Patterns of means, SDs, and sex differences across cultures in the social structural model, with all societies patriarchal to varying degrees: Version A—cultural factors polarize men and women

to high-patriarchal cultures with traditional gender roles. Men's and women's means do not show a crossover effect, as was the case in Fig. 1. Rather, the difference between men's and women's means is smallest in low-patriarchal societies (e.g., the sex difference in the time spent in employed work versus homemaking is relatively small in gender-egalitarian societies, but women still work less outside the home and do more housework than men), and the difference is largest in high-patriarchal societies (only men engage in income-producing work, only women engage in housekeeping and domestic work).

For both men and women, within-sex SDs are highest in low-patriarchal societies and lowest in high-patriarchal societies. Sex differences in high-patriarchal cultures are much larger than sex differences in low-patriarchal cultures; and in high-patriarchal cultures, sex differences assessed via d statistics are amplified in comparison to raw difference scores, because they are increased by the decreased within-sex SDs in high-patriarchal cultures as well as by the large mean differences between men and women in these cultures.

The Social Structural Model, with All Societies Patriarchal to Varying Degrees: Version B—Cultural Factors Affect Women More than Men

The previous model assumed that cultural factors affect men and women equally, leading to a polarization of the sexes in patriarchal societies. But this may not always be the case. Baumeister (2000) presented evidence suggesting that women's sexual behaviors tend to be more variable, flexible, and subject to social and cultural influences than men's, whereas men's sexual behaviors tend to be more rigid, inflexible, and channeled by biological urges than women's. Figure 3 illustrates this model with a hypothetical graph plotting across cultures the five parameters of interest: male means, female means, male SDs, and female SDs, and sex differences. A priori, based on Baumeister's review, this model seems a good candidate to apply to the traits of sex drive and sociosexuality.

In Fig. 3, the x -axis arrays cultures along a dimension that ranges from low-patriarchal cultures with liberal gender roles to high-patriarchal cultures with traditional gender roles. Unlike the patterns portrayed in Fig. 2, men's means are relatively impervious to cultural influences, whereas women's means—say, in sociosexuality—decrease markedly as we move from low-patriarchal societies to high-patriarchal societies. Extending Baumeister's hypothesis of greater female than male sexual plasticity, I further assume that women's SDs vary across cultures more than men's do. The pattern portrayed in Fig. 3 is that women are more variable in their levels of sociosexuality in modern, low-patriarchal societies, and they are less variable in more

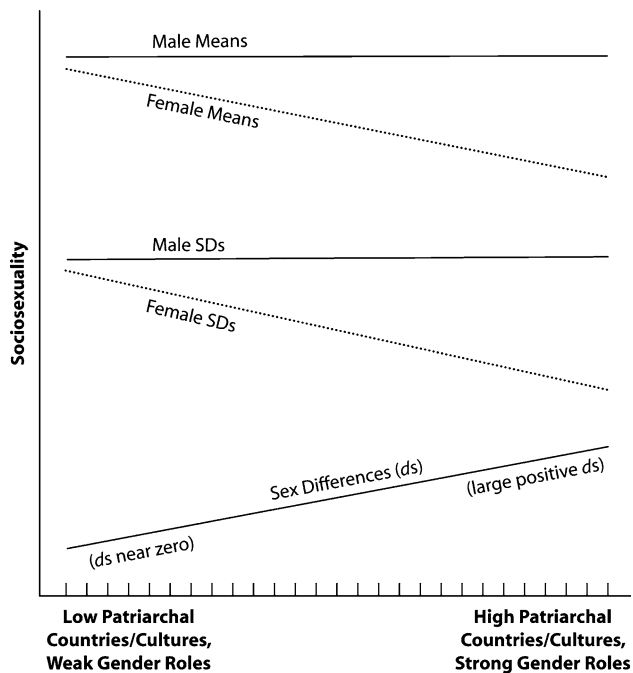


Fig. 3 Patterns of means, SDs, and sex differences across cultures in the social structural model, with all societies patriarchal to varying degrees: Version B—cultural factors affect women more than men

restricted, traditional, high-patriarchal societies. As in the previous model, both reduced means and SDs (in this case, for women only) contribute to amplified d statistics, which show larger sex differences in high-patriarchal societies than raw difference scores do.

A Hybrid Model: Evolved Sex Differences and Social Structural Influences

The previous models assumed either pure biological causation or pure social structural and cultural causation of sex differences. Such either-or partitioning of causation may be unrealistic for many gender-related traits and behaviors (Lippa, 2005). Figure 4 presents one of many possible hybrid models that assume both biological and social structural influences on sex differences. In particular, Fig. 4 presents a model that superimposes the pure biological model with the model portrayed in Fig. 3. Given that the current research focuses on sexual traits and given Baumeister's (2000) hypothesis of greater female than male sexual responsiveness to cultural influences, the current hybrid model seemed a particularly plausible candidate to apply to the traits of sex drive and sociosexuality, assuming that there is a biological as well as cultural component to sex differences in these traits.

The hybrid model presented in Fig. 4 uses sociosexuality as its example. The x -axis of the portrayed graph arrays cultures along a dimension that ranges from unrestricted to restricted sociosexuality. The model assumes that biological

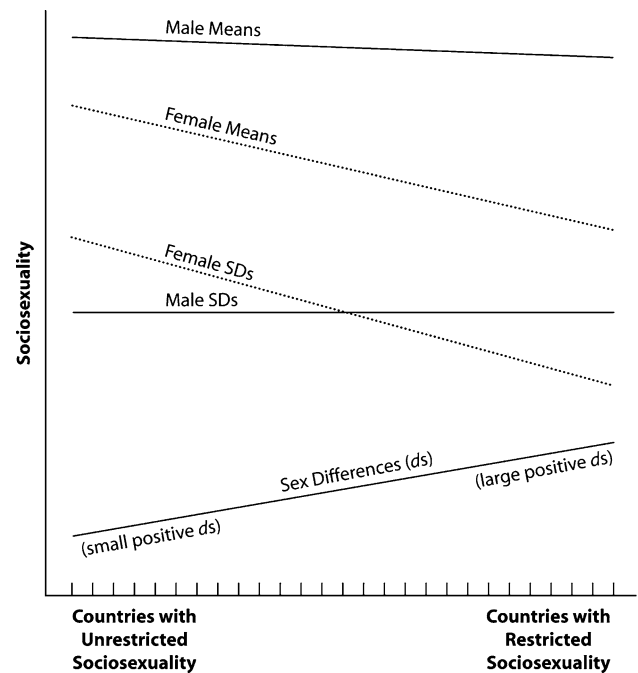


Fig. 4 Patterns of means, SDs, and sex differences across cultures in a hybrid model: evolved sex differences and social structural influences, with all societies patriarchal to varying degrees and cultural factors affecting women more than men

predispositions exist in men and women that produce sex differences in sociosexuality, with men tending to be more unrestricted and women tending to be more restricted in sociosexuality. Superimposed on this biological “main effect” are cultural influences, which affect women’s sociosexuality more than men’s. The net result is that in all cultures men are more unrestricted than women in sociosexuality. However, culture exerts a substantial additional influence. Both men’s and women’s mean levels of sociosexuality are more restricted in restrictive cultures than in nonrestrictive cultures; however, restrictive cultures have a greater impact on women than men.

Predicting the pattern of men’s and women’s SDs in sociosexuality, across cultures, is trickier in the hybrid model than in previous models. The model presented in Fig. 3 (the social structural “parent” of the current model) proposes that women’s SDs will be more influenced by cultural factors than men’s. In the case of sociosexuality, the most reasonable prediction is that women’s variability in sociosexuality will be smaller in restricted than in unrestricted societies. However, a complicating factor in the hybrid model is the possibility that cultural influences interact with biological predispositions. Because of men’s predisposition to unrestricted sociosexuality and women’s predisposition to restricted sociosexuality, unrestricted societies are more congruent with men’s predispositions, whereas restricted societies are more congruent with women’s predispositions. As a result, men may show

particularly low variability in unrestricted societies and particularly high variability in restricted societies, whose cultural pressures conflict with their innate dispositions. Similarly, women may show particularly low variability in restricted societies and particularly high variability in unrestricted societies, whose cultural pressures conflict with their innate dispositions (or, alternately, whose liberal ideologies allow women freer rein to express individual differences in sociosexuality).

When we superimpose the pattern in Fig. 3 (greater cultural influence on women's than on men's SDs) with the biology-culture interaction just hypothesized, the net result is the following: Women show strongly decreased SDs in sociosexuality in restrictive cultures, because they are generally more influenced by cultural pressures than men are and, simultaneously, the cultural press in restrictive cultures is congruent with their innate disposition, so the two influences superimpose and reinforce one another. Effects for men should be weaker, because the effect of culture (restricted cultures reduce variance in sociosexuality) opposes the hypothesized biology-culture interaction (men will show more variable sociosexuality in restrictive cultures, because in these cultures they are subject to the countervailing pushes and pulls of cultural pressures and innate dispositions).

Previous Research on Sex Drive and Sociosexuality

To place the current research on sex differences in sex drive and sociosexuality in a broader context, in the following sections I briefly review previous work on the assessment of these traits and existing evidence on sex differences in sex drive and sociosexuality.

Measurement of Sex Drive and Sociosexuality

A number of self-report measures of sex drive have appeared in recent years (Lippa, 2006; Ostovich & Sabini, 2004; Spector, Carey, & Steinberg, 1996). These scales typically assess respondents' desire for sex, their frequency of sexual activity, their degree of thinking about and fantasizing about sex, and their evaluation of the rewardingness of sex. For example, in a recent study of the relation between sex drive and same-sex and other-sex attractions (Lippa, 2006), I used a five-item sex drive scale that asked participants to rate how much they agreed with the following statements: (1) "I have a strong sex drive;" (2) "I frequently think about sex;" (3) "It doesn't take much to get me sexually excited;" (4) "I think about sex almost every day;" (5) "Sexual pleasure is the most intense pleasure a person can have."

The most commonly used instrument used to assess sociosexuality is the Sociosexuality Orientation Inventory (SOI; Simpson & Gangestad, 1991), a 7-item scale that includes three overt behavior items (e.g., "With how many different partners have you had sex within the past year?"), one covert behavior item ("How often do [did] you fantasize about having sex with someone other than your current [most recent] dating partner?"), and three attitudinal items (e.g., "Sex without love is ok."). Because the behavior items have different response formats from attitudinal and covert behavioral items, Simpson and Gangestad proposed a complex weighting system to combine SOI items (see Simpson & Gangestad, 1991, Appendix A).

Although the SOI shows good internal consistency, highly skewed response distributions for some items and the complex weighting system proposed by Simpson and Gangestad for scoring the SOI have led some researchers to question its psychometric soundness (Voracek, 2005). Another concern is that responses to some items (e.g., those that assess number of sexual partners in the past year and number of one-night stands) depend too much on participants' relationship status. One item (fantasizing about sex with someone other than one's current or most recent dating partner) does not readily apply to married people or to people in committed relationships, and thus it may not be appropriate for studies that assess non-college students. Finally, behavioral items may tend to confound the constructs of sex drive and sociosexuality.

Sex Differences in Sex Drive and Sociosexuality

In a comprehensive review, Baumeister, Catanese, and Vohs (2001) surveyed a broad range of research results indicating that, on average, men's sex drive is higher than women's. In summarizing their findings, they observed that "[t]here were no measures that showed women having stronger drives than men" (p. 264). As part of their review, Baumeister et al. examined research results from several non-western societies, and they concluded that these studies were consistent with other studies showing that men have higher sex drive than women. However, they acknowledged that "[r]igorous data from other cultures are difficult to find..." (p. 268).

There is little quantitative information on the magnitude of sex differences in sex drive. In a recent study (Lippa, 2006, Study 3), I computed a reliable ($\alpha = .82$) multi-item self-report measure of sex drive, and in a sample of over 1,700 participants, heterosexual men and women showed a large difference in their self-reported sex drive ($d = .82$). Furthermore, women were more variable than men in their sex drive (female to male variance ratios were 1.43 for heterosexual participants). Using a less reliable one-item measure of sex drive to assess more than 1,700 college

students (Lippa, 2006, Study 1), I found a smaller but still substantial difference in heterosexual men's and women's sex drives ($d = .58$) and, once again, women's self-reported sex drive was significantly more variable than men's (female to male variance ratio = 1.30). Ostavich and Sabini (2004) used a four-item scale to assess sex drive in 129 college men and 148 college women, and their statistics translated to a very large sex difference ($d = 1.17$). Their data also showed women to be more variable than men in sex drive (female to male variance ratio = 1.60).

An ambitious study by Schmitt (2005) has provided the current gold standard for estimates of sex differences in sociosexuality. Using SOI data collected in 48 nations, Schmitt found d values for sex differences that ranged from .30 to 1.24 in various nations, with an overall mean value of .74. Schmitt concluded that “[t]hese results...place sex differences in sociosexuality...among the largest and culturally most robust ever documented in the domain of sex and human mating” (p. 262). Schmitt further noted that “[w]ithin the constraints of the current methodology and sampling limitations, it can be concluded from these results that sex differences in sociosexuality are a cultural universal, supporting the basic tenets of parental investment theory...” (p. 265).

Social Structural Factors that Correlate with Sex Differences in Sociosexuality across Cultures

In addition to documenting cross-culturally consistent sex differences in sociosexuality, Schmitt (2005) identified a number of cultural, economic, and demographic factors that were associated, across nations, with men's and women's levels of sociosexuality and with sex differences in sociosexuality. For example, indices of nations' degree of gender equality tended to be associated with women's levels of sociosexuality and with sex differences in sociosexuality, with greater gender equality associated with higher levels of sociosexuality in women and smaller sex differences. Measures of economic and environmental stress (e.g., as assessed by infant mortality rates, life expectancy, and gross domestic product) were associated, across nations, with lower levels of sociosexuality in both men and women. Schmitt viewed these findings as providing strong support for strategic pluralism theory, which proposes that humans have evolved a menu of mating strategies, which are triggered by environmental contingencies (Gangestad & Simpson, 2000). Finally, higher sex ratios (more men than women) were associated with lower national levels of sociosexuality, supporting some of the predictions of sex ratio theory (Guttentag & Secord, 1983; Lazarus, 2002; Pedersen, 1991). The results that follow will, among other things, test whether Schmitt's findings replicate in another large international sample.

Method

Participants and Procedure

From February through May 2005, the British Broadcasting Corporation (BBC) conducted an English-language Internet survey, which focused on human sex differences in cognition, motivation, personality, and sexuality. The survey, designed to produce data for use in the BBC documentary *Secrets of the Sexes*, was advertised on the BBC website and participants responded online. Because of the broad reach of the BBC as an international news source, survey participants came from all over the world. Participants could complete a variety of psychological tests and questionnaires, which were arranged in six modules, each of which took about five minutes to complete. A total of 255,114 people responded to at least some items in every module. In the course of responding to approximately 200 questions, most participants reported their sex and height and completed a two-item sex drive scale and a three-item scale that assessed the attitudinal component of sociosexuality.

For the entire BBC sample, men's median age was 30 ($M = 32.26$, $SD = 11.26$), and women's median age was 28 ($M = 31.11$, $SD = 10.83$). The current analyses focused on participants whose ages were ≥ 18 and ≤ 80 years. The breakdown of participants by reported relationship status was: 29% married, 29% single, 16% living together in a serious relationship, 15% living apart in a serious relationship, 8% in a causal relationship, 3% divorced, and under 1% widowed. Participants came from countries across the world, but the largest numbers were from the United Kingdom (45%), the United States (29%), Canada (5%), and Australia (4%). Participants from continental Western Europe made up about 6% of the sample.

Fifty-three nations in the BBC dataset had samples of 90 or more participants. In many of the national samples, there were roughly equal numbers of men and women, although there was a tendency for men to outnumber women. In all national samples but two, both male and female sample sizes were larger than 40. The two exceptions were Venezuela (female $n = 32$ for sociosexuality and sex drive scores) and Saudi Arabia (female $n = 20$ for sociosexuality and sex drive scores). In his 48-nation study of sociosexuality, Schmitt (2005) noted that “[a]t least 25 men and 25 women were needed to achieve the necessary statistical power for evaluating sex differences...(when setting $\beta = .80$, $\alpha = .05$, and looking for an effect moderate to large in size...)” (p. 253). All of the male and female samples in the current study achieved this criterion, except for the sample of Saudi women. For additional demographic information about the BBC sample, see Lippa (2007) and Reimers (2007).

Measures

Demographic

Demographic information collected by the BBC Internet survey included age, relationship status, country of residence, ethnicity, education level, and income level. For an overview of the BBC Internet survey, its questions, and their response formats, see Reimers (2007).

Nations' Dominant Religions

Most of the 53 nations studied in the current study were classified, based on their majority religions, as Buddhist, Catholic, Eastern Orthodox, Hindu, Jewish, Moslem, Protestant, or Taoist. Information about dominant religions was obtained from the *US Department of State International Religious Freedom Report 2004*. If Catholics or Protestants did not constitute a majority in a given country, but Christians nonetheless formed a majority of the population, then nations were classified as “mixed Christian.” The five religious groupings that included the most nations were: Catholic (Argentina, Austria, Belgium, Brazil, Chile, Croatia, France, Hungary, Italy, Ireland, Lithuania, Malta, Mexico, the Philippines, Poland, Portugal, Slovenia, Spain, and Venezuela); Eastern Orthodox (Bulgaria, Cyprus, Greece, Romania, and Russia); Moslem (Egypt, Pakistan, Turkey, Saudi Arabia, and the United Arab Emirates); Protestant (Denmark, Finland, Iceland, Norway, South Africa, Sweden, the United Kingdom, and the United States); and mixed Christian (Australia, Canada, Germany, the Netherlands, New Zealand, Switzerland, and Trinidad and Tobago).

Sex Drive, Sociosexuality, and Height

In one section of the BBC survey, participants were asked about their romantic and sexual relationships, and there were two items that assessed sex drive: “I have a strong sex drive” and “It doesn’t take much to get me sexually excited.” Participants responded to these items using a 7-point scale that ranged from “disagree” to “agree.” This section also included three items that assessed the attitudinal component of sociosexuality: “Sex without love is OK.” “I can imagine myself being comfortable and enjoying casual sex with multiple partners.” “I would have to be closely attached (emotionally and psychologically) to someone before I’d feel comfortable and fully enjoy having sex with him/her.” Response formats were the same as for sex drive items. Sex drive and sociosexuality scores were computed from these items, with appropriate items reversed.

The decision to use just attitudinal sociosexuality items was based on three considerations. First, although a number

of behavioral SOI items were included in the BBC survey, their wording was sometimes different from that in the original SOI and some were targeted at only a subset of the BBC participants (e.g., single participants). Second, computing sociosexuality from just the attitudinal items sidestepped some of the psychometric problems that affect the full sociosexuality scale. Third, the current research sought to compare and contrast results for sex drive and sociosexuality. Because sex drive and attitudinal sociosexuality items in the BBC survey used exactly the same response format and because the sex drive and sociosexuality scales were both short (a two-item and a three-item scale), the two measures were psychometrically similar—a major virtue in the current analyses.

The BBC survey assessed participants’ height by asking them to type in, as string variables, their height in feet and inches or in meters. In the final data files, heights were converted to feet and inches. To exclude implausibly low or high values for height, I included in my analyses only heights that ranged from 56 to 84 inches (four feet eight inches to seven feet). The number of participants who had useable height information was somewhat smaller than the number who had valid sex drive and sociosexuality scores.

Gender Equality, Economic Development, and Sex Ratios

Statistics for United Nations gender-related development and gender empowerment indices were taken from the United Nations 2005 and 2001 Human Development Reports (available at: <http://www.hdr.undp.org/statistics/data/>, see the section on “data by indicator”). The UN gender-related development index assesses nations’ gender equity on three dimensions: health and longevity, standard of living, and knowledge and education. The UN gender empowerment measure assesses nations’ gender equity on three power dimensions: power over economic resources, participation in economic decision making, and participation in political decision making. In several cases, when 2005 statistics were not available for given nations, I used 2001 statistics instead. United Nations gender empowerment statistics were not available for six of the 53 nations studied here.

Indices of economic development were also obtained from UN Human Development reports. These included nations’ per capita income in U.S. dollars, life expectancy, infant mortality per thousand live births, fertility rates, and rates of contraception use. A final variable, national sex ratios for people aged 15–64 years of age, was obtained from the *World Fact Book 2005*, a publication of the United States Central Intelligence Agency (<http://www.odci.gov/cia/publications/factbook/index.html>).

Results

Reliability of Sex Drive and Sociosexuality Across Nations and the Correlation of Sex Drive and Sociosexuality

Mean reliabilities (α) over all 53 nations for sex drive and sociosexuality were .72 and .78, respectively. Reliabilities for sex drive and sociosexuality computed over all participants were .79 and .81, respectively. Over all participants, sex drive and sociosexuality were modestly correlated, $r(210277) = .28, p < .001$. The correlation of sex drive and sociosexuality was lower when computed separately for men, $r(115923) = .21, p < .001$, and for women, $r(94253) = .20, p < .001$, suggesting that the association between sex drive and sociosexuality in the entire sample was partly due to the fact that both variables were correlated with sex.

Intercorrelation of Indices of Gender Equality, Economic Development, and Sex Ratios

Table 1 presents intercorrelations of indices of gender equality, economic development, and sex ratios. The two UN indices (gender development and gender empowerment) were highly correlated ($r = .82$) and they were also substantially correlated with indices of economic development. In general, the correlations in Table 1 show that countries that were gender egalitarian also tended to be high on economic development, whereas countries that were gender nonegalitarian tended to be low on economic development. The only measure that was relatively independent of other measures was that of national sex ratios.

Sex Drive

The following sections present the core analyses of the current study, with one section devoted to each of the three traits under study: sex drive, sociosexuality, and height. In each section, I first examine the intercorrelations of male and female means, male and female SDs, and sex differences for the trait under study. The goal was to see which factor contributed most to sex differences: male means, female means, male SDs, or female SDs. A second goal was to see whether there were national traits of sex drive, sociosexuality, and height. To the extent that male and female means correlated strongly across nations, then this provided evidence for national traits (e.g., if male and female heights strongly correlated across nations, then this would indicate there were consistently “shorter” and “taller” nations, on average).

To investigate the power of cultural and social structural factors to predict sex differences and other parameters, I

Table 1 Intercorrelations across nations of United Nations indices of gender development and gender empowerment, indices of economic development, and sex ratios

	UN gender development	UN gender empowerment	Per capita income	Life expectancy	Infant mortality	Fertility	Contraception	Sex ratios
UN gender development	–							
UN gender empowerment	.82*** (47)	–						
Per capita income	.78*** (52)	.79*** (47)	–					
Life expectancy	.84*** (53)	.69*** (47)	.68*** (52)	–				
Infant mortality	–.91*** (53)	–.60*** (47)	–.57*** (52)	–.82*** (53)	–			
Fertility	–.67*** (53)	–.49*** (47)	–.34* (52)	–.46*** (53)	.70*** (53)	–		
Contraception	.59*** (45)	.59*** (39)	.50*** (44)	.39*** (45)	–.43*** (45)	–.51*** (45)	–	
Sex ratios	–.13 (53)	–.19 (47)	.09 (52)	.10 (53)	.03 (53)	.34 (53)	–.46** (45)	–

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. Numbers in parentheses are sample sizes. All indices are taken from 2005 and 2001 United Nations Human Development Reports, except for measures of sex ratios, which come from the CIA World Fact Book, 2005

present for each trait the correlations between social indices and the five parameters of interest: male means, female means, male SDs, female SDs, and sex differences. To the extent that social indices predict parameters strongly (e.g., UN indices of gender equality predict sex differences in sociosexuality), then this provides evidence that there is systematic variation across nations in the parameters. However, if social indices do not predict parameters, then there is little evidence for systematic national and cultural variation, and the likelihood increases that sex differences—particularly those that are consistent across nations—have biological causes.

To elucidate the observed patterns of correlations, I present for each trait graphs of the five parameters of interest: male means, female means, male SDs, female SDs, and sex differences. In these graphs, nations were arrayed along the x -axis in the order of the magnitude of their sex differences. These graphs correspond closely to the graphs presented for the hypothetical models presented in the introduction. In a final set of analyses, I use regression analyses to compare the power of sex, gender equality as assessed by UN indices, and their interaction to predict male and female trait means across 53 nations.

Intercorrelations of Male and Female means, Male and Female SDs, and Sex Differences in Sex Drive

For sex drive, sex differences as assessed by the raw difference between male and female means correlated .97 ($p < .001$) with d scores, and thus these two measures of sex differences were essentially the same. Because d values are the conventional way to assess sex differences, I used them in the current analyses.

Male and female SDs correlated relatively weakly with d statistics ($r = -.36$, $p < .01$, and $r = .24$, $p < .10$), whereas male and female means correlated more strongly with d statistics ($r = .56$ and $-.51$, respectively; $p < .001$ for both).

This is the intuitively expected pattern: d statistics (i.e., sex differences in sex drive) can increase for two reasons—if men’s means increase or if women’s means decrease. Men’s mean sex drive correlated modestly ($r = .40$, $p < .01$) with women’s mean sex drive across nations. This indicated that there were not strongly consistent national levels of sex drive—i.e., there were not consistently “low sex drive nations” and “high sex drive nations.”

Correlations between Social Indices and Sex Drive Parameters

Were sex differences in sex drive predicted, across nations, by cultural and social structural factors? Table 2 presents correlations between societal indices and the five parameters of interest: men’s means, women’s means, men’s SDs, women’s SDs, and sex differences in sex drive. The right-most column of Table 2 shows that most correlations between indices and sex differences in sex drive were not significant. Some correlations between indices and men’s and women’s mean sex drive levels across nations were significant, but most of these correlations tended to be modest in magnitude. Gender equality, per capita income, life expectancy, and contraception levels were weakly associated with *decreases* in men’s and women’s average levels of sex drive. In contrast, fertility rates and sex ratios were associated with higher levels of male sex drive.

The pattern of correlations in Table 2 is clarified by Fig. 5, which graphically portrays the five parameters of interest across the 53 nations, arrayed in order of the magnitude of their sex differences in sex drive. The most striking feature of Fig. 5 was the consistency of sex differences across nations. The graphs of men’s means and women’s means tended to be parallel across the 53 nations, with men’s means always higher than women’s means. A paired-data t -test showed that these sex differences were highly significant across nations, $t(52) = 30.88$, $p < .001$,

Table 2 Correlations, across nations, between social indices and sex drive parameters

	Men’s mean sex drive	Women’s mean sex drive	Men’s SDs	Women’s SDs	Sex differences (ds)
UN gender development	-.34* (53)	-.28* (53)	.20 (53)	-.18 (53)	-.10 (53)
UN gender empowerment	-.25 [†] (47)	-.22 (47)	.33* (47)	-.09 (47)	-.06 (47)
Per capital income	-.25 [†] (52)	-.30* (52)	.33* (52)	-.07 (52)	.01 (52)
Life expectancy	-.23 (53)	-.31* (53)	.10 (53)	-.03 (53)	.04 (53)
Infant mortality	.28* (53)	.19 (53)	-.04 (53)	.24 [†] (53)	.11 (53)
Fertility	.42** (53)	.11 (53)	-.11 (53)	.35* (53)	.30* (53)
Contraception	-.65*** (45)	-.31* (45)	.48** (45)	-.06 (45)	-.39** (45)
Sex ratios	.39** (53)	.18 (53)	-.27 [†] (53)	-.06 (53)	.26 [†] (53)

Note: [†] $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$. Numbers in parentheses are sample sizes

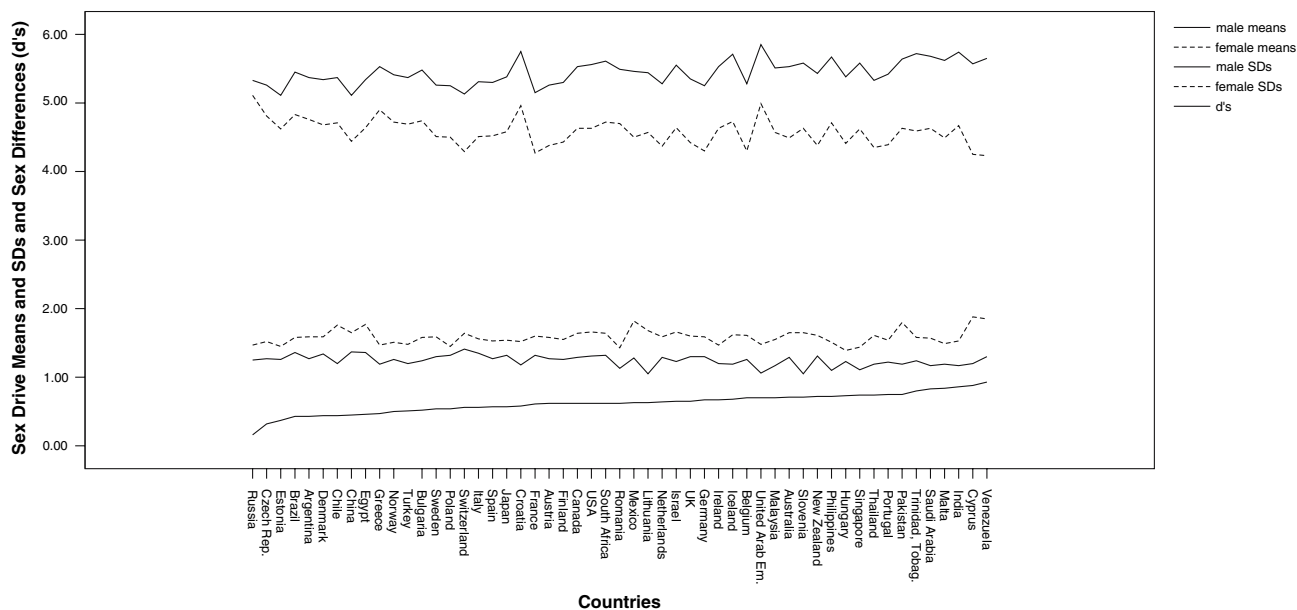


Fig. 5 Sex drive parameters across 53 nations presented in order of their sex differences in sex drive

$d = 4.24$. The very large d value may seem puzzling, given that the mean d for sex drive, across nations, was $.62$. However, d values for nations were computed with *individuals* as the unit of analysis, whereas in the paired-data t -test, *nations* was the unit of analysis and the data points were national means. Thus, at the level of nations, men's mean sex drive levels were consistently much higher than women's mean sex drive levels.

Examination of Fig. 5 also reveals a second dramatic sex difference: Across nations, female SDs in sex drive were consistently higher than male SDs. This difference was also significant and strong, paired-data $t(52) = -20.75$, $p < .001$, $d = -2.85$, mean female-to-male variance ratio across nations = 1.64.

As noted earlier, nations were arranged along the x-axis in order of their sex differences in sex drive in Fig. 5. Because the graph of sex differences increased in such an orderly fashion, it is tempting to see this increase as reflecting systematic factors. However, this was not the case. The ordering of nations in Fig. 5 did not show any culturally or demographically coherent pattern. Furthermore, the largest-sample nations (e.g., the United Kingdom, the United States, Canada, Australia, and a number of European nations) tended to be in the middle of the list, whereas many small-sample nations were to the left and right sides of the array. This suggests that variations in effect sizes resulted from sampling error, not from systematic factors. Figure 6 makes this point more apparent by plotting effect sizes as a function of the log of sample sizes.

The scatter plot shows that, for large-sample nations, effect sizes were stable, clustering around $.60$ whereas, for small-sample nations, effect size values scattered considerably about this mean level. Indeed, when effect sizes were regressed on the log of sample sizes, the regression line was essentially flat ($\beta = .05$, ns), indicating that mean effect sizes did not vary across samples of various sizes. However, log sample size correlated significantly with the absolute value of residuals, $r = -.46$, $p = .001$ —that is, larger sample sizes were associated with less variable effect sizes. Thus, much of the variation in d values, across nations, appeared to result from sampling error, not from systematic differences across nations and cultures.

Sex and Gender Equality as Predictors of Mean Levels of Sex Drive

Using regression analysis, I examined the power of sex and gender equality to predict male and female means across cultures. The data points were the 53 male means and the 53 female means for sex drive. The predictor variables were sex, coded as “1” for males and “2” for females, and gender equality (the mean of the two highly correlated UN indices). An interaction term was also entered into the regression—the product of the standardized sex and gender equality variables.

These three orthogonal variables significantly predicted male and female sex drive means, multiple $r = .93$, $r^2 = .86$, $p < .001$, with sex the strongest predictor: β for sex = $-.92$, $p < .001$; β for gender equality = $-.11$, $p = .005$; and β for

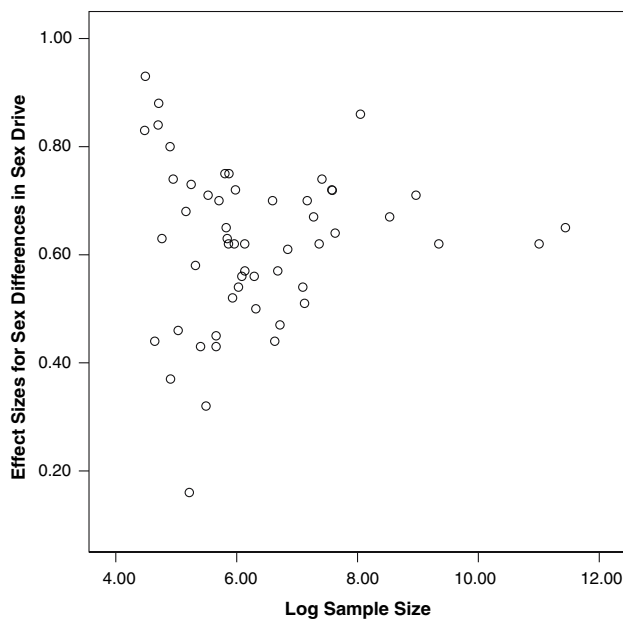


Fig. 6 Sex differences in sex drive in 53 nations as a function of the logarithm of sample sizes

the interaction = .01, *ns*. These results are consistent with the graphs of male and female sex drive means in Fig. 5, which show a highly consistent sex difference across nations, not much variation in men's and women's sex drive levels across nations, and quite parallel graph lines for men and women (i.e., no interaction).

When a corresponding regression was run on men's and women's SDs, the prediction was again strong, multiple $r = .88$, $r^2 = .78$, $p < .001$, and again sex proved to be the strongest predictor: β for sex = .88, $p < .001$; β for gender equality = .03, *ns*; and β for the interaction = $-.10$, $p < .05$. The large β -weight for sex demonstrated again that women consistently had larger SDs in sex drive than men did across nations. The small interaction effect indicated that the difference between women's and men's SDs tended to be smaller in gender egalitarian societies. Note that in both the regression on means and in the regression on SDs sex differences were much more powerful than culture effects or sex-by-culture interactions.

Sociosexuality

The second series of analyses focused on sociosexuality. These analyses corresponded closely to the analyses reported for sex drive.

Intercorrelations of Male and Female means, Male and Female SDs, and Sex Differences in Sociosexuality

For sociosexuality, raw difference scores between men's and women's means correlated .99 ($p < .001$) with d

scores, and thus these two measures of sex differences were essentially the same. Therefore as before, I used d scores as measures of sex differences.

Female means and SDs correlated strongly with sex differences ($r = -.78$ and $-.73$, respectively; $p < .001$ for both), but men's means and SDs did not ($r = -.32$, $p < .05$, and $.19$, *ns*). This suggests that it was primarily variations in women's sociosexuality that determined the magnitude of sex differences. Men's mean sociosexuality correlated strongly ($r = .83$, $p < .001$) with women's mean sociosexuality across nations. This indicated that there were consistent national levels of sociosexuality—i.e., there were “low sociosexuality nations” and “high sociosexuality nations.”

Correlations between Social Indices and Sociosexuality Parameters

Were sex differences in sociosexuality predicted, across nations, by cultural and social structural factors? Table 3 presents correlations between societal indices and the five parameters of interest: men's means, women's means, men's SDs, women's SDs, and sex differences in sociosexuality. Unlike the corresponding results for sex drive, the right-most column of Table 3 shows that sex differences in sociosexuality were strongly associated with various indices. The UN gender development index and the UN gender empowerment index accounted respectively for 34% and 45% of the cross-nation variation in sex differences in sociosexuality, with higher gender equality associated with smaller sex differences. Measures of economic development were also strongly correlated with sex differences in sociosexuality, with higher levels of economic development significantly associated with smaller sex differences in sociosexuality. However, sex ratios were not associated with sex differences in sociosexuality.

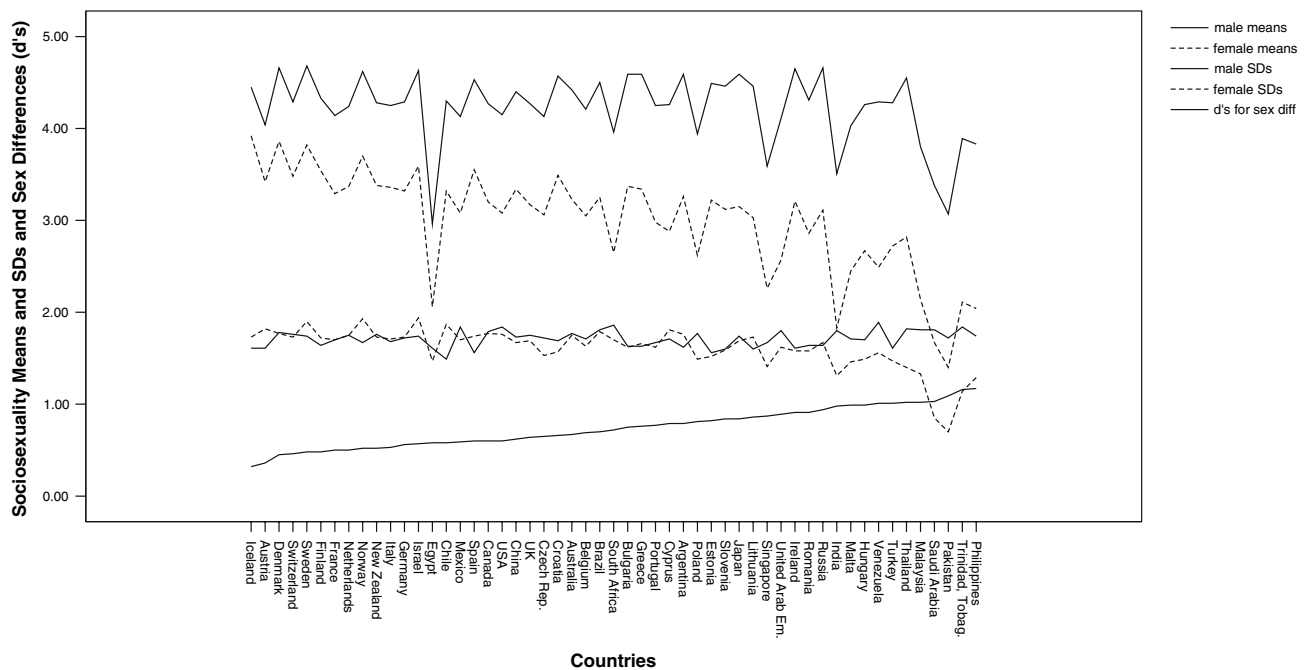
Gender equality and economic indices were also strongly associated with men's means, women's mean, and women's SDs in sociosexuality. Gender equality and economic development were correlated with higher mean levels of sociosexuality, both for men and women; however, these associations tended to be stronger for women than for men. Furthermore, for women, gender equality and economic development were associated, across nations, with greater variability in sociosexuality.

The pattern of correlations in Table 3 is clarified by Fig. 7, which graphically portrays the five parameters of interest across the 53 nations, arranged in order of the magnitude of their sex differences. This graph looks remarkably like the hypothetical graph presented in Fig. 4 for the hybrid model, which assumes both biological and social structural contributions to sex differences. The graph shows that both men's and women's mean sociosexuality

Table 3 Correlations, across nations, between social indices and sociosexuality parameters

	Men's means, sociosexuality	Women's means, sociosexuality	Men's SDs	Women's SDs	Sex differences (<i>ds</i>)
UN gender development	.64*** (53)	.76*** (53)	-.19 (53)	.67*** (53)	-.58*** (53)
UN gender empowerment	.48** (47)	.71** (47)	.04 (47)	.62*** (47)	-.67*** (47)
Per capita income	.32* (52)	.58*** (52)	-.02 (52)	.48*** (52)	-.63*** (52)
Life expectancy	.38** (53)	.55*** (53)	-.21 (53)	.47*** (53)	-.50*** (53)
Infant mortality	-.55*** (53)	-.62*** (53)	.24 [†] (53)	-.57*** (53)	.42** (53)
Fertility	-.63*** (53)	-.62*** (53)	.33* (53)	-.55*** (53)	.32* (53)
Contraception	.55*** (45)	.71*** (45)	-.15 (45)	.64*** (45)	-.60*** (45)
Sex ratios	-.25 [†] (53)	-.27 [†] (53)	.24 [†] (53)	-.25 [†] (53)	.14 (53)

Note: [†] $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$. Numbers in parentheses are sample sizes

**Fig. 7** Sociosexuality parameters across 53 nations presented in order of their sex differences in sociosexuality

levels decrease as we move from left to right, from small to large sex differences in sociosexuality. Superimposed on the downward slope of male and female means was a consistent sex difference in sociosexuality, with men higher than women. A paired-data *t*-test showed that this sex difference was significant and strong, $t(52) = 27.60$, $p < .001$, $d = 3.79$. The mean *d*-value for sex differences in sociosexuality across 53 nations was .74.

Women's SDs in sociosexuality decreased as we move from left to right, whereas men's SDs were more stable. The result was a crossover in female and male SDs. To the left side of the graph women's SDs tended to be larger than men's, whereas to the right side of the graph men's SDs tended to be larger than women's. This crossover effect was

significant: across nations, the difference between women's and men's SDs correlated significantly with sex differences in sociosexuality, $r = -.70$, $p < .001$.

There were systematic differences between the low-sex-difference nations to the left and the high-sex-difference nations to the right of Fig. 7. On the left side are Iceland, Austria, Denmark, Switzerland, Sweden, Finland, France, and the Netherlands, and on the right side are the Philippines, Trinidad and Tobago, Pakistan, Saudi Arabia, Malaysia, Thailand, Turkey, and Venezuela. As the correlations in Table 6 suggest, nations to the left side of the x-axis tended to be high on gender equality and economic development, whereas nations to the right side of the x-axis tended to be low on gender equality and economic development.

Sex and Gender Equality as Predictors of Mean Levels of Sociosexuality

As in the analyses of sex drive, I examined the power of sex and gender equality to predict male and female means across cultures. The data points were the 53 male means and the 53 female means for sociosexuality. The predictor variables were sex, gender equality (the mean of the two UN indices), and an interaction term.

These three orthogonal variables significantly predicted male and female sociosexuality means, multiple $r = .90$, $r^2 = .81$, $p < .001$: β for sex = $-.79$, $p < .001$; β for gender equality = $.41$, $p < .001$; and β for the interaction = $.14$, $p = .002$. These results are consistent with the graph of male and female means for sociosexuality presented in Fig. 7, which shows a highly consistent sex difference across nations, a systematic decline across nations in both men's and women's mean sociosexuality levels, and a steeper decline in women's than in men's sociosexuality across nations (i.e., an interaction effect).

Note that the interaction between sex and gender equality in the current analysis tapped the same phenomena that the correlations between UN indices and sex differences did in Table 3. However, the current analysis reminds us that although the power of culture (i.e., structural measures of gender equality) to moderate sex differences was real and substantial for sociosexuality, when one predicts the overall pattern of male and female means, the main effects for sex ($\beta^2 = .62$) and for culture ($\beta^2 = .17$) were much stronger than the moderating effect of culture on sex differences ($\beta^2 = .02$ for the interaction). Stated another way, although culture moderated the magnitude of sex differences, it was never the case that culture eliminated these sex differences, which remained quite powerful overall, despite the presence of significant cultural main effects and interactions.

When a similar regression was conducted on men's and women's SDs for sociosexuality, the prediction was not as strong, but still substantial, multiple $r = .68$, $r^2 = .47$, $p < .001$: β for sex = $-.28$, $p < .001$; β for gender equality = $.43$, $p < .001$; and β for the interaction = $.45$, $p < .001$. The interaction effect once again indicated that there was a crossover of women's and men's SDs as we move from gender egalitarian to gender nonegalitarian nations. The main effect for sex reflected the fact that, in general, men's SDs were a bit higher than women's, paired-data $t(52) = 2.84$, $p = .006$, $d = .39$, and the main effect for culture reflected the fact that SDs in sociosexuality tended to be smaller in gender nonegalitarian than in gender egalitarian societies. It is interesting to note that the sex difference in sociosexuality SDs, to the extent it was present, was opposite in direction to the sex difference in sex drive SDs.

Height

In the following sections, I report analyses for height that correspond to the analyses reported in the previous sections for sex drive and sociosexuality. Recall that I assumed at the start that sex differences in height are largely caused by biological factors, and thus the results that follow should illustrate the patterns of results expected for a trait with a biologically caused sex difference.

Intercorrelations of Male and Female means, Male and Female SDs, and Sex Differences in Height

Unlike the corresponding results for sex drive and sociosexuality, difference scores and d statistics for height were only moderately correlated ($r = .51$, $p < .001$). The reason for this relatively weak correlation was that d statistics for height correlated strongly with men's and women's SDs ($r = -.79$ and $-.57$, respectively), but only weakly with men's and women's mean heights ($r = -.04$ and $-.27$, respectively), and thus variations in d scores for height were much more a function of SDs than of means. Variations in men's and women's SDs in height were, in turn, largely a function of sample size, as illustrated by Fig. 8, which presents a scatter plot of male and female SDs as a function of the logarithm of male and female sample sizes. In this plot, SDs clustered narrowly around a value of three inches in large samples, but they were much more scattered in small samples. The net result was that sex differences in height, as

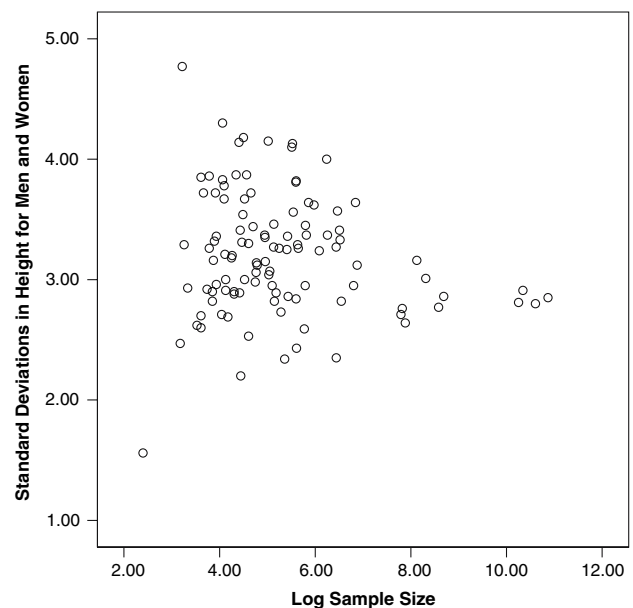


Fig. 8 SDs of men's and women's height in 53 nations as a function of the logarithm of sample sizes

assessed by d statistics, were greatly influenced by random error in the estimation of SDs. Consequently, raw difference scores provide a better measure of sex differences in height than d statistics do and, therefore, raw difference scores were used in the analyses that follow.

Men's and women's mean heights were strongly correlated, across nations ($r = .93$, $p < .001$), indicating that there were consistent national levels of heights—i.e., there were “shorter” nations (e.g., India, Pakistan, the Philippines, Singapore) and there were “taller” nations (Estonia, Lithuania, the Netherlands, Norway).

Correlations between Social Indices and Height Parameters

Were sex differences in height predicted, across nations, by cultural and social structural factors? Table 4 presents correlations between societal indices and the five parameters of interest: men's means, women's means, men's SDs, women's SDs, and sex differences in height. The right-most column of Table 4 shows that sex differences in height did not correlate significantly with any index. There were, however, significant correlations between indices and men's and women's mean heights across nations. In general, gender equality and economic development were associated with greater height. This may seem surprising at first glance, but upon reflection the finding makes sense. Countries high on gender equality tend to be affluent countries with good nutrition and good health care, both of which may serve to increase the average height of citizens. In general, indices of gender equality and economic development were not associated with men's and women's SDs in height.

The pattern of correlations in Table 4 is clarified by Fig. 9, which graphically portrays the five parameters of interest across the 53 nations, arrayed in order of the magnitude of their sex differences. The most striking feature of Fig. 9 is the consistency of sex differences in height

across nations. The graphs of men's means and women's means tended to be quite parallel across the 53 nations, with men's means always higher than women's means. A paired-data t -test showed that sex differences in height were highly significant across nations and very strong, $t(52) = 101.08$, $p < .001$, $d = 13.88$, mean sex difference = 5.26 inches, mean of 53 national d s = 1.63.

Examination of Fig. 9 also shows that men's and women's SDs appear not to differ much—all SDs were clustered around 3 inches. Although it is not visually apparent, men's SDs ($M = 3.37$) were slightly larger than women's SDs ($M = 3.03$), paired-data $t(52) = 4.42$, $p < .001$, $d = .61$. The mean ratio of male to female SDs (1.11) was close to the mean ratio of male to female heights (1.08), and thus the larger male SDs may simply reflect the influence of a scaling factor—the taller group (men) had slightly larger SDs in height than the shorter group (women).

Although nations are arranged in Fig. 9 in order of the magnitude of their sex differences in height, this order was most likely due to random factors, for the sex difference in height was very stable across nations. Examination of the order of nations in Fig. 9 revealed no systematic pattern.

Sex and Gender Equality as Predictors of Mean Levels of Height

As in previous analyses, I examined the power of sex and gender equality to predict male and female means across cultures. The data points were the 53 male means and the 53 female means for height. The predictor variables were sex, UN gender equality, and a sex-by-gender equality interaction term.

These three orthogonal variables significantly predicted male and female mean heights, multiple $r = .96$, $r^2 = .92$, $p < .001$, with sex proving to be the strongest predictor: β for sex = $-.94$, $p < .001$; β for gender equality = $.17$, $p < .001$; and β for the interaction = $-.01$, *ns*. These results were consistent with the graphs of male and female mean heights in

Table 4 Correlations, across nations, between societal variables and height parameters

	Men's means, height	Women's means, height	Men's SDs	Women's SDs	Sex differences (raw diffs.)
UN gender development	.50*** (53)	.51*** (53)	.07 (53)	.20 (53)	.14 (53)
UN gender empowerment	.50*** (47)	.48** (47)	-.09 (47)	.17 (47)	.22 (47)
Per capita income	.38** (52)	.36** (52)	-.15 (52)	.04 (52)	.19 (52)
Life expectancy	.21 (53)	.25 [†] (53)	-.10 (53)	.06 (53)	-.02 (53)
Infant mortality	-.40** (53)	-.45** (53)	-.17 (53)	-.25 [†] (53)	-.02 (53)
Fertility	-.63*** (53)	-.64*** (53)	-.22 (53)	-.46** (53)	-.20 (53)
Contraception	.42** (45)	.45** (45)	.30* (45)	.26 [†] (45)	.09 (45)
Sex ratios	-.23 [†] (53)	-.27* (53)	-.32* (53)	-.34* (53)	.02 (53)

Note: [†] $p < .1$, * $p < .05$, ** $p < .01$, *** $p < .001$. Numbers in parentheses are sample sizes. For height, sex differences were assessed as raw difference scores (male means – female means)

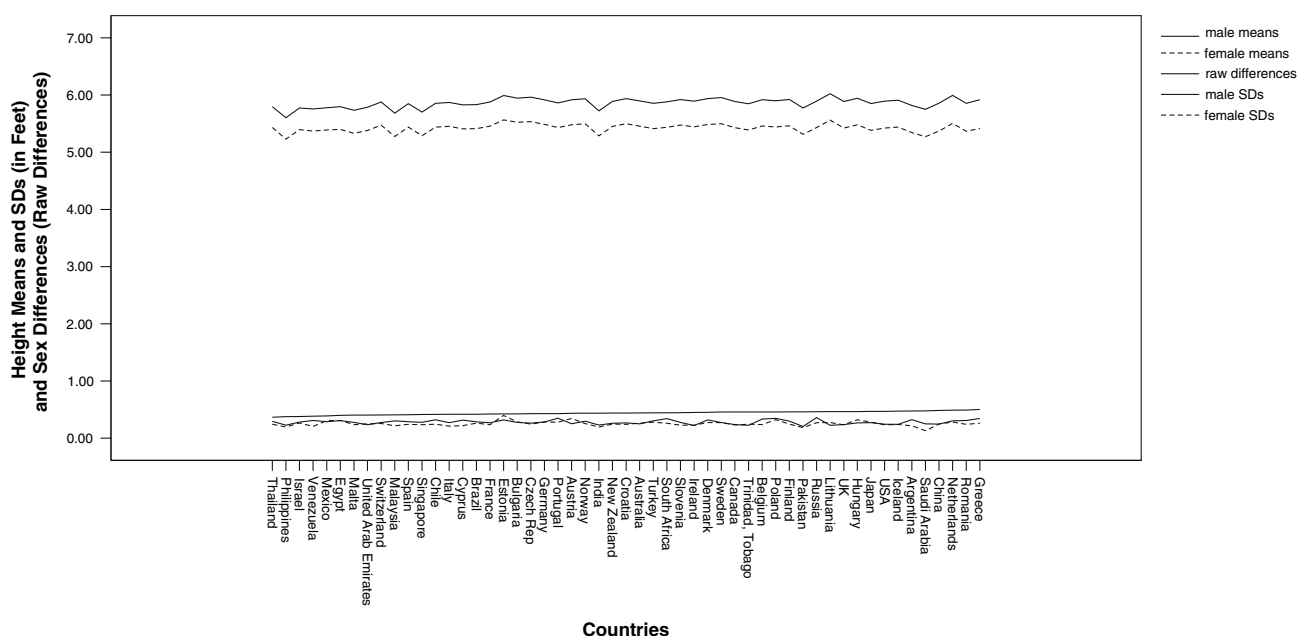


Fig. 9 Height parameters across 53 nations presented in order of their sex differences in height

Fig. 9, which show a highly consistent sex difference across nations, not much variation in men's and women's height across nations, and quite parallel graph lines for men and women (i.e., no interaction).

When a corresponding regression was run on men's and women's SDs in height, the prediction was weak, multiple $r = .36$, $r^2 = .13$, $p = .003$, and there was only one significant predictor: β for sex = $-.33$, $p = .001$; β for gender equality = $.07$, ns ; and β for the interaction = $.12$, ns . The significant effect for sex showed again that men's SDs were significantly larger than women's, which I hypothesized might be due to a scaling effect. The low multiple r was consistent with earlier evidence suggesting that variation in height SDs resulted largely from sampling error, not from systematic factors.

Religion, Sex Drive, and Sociosexuality

As noted earlier, the five religious groupings that comprised the most nations in the total set of 53 nations were: Catholic nations ($n = 18$), Eastern Orthodox nations ($n = 5$), Moslem nations ($n = 5$), Protestant nations ($n = 8$), and mixed Christian nations ($n = 7$). To probe the effect of religion on sex differences in sex drive and sociosexuality, I conducted two one-way ANOVAs—the first on sex differences in sex drive and the second on sex differences in sociosexuality. The groups of nations compared in the ANOVAs were the five religious groupings just described. The ANOVA on sex differences in sex drive did not show a significant difference

across religions, $F(4, 39) = 1.03$, ns . However, the ANOVA on sex differences in sociosexuality did show a significant difference, $F(4, 39) = 4.34$, $p = .005$. Group means, ordered from smallest to largest sex differences in sociosexuality, were: Protestant nations (mean $d = .53$), mixed Christian nations (mean $d = .64$), Catholic nations (mean $d = .76$), Eastern Orthodox nations (mean $d = .83$), and Moslem nations (mean $d = .92$). This spectrum could be characterized as ranging from more liberal, individualistic, and “western” religions (although it should be noted that Protestant denominations vary considerably on the “liberal” dimension) to more conservative, collectivist, and “eastern” religions.

Religions might influence sex differences in sociosexuality via the gender ideologies and social structures they promote. To test this hypothesis, I ran the one-way ANOVA on sex differences in sociosexuality again, this time treating societal gender equality (as assessed by the mean of the two UN indices) as a covariate. After controlling for gender equality, the five groups of nations no longer differed significantly, $F(4, 38) = .81$, ns . This result was consistent with the hypothesis that religions had their impact via the mediating route of gender ideologies and social structure, although it did not prove the hypothesis.

Discussion

In the current research, measures of sex drive, sociosexuality, and height served as useful controls to one another. In

particular, sex drive and sociosexuality measures were well matched in terms of their response formats and scale lengths. Because of this, it is unlikely that the reported findings resulted from response sets or from the idiosyncratic ways that people in different countries used rating scales. If this were so, then the findings for sex drive and sociosexuality would have shown similarities cross-culturally, which they did not. Indeed, if there is a central take-home message that emerges from the current results, it is how different the results were for sex drive and sociosexuality. These two traits showed different patterns of sex differences, different patterns of within-sex variability, different patterns of cross-cultural consistency, and different patterns of association with outside criteria. Thus, on one level, the current research could be viewed as a complex demonstration of the discriminant validity of the constructs of sex drive and sociosexuality (see Ostovich & Sabini, 2004; Simpson & Gangestad, 1991).

At the start of this article, I offered five hypothetical models of how male and female trait means, male and female trait SDs, and sex differences might vary across nations, depending on various assumptions about biological and socio-cultural influences on men's and women's behavior. The results presented in the previous sections can be summarized succinctly in terms of these models. The findings for sex drive and height were most consistent with the pure biological causation model, whereas the results for sociosexuality were most consistent with the hybrid model, which assumes cultural influences superimposed on biological predispositions.

For both sex drive and height, sex differences were extremely consistent across nations and they were not moderated by gender equality or associated with economic development. Regression analyses that probed the power of sex, gender equality, and their interaction to predict male and female trait means yielded very similar results for sex drive and height: β s for sex were $-.92$ and $-.94$, respectively; β s for gender equality were $-.11$ and $.17$, respectively, and β s for interactions were $.01$ and $-.01$, respectively. Thus, for these two traits, sex accounted for 85–88% of the variance in male and female trait means, gender equality accounted for one to three percent of the variance, and sex-by-culture interactions accounted for insignificant amounts of variance.

At the same time, there were several noteworthy differences between the results for sex drive and height. For one, height was more trait-like across nations than sex drive was, and this probably resulted from both genetic factors (ethnic differences in stature) and biologically active environmental factors (national differences in nutrition and health care). A second important finding that distinguished sex drive from height (and from sociosexuality as well) was that, across nations, women were consistently

more variable than men in sex drive. Sex drive was the only trait to show such a powerful sex difference in trait variability. Although there was a weak sex difference in SDs for height, this may have resulted from scaling effects, and the weak sex difference in sociosexuality SDs was opposite in direction to the sex difference in sex drive SDs.

While many of the results for sex drive and height were similar, the results for sociosexuality, in contrast, differed in many ways from corresponding results for sex drive and height. Although men were consistently higher in sociosexuality than women, this sex difference was moderately moderated by nations' levels of gender equality and economic development. Sex differences in sociosexuality proved to be smallest in nations that were high on gender equality and economic development and largest in nations that were low on gender equality and economic development. Both men's and women's mean levels of sociosexuality decreased as nations' levels of gender equality decreased, but the decrease was steeper for women than for men.

Furthermore, women's, but not men's, variability in sociosexuality decreased as levels of gender equality decreased across nations. This resulted in a crossover effect for men's and women's SDs in sociosexuality: in gender egalitarian countries, women tended to be more variable than men, but in gender nonegalitarian countries men tended to be more variable than women. This crossover effect is an important piece of evidence supporting the hybrid model. Social structural theorists have argued that all modern societies are patriarchal to varying degrees, and this explains why women's sociosexuality is lower than men's in all modern societies. Extending this argument to men's and women's variability in sociosexuality, social structural theorists might be expected to similarly argue that if patriarchal culture restricts the variability of women's sociosexuality compared to men's, then this effect should be consistent in direction across cultures, but variable in magnitude. However, this was not the case. The observed crossover effect was consistent with the hybrid model's prediction that men's and women's biological predispositions interact with "cultural presses" to influence the variability of men's and women's sociosexuality differently across cultures.

The Current Results and Those of Schmitt (2005)

Thirty of the 53 nations assessed in the current study were also assessed in Schmitt's (2005) 48-nation study of sociosexuality. Across these 30 nations, Schmitt's estimated effect sizes for sex differences in sociosexuality correlated moderately with the current study's estimates, $r = .49$, $p = .006$. The relatively modest size of this correlation may have resulted from the different scales used to assess

sociosexuality in the two studies and from the different samples obtained in the two studies.

In summarizing the results of his study, Schmitt (2005) wrote, “the most consistent finding was that men scored higher on sociosexuality than women across cultures” (p. 273). According to Schmitt, this cross-cultural consistency provided strong support for sexual selection theory and parental investment theory, which imply that the sex that invests more in offspring (i.e., women), will show more restricted sociosexuality than the sex that invests less in offspring (men). The current results constituted a strong replication of Schmitt’s findings on the strength and cross-cultural consistency of sex differences in sociosexuality. Indeed, the overall mean effect size for sex differences in sociosexuality was identical in the two studies, $d = .74$. After correcting the effect size in the current study for attenuation due the unreliability of the three-item sociosexuality scale, the estimate was even larger, $d = .85$, and because scale reliability represents just a portion of measurement error and does not address other sources of attenuation, such as restrictions in range, this was very likely an under-correction (see Baugh, 2002; Bobko, Roth, & Bobko, 2001).

The current research identified two additional sex differences that were remarkably consistent across cultures. In all nations, men reported having higher sex drives than women (mean $d = .62$; when corrected for unreliability, $d = .74$), and in all nations women had more variable sex drives than men did (in a paired t -test with nations as the units of analysis, $d = 2.85$; mean female-to-male variance ratio = 1.64). These findings also seem interpretable in terms of sexual selection and parental investment theory. Because women are the “choosier” sex and because women often offer mating privileges to men in exchange for resources, protection, and commitment, it seems reasonable to hypothesize that sexual selection would endow women, on average, with less urgent sex drives that are more subject to rational control. As the limiting resource in reproduction, women typically do not have to worry about finding men to impregnate them, although they may have to worry about inducing men to stay around after impregnation. In contrast, men’s success at mating and reproduction tends to be more variable than women’s, and the highest levels of male success (defined here in terms of transmission of genes to future generations) may sometimes result from promiscuous sexual activity with multiple partners. Thus, sexual selection likely has led men, on average, to have stronger and more consistently “turned on” sex drives than women.

The current research replicated a number of additional findings reported in Schmitt (2005), and in several cases the current findings were stronger than Schmitt’s. For example, stressed reproductive environments were associ-

ated with lower levels of sociosexuality in both men and women, and these associations tended to be stronger for women than men. Associations between societal stress and sociosexuality were generally stronger in the current study than in Schmitt’s study. Schmitt reported only weak evidence that societal stress and low economic development were linked to *sex differences* in sociosexuality. In contrast, the current study found stronger evidence, with social stress associated with larger sex differences in sociosexuality. Schmitt reported fairly strong associations between UN indices of gender equality and women’s levels of sociosexuality. The current research replicated these findings and further documented substantial associations between UN indices and men’s sociosexuality and between UN indices and sex differences in sociosexuality.

Why were results in the current study often stronger than corresponding results in Schmitt’s (2005) study? One possible answer is that the current study used a short sociosexuality scale consisting of just attitudinal items, whereas Schmitt’s research used the full SOI. Apropos of this possibility, one reason why men consistently showed greater variability in sociosexuality than women did in Schmitt’s study (see commentary by Eagly & Wood, 2005, p. 283) may be that the behavioral items in the SOI acted to inflate male variability, because of the extreme behavioral responses of a relatively small subset of men. A second reason for stronger results in the current study is that Schmitt’s national samples may have been, on average, smaller and more restricted than the samples obtained in the current research (see below).

There was one finding in the current study that proved to be weaker than the corresponding finding in Schmitt’s report—namely, the association between national sex ratios and sociosexuality. Table 3 showed that correlations between sex ratios and men’s sociosexuality ($r = -.25$) and between sex ratios and women’s sociosexuality ($r = -.27$) were only marginally significant. When I computed the average of men’s and women’s sociosexuality for each nation (a measure of overall national sociosexuality levels), this average, unlike its components, did correlate significantly with national sex ratios, $r(52) = -.27$, $p < .05$. However, the corresponding correlation from Schmitt’s study was larger, $r(46) = -.45$, $p < .001$. As others have noted, local sex ratios are likely to be more important determinants of men’s and women’s mating strategies than national sex ratios (Bond, 2005), and this is particularly true for geographically large and diverse nations. Given the crudeness of the sex ratio measures used in both Schmitt’s study and the current one, it is remarkable that there were any significant correlations between sex ratios and sociosexuality. To the extent that these correlations were significant, they tended to support the predictions of sex ratio theory (Guttentag & Secord, 1983; Pedersen, 1991), that

high sex ratios (more men than women) are associated with reduced levels of sociosexuality, because in societies with surplus males the sexual “marketplace” is driven more by women’s than by men’s desires.

The current results extended Schmitt’s findings on sociosexuality by investigating the impact of nations’ dominant religion on sex differences in sociosexuality (and on sex drive as well). The results indicated that religion covaried with national sex differences in sociosexuality, but not with sex differences in sex drive. In general, nations with more conservative and collectivist religions tended to show larger sex differences in sociosexuality. These differences disappeared, however, when UN gender equality was entered as a covariate, and this provided at least circumstantial evidence that religion had its impact via the mediating route of gender ideologies and social structure.

Limitations and Strengths of the BBC Data

The BBC data had a number of limitations that are worth noting. For one, they were not drawn from a probability sample. As described in the method section, BBC Internet survey participants were self-selected—they tended to be relatively young, well educated, affluent, and Internet savvy. Thus, on average, BBC participants may have represented their nations’ educated elites. Furthermore, the BBC survey was administered in English, and this undoubtedly restricted who could participate in the survey, particularly in non-English-speaking countries. As Schmitt (2005) has observed, it is difficult to obtain large, representative cross-cultural samples. A limitation of the BBC sex drive and sociosexuality measures was their brevity, which may have resulted in reduced reliability. Finally, the BBC data were collected by an Internet survey, and such data may be subject to unique kinds of error variance (see Gosling, Vazire, Srivastava, & John, 2004).

The BBC data also had strengths. One was the size and diversity of the BBC sample. It is virtually unheard of for researchers to have access to self-report data on sex drive and sociosexuality from an international sample comprising over 200,000 people. The only study comparable in scope to the current one was Schmitt’s (2005) ambitious analysis of International Sexuality Description Project data. In a number of ways, however, the BBC data are likely superior in quality to ISDP data. Schmitt’s data came largely from college students, who were young and often inexperienced with long-term relationships. In contrast, the majority of BBC participants were not college students; the average age of BBC participants ensured that most BBC participants were older than the typical college student and in their prime reproductive years. Furthermore, because most BBC participants were either married or in serious

relationships, they likely responded to sexuality-related questions based on more extensive and varied real-life experience than the average college student would. The fact that the BBC data were collected via an Internet survey virtually guaranteed that samples from various nations were more geographically diverse, within each nation, than Schmitt’s samples, which often consisted of college students surveyed at particular universities. Finally, many of the national samples in the BBC dataset were larger than corresponding samples in Schmitt’s study. All of these factors taken together suggest that parameter estimates in the current research (e.g., estimates of national means and national SDs in sociosexuality) may have been more reliable and more representative of their respective nations than corresponding estimates from Schmitt’s study.

Setting a More Demanding Standard of Prediction for Both Evolutionary and Social Structural Theories

Specific results in this article are likely to please both social structural and evolutionary theorists. Social structural theory was successful in predicting that sex differences in sociosexuality would be moderated by societies’ levels of gender equality and economic development. Consistent with social structural theory, societies with higher levels of gender equality and economic development tended to display weaker sex differences in sociosexuality. Furthermore, across nations, gender egalitarianism was associated with higher levels of sociosexuality in both men and women, though the association was stronger for women than for men. The greater association between “culture” and female sociosexuality provides new evidence supporting Baumeister’s (2000) claim that women’s sexuality is, in some ways, more influenced than men’s by social and cultural factors.

In its most strongly stated form, Eagly and Wood’s (1999, 2005) social structural theory proposes that sex differences in psychological traits and behaviors do not at all result from evolved psychological dispositions in men and women. Rather, they result from the social roles that have evolved in some societies—particularly modern agricultural and industrial societies—as a result of physical differences between the sexes (e.g., greater male upper body strength, female gestation and lactation), and the economic divisions of labor and social structures that followed from these physical differences. Thus, according to Eagly and Wood’s theory, the proximate causes of sex differences are social structure (e.g., greater male than female power, patriarchy), social roles (men as workers, women as housekeepers), and the gender ideologies that accompany and sustain these patriarchal social structures and social roles.

The current results offer at best partial support for this strong version of social structural theory, and this partial

support was present for only one trait—sociosexuality. The results offered no support for social structural theory in relation to sex differences in sex drive. Even in the case of sociosexuality, it is important to note that regression analyses of male and female national means indicated that sex differences were much more powerful than culture main effects or sex-by-culture interactions. Although sex differences in sociosexuality could plausibly result from both biological and cultural factors, it is important to note that the “main effect” of gender equality on men’s and women’s levels of sociosexuality ($\beta^2 = .17$), was much stronger than the interaction between gender equality and sex ($\beta^2 = .02$). In other words, both men’s and women’s mean sociosexuality levels tended to covary in a parallel fashion with nations’ levels of gender equality, and gender equality did not strongly moderate sex differences in sociosexuality. The overall pattern of results for sociosexuality, i.e., the cross-cultural patterns of sex differences, male and female means, and male and female SDs, seems most consistent with the hybrid model portrayed in Fig. 4.

Although social role theory has not much addressed the issue of within-sex variation, it seems to imply that societies characterized by strong gender roles and nonegalitarian gender ideologies will show less within-sex variation in gender-linked traits and behaviors (e.g., occupational choices) than societies characterized by weak gender roles and egalitarian gender ideologies (Lippa, 2005; see the pure social structural model presented in Fig. 1). In the current results, this prediction held for women’s sociosexuality, but it did not hold for men’s sociosexuality, nor did it hold for women’s or men’s sex drive. Again, this provides at best partial support for social structural theory. Furthermore, social role theory does not offer an obvious explanation for the interaction between gender equality and men’s and women’s SDs in sociosexuality. This interaction can, however, be readily explained by assuming that biological predispositions interact with cultural “presses.”

A major weakness of social structural theory is that it often seems to make a generic “strong gender roles lead to large sex differences” prediction for psychological traits that show sex differences. Although this prediction appears to be true for sex differences in sociosexuality, it does not appear to be true for sex differences in other traits. For example, the strength of societal gender roles is unrelated to observed sex differences in the value assigned to a mate’s physical attractiveness (Eagly & Wood, 1999; Lippa, 2007), and it is unrelated to sex differences in the mean levels and variability of sex drive (as reported here). Also contrary to social role’s generic hypothesis, strong gender roles are associated with *smaller* sex differences in the value assigned to a mate’s niceness (Lippa, 2007), and strong versus weak gender roles are associated with differences in the *direction* of sex differences in valuing a

mate’s intelligence (Lippa, 2007). To demonstrate true explanatory power, social structural theory must account for such variations in the relation between social roles and sex differences, and ideally it should *predict*, not *postdict*, such variations. In addition, social role theory must predict the *magnitudes* as well as direction of sex differences for various traits.

The current results present explanatory challenges to evolutionary theories as well. Mean levels of sociosexuality and national SDs in sociosexuality, particularly mean levels and SDs for women, were strongly associated with societal measures of gender equality and economic development and, as a result, sex differences in sociosexuality were also strongly associated with gender equality and economic development. In commenting upon similar findings in Schmitt’s (2005) study, Buss (2005) wrote that “...although the modest cultural variation in the magnitude of sex differences in the SOI is theoretically important, I suggest that it is not adequately explained by nebulous theoretical constructs such as structural powerlessness, gender empowerment, patriarchy, or social structural roles...” (p. 279). Buss proposed instead that “...both men and women possess an evolved menu of mating strategies, selectively activated by particular features of the personal, social, and ecological context...” (p. 279). In relation to the current results, the task that confronts theorists like Buss is to explain why men’s and women’s sociosexuality covaried with features of the social and ecological context, whereas their sex drive did not. Furthermore, evolutionary theories must explain why gender equality and gender empowerment measures covaried so strongly with sex differences in sociosexuality, but not at all with sex differences in sex drive. Like social structural theories, evolutionary theories should *predict*, not *postdict*, such findings.

Setting the Stage for More Complex and Interactive Theories

Because the findings reported here for sex drive and sociosexuality differed so strongly, we now know that none of the models presented at the start of this article is necessarily or uniquely true. The future task facing those who study psychological sex differences is to do the hard empirical work of testing various models, for various traits, with hard-to-get cross-cultural data. I predict that empirical reality will prove to be sufficiently complex so as to confound many theorists’ unitary notions about the etiology and cross-cultural consistency of sex differences. Unlike Schmitt (2005), who expressed dissatisfaction with the possibility that several different theoretical perspectives might be necessary to explain sex differences in sociosexuality, I am not disappointed by this prospect. The news that emerges from both Schmitt’s study and the current one—

news that should not have been totally unexpected—is that sex differences, like the rest of human behavior, are complex and multifaceted. My hope is that the various models presented in this article and the accompanying methods proposed to test these models will provide a more systematic means to probe the many different ways in which biological and social factors, separately and in combination, come together to influence sex differences in behavior.

Acknowledgment I am grateful to BBC TV Science for commissioning this research, and to the BBC Science and Nature website for programming and hosting the study.

References

- Archer, J., & Mehdiqhani, M. (2003). Variability among males in sexually selected attributes. *Review of General Psychology*, *7*, 219–236.
- Baugh, F. (2002). Correcting effect sizes for score reliability: A reminder that measurement and substantive issues are linked inextricably. *Educational and Psychological Measurement*, *62*, 254–263.
- Baumeister, R. F. (2000). Gender differences in erotic plasticity: The female sex drive as socially flexible and responsive. *Psychological Bulletin*, *126*, 347–374.
- Baumeister, R. F., Catanese, K. R., & Vohs, K. D. (2001). Are there gender differences in strength of sex drive? Theoretical views, conceptual distinctions, and a review of relevant evidence. *Personality and Social Psychology Review*, *5*, 242–273.
- Bobko, P., Roth, P. L., & Bobko, C. (2001). Correcting the effect size of *d* for range restriction and unreliability. *Organizational Research Methods*, *4*, 46–61.
- Bond, N. W. (2005). Who's zooming who? *Behavioral and Brain Sciences*, *28*, 278.
- Buss, D. M. (1989). Sex differences in human mate preferences: Evolutionary hypotheses tested in 37 cultures. *Behavioral and Brain Sciences*, *12*, 1–49.
- Buss, D. M. (2005). Sex differences in the design features of socially contingent mating adaptations. *Behavioral and Brain Sciences*, *28*, 278–279.
- Deary, I. J., Thorpe, G., Wilson, V., Starr, J. M., & Whalley, L. J. (2003). Population sex differences in IQ at age 11: The Scottish mental survey 1932. *Intelligence*, *31*, 533–542.
- Eagly, A. H., & Wood, W. (1999). The origins of sex differences in human behavior: Evolved dispositions versus social roles. *American Psychologist*, *54*, 408–423.
- Eagly, A. H., & Wood, W. (2005). Universal sex differences across patriarchal cultures ≠ evolved psychological dispositions. *Behavioral and Brain Sciences*, *28*, 281–283.
- Gaulin, S. J. C., & Boster, J. (1985). Cross-cultural differences in sexual dimorphism: Is there any variance to be explained? *Ethology and Sociobiology*, *6*, 219–225.
- Gangestad, S. W., & Simpson, J. A. (2000). The evolution of human mating: Trade-offs and strategic pluralism. *Behavioral and Brain Sciences*, *23*, 573–644.
- Gosling, S. D., Vazire, S., Srivastava, S., & John, O. P. (2004). Should we trust web-based studies? A comparative analysis of six preconceptions about Internet questionnaires. *American Psychologist*, *59*, 93–104.
- Guttentag, M., & Secord, P. (1983). *Too many women?* Beverly Hills, CA: Sage.
- Lazarus, J. (2002). Human sex ratios: Adaptations and mechanisms, problems and prospects. In I. C. Hardy (Ed.), *Sex ratios: Concepts and research methods* (pp. 287–311). Cambridge: Cambridge University Press.
- Lippa, R. A. (2005). *Gender, nature, and nurture* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates.
- Lippa, R. A. (2006). Is high sex drive associated with increased sexual attraction to both sexes? It depends on whether you are male or female. *Psychological Science*, *17*, 46–52.
- Lippa, R. A. (2007). The preferred traits of mates in a cross-national study of heterosexual and homosexual men and women: An examination of biological and cultural influences. *Archives of Sexual Behavior*, *36*, 193–208.
- Ostovich, J. M., & Sabini, J. (2004). How are sociosexuality, sex drive, and lifetime number of sexual partners related? *Personality and Social Psychology Bulletin*, *30*, 255–266.
- Paoletti, J. B., & Kregloh, C. (1989). The children's department. In C. B. Kidwell & V. Steele (Eds.), *Men and women: Dressing the part* (pp. 22–41). Washington, DC: Smithsonian Institution Press.
- Pedersen, F. A. (1991). Secular trends in human sex ratios: Their influence on individual and family behavior. *Human Nature*, *2*, 271–291.
- Reimers, S. (2007). The BBC internet study: General methodology. *Archives of Sexual Behavior*, *36*, 147–161.
- Schmitt, D. P. (2005). Sociosexuality from Argentina to Zimbabwe: A 48-nation study of sex, culture, and strategies of human mating. *Behavioral and Brain Sciences*, *28*, 247–311.
- Simpson, J. A., & Gangestad, S. W. (1991). Individual differences in sociosexuality: Evidence for convergent and discriminant validity. *Journal of Personality and Social Psychology*, *60*, 870–888.
- Spector, I. P., Carey, M. P., & Steinberg, L. (1996). The Sexual Desire Inventory: Development, factor structure, and evidence of reliability. *Journal of Sex and Marital Therapy*, *22*, 175–190.
- Voracek, M. (2005). Shortcomings of the Sociosexual Orientation Inventory: Can psychometrics inform evolutionary psychology? *Behavioral and Brain Sciences*, *28*, 296–297.
- Wood, W., & Eagly, A. H. (2002). A cross-cultural analysis of the behavior of men and women: Implications for the origins of sex differences. *Psychological Bulletin*, *128*, 699–727.
- Zucker, K. J. (2005). Measurement of psychosexual differentiation. *Archives of Sexual Behavior*, *34*, 375–388.