

Original Article

Misrepresentations of Evolutionary Psychology in Sex and Gender Textbooks

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Abstract: Evolutionary psychology has provoked controversy, especially when applied to human sex differences. We hypothesize that this is partly due to misunderstandings of evolutionary psychology that are perpetuated by undergraduate sex and gender textbooks. As an initial test of this hypothesis, we develop a catalog of eight types of errors and document their occurrence in 15 widely used sex and gender textbooks. Consistent with our hypothesis, of the 12 textbooks that discussed evolutionary psychology, all contained at least one error, and the median number of errors was five. The most common types of errors were “Straw Man,” “Biological Determinism,” and “Species Selection.” We conclude by suggesting improvements to undergraduate sex and gender textbooks.

Keywords: textbooks, evolutionary psychology, sex differences, sex and gender studies

Introduction

Evolutionary psychology (EP) is a theoretical perspective that applies evolutionary principles to the study of human behavior. Although EP has yielded many theoretical advances and empirical discoveries, it has provoked resistance from some scholars in the social sciences (Confer et al., 2010; Laland and Brown, 2011). This resistance is especially evident when EP is applied to sex and gender differences, but this application is an inevitable extension of powerful theories that were developed by evolutionary biologists (Vandermassen, 2005). Darwin (1871), for example, initially proposed the theory of sexual selection to explain a persistent pattern of sex differences that he and others observed across the animal kingdom. Sexual selection has since been elaborated and shown to be vital for understanding sex differences in many species, including humans (Andersson, 1994; Geary, 2010).

Despite success in explaining cognitive, behavioral, and morphological sex differences in many species, evolutionary theory remains controversial when applied to humans and continues to provoke hostility (Geher and Gambacorta, 2010; Segreståle, 2000; Vandermassen, 2005). Because this controversy has been broadcast to the public in often sensationalist accounts, it might appear more vitriolic than it really is (Kurzban, 2010). The preponderance of complaints and attacks on EP come from scholars outside of the field and are frequently based on misunderstandings of evolution itself or how it is applied to humans (Vandermassen, 2005). Concerned scholars have attempted to correct these misunderstandings and simplistic media portrayals and to build bridges with scholars from other disciplines (e.g., Buss and Schmitt, 2011; Confer et al., 2010). However, many of these corrections and clarifications are published in academic journals that are read by few undergraduates. By contrast, textbooks are a crucial component of an undergraduate's education and are an important conduit of the ideas and data that comprise a paradigm of research (Griggs, Jackson, Christopher, and Marek, 1999). Previous research indicates that textbook accounts of EP are frequently inaccurate (see Previous Textbook Studies section for references), and there apparently has been little effort devoted to improving textbook accuracy.

In this article, we assess the presentation of EP in 15 textbooks on sex and gender. We focus on sex and gender textbooks for three reasons. First, as explained above, evolutionary theory is well suited to contribute to the understanding of sex differences and similarities (Geary, 2010). Second, many sex and gender studies scholars appear skeptical about the merits of EP (Buss and Schmitt, 2011; Vandermassen, 2005). Third, to our knowledge, researchers have not examined the accuracy of sex and gender textbook presentations of EP. Before presenting our coding methodology and results, we briefly investigate potential reasons for mistrust and hostility toward EP among sex and gender studies scholars and review previous presentations of evolutionary psychology in textbooks.

Reasons for Mistrust and Lack of Acceptance

The idea that human nature—including differences between the sexes—is biologically influenced was once relatively standard, indeed, taken for granted by most social scientists (Degler, 1991). In the early 1900's, however, a number of scholars, influenced by the incipient disciplines of cultural anthropology and behaviorism, began to question this assumption. The gradual revelation of the crimes committed by the Nazis alarmed the public and academics alike and further promoted concerns about the social and political implications of biological approaches to human nature (Laland and Brown, 2011). These concerns and skepticism have persisted, to some degree, as protection against what some scholars view as an attempt to justify inequitable social policies and institutions (Lopreato and Crippen, 1999; Lord and Sanderson, 1999). That is, biologically based views of human nature are, within certain academic communities, seen as a form of apologetics for an unjust social system and for myriad other social evils (e.g., sexism, racism, classism). This seems especially true for broadly liberal disciplines that aspire actively to ameliorate social suffering (Geher and Gambacorta, 2010).

However, recent research has shown that, despite popular assumptions, liberalism *does not predict* a rejection of applying evolutionary theory to humans (Perry and Mace, 2010). Furthermore, from the imperfect data we possess, EPs appear no more likely to adhere to conservative political beliefs than other social scientists (Tybur, Miller, and Gangestad, 2007). Therefore, political ideology, although a probable source of some hostility toward EP, is not a powerful predictor of a scholar's willingness to apply EP to human behavior.

Evidence indicates that, in fact, a misunderstanding of the basic principles of EP is a more powerful predictor of hostility toward it than is political ideology (Perry and Mace, 2010). A student, for example, who is taught that EP ignores the importance of culture might understandably develop a skeptical, perhaps even hostile, attitude toward EP. A similar problem led to hostility toward behaviorism, especially as propounded by B.F. Skinner. Students were taught that Skinner eschewed instincts altogether and that he completely ignored internal processes (Jensen and Burgess, 1997). Instincts and internal processes quite clearly exist, so this led to dismissals of Skinner and accusations that his framework was entirely wrong (in fact, embarrassingly so). These errors were included in textbooks and propagated to the next generation of students, who continued to reject "Skinnerism" (DeBell and Harless, 1992). We suggest that a similar process involving sex and gender textbooks may explain some of the hostility toward EP. Thus, a combination of liberal ideology and broad misunderstanding of the content of EP may combine to lead sex and gender scholars to view EP as a conservative and wrongheaded approach to explaining human sex differences.

As a first step in testing our hypothesis that a cycle of ignorance contributes to the hostility directed toward EP, we coded its presentation in sex and gender textbooks. We predict that presentations of EP will be frequently inaccurate.

It is important to note that sex and gender scholars and sociologists probably hold a more negative view of EP and have more misconceptions than scholars in many areas of psychology (e.g., cognitive scientists, developmentalists, neuroscientists, linguists, etc.) (Geher and Gambacorta, 2010; Lopreato and Crippen, 1999; Perry and Mace, 2010). Many psychologists who do not identify as EPs have fully integrated the Darwinian revolution into their research and possess an acute knowledge of evolution and natural and sexual selection.

Previous Textbook Studies

To our knowledge, five previous studies have examined presentations of EP in undergraduate textbooks. All found that EP presentations were flawed, inaccurate, or, more rarely, hostile. Cornwell, Palmer, Guinther, and Davis (2005) reported that almost 80% of 39 introductory psychology textbooks (years 2000-2004) presented EP inaccurately, and roughly 30% were negative toward EP. Martin and Machaleck (2006) found that 69% of introductory sociology textbooks covered EP in any way, and the ones that did frequently contained errors. Some of the most common errors were claims that EPs adhere to genetic determinism or biological reductionism. Park (2007) studied 10 social psychology textbooks and found that all contained at least one mistaken representation of kin selection,

a foundational theory for evolutionary approaches to cooperation. Chrisler and Erchull (2011) examined 16 social psychology textbooks and found that none presented EP uncritically, concluding that, “The most common critique of evolutionary theory seems to be to tell students that cognition and culture can override biological tendencies or that culture restrains or limits biological tendencies” (p. 756). Last, Leahy (2012) found that sociology textbooks tend to reject explicit theories of human nature, including EP, as “biological” and therefore incompatible with the plasticity of human behavior.

Our study extends these previous ones in several ways. First, our study focuses exclusively on sex and gender textbooks. Second, we present a well-defined and explicit catalog of errors pertaining to the presentation of evolutionary theory; previous studies generally did not define the errors they were coding (but see Park, 2007). Third, we provide full documentation for every error we coded so that our procedure and claims are fully transparent.

Materials and Methods

Selecting textbooks

We began identifying social science textbooks that focus on sex and/or gender by contacting Monument Information Resource (MIR), a company that compiles information on undergraduate textbook usage in the United States. MIR provided us with separate databases for a sample of psychology ($n = 1,200$) and sociology ($n = 1,484$) courses taught in the U.S. during 2007 with titles similar to “Sex and Gender,” “Women’s Studies,” and “Human Sexuality.”¹ For each course, information was provided on the institution where the course was taught, the course title, the instructor, the expected enrollment, and any required or recommended books. For both psychology and sociology databases, we sorted the books by title and used online resources, such as reviews and publisher’s descriptions, to initially identify introductory textbooks to sex and gender that were broad in scope, including discussions of both social and biological factors that influence gender-differentiated behavior. We excluded textbooks published prior to 2005, edited volumes, encyclopedias, readers or article compilations, specialized academic books (e.g., on sexual violence, human sexuality, gender and aging, gender and religiosity, gender and math, gender and labor markets, gender and group processes), and non-academic books (e.g., those marketed toward parents or lay audiences). These categories of books were excluded to 1) keep our sample manageable and 2) because undergraduate textbooks form the core of most undergraduate classes (Griggs et al., 1999) and, therefore, are most informative in gauging the mainstream view of the discipline. In cases where it was unclear if a book was appropriate, we obtained it and collectively made a judgment.

¹ MIR used “Human Sexuality” as a key research term when providing data about classes on sex and gender and textbook usage. However, we were interested in introductory textbooks on sex and gender and thus excluded specialized textbooks on human sexuality. Some courses with course titles similar to Human Sexuality served as introductory courses to sex and gender in general whereas others were more specialized.

We obtained the 15 textbooks (six sociology; nine psychology) that were used in more than one course in the MIR database and met our criteria for inclusion. At least one of these six sociology textbooks was used in 712 of 1,484 sociology courses (48%); the most widely used book was used in 326 courses (22%), and the least widely was used in 15 courses (1%). At least one of these nine psychology textbooks was used in 552 of 1,200 psychology courses (46%); the most widely used book was used in 124 courses (10%), and the least widely was used in 21 courses (2%). See references for the number of courses that used each textbook.

Identifying relevant pages

To find the pages in the textbooks that covered EP, we searched the index for three key phrases (evolutionary theory, evolutionary psychology, and sociobiology). We summed the pages and checked each page thoroughly for the errors listed in our catalog.

Developing the error catalog

We identified types of errors by reading previous textbook analyses, evolutionary psychology textbooks, and introductory sex and gender textbooks. We identified eight major types of errors, each of which is discussed in the catalog below. We note our error catalog, like any other, is somewhat arbitrary. However, the errors listed in our catalog were selected because EPs themselves have addressed them, sometimes repeatedly. We also note that the Straw Man category is something of a catch all category which includes Biological Determinism, Naturalistic Fallacy, Political Agenda, and the Intentionalistic Fallacy. That said, there were several egregious misrepresentations that simply did not fit in these categories and we felt these deserved to be made explicit and rebutted. Therefore, our Straw Man (not otherwise specified) category includes straw man arguments that are not captured by the other error types. The Appendix also corrects a few errors that were not formally coded for analysis. We encourage other scholars to code textbooks using different or expanded error catalogs.

Identifying errors

The first author initially coded errors by occurrence and type. He then directed the second author to each passage containing an apparent error, and the second author independently classified it according to error type. They agreed in 87% of cases (Cohen's $\kappa = .85$), and disagreements were resolved by discussion.

The error catalog

Below is a list of the eight types of errors we coded with an explanation, rebuttal, and textbook example of each. E#) denotes the type of error and R#) provides a rebuttal of the error. Note that four of these errors—Biological Determinism, Naturalistic Fallacy, Political Agenda, and Intentionalistic Fallacy—are ones that EPs are accused of making, whereas the others are made in the explication of evolutionary theory and its application to humans.

E1) Lack of Evidence/Lack of Falsifiability. The assertion that many or all claims by EPs

(1) lack substantive confirmatory evidence and/or (2) are unfalsifiable.

R1) (1) Evidence supports many claims made by EPs. Buss, Haselton, Shackelford, Bleske, and Wakefield (1998, Table 1) summarized 30 empirical discoveries about human nature generated by explicit evolutionary theorizing, including mother-fetus conflict and landscape preference. More recently, Buss and Schmitt (2011, Table 1) summarized 17 robust empirical findings regarding sex differences in desire for sexual variety. Many more empirical findings are reviewed in introductory evolutionary psychology textbooks (e.g., Badcock, 2000; Barrett, Dunbar, and Lycett, 2002; Buss, 2008; Cartwright, 2000; Gaulin and McBurney, 2004; Workman and Reader, 2004). (2) Most hypotheses proposed by EPs are falsifiable. Buss's introductory textbook (1999) presented 11 methods and data sources for testing evolutionary hypotheses (p. 54) and concluded that at least two of the methods must support a hypothesis for it to have a "firm empirical foundation" (p. 65). Ketelaar and Ellis (2000) devoted a full article to falsifiability and demonstrated that the charge that EP claims are generally unfalsifiable is unwarranted. Last, Schmitt and Pilcher (2004) laid out a rigorous program for testing evolutionary based hypotheses, and this emphasized the importance of generating and testing empirical predictions.

Textbook Example: "Sociobiology has some success in applying evolutionary theory to animal behavior, but because it is virtually impossible to test the natural selection principles on which it is based, empirical support for evolutionary links to human behavior is weak." (Lindsey, 2011, p. 25).

E2) Biological Determinism/Dichotomy between Nature & Nurture. (1) The assertion that EPs contend that biology determines or can explain all human behavior. (2) The assertion that some phenomena are entirely cultural whereas others are entirely biological.

R2) (1) EPs do not contend that human nature is "hardwired" by genes or determined exclusively by "biology." In fact, introductory evolutionary psychology textbooks warn about deterministic views of human nature (e.g., Buss, 2008; Gaulin and McBurney, 2004). For example, Rossano (2003) states, "Evolutionary psychologists firmly reject both genetic determinism and environmental determinism and, instead, contend that both genes and environment must be considered in understanding the human mind" (p. 28). (2) EPs believe that understanding human nature requires an interactionist framework; i.e., incorporating both biology and culture. As Tooby and Cosmides (1992) point out:

Evolution shapes the relationship between the genes and the environment such that they both participate in a coordinated way in the construction and calibration of adaptations. Thus, evolutionarily patterned structure is coming in from the environment, just as much as it is coming out from the genes. (p. 86)

In short, nature and nurture are inseparable in the EP account.

Textbook Example: "What's more, if these [biological] explanations are true, no amount of political initiative, no amount of social spending, no great policy upheavals will change the relationships between women and men" (Kimmel, 2013, p. 22).

E3) Naturalistic Fallacy. The assertion that EPs contend that what exists is either ipso facto good or morally desirable simply because it exists.

R3) The accusation that EPs are guilty of the naturalistic fallacy is belied by numerous writings from early sociobiologists (e.g., Alexander, 1979; Symons, 1979) and more recently from evolutionary psychologists. In *The Selfish Gene*, Richard Dawkins (1976) writes, “I am not advocating a morality based on evolution. I am saying how things have evolved. I am not saying how we humans morally ought to behave” (pp. 2-3). Many introductory textbooks on evolutionary psychology contain explicit warnings about committing the naturalistic fallacy (e.g., Bridgeman, 2003; Buss, 1999; Cartwright, 2000; Palmer and Palmer, 2002; Rossano, 2003).

Textbook Example: “Biological arguments reassure us that what *is* is what should be, that the social is natural. Finally, such reassurances tell us that these existing inequalities are not our fault, that no one is to blame, really” (Kimmel, 2013, p. 22).

E4) Political/Ideological Agenda/Consequentialist Fallacy. (1) The assertion that EPs have a conservative, rightwing political agenda and that this agenda significantly influences their research. (2) The assertion that evolutionary accounts are morally dubious and possibly dangerous if widely disseminated.

R4) (1) To the extent that we have empirical data on the political views of EPs, this assertion appears to be false. Most of the early sociobiologists were liberals or social democrats (including E.O. Wilson and Richard Dawkins), while Robert Trivers, who developed the theory of parental investment, was a political radical who coauthored a paper with Huey Newton (Segreståle, 2000; Trivers, 2002). A recent study of EPs found that their political views match those of social scientists in general—0 of 31 EPs identified with the Republican Party (Tybur et al., 2007). Even if it were true that EPs have more conservative views than other social scientists, it would not automatically follow that they are more likely than others to use their scholarship to advance a conservative agenda. We know of no data addressing this possibility, and the textbooks making this assertion do not provide any evidence for it. (2) Unfortunately, almost any view of human nature can be used to justify self-serving behavior that harms other people, ranging from the extremes of Nazism on the right to communism on the left (Pinker, 2002). The communists, for example, perpetrated numerous ghastly crimes, which were justified by a singular commitment to human flexibility, environmental determinism, and equality (Pipes, 2001). However, the factual content of a theory or proposition is not determined by the perceived good or ill it may do to society.

Textbook Example: “Another concern is the claim that gender differences have evolved over time, which implies that gender differences are inevitable and unchangeable. Biology then becomes an excuse for accepting differences and not advocating for social change” (Rider, 2005, p. 117).

E5) Species Selection. The assertion that evolution via natural and sexual selection operates to ensure species survival or that the survival of the species is the “goal” of evolution.

R5) Charles Darwin (1859/1958; 1871) argued that natural and sexual selection targeted the individual, not the species. In the 1960s, evolutionary biologists revolutionized the field by formalizing the insight that it was not the individual but the gene that was the fundamental unit of selection (Dawkins, 1976; Hamilton, 1964a,b). Although there is debate about the importance of differing units or levels of selection (e.g., group, individual, gene; Wilson and Wilson, 2007), biologists are nearly unanimous that species level selection does not occur:

In the early post-Darwinian period when thinking about selection was rather confused, it was often said that such and such a character had evolved because it was “good for the species.” This is quite misleading. The selected character had originated because it benefited certain individuals of a species and had gradually spread to all others. The species as an entity does not answer to selection. (Mayr, 1997, p. 2092)

Textbook Example: “Evolutionary theory argues that in any species, including humans, certain characteristics persist across generations—passed along genetically—because they help the species survive” (Lips, 2006, p. 132).

E6) Straw Man Argument (Not Otherwise Specified). A misrepresentation of the opponent’s position which creates the illusion that the argument in question has been refuted when, in fact, the actual position of the opponent has not been addressed.

R6) Straw Man arguments must be examined case by case but often involve oversimplifying the arguments of EPs to make them appear careless or reductionist. For example, many critics of EP assert that the theory posits that all men are promiscuous when, to our knowledge, this is not a serious position of EPs.

Textbook Example: Because each Straw Man argument is somewhat unique, aside from those that fall into specified errors we have already cataloged, each requires its own explanation (see Appendix for detailed comments on each coded Straw Man error).

E7) Intentionalistic Fallacy. The assertion that EPs contend that humans intentionally attempt to enhance their inclusive fitness and are explicitly aware of such intentions. For example, the claim that using contraception and engaging in sex for the sake of pleasure rather than reproduction refutes evolutionary arguments regarding natural and sexual selection.

R7) EPs do not believe that humans are consciously aware of the “evolutionary logic” of their behavior. E.O. Wilson, the founder of sociobiology, made the point that the brain “has

been programmed to *perform as if it knows* [emphasis added]” the underlying evolutionary logic of its affective biases (Wilson, 1975, p. 4). Similarly, John Tooby and Leda Cosmides (1992), two of the founders of evolutionary psychology, state “...the biological concept of functionality differs from the folk notion of functionality as goal-seeking behavior. Although some of our evolved psychological mechanisms probably operate through goal-seeking, surely none of them has fitness maximization as a mentally represented goal” (p. 54). Even in cases where humans explicitly represent goals (e.g., I need to protect my child; I would like to have sex), EPs do not posit that they are aware of the evolutionary logic guiding the specific goal in question (see for example, Buss, 1999; Geary, 2005).

Textbook Example: The sociobiological view of sex differences assumes that sexual intercourse will lead – or is intended to lead – to reproduction. Today, I doubt that the majority of men are thinking about establishing paternity and the majority of women are thinking about their partners’ ability to support a child when deciding whether or not to engage in sex. (Helgeson, 2012, p. 114)

E8) Mechanical Demonstration. The assertion that if a scholar lacks knowledge of the specific proximate mechanism(s) contributing to a behavior, then that scholar is unable to legitimately make any claims about the evolutionary function of the behavior. For example, the claim that sex differences in cognition cannot have an evolutionary basis because the precise genes, neurotransmitters, and evolutionary pressures giving rise to them are not perfectly understood.

R8) It is, of course, desirable to have perfect knowledge of all of the physiological, genetic, and historical components of a hypothesized adaptation, but this is not necessary to make informed hypotheses about human adaptations. George Williams (1966) developed rigorous criteria for evaluating adaptations (reliability, efficiency, and economy) and these criteria can be used for evaluating evident design features of humans (e.g., the eye, opposable thumbs, fever) without knowing the precise physiological basis of the adaptation in question (see also Buss, 1999; Tooby and Cosmides, 1992). We also note that scholars using non-evolutionary perspectives routinely and fruitfully advance hypotheses about the causes of behavior without providing a comprehensive account of all mechanisms involved in the causal pathway.

Textbook Example: Evolutionary psychologists fail to specify the biological mechanisms from evolution to behavior. Their basic arguments are that evolution occurred over millions of years and, voila, we have a certain pattern of gender differences in the 21st century. But evolution can act only through genes, and genes influence behavior because they direct the synthesis of certain proteins and not others, leading to differing levels of biochemicals such as neurotransmitters or hormones. This is the era of the Human Genome Project, in which specific genes that create specific medical conditions and behaviors are being identified. Evolutionary psychology has failed to incorporate this work, and fails to specify which genes and biochemicals are responsible for the patterns of gender differences that they claim have evolved. (Hyde and Else-Quest, 2013, p. 35)

Table 1. Summary of textbook errors

Textbook (Year)	Discipline	# of Pages	Errors Made	Totals	
				Types of Errors	Overall Errors
Rider (2005)	Psych	9	E2, E4, E6	3	3
Johnson (2005)	Soc	1	E3	1	1
Lips (2006)	Psych	5	E2, E5, E6	3	3
Smith (2007)	Psych	2	E6	1	1
Lips (2008)	Psych	11	E1, E2, E5 (2), E6 (3), E7, E8 (2)	6	10
Caplan & Caplan (2009)	Psych	9	E1, E3 (3), E5 (3), E6 (2)	4	9
Connell (2009)	Soc	4	E1, E2 (2), E4 (2), E6, E8	5	7
Brannon (2011)	Psych	7	E2 (2), E4	2	3
Lindsey (2011)	Soc	6	E1 (2), E2 (2), E4, E5 (2), E6, E7	6	9
Anderson (2011)	Soc	0		0	0
Helgeson (2012)	Psych	7	E2, E5, E7	3	3
Crawford (2012)	Psych	0		0	0
Renzetti, Curran, & Maier (2012)	Soc	0		0	0
Hyde & Else- Quest (2013)	Psych	7	E2 (2), E4 (2), E5, E6 (2), E8	5	8
Kimmel (2013)	Soc	15	E1 (2), E2 (2), E3, E6 (5), E7, E8	6	12

Note. For complete textbook citation information see references. # of Pages refers to the pages the textbook devoted to covering EP. Error number corresponds to the coding rubric and the number in the parentheses refers to the number of times the particular error occurred in the textbook. So E5 (2) means that error number five (species selection) occurred two times in the textbook.

Figure 1. Frequency of cataloged errors

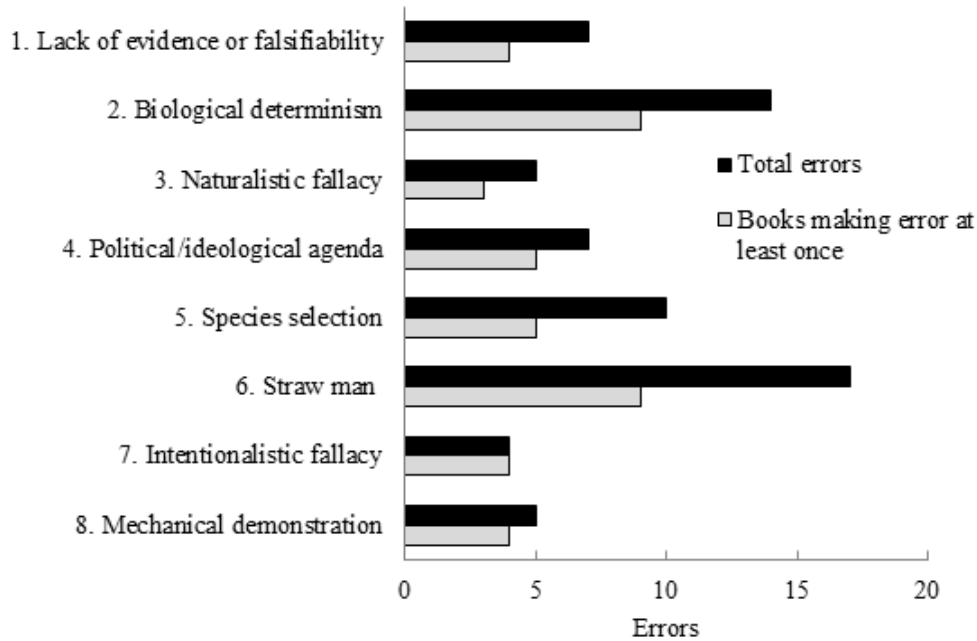


Table 2. Errors by type of textbook

Type of Textbook	Sample size	Types of errors	Overall errors
Sociology	4	4.5 (2.38)	7.25 (4.65)
Psychology	8	3.38 (1.60)	5 (3.42)

Note. Mean (Standard Deviation)

Results

Three textbooks (Anderson, 2011; Crawford, 2012; Renzetti, Curran, and Maier, 2012) were not coded because they did not discuss the theoretical framework of EP. Of the 12 remaining textbooks, all contained at least one error (see Table 1 and Fig. 1; see Appendix for complete documentation of every coded error). The mean number of errors per book was 5.75 ($SD = 3.81$) and the median was 5; this statistic allows that a book may commit an error type more than once. Across books, the mean number of error types was 3.75 ($SD = 1.86$) and the median was 3.5. Not surprisingly, there was a strong correlation between the number of pages devoted to discussing EP and total errors, $r = .73$.

The Straw Man error was the most frequent, occurring 17 times in nine textbooks. Because this category of error is the most open-ended, the result is not surprising. The Biological Determinism/Dichotomy between Nature and Nurture error was the second most frequent (14 times in nine textbooks). The Naturalistic Fallacy and Intentionalistic Fallacy

errors were the least frequent, occurring four times in three textbooks and four times in four textbooks, respectively. Psychology undergraduate textbooks devoted more pages to EP ($M = 5.67$, $SD = 3$) than did sociology textbooks ($M = 3.67$, $SD = 4.59$); Sociology textbooks contained more types and more overall errors than did psychology textbooks (see Table 2). We note that the sample size was extremely small so these results should be treated with due caution.

Discussion

Our study improves upon previous studies by furnishing a well-defined catalog of errors in the presentation of EP and demonstrating that these errors occur frequently in undergraduate sex and gender textbooks. EPs have frequently addressed these errors (Buss, 1999; Confer et al., 2011; Pinker, 2002), but our results demonstrate that, despite these efforts, errors persist.

Although these results are discouraging, they are also encouraging because the factual errors can be corrected and future textbook writers, equipped with a more accurate understanding of evolutionary theory, can produce balanced (but critical) textbooks. EP should be exposed to rigorous criticism and debate; however, that cannot happen if researchers are not well-informed. There are well-informed criticisms of EP's analysis of sex differences, and these can lead to a more comprehensive and flexible theory. For example, Wood and Eagly (2012) have published widely cited criticisms of a biologically-based analysis of the origins of human sex differences. Scholars debate their conclusions, but they can serve as catalysts for future research and clarification of hypotheses (see also Eagly and Wood, 1999; Wood and Eagly, 2002).

A possible concern with the current study is the accuracy of our error catalog. Perhaps, for example, EPs do espouse a form of biological determinism (E2), a common attribution of the textbooks (see Results), despite explicitly arguing that evolutionary theory does not entail such determinism. To some degree, this will depend upon perspective. A researcher who believes that biology plays no role in causing sex and gender differences will view any suggestion otherwise as redolent of biological determinism. What is important, however, are not the specifics of this debate, but rather whether EP is accurately represented in textbooks. The passages in sex and gender textbooks that we coded as errors are contradicted by quotes from EP textbooks, which consistently urge researchers to avoid making the four fallacies attributed to evolutionary psychologists (see EP textbooks in references). Furthermore, these passages are contradicted by numerous peer-reviewed articles (see EP textbooks for references).

The evidence for all errors is provided in the Appendix, and researchers can evaluate these themselves. Some might argue that specific EPs do make the errors imputed to them by the textbooks we coded. However, our contention is that mainstream EP as a field does not commit these errors and should not be judged nor characterized by the writings or assertions of one or two unorthodox scholars. Moreover, in making these claims ("EPs generally espouse Biological Determinism"), the textbooks invariably failed to provide a single case of an EP making the error.

We anticipate a few more concerns, some of which represent limitations of the

present research and some of which underscore the need for further research. First, we did not apply our catalog of errors to textbooks that were not focused on sex and gender. This should be done because general introductory textbooks reach a wider audience than sex and gender textbooks.

Second, sex and gender researchers from a more social constructionist perspective may argue that EP textbooks and articles similarly mischaracterize their theories and arguments. If true, we welcome careful documentation of this problem, because this can lead to increased understanding. Nevertheless, this does not mitigate or excuse the shoddy treatment of EP documented here.

Last, we simply demonstrated that textbooks frequently make errors; we did not establish that such errors are perpetuated or have an impact on students. It is, however, reasonable to posit that students *are* exposed to these errors (from reading textbooks, listening to lectures, or both) and that such exposure *influences* student attitudes about EP, as we hypothesized. More research is necessary to demonstrate causal links between textbook errors and student knowledge and attitudes. A clear prediction from the current research is that students will be more hostile toward EP after taking sex and gender classes and that the hostility of the used textbook will moderate this effect.

On a practical level, we suggest several recommendations to improve the quality of textbooks. First, sex and gender textbook writers could communicate with EPs and send them preliminary versions of their chapters. Second, EPs could write their own textbooks. This would certainly increase the accuracy of the presentation of EP. However, it may create its own problems and may provoke suspicion in an unsympathetic audience. Perhaps the best solution would be to encourage more collaboration between EPs and researchers who operate from different theoretical perspectives. This would allow both perspectives full and honest expression and would allay the concerns of skeptical researchers who might anticipate ideological distortions from authors who belonged to one theoretical camp or another.

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(*textbooks included in analysis; **introductory human EP textbooks; number of courses textbook is listed as a primary text is in parentheses)

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Appendix: Documentation of all Coded Errors

Note: E# = Error number from coding rubric; R# = See coding rubric rebuttal for explanation of error.

Lips, H. M. (2006). *A new psychology of women: Gender, culture, and ethnicity* (3rd ed.).

Quotation: “Evolutionary theory argues that in any species, including humans, certain characteristics persist across generations—passed along genetically—because they help the species survive.” (p. 132) (**Species Selection, E5**) (**R5**)

Quotation: “Researchers studying humans find that the patterns expected by evolutionary theory—a male tendency to want more sexual partners and to prefer women who are young and attractive (presumably signs of fertility) and female tendencies to be more selective and choose mates with plenty of resources—are not universal.” (p. 134) (**Other Errors**)

Comment: Although there is substantial within sex and cross-cultural variation, these general patterns are found universally or nearly so (Betzig, 1986; Buss, 1989; Kenrick and Keefe, 1992; Schmitt, 2005).

Quotation: “For example, it is simply not universally true that women tend to carefully choose one man and then try to hold onto him, whereas men tend to try to have sex with as many women as possible.” (p. 135) (**Straw Man, E6**) (**R6**)

Comment: EPs do not hold this view. EPs posit that there are myriad reasons that women engage in casual sex (Chisholm, 1993; Gangestad and Simpson, 2000; Greiling and Buss, 2000). EPs also recognize that men may be choosy and have posited several reasons for such choosiness, with paternal investment of particular importance (Geary, 2000; Marlowe, 2000).

Quotation: “These theories suggest ways in which behavior is grounded in biology, but other theories illustrate how we transcend our biology and respond to a multitude of social forces.” (p. 135) (**Biological Determinism/Dichotomy between Nature & Nurture, E2**) (**R2**)

Caplan, P. J., & Caplan, J. B. (2009). *Thinking critically about research on sex and gender* (2nd ed.).

Quotation: “Some early and some contemporary heirs of Darwin are similar to Social Darwinists in important ways: They have often based their theories on the assumption that existing human behavior patterns are good things because they are the patterns that survived as humans have evolved, and therefore must help to ensure the survival of the human species.” (p. 20) (**Naturalistic Fallacy, E3; Species Selection, E5**) (**R3 & R5**)

Quotation: “Although Buss occasionally says that he is not justifying those kinds of behavior and acknowledges some within-sex variability, his focus is on arguing that these

patterns are necessary to preserve the human species.” (p. 20) (**Species Selection, E5**) (**R5**)

Quotation: “This illustrates a fundamental problem for many EP [evolutionary psychological] theorists, which is that they assume all sex related behavior to be universal...” (p. 20) (**Straw Man, E6**) (**R6**)

Comment: EPs do not assume all sex related behavior is universal. EPs have posited many factors to explain within sex and cultural variation in sex related behavior including pathogen prevalence, life history factors, and socialization (Gangestad and Simpson, 2000; Gangestad, Haselton, and Buss, 2006; Heine and Norenzayan, 2006).

Quotation: “An additional problem is that, because EP is based on notions about what had survival value millions of years before, many of its theories are no more provable than, for instance, Freud’s claim that all girls have penis envy and that those girls who deny it are simply deceiving themselves.” (p. 21) (**Lack of Evidence/Lack of Falsifiability, E1**) (**R1**)

Quotation: “Some of EP is like Buss’s work not only in being based on unquestioned assumptions about what is right and good...” (p. 21) (**Naturalistic Fallacy, E3**) (**R3**)

Quotation: “Another example is Buss’s presentation as evidence of women’s greediness for wealthy husbands the fact that his colleague reported overhearing a conversation among four women in a restaurant, in which the women complained that there were no eligible men around, even though, Buss says, they were ‘surrounded by male waiters, none of whom was wearing a wedding ring.’” (p. 21) (**Straw Man, E6**) (**R6**)

Comment: Buss (2003) does not make use of loaded phrases such as “greediness for wealthy husbands.” The paragraph to which Caplan and Caplan refer follows two paragraphs that detail a study about what men and women value in potential spouses (Buss, 2003, p. 26). This study included “several hundred individuals” and found that “Women judge the likelihood of success in a profession and the possession of a promising career to be highly desirable in a spouse” (p. 26). The study also found that “women rate the lack of education as highly undesirable in a potential husband” (ibid). The first sentence of the offending paragraph reads, “Women’s desire for status shows up in everyday occurrences” (ibid). Buss then describes the conversation, which is intended as an anecdote to supplement the previously described study. Note that *The Evolution of Desire* is a book intended to popularize Buss’ peer-reviewed research.

Quotation: “Evolutionary biologists and psychologists theorize that current humans’ sexual behavior is that which for millennia has promoted the survival of the species.” (p. 79) (**Species Selection, E5**) (**R5**)

Quotation: “The most common evolutionary story is focused on heterosexuals (making it *heteronormative*) and based on the assumption that men try to increase the frequency of their genes in the population by impregnating as many women as possible, whereas women are more selective and choose men who will be good providers to their offspring (Buss, 2000). That theory is problematic partly because of the failure to take homosexuals into

account.” (p. 79) (**Straw man, E6**) (**R6**)

Comment: There are many papers by EPs addressing homosexuality (e.g., Bobrow and Bailey, 2001; Camperio-Ciani, Corna, and Capiluppi, 2004; Iemmola and Ciani, 2009; Rahman and Hull, 2005; Rahman and Wilson, 2003).

Helgeson, V. S. (2012). *The psychology of gender* (4th ed.).

Quotation: “Sociobiology examines the biological origins of social behavior—in other words, how social behavior evolved over time to perpetuate the species.” (p. 143) (**Species Selection, E5**) (**R5**)

Quotation: “Cultural factors may have overridden the influence of evolutionary theory on sexual behavior” (p. 144) (**Biological Determinism/Dichotomy between Nature & Nurture, E2**) (**R2**)

Quotation: “The sociobiological view of sex differences assumes that sexual intercourse will lead – or is intended to lead – to reproduction. Today, I doubt that the majority of men are thinking about establishing paternity and the majority of women are thinking about their partners’ ability to support a child when deciding whether or not to engage in sex.” (p. 144) (**Intentionalistic Fallacy, E7**) (**R7**)

Lindsey, L. (2011). *Gender roles: A sociological perspective* (5th ed.).

Quotation: “This Darwinian view suggests simply that sex differences (such as sexuality, cognitive ability, and parenting) and gender differences (such as toy preferences, college major, and career choice) have adaptive advantages for species survival.” (p. 24) (**Species Selection, E5**) (**R5**)

Quotation: “Sociobiologists believe that principles of evolution pointing to species survival provide the best understanding of how gendered social behaviors developed.” (p. 24) (**Species Selection, E5**) (**R5**)

Quotation: “Sociobiology has some success in applying evolutionary theory to animal behavior, but because it is virtually impossible to test the natural selection principles on which it is based, empirical support for evolutionary links to human behavior is weak.” (p. 25) (**Lack of Evidence/Lack of Falsifiability, E1**) (**R1**)

Quotation: “Such approaches present data with overtones that may serve political agendas. Stereotypes about male dominance in all species and untested, untestable assumptions about the evolution of sex differences distort an otherwise valid approach to understanding evolution.” (p. 25) (**Lack of Evidence/ Lack of Falsifiability, E1; Political/Ideological Agenda/Consequentialist Fallacy E5**) (**R1 & R5**)

Quotation: “For humans, new research suggests that the view that humans have sex only to reproduce rather than for sexual stimulation or to experience pleasure disregards an

entire range of emotions, personality traits, and sexual strategies that cannot be traced to animals.” (p. 25) (**Intentionalistic Fallacy, E7**) (**R7**)

Quotation: “Feminist scientific critiques center on the fact that sociobiology and similar evolutionary approaches are *androcentric* perspectives, are often presented in deterministic ways, and make faulty assumptions about human behavior and disregard well-documented research about animals.” (p. 25) (**Biological Determinism/Dichotomy between Nature & Nurture, E2**) (**R2**)

Comment: It is not clear what is meant by “androcentric” but many of the leading EPs are, in fact, women (e.g., Leda Cosmides, Martie Haselton, Sarah Blaffer Hrdy, Anne Campbell, Joyce Benenson, Bobbi Low, Laura Betzig, Sarah Hill, etc.). It is also not clear which animal studies are disregarded.

Quotation: “Conventional Darwinian wisdom about competition and the desire to pass on selfish genes does not conform to newer models suggesting that humans are naturally predisposed to altruism and cooperation. Attempts by humans to dominate other humans through violence, distrust, and cruelty were uncommon in early humans because they were maladaptive.” (p. 25) (**Straw man, E6**) (**R6**)

Comment: EPs were among the first to explicate the logic of cooperation in animals and humans (Axelrod and Hamilton, 1981; Hamilton, 1964a; Hamilton, 1964b; Trivers, 1971) and they continue to be interested in human prosociality (Fehr and Fischbacher, 2003; Fischbacher and Gächter, 2002; Gintis, 2000). The assertion that attempts by humans to dominate others through violence were rare in early human history is factually incorrect. Numerous scholarly works demonstrate that early humans were violent by today’s standards (Bowles, 2006; Gat, 2006; Ghilgieri, 1999; Keegan, 1994; Keeley, 1996; LeBlanc and Register, 2003; Otterbein, 2004).

Quotation: “Nonetheless, a great deal of rapidly emerging data in many disciplines suggests that the nature *versus* nurture view must be replaced by the more empirically sound and productive nature *and* nurture view.” (p. 52) (**Biological Determinism/Dichotomy between Nature & Nurture, E2**) (**R2**)

Comment: The author is accusing EP of being a “nature” view.

Johnson, A. G. (2005). *Gender knot: Unraveling our patriarchal legacy* (2nd ed.).

Quotation: “And if we believe in evolution, essentialism backs us into the corner of arguing that privilege and oppression are actually a positive adaptation, that societies organized in this way will thrive more than those that aren’t” p. 52. (**Naturalistic Fallacy, E3**) (**R3**)

Brannon, L. (2011) *Gender: Psychological perspectives* (6th ed.).

Quotation: Evolutionary psychology “contends that women’s and men’s brains have

evolved in different ways that furnish modern humans with “hard-wired” gender differences...” (p. 1) (**Biological Determinism/Dichotomy between Nature & Nurture, E2) (R2)**)

Quotation: “Evolutionary psychology also predicts that attractiveness should be more important in heterosexual attraction than for gay or lesbian couples.” (p. 215) (**Other Errors)**)

Comment: EP does not make this prediction. It predicts that physical attractiveness should be relatively more important to men than women on average (Buss, 1999). There is research that supports the hypothesis that gay men are more concerned with physical attractiveness in romantic partners than are lesbian women (Bartholome, Tewksbury, and Bruzzone, 2000; Hata and Prehodka, 1996; Smith and Stillman, 2002). This is entirely consistent with EP.

Quotation: “A more reliable [than youth and attractiveness] sign of reproductive capability is having borne children; however, the evolutionary psychologists do not hypothesize that women with young children are the most attractive potential mates, despite their demonstrated reproductive success.” (p. 215) (**Other Errors)**)

Comment: There are many reasons that EPs do not hypothesize this: 1) The significant level of paternal investment in many societies (Geary, 2000; Marlow, 2000) means that men who preferred women with children would potentially invest resources in non-genetic children. 2) Bearing children may deplete women of essential fatty acids that impact infant brain development (Lassek and Gaulin, 2006; Lassek and Gaulin, 2008). 3) Youth is probably the most important indicator of fertility; concluding that a 40 year old woman is fertile simply because she has a child is erroneous (Schwartz and Mayaux, 1982). 4) Men who are seeking long-term partners must take into account not just current fertility but also residual reproductive value (the expected future contribution of the women to the gene pool) (Buss, 2003; Confer, Perilloux, and Buss, 2010; Symons, 1979). For these reasons and more, it is extremely implausible that men would evolve adaptive mechanisms for finding woman with children desirable *solely because they had children*.

Quotation: “Evolutionary psychology is a maximalist theory that proposes that human evolutionary history has equipped people with preprogrammed patterns of behavior that differ a great deal between women and men. These theorists tend to rationalize the disadvantaged social position of women by citing biological programming as the source of differences. Naomi Weisstein (1982, p. 41) summarized this position by saying, ‘Men are biologically suited to their life of power, pleasure, and privilege, and women must accept subordination, sacrifice, and submission. It’s in the genes. Go fight city hall.’” (p. 433) (**Biological Determinism/Dichotomy between Nature & Nurture, E2; Political/Ideological Agenda/Consequentialist Fallacy, E5) (R2 & R5)**)

Rider, E. A. (2005). *Our voices: Psychology of women* (2nd ed.).

Quotation: “Buss argues that men adopt a short-term mating strategy, whereas women
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pursue a long-term mating strategy. Thus, men try to inseminate as many women as possible and minimize their commitment and investment in any single woman.” (p. 113) **(Straw man, E6) (R6)**

Comment: Buss and Schmitt (1993) argue that both men and women adopt short-term and long-term mating strategies.

Quotation: “Another concern is the claim that gender differences have evolved over time, which implies that gender differences are inevitable and unchangeable. Biology then becomes an excuse for accepting differences and not advocating for social change.” (p. 117) **(Biological Determinism/Dichotomy between Nature & Nurture, E2; (Political/Ideological Agenda/Consequentialist Fallacy, E5) (R2 & R5)**

Connell, R. (2009). *Gender: A short introduction* (2nd ed.).

Quotation: “Models of the body as a machine producing gender differences are mainly advanced by men, and have often been used to defend the existing gender order, to ridicule feminism or feminist ideas about gender roles.” (p. 53) **(Political/Ideological Agenda/Consequentialist Fallacy, E5) (R5)**

Quotation: “Sociobiological explanations for human kinship, for instance, foundered when the predictions of genetics failed to match the realities of kinship systems actually documented by anthropologists (Sahlins 1977). It seems that social logic works independently of genetic logic.” (p. 54) **(Biological Determinism/Dichotomy between Nature & Nurture, E2) (R2)**

Quotation: “The ‘evolutionary psychology’ arguments are based on an unrealistic individualism, which takes no account of institutionalized gender arrangements. For instance, in discussing the higher levels of violence among men than among women, all that Geary (1998) can see is male vs male competition for reproductive resources. He cannot see military institutions, insurgencies, mafias, or cultural definitions of manhood – let alone football.” P. 54 **(Straw Man, E6) (R6)**

Comment: This is not an accurate portrayal of Geary’s (1998) position. Geary uses the theory of sexual selection to explain evolved differences between men and women. Thus, his focus is not on institutional arrangements. However, he does document that male-on-male physical violence fluctuates depending on the cultural milieu (see pp. 139-144). For example, Geary states, “...men in industrial societies compete in terms of the indicators of success in these cultures—primarily in terms of educational and occupational status...” (p. 144). Geary concludes his book by noting:

Just as research in the biological and medical sciences has reduced the pain and suffering that were an integral part of our evolutionary past (e.g., infectious diseases), biologically informed psychological research on social, emotional, behavioral, and cognitive processes that have been shaped by evolutionary selection can result in strategies for changing the ways in which these evolved biases are

expressed in modern society. (p. 331)

Quotation: “But the most striking problem about sociobiology and evolutionary psychology, given the constant appeals to ‘science’, to evolution and to Darwin, is that the entire argument is based on speculation. Not one sex difference in psychological characteristics has actually been *shown* to result from evolutionary mechanisms.” (p. 54) (**Lack of Evidence/Lack of Falsifiability, E1; Mechanical Demonstration, E8) (R1 & R8)**

Comment: This could be categorized E1 as well.

Quotation: According to EPs “Biology determines; only within its ‘framework’ may humans choose their gender arrangements.” (p. 59) (**Biological Determinism/Dichotomy between Nature & Nurture, E2) (R2)**

Quotation: “In sociobiology...and popular ideologies of natural difference, bodily difference is understood to be a conservative force. It holds back historical change, limits what social action can accomplish. But we can now see that bodies as agents in social practice are involved in the very construction of the social world, the bringing-into-being of social reality.” (p. 71) (**Political/Ideological Agenda/Consequentialist Fallacy, E5) (R5)**

Comment: This paragraph is somewhat difficult to parse. It seems as though the author is stating that believing in bodily difference leads to a conservative view of the world and that this has negative ramifications.

Smith, B. (2007). *The psychology of sex and gender.*

Quotation: “The theory of evolution proposed by Wilson has been interpreted as **genetic determinism** when applied to explanations for human behavior. Wilson’s argument is that human behavior is controlled by genes, rather than by the environment, or by the interaction of biology and the environment.” (p. 133) (**Straw man, E6) (R6)**

Comment: E.O. Wilson (1975) makes explicit his view that humans are extremely flexible and that the environment is of overriding importance. As Wilson put it, “Although the genes have given away most of their sovereignty, they maintain a certain amount of influence in at least the behavioral qualities that underlie variations between cultures” (p. 550). He makes a more elaborate interactionist argument in his 1978 book, *On Human Nature*.

Lips, H. M. (2008). *Sex & gender: An introduction (6th ed.)*.

Quotation: “The claims of sociobiology and evolutionary psychology are couched in the language of Darwin’s (1871/1967) theory of evolution—a theory developed to explain the way the physical characteristics of animals change over successive generations to favor those that were most conducive to species survival.” (p. 79) (**Species Selection, E5) (R5)**

Quotation: “This theory postulates that a physical characteristic is adaptive if it contributes

to the *maximum fitness* of the species, where “maximum fitness” means being able to reach sexual maturity and leave healthy descendants.” (p. 79) (**Species Selection, E5**) (**R5**)

Quotation: “Yet evolutionary approaches to social behavior claim that underneath our cultural trappings lie genetically based human universals: sexual aggressivity among men, a sexual division of labor that assigns child care to women, and an innate desire for sexual variety among men but not women. Moreover, the proponents of this approach argue that the genetic basis of these social patterns makes them more or less inescapable, not for individuals but for humans as a species.” (p. 80) (**Biological Determinism/Dichotomy between Nature & Nurture, E2**) (**R2**)

Quotation: “Animal data do not always support the thesis that males are “programmed” for promiscuity and females are instinctively more selective.” (p. 81) (**Straw man, E6**) (**R6**)

Comment: This represents a fundamental misunderstanding of Trivers’ (1972) important paper on parental investment and sexual selection. According to parental investment theory, it is not sex per se that determines choosiness; it is the relative investment of parents in their offspring. Parental investment theory, in fact, predicts “sex-role reversed” species:

Where male parental investment strongly exceeds that of the female (regardless of which sex invests more in the sex cells) one would expect females to compete among themselves for males and for males to be selective about whom they accept as a mate. (Trivers, 1972, p. 141)

Consistent with parental investment theory, biologists have found that in species where males invest more in their offspring than females (e.g., Jacanas, Pipefish, Phalaropes, etc.), they tend to be choosier (Delehanty, Fleisher, Colwell, and Oring, 1998; Eens and Pinxten, 2000; Emlen and Wrege, 2004). Scholars have critiqued Trivers’ formulation and offered subtler accounts (e.g., Queller, 1997; Wade and Shuster, 2002). However, these accounts still predict sex-role reversal in a variety of circumstances.

Quotation: “So, the notion that gender differences in behavior stem from different genetically based strategies evolved by females and males to maximize their reproductive fitness, while intriguing, has not been proven. If a genetic basis should be established for some of the behaviors in question, to date scientists have no way of knowing whether their persistence is the result of random genetic events or (as sociobiologists argue) of adaptations for fitness maximization (Fausto-Sterling, 1992).” (p. 83) (**Lack of Evidence/Lack of Falsifiability, E1; Mechanical Demonstration, E8**) (**R1 & R8**)

Quotation: “...if humans *have* evolved behavioral tendencies to maximize reproductive success, these tendencies probably cannot be summed up in such simple terms as ‘men compete and women choose’ or ‘men are promiscuous and women are selective.’” (p. 83) (**Straw Man, E6**) (**R6**)

Comment: EPs do not hold this view. EPs posit that there are many reasons that women engage in casual sex (Chisholm, 1993; Gangestad and Simpson, 2000; Greiling and Buss,

2000). EPs also recognize that men may be choosy and have posited several reasons for such choosiness (Geary, 2000; Marlowe, 2000).

Quotation: "...many species provide exceptions to the idea that males always compete for mates and females always choose on the basis of "best" genes. Also, there are numerous examples (among nonhuman primates as well as humans) in which sexual behavior is clearly linked more to pleasure and to cementing relationships than to procreation—and much more mating takes place than is necessary simply to ensure procreation." (p. 292) (**Straw Man, E6; Intentionalistic Fallacy, E7) (R6 & R7)**

Quotation: "Convincing evidence for an evolutionary explanation of this difference [in promiscuity] would involve demonstrating both that the behavior in question has a genetic basis and that it is adaptive for reproductive success." (p. 292) (**Mechanical Demonstration, E8) (R8)**

Kimmel, M. S. (2013). *The gendered society* (5th ed.).

Quotation: "Biological arguments reassure us that what *is* is what should be, that the social is natural. Finally, such reassurances tell us that these existing inequalities are not our fault, that no one is to blame, really." (p. 22) (**Naturalistic Fallacy, E3) (R3)**

Quotation: "What's more, if these [biological] explanations are true, no amount of political initiative, no amount of social spending, no great policy upheavals will change the relationships between women and men." (p. 22) (**Biological Determinism/Dichotomy between Nature & Nurture, E2) (R2)**

Quotation: "Take, for example, the size and the number of the reproductive cells themselves. Add to that the relative cost to male and female in producing a healthy offspring, and—presto!—you have the differences between male and female sexual behavior at a typical college mixer this weekend." (p. 26) (**Straw Man, E6) (R6)**

Comment: Although this comment is obviously intended to be facetious, EPs would not completely disagree. For example, men, on average, do desire more sexual variety than women and are less reticent about engaging in casual sex (Buss and Schmitt, 2011; Clark and Hatfield, 1989). Men, on average, also experience less sexual regret than women (Campbell, 2008; Eshbaugh and Gute, 2008; Townsend and Wasserman, 2011). However, EPs also acknowledge the importance of individual and contextual factors in sexual behavior (Buss, 1999; Simpson and Gangestad, 2000). Further, most EPs would not attempt a facile explanation of a college mixer based solely on parental investment theory.

Quotation: "Thus males are hardwired genetically to be promiscuous sexual predators, ever on the prowl for new potential sexual conquests, whereas females have a built-in biological tendency toward monogamy, fantasies of romantic love and commitment coupled with sexual behavior, and a certain sexual reticence that can be overcome only by chivalric male promises of fealty and fidelity." (p. 27) (**Biological**

Determinism/Dichotomy between Nature & Nurture, E2; Straw Man, E6) (R2 & R6)

Comment: EPs do not believe that women have a “built in biological tendency toward monogamy” (Barash and Lipton, 2002; Draper and Harpending, 1982; Gangestad, Thornhill, and Garver-Apgar, 2005). As previously documented, EPs do not believe that men are genetically prone to be “promiscuous sexual predators.”

Quotation: “Women, then, are biologically programmed to “hold out” –but they better not do it too long. If women were only a little bit more compliant, men wouldn’t be forced to resort to rape as a reproductive tactic.” (p. 28) (**Straw Man, E6) (R6)**

Comment: As noted, not all women engage in exclusive long-term mating strategies (Buss and Schmitt, 1993). The comment about rape is flippant and misconstrues EP’s views (e.g., Ellis, 1991; McKibbin, Shackelford, Goetz, and Starratt, 2008; Thornhill and Palmer, 2000).

Quotation: “Can we explain each single sexual encounter by such grand evolutionary designs? I would bet that most of our conscious “strategies” at college mixers have more immediate goals than to ensure our reproductive success.” (p. 28) (**Intentionalistic Fallacy, E7) (R7)**

Quotation: “Some arguments go far beyond what the data might explain and into areas that are empirically untestable. Biologist Richard Lewontin, a passionate critic of sociobiology, argues that “no evidence at all is presented for the genetic basis of these characteristics [religion, warfare, cooperation] and the arguments for their establishment by natural selection cannot be tested, since such arguments postulate hypothetical situations in human prehistory that are uncheckable.” And fellow evolutionary biologist Stephen Jay Gould denies that there is “any direct evidence for genetic control of specific human social behavior.” (p. 28-29) (**Lack of Evidence/Lack of Falsifiability, E1; Mechanical Demonstration, E8) (R1 & R8)**

Quotation: “Sociobiologists tend to favor male-dominant species to demonstrate the ubiquity of male dominance.” (p. 29) (**Straw Man, E6) (R6)**

Comment: There is no evidence that EPs favor male-dominated species for the purpose of demonstrating the ubiquity of male dominance. In his discussion of ring-tailed lemurs, E.O. Wilson (1975) notes, “Adult females are dominant over adult males, a reversal of an otherwise nearly universal primate pattern” (p. 531). Although this pattern is still generally held to be true, one of our closest relatives, the bonobo, does not exhibit a pattern of male dominance. EPs have utilized the bonobo to better understand human evolution (De Waal, 1995; McHenry and Corruccin, 1981; Parish, 1994; Parish, De Waal, and Haig, 2000; Wrangham, 1993). EPs emphasize whatever species can shed light on human behavior.

Quotation: “The preposterous idea that rape is an evolutionary mating strategy for losers in the sexual marketplace is belied by the most common form of rape in the United States. Did you know that the majority of rapes in America have nothing whatever to do with

reproduction? You know why? The victims are male. In January 2012, the U.S. department of Justice released an estimate of the prevalence of sexual abuse in penitentiaries: 216,000...These victims are often assaulted multiple times over the course of a year, meaning the number of actual rapes is significantly higher. Such rates make the United States the first country in the history of the world to count more men as rape victims than women. And Thornhill and Palmer's facile evolutionism is exposed as mere ideology." (p. 31) **(Straw Man, E6) (R6)**

Comment: This simplifies the account given by Thornhill and Palmer (2000). Thornhill and Palmer explicitly state that "the question of whether rape is an adaptation or a by-product cannot be definitively answered..." (p. 84). Further, Thornhill and Palmer never make the argument that rapists are consciously thinking about reproduction. They take pains to explain that humans are not aware of the evolutionary logic of many, if not most, of their behaviors. Whatever one thinks of the Thornhill and Palmer book, the data that is cited does not address their actual position because the U.S. has a unisex prison system.

Quotation: "Sociobiology and evolutionary psychology provide us with what Rudyard Kipling called a "just-so story" –an account that uses some evidence to tell us how, for example, an elephant got its trunk, or a tiger its stripes. Just-so stories are children's fables, understood by the reader to be fictions, but convenient, pleasant, and, ultimately, useful fictions." (pp. 31-32) **(Lack of Evidence/Lack of Falsifiability, E1) (R1)**

Quotation: "Another biological fact about women might make life even more confusing for males seeking to determine paternity. Martha McClintock's research about women's menstrual cycles indicated that in close quarters, women's cycles tend to become increasingly synchronous; that is over time, women's cycles will tend to converge with those of their neighbors and friends...What's more, in cultures where artificial light is not used, all the women will tend to ovulate at the full moon and menstruate at the new moon." (p. 33) **(Other Errors)**

Comment: McClintock's research has been criticized on methodological grounds and there is now a near consensus that women's cycles do not synchronize (Schank, 2000; Strassman, 1997, 1999; Wilson, 1992; Yank and Schank, 2006; Ziomkiewicz, 2006). The assertion that women tend to ovulate at the full moon is not supported by peer-reviewed literature. Strassman (1997) tested the lunar hypothesis among the Dogon, a natural fertility population lacking artificial lighting. Her data did not support the hypothesis.

Hyde, J. S., & Else-Quest, N. (2013). *Half the human experience: The psychology of women* (8th ed.).

Quotation: "The thrust of the argument is clear: Sociobiologists argue that the social behaviors we see in animals and humans today evolved because these behaviors were adaptive, and they continue to be biologically programmed." (p. 32) **(Biological Determinism/Dichotomy between Nature & Nurture, E2) (R2)**

Quotation: “For example, the sociobiologist’s belief is that the greater aggression and dominance of males are a result of sexual selection and are controlled by genes. Therefore, men are genetically dominant, and women are genetically subordinate, and the subordinate status of women will have to continue because it is genetic.” (p. 33) **(Biological Determinism/Dichotomy between Nature & Nurture, E2; Political/Ideological Agenda/Consequentialist Fallacy, E5) (R2 & R5)**

Quotation: “Sociobiologists tend to view data from an *androcentric* (male-centered) perspective and to talk selectively about those studies that confirm their androcentric theory, ignoring those studies that contradict it. For example, the female chimpanzee...is notoriously promiscuous (Janson-Smith, 1980). When she is in estrus (“heat”), she mates indiscriminately with many males. That does not fit into sociobiology, which says that she should be choosy about the male with whom she mates and that the most aggressive, dominant male should be the only one to have the privilege of inseminating her. The sociobiologists tend to ignore chimpanzees.” (p. 33) **(Political/Ideological Agenda/Consequentialist Fallacy, E5; Straw man, E6) (R6)**

Comment: EPs do not ignore the chimpanzee. E.O. Wilson (1975) mentions chimpanzees on at least 20 pages of his foundational text, *Sociobiology: The new synthesis*. Introductory EP textbooks also frequently discuss chimpanzees (e.g., Badcock, 2000, 5 pages; Barrett, Dunbar, and Lycett, 2002, 7 pages; Bridgeman, 2003, 13 pages; Buss, 2008, 11 pages; Cartwright, 2000, 7 pages). EPs have also made wide use of the chimpanzee when developing models of human evolution (Chapais, 2009; Geary, 2010; Tomasello and Hermann, 2010; Wrangham and Wilson, 2004; Wrangham, Wilson, and Muller, 2006).

Quotation: “In discussing this [man the hunter], Wilson (1978, p. 127) makes much of how natural selection for these traits is reflected in men’s current superiority in Olympic track events. Later on the same page, he mentions that women are superior in precision archery and small-bore rifle shooting in the Olympics, but does not see to see this as inconsistent with the evolution of only man as the hunter. “Woman the gatherer” is ignored, although she may have formed the foundation for early human social organization...” (p. 34) **(Straw Man, E6) (R6)**

Comment: Wilson does discuss women’s role as gatherers (pp. 83-86). Here is the actual passage dealing with Olympic events:

It is of equal importance that women *match* or surpass men in a few other sports, and these are among the ones *furthest removed* from the primitive techniques of hunting and aggression: long distance swimming, the more acrobatic events of gymnastics, precision (but not distance) archery, and small-bore rifle shooting. As sport-like activities evolve into more sophisticated channels dependent on skill and agility, the overall achievements of men and women can be expected to converge more closely. [emphasis added] (pp. 127-128)

There is no inconsistency.

Quotation: "...modern biologists focus on more complex issues such as the survival of the group and the species, and the evolution of a successful adaptation between the species and its environment." (p. 34) (**Species Selection, E5) (R5)**

Quotation: "Evolutionary psychologists fail to specify the biological mechanisms from evolution to behavior. Their basic arguments are that evolution occurred over millions of years and, voila, we have a certain pattern of gender differences in the 21st century. But evolution can act only through genes, and genes influence behavior because they direct the synthesis of certain proteins and not others, leading to differing levels of biochemicals such as neurotransmitters or hormones. This is the era of the Human Genome Project, in which specific genes that create specific medical conditions and behaviors are being identified. Evolutionary psychology has failed to incorporate this work, and fails to specify which genes and biochemicals are responsible for the patterns of gender differences that they claim have evolved." (p. 35) (**Straw Man, E6; Mechanical Demonstration, E8) (R6 & R8)**

Comment: EPs do not make Lamarckian arguments about sex differences. EPs recognize that evolution acts through the differential replication of genes and that genes influence behavior through protein synthesis and differential production of hormones, neurotransmitters, amino acids, etc. Men and women differ genetically because men have a Y chromosome whereas women have two X chromosomes. EP has, in fact, incorporated the work of endocrinologists, behavioral geneticists, molecular biologists, and neuroscientists. Many EPs have studied the relation between hormones and sex differences (Collaer and Hines, 1995; Puts, McDaniel, Jordan, and Breedlove, 2008; Van Anders and Hampson, 2005) and many more have written about the topic (for a review, see Geary, 2010). Specifying the precise genes and "biochemicals" responsible for sex differences is an arduous task but scientists are slowly making progress (Hines, 2011; Jazin and Cahill, 2010; McCarthy and Arnold, 2011; McCarthy, Arnold, Ball, Blaustein, and De Vries, 2012). EPs can only report the current state of knowledge on sex differences, genes, hormones, and neurotransmitters.

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