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Race, Monogamy, and Other Lies They Told You

Busting Myths about Human Nature

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Myths about Sex

In 1995 the author and family therapist John Gray published the first edition of his book *Men Are from Mars, Women Are from Venus,* which argues that to make male-female romantic relationships (especially marriages) work, one needs to realize the core differences in communication, emotion, and behavioral styles of males and females. Twenty years (and multiple editions and follow-ups) later, this is still a common metaphor people use to think about men and women.[1] Men are aggressive, belligerent, but protectors like the Roman god of war Mars, and women are emotive, beautiful, vain, and fertile like the goddess of love Venus. This implies that males and females want to have a specific kind of romantic relationship, but that males and females speak different languages, have different desires and needs, and although they are the same species, act like they come from different planets.

In our daily lives we are constantly bombarded with images, words, and situations that reinforce the notion that men and women differ in bodies, desires, needs, and even minds. A book entitled *The Teenagers Guide to the Real World* starts its chapter 11 with a phrase that summarizes the myth: "Men and women are completely different." The book goes on with an exaggerated, but not unfamiliar, explanation for why and how the sexes differ:

> Men are equipped to impregnate women. There is no cost to a man in impregnating someone. Women, on the other hand, are equipped to be impregnated and produce babies. As soon as a woman gets pregnant she has just signed on for a 20 year tour of duty taking care of the resulting child. Her goal, going back millions of years, is to help that baby survive. For a woman pregnancy carries an extremely high cost. Furthermore, the woman's mind and body also know, instinctively at some level, that a baby needs two people to survive. Women are therefore designed to wait for a strong commitment prior to getting pregnant. In our culture that commitment is called "marriage," and women are smart to wait for it. Many men seem to have little or no such programming. This basic anatomical difference, by itself, leads to rather strong differences in priorities between men and women. In addition, men and women clearly have different programming in other parts of their brains.[2]

These books reflect the common perception that men and women "complete" each other in their differences, that marriage and the quest for a perfect mate emerges from our evolutionary histories, and that male aggression and female nurturing are part of the package. Although a bit over the top, the preceding quote highlights the point that our perception of male-female differences relies heavily on current popular beliefs about the mind, the body, and evolution: it is widely accepted that male and female differences are a reflection of our nature.

MEN AND WOMEN ARE FROM DIFFERENT PLANETS, AREN'T THEY?

Most people seem to think so. It is a common assumption that parts of the male and female brain have evolved to focus on different things; men want sex and sports, and women want material things, to be social with other women, and avoid sexual advances of men. A core part of these differences is sexuality: it is a basic assumption that males and females see sexual activity in very different ways. This view (and its association to the overall myth) is evident across many aspects of our culture. Think of the time leading up to Christmas and Valentine's Day when the media is packed with advertisements for jewelry, always showing the man buying a diamond for the woman, and the woman being eternally grateful; this image of gift-giving is a metaphor for men providing goods or support in exchange for women giving them access to sex (or a bond of marriage and its association with continuous sexual access). Think of the advertisements for online dating sites, which focus on the cultural goal to marry, its relation to sex and sexuality, and the concept that there is someone out there for everyone. There is near total agreement that at the heart of it men

and women want different things out of life and sex, as the journalist Nicholas Wade asserts: "When it comes to the matter of desire, evolution leaves little to chance. Human sexual behavior is not a free-form performance, biologists are finding, but is guided at every turn by genetic programs."[3]

The concept that there is a well-established pattern of differences between the sexes is a belief about human nature. But is this belief justified? What if sex and sexuality are really complicated? What if our assumptions about what is normal and natural are not reflected in the actual data about sex differences and similarities? The following two quotes challenge the myth about patterns of human sexual differences by suggesting that male and female behavior might not be so different or that differences might not be as ingrained as we think they are:

> Although sex is a biological urge, it is rarely experienced in the same ways by people everywhere: it is differently practiced and felt depending on the social and cultural settings in which it occurs. (Hastings Donnan and Fiona Magowan, anthropologists)[4]

> The gender similarities hypothesis holds that males and females are similar on most, but not all, psychological variables. That is, men and women, as well as boys and girls, are more alike than they are different. . . . Results from a review of 46 meta-analyses support the gender similarities hypothesis. Gender differences can vary substantially in magnitude at different ages and depend on the context in which measurement occurs. . . . The question of the magnitude of psychological gender differences is more than just an academic concern. There are serious costs of overinflated claims of gender differences. These costs occur in many areas, including work, parenting, and relationships. (Janet Shibley Hyde, psychologist)[5]

Hyde also suggests that if these assumptions about human sexual differences are incorrect, their maintenance might even be detrimental to our society's functioning and health. How do males and females actually behave? Do our cultural schemata filter how we see and interpret the world or are the differences we seem to see in everyday life accurate representations of a human nature?

As with the myth busting in the previous two chapters, reality is not simple but it is important. Sex and sexuality are very complicated and they mean a lot for our daily lives. What we really know about men and women and the nature of sex in humans challenges the extent of these differences and any simplistic take on this

topic. To bust this myth we have to test the core assumptions and refute them.

Testing Core Assumptions about Sex

ASSUMPTION: *Males and females are biological very different from one another.*

TEST: Are male and female biologies totally different, sufficiently different, or just versions of the same biological theme? If there is a clearly distinct biological patterning between males and females that mandates radical differences in behavior and function then the assumption is supported; if males and females are basically variations on a theme, and not that different, then it is refuted.

ASSUMPTION: *Behavioral differences between males and females are evolutionary; they are hardwired.*

TEST: If the differences in behavior between males and females are more biologically based (sex) than culturally based (gender) and are best explained as evolutionary adaptations, the assumption is supported. If, however, the differences are complicated, less clear, and mostly related to patterned social differences between genders, not primarily to evolved differences, then this assumption is refuted.

ASSUMPTION: *Males and females are different because they are complementary to one another, resulting in the monogamous pair bond and the nuclear family as a natural state for humans. This means that it is a natural human goal to obtain a unique and powerful sexually monogamous romantic relationship.*

TEST: This has a multipart test: first, are humans monogamous sexually? If yes, then supported; if no, then refuted. Second, are pair bonds and marriage (or at least romantic relationships) the same thing? If yes, then supported; if no, then refuted. Finally, do humans "naturally" live in nuclear families where the strongest bonds are between husband and wife and children? If yes, then supported; if no, then refuted.

ASSUMPTION: *Men and women are really different when it comes to sexuality: men want sex and women want relationships (and less sex than men).*

TEST: Do men want more sex than women? Are men more sexually focused than women? Do the sexes differ dramatically in how, when, and how much they have sex? If yes, then supported; if no or if it is much more complicated than these simplistic assumptions, then refuted.

MYTH BUSTING: MALES AND FEMALES ARE MADE OF THE SAME BIOLOGICAL STUFF

Are male and female biologies totally different, sufficiently different, or just versions of the same biological theme? This section of the chapter summarizes what is known about the development of humans into male and female sexes and the differences and similarities between adults. From the development of the male and female reproductive tracts to the range of variation in sex chromosome patterns, to the physiological, morphological, and neurological variation and overlap of human sexes the bottom line is, while there are many differences, there is no doubt that we all are the same species and are more biologically similar than different.

Of course, no one in their right mind is going to deny that there are differences from birth (or even before) between males and females:

> Yes, boys and girls are different. They have different interests, activity levels, sensory thresholds, physical strengths, emotional reactions, relational styles, attention spans and intellectual aptitudes. The differences are not huge and, in many cases, are far smaller than the gaps that separate adult men and women. (Lise Eliot, neuroscientist)[6]

However, those differences are not necessarily what we think they are, nor is the gap as wide as is usually presented. In fact, in many cases there is no gap at all. One concept critical to our discussion needs to be examined prior to reviewing the biological and behavioral data—overlap of distributions. When we talk about differences we tend to think of a point on a line or single figures, not the entire range of variation that actually occurs. For example, we already mentioned the size dimorphism in our species, with males 10 to 15 percent larger than females. These percentages represent an average difference, with both males and females showing a large range of variation with substantial overlap. In figure 6 we see one male who is about 12 percent taller than the female. In figure 7 we can see the total range of male height and the total range of female height with the means separated by about

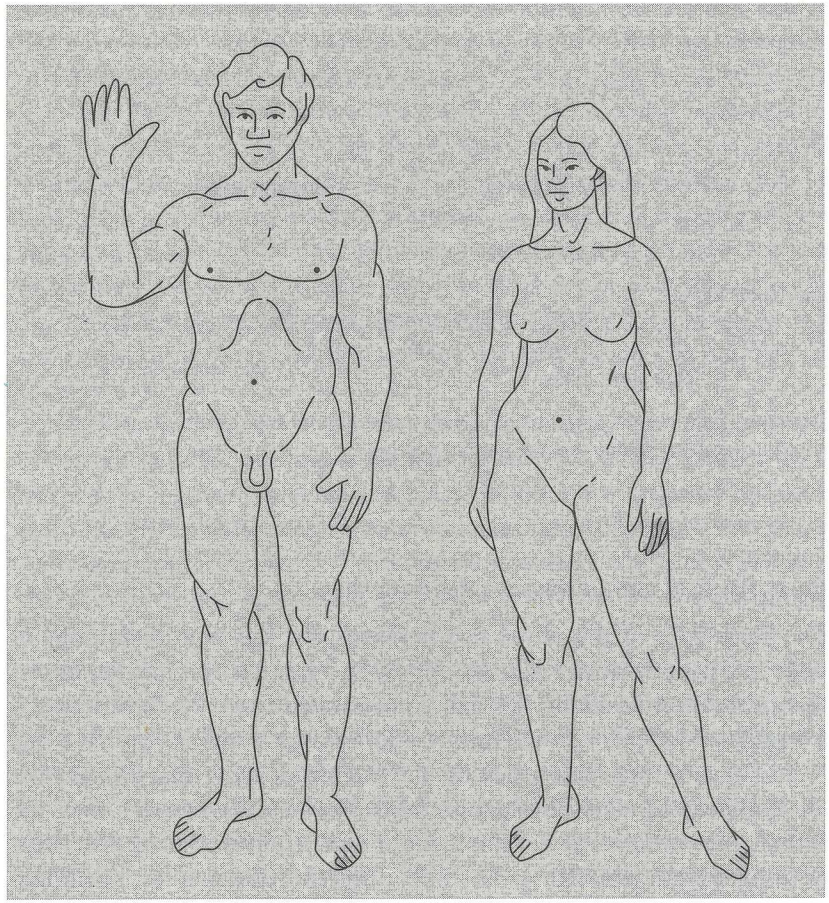

FIGURE 6. In this illustration sent out beyond the solar system on the *Pioneer 10* spacecraft, the representative human male is about 10 to 15 percent larger than the female. Adapted from NASA.

12 percent, but notice the substantial overlap. In practice, when we use only averages we ignore the actual real-world patterns where there is a lot of overlap. So when we say males are 10 to 15 percent larger than females we don't mean that every male is larger than every female, just that the averages in height between the two groups are separated by that figure. Remember this as we discuss the differences (and lack thereof) in males and females; sometimes it is important to see the forest and not just a few tress to understand what is really out there biologically and what is the product of culturally filtered schemata.

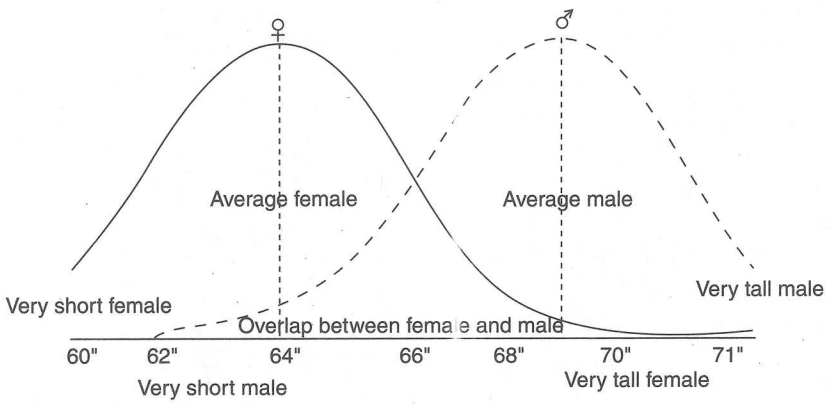

FIGURE 7. Total ranges of male and female heights, with the means separated by about 12 percent. Notice the substantial overlap.

Basic Physical and Developmental Patterns

The basic core of the physical difference (and the legal definition) of male and female does reside in our DNA or, more specifically, in our chromosomes. Generally, we call someone with two X chromosomes a female and someone with one X and one Y a male. If you have one X and one Y there are genes on the Y chromosome that initiate the development of male physical patterns. If you have two X's then the active genes initiate the development of female physical patterns. These developmental trajectories include different patterns of hormonal action, muscle and bone development and, possibly, some brain differentiation.

As usual, nothing is as clear as we'd like it to be. The XX and XY classification does not always correlate with the physical and behavioral patterns we associate with male and female. You can be XY and have an error in the activation of segments of DNA so that the specific genes that initiate male development (like the genes called TDF and SRY) never turn on and their protein products are not properly made or transported. In this case the genetic impact from the one X will facilitate the development of female physical form. There are also a wide array of other variations on this theme such as XO (no Y), XXY, and a variety of developmental scenarios which cause less than crystal clear sex outcomes such as XX individuals with male genitals, XY individuals with female genitals, individuals who are XX or XY but have mixed sex genitals, and other variants.[7] The total frequency of variations on the standard patterns (XX equals female physical form and XY equals male physical form), which is called intersexed, is about 1.7 in every 1000 births. For a little context on this, the average frequency of albinism is about 1 in 20,000 births. Intersexed individuals, biological variation that muddles the clear distinction between what can be genetically defined as male and female, are fairly common in humans. Most of the cases are minor in effect and the individuals are able to generally confirm to the physical expectations of one sex or the other, but this still reflects a pretty flexible system of sex development.

All humans, male or female, share the same bones and physical structures. We are the same species and all of our tissues (such as tendons, ligaments, bones, blood, skin, etc.) are made of the same stuff. But these bodily tissues do not always take the exact same shape. As was hinted at in chapter 5, there are a suite of physical differences that, on average, occur between males and females. A pronounced difference is found in the shape of the pelvic bones. In females, the pelvic girdle is more flared outward and the size of the central space created by the bones of the pelvis (the birth canal) is larger in females than in males. The reason behind this physical difference is obvious: females give birth and thus need maximum space for the birth canal. It is this larger birth canal and the wider flare of the pelvis in females that gives them slightly more side-to-side displacement when they walk than males (on average). This behavior, the slight swinging of hips when walking, is often accentuated culturally to reflect a hyperfeminine behavior.[8] Here is our first example of a small physical difference between males and females that can be culturally played up to be visually very distinct.

Aside from the pelvis, there are other common patterns of physical differences. In general female skulls have a more vertical forehead, smaller ridges above the eyes, fewer bony buildups around muscle attachments, and smaller mastoids (the lump on your skull just behind and below your ears). Also, the angle of the female jawbone tends to be larger than in males. This gives an overall rounder and smoother look to females heads than those of males. In addition to these skeletal differences males tend to have, on average, higher muscle density per unit area and more upper body strength than females (which contributes

to their greater physical impact in aggressive behavior, as discussed in chapter 5).

The way we deposit fat on our bodies contributes a great deal to their shape. Human females and males lay down fat (called adipose tissue) more or less in the same way that most mammals do, but at slightly higher rates. That is, modern humans tend to be a bit fattier than most mammals. The pattern of fat deposition is similar for both sexes in location, but males and females exhibit slightly different rates of fat deposition by location and of fat utilization: females deposit more fat around the chest area and thighs, men more around the abdomen, and men burn or utilize fat faster than women.[9] Because we walk upright on two legs (and have associated changes in our muscles and their attachments), and the fact that we only have two nipples (many mammals have multiple sets), the pull of gravity on that fat and the structure of our bodies create different fatty accumulations than in other mammals (like breasts for human females and pronounced buttocks for both male and female humans relative to other primates). This also creates the differences in the general appearance of male and female human bodies.

Remember that all of these variables are average patterns. In any given population you will find some males smaller than some females and some females whose skulls and bodies have many male characteristics, and vice versa. The patterns of difference between male and females bodies are there, but any specific individual will have some variation on these themes. Also, when you compare between populations or across the whole species these patterns of difference are less robust (there is more overlap between males and females) because of the dramatic size and shape plasticity in modern *Homo sapiens* (remember the discussion of human variation in chapter 4).

We do expect substantial differences between males and females when it comes to reproductive biology, and indeed the reproductive organs and external genitalia do differ in certain ways. However, these differences are more of degree than kind, since the same embryonic tissue mass gives rise to both female and male genitalia. Females, and not males, give birth and produce milk for the offspring (called lactation). Because of this females also have specific differences in the internal structures surrounding the nipples that men lack (called mammary, or milk, glands). The tissue mass of the chest is from the same embryonic structures so both males and females have nipples that are generally the same (surrounded by a suite of glands and a cluster of nerves). But

males are not able to lactate because their glands (largely sebaceous, or sweat, glands) do not develop into mammary glands. The male reproductive tract is active (making sperm, called spermatogenesis) for the majority of men's lives, with the effectiveness of the system dropping off as they age. Females, however, cease reproductive cycling and undergo a change in their hormonal patterns at some point between forty-five and sixty years of age, called menopause, which signals a cessation of their reproductive lifetime.[10] Throughout the human life span all the actual hormones in males and females are the same (there are no male-only or female-only hormones), but there can be differences in the levels, patterns, and impacts of some of these hormones in male and female bodies.

Genitals are surprising

Almost everyone assumes that the best way to tell someone's sex is by looking at their genitals: if you have a penis, you're male, or if you have a vagina, you're female. Most people think that male and female genitals are about as different as can be. But this is not true. Men and women are all made of the same stuff, even our genitals. We are just different variants on common themes.

The female and male reproductive systems, including the genitals, emerge from the same mass of embryonic tissue. For the first six weeks of life the specific pre-sexed tissue masses develop identically. Starting at about six to seven weeks after fertilization, depending on whether the fetus has XX or XY chromosomes (usually), a series of hormone and other chemical signals are distributed to these tissues and they begin to differentiate. One part of the tissues begins to form the clitoris or penis (depending on the chemical cues) and another forms the labia or scrotum. Another area begins to form into either the testes or the ovaries.[11] This means that physiologically, male and female genitals are made of the same stuff and work in more or less the same ways. For example, in sexual response physiology the clitoris and penis are basically the same. This also helps us understand the large range of variation in genitals. Male penis size and shape vary, female clitoris and labia vary, and there can even be a fairly high rate of genitals which develop without a 100 percent clear distinction between being a so-called male or female structure.[12] In large part all of this variation is irrelevant to reproductive function; the vast majority of genitals work fine. Genitals can be both an indicator of

difference between men and women and a clear sign of how similar we are.

Biology of Sex and Reproduction

The core of the biology of sex is the reproductive system. Even though the systems are derived from the same tissues via similar processes, there are some important differences in the final forms. The female reproductive system includes the external vagina and clitoris and the internal uterus, ovaries, and fallopian tubes. The ovaries are involved in the storage of egg cells and the production of many hormones, such as estradiol and progesterone (also produced by males, but from different sources). Once females pass puberty they begin to cycle reproductively. Once per cycle an egg is transported to the uterus via the fallopian tubes, where contact with sperm and fertilization can occur. If an egg is fertilized it will be implanted in the uterine wall and begin development. The uterus changes its internal structure on a regular cycle (the menstrual cycle), which is tied to the timing of egg release and potential fertilization. If an egg implants, the uterine lining begins the pregnancy cycle; if not the lining sloughs off and another cycle is begun. This cycle is regulated largely by hormones such as follicle-stimulating hormone (FSH) and luteinizing hormone (LH). Females also have mammary glands, which produce a highly nutritious supplement for the newborn infant in the form of milk. Most mammals have six or more mammary glands, but most primates (monkeys, apes, and humans) have only two. The amount of fatty tissue around the glands is larger in humans than in most primates (resulting in breasts). The development of breasts at puberty is one of the secondary sexual characteristics that are regulated by the hormones secreted by the ovaries.

The male reproductive system consists of the external penis and scrotum, which contains the testes and the epididymus. Sperm are produced in the testes, transported across the accessory sex organs, and eventually ejaculated via the penis. The vas deferens (a tube-like structure) connects the testes to the seminal vesicles and the Cowper's and prostate glands, all of which are involved in the production and ejaculation of sperm. Unlike the eggs, sperm can move on their own, and once deposited in the vagina they attempt to move up into the fallopian tubes and contact an egg. As in females, the male testes (counterpart to the female ovaries) are important in the production of hormones, such as testosterone. It should be no surprise that the development and function of the male reproductive tract is heavily regulated by the same hormones that regulate much of the female reproductive function, including follicle-stimulating hormone (FSH) and luteinizing hormone (LH).

A key facet of the reproductive system is the ability to actually have sex. Not surprisingly, given the similarities between males and females, there is a high degree of overlap in how these systems function during sexual activity. Both males and females require the limbic system (the basic emotive and nervous system) to be stimulated by sensory input to initiate sexual arousal. There is some evidence that females are more susceptible to smells and possibly even pheromones than are males, and that males are more stimulated via visual cues than females. Once the initial stimulus is engaged, neural stimuli (brain actions) are transmitted via the endocrine system (using hormones like testosterone, vasopressin, and oxytocin in both males and females). This leads to physical and psychological excitement that includes increased blood flow and swelling of tissues (called vasocongestion) and a tensing of the muscles (called myotonia) throughout body, sporadic increases in blood pressure, lubrication in the vagina and inner labia (females), erection of the clitoris (females), and erection of the penis (males), glandular secretions across parts of the body, and ultimately (or potentially) a variable suite of physiological changes associated with orgasm, including male ejaculation. This is simply the physical description of sexual activity. At the end of this section we go into more detail about the wide range of variation in sexual behavior in humans and the similarities and differences between men and women.

The reproductive system and the evolution of male-female differences

One of the core assumptions about the behavioral differences between the sexes comes from a basic misunderstanding of the mammalian reproductive system. According to the *Teenager's Guide to the Real World*, "Men are equipped to impregnate women. There is no cost to a man in impregnating someone. Women, on the other hand, are equipped to be impregnated and produce babies." The basic idea is that for men reproduction is cheap and for women it is very costly. This is derived from the basic notion of anisogamy (different-sized sex cells—big egg and small sperm). Basically, the assumption is that females spend a lot of energy to produce a limited amount of eggs and then make a high

investment in rearing the young, whereas males produce lots and lots of cheap sperm only. Many biologists have argued that because of this differential in the evolutionary cost of reproduction males and females should have very different approaches to reproductive behavior. Thus a male should try to fertilize as many females as possible and females should be extremely choosy and pick only males that either will help them raise the offspring or will provide the best possible set of genes for the offspring (or both). Drawing on a series of perspectives since Darwin's time the theoretical biologist and biological anthropologist Robert Trivers (and subsequently many others) translated this basic idea into evolutionary models that offered behavioral predictions for many organisms, including humans. The basic idea is that distinct reproductive pressures on males and females result in competition between the sexes caused by the differential goals and patterns.[13] This is the notion that is the basis for the belief about differences, and disagreements, between the sexes.

Not everyone agrees. The biological anthropologists Monique Borgerhoff Mulder and Kristin Rauch in their recent evolutionary overview of sexual conflict in humans point out the problem with this myth that male reproductive investment is cheap: "And as our review has shown, predicted outcomes are shaped by many factors other than sex differences in postzygotic investment in offspring. . . . More fundamentally, of course, the identification of winners and losers is a flawed pursuit."[14] Males cannot simply walk up to females and inseminate them. In social organisms, especially complex ones like humans, mating is part of a larger social reality and thus the behavior, the costs, and the contexts of reproduction are tied to a variety of factors, not just eggs and sperm. Even at the level of sperm, not just one is need for a successful copulation but rather millions (per ejaculation), so sperm are nowhere near as cheap to produce as we are led to believe. Recent work by the biological anthropologist Sarah Hrdy, et al. has also demonstrated that humans have been cooperative breeders for a long time. At an early stage in our evolutionary history multiple individuals (females and males) were involved in raising and caring for children.[15] The idea that it is natural for one human female to raise her offspring alone, or with just a single male, is a very recent one indeed, and one that is biologically not supported.

The notion that male and female behavioral differences are largely explained by the differences in their reproductive biology is absurdly oversimplified. There is a wide range of recent reviews and refutations

of this notion, suggesting that a real understanding of reproductive systems and patterns of investment, aspects of sexual selection, the division of labor, and the wide array of human ecological, social, and historical contexts better explain male and female reproductive relationships than overhyped differences in their respective reproductive investments.[16]

Sex and the Brain

> . . . what I found after an exhaustive search, was surprisingly little solid evidence of sex differences in children's brains. Sure, there are studies that *do* find differences, but when I looked closely at *all* the data—not just the research that confirms what we already know about boys' and girls' behavior but a truly balanced collection of findings—I had to admit that only two facts have been reliably proven: boys' brains are larger than girls and girls' brains finish growing earlier than boys'.
>
> —Lise Eliot (neuroscientist)[17]

Males have bigger bodies and bigger brains, on average, than do females. Because of the assumptions about how males and females differ in behavior, there has been an intensive search for measurable biological differences in men's and women's brains. Over the past fifty years or so there have been many studies of the brains of cadavers and in the last few decades researchers have been able to move to various imaging technologies to examine the brains of living individuals. Yet as Lise Eliot observes, the end result of these studies does not provide any clear pattern or indication of differences that can be tied to behavior and/or other male-female distinctions. However, there are some areas of interest in the brains of males and females that have been the focus of these inquiries.

In chapter 5 we noted that the prefrontal cortex of the brain was an important region for aggression. It should not be surprising that another area near this region, the ventral frontal cortex, is of interest in studying behavioral differences. The ventral frontal cortex consists of the orbitofrontal cortex and straight gyrus, and plays an important role in normal social behavior in humans. Specifically, this area is assumed to play a role in social perception (figuring out social scenarios and contexts). In two small studies the ventral frontal cortex was shown to be slightly larger in females, suggesting that this might be correlated with females' (presumably) more acute sense of social interactions. A later study found that there was no difference in the

orbitofrontal cortex between males and females, but that the straight gyrus was proportionally larger in women. This same study also correlated the larger size of the straight gyrus with "higher identification with feminine characteristics and better performance on a test of social cognition."[18] This suggested that maybe the straight gyrus had some association with female behavior and might be a good place to look for the male-female brain differences.[19]

In a study of seventy-four boys and girls the neuropsychiatrist Jessica Woods and colleagues found no pattern of differences between boys and girls in the ventral frontal cortex or the orbitofrontal cortex, but did find one in the straight gyrus: it was larger in the boys. This was the opposite result from previous studies. However, there was a twist—this size difference was negatively correlated with age. That is, the older boys had smaller straight gyruses than the younger ones, an effect not found in the girls. This change is in accord, to an extent, with general brain growth patterns, where gray matter grows until the early teens in males and females (stopping slightly earlier for females than males) and then begins to decrease into adulthood. However, the females' gray matter in the straight gyrus did not decrease with age and the males' did. Finally, and most interestingly, the interviews and assessments of the study subjects (in this and previous similar studies) identified a relationship between the straight gyrus and self-described/interpreted femininity. In adults, higher self-rated association with feminine traits was associated with larger straight gyrus volume. In children the opposite happened, that is, higher self-association with femininity was correlated with smaller straight gyrus volume. Not a particularly clear outcome, aside from the apparent connection between the size of the straight gyrus and self-reported femininity. The researchers conclude that "the origins of the relationship between sexual dimorphism of straight gyrus morphology and social cognition have not yet been elucidated."[20] So, there are some potential differences in the straight gyrus between males and females, but the clearest association is with a gendered trait, not necessarily sex.

For over one hundred years the corpus callosum was supposed to be the Holy Grail of brain differences between males and females (and, earlier in the twentieth century, between human "races"). The corpus callosum is a broad bundle of millions of nerve fibers that lies under the cerebral cortex (the convoluted outer layer of the brain) and runs along its midline. The central part of the corpus callosum is often said to lie on the dividing line of the brain and its nerve fibers reach out

like tendrils into the parts of the brain acting as the mediator of signals between the left and right hemispheres. Anne Fausto-Sterling suggests we see the corpus callosum as "a bunch of transatlantic telephone cables. In the mid Atlantic they are bundled. Sometimes the bundles bunch up in ridges, but as cables they splay out to homes and offices in North America and Europe, they lose their distinct form . . . these in turn subdivide, going to separate cities, and ultimately to particular phone connections." She continues, "at its connecting ends, the CC [corpus callosum] loses its structural definition, merging into the architecture of the cerebellum itself."[21] We know the corpus callosum plays an important part in information transfer in the brain, but is it sexually dimorphic?

In the 1990s a number of publications purported to show size dimorphism in the corpus callosum. The general argument was that a larger splenium (the rear part of the corpus callosum, where it is at its thickest) would indicate a better set of connections and maybe reflect better kinds of social or empathetic skills. The argument was that women have a larger splenium than men, and thus better integrative, or holistic, thinking skills. In 1997 the psychologists Katherine Bishop and Douglas Wahlsten examined studies on the corpus callosum and came to the following conclusion: "A meta-analysis of 49 studies published since 1980 reveals no significant sex difference in the size or shape of the splenium of the corpus callosum, whether or not an appropriate adjustment is made for brain size using analysis of covariance or linear regression. . . . The widespread belief that women have a larger splenium than men and consequently think differently is untenable."[22] This seems pretty straightforward: if you conduct a serious overview, the patterned differences disappear. The problem is that so many studies show so many different patterns. A large part of the reason for this is that brain studies generally rely on a low number of subjects (the study with seventy-four subjects is one of the largest!), so as you grow the dataset the actual patterns emerge, whereas with just a few subjects the potential for bias is very large. Looking across all the published studies prior to 2000, Anne Fausto-Sterling found that the majority actually report no sex differences, even when you break them down by specific subareas of the corpus callosum, and for almost every area where at least one report has females with larger structures, another shows no difference.[23] The structure of the corpus callosum makes accurate measurement difficult, especially across studies. The corpus callosum is an important

part of our brain, and might hold some cues into human variation in behavior, but at this point in time, Bishop and Whalsten's statement holds. The corpus callosum is not going to tell us about differences between men and women; instead, it tells us that the variation is between individuals, not sexes.

Biology of attachment and attraction: what hormones are at play

It is often asserted that, by nature, men are aggressive and women are nurturing, and that there is "chemistry" between males and females that leads them to desire one another. So one area where we might expect to see biological sex difference would be in the physiological systems of attachment and attraction, especially as they relate to hormones.

We already know that men are not always more aggressive than women, and when they are it is not clear that it is their nature, not their size and culture, that is the best explanation. We know that women do give birth and lactate (and men don't), but we also have noted that humans seem to have evolved a particularly cooperative system for taking care of their young, where males do a lot of caretaking, unlike with most mammals. So, in humans both males and females participate in taking care of their young, but are women biologically more nurturing? We've already established that males and females have all of the same hormones, just that there may be differing levels of those hormones between the sexes. In the context of nurturing we know that a hormone called oxytocin is important in females after they give birth to help facilitate nursing and establish physiological bonds between mothers and infants. We also know that this same chemical is involved in facilitating the physiological bonding between human partners (and in many mammals). This hormone has been moderately well studied in females, and less so in males.

Biologically oxytocin appears to function more or less the same in males and females. However, in females it is also associated with facilitating lactation (milk delivery in response to infant suckling), so this is one difference between males and females in oxytocin function. Oxytocin's overall impact seems to be in mediating and rewarding social attachment via helping induce physiological stress reduction, muscle relaxation, and some neurochemical rewards. This process works the same way in male and female humans.[24] The more secure and positive individuals feel in their relationships the larger the measurable increase in oxytocin during social interactions. While this effect appears in both

sexes, a few studies suggests greater health benefits (reduced stress and other cardioprotective benefits) from increased oxytocin levels for females and/or a slightly higher sensitivity to oxytocin in females.[25]

We know that on average males have higher circulating levels of testosterone than females, but there are very few studies that test a group of comparable males and females doing the same things at the same time. The relationship of parenting and testosterone is suggested to be a negative one: interacting with infants can decrease testosterone levels. This appears to be the opposite pattern for another hormone important in caregiving, prolactin. When mothers are lactating and interacting extensively with young infants their levels of the hormone prolactin are high and their levels of testosterone are low. Generally males' prolactin levels are highest in the morning (still much lower than females) and decrease during the day, and we already know from chapter 5 that males' testosterone levels can be affected by activity patterns, dominance interactions, and aggressive events or contests. Recent research looked at the prolactin levels and testosterone levels of males as they interacted with infants. Although there is some variation in the results, the trend was for testosterone to go down and prolactin to stay steady or increase in fathers when they interacted with infants relative to control males who did not interact with infants.[26] Also, testosterone was generally lower in newly married men, married fathers, and men in long-term relationships than in single men.[27] So, while there are differences in the levels and some of the outcomes of these hormones in males and females, social contexts, especially those dealing with attachment and parenting, seem to elicit similar general patterns of hormone response in both sexes.

An important physiological difference between the sexes in many mammals is the presence of pheromones. Pheromones play important roles in attracting mates, sexual behavior, and in inter- and intrasexual conflicts in many mammalian species. There are a number of popular studies that purport to demonstrate the presence of human pheromones (specific chemical odor signals produced by humans). In particular, there has been significant interest in sex pheromones. The best known cases are females detecting specific cues of attractions from male sweat (via the t-shirt experiments). In these experiments females are given t-shirts worn by males for a few days, recently washed shirts and never-worn shirts (or some similar variation). Some of these studies report that females who are ovulating select the t-shirts of either very symmetrical men or men who have immune systems that complement their own.[28]

Few researchers argue that pheromones are involved; instead, they argue that sweat contains indicators of overall health, which is supposed to be related to symmetry or better immune systems. The other well-known case is the reported instance of women living together and having their menstrual cycles synchronize.

The only identified and replicated (by two research teams) human pheromone is androstadienone (a steroid that appears in some sweat), which is reported to produce a positive response from females. A recent study also demonstrated that androstadienone acts in both males and females to enhance the ability to focus on emotional cues.[29] Thus, it is not currently clear what sort of differences between the sexes this compound demonstrates (if any). The second case noted above, female menstrual synchrony, has only been reliably supported by a single study with twenty female participants. Additionally, it appears that women produce certain aliphatic acids in vaginal secretions during fertile parts of their cycles (these have been shown in other primates to attract males), but human males do not seem to respond to them in any consistent manner. The bulk of studies seeking to identify and validate pheromones in humans either refute their existence or give nonsignificant results.[30] This makes it unlikely that there are significant sex differences in pheromone cues of attraction, or at least that, as of the current moment, we do not have any robust evidence of such.

Male and female biology: we have differences, but we're made of the same stuff

Male and female bodies have many differences, but they overlap extensively in structure and function. Looking at average differences blinds us to the important system-wide view, the normative range of variation, and how bodies actually function. When we look at the biology of males and females we are constantly reminded of one major point: we are all *Homo sapiens*. One can easily focus on the clothing, the hairstyles, the cultural behavior, the social history, and the modern-day ideas about gender and being masculine or feminine and see substantial differences between men and women, but very few of those elements match the actual biological patterns in our species. Males are often larger and more muscular than females, and aspects of our skeletons are variations on a theme. This size difference and the slight difference in the way we walk mean a lot to us socially, but biologically these are extremely minor differences.

There is a major difference when it comes to the ways in which our reproductive tracts function. However, we can also see the immense similarities underlying these differences. The tissues that make up the reproductive tract are the same in males and females—it is the same stuff that undergoes development but with different endpoints. The hormones that affect the functioning of the reproductive system are the same for males and females with varying levels and patterns found between and among them depending on social context, age, behavior, and other factors. In a chemical and physiological sense hormones frequently act the same way in males and females. In attachment and bonding the functions are the same with similarities in response patterns, but some differences are found in levels and contexts of hormone action.

One could argue that if there were really deep-seated differences between male and female human behavior and biology they should show up in the brain. The genitals start in the same place and end up looking different, the brain does not. Our brains, rather than being very different, are pretty much the same. Aside from the size difference, maybe some differences in the area of the straight gyrus, and the fact that females' brains stop growing earlier than males (as with every other part of their respective physical bodies), there are no consistent and replicated reliable differences in the male and female brain; it is a human brain.

Looking at the body, reproductive systems, hormones, and the brain, it is obvious that the sexes are alike as much, if not more, than they differ. The myth that males and females are biologically very different from one another is busted. This does not mean that men and women do not differ from one another. I am not arguing that males and females are the same, rather that we are humans and that the actual biological differences between the sexes are much smaller than the behavioral differences between the genders. Understanding this distinction, sex and gender, is core to busting the myth.

MYTH BUSTING: BEHAVIORAL DIFFERENCES BETWEEN MALES AND FEMALES ARE NOT AS GREAT AS WE THINK THEY ARE, NOR ARE MOST DUE TO OUR EVOLUTIONARY HISTORY—CULTURE MATTERS AND GENDER COUNTS

Harkening back to chapter 2, remember how powerful the societal shaping of behavior is. Of course biological differences between the sexes do lead to some adult differences, but having demonstrated that

these biological differences between the sexes are smaller or less extreme than we may have thought we can move forward to think about what gender is, what gender differences are, and how they emerge. But first we need to ask the question, how much do males and females actually differ in behavior and skill?

The Gender Similarity Hypothesis

> It does appear that on many, many different human attributes—height, weight, propensity for criminality, overall IQ, mathematical ability, scientific ability—there is relatively clear evidence that whatever the difference in means—which can be debated—there is a difference in the standard deviation, and variability of a male and a female population.
>
> —Lawrence Summers (former president of Harvard University)[31]

In the previous section we laid out biological differences and similarities between men and women; now we are interested in behavior. Is Lawrence Summers correct? We know that men, on average, are taller and heavier, but are men and women really different when it comes to IQ or mathematical and scientific ability? Height and weight differences are part of our biology and evolutionary heritage, but can evolutionary differences explain male-female differences in skill and behavior? To answer these questions we need to bust a specific part of this myth first: just exactly how do males and females differ in behavioral potential?

In our society we often think about sex differences in the context of a specific set of skills: verbal, mathematical, spatial perception, and assertiveness. These are all variables that are commonly assessed on psychological and standardized exams. In our society we have very specific assumptions (and expectations) of differences between males and females in these areas that fall in line with Summers's comments. Many anthropologists have long held that male and female behavior varies across cultures, and none would disagree that in general one can point to many differences in the social roles and behavior of males and females. But do these behavioral patterns based on social roles reflect consistent and identifiable differences in the behavioral potential and actual skills of humans? That is, are they tied to biological, evolutionary differences between the sexes? To answer this question, we need ask, what exactly are the differences between men and women?

This myth about male-female differences in behavior and potential owes a large part of its history to the famous meta-analysis published

by the psychologists Eleanor Maccoby and Carol Jacklin in 1974; they reviewed more than 2,000 reports of gender differences and found that most societal assumptions about differences were not supported, that males and females were much more similar in behavior and potential than previously thought.[32] However, they did argue for a set of differences in four specific areas: verbal ability, visual-spatial ability, mathematical ability, and aggression. It is this assertion about differences that has pervaded our mindsets for nearly forty years . . . we tend to forget that Maccoby and Jacklin's main point was about gender similarities.

In her recent work, the psychologist Janet Shibley Hyde emphasizes Maccoby and Jacklin's main point: "The gender similarities hypothesis holds that males and females are similar on most, but not all, psychological variables. That is, men and women, as well as boys and girls, are more alike than they are different." [33] She goes on to suggest that we can take a look at the psychological literature, at the bulk of the actual published data from the kinds of tests that specifically focus on male-female differences, to get a good idea of how much men and women actually differ in their abilities. In her 2005 study she took an overview of psychological and standardized assessments of cognitive variables (math, verbal, spatial), communication (verbal and nonverbal), social and personality variables (aggression, negotiation, helping, sexuality, leadership, introversion/extroversion), psychological well-being, motor behaviors (throwing, balance, flexibility, etc.), and a few others (moral reasoning, cheating behavior, etc.).

Shibley Hyde's data consisted of examining 46 previous meta-analyses of male-female differences (published between 1980 and 2004), consisting of nearly 5,000 reports and assessing 128 psychological measures.[34] In comparing the reports Shibley Hyde uses the *d* measure, which reflects how far apart the male and female means are in standardized units.[35] As with the earlier discussion about men's and women's heights, remember that the closer the means the greater the overlap in the overall ranges. Shibley Hyde argues that the gender similarities hypothesis would be supported if "most psychological gender differences are in the close-to-zero ($d \leq 0.10$) or small ($0.11 < d < 0.35$) range, a few are in the moderate range ($0.36 < d < 0.65$), and very few are large ($d < 0.66 < 1.00$) or very large ($d > 1.00$)."

What did she find across the 5,000 reports in 46 meta-analyses? For 78 percent, the *d* measures are close to zero or small (38 percent: $d \leq 0.10$; 40 percent: $0.11 < d < 0.35$). Where are the large gender

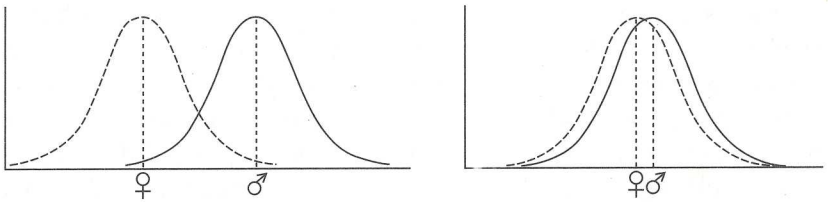

FIGURE 8. Graph on the left shows differences in male and female heights; graph on the right shows male-female psychological gender differences with $d = .35$. Adapted from L. Eliot (2009) and J.S. Hyde (2005). Adapted from L. Eliot (2009), *Pink Brain, Blue Brain* (New York: Houghton Mifflin Harcourt) and J.S. Hyde (2005), The gender similarities hypothesis, *American Psychologist* 60(6): 581–92.

differences? Males scored noticeably higher ($d > 0.35$) in grip strength, sprinting, throwing velocity and throwing distance, masturbation, views on casual sex, physical aggression, and mental rotation of objects. Females scored higher on indirect aggression (reinforcing Archer's studies discussed in chapter 5), agreeableness, and smiling. Thus, the male and female differences in behavior and potential (especially the math and verbal abilities) are aptly demonstrated by comparing height overlap with the pattern of overlap on the vast majority of Shibley Hyde's comparisons (figure 8). Looking at the two graphs, one can see that the vast majority of the assumed male-female differences in the psychological and skill variables overlap extensively. Even more impressive, this graph is the overall mean of the entire dataset, and 77 percent of the actual measures have even less difference and more overlap than shown in the graph!

This is an excellent example of some real biological differences between males and females, which might relate to some behavioral differences (physical aggression or strength-related activities), but the vast majority of psychological tests (and the fact that our brains are the same) demonstrate, unequivocally, that males and females are much more similar than they are different in behavior and ability. A few differences stand out as interesting. Males are generally better at mental rotation of objects, for example. Some have argued that men evolved better spatial skills due to their selection for hunting ability. The problem with this explanation is that males don't do better on all spatial skills, such as mapping skills or spatial memory, but just on certain mental rotation of objects; moreover, in many societies females also hunt (just not large game). It is not clear what that means. But it is absolutely clear that men did not evolve better math skills and women better verbal skills—the data refute that assumption.

But other differences do remain: physical aggression in males versus indirect aggression in females, females' greater smiling and agreeableness. In chapter 5, we suggested that the aggression differences are in part explained by physical size and muscle strength. But smiling and agreeableness? What if these differences do not have their origin exclusively in our evolutionary past, but rather in our cultural present? What if these differences, even those of aggression, are due the ways in which we as humans live in and use culture? I suggest that the anthropological concept of gender can help us understand this possibility.

What is gender?

> Gender refers to the social, cultural and psychological constructions that are imposed on the biological differences of sex.
>
> —Serena Nanda (anthropologist)[36]

> . . . the formation of gender roles, by which people of each sex are expected to have psychological characteristics that equip them for the tasks that their sex typically performs. . . .
>
> —Wendy Wood and Alice H. Eagly (psychologists)[37]

So we see that males and females are not that different in skills on tests but we do recognize that men and women do differ in our society, in our daily lives, in how we see each other and expect one another to act. Anyone reading this book will be able to describe more or less typical behaviors for males and females in their own society. Why? One word: Gender.

In general most people, and many researchers, use the words "gender" and "sex" interchangeably. The two are related, entangled even, but not the same thing. Anthropologists have long held that gender is best seen as the culturally influenced perception of what the sexes are and the roles they are expected to play. Sex is a biological definition (XX or XY . . . more or less) and gender is how the social worlds, and expectations, of the sexes play out. Gender is best conceived of as a continuum, not a dichotomy.[38] At one extreme end we have total femininity and at the other end total masculinity, with most people falling in between those points. In our society, we expect sex-females to fall largely toward the behaviorally feminine side and sex-males to be mostly toward the masculine side. That is, behaviors we culturally associate with masculinity, like assertiveness, aggression, intense interest in athletics, are seen as being normal for the male sex. So when women exhibit these behaviors we see them as behaving like men on the gender spectrum. The same is

true for men who exhibit socially feminine behavior such as heightened displays of emotion, subservience to others, intense interest in Broadway musicals or daytime soap operas; we see them as being like women. These examples are very stereotypical, and there are many, many exceptions to this pattern, but I choose them for a reason: everyone reading this book has a social context of gender that enables them to understand these specific examples.[39] Gender works because it is a core part of the social fabric in which we develop our schemata, the way we see and interpret the world.

The gender roles of society reflect a kind of division with sex-females expected to fill particular roles and sex-males other ones. There can be a good deal of overlap, but to a large part the gender pattern holds. This is true for social roles, in marriage (the male is supposed to ask the female), in public (females can cry at a sad movie, men are supposed to be stoic and comfort the females), and for more formal roles such as paid jobs. As an example of this, think of jobs we consider female (secretaries, librarians, nurses) and those we think of as male (construction workers, business managers, airline pilots). What do you imagine when you picture each one of those jobs? For example, when you picture a pilot most of you will see a male, although there are many female pilots. There are many jobs in which both sexes participate, but there are many gender-based differences when we associate the job with gender. Picture a lawyer, now picture a female lawyer, and now, a male lawyer. In the first and third instances most likely you pictured a man and in the second a woman (though some of you might have pictured a woman in the first case as well). But are they dressed the same? What about hair and accessories? What are they carrying and what kind of shoes do they have on? How would you expect them to behave in the courtroom? The point is we have specific expectations of how the genders should look and act. These expectations are a central part of our culture.[40]

There is also a very strong association between sexuality and gender. We have expectations based on gender roles about how males or females should feel and think about sex. In our society, the roles one plays in sexual activity and the ways in which one displays sexuality in public are highly gendered. In our society (and in many, but not all, societies) homosexuality is often associated with gender transgressions. We tend to socially classify homosexual men as feminized and homosexual women as masculinized, regardless of their actual behavior. This is because we have a particular set of dichotomized expectations

associated with gender when it comes to sexuality; men are men and women are women, and they have different relationships with sexuality, often seen as complementary. We expect one partner in a sexual relationship to act "female" and one to act "male" in the kinds of gendered behavior exhibited. Same-sex couples may challenge our expectations because most of us so tightly associate gender with biological sex. In the final myth-busting section of this chapter we examine the actual data for sexual behavior and sexuality to see how they fit the cultural expectations for the sexes and genders.

Serena Nanda, an anthropologist who specializes in gender, points out that while it is easy to think about a sex-gender dichotomy, this creates an artificial nature-culture divide. As we have illustrated in every chapter in this book, humans are amazingly complex. We are naturenurtural, so making a clear distinction between biology and culture is very difficult in many cases. It does not help for us to think of sex as biologically fixed and gender as culturally contingent, like a flexible behavioral cloak thrown over biology. Nanda reminds us that using such a dichotomy ignores the "integration of biology and culture in human life, experience, and behavior." She opts for the term sex/gender to best describe what we are actually talking about. The two are perpetually intertwined, just not always in the ways we think. So it is best to think of sex/gender as a dynamic system of interaction rather than one physical part (biological sex) and one cultural part (gender); you can't have one without the other.

It is gender differences that we are interested in trying to link to our evolutionary past. We know that size and strength differences might explain some of the patterns we see in males and females. But these are small and we know that as individuals there is enormous overlap in behavior and potential between males and females in behavior and biology. Are some of the larger gender differences introduced and maintained in ways that are not related to our evolutionary past? Do our current societies create and maintain some of these differences?

Development and Maintenance of Gender Differences

While we see infants through gendered eyes, the infants themselves do not have full-blown gendered behavior and perceptions at birth; instead, they have to acquire gender as they develop. Given Nanda's point above, we need to think about gender acquisition as part of

the biocultural development of the human being. In young infants (by about 1.5 years of age) the gender schemata begin to develop, with gendered play patterns emerging by about two years of age. These patterns differ by culture, but one consistency is related to size and strength. Males start to play in a more rough-and-tumble manner than females at about this age (on average, there is a lot of overlap still). By ages three to four children begin to display consistent gendered behavior and at six to seven years children form relatively fixed gender stereotypes and behave more or less in accord with them. Each child develops his or her gender in the context of a given society, so the specifics of masculinity or femininity will vary for children depending on the societal norms. This is why we see overall similarities in gender within cultures but interesting differences between them. These differences can be in the ways in which the genders interact in public or in mixed-gender contexts, how same-gender individuals act around one another, the ways in which sexual behavior is initiated and carried out, the changes one undergoes socially before and after marriage, and so on. However, each individual human develops with a specific set of biological and social conditions resulting in culture-wide gender similarities but also, very importantly, a wide range of individual differences in gender behavior.

The psychologists Wendy Wood and Alice H. Eagly argue for a biosocial approach to gender that attempts to fuse biological and cultural developments together to better understand certain patterns in gendered difference. They looked at anthropological records of hundreds of societies and examined the gender roles, division of labor, and patterns of sex/gender differences over time. Keeping in mind that there are male and female size and strength differences and that females give birth and lactate, they also looked at the different ways of living (foragers, agriculturalists, pastoralists, industrial societies, etc.) and noted the different divisions of labor inherent to them. They looked at different types of social and kinship systems as well. They found that differences largely came from interactions between the physical specialization of the sexes, like female reproduction, and the economic and social structural aspects of societies. Their biosocial approach sees psychological attributes of women and men as emerging via the evolved characteristics of the sexes, their developmental experiences, and their activity in society.[41] The bottom line is that gender emerges from the combination of our bodies, cultures, and individual experiences. Our bodies are shaped by our evolutionary histories, resulting in some important differences, but so are our brains, resulting in important similarities in behavior and potential. What about cultural and experiential impacts?

Wood and Eagly found that there is variation in the roles males and females play across societies, with high degrees of overlap in many areas, but greater differences being found in aspects of those societies that deal directly with size and strength (such as large-game hunting with spears) or giving birth and taking care of young children, and that other patterns become associated or emerge from, these differences. They suggest that much of the current social division of labor we associate with gender emerges from both the biological facets of being human and human evolutionary histories combined with our histories of resource use and distribution.[42] These assertions are supported by the fossil and archeological record of human evolution and by the fact that gender roles and the division of labor have undergone substantial changes over the last few centuries as societies change both structurally (industrialization and technology changes) and socially (political and educational changes).[43]

But what about today's society? Are there broad-scale social patterns that reflect gender differences (or cause or reinforce them)? As adults we see a wide variety of societal differences between males and females that are not directly tied to interpersonal behavior patterns, but rather to the ways in which societies structure themselves and are governed. These patterns can act to create and maintain differences between males and females, because in each case males tend to have higher access and control over these categories. The differences are in areas such as social and political power, economic power, educational status, and health, as reported in the *Global Gender Gap Report 2010*, which tracks progress over five-year spans: "On average, over 96% of the gap on health outcomes, 93% of the gap on educational attainment, 59% of the gap on economic participation and 18% of the gap on political empowerment have been closed. No country in the world has achieved gender equality."[44]

The fact that aspects of our societies are biased toward male control is not part of our evolutionary heritage, it is part of our cultural reality. There is a gender gap in economic and political power that constructs and helps maintain gender roles and inequality. The World Economic Forum is an agency in Switzerland that collaborates with researchers at

the University of California, Berkeley, and Harvard University to assess the division of, and access to, resources between males and females in 134 countries. Controlling resources (political and economic) enables the control of most major aspects of our social lives. What does the gender gap look like in the United States? In 2010, the United States moved to 19th place (up from 31st in 2009), with an overall gap index of 74 percent (Iceland was number 1 with a gap index score of 85 percent and Yemen was number 134 with a score of 46 percent). This overall score for the United States reflects the percentage attainment by females relative to males in the areas of interest.[45] This increase in the rankings is largely due to the fact that in the United States females and males are near parity in educational attainment (we are tied for number 1) and participation in the workforce (we are tied for 6th place). This was not true a century ago. Cultures are dynamic and change rapidly. However, larger differences still remain in earned income and wage inequality (the United States is 64th in this measure) and political empowerment (the United States is 40th here).[46] Men make more money for similar work, hold more positions of power, and predominate in political roles. This is a global pattern, but not an evolutionary one. There are no patterns of biological or behavioral differences between males and females that make males run companies or societies better. These are aspects of societal structures that act to maintain broadly held ideas about gender. When children grow up within a society, they acquire the templates that are around them and these help create their schemata. These contexts set the stage for our biosocial development, resulting in what we experience on a day-to-day basis.

There is no evidence that most gender behavior and the gender gap reflect evolved patterns

Males and females have important biological differences and important gender differences, but they have even more similarities. It makes sense that these similarities are due to our evolutionary history as humans. Both in biology and in behavior and potential the differences are smaller than we generally think they are, and only a few can clearly be linked to aspects of our evolutionary past.

In the areas of gender aggression differences, it seems clear that males' size and strength are important factors in their increased likelihood of exhibiting physical aggression. However, as discussed in

chapter 5, the details are quite complicated. Women also use physical aggression, at even higher rates than men, at least within couples. However, males' potential to do greater harm is there. Might this be a reflection of our evolutionary past? Yes. Male size and muscle mass are part of our evolutionary heritage, but this pattern did not evolve so that males could beat up or intimidate females.[47] However, this difference can have an effect in our societies and our gender systems. In social structures where males have political and economic power they can also exploit this physical difference to help maintain these patterns of control. It might be in this case that males' use of physical aggression toward females is a cultural co-option of a biological potential and not a specific evolutionary adaptation in our species. If we think about females' greater use of indirect aggression, the picture is more complicated. Do they use it more because they are on average smaller than males (but then why do females in couples use physical aggression)? Or is this a reflection, like their greater use of smiling and agreeableness, of gendered expectations of behavior? It appears that rather than being clearly evolutionarily linked, many of the actual differences appear to emerge from the structures and expectations of the gender systems in which they occur.

Rather than hanging our hat on a few biological differences and trying to use them to explain gender differences we should be paying attention to what actual gender differences in behavior and potential are and seeing how they relate to our biology and our societies. At the same time we need to realize how much overlap there is across the genders and how variable individuals are in the ways in which they embody and experience gender patterns. Of course some evolutionary patterns have led to gender differences, but very few. The power of cultural traditions, beliefs, and expectations are very strong. Societies do incorporate biological patterns into gender roles, but we cannot look to our evolutionary history to explain the gender gap or most of the general expectations of gender behavior we rely on every day in our society.

Gender behavior is best seen as the result of biosocial development: culture matters, gender counts, and we are simply not as different as we think. Given what we know about male and female behavior and potential the myth that the genders differ dramatically in behavior and potential and that the majority of the behavioral differences that do occur between males and females are evolutionarily hard-wired is busted.

MYTH BUSTING: WE ALL NEED LOVE, BUT NOT NECESSARILY SEX, MARRIAGE, OR MONOGAMY

> Romantic love is one of three basic brain circuits that evolved for reproduction: the *sex drive* motivates all of us to look for a range of partners. *Romantic love,* the elation and obsessive thinking that is produced when you first fall in love, focuses our mating energy on just one individual. Following that, *attachment* sets in, the calm and security you can feel with a long term mate, enabling you to sustain your relationship to rear your children as a team. Romantic love is the most powerful, and the beginning of the cascade . . . romantic love is a drive, an instinct that arises from primitive parts of the brain.
>
> —Helen Fisher (anthropologist)[48]

There is a basic story told by many evolution-minded folks interested in human relationships: the body is wired to find mates. Once the best biological mate is found the brain and hormones kick in to create a particular kind of attachment drive: romantic love. This leads to the monogamous pair bond (which may or may not last), offspring, and the natural family unit—a man, a woman, and their children. When you meet the right person for you the evolved chemical cascade will lead you toward a pair bond relationship.[49] The nonevolutionary version (whether religious or secular) is pretty much the same: just remove the chemical part and replace ideal biological mate with spiritual or soul mate. Underlying both of these scenarios is the assumption shared by many evolutionary psychologists as well as the Judeo-Christian-Muslim religions and most people in the United States, that the bonded male-female pair (with offspring) is the evolved, or natural, unit of the human family; that marriage is part of human nature; and that there is a specific pair bond partner out there for everyone. Whether one sees this as the culmination of an evolutionary history or as a spiritual reality, this vision acts to justify the role of marriage and the nuclear family as primary to human nature.

There is no real anthropological, biological, or psychological support for the notion that there is a perfect (or reasonably perfect) match for everyone, or for anyone. This section examines the concept that there are specific biological matches for people and that this mated, romantic pair bond is what humans are evolved to seek. There is substantial evolutionary evidence that humans do seek pair bonds (socially and physiologically), but these bonds do not necessarily involve sex, marriage, exclusivity, or even heterosexuality. We will also see that marriage is not equal to evolutionary or physiological pair bonds, that the nuclear family is not the basic unit of human social organization, and that social expectations for the quality and structure of life after attaining these two things can lead to an array of social and psychological problems for people.[50]

There are three parts to this section of the myth: first, that the unit consisting of bonded male-female + kids is the basic unit of humanity; second, that humans are naturally monogamous and that marriage is a reflection of evolutionary origins; and third, that individuals are attracted to a single, specific mate (pair bond mate or soul mate), with whom they are evolved to have sex, marriage, and exclusivity. These assumptions are not really accurate.

What is love?

We often think of the concept of love at the center of understanding romantic relationships. Humans form pair bonds and are frequently in monogamous sexual and social relationships, but that does not mean what you think it does: romantic relationship ≠ love ≠ monogamy ≠ pair bond.

So what is love? Unfortunately, the answer that most people seek involves a philosophical question beyond the scope of this book. However, we can slightly rephrase the question to ask, what is going on in the body when people feel strongly toward one another and why are these feelings so powerful? The initial answer goes back to the section earlier in this chapter on the biology of attachment. We already know that a suite of hormones and neurotransmitters (including oxytocin, vasopressin, prolactin, testosterone, dopamine, etc.) are involved in developing and maintaining physiological bonds between mothers and infants and fathers and infants. This system also functions in the same way between adults. Physical touch, spending intense social time in contact or near one another, and positive social interactions can trigger it. There is an evolved system in humans that uses social and physical interactions, hormones, and the brain to prime the body to feel closer and more attached to another individual. The anthropologist Walter Goldschmidt called this affect hunger.[51] He argues that the basic system that acts to bond mammalian mothers to their infants has been expanded and co-opted in the human species to act as a social and physiological bonding system between individuals of all ages and sexes. This drive of affect hunger enables humans to form and experience types of social bonds that are not found (to the same extent) in

other animals, even in other primates. He also argues that it is these bonds which have enabled humans to do better than almost any other organism on the planet.[52]

So the answer to "what is love" in this context is that it is the biology underlying affect hunger, the ability to form multiple, strong social bonds, and part of the human adaptive niche—the evolutionary history that has made us so successful as a species. However, this notion of love covers what is called love between parents and offspring, between siblings or other family members, and between good friends as well as between romantic pairs. Most people when they ask about love are actually only interested in one version of this: the romantic pair. Culturally we see romantic love as separate from familial or friendship love. Unfortunately, aside from a slightly different pattern of some specific hormones brought about by sexual behavior, there is nothing biologically different about romantic love than any other kind of love.[53] The myth that romantic love is essentially (biologically) different from other types of strong attachment is created and maintained by cultural beliefs and our schemata, not our biology. So asking about the naturalness of romantic love misses the boat. What most people are really getting at when they try to figure out romantic love is to explain the specific strong relationship between two people that we call the pair bond.

What is a pair bond?

In the basic biological literature a pair bond is simply a special, predictable relationship between two adults. When researchers look to humans (and some other mammals, especially primates) this is refined to focus on special and predictable relationships between a male and a female that involve tight social connections and a sexual relationship, and usually includes mating and the raising of young. It is often asserted that this pair bond is the basis of human society and that we can look to our evolutionary heritage to see that it is a major, early event in human evolutionary history.[54] However, pair bonds are not exactly what many think they are and they are not necessarily linked to procreation and the nuclear family in human evolutionary history.

More primate species are said to have pair bonds, and monogamous relationships, than any other group of mammals. This assertion is used to argue that humans are expanding on this primate trend and solidifying the pair bond, and monogamy, as our basic social unit. In 1999 and 2002 I published overviews of the relevant datasets on primates and

humans, asking several questions: do primates have more pair bonds or more monogamy than other mammals, are pair bonds the same thing across primates, and are pair bonds the same as monogamy.[55] What did I find? Primates (including humans) are not more monogamous than other mammals (in fact it is really rare, as only about 3 percent of all mammalian species are monogamous); there are a number of primate species that live in small groups consisting of male-female plus offspring, some with and some without pair bonds; pair bonds come in a number of different types across primates; and pair bonds are not the same as monogamy. Other researchers have looked extensively at the biology of pair bonding in voles (a kind of rodent) and a few monkey species as well as humans.[56]

From this work it is clear that there are two types of pair bonding that are of interest here: the social pair bond and the sexual pair bond. The social pair bond is akin to what we described above with affect hunger, and can be defined as a strong biological and psychological relationship between two individuals that is measurably different in physiological and emotional terms from general friendships or other acquaintance relationships. The sexual pair bond is a pair bond that has a sexual attraction component such that the members of the sexual pair bond prefer to mate with one another over other mating options. In humans and other mammals pair bonds are developed via social interactions combined with the biological activity of neurotransmitters and hormones like oxytocin, vasopressin, dopamine, corticosterone, and others.[57] In voles and a few other mammals where the biology of pair bonds has been studied, social and sexual pair bonds are frequently coexistent, but in humans this is not the case. Humans have both social and sexual pair bonds, and the two are not necessarily connected.

Humans have extensive social pair bonding across genders and age categories, probably more than any other species. We can have pair bonds with our relatives and our closest friends, they can be with same-sex individuals or different-sex individuals, same age or different age.[58] Humans are also unique in having sexual pair bonds both heterosexually and homosexually. Our sexual pair bonding, like our sexual activity, is not limited to reproduction.

Recent work in the evolution of human social systems has noted the important role of the pair bond. The primatologist Bernard Chapais has mounted a broad comparative approach looking at primate behavior and models of human evolution and argues that the sexual pair bond

precedes the nuclear family structure in human evolution, but that its appearance marked a core turning point in the evolution of the human social system. He argues that the sexual pair bond sets the stage for the kinds of parental cooperation that we see today as a core factor in humanity.[59] I, and many others, have also recently argued for a broader core role for social pair bonds in human evolution. Taking a page from the mounting evidence for a key role of cooperation in human evolution, we argue that social pair bonds are a logical and effective way to enhance and expand the social networks and cooperative possibilities in human ancestors.[60] Pair bonds, both social and sexual, in humans are part of complex social networks that emerged as a core pattern in human evolution. Pair bonds can involve sexual relationships (and in a cultural sense, romantic attachments) and are probably involved in what most people experience when they think of romantic love. But pair bonds are not the same as marriage and they are not necessarily connected to monogamy.

So if love per se and pair bonds do not give us clear answers as to human romantic relationships, is it monogamy that is most important when we are trying to figure out romance and marriage? The answer in the biological sense is no but in a cultural sense, possibly. So what actually is monogamy and are humans monogamous?

We are not naturally monogamous, but we are frequently monogamous

> Clearly, the notion that women are designed solely for lifelong pair bonding, and that any deviation from long-term monogamy represents a maladaptive response of our pair-bonding system, is at odds with the prevailing evidence that multiple mating is a relatively common—and in some ways preferred—sexual strategy.
>
> —David P. Schmitt (psychologist)[61]
>
> . . . when it comes to monogamy as mating exclusivity, what we see is not necessarily what we get.
>
> —David P. Barash (psychologist/zoologist) and Judith E. Lipton (psychiatrist)[62]

Over the last three decades sufficient overviews of human mating patterns and sexual behavior have emerged to resoundingly demonstrate that most humans, today and in our evolutionary past, did not mate monogamously across their life span. But many individuals do have one or more relatively monogamous sexual pair bonds during their lifetimes. The majority of cultures today legally sanction both polygynous

(multiple wives) and monogamous marriage systems. There is also a robust body of evidence that monogamous marriage systems are not the same as monogamous mating systems, that is, even within monogamous marriage systems there is a good deal of polygamous (multiple partners) mating going on.[63]

In a biological sense monogamy is defined as exclusive mating between two adults across one reproductive cycle. Often the definition also includes the production of young by the two adults. Long-term monogamy would then be exclusive mating across multiple breeding seasons. For nonseasonally breeding animals and humans, monogamy means exclusive mating between two adults resulting in one or more offspring. This is the biological definition, and this type of mating system is extremely rare in the animal kingdom. Even when a species is monogamous socially and in most matings, it appears that between 10 to 20 percent of all matings and a similar number of offspring are the result of extra-pair copulations.[64]

In a cultural sense monogamy is usually assumed to be an exclusive association between two adults, sanctioned by marriage. Often extra-pair sexual encounters by individuals in this arrangement are punishable by civil or religious law. Right away we can see that there is a particularly glaring problem between the biological reality of mating patterns and the cultural assumptions (and laws) of marriage patterns (under which mating is sanctioned).

There is an extensive body of research looking into the history and structure of marriage systems throughout the world, too voluminous to review here. Basically, anthropologists, historians, and sociologists agree that in general marriage (in both secular and religious systems) is best seen as a social system for legitimizing reproduction and inheritance of property, control of and regulation of sexual activity, and, recently, the culturally sanctioned outcome of romantic love.[65] This is also an important way in which cultures can officially recognize and sanction the sexual pair bonds that characterize human beings.

It is critical to mention that the current view of marriage that dominates the Judeo-Christian-Muslim religions, and the cultures that are intertwined with them, is a fairly recent occurrence in human history.[66] This is the idea that romantic love and marriage are connected and that marriage is the ultimate outcome for a couple in love. It begins to emerge in the sixteenth century and rapidly spreads across much of the Western world, and now much of the globe.[67] Previously, and in many societies still today, there is no necessary connection between romantic

love (or lust) and marriage. Today, most people in the United States do identify marriage as a natural goal for humans, and at least in public, equate monogamy and marriage.

The bottom line is that there is a difference between marriage and mating (or at least sexual activity). True or long-term monogamy is rare in an evolutionary sense and not the typical mating pattern for humans. However, monogamy, via the proxy of marriage, is the expected cultural norm in many societies. And, importantly, most humans today who are married are in assumedly monogamous marriages. At the same time humans do socially and sexually pair bond, but are all married couples sexually pair bonded? And/or socially pair bonded? Given the enormous variation in why and how people marry, probably not. But there is very, very little research asking these questions. We currently have no data on this critical measure.

However, we do know that there is discordance between the biological patterns of sexual relations and attachment and a society's cultural expectations. For example, if a married pair is not sexually pair bonded with one another, it would not be surprising that they would have trouble being sexually monogamous. If a pair is socially pair bonded, it might not matter to them that there are occasional (or frequent) deviations from sexual monogamy. However, even if a married couple is sexually and socially pair bonded the basic biology of human mating predicts that over their time together each will have occasional physiological and psychological desire and/or inclination to mate with other individuals. Our cultural expectation of sexual monogamy is at odds with our evolutionary heritage and basic biology. However, our expectation of social monogamy is generally reflected in the biology and behavior of social pair bonds between partners.[68] The real wrench in the system is sex, not social relationships, and this has to do with sexual behavior, desire, and attraction.

It is not human nature to seek marriage and a specific sexually monogamous romantic relationship, but it is in our nature to pair bond and in our culture to seek marriage

Human affect, hunger, and the need to form multiple physiological and psychological close bonds with other humans is core to who we are. It is part of our human nature. If Walter Goldschmit is right, and this is what we call love, then the human need for love via social pair bonds is a hallmark of our evolutionary history and current biology. Humans

are rarely sexually monogamous over their lifetimes. Rather we can form multiple sexual pair bonds of differing durations over the course of our lives, which may or may not also be social pair bonds. In the next section we also point out that humans can have sex (and do) without pair bonds at all.

There is no good evidence that pair bonds evolved because of the nuclear family (or for the initiation of one). In fact, there is evidence that pair bonds preceded the more recent pattern of one male and one female plus their offspring being a central residential and familial unit in our species. All of this conflicts with the widespread cultural expectations (built into our schemata) that people can all hope to find a monogamous partner, be monogamous sexually, and that once we enter into the nuclear family relationship we are set. The myth that it is a natural human goal to obtain a unique and powerful specific sexually monogamous romantic relationship and a nuclear family is busted.

MYTH BUSTING: MEN, WOMEN, AND SEX—THE GOOD, THE BAD, AND THE COMPLICATED

Sexuality is a somatic fact created by cultural effect.
—Anne Fausto-Sterling (biologist)[69]

Human sexuality is one of the best examples of our naturenurtural reality. We've already talked about male and female biological and gender similarities and differences, about the biology of attachment, about pair bonds, and about the intricate connections between cultural context, experience, and gender. However, in attempting to talk about sexual behavior we confront a situation where any individual's sexuality is such a biologically and culturally entangled reality that describing in a general way what men and women are sexually is extremely difficult.[70] But we can try.

The anthropologists Hastings Donnan and Fiona Magowan recently completed an overview of the ethnographic and theoretical literature looking at how sexuality and sexual behavior are narrated and embodied (described, lived, and felt) across cultures. Their conclusion is telling:

> . . . it is not possible to pin down sex to any one thing . . . sex can be many things to many people, including but not limited to a blend of personalities, social rules, desire, intimacy and performance, moral order and national

image that speak to processes of sexual embodiment, varieties of sexual practice, and the dynamics of culture.[71]

So it's complicated, really complicated. And the myth of male and female differences in sexual behavior is a dominant one. Because we are primarily interested in debunking this myth (or at least showing how it is really not that simple) we'll only tackle two parts of the picture: a brief review of what we know about how people are attracted to one another and an overview of what males and females actually do in regard to sexual behavior and activity. By looking at what people actually do we can tackle the misinformation in popular perceptions about male and female sexual actions and desires. The bottom line is the same as in every other section: we are not as different as you think, which is a fact well-summarized in the conclusions of the 2010 National Survey of Sexual Health and Behavior: "Men and women engage in a diverse range of solo and partnered sexual behaviors throughout the life course."[72] How males and females do so, the similarities and differences, are what we are interested in. But first, what is it that draws individuals together to have sex in the first place?

How People Are Sexually Attracted to One Another

In order to understand the ideas about how individuals select mates or are attracted to others enough to engage in sexual activity, we need a brief review of the development of sexuality. There is reasonably good evidence that a person's sexual orientation is relatively fixed early in life but that the specifics of any one person's sexuality varies across the life span. In a very general sense the average sequence looks something like this for both males and females.[73] From birth until about three years of age the nervous and endocrine systems are developing patterns and connections, which means that physical stimulation often results in a response in the genitals. There is an early association of physical contact with positive neurochemical feedback and reaction in the genitals. This is often considered nonsexual in the sense that adult sexuality and attraction are not at play for the infant or toddler, but it is setting the biological pathways for sexual response. The initial phase of strong attachment and the beginning of pair bonding (at least with caretakers) starts here as does the initiation of gender identity. Between three years of age and the onset of puberty (usually between nine and thirteen years of age) children engage in sex play within their peer group, both homosexually and heterosexually. This

activity is considered largely nonformative in that there is no necessary connection between adult sexual orientation and the exploratory sexual activity of children. This is also the period where intentional exploratory masturbation begins.

From adolescence through young adulthood (mid-twenties or so) there is a variety of activities which influence the full-blown adult sexuality and the completion of the biological and physiological changes of puberty and menarche.[74] Obviously there is enormous variation between individuals but long-term overviews show that on average the following elements emerge in this period: increased masturbation, increased sexual interactions, increased physiological attractions, first coital experiences, and first pregnancies (in females). During this period the following cultural elements are shown to influence the shape adult sexuality takes: gender and cultural role changes, parental impact, peer impact, national and ethnic cultural impact, religious beliefs, and economic, political and other external limitations. Finally, in the adult years (late twenties until death) there are both physiological factors (menopause and related physiological changes in females and decline in function of the reproductive organs in men) and social factors (cultural expectations and restrictions) that influence sexuality and sexual behavior. This overall pattern is more or less the same for males and females; however, females tend to be slightly ahead of males (hit the phases earlier) in this developmental pattern, just as they are on brain and body growth.

As the body and mind codevelop one's sexuality, individuals begin to have patterns of attraction. This means that certain cues or assemblages of traits elicit strong attraction and initiate sexual response physiology. These patterns of attraction are the things that turn people on. This is one area where there might be some important male-female differences.

Some gender differences in attraction are largely shaped by cultural and experiential context: clothing, hairstyles, certain mannerisms or behavior, certain smells and types of language use. Given humans' tendency to belong to a group and participate in that group's social patterns, popular culture and one's peers have a great impact on the development of attraction. While there is extensive individual variation most noticeable gender differences are closely linked to cultural expectations and patterns. There is also often a connection between situation and sexual activity that may not relate directly to general patterns of attraction or mate choice. Use of alcohol, peer pressure, and a variety of other factors can affect actually engaging in sex, but

in this section we are primarily interested in male and female patterns of attraction.

Some researchers believe that there are evolved systems of attraction that are the result of adaptation by males and females to focus in on traits that indicate higher mate quality. The argument is that over time those who have the best intrinsic abilities to identify and be attracted to higher-quality mates will benefit in evolutionary terms (more or better-quality offspring).

In their overview of evolutionary approaches to human physical attractiveness, the evolutionary psychologists Steven W. Gangestad and Glenn J. Scheyd suggest that there are certain aspects of attraction that are best seen as the result of human biological evolution.[75] Interestingly, the first of these is a similarity between males and females: unlike many animals where only one sex does the majority of mate choice, in humans there is mate choice by both sexes. However, some results suggest that while both males and females differentiate the desirability of potential mates, they might do so using different cues. Some suggested areas where this occurs are facial features and symmetry, body symmetry, body shape, and immune system complementarity.[76] In some studies men report preferring females with what are considered more feminine faces (small chins, large eyes, high cheekbones, full lips). However, while a few studies report women preferring masculine faces (broader faces, more robust skulls), other studies show no preference at all. Interestingly, a few studies demonstrate that both males and females tend to find digitally averaged faces most attractive. There are also some data that suggest that both males and females prefer more symmetrical faces over less symmetrical ones.

Much research has gone into the assessment of female body form by males, especially waist-to-hip ratio (WHR). It is argued that a slightly lower than average WHR is especially attractive to males and that WHR might be related to female fecundity (high fertility). However, this remains a contested proposal, both in the sense of what WHR reflects and in the sense of cross-cultural contexts, modern media impact, and body shape variation.[77] There is some preliminary evidence that women are particularly attracted to males who have more masculine bodies, but these data are almost exclusively from North American college student samples, so it is not clear if they could reflect a human-wide pattern.[78]

Across both the body and face attraction studies we find a few differences between males and females, but not much. It is very interesting that the differences we do find seem to suggest that the biological differences in size and shape are what are being focused on, and that men might be more influenced by visual cues than women. There also might be some attraction by women to men who have complementary immune systems (but not vice versa), maybe indicating that females are using olfactory cues in attraction more than males.[79]

What is typical sexual behavior?

> It is difficult to have ubiquitous conversations about sexuality and sex for pleasure in the absence of accurate data about the actual sexual experiences that are common.
>
> —M. Joycelyn Elders (former US surgeon general)[80]

It is very difficult to study sexual behavior. Even in our closest evolutionary relatives, the apes, it is only recently that we have come to realize that sexual behavior is common, not always related to reproduction, and complicated. For humans, we often assume that men have more sex than women and that men are more interested in sex than women. Is this actually true? In the late 1940s and 1950s the zoologist Alfred Kinsey revolutionized the study of human sexuality by recoding testimonials and interviewing over 5,000 males and nearly 8,000 females. The publications from this dataset rocked the academic and public worlds; people had a lot of sex, they had it in a variety of different ways, and most importantly, males and females both had complex sexual lives.[81] Since then there have been a few broad-scale studies of sexual patterns in the United States and other societies. Let's review the data from the most recent study of the United States to help answer the question of what males and females actually do.[82]

The data come from the 2010 National Survey of Sexual Health and Behavior, a nationally representative study of 5,865 adolescents and adults (2,936 men and 2,929 women ages fourteen to ninety-four) carried out in 2009 by a team based at the University of Indiana's Center for Sexual Health Promotion.[83] The results are as follows:

Masturbation: 55 percent of men reported masturbation in the past month, and 71 percent in the last year; 31 percent of women reported masturbation in the last month and 54 percent in the last year, except those over seventy.

Vaginal intercourse: 85 percent of men in their twenties and thirties reported having vaginal intercourse in the last year, compared to 74 percent in their forties, 58 percent in their fifties,

54 percent in their sixties, and 43 percent in their seventies. For women, 81 percent in their twenties and thirties reported having vaginal intercourse in the last year, compared to 70 percent in their forties, 51 percent in their fifties, 42 percent in their sixties, and 22 percent in their seventies.

Partnered noncoital behavior: Men and women of all age groups reported engaging in oral sex and masturbation with a partner. For both oral sex and partnered masturbation the pattern is practically identical in both sexes: the highest rate of oral sex is in the eighteen to forty-nine age group with a decrease in older age groups.

Anal intercourse: More than 20 percent of men between ages twenty-five to twenty-nine reported anal sex in the last year, with younger and older men reporting much lower numbers. More than 40 percent of men eighteen to fifty-nine years old reported participating in anal sex during their lifetime. For women the numbers are almost identical except that females reported slightly higher frequencies of anal sex over a larger age range (eighteen to sixty-nine) than males.

Same-sex sexual behavior: While not common, this behavior is by no means rare. Across all age categories about 8 to 10 percent of men reported engaging in same-sex sexual activity during their lifetime, with higher numbers (13 to 15 percent) reported in the forty to fifty-nine age groups. About 5 to 9 percent of women report participation in same-sex sexual behavior during their lifetime, with much higher figures (up to 17 percent) for the twenty to thirty-nine age group. One key difference between males and females is that a higher percentage of males reported same-sex encounters in the past month or year than did females (except for females aged twenty to twenty-four and thirty to thirty-nine). This part of the survey did not ask about sexual orientation so it is not clear what percentage of these numbers reflect homosexually oriented individuals as opposed to heterosexual or bisexual persons engaging in same-sex sexual behavior.[84]

One pattern of similarity and difference that emerges in this study is the decline in sexual activity with age (especially over sixty). However, in this decline there is a slight difference between males and females; the female decline is larger than the males'. This is a pattern observed in other studies: as females age their overall participation in sex goes down (on average). This is especially acute in married couples where

females' participation in sexual activity with their partners is negatively correlated with the length of time married.[85]

The data from this study show few major differences between males and females in sexual activity. However, one might argue that the real differences between males and females are not in sexual activity but in the expression of interest in the pattern of sexual behavior as it relates to mating. This concept is called sociosexual orientation and is measured via the Sociosexual Orientation Inventory (SOI), which is a self-reported measure of individual differences in human mating strategies. These scores range from low (preferring monogamy) to high (preferring a promiscuous mating). The basic argument is that there is a pervasive pattern of differences between males and females in attitudes about sex, fantasy, and sexual behavior. The assumption is that men should rate higher or more unrestricted on sociosexuality than women because of their evolutionarily based tendency to want to reproduce as much as possible and females' tendency to look for the best mates rather than mate with many males; in short, males want to have many mates and short-term mating investment, and females want longer-term mates and long-term mating investment.[86]

In general the major datasets reporting on this variable show that men across the globe tend to score higher than women on the SOI. In studies of the United States, men do tend to report higher interest in sexual activity and sexual fantasies, higher numbers of preferred or actual sexual partners, and wanting short-term versus long-term mating opportunities (on average). However, are these results best attributable to evolutionary differences between males and females? Where are those differences located? Not in the brain or the body . . . but maybe in the perception of sex and mating/marriage patterns. What influences this perception? Our cultural schemata do. We are naturenurtural creatures and the context in which we develop is going to have enormous influence on something like our self-reported perceptions of sex and sexuality.[87] Even the evolutionary psychologist David P. Schmitt, author of the most comprehensive sociosexuality survey, concludes:

In the present study, the most consistent finding was that men scored higher on sociosexuality than women across cultures. Several different theories were evaluated concerning why men and women differ in this way. They all received at least some empirical support. As a result, we are left with the relatively unsatisfying conclusion that sociosexual sex differences are predictable from several theoretical perspectives, none of which is conspicuously superior to the others. . . . At present, it appears that multiple perspectives

> are required to more fully explain the cultural and gender-linked variance in sociosexuality.[88]

Yes, there is a difference in self-reported perspectives on sexuality, but are those differences as great as many make them out to be? Psychologists David Buss and David Schmitt argued for a radical difference in male and female mating strategies based on self-reported ideal partner number over time. Males reported wanting an average of about ten partners over their lifetime and females reported wanting about four. However, if you look closely at the data and ask what the median was (the absolute true middle of the distribution of responses) the answer came back as around one for both males and females! No real difference. In fact, the large average differences seem to be brought about mostly by more males reporting much higher numbers (a hundred partners or more) than females; these outliers increased the average.[89] Also, all of these data come from US college students, not really a great representative sample of humanity.[90]

So what do these data tell us? First, people have a lot of sex and second, there are relatively few differences between males and females in the kinds and patterns of sexual activity. This result should not be too surprising as 90 percent of the time (more or less) it is males and females who are having sex with one another, so the numbers should be very similar. In the majority of studies presented here, as in Kinsey's study sixty years ago and in the few similar studies that have been produced in the interim since then, the results are generally the same: men and women engage in sexual activity in more or less the same manner. Men might talk about it more freely or express more active interest to questioners than females, but this also might reflect the power of culture and gender. It also appears that females have less sex than males as they age and that there might be a difference in sexual interest over time in married males and females.

Do males just want sex and females just want good males? No, at least not based on studies of sexual activity or attraction. However, cultural and gender contexts might make many kinds of differences appear. There are behavioral differences between males and females in how they act on and think about sex, but there does not appear to be any consistent evidence, aside from self-reports and interviews of sociosexuality, that suggest this is a property of human evolutionary histories. Males and females are just not that different when it comes to sex. But there does appear to be a core role for cultural and gender-based structures in affecting how we see, live, and think about sex and sexuality. These are patterns of social, historical, political, and economic variation, not distinct biological, or "natural," differences between males and females in regard to sexuality. We can see this kind of effect even across the United States, which is relatively free in regard to constraints on gender and sexual activity in contrast to many societies. It stands to reason that there would be even larger differences between the genders in societies with extreme curtailment of female public movement, freedom of expression, or sexuality.[91] As the psychologist David Schmitt sums it up,

> Women never precisely match the sociosexual psychology of men, but women's overall level of sociosexuality comes closer to men's when it is given the chance. The current findings support the view that women's sexuality is often constrained by cultural values and social institutions, and the "true" nature of women's sexuality includes short-term mating desires and some degree of sexual promiscuity.[92]

Given what we actually know about human attraction, human sexual activity, and sexuality itself, we can safely state that the myth that men and women are really different when it comes to sexuality is busted.

MEN ARE NOT FROM MARS, WOMEN ARE NOT FROM VENUS: BOTH ARE FROM EARTH AND BELONG TO THE SAME SPECIES

There are important differences between the sexes: women give birth and lactate, men are usually larger and more muscular, and the levels and patterns of some hormones vary between the sexes. There are also important similarities: our differentiated reproductive organs come from the same embryonic tissues, our bodies are made of the same stuff and structures, our hormones and brains are the same, we are the same species. This chapter intentionally focused on the similarities to illustrate a main point: men and women are not as different as most people think in our bodies, minds, and behavior.

We know that males are not intrinsically better at math and females better at verbal skills, and that the vast majority of the core differences are tied to the basic facts of physical differences in the bodies of the sexes. For the majority of behavioral traits males and females overlap extensively, almost to the point of insignificant differences at the level of sex, but significant differences at the level of individuals. Even for physical traits we know that there is a greater range of overlap than popularly conceived. Both males and females

can care for young (and their bodies respond to this in more or less the same way). Humans, regardless of sex, seek to form social and sexual pair bonds.

Humans are very sexual relative to other mammals.[93] We have lots of sex in a wide range of contexts and formats. We know less about desire within and between the sexes, but we do know that the ways in which people have sex and think about sex are extremely connected to the culture in which they live.

These strong similarities in male and female bodies and behavior do not mean that gender differences are not very real and very important. Just like the concept of socially constructed races, the perception and expectation of gender differences are part of all cultures and impact individuals and society. We all experience these patterns of gender difference—and they can fool us into thinking that men and women are so very different by nature.

Different cultures do it in different ways, but certain patterns are relatively consistent. Males tend to control economic and political resources, not because they are evolved to do so or that women are less capable of doing so, but because of the social and historical paths that have favored patriarchy. Women are associated with the domestic sphere and children due to their giving birth and lactating, not due to any inability of males generally to care for offspring. There is no biological mandate that only females care for young and only males care for economics and politics. In fact, it is highly likely that it is the cooperation between parents and other people in the raising of young that enabled humans to be as successful as we are today.

If this is all true (and it is), then why do so many people (researchers and the public alike) make such strong claims about the nature of human sexual difference? For two reasons: first, they focus only on the differences, ignoring the similarities; and second, they forget, or do not realize, that they are seeing everything around them through their own schemata (their all-encompassing worldviews).

If you ignore the massive set of gender and biological similarities or better, put overlaps between men and women and just look to the gender and biological differences, then of course you are going to assume that we must be different by design (either evolution's or a deity's design). However, if you look both to the similarities and the differences you are struck by how complicated the whole picture is and how the differences fall into specific patterns associated with body structure and

cultural expectations of gender. You then have to attempt to explain both the differences and similarities, which means you are stuck dealing with the very complicated biocultural nature of humanity. What you do not have handy is a clear suite of evolved differences in behavior between the sexes.

We are all products of our own societies. We are who we meet and grow up with. If we are told from day one that little boys like trucks and little girls like dolls, that women are emotional and nurturing, and that men are assertive and controlling, we will grow up seeing those behaviors around us. Researchers, especially those looking for evolutionary origins of why we do what we do, have to be extremely careful that they do not overlook the structures of modern human societies and our schemata in their quest to understand the big picture. They must be careful not to already know how the world looks and simply seek an explanation as to why the world is this way without first asking the most basic scientific question: is the world really this way?

The myth of anisogamy, that there is a massive and insurmountable burden placed on females due to their reproductive system, and that this burden is simply not the same for males, is strong and leads many to assume that male and female natures are different because of it. This myth is strong because it does seem to fit for many forms of life on this planet, like insects and even some mammals. However, in many organisms, especially in humans, a system has evolved that requires intensive cooperation between males and females—the actual act of gestating, birthing, and lactating is only a small part of the overall reproductive and parenting effort shared by both sexes. Relying on simplistic notions about females' limitations and males' drive to inseminate as many females as possible as a starting point for evolutionary theorizing is simply not tenable.[94] The human situation has a different basis and thus the hypotheses and research questions need to be expanded and resituated.

MOVING BEYOND THE MYTH

So what now? How does this information, the busting of the myth of extreme differences between men and women, impact our daily lives? First, we need to listen to Anne Fausto-Sterling and discard dualisms. Thinking of males and females as opposites is incorrect biologically and socially, so it will not get us good answers to questions. Looking only at culture and social histories or only at biology and evolutionary

patterns is also a false dichotomy and will hamper our abilities to ask and answer important questions. We need to be especially careful when using aspects of gendered behavior as reflections of human nature and we need to be aware of our biases, and the biases in our datasets, at all times. As the sociomedical scientist Rebecca Jordan-Young says, "we are not blank slates, but we are also not pink and blue notepads."[95] Our brains are not made "male" or "female" but develop via interactions between the external world and our own sensory apparatus, our bodily systems have important differences but are more similar than they are different, and gendered behavior and gender relations change over time as our social and structural contexts shift and our schemata change accordingly.

If we discard the myth that men and women are so different then we can see the range of individuals more clearly. If we accept that there are many ways to be male and female and that many of these ways overlap, we can be more accepting of a wider range of masculinity and femininity within and between individuals. A nine-year-old male who picks up a baseball for the first time and throws it ineptly is not "throwing like a girl" as his teammates might say. He is throwing the ball like a human who has not been trained to throw a small round ball with accuracy and speed.[96] When a nine-year-old girl plays baseball well, sliding hard, getting dirty, and running out every time she is at bat she is called a tomboy or is described with masculine adjectives. She is being a good athlete, not being like a boy. These are simplistic examples, but the idea has significant impact across all aspects of our lives. Taking this perspective can help reduce conflict for individuals, and their families and friends, who feel that they fall outside of the social expectations for their gender. It can also create a more level playing field when we look at the abilities and behavior of others, not thinking they will perform one way or another because of assumed limitations of their sex. Again this does not mean people do not vary in occasionally predictable ways. However, if we broaden our categories we might just be pleasantly surprised.

Another way the ideas in this chapter might help is with the expectations for love and romance and marriage that permeate our society. There is no evidence that there is a specific chemical/biological and social match for each individual on the planet. There is also no guarantee that any individual will successfully initiate and maintain one or more strong pair bonds socially and sexually across the life span, although many of us probably do desire such relationships. Marriage is not necessarily

one of those pair bonds. It might coexist with one, but getting married and having children does not automatically initiate a pair bond. People need to realize this because spending enormous amounts of time and effort with one other individual is very difficult, and if there is not a pair bond it is probably even more difficult. Romance and marriage are not evolutionary adaptations, they are part of our cultural expectations and patterns, which change over time.

Pair bonds are not necessarily lifelong (in fact most are not) nor are they always the same across the duration of the relationship. Humans can have many pair bonds across their lifetimes and, frequently, multiple ones at the same time. Social and sexual pair bonds can be very similar biologically but their social and cultural impacts can be quite different. Being in a pair bond (social and/or sexual) does not mean that either individual ceases to be sexually attracted to (or active with) other individuals. Monogamy in humans is a social contract, not a biological reality. We can be monogamous, but our bodies and minds are not specifically designed for it.[97]

Men and women do not really want different things from life; in the end we are all humans. However, some biological patterns combined with specific cultural contexts can create different desires, expectations, and patterns of behavior. We must realize that each individual may or may not match the appropriate ideas society has for sex/gender but that such variation is normal for humanity. Understanding how we are similar and different and the range of human variation gives us a broader notion of what is natural for humans. There is no evolved battle of the sexes in humans, nor are gender differences and similarities unimportant, but understanding both how we do and do not vary can help us move forward toward a better society.