

The Psychology of Human Sexuality

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Sexuality is one of the fundamental drives behind everyone's feelings, thoughts, and behaviors. It defines the means of biological reproduction, describes psychological and sociological representations of self, and orients a person's attraction to others. Further, it shapes the brain and body to be pleasure-seeking. Yet, as important as sexuality is to being human, it is often viewed as a taboo topic for personal or scientific inquiry.

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Learning Objectives

- Explain how scientists study human sexuality.
- Share a definition of human sexuality.
- Distinguish between sex, gender, and sexual orientation.
- Review common and alternative sexual behaviors.
- Appraise how pleasure, sexual behaviors, and consent are intertwined.

Introduction

Sex makes the world go around: It makes babies bond, children giggle, adolescents flirt, and adults have babies. It is addressed in the holy books of the world's great religions, and it infiltrates every part of society. It influences the way we dress, joke, and talk. In many ways, sex defines who we are. It is so important, the eminent neuropsychologist Karl Pribram (1958) described sex as one of four basic human drive states. Drive states motivate us to accomplish goals. They are linked to our survival. According to Pribram, feeding, fighting, fleeing, and sex are the four drives behind every thought, feeling, and behavior. Since these drives are so closely associated with our psychological and physical health, you might assume people would study, understand, and discuss them openly. Your assumption would be generally correct for three of the four drives (Malacane & Beckmeyer, 2016). Can you guess which drive is the least understood and openly discussed?

This module presents an opportunity for you to think openly and objectively about sex. Without shame or taboo, using science as a lens, we examine fundamental aspects of human sexuality—including gender, sexual orientation, fantasies, behaviors, paraphilias, and sexual consent.

The History of Scientific Investigations of Sex



An

image on an ancient Greek drinking cup of two lovers kissing. ca. 480 BC [Image: Marie-Lan Nguyen, <https://goo.gl/uCPpNy>, Public Domain]

The history of human sexuality is as long as human history itself—200,000+ years and counting (Antón & Swisher, 2004). For almost as long as we have been having sex, we have been creating art, writing, and talking about it. Some of the earliest recovered artifacts from ancient cultures are thought to be fertility totems. The Hindu *Kama Sutra* (400 BCE to 200 CE)—an ancient text discussing love, desire, and pleasure—includes a how-to manual for having sexual intercourse. Rules, advice, and stories about sex are also contained in the Muslim *Qur'an*, Jewish *Torah*, and Christian *Bible*.

By contrast, people have been scientifically investigating sex for only about 125 years. The first scientific investigations of sex employed the **case study** method of research. Using this method, the English physician Henry Havelock Ellis (1859-1939) examined diverse topics within sexuality, including arousal and masturbation. From 1897 to 1923, his findings were published in a seven-volume set of books titled *Studies in the Psychology of Sex*. Among his most noteworthy findings is that transgender people are distinct from homosexual people. Ellis's studies led him to be an advocate of equal rights for women and comprehensive human sexuality education in public schools.

Using case studies, the Austrian neurologist Sigmund Freud (1856-1939) is credited with being the first scientist to link sex to healthy development and to recognize humans as being sexual throughout their lifespans, including childhood (Freud, 1905). Freud (1923) argued that people progress through **five stages of psychosexual development**: oral, anal, phallic, latent, and genital. According to Freud, each of these stages could be passed through in a healthy or unhealthy manner. In unhealthy manners, people might develop psychological problems, such as frigidity, impotence, or anal-retentiveness.

The American biologist Alfred Kinsey (1894-1956) is commonly referred to as the father of human sexuality research. Kinsey was a world-renowned expert on wasps but later changed his focus to the study of humans. This shift happened because he wanted to teach a course on marriage but found data on human sexual behavior lacking. He believed that sexual knowledge was the product of guesswork and had never really been studied systematically or in an unbiased way. He decided to collect information himself using the **survey method**, and set a goal of interviewing 100 thousand people about their sexual histories. Although he fell short of his goal, he still managed to collect 18 thousand interviews! Many “behind closed doors” behaviors investigated by contemporary scientists are based on Kinsey's seminal work.

Today, a broad range of scientific research on sexuality continues. It's a topic that spans various disciplines, including anthropology, biology, neurology, psychology, and sociology.

Sex, Gender, and Sexual Orientation: Three Different Parts of You

Applying for a credit card or filling out a job application requires your name, address, and birth-date. Additionally, applications usually ask for your sex or gender. It's common for us to use the terms “sex” and “gender” interchangeably. However, in modern usage, these terms are distinct from one another.



Cartoon depicting a traditional gender role of a woman as a housewife, working in the kitchen. [Image: JosephineRN28, <https://goo.gl/4x6cvg>, CC BY-SA 4.0, <https://goo.gl/FxkLZS>]

Sex describes means of biological reproduction. Sex includes sexual organs, such as ovaries—defining what it is to be a female—or testes—defining what it is to be a male. Interestingly, biological sex is not as easily defined or determined as you might expect (see the section on variations in sex, below). By contrast, the term **gender** describes psychological (**gender identity**) and sociological (**gender role**) representations of biological sex. At an early age, we begin learning cultural norms for what is considered masculine and feminine. For example, children may associate long hair or dresses with femininity. Later in life, as adults, we often

conform to these norms by behaving in gender-specific ways: as men, we build houses; as women, we bake cookies (Marshall, 1989; Money et al., 1955; Weinraub et al., 1984).

Because cultures change over time, so too do ideas about gender. For example, European and American cultures today associate pink with femininity and blue with masculinity. However, less than a century ago, these same cultures were swaddling baby boys in pink, because of its masculine associations with “blood and war,” and dressing little girls in blue, because of its feminine associations with the Virgin Mary (Kimmel, 1996).

Sex and gender are important aspects of a person’s identity. However, they do not tell us about a person’s sexual orientation (Rule & Ambady, 2008). **Sexual orientation** refers to a person’s sexual attraction to others. Within the context of sexual orientation, **sexual attraction** refers to a person’s capacity to arouse the sexual interest of another, or, conversely, the sexual interest one person feels toward another.

While some argue that sexual attraction is primarily driven by reproduction (e.g., Geary, 1998), empirical studies point to pleasure as the primary force behind our sex drive. For example, in a survey of college students who were asked, “Why do people have sex?” respondents gave more than 230 unique responses, most of which were related to pleasure rather than reproduction (Meston & Buss, 2007). Here’s a thought-experiment to further demonstrate how reproduction has relatively little to do with driving sexual attraction: Add the number of times you’ve had and hope to have sex during your lifetime. With this number in mind, consider how many times the goal was (or will be) for reproduction versus how many it was (or will be) for pleasure. Which number is greater?

Although a person’s intimate behavior may have **sexual fluidity**—changing due to circumstances (Diamond, 2009)—sexual orientations are relatively stable over one’s lifespan, and are genetically rooted (Frankowski, 2004). One method of measuring these genetic roots is the *sexual orientation concordance rate* (SOCR). An SOCR is the probability that a pair of individuals has the same sexual orientation. SOCRs are calculated and compared between people who share the same genetics (**monozygotic twins**, 99%); some of the same genetics (**dizygotic twins**, 50%); siblings (50%); and non-related people, randomly selected from the population. Researchers find SOCRs are highest for monozygotic twins; and SOCRs for dizygotic twins, siblings, and randomly-selected pairs do not significantly differ from one another (Bailey et al. 2016; Kendler et al., 2000). Because sexual orientation is a hotly debated issue, an appreciation of the genetic aspects of attraction can be an important piece of this dialogue.

On Being Normal: Variations in Sex, Gender, and Sexual Orientation

“Only the human mind invents categories and tries to force facts into separated pigeon-holes. The living world is a continuum in each and every one of its aspects. The sooner we learn this concerning human sexual behavior, the sooner we shall reach a sound understanding of the realities of sex.” (Kinsey, Pomeroy, & Martin, 1948, pp. 638–639)

We live in an era when sex, gender, and sexual orientation are controversial religious and political issues. Some nations have laws against homosexuality, while others have laws protecting same-sex marriages. At a time when there seems to be little agreement among religious and political groups, it makes sense to wonder, “What is normal?” and, “Who decides?”



Left: An intersexual two-spotted bumble bee (*Bombus bimaculatus*) and, Right: Two mallard (*Anas platyrhynchos*) ducks—one of hundreds of species having homosexual or bisexual orientations. [Image left: USGS Bee Inventory, <https://goo.gl/fE3EUj>, Public Domain][Image right: Norbert Nagel, <https://goo.gl/vep4y3>, CC BY-SA 3.0, <https://goo.gl/HXJGvT>]

The international scientific and medical communities (e.g., World Health Organization, World Medical Association, World Psychiatric Association, Association for Psychological Science) view variations of sex, gender, and sexual orientation as normal. Furthermore, variations of sex, gender, and sexual orientation occur naturally throughout the animal kingdom. More than 500 animal species have homosexual or bisexual orientations (Lehrer, 2006). More than 65,000 animal species are **intersex**—born with either an absence or some combination of male and female reproductive organs, sex hormones, or sex chromosomes (Jarne & Auld, 2006). In humans, intersex individuals make up about two percent—more than 150 million people—of the world’s population (Blackless et al., 2000). There are dozens of intersex conditions, such as Androgen Insensitivity Syndrome and Turner’s Syndrome (Lee et al., 2006). The term “syndrome” can be misleading; although intersex individuals may have physical limitations (e.g., about a third of Turner’s individuals have heart defects; Matura et al., 2007), they otherwise lead relatively normal intellectual, personal, and social lives. In any case, intersex individuals demonstrate the diverse variations of biological sex.

Just as biological sex varies more widely than is commonly thought, so too does gender. **Cisgender** individuals' gender identities correspond with their birth sexes, whereas **transgender** individuals' gender identities do not correspond with their birth sexes. Because gender is so deeply ingrained culturally, rates of transgender individuals vary widely around the world (see Table 1).

| Nation | Transgender people per 100,000 |
|---------------|--------------------------------|
| Sweden | .17 |
| Poland | .26 |
| Ireland | 1.4 |
| Japan | 1.4 |
| India | 167 |
| Thailand | 333 |
| United States | 476 |
| Malaysia | 1,333 |

Table 1: Nations vary in the number of transgender people found in their populations (De Gascun et al., 2006; Dulko & Imielinska, 2004; Landen et al., 1996; Okabe et al., 2008, Conron et al., 2012; Winter, 2009).

Although incidence rates of transgender individuals differ significantly between cultures, **transgender females (TGFs)**—whose birth sex was male—are by far the most frequent type of transgender individuals in any culture. Of the 18 countries studied by Meier and Labuski (2013), 16 of them had higher rates of TGFs than **transgender males (TGMs)**—whose birth sex was female— and the 18 country TGF to TGM ratio was 3 to 1. TGFs have diverse levels of **androgyny**—having both feminine and masculine characteristics. For example, five percent of the Samoan population are TGFs referred to as *fa'afafine*, who range in androgyny from mostly masculine to mostly feminine (Tan, 2016); in Pakistan, India, Nepal, and Bangladesh, TGFs are referred to as *hijras*, recognized by their governments as a third gender, and range in androgyny from only having a few masculine characteristics to being entirely feminine (Pasquesoone, 2014); and as many as six percent of biological males living in Oaxaca, Mexico are TGFs referred to as *muxes*, who range in androgyny from mostly masculine to mostly feminine (Stephen, 2002).



Figure 2: Hijra Dancer in Nepal. [Image: Adam Jones, <https://goo.gl/TCxrVY>, CC BY-SA 2.0, <https://goo.gl/eEDNLY>]

Sexual orientation is as diverse as gender identity. Instead of thinking of sexual orientation as being two categories—homosexual and heterosexual—Kinsey argued that it's a continuum (Kinsey, Pomeroy, & Martin, 1948). He measured orientation on a continuum, using a 7-point Likert scale called the Heterosexual-Homosexual Rating Scale, in which 0 is exclusively **heterosexual**, 3 is **bisexual**, and 6 is exclusively **homosexual**. Later researchers using this method have found 18% to 39% of Europeans and Americans identifying as somewhere between heterosexual and homosexual (Lucas et al., 2017; YouGov.com, 2015).

These percentages drop dramatically (0.5% to 1.9%) when researchers force individuals to respond using only two categories (Copen, Chandra, & Febo-Vazquez, 2016; Gates, 2011).

What Are You Doing? A Brief Guide to Sexual Behavior

Just as we may wonder what characterizes particular gender or sexual orientations as “normal,” we might have similar questions about sexual behaviors. What is considered sexually normal depends on culture. Some cultures are sexually-restrictive—such as one extreme example off the coast of Ireland, studied in the mid-20th century, known as the island of *Inis Beag*. The inhabitants of *Inis Beag* detested nudity and viewed sex as a necessary evil for the sole purpose of reproduction. They wore clothes when they bathed and even while having sex. Further, sex education was nonexistent, as was breast feeding (Messenger, 1989). By contrast, *Mangaians*, of the South Pacific island of A’ua’u, are an example of a highly sexually-permissive culture. Young *Mangaian* boys are encouraged to masturbate. By age 13, they’re instructed by older males on how to sexually perform and maximize orgasms for themselves and their partners. When the boys are a bit older, this formal instruction is replaced with hands-on coaching by older females. Young girls are also expected to explore their sexuality and develop a breadth of sexual knowledge before marriage (Marshall & Suggs, 1971). These cultures make clear that what are considered sexually normal behaviors depends on time and place.

Sexual behaviors are linked to, but distinct from, fantasies. Leitenberg and Henning (1995) define sexual fantasies as “any mental imagery that is sexually arousing.” One of the more common fantasies is the **replacement fantasy**—fantasizing about someone other than one’s current partner (Hicks & Leitenberg, 2001). In addition, more than 50% of people have forced-sex fantasies (Critelli & Bivona, 2008). However, this does not mean most of us want to be cheating on our partners or be involved in sexual assault. Sexual fantasies are *not* equal to sexual behaviors.

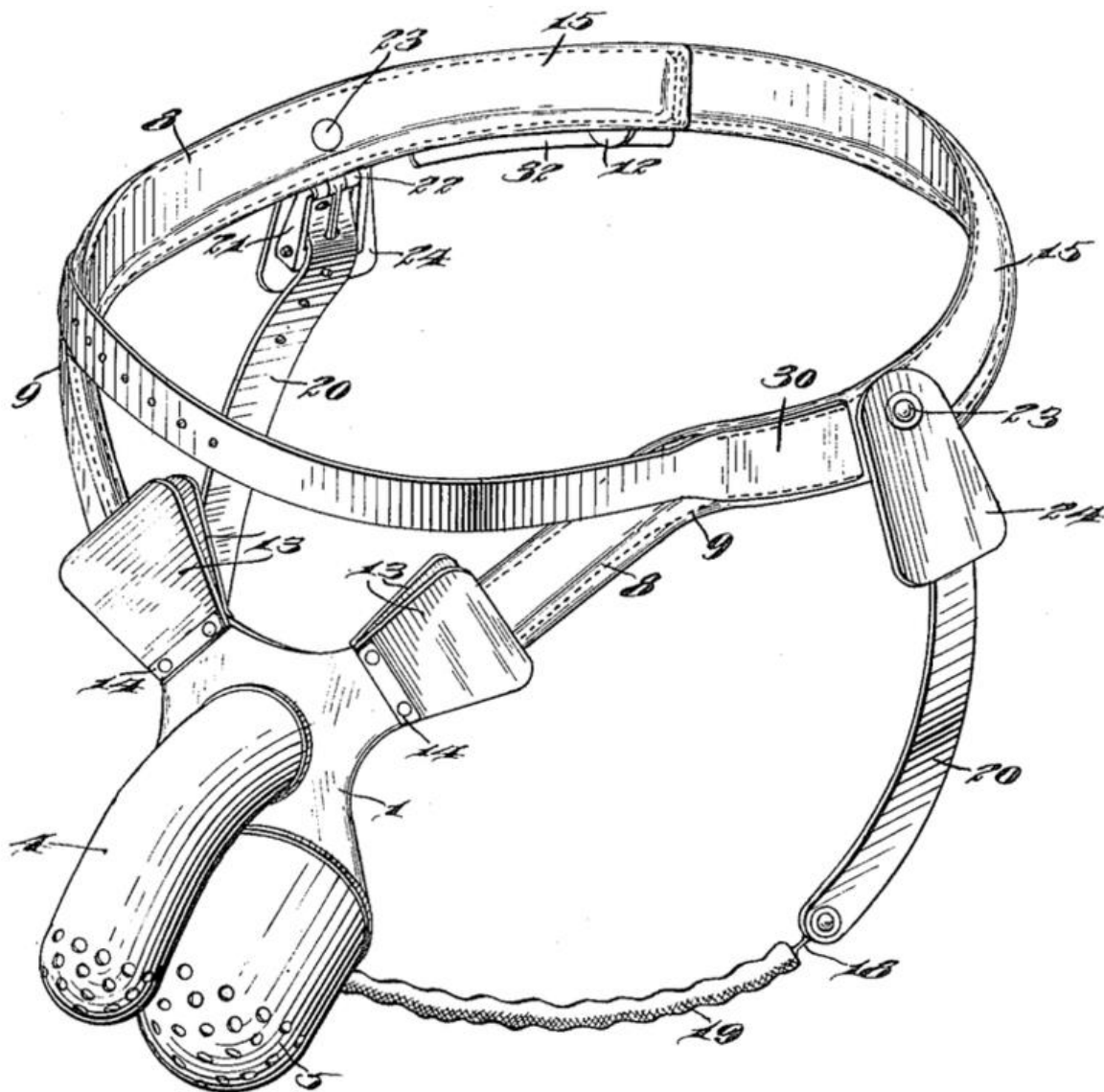


Figure 3: A United States patent drawing of an early 20th century anti-masturbation chastity belt. [Image: unknown, <https://goo.gl/D15Lnw>, Public Domain]

Sexual fantasies are often a context for the sexual behavior of **masturbation**—tactile (physical) stimulation of the body for sexual pleasure. Historically, masturbation has earned a bad reputation; it’s been described as “self-abuse,” and falsely associated with causing adverse side effects, such as hairy palms, acne, blindness, insanity, and even death (Kellogg, 1888). However, empirical evidence links masturbation to increased levels of sexual and marital satisfaction, and physical and psychological health (Hurlburt & Whitaker, 1991; Levin, 2007). There is even evidence that masturbation significantly decreases the risk of developing prostate cancer among males over the age of 50 (Dimitropoulou et al., 2009). Masturbation is common among males and females in the U.S. Robbins et al. (2011) found that 74% of males and 48% of females reported masturbating. However, frequency of masturbation is affected by culture. An Australian study found that only 58% of males and 42% of females reported masturbating (Smith,

Rosenthal, & Reichler, 1996). Further, rates of reported masturbation by males and females in India are even lower, at 46% and 13%, respectively (Ramadugu et al., 2011).

Coital sex is the term for vaginal-penile intercourse, which occurs for about 3 to 13 minutes on average—though its duration and frequency decrease with age (Corty & Guardiani, 2008; Smith et al., 2012). Traditionally, people are known as “virgins” before they engage in coital sex, and have “lost” their virginity afterwards. Durex (2005) found the average age of first coital experiences across 41 different countries to be 17 years, with a low of 16 (Iceland), and a high of 20 (India). There is tremendous variation regarding frequency of coital sex. For example, the average number of times per year a person in Greece (138) or France (120) engages in coital sex is between 1.6 and 3 times greater than in India (75) or Japan (45; Durex, 2005).

Oral sex includes **cunnilingus**—oral stimulation of the female’s external sex organs, and **fellatio**—oral stimulation of the male’s external sex organs. The prevalence of oral sex widely differs between cultures—with Western cultures, such as the U.S., Canada, and Austria, reporting higher rates (greater than 75%); and Eastern and African cultures, such as Japan and Nigeria, reporting lower rates (less than 10%; Copen, Chandra, & Febo-Vazquez, 2016; Malacad & Hess, 2010; Wylie, 2009). Not only are there differences between cultures regarding how many people engage in oral sex, there are differences in its very definition. For example, most college students in the U.S. do not believe cunnilingus or fellatio are sexual behaviors—and more than a third of college students believe oral sex is a form of abstinence (Barnett et al., 2017; Horan, Phillips, & Hagan, 1998; Sanders & Reinisch, 1999).

Anal sex refers to penetration of the anus by an object. Anal sex is not exclusively a “homosexual behavior.” The anus has extensive sensory-nerve innervation and is often experienced as an erogenous zone, no matter where a person is on the Heterosexual-Homosexual Rating Scale (Cordeau et al., 2014). When heterosexual people are asked about their sexual behaviors, more than a third (about 40%) of both males and females report having had anal sex at some time during their life (Chandra, Mosher, & Copen, 2011; Copen, Chandra, & Febo-Vazquez, 2016). Comparatively, when homosexual men are asked about their most recent sexual behaviors, more than a third (37%) report having had anal sex (Rosenberger et al., 2011). Like heterosexual people, homosexual people engage in a variety of sexual behaviors, the most frequent being masturbation, romantic kissing, and oral sex (Rosenberger et al., 2011). The prevalence of anal sex widely differs between cultures. For example, people in Greece and Italy report high rates of anal sex (greater than 50%), whereas people in China and India report low rates of anal sex (less than 15%; Durex, 2005).

In contrast to “more common” sexual behaviors, there is a vast array of alternative sexual behaviors. Some of these behaviors, such as *voyeurism*, *exhibitionism*, and *pedophilia* are classified in the *DSM* as **paraphilic disorders**—behaviors that victimize and cause harm to others or one’s self (American Psychiatric Association, 2013). **Sadism**—inflicting pain upon another person to experience pleasure for one’s self—and **masochism**—receiving pain from another person to experience pleasure for one’s self—are also classified in the *DSM* as paraphilic disorders. However, if an individual consensually engages in these behaviors, the term

“disorder” is replaced with the term “interest.” Janus and Janus (1993) found that 14% of males and 11% of females have engaged in some form of sadism and/or masochism.

Sexual Consent

ASK YOURSELF SOME QUESTIONS
Want to talk about it?
Resources on the back can help you out.

| CONSENT | POWER |
|---|---|
| Consent is not just a lack of no. You need a <i>real</i> YES! | Just because your relationship is legal, <i>doesn't</i> mean it's equal. |
| Ask for it! Consent is Respect. Say what you want to do, ask what they want to do. Respect the answer <i>no matter what</i> . | Do you & your partner trust each other equally? |
| Consent means each person actively wants to participate in whatever physical or sexual act is happening. | Do you each have autonomy - separate friends and activities? |
| People who are drunk, high, or asleep cannot give consent. | Does your partner pressure you to do things you don't want to? |
| Always ask before you touch someone. It's easy and respectful. | Does your partner tell you that no-one else would ever love you? |
| | Does your partner ever scare you with the things they do or say? |

[Image: King County Sexual Assault Resource Center, <https://goo.gl/W4Vvmn>]

Clearly, people engage in a multitude of behaviors whose variety is limited only by our own imaginations. Further, our standards for what's normal differs substantially from culture to culture. However, there is one aspect of sexual behavior that is universally acceptable—indeed, fundamental and necessary. At the heart of what qualifies as sexually “normal” is the concept of consent. Sexual consent refers to the voluntary, conscious, and *empathic* participation in a

sexual act, which can be withdrawn at any time (Jozkowski & Peterson, 2013). Sexual consent is the baseline for what are considered *normal*—acceptable and healthy—behaviors; whereas, nonconsensual sex—i.e., forced, pressured or unconscious participation—is unacceptable and unhealthy. When engaging in sexual behaviors with a partner, a clear and explicit understanding of your boundaries, as well as your partner’s boundaries, is essential. We recommend **safer-sex practices**, such as condoms, honesty, and communication, whenever you engage in a sexual act. Discussing likes, dislikes, and limits *prior to* sexual exploration reduces the likelihood of miscommunication and misjudging nonverbal cues. In the heat of the moment, things are not always what they seem. For example, Kristen Jozkowski and her colleagues (2014) found that females tend to use verbal strategies of consent, whereas males tend to rely on nonverbal indications of consent. Awareness of this basic mismatch between heterosexual couples’ exchanges of consent may proactively reduce miscommunication and unwanted sexual advances.

The universal principles of pleasure, sexual behaviors, and consent are intertwined. Consent is the foundation on which sexual activity needs to be built. Understanding and practicing *empathic* consent requires **sexual literacy** and an ability to effectively communicate desires and limits, as well as to respect others’ parameters.

Conclusion

Considering the amount of attention people give to the topic of sex, it’s surprising how little most actually know about it. Historically, people’s beliefs about sexuality have emerged as having absolute moral, physical, and psychological boundaries. The truth is, sex is less concrete than most people assume. Gender and sexual orientation, for example, are not either/or categories. Instead, they are continuums. Similarly, sexual fantasies and behaviors vary greatly by individual and culture. Ultimately, open discussions about sexual identity and sexual practices will help people better understand themselves, others, and the world around them.

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Outside Resources

Documentary: *I am Elizabeth Smart*. In 2002, Elizabeth Smart became a household name when news of her kidnapping from her home—at age 14—made national news. She was the victim of sexual assault and was held hostage for nearly a year, until she escaped. Today, she is an

outspoken advocate for issues related to sex education and human trafficking. She is also author of an autobiography. Note: some content may be behind a paywall.

<http://www.aetv.com/shows/elizabeth-smart-autobiography/season-1/episode-1>

Journal: *The Journal of Sex Research*

http://www.sexscience.org/journal_of_sex_research/

Journal: *The Journal of Sexual Medicine*

<http://www.jsm.jsexmed.org/>

Non-fiction book: *Missoula*. In 2015, journalist Jon Krakauer wrote a book discussing rape on college campuses by focusing on a single town: Missoula, Montana (USA).

http://www.amazon.com/Missoula-Rape-Justice-System-College/dp/0804170568/ref=tmm_pap_swatch_0?encoding=UTF8&qid=&sr=

Organization: SIECUS - the Sexuality Information and Education Council of the United States- was founded in 1964 to provide education and information about sexuality and sexual and reproductive health.

<http://www.siecus.org/>

Organization: The Guttmacher Institute is a leading research and policy organization committed to advancing sexual and reproductive health and rights in the United States and globally.

<https://www.guttmacher.org/>

Organization: The Intersex Society of North America

<http://www.isna.org/>

Podcast : This American Life - *Sissies*, This episode focuses on perceptions of masculinity and of being seen as a “sissy.” The transcript can be found here.

<https://www.thisamericanlife.org/radio-archives/episode/190/transcript>

Podcast: This American Life - *Testosterone*, Stories of people getting more testosterone and regretting it and some of people losing it and coming to appreciate their new circumstances.

<https://www.thisamericanlife.org/radio-archives/episode/220/testosterone/>

Video: 5MIweekly—YouTube channel with weekly videos that playfully and scientifically examine human sexuality.

<https://www.youtube.com/channel/UCQFQ0vPPNPS-LYhIbKOzpFw>

Video: Muxes, a documentary about Mexican children identified as male at birth, but who choose at a young age to be raised as female.

Video: Sexplanations—YouTube channel with shame-free educational videos on everything sex.

<https://www.youtube.com/user/sexplanations>

Video: YouTube: AsapSCIENCE

<https://www.youtube.com/user/AsapSCIENCE>

Web: Kinsey Confidential—Podcast with empirically-based answers about sexual questions.

<http://kinseyconfidential.org/>

Web: Sex & Psychology—Blog about the science of sex, love, and relationships.

<http://www.lehmiller.com/>

Discussion Questions

1. Of the four basic human drive states Karl Pribram describes as being linked to our survival, why do you think the sex drive is the least likely to be openly and objectively addressed?
2. How might you go about scientifically investigating attitudes and behaviors regarding masturbation across various cultures?
3. Discuss the three different parts of you as described by this module.

4. How would you define “natural” human sexual behavior with respect to sex, gender, and sexual orientation? How does nature (i.e., the animal kingdom) help us define what is considered natural?
5. Why do humans feel compelled to categorize themselves and others based on their sex, gender, and sexual orientation? What would the world be like if these categories were removed?
6. How has culture influenced your sexual attitudes and behaviors?
7. The concept of sexual consent is seemingly simple; however, as this module presents, it is oftentimes skewed or ignored. Identify at least three factors that contribute to the complexities of consent, and how these factors might best be addressed to reduce unwanted sexual advances.

Vocabulary

Anal sex

Penetration of the anus by an animate or inanimate object.

Androgyny

Having both feminine and masculine characteristics.

Bisexual

Attraction to two sexes.

Case study

An in-depth and objective examination of the details of a single person or entity.

Cisgender

When a person’s birth sex corresponds with his/her gender identity and gender role.

Coital sex

Vaginal-penile intercourse.

Cunnilingus

Oral stimulation of the female's external sex organs.

Dizygotic twins

Twins conceived from two ova and two sperm.

Fellatio

Oral stimulation of the male's external sex organs.

Five stages of psychosexual development

Oral, anal, phallic, latency, and genital.

Gender

The psychological and sociological representations of one's biological sex.

Gender identity

Personal depictions of masculinity and femininity.

Gender roles

Societal expectations of masculinity and femininity.

Heterosexual

Opposite-sex attraction.

Homosexual

Same-sex attraction.

Intersex

Born with either an absence or some combination of male and female reproductive organs, sex hormones, or sex chromosomes.

Masochism

Receiving pain from another person to experience pleasure for one's self.

Masturbation

Tactile stimulation of the body for sexual pleasure.

Monozygotic twins

Twins conceived from a single ovum and a single sperm, therefore genetically identical.

Oral sex

Cunnilingus or fellatio.

Paraphilic disorders

Sexual behaviors that cause harm to others or one's self.

Replacement fantasy

Fantasizing about someone other than one's current partner.

Sadism

Inflicting pain upon another person to experience pleasure for one's self.

Safer-sex practices

Doing anything that may decrease the probability of sexual assault, sexually transmitted infections, or unwanted pregnancy; this may include using condoms, honesty, and communication.

Sex

An organism's means of biological reproduction.

Sexual attraction

The capacity a person has to elicit or feel sexual interest.

Sexual consent

Permission that is voluntary, conscious, and able to be withdrawn at any time.

Sexual fluidity

Personal sexual attributes changing due to psychosocial circumstances.

Sexual literacy

The lifelong pursuit of accurate human sexuality knowledge, and recognition of its various multicultural, historical, and societal contexts; the ability to critically evaluate sources and discern empirical evidence from unreliable and inaccurate information; the acknowledgment of humans as sexual beings; and an appreciation of sexuality's contribution to enhancing one's well-being and pleasure in life.

Sexual orientation

A person's sexual attraction to other people.

Survey method

One method of research that uses a predetermined and methodical list of questions, systematically given to samples of individuals, to predict behaviors within the population.

Transgender

A person whose gender identity or gender role does not correspond with his/her birth sex.

Transgender female (TGF)

A transgender person whose birth sex was male.

Transgender male (TGM)

A transgender person whose birth sex was female.

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Human Sexual Anatomy and Physiology

By Don Lucas and Jennifer Fox
Northwest Vista College

It's natural to be curious about anatomy and physiology. Being knowledgeable about anatomy and physiology increases our potential for pleasure, physical and psychological health, and life satisfaction. Beyond personal curiosity, thoughtful discussions about anatomy and physiology with sexual partners reduces the potential for miscommunication, unintended pregnancies, sexually transmitted infections, and sexual dysfunctions. Lastly, and most importantly, an appreciation of both the biological and psychological motivating forces behind sexual curiosity, desire, and the capacities of our brains can enhance the health of relationships.

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- [Sexual physiology](#)
- [Sexual response cycle](#)
- [Sexually transmitted infections](#)
- [Vulva](#)

Learning Objectives

- Explain why people are curious about their own sexual anatomies and physiologies.
- List the sexual organs of the female and male.
- Describe the sexual response cycle.
- Distinguish between pleasure and reproduction as motives behind sexuality.
- Compare the central nervous system motivating sexual behaviors to the autonomic nervous system motivating sexual behaviors.
- Discuss the relationship between pregnancy and birth control.
- Analyze how sexually transmitted infections are associated with sexual behaviors.
- Understand the effects of sexual dysfunctions and their treatments on sexual behaviors.

Introduction

Most people are curious about sex. Google processes over 3.5 billion search queries per day ([Google Search Statistics](#))—tens of millions of which, performed under the cloak of anonymity, are about sex. What are the most frequently asked questions concerning sex on Google? Are they about extramarital affairs? Kinky fantasies? Sexual positions? Surprisingly, no. Usually they are practical and straightforward, and tend to be about *sexual anatomy* ([Stephens-Davidowitz, 2015](#))—for example, “How big should my penis be?” and, “Is it healthy for my vagina to smell like vinegar?” Further, Google reveals that people are much more concerned about their own sexual anatomies than the anatomies of others; for instance, men are 170 times more likely than women to pose questions about penises ([Stephens-Davidowitz, 2015](#)). The second most frequently asked questions about sex on Google are about *sexual physiology*—for example, “How can I make my boyfriend climax more quickly?” “Why is sex painful?” and, “What exactly is an orgasm?” These searches are clear indicators that people have a tremendous interest in very basic questions about sexual anatomy and physiology.



What exactly is an orgasm?



Google Search

I'm Feeling Lucky



Quick tips to protect your data this Cyber Security Month

However, the accuracy of answers we get from friends, family, and even internet “authorities” to questions about sex is often unreliable (Fuxman et al., 2015; Simon & Daneback, 2013). For example, when Buhi and colleagues (2010) examined the content of 177 sexual-health websites, they found that nearly half contained inaccurate information. How about we—the authors of this module—make you a promise? If you learn this material, then we promise you won’t need nearly as many clandestine Google excursions, because this module contains unbiased and scientifically-based answers to many of the questions you likely have about sexual anatomy and physiology.

Are you ready for a new twist on “sexually-explicit language”? Even though this module is about a fascinating topic—sex—it contains vocabulary that may be new or confusing to you. Learning this vocabulary may require extra effort, but if you understand these terms, you will understand sex and yourself better.

Masters and Johnson

Although people have always had sex, the scientific study of it has remained taboo until relatively recently. In fact, the study of sexual anatomy, physiology, and behavior wasn’t formally undertaken until the late 19th century, and only began to be taken seriously as recently as the 1950’s. Notably, William Masters (1915-2001) and Virginia Johnson (1925-2013) formed

a research team in 1957 that expanded studies of sexuality from merely asking people about their sex lives to measuring people's anatomy and physiology while they were actually *having* sex. Masters was a former Navy lieutenant, married father of two, and trained gynecologist with an interest in studying prostitutes. Johnson was a former country music singer, single mother of two, three-time divorcee, and two-time college dropout with an interest in studying sociology. And yes, if it piques your curiosity, Masters and Johnson were lovers (when Masters was still married); they eventually married each other, but later divorced. Despite their colorful private lives they were dedicated researchers with an interest in understanding sex from a scientific perspective.

Masters and Johnson used primarily **plethysmography** (the measuring of changes in blood- or airflow to organs) to determine sexual responses in a wide range of body parts—breasts, skin, various muscle structures, bladder, rectum, external sex organs, and lungs—as well as measurements of people's pulse and blood pressure. They measured more than 10,000 orgasms in 700 individuals (18 to 89 years of age), during sex with partners or alone. Masters and Johnson's findings were initially published in two best-selling books: *Human Sexual Response*, 1966, and *Human Sexual Inadequacy*, 1970. Their initial experimental techniques and data form the bases of our contemporary understanding of sexual anatomy and physiology.

The Anatomy of Pleasure and Reproduction

Sexual anatomy is typically discussed only in terms of reproduction (see e.g., [King, 2015](#)). However, reproduction is only a (small) part of what drives us sexually ([Lucas & Fox, 2018](#)). Full discussions of sexual anatomy also include the concept of pleasure. Thus, we will explore the sexual anatomies of females (see Figures 1a and 1b) and males (see Figure 2) in terms of their capabilities for both reproduction and pleasure.

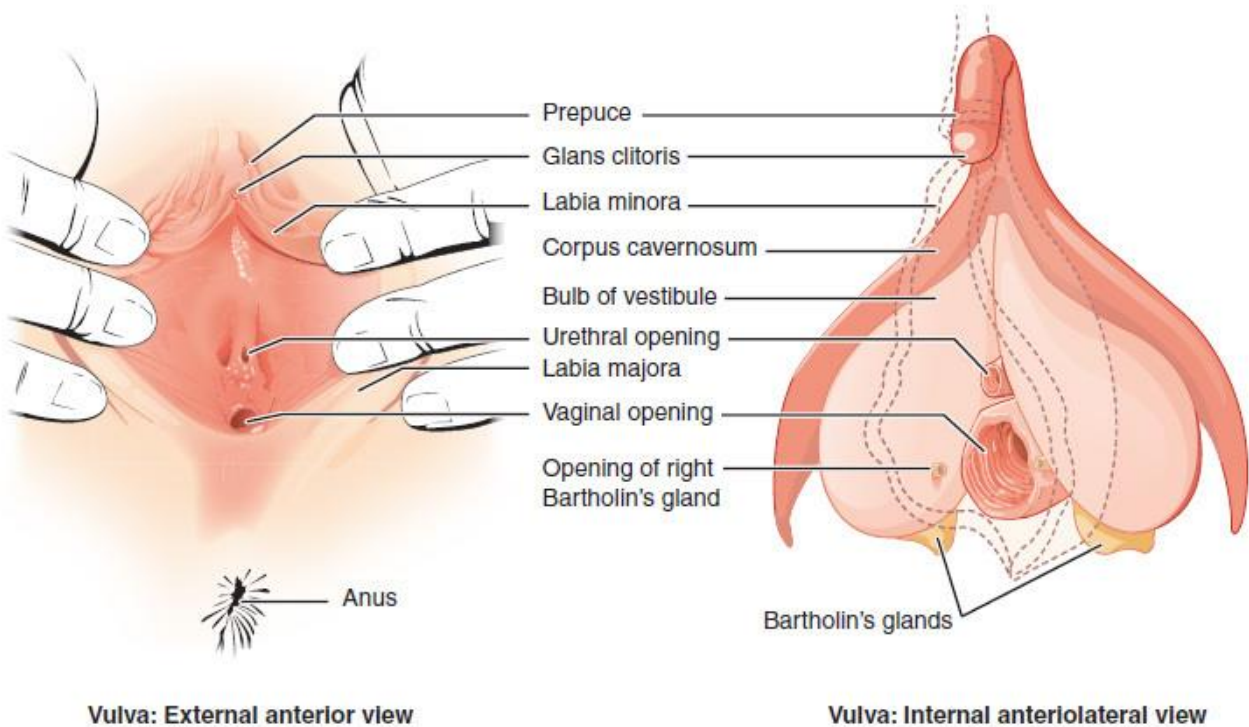


Figure 1a: The Female's External Sex Organs. [Image: Open Stax College, <https://goo.gl/Hj59kX>, CC BY 3.0, <https://goo.gl/Dmg4Uu>]

Female Anatomy

Many people find female sexual anatomy curious, confusing, and mysterious. This may be because so much of it is internal (inside the body), or because—historically—women have been expected to be modest and secretive regarding their bodies.

Perhaps the most visible structure of female sexual anatomy is the vulva. The primary functions of the vulva are pleasure and protection. The **vulva** is composed of the female's *external sex organs* (see Figure 1a). It includes many parts:

- (a) the **labia majora**—the “large lips” enclosing and protecting the female’s internal sex organs;
- (b) the **labia minora**—the “small lips” surrounding and defining the openings of the vagina and urethra;
- (c) the minor and major **vestibular glands (VGs)**.

The minor VGs—also called **Skene's glands** (not pictured), are on the wall of the vagina and are associated with female ejaculation, and mythologically associated with the G-Spot ([Kilchevsky et al., 2012](#); [Wickman, 2017](#)). The major VGs—also called Bartholin's glands—are located just

to the left and right of the vagina and produce lubrication to aid in sexual intercourse. Most females—especially postmenopausal females—at some time in their lives report inadequate lubrication, which, in turn, leads to discomfort or pain during sexual intercourse (Nappi & Lachowsky, 2009). Extending foreplay and using commercial water-, silicone-, or oil-based personal lubricants are simple solutions to this common problem.

The clitoris and vagina are considered parts of the vulva as well as internal sex organs (see Figure 1b). They are the most talked about organs in relation to their capacities for female pleasure (e.g., Jannini et al., 2012). Most of the **clitoris**, which is composed of 18 parts with an average overall excited length of about four inches, cannot be seen (Ginger & Yang, 2011; O'Connell et al., 2005). The visible parts—the glans and prepuce—are located above the urethra and join the labia minora at its pinnacle. The clitoris is highly sensitive, composed of more than 8,000 sensory-nerve endings, and is associated with initiating orgasms; 90% of females can orgasm by clitoral stimulation alone (O'Connell et al., 2005; Thompson, 2016).

The **vagina**, also called the “birth canal,” is a muscular canal that spans from the cervix to the introitus. It has an average overall excited length of about four and a half inches (Masters & Johnson, 1966) and has two parts: First, there is the inner two-thirds (posterior wall)—formed during the first trimester of pregnancy. Second, there is the outer one-third of the vagina (anterior wall). It is formed during the second trimester of pregnancy and is generally more sensitive than the inner portion, but dramatically less sensitive than the clitoris (Hines, 2001). Only between 10% and 30% of females achieve orgasms by vaginal stimulation alone (Thompson, 2016). At each end of the vagina are the **cervix** (the lower portion of the uterus) and the **introitus** (the vaginal opening to the outside of the body). The vagina acts as a transport mechanism for sperm cells coming in, and menstrual fluid and babies going out. A healthy vagina has a pH level of about four, which is acidic. When the pH level changes, often due to normal circumstances (e.g., menstruation, using tampons, sexual intercourse), it facilitates the reproduction of microorganisms that often cause vaginal odor and pain (Anderson, Klink & Cohrssen, 2004). This potential problem can be solved with over-the-counter vaginal gels or oral probiotics to maintain normal vaginal pH levels (Tachedjiana et al., in press).

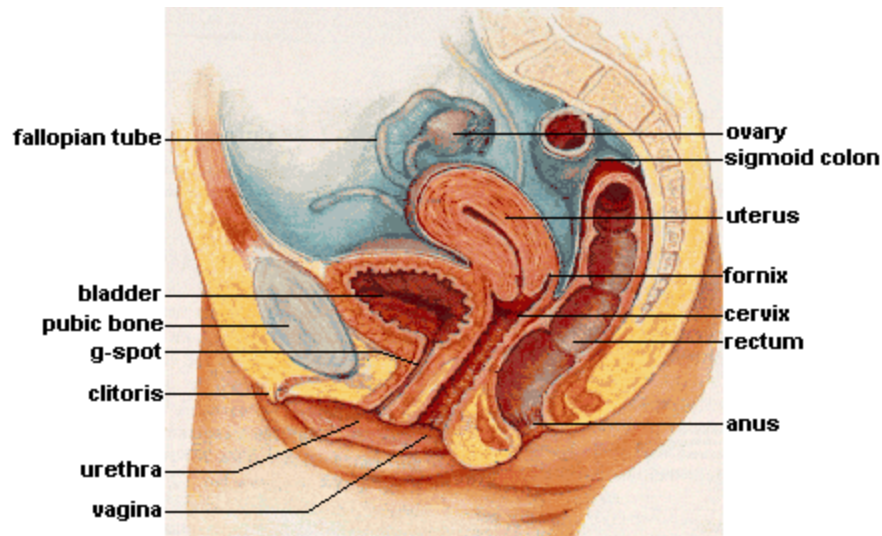


Figure 1b: The Female's

Internal Sex Organs. [Image: unknown, <https://goo.gl/5GMbCr>, CC BY-SA 3.0, <https://goo.gl/jidmcs>]

The primary functions of the *internal sex organs* of the female are to store, transport, and keep ovum cells (eggs) healthy; and produce hormones (see Figure 1b). These organs include:

- (a) the **uterus** (or womb)—where human development occurs until birth;
- (b) the **ovaries**—the glands that house the ova (eggs; about two million; [Faddy et al., 1992](#)) and produce progesterone, estrogen, and small amounts of testosterone;
- (c) the **fallopian tubes**—where fertilization is most likely to occur. These tubes allow for **ovulation** (about every 28 days), which is when ova travel from the ovaries to the uterus. If fertilization does not occur, **menstruation** begins. Menstruation, also known as a “period,” is the discharge of ova along with the lining of the uterus through the vagina, usually taking several days to complete.

Male Anatomy

The most prominent *external sex organ* for the male is the **penis**. The penis's main functions are initiating orgasm, and transporting semen and urine from the body. On average, a flaccid penis is about three and a half inches in length, whereas an erect penis is about five inches ([Veale et al., 2015](#); [Wessells, Lue & McAninch, 1996](#)). If you want to know the length of a particular male's erect penis, you'll have to actually see it—because there are *noreliable* correlations between the length of an erect penis and (a) the length of a flaccid penis, (b) the lengths of other body parts—including feet, hands, forearms, and overall height—or (c) race and ethnicity ([Shah & Christopher, 2002](#); [Siminoski & Bain, 1993](#); [Veale et al., 2015](#); [Wessells, Lue & McAninch,](#)

1996). The penis has three parts: the root, shaft, and glans. **Foreskin** covers the glans, or head of the penis, except in circumcised males. The **glans penis** is highly sensitive, composed of more than 4,000 sensory-nerve endings, and associated with initiating orgasms (Halata, 1997). Lastly, it has the urethral opening that allows semen and urine to exit the body.

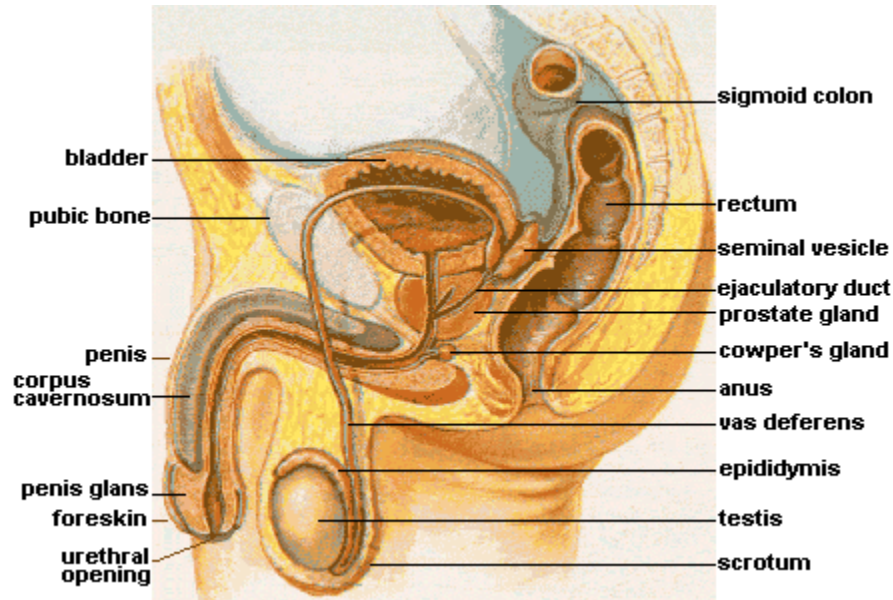


Figure 2: The Male's Internal and External Sex Organs. [Image: unknown, <https://goo.gl/9kUDCN>, CC BY-SA 3.0, <https://goo.gl/jidmcs>]

In addition to the penis, there are other male external sex organs that have two primary functions: producing hormones and sperm cells. The **scrotum** is the sac of skin behind and below the penis containing the testicles. The **testicles** (or testes) are the glands that produce testosterone, progesterone, small amounts of estrogen, and sperm cells.

Many people are surprised to learn that males also have *internal sex organs*. The primary functions of male internal sex organs are transporting sperm cells, keeping sperm cells healthy, and producing **semen**—the fluid in which sperm cells are transported. The male's internal sex organs include:

- (a) the **epididymis**, which is a twisted duct that matures, stores, and transports sperm cells into the vas deferens;
- (b) the **vas deferens**—a muscular tube that transports mature sperm to the urethra, except in males who have had a **vasectomy**;

(c) the **seminal vesicles**—glands that provide energy for sperm cells to move. This energy is in the form of sugar (fructose) and it composes about 75% of the semen. Sperm cells only compose about 1% of the semen (Owen & Katz, 2005);

(d) the **prostate gland**, which provides additional fluid to the semen that nourishes the sperm cells; and the **Cowper's glands**, which produce a fluid that lubricates the urethra and neutralizes any acidity due to urine;

(e) the **urethra**—the tube that carries urine and semen outside of the body.

Sex on the Brain

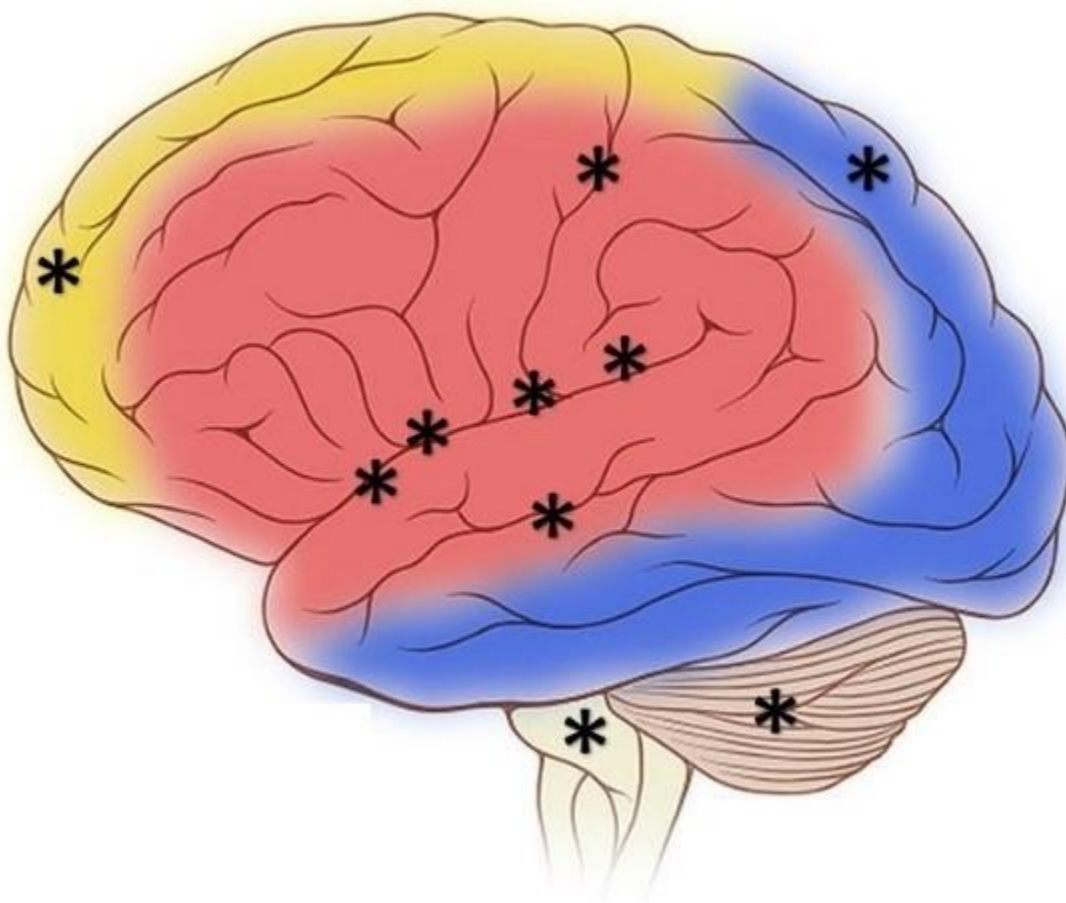


Figure 3: Some of the many regions of the brain and brainstem activated during pleasure experiences. [Image: Frank Gaillard, <https://goo.gl/yCKuQ2>, CC-BY-SA 3.0. Identifying marks added]

At first glance—or touch for that matter—the clitoris and penis are the parts of our anatomies that seem to bring the most pleasure. However, these two organs pale in comparison to our central nervous system’s capacity for pleasure. Extensive regions of the brain and brainstem are activated when a person experiences pleasure, including: the insula, temporal cortex, limbic system, nucleus accumbens, basal ganglia, superior parietal cortex, dorsolateral prefrontal cortex, and cerebellum (see Figure 3, [Ortigue et al., 2007](#)). **Neuroimaging techniques** show that these regions of the brain are active when patients have spontaneous orgasms involving no direct stimulation of the skin (e.g., [Fadul et al., 2005](#)) and when experimental participants self-stimulate erogenous zones (e.g., [Komisaruk et al., 2011](#)). **Erogenous zones** are sensitive areas of skin that are connected, via the nervous system, to the somatosensory cortex in the brain.

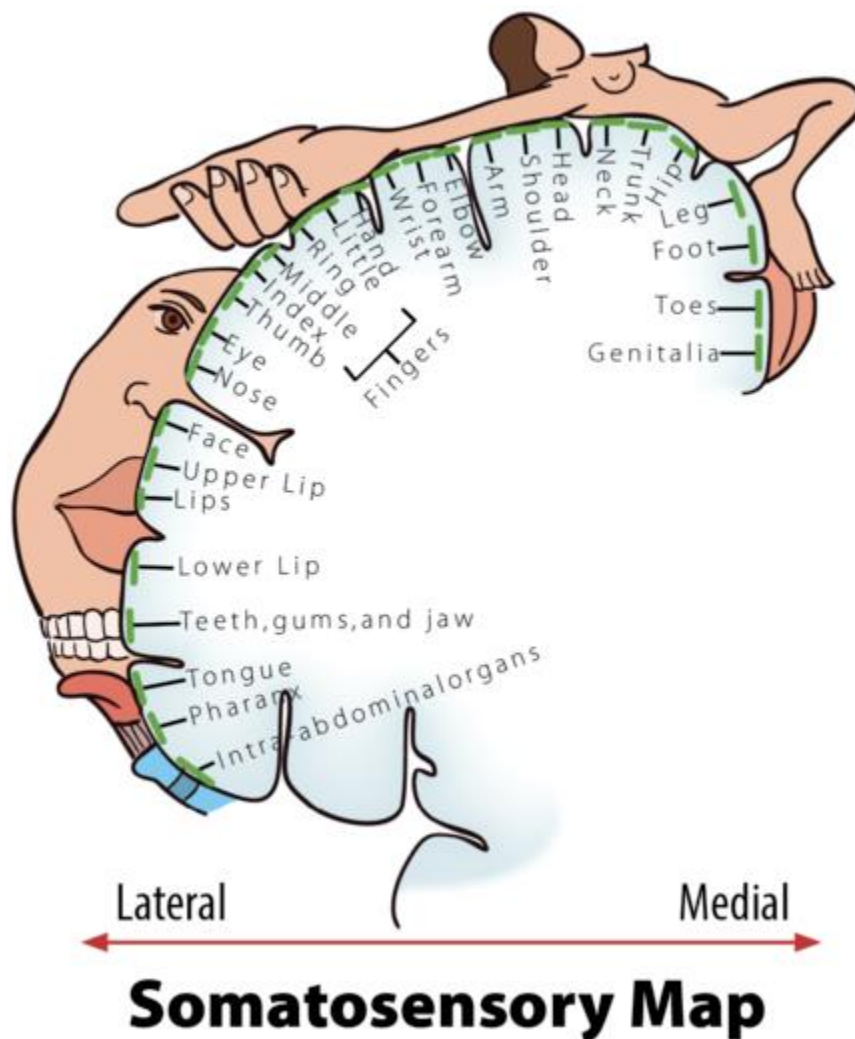


Figure 4: Erogenous Zones Mapped on the Somatosensory Cortex.

The **somatosensory cortex** (SC) is the part of the brain primarily responsible for processing sensory information from the skin. The more sensitive an area of your skin is (e.g., your lips), the larger the corresponding area of the SC will be; the less sensitive an area of your skin is (e.g.,

your trunk), the smaller the corresponding area of the SC will be (see Figure 4, [Penfield & Boldrey, 1937](#)). When a sensitive area of a person's body is touched, it is typically interpreted by the brain in one of three ways: “*That tickles!*” “*That hurts!*” or, “*That...you need to do again!*” Thus, the more sensitive areas of our bodies have greater potential to evoke pleasure. A study by Nummenmaa and his colleagues ([2016](#)) used a unique method to test this hypothesis. The Nummenmaa research team showed experimental participants images of same- and opposite-sex bodies. They then asked the participants to color the regions of the body that, when touched, they or members of the opposite sex would experience as sexually arousing while masturbating or having sex with a partner. Nummenmaa found the expected “hotspot” erogenous zones around the external sex organs, breasts, and anus, but also reported areas of the skin beyond these hotspots: “[T]actile stimulation of practically all bodily regions trigger sexual arousal...” Moreover, he concluded, “[H]aving sex with a partner...”—beyond the hotspots—“...reflects the role of touching in the maintenance of...pair bonds.”

Physiology and the Sexual Response Cycle

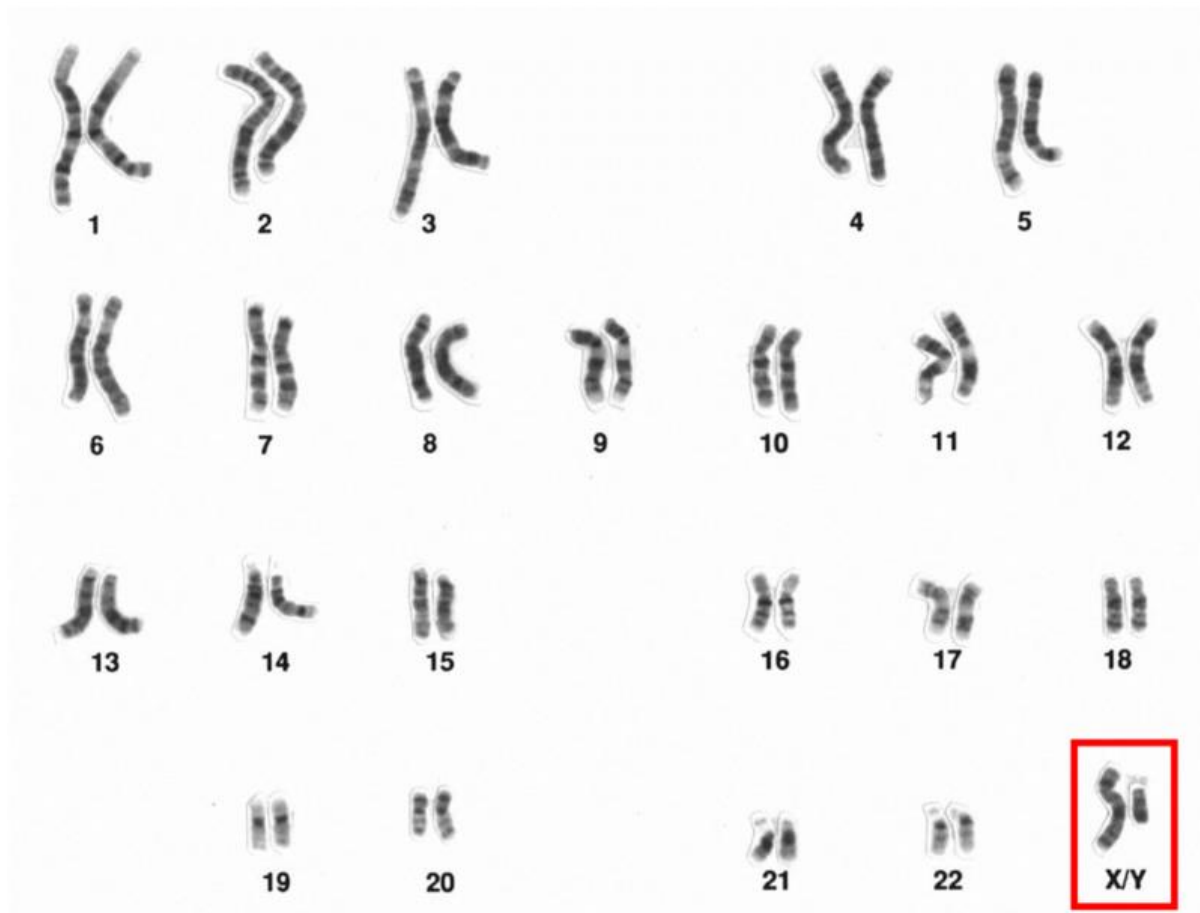
The brain and other sex organs respond to sexual stimuli in a universal fashion known as the **sexual response cycle** (SRC; [Masters & Johnson, 1966](#)). The SRC is composed of four phases:

1. **Excitement**: Activation of the sympathetic branch of the autonomic nervous system defines the *excitement phase*; heart rate and breathing accelerates, along with increased blood flow to the penis, vaginal walls, clitoris, and nipples. Involuntary muscular movements (**myotonia**), such as facial grimaces, also occur during this phase.
2. **Plateau**: Blood flow, heart rate, and breathing intensify during the *plateau phase*. During this phase, often referred to as “foreplay,” females experience an **orgasmic platform**—the outer third of the vaginal walls tightening—and males experience a release of pre-seminal fluid containing healthy sperm cells ([Killick et al., 2011](#)). This early release of fluid makes penile withdrawal a relatively ineffective form of birth control ([Aisch & Marsh, 2014](#)). (*Question: What do you call a couple who use the withdrawal method of birth control? Answer: Parents.*)
3. **Orgasm**: The shortest but most pleasurable phase is the *orgasm phase*. After reaching its climax, neuromuscular tension is released and the hormone **oxytocin** floods the bloodstream—facilitating emotional bonding. Although the rhythmic muscular contractions of an orgasm are temporally associated with ejaculation, this association is not necessary because orgasm and ejaculation are two separate physiological processes.
4. **Resolution**: The body returns to a pre-aroused state in the *resolution phase*. Males enter a **refractory period** of being unresponsive to sexual stimuli. The length of this period depends on age, frequency of recent sexual relations, level of intimacy with a partner, and novelty. Because females do not have a refractory period, they have a greater potential—physiologically—of having multiple orgasms. Ironically, females are also more likely to “fake” having orgasms ([Opperman et al., 2014](#)).

Of interest to note, the SRC occurs regardless of the type of sexual behavior—whether the behavior is masturbation; romantic kissing; or oral, vaginal, or anal sex (Masters & Johnson, 1966). Further, a partner or environmental object is sufficient, but not necessary, for the SRC to occur.

Pregnancy

One of the potential outcomes of the SRC is **pregnancy**—the time a female carries a developing human within her uterus. How does this happen?



Human male, sex chromosomes highlighted [Image: National Human Genome Research Institute, <https://goo.gl/8UWQwa>, Public Domain]

The process begins during vaginal intercourse when the male ejaculates, or releases semen. Each ejaculate contains about 300 million sperm cells. These sperm compete to make their way through the cervix and into the uterus. **Conception** typically occurs within a fallopian tube when a single sperm cell comes into contact with an ovum (egg). The sperm carries either an X- or Y-

chromosome to fertilize the ovum—which, itself, usually carries an X-chromosome. These chromosomes, in combination with one another, are what determine a person’s sex. The combination of two X chromosomes produces a female **zygote** (fertilized ovum). The combination of an X and Y chromosome produces a male zygote. XX- or XY-chromosomes form your 23rd set of chromosomes (most humans have a total of 46 chromosomes) commonly referred to as your **chromosomal sex** or genetic sex.

Interestingly, at least 1 in every 1,000 conceptions results in a variation of chromosomal sex beyond the typical XX or XY sets. Some of these variations include, XXX, XXY, XYY, or even a single X (Dreger, 1998). In some cases, people may have unusual physical characteristics, such as being taller than average, having a thick neck, or being sterile (unable to reproduce); but in many cases, these individuals have no cognitive, physical, or sexual issues (Wisniewski et al., 2000). Almost 15 out of every 1,000 births are multiple births (twins, triplets, quadruplets, etc.). These can occur in a couple of ways. Dizygotic (fraternal) births are the result of a female releasing multiple ova of which more than one is fertilized by sperm. Because sperm carry either X or Y chromosomes, fraternal births can be any combination of sexes (e.g., two girls or a boy and a girl). They develop together in the uterus and are usually born within minutes of one another. Monozygotic (identical) births result from a special circumstance in which a fertilized ovum splits into multiple identical embryos and they develop simultaneously. Identical twins are, therefore, the same sex.

Hours after conception, the zygote begins dividing into additional cells. It then starts traveling down the fallopian tube until it enters the uterus as a *blastocyst*. The blastocyst implants itself within the wall of the uterus to become an *embryo* (Moore, Persaud & Torchia, 2016). However, the percentage of successful implantations remains a mystery. Researchers believe the failure rate to be as high as 60% (Diedrich et al., 2007). Failed blastocysts are eliminated during menstruation, often without the female ever knowing conception occurred.

Mothers are pregnant for three **trimesters**, a term that begins with their last menstrual period and ends about 40 weeks later; each trimester is 13 weeks. During the first trimester, most of the body parts of the embryo are formed, although at this stage they are not in the same proportions as they will be at birth. The brain and head, for example, account for about half of the body at this point. During the fifth and sixth weeks of gestation, the **primitive gonads** are formed. They eventually develop into ovaries or testes. Until the seventh week, the developing embryo has the potential of having either male (**Wolffian ducts**) or female (**Mullerian ducts**) internal sex organs, regardless of chromosomal sex. In fact, there is an innate tendency for all embryos to have female internal sex organs, unless there is the presence of the SRY gene, located on the Y-chromosome (Grumbach & Conte, 1998; Wizemann & Pardue, 2001). The SRY gene causes XY-embryos to develop testes (dividing cells from the medulla). The testes emit testosterone which stimulates the development of male internal sex organs—the Wolffian ducts transforming into the epididymis, seminal vesicles, and vas deferens. The testes also emit a Mullerian inhibiting substance, a hormone that causes the Mullerian ducts to atrophy. If the SRY gene is not present or active—typical for chromosomal females (XX)—then XX-embryos develop ovaries (dividing cells from the cortex) and the Mullerian ducts transform into female internal sex organs, including the fallopian tubes, uterus, cervix, and inner two-thirds of the vagina

(Carlson, 1986). Without a burst of testosterone from the testes, the Wolffian ducts naturally deteriorate (Grumbach & Conte, 1998; Wizemann & Pardue, 2001).

During the second trimester, expectant mothers can feel movement in their wombs. This is known as **quickenning**. Inside the uterus, the embryo develops fine hair all over its body (called *lanugo*) as well as eyelashes and eyebrows. Major organs, such as the pancreas and liver, begin fully functioning. By the 20th week of gestation, the external sex organs are fully formed, which is why “sex determination” using ultrasound during this time is more accurate than in the first trimester (Igbinedion & Akhigbe, 2012; Odeh, Ophir & Bornstein, 2008). Formation of male external sex organs (e.g., the penis and scrotum) is dependent upon high levels of testosterone, whereas female external sex organs (e.g., the outer third of the vagina and the clitoris) form without hormonal influences (Carlson, 1986). Levels of sex hormones, such as estrogen, testosterone, and progesterone, begin affecting the brain during this trimester, impacting future emotions, behaviors, and thoughts related to gender identity and sexual orientation (Swaab, 2004). It’s important to understand that the interactions of chromosomal sex, gonadal sex, sex hormones, internal sex organs, external sex organs, and brain differentiations during this developmental stage are too complex to readily conform to the familiar categories of sex, gender, and sexual orientation historically used to describe people (Herdt, 1996). Toward the end of the second trimester—at about the 26th week—is the **age of viability**, when survival outside of the uterus has a probability of more than 90% (Rysavy et al., 2015). Interestingly, technological advances and changes in hospital care have affected the age of viability such that viability is possible earlier in pregnancy (Rysavy et al., 2015).



Potential outcomes of the Sexual Response Cycle are pregnancy and childbirth. [Image: Ernest F, <https://goo.gl/TPu7g8>, CC BY-SA 3.0, <https://goo.gl/jidmcs>]

During the third trimester, there is rapid development in the brain and rapid weight gain. Typically, by the 36th week, the fetus begins descending head-first into the uterine cavity. Getting ready for birth is not the only behavior exhibited during this last trimester. Erectile responses in male fetuses occur during this time (Haffner, 1999; Martinson, 1994; Parrot, 1994); and Giorgi and Siccardi (1996) reported ultrasonographic observations of a fetus performing self-exploration of her external sex organs. Most babies are born vaginally (through the vagina), though in the United States one-third are by Cesarean section (through the abdomen; Molina et al., 2015). A newborn's health is initially determined by his/her weight (normally ranging between 2,500 and 4,000 grams)—though birth weight significantly differs between ethnicities (Janssen et al., 2007).

Birth Control

Contraception, or birth control, reduces the probability of pregnancy resulting from sexual intercourse. There are various forms of birth control, including: hormonal, barrier, or natural. As shown in Table 1, the effectiveness of the different forms of birth control ranges widely, from 68% to 99.9% (optionsforsexualhealth.org).

| Method | Effectiveness (Actual Use) | Effectiveness (Perfect Use) |
|---|---------------------------------------|--|
| Evra Patch | 92% | 99.7% |
| PILL - Combined | 92% | 99.7% |
| - Progestin | 92% | 99.7% |
| Nuvaring | 92% | 99.7% |
| <u>IUD</u> | | |
| Copper T | 99.2% | 99.4% |
| Levonorgestrel (Mirena) | 99.9% | 99.9% |
| Diaphragm & Spermicide | 84% | 94% |
| Spermicide & Male Condoms (1) | no confirmed data | 99% |
| Female condom alone | 79% | 95% |
| Male condom alone | 85% | 98% |
| Spermicides (2) | 71% | 82% |
| Tubal ligation | 99.5% | 99.5% |
| Vasectomy | 99.85% | 99.9% |
| <u>Cervical cap</u> | | |
| Woman has had children | 68% | 74% |
| Woman has not had children | 84% | 91% |
| Depo-Provera | 97% | 99.95% |
| <u>Sponge</u> | | |
| Woman has had children | 68% | 80% |
| Woman has not had children | 84% | 91% |
| Fertility awareness method | 75% | 95-97% |
| Withdrawal | 73% | 96% |
| No method (Chance) | 15% | 15% |
| (1) separate spermicide in addition to condoms (2) foams, creams, gels, vaginal suppositories, and vaginal film | | |

Table 1. Forms of Birth Control and their Effectiveness -
from <https://www.optionsforsexualhealth.org/>

Hormonal forms of birth control release synthetic estrogen or progestin, which prevents ovulation and thickens cervical mucus, making it difficult for sperm to reach ova (sexandu.ca/contraception). There are a variety of ways to introduce these hormones into the body, including: implantable rods, birth control pills, injections, transdermal patches, IUDs, and vaginal rings. For example, the vaginal ring is 92% effective, easily inserted into and taken out of the vagina by the user, and comprised of thin plastic containing a combination of hormones that are released during the time it is in the vagina—usually about three weeks.

Barrier forms of birth control prevent sperm from entering the uterus by creating a physical barrier or chemical barrier toxic to sperm. There are a variety of barrier methods, including: vasectomies, tubal ligations, male and female condoms, spermicides, diaphragms, and cervical caps. The most popular barrier method is the condom, which is 79-85% effective. The male condom is placed over the penis, whereas the female condom is worn inside the vagina and fits around the cervix. Condoms prevent bodily fluids from being exchanged and reduce skin-to-skin contact. For this reason, condoms are also used to reduce the risk of some sexually transmitted infections (STIs). However, it is important to note that male and female condoms, or two male condoms, should not be worn simultaneously during penetration; the friction between multiple condoms creates microscopic tears, rendering them ineffective ([Munoz, Davtyan & Brown, 2014](#)).

Natural forms of birth control rely on knowledge of the menstrual cycle and awareness of the body. They include the Fertility Awareness Method (FAM), lactational amenorrhea method, and withdrawal. For example, the FAM is about 75% effective, and requires tracking the menstrual cycle, and avoiding sexual intercourse or using other forms of birth control during the female's fertile window. About 30% of females' fertile windows—the period when a female is most likely to conceive—are between days ten and seventeen of their menstrual cycle ([Wilcox, Dunson & Baird, 2000](#)). The remaining 70% of females experience irregular and less predictable fertile windows, reducing the efficacy of the FAM.

Other forms of birth control that do not fit into the above categories include: emergency contraceptive pills, the copper IUD, and abstinence. Emergency contraceptive pills (e.g., Plan B) delay the release of an ovum if taken prior to ovulation. **Emergency contraception** is a form of birth control typically used after unprotected sex, condom mishaps, or sexual assault. The most effective form of emergency contraception is the copper IUD. A medical professional inserts the IUD through the opening of the cervix and into the uterus. It is more than 99% effective and may be left within the uterus for over 10 years. It differs from typical IUDs because it is hormone-free and uses copper ions to create an inhospitable environment for sperm, thus significantly reducing the chances of fertilization. Additionally, the copper ions alter the lining of the uterus, which significantly reduces the probability of implantation. Lastly, **abstinence**—avoiding any sexual behaviors that may lead to conception—is the only form of birth control with a 100% effective rate.

There are many factors that determine the best birth control options for any particular person. Some factors are related to personality and habits. For example, if a woman is a forgetful person, “the pill” may not be her best option, since it requires being taken daily. Other factors that

influence birth control choices include cost, age, education, religious beliefs, lifestyle, and sexual health.

Sexually Transmitted Infections

Unfortunately, a potential outcome of sexual activity is infection. **Sexually transmitted infections (STIs)** are like other transmittable infections, except STIs are primarily transmitted through social sexual behaviors. Social sexual behaviors include romantic kissing and oral, vaginal, and anal sex. Additionally, STIs can be transmitted through blood, and from mother to child during pregnancy and childbirth. STIs may lead to sexually transmitted diseases (STDs). Often, infections have no symptoms and do not lead to diseases. For example, the most common STI for men and women in the US is Human Papillomavirus (HPV). In most cases, HPV goes away on its own and has no symptoms. Only a fraction of HPV STIs develop into cervical, penile, mouth, or throat cancer (Centers for Disease Control and Prevention, CDCP, December 2016).

There are more than 30 different STIs. STIs differ in their primary methods of transmission, symptoms, treatments, and whether they are caused by viruses or bacteria. Worldwide, some of the most common STIs are: genital herpes (500 million), HPV (290 million), trichomoniasis (143 million), chlamydia (131 million), gonorrhoea (78 million), human immunodeficiency virus (HIV, 36 million), and syphilis (6 million; World Health Organization, 2016).

Medical testing to determine whether someone has an STI is relatively simple and often free (gettested.cdc.gov). Further, there are vaccines or treatments for all STIs, and many STIs are curable (e.g., chlamydia, gonorrhea, and trichomoniasis). However, without seeking treatment, all STIs have potential negative health effects, including death from some. For example, if untreated, HIV often leads to the STD acquired immune deficiency syndrome (AIDS)—over one million people die every year from AIDS (aids.gov). Unfortunately, many, if not most, people with STIs never get tested or treated. For example, as many as 30% of those with HIV and 90% of those with genital herpes are unaware of having an STI (Fleming et al., 1997; Nguyen & Holodniy, 2008).



Sex education is a critical tool in the fight against sexually transmitted infections. [Image: turibamwe, <https://goo.gl/iviJ3U>, Public Domain]

It is impossible to contract an STI from a person who does not have an STI. This may seem like an obvious statement, but a recent study asked 596 freshmen- and sophomore-level college students the following True/False question, “A person can get AIDS by having anal (rectal) intercourse even if neither partner is infected with the AIDS virus,” and found that 33% of them answered “true” (Lucas et al., 2016). What isobvious, is that false stereotypes about anal sex causing AIDS continue to misinform our collective sexual knowledge. Only open, honest, and comprehensive education about human sexuality can fight these STI stereotypes. To be clear, anal sex is *associated* with STIs, but it cannot cause an STI. Specifically, anal sex, when compared to vaginal sex (the second most likely method of transmission), oral sex (third most likely), and romantic kissing (fourth most likely), is associated with the greatest risk of transmitting and contracting STIs, because the tissue lining of the rectum is relatively thin and apt to tear and bleed, thereby passing on the infection (CDCP, 2016).

A sexually active person’s chance of getting an STI depends on a variety of factors. Two of these are age and access to sex education. Young people between the ages of 15 and 24 account for more than 50% of all new STIs, even though they account for only about 25% of the sexually active population (Satterwhite et al., 2013). Generally, young males and females are equally susceptible to getting an STI; however, females are much more likely to suffer long-term health

consequences of an STI. For example, each year in the US, undiagnosed STDs cause about 24,000 females to become infertile (CDCP, October 2016; DiClemente, Salazar & Crosby, 2007).

Limited access to comprehensive sex education is also a major contributing factor toward the risk of contracting an STI. Unfortunately, some sex education is limited to the promotion of abstinence, and relies heavily on “virginity pledges.” A virginity pledge is a commitment to refrain from sexual intercourse until heterosexual marriage. Although virginity pledges fit well with some cultural and religious worldviews, they are only effective if people, in fact, remain abstinent. Unfortunately, this is not always the case; research reveals many ways these types of strategies can backfire. Adolescents who take virginity pledges are significantly less likely than other adolescents to use contraception when they do become sexually active (Bearman & Brückner, 2001). Further, virginity pledgers are four to six times more likely than non-pledgers to engage in both oral and anal intercourse (Paik, Sanchagrin & Heimer, 2016), often assuming they’re preserving their virgin status by simply avoiding vaginal sex. In fact, schools with students taking virginity pledges have significantly higher rates of STIs than other schools (Bearman & Brückner, 2001).

Interestingly, senior citizens are one of the fastest growing segments of the European and US populations being diagnosed with STIs. The Centers for Disease Control and Prevention report a steady increase in people over 65 being diagnosed with HIV; since 2007, incidence of syphilis among seniors is up by 52% and chlamydia is up by 32%; and from 2010 to 2014, there was a 38% increase in STI diagnoses in people between the ages of 50 and 70 (Forster, 2016; Weiss, 2014). Why is this happening? Bear in mind, seniors are not necessarily more sexually knowledgeable than adolescents; they may have no greater access to comprehensive sex education than younger people (Adams, Oye & Parker, 2003). Even so, medical advances allow seniors to continue to be sexually active at later points in their lifespan—and to make the same mistakes adolescents make about safer sex.

Safer Sex

STIs are 100% preventable: Simply don’t engage in social sexual behaviors. But in the grand scheme of things, you may be surprised to hear, avoiding sex is detrimental to your physical and mental well-being—whereas, having sex can be widely beneficial (Charnetski & Brennan, 2004; Ditzen, Hoppmann & Klumb, 2008; Hall et al., 2010). Thus, we recommend **safer-sex practices**, such as communication, honesty, and barrier methods. Safer-sex practices always begin with communication. Before engaging in sexual behaviors with a partner, a clear, honest, and explicit understanding of your boundaries, as well as your partner’s, should be established. Safer sex involves discussing and using barriers—male condoms, female condoms, or dental dams—relative to your specific sexual behaviors. Also, keep in mind: Although safer sex may use some of the same tools as birth control, safer sex is *not* birth control. Birth control focuses on reproduction; safer sex focuses on well-being. A proactive approach to behaving sexually may at first seem burdensome, but it can be easily reimagined as “foreplay,” is associated with greater

sexual satisfaction, increases the probability of orgasm, and addresses fears people have during sex (see Table 2; Jalili, 2016; Nuno, 2017).

| Sex Fears with highest average rating by gender | |
|--|---|
| Men | Women |
| (1) Your partner has an STI | (1) Your partner won't want to wear a condom |
| (2) Your partner won't have an orgasm or be satisfied | (2) Your partner has an STI |
| (3) The condom will break/sex will result in unintended pregnancy | (3) The condom will break/sex will result in unintended pregnancy |
| (4) You'll ejaculate prematurely | (4) Your partner will find your naked body unattractive |
| (5) Your partner will find your naked body unattractive | (5) Your partner will not take " no " for an answer |
| (6) You won't be able to perform | (6) Your partner will want to do something you're not comfortable with |
| (7) You are bad at sex | (7) An embarrassing bodily function will occur during sex |
| (8) Your penis is too small | (8) Your partner won't have an orgasm or be satisfied |
| (9) Your partner will think you are inexperienced | (9) You won't have an orgasm or be satisfied |
| (10) It will be awkward after sex | (10) You are bad at sex |

Table 2: Top 10 Fears Men and Women Have During Sex

Sexual Dysfunctions

Roughly 43% of women and 31% of men suffer from a clinically significant impairment to their ability to experience sexual pleasure or responsiveness as outlined by the SRC (Rosen, 2000). The *Diagnostic and Statistical Manual of Mental Disorders, 5th edition* (DSM) refers to these difficulties as **sexual dysfunctions**.

According to the DSM, there are four male-specific dysfunctions:

- delayed ejaculation
- erectile disorder (ED)
- male hypoactive sexual desire disorder

- premature ejaculation (PE)

There are three female-specific dysfunctions:

- female orgasmic disorder
- female sexual interest/arousal disorder
- genito-pelvic pain/penetration disorder

There is also one non-gender-specific sexual dysfunction: substance-/medication-induced sexual dysfunction (American Psychiatric Association, 2013). The most commonly reported male sexual dysfunctions are premature ejaculation (PE) and erectile dysfunction (ED), whereas females most frequently report dysfunctions involving desire and arousal. Females are also more likely to experience multiple sexual dysfunctions (McCabe et al., 2016).

PE is a pattern of early ejaculation that impairs sexual performance and causes personal distress. In severe cases, ejaculation may occur prior to the start of sexual activity or within 15 seconds of penetration (American Psychiatric Association, 2013). PE is a fairly common sexual dysfunction, with prevalence rates ranging from 20-30%. Relationship and intimacy difficulties, as well as anxiety, low self-confidence, and depression, are often associated with PE. Most males with PE do not seek treatment (Porst et al., 2007).

ED is the frequent difficulty to either obtain or maintain an erection, or a significant decrease in erectile firmness. Normal aging increases the prevalence and incidence rates of erectile difficulties, especially after the age of 50 (American Psychiatric Association, 2013). However, recent studies have found significant increases in the prevalence of ED in young men, less than 30 years of age (e.g., Capogrosso et al., 2013).

Female sexual interest/arousal disorder (FSIAD) is characterized by reduced or absent sexual interest or arousal. A person diagnosed with FSIAD has had an absence of at least three of the following emotions, behaviors, and thoughts for more than six months:

- interest in sexual activity
- sexual or erotic thoughts and fantasies
- initiation of sexual activity
- sexual excitement or pleasure during sexual activity
- sexual interest/arousal in response to sexual or erotic cues
- genital or non-genital sensations during sexual activity

FSIAD is not diagnosed if the presenting symptoms are a result of insufficient stimulation or lack of sexual knowledge—such as the erroneous expectation that penile-vaginal intercourse always results in orgasm (American Psychiatric Association, 2013).

Treatments

When it comes to treating sexual dysfunctions, there's some good news and there's some bad news. The good news is that most sexual dysfunctions have treatments—however, most people don't seek them out (Gott & Hinchliff, 2003). So, the further good news is that—once you have the knowledge (say, from this module)—if you experience such difficulties, getting treatment is just a matter of making the choice to seek it out. Unfortunately, the bad news is that most treatments for sexual dysfunctions don't address the psychological and sociocultural underpinnings of the problems, but instead focus *exclusively* on the physiological roots. For example, Montague et al. (2007, pg. 1-7) make this point perfectly clear in *The American Urological Association's* treatment options for ED: “The currently available therapies...for the treatment of erectile dysfunction include the following: oral phosphodiesterase type 5 inhibitors, intra-urethral alprostadil, intracavernous vasoactive drug injection, vacuum constriction devices, and penile prosthesis implantation.”



Relationship issues like frequent disagreement and conflict can lead to sexual dysfunction.

[Image: Ed Yourdon, <https://goo.gl/9e8YU5>, CC BY-NC-SA 2.0, <https://goo.gl/3QMoxH>]

Treatments that focus solely on managing symptoms with biological fixes neglect the fundamental issue of sexual dysfunctions being grounded in psychological, relational, and social contexts. For example, a female seeking treatment for inadequate lubrication during intercourse is most likely to be prescribed a supplemental lubricant to alleviate her symptoms. The next time she is sexually intimate, the lubricant may solve her vaginal dryness, but her lack of natural arousal and lubrication due to partner abuse, is completely overlooked ([Kleinplatz, 2012](#)).

There are numerous factors associated with sexual dysfunctions, including: relationship issues; adverse sexual attitudes and beliefs; medical issues; sexually-oppressive cultural attitudes, codes, or laws; and a general lack of knowledge. Thus, treatments for sexual dysfunctions should address the physiological, psychological, and sociocultural roots of the problem.

Conclusion

We hope the information in this module has a positive impact on your physical, psychological, and relational health. As we initially promised, your clandestine Google searches should decrease now that you've acquired a scientifically-based foundation in sexual anatomy and physiology. What we neglected to mention earlier is that this foundation may dramatically increase your *overt* Google searches about sexuality! Exploring human sexuality is a limitless enterprise. And, by embracing your innate curiosity and sexual knowledge, we predict your sexual-literacy journeys are just beginning.

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Outside Resources

Journal: The Journal of Sex Research

http://www.sexscience.org/journal_of_sex_research/

Journal: The Journal of Sexual Medicine

<http://www.jsm.jsexmed.org/>

Organization: Advocates for Youth partners with youth leaders, adult allies, and youth-serving organizations to advocate for policies and champion programs that recognize young people's rights to honest sexual health information; accessible, confidential, and affordable sexual health services; and the resources and opportunities necessary to create sexual health equity for all youth.

<http://www.advocatesforyouth.org/>

Organization: SIECUS - the Sexuality Information and Education Council of the United States - was founded in 1964 to provide education and information about sexuality and sexual and reproductive health.

<http://www.siecus.org/>

Organization: The Guttmacher Institute is a leading research and policy organization committed to advancing sexual and reproductive health and rights in the United States and globally.

<https://www.guttmacher.org/>

Video: 5MIweekly—YouTube channel with weekly videos that playfully and scientifically examine human sexuality.

<https://www.youtube.com/channel/UCQFQ0vPPNPS-LYhIbKOzpFw>

Video: Sexplanations—YouTube channel with shame-free educational videos on everything sex.

<https://www.youtube.com/user/sexplanations>

Video: YouTube - AsapSCIENCE

<https://www.youtube.com/user/AsapSCIENCE>

Web: Kinsey Confidential—Podcast with empirically-based answers about sexual questions.

<http://kinseyconfidential.org/>

Web: Sex & Psychology Web: Sex & Psychology—Blog about the science of sex, love, and relationships.

<http://www.lehmiller.com/>

Discussion Questions

1. Consider your own source(s) of sexual anatomy and physiology information previous to this module. Discuss at least three of your own prior sexual beliefs challenged by the content of this module.
2. Pretend you are tasked with teaching a group of adolescents about sexual anatomy, but with a twist: You must teach through the lens of pleasure instead of reproduction. What would your talking points be? Be sure to incorporate the role of the brain in evoking sexual pleasure.
3. Given how universal and similar the sexual response cycle is for both males and females, why do you think males enter a refractory period during the resolution phase and females do not? Consider potential evolutionary reasons for why this occurs.
4. Imagine yourself as a developing human being from conception to birth. Using a first-person point of view, create a commentary that addresses the significant milestones achieved in each trimester.
5. Pretend your hypothetical adolescent daughter has expressed interest in birth control. During her appointment with a health care provider, what are some factors that should be considered prior to selecting the best birth control method for her?
6. Describe at least three ways you can reduce your chances of contracting a sexually transmitted infection.
7. How can practicing safer sex enhance your well-being?
8. As discussed within the module, numerous influences contribute to the development and maintenance of a sexual dysfunction, such as, adverse sexual attitudes and beliefs. Which influences, if any, can you relate to? How do you plan on addressing those influences to achieve optimal sexual health?

Vocabulary

Abstinence

Avoiding any sexual behaviors that may lead to conception.

Age of viability

The age at which a fetus can survive outside of the uterus.

Barrier forms of birth control

Methods in which sperm is prevented from entering the uterus, either through physical or chemical barriers.

Cervix

The lower portion of the uterus that connects to the vagina.

Chromosomal sex

Also known as genetic sex; defined by the 23rd set of chromosomes.

Clitoris

A sensitive and erectile part of the vulva; its main function is to initiate orgasms.

Conception

Occurs typically within the fallopian tube, when a single sperm fertilizes an ovum cell.

Cowper's glands

Glands that produce a fluid that lubricates the urethra and neutralizes any acidity due to urine.

Emergency contraception

A form of birth control used in a variety of circumstances, such as after unprotected sex, condom mishaps, or sexual assault.

Epididymis

A twisted duct that matures, stores, and transports sperm cells into the vas deferens.

Erogenous zones

Highly sensitive areas of the body.

Excitement phase

The activation of the sympathetic branch of the autonomic nervous system defines this phase of the sexual response cycle; heart rate and breathing accelerate, along with increased blood flow to the penis, vaginal walls, clitoris, and nipples.

Fallopian tubes

The female's internal sex organ where fertilization is most likely to occur.

Foreskin

The skin covering the glans or head of the penis.

Glans penis

The highly sensitive head of the penis, associated with initiating orgasms.

Hormonal forms of birth control

Methods by which synthetic estrogen or progesterone are released to prevent ovulation and thicken cervical mucus.

Introitus

The vaginal opening to the outside of the body.

Labia majora

The "large lips" enclosing and protecting the female internal sex organs.

Labia minora

The "small lips" surrounding and defining the openings of the vagina and urethra.

Menstruation

The process by which ova as well as the lining of the uterus are discharged from the vagina after fertilization does not occur.

Mullerian ducts

Primitive female internal sex organs.

Myotonia

Involuntary muscular movements, such as facial grimaces, that occur during the excitement phase of the sexual response cycle.

Natural forms of birth control

Methods that rely on knowledge of the menstrual cycle and awareness of the body.

Neuroimaging techniques

Seeing and measuring live and active brains by such techniques as electroencephalography (EEG), computerized axial tomography (CAT), and functional magnetic resonance imaging (fMRI).

Orgasm phase

The shortest, but most pleasurable, phase of the sexual response cycle.

Orgasmic platform

The tightening of the outer third of the vaginal walls during the plateau phase of the sexual response cycle.

Ovaries

The glands housing the ova and producing progesterone, estrogen, and small amounts of testosterone.

Ovulation

When ova travel from the ovaries to the uterus.

Oxytocin

A neurotransmitter that regulates bonding and sexual reproduction.

Penis

The most prominent external sex organ in males; it has three main functions: initiating orgasm, and transporting semen and urine outside of the body.

Plateau phase

The phase of the sexual response cycle in which blood flow, heart rate, and breathing intensify.

Plethysmography

The measuring of changes in blood - or airflow - to organs.

Pregnancy

The time in which a female carries a developing human within her uterus.

Primitive gonads

Reproductive structures in embryos that will eventually develop into ovaries or testes.

Prostate gland

A male gland that releases prostatic fluid to nourish sperm cells.

Quickening

The feeling of fetal movement.

Refractory period

Time following male ejaculation in which he is unresponsive to sexual stimuli.

Resolution phase

The phase of the sexual response cycle in which the body returns to a pre-aroused state.

Safer-sex practices

Doing anything that may decrease the probability of sexual assault, sexually transmitted infections, or unwanted pregnancy; these may include using condoms, honesty, and communication.

Scrotum

The sac of skin behind and below the penis, containing the testicles.

Semen

The fluid that sperm cells are transported within.

Seminal vesicles

Glands that provide sperm cells the energy that allows them to move.

Sexual dysfunctions

A range of clinically significant impairments in a person's ability to experience pleasure or respond sexually as outlined by the sexual response cycle.

Sexual response cycle

Excitement, Plateau, Orgasm, and Resolution.

Sexually transmitted infections (STIs)

Infections primarily transmitted through social sexual behaviors.

Skene's glands

Also called minor vestibular glands, these glands are on the anterior wall of the vagina and are associated with female ejaculation.

Somatosensory cortex

A portion of the parietal cortex that processes sensory information from the skin.

Testicles

Also called testes—the glands producing testosterone, progesterone, small amounts of estrogen, and sperm cells.

Trimesters

Phases of gestation, beginning with the last menstrual period and ending about 40 weeks later; each trimester is roughly 13 weeks in length.

Urethra

The tube that carries urine and semen outside of the body.

Uterus

Also called the womb—the female’s internal sex organ where offspring develop until birth.

Vagina

Also called the birth canal—a muscular canal that spans from the cervix to the introitus, it acts as a transport mechanism for sperm cells coming in, and menstrual fluid and babies going out.

Vas deferens

A muscular tube that transports mature sperm to the urethra.

Vasectomy

A surgical form of birth control in males, in which the vas deferens is intentionally damaged.

Vestibular glands (VGs)

Also called major vestibular glands, these glands are located just to the left and right of the vagina, and produce lubrication to aid in sexual intercourse.

Vulva

The female’s external sex organs.

Wolffian ducts

Primitive male internal sex organs.

Zygote

Fertilized ovum.

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