Whatever else humans are, they are relational, spiritual, and sexual (whether or not they engage in sexual activity)

- The brain is your primary sexual organ – this means that sex begins in the brain
- Sexuality impacts every aspect of life, personal and professional—at home, school, organization, church, work, play …
Humans are a combination of nature and nurture—but it’s complex and not fool-proof

- **Nature:** Genetics (genome) – chromosomes, genes, and DNA

- **Nurture:** Epigenetics (epigenome) – including environment, gestation, hormones, neurotransmitters, cellular memory, PLUS your microbiome and virome (all of which can turn genes on or off)

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Professor Daphna Joel and colleagues at Tel-Aviv University analyzed brain scans of over 1400 men and women.

While some features are more common in one gender than the other, each person’s brain has a unique ‘mosaic’ of these features as well as others seen commonly in both.

There are multiple ways to be male and female, there is not one way, and most of these ways are completely overlapping.

—Daphna Joel
• Human brains are more alike than they are different—and there is no ‘default’ position

• A person’s ‘gender’ cannot be determined with any certainty by looking at the brain

• Some individuals have congruent chromosomes, genes, internal sex organs, external genitalia, and personal perception, but more are gender non-conforming than previously thought

• So far, humans who have a ‘Y’ are males
Every brain on the planet is different so in one sense, each person is a variation.

All species contain variations and human beings are no exception; many variations have been and are being identified.

Notwithstanding, many have a tendency to believe that they represent the true and authentic model and that everyone else represents a variation …
Brain-Body Variation
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Typically, the brain matches the body in which it is housed.

There can be a mismatch, however, between the brain and the body.

If this causes enough discomfort, the individual may opt for a sex-change.

There may be more possibilities for variations when a ‘Y’ chromosome is present . . .
Intersex refers to a group of conditions where confusion exists between external genitals and internal genitals.

It impacts as many as 2% of live births worldwide (120 million of six billion people are intersex).

―American Journal of Human Biology

Formerly known by the term Hermaphrodite, it is now Disorders of Sex Development or DSD.

True Gonadal Intersex

The individual has both ovarian and testicular tissue

May be in the same gonad (an ovotestis) or may have one ovary and one testis

External genitalia may appear male or female or be ambiguous

There are several subcategories but causes for Intersex may remain undetermined even with modern advanced diagnostic techniques
AGS is a condition where a person has female internal organs plus a form of penis-scrotum; may occur in a chromosomally normal female who was exposed to excess masculinizing hormones during gestation.

—Martin E. P. Seligman, PhD

*What You Can Change...and What You Can’t*
AIS is a condition where a person has male internal organs plus a vagina; may occur in a chromosomally normal male who had reduced sensitivity to masculinizing hormones during gestation.

—Martin E. P. Seligman, PhD

*What You Can Change...and What You Can’t*
The hypothalamus is believed to be the brain’s sex center—templating of sexuality appears to involve the 3\textsuperscript{rd} interstitial nuclei of the anterior hypothalamus (INAH3).

Less than an ounce in weight and about the size of a cherry, it is larger in systemizing brains than in empathizing brains or in the brains of homosexuals or transsexuals.

—Pease, Barbara and Allan Pease

*Why Men Don’t Listen and Women Can’t Read Maps*
The anterior commissure (one of the three main bridges between the hemispheres) is 10%-12% larger in the female brain and in the brains of homosexual males. Homosexual males tend to have fewer neurons in the 3rd interstitial nuclei of the anterior hypothalamus (INAH-3) as compared to the straight male brain but more than in the female brain. —Deborah Blum, *Sex on the Brain*
According to Dr. Gunter Dorner (Germany) there are three ‘Centers’ that template the brain for sexuality:

- Sexual center
- Mating center
- Gender-role center
According to Dr. Milton Diamond (USA) there are four ‘Stages’ that template the brain for sexuality:

- Sexual identity (gender mindset)
- Basic sexual patterning for passivity or aggressiveness
- Sexual object choice (similar to Dorner’s mating center and ‘who you’re attracted to’)
- Control over your sexual equipment
Sex Identification Levels

- **Genetic sex** - chromosomal pattern set at time of conception
- **Gonadal sex** - normal testes or ovaries producing appropriate levels of appropriate hormones
- **Genital sex** - a normal penis if male or a normal vagina if female
Brain sex type

Systemizing is stronger in male brains
Empathizing is stronger in female brains

Sex-typical behaviors

Males are more interested in things and systems
Females in connection and intimacy / emotions

—Dr. Simon Baron-Cohen
*The Essential Difference*
Sixty percent of males, who must have the penis removed due to cancer, report phantom penile syndrome.

However, individuals who have the penis removed due to a perceived mismatch between brain and body, do not show or report phantom penile syndrome.

—Robert Sapolsky PhD, 2010 Lecture
The bed nucleus of the *stria terminalis* is a bundle of nerve fibers that connects the amygdala on one side of the brain to the anterior hypothalamus and on to the amygdala on the other side—bed nucleus neurons are usually twice the size in male brains.

Post mortems of transsexuals (brain-body mismatch) showed these neurons were the size of what the persons believed they were and not for the gender assigned at birth —Robert Sapolsky PhD, 2010 Lecture
The **amygdala** is involved with emotions and plays a role in the brain's reward system.

Amygdala connections were more widespread from the left amygdala in homosexual males, as is also found in heterosexual females.

Amygdala connections were more widespread from the right amygdala in homosexual females, as is also found in heterosexual males.

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**Amygdala Differences**

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Larger male than female amygdalae have been demonstrated in children ages 7–11 and in adults.

Homosexual males tend to show more female-like amygdala patterns compared with heterosexual males.

Homosexual females tend to show more male-like amygdala patterns compared with amygdala patterns in heterosexual females.
Nobody in science now believes that sexual orientation is caused by events in adolescence ... Homosexuality is an early, probably prenatal, and irreversible preference

—Author and Geneticist Matt Ridley

Religious Tolerance.org
Ontario Consultants on Religious Tolerance

http://www.religioustroke.com/hom_caus4.htm

Summary of studies that show brain and body differences between heterosexual and homosexual individuals (inner ear, finger lengths, finger ridges, startle reflex, amygdala, etc.)