

Sex, Gender, Orientation, and Human Variations

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Brain References
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www.LLM.life



8-20-16

Human Variations

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All species contain variations and human beings are not exempt



Every brain on the planet differs so in one sense each person is a variation—notwithstanding, many have a tendency to believe that he or she represents the true and authentic model and it is ‘others’ who represent a variation ...

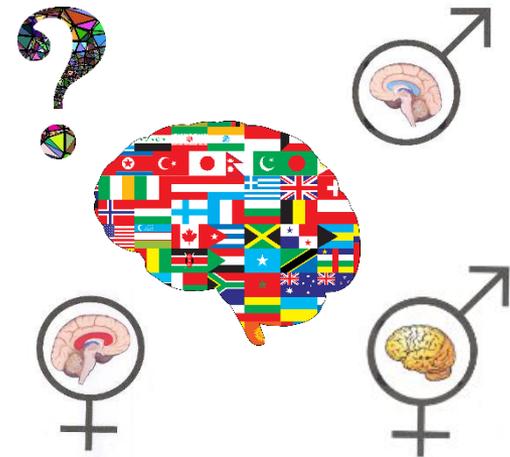
This presentation is simply designed to share brain information related to sex, gender, orientation, and human variations

Caveat

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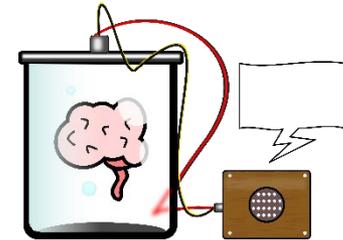
Whatever else humans are, they are relational, spiritual, and sexual (whether or not they engage in sexual activity)

- **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 ...**



Nature + Nurture

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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)**

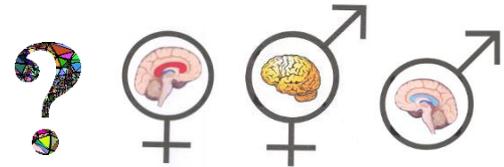




Brain Scans

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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



Current Caveats

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- **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**

Brain-Body Variation

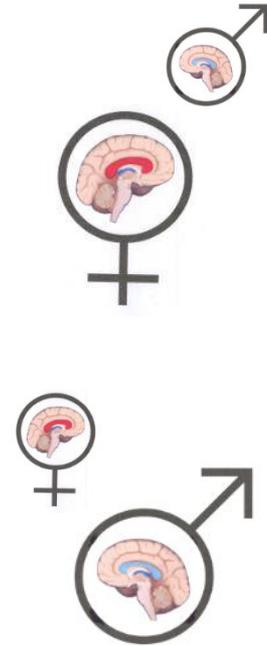
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Typically, the brain matches the body in which it is housed

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

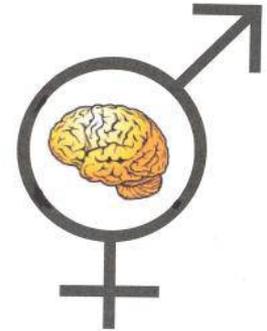
There may be more possibilities for variations when a 'Y' chromosome is present . . .



Intersex Variation

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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

—www.nlm.nih.gov/medlineplus/ency/article/001669.htm

True Gonadal Intersex

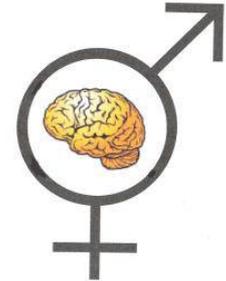
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The individual has both ovarian and testicular tissue (may be XX or XY)

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

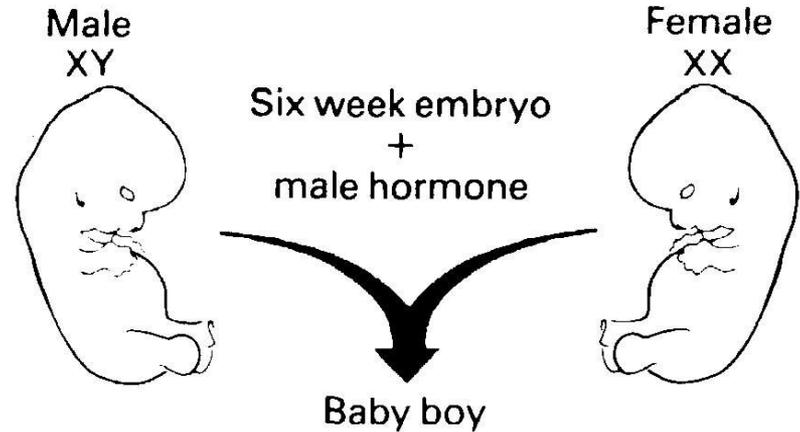
There are several subcategories but causes for Intersex may remain undetermined even with modern advanced diagnostic techniques



Androgenital Syndrome Variation

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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

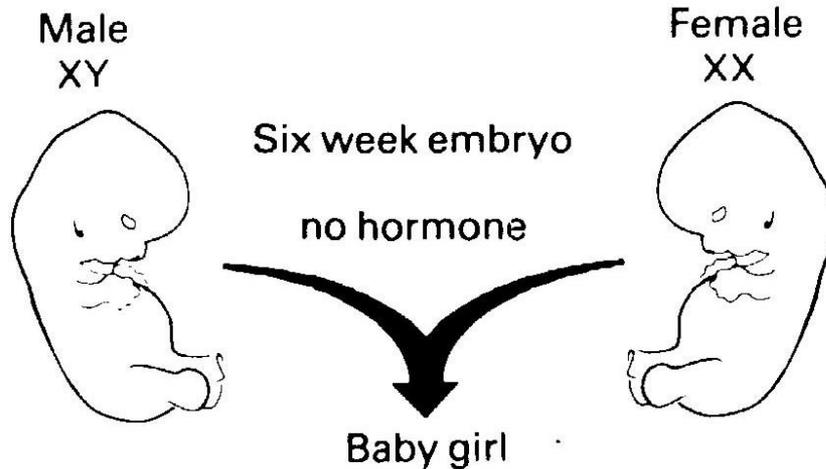


—Martin E. P. Seligman, PhD
What You Can Change...and What You Can't

Androgen Insensitivity Syndrome

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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



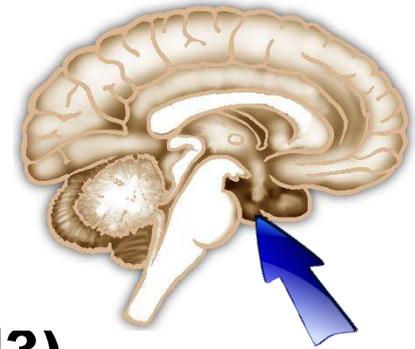
—Martin E. P. Seligman, PhD

What You Can Change...and What You Can't

Hypothalamus Differences

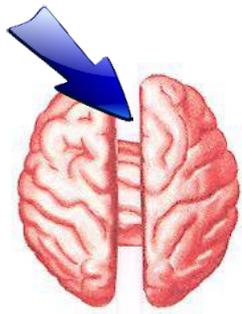
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The hypothalamus is believed to be the brain's sex center—templating of sexuality appears to involve the 3rd interstitial nuclei of the anterior hypothalamus (INAH3)



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

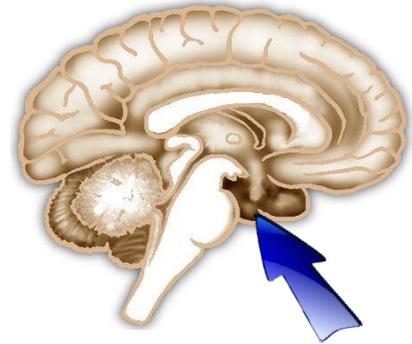


Brain Differences

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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*

Dr. Gunter Dorner

www.ArleneTaylor.org

According to Dr. Gunter Dorner (Germany) there are three **'Centers'** that template the brain for sexuality

- Sexual center
- Mating center
- Gender-role center



Dr. Milton Diamond

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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

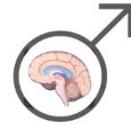


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Sex Identification Levels

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- **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





Sex Identification Levels

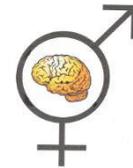
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➤ Brain sex type

Systemizing is stronger in male brains

Empathizing is stronger in female brains



➤ Sex-typical behaviors

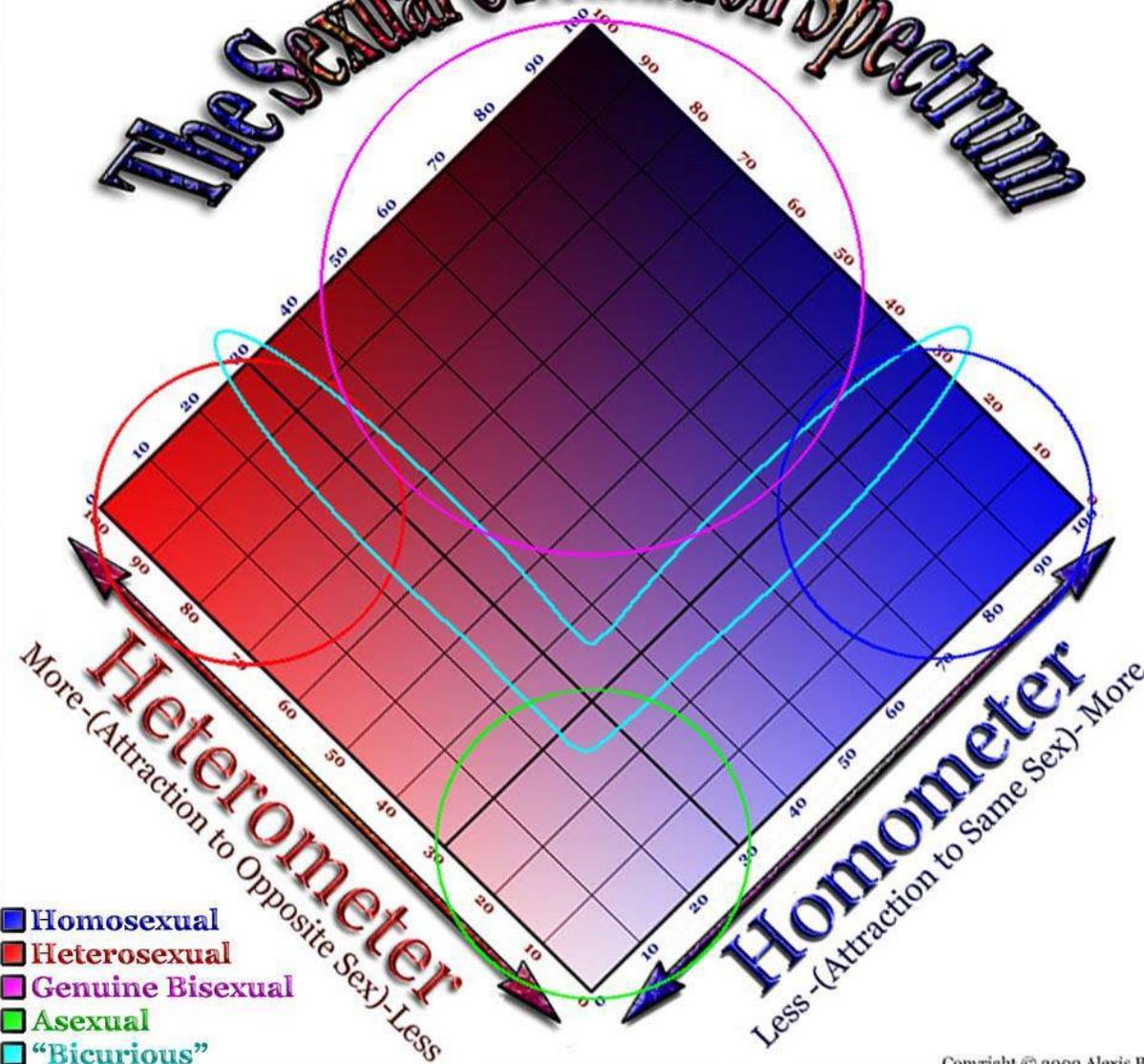
Males are more interested in things and systems

Females in connection and intimacy / emotions



—Dr. Simon Baron-Cohen
The Essential Difference

The Sexual Orientation Spectrum

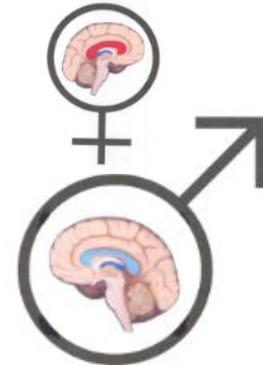


Phantom Penile Syndrome

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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



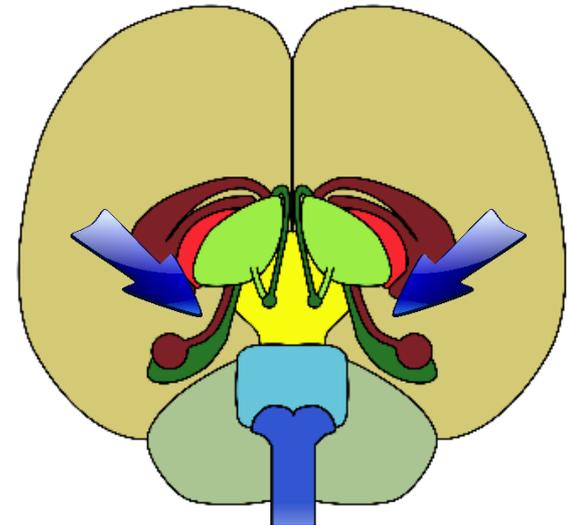
—Robert Sapolsky PhD, 2010 Lecture

Bed Nucleus Differences

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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



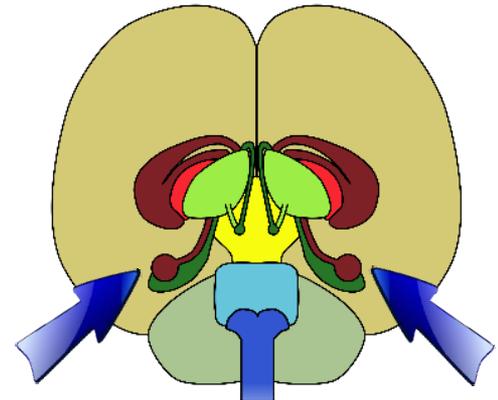
Amygdala Differences

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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 and in heterosexual females

Amygdala connections were more widespread from the right amygdala in homosexual females and heterosexual males



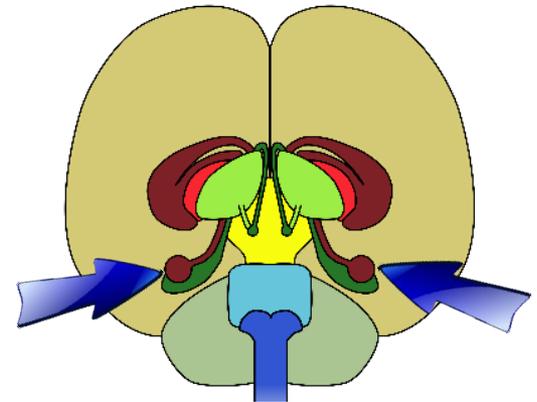
Amygdala Differences

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Larger **amygdalae** in males over females have been identified 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.religioustolerance.org/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.)