Sex and Gender: Studyguide and Review Notes#1

Nature and Nurture

- Genes and environment work together: genes don't do anything unless they are expressed, and gene expression is affected by the environment
- most traits are "facultative" - expressed differently, depending on the environment. There is a "norm of reaction" such that these traits change predictably as the environment changes. (examples: skin color and UV radiation; orangutan male development and presence of other adult males; in some species, sex and temperature)
- Childrens' preferences shape their environments (example: if boys prefer to range farther than girls, they will encounter different environments, less adult supervision)
- While we can't partition the effects of genes and environment in the development and behavior of an individual, we can do so when explaining the phenyotypic variance in a population. (a comparison of the variance in skin color between Minnesotans returning from vacation and UN delegates would show that more of the variance in the latter is genetic; google "heritability" if you missed this).

The Evolution of Sex

- Sex is the mixing of genes (explain) and is not necessarily the same thing as reproduction.
- Why is sex a biological puzzle? (i.e., what is the 2-fold cost to sexual reproduction)?
- Parasites are thought to have been an important selective force in the evolution of sex. Why? How do the minnow studies seen in the film support this?
- Review evidence that mice and people are attracted to the smell of individuals with dissimilar MHC genes (smelly t-shirt and Hutterite studies). What might this have to do with parasites and the evolution of sex? This pattern is reversed in pregnant mice and doesn't hold with women on birth-control pills. Why?

Hormones: nuts and bols

- Understand the basic feedback system between the hypothalamus, the pituitary, and the gonads.
- Know what an "androgen" is and what an "estrogen" is, and something about their effects. Be able to name at least one androgen (for example, testosterone) and one estrogen (for example, estradiol).
- Recognize that the different steroids (testosterone, estradiol, progesterone, etc.) are chemically very similar and that they are produced by chemically converting one into another.
- Understand the difference between organizational effects (hormones affecting brain organization during development) and activational effects (effects due to different levels of circulating hormones after birth – these are, at least potentially, transient)
- In a study not discussed in class, a researcher found that she could raise the dominance rank of cows by giving them testosterone – and also by giving them estrogen! How might this paradox be explained?

Fetal development

- A normal male is 46,XY (46 chromosomes, including 1 X and 1 Y). A normal female is 46,XX. What does an individual look like who has sex chromosomes X0 (Turner's syndrome)? XXY (Klinefelter's)? Why?
- Male and female external genitalia develop from the same set of primordial organs. Give examples.
- Male and female internal genitalia develop from different primordial organs. What structures develop from the Mullerian ducts? The Wolffian ducts?
- Which of the sex hormones (androgens or estrogens) is most important in determining whether the fetus will become male or female?
- Maleness is determined chiefly by the action of testosterone on the developing fetus, a process set in motion by "testis determining factor" on the y chromosome. Why does this make sense, rather than by having male traits determined by genes on the autosomes non-sex chromosomes)?
- Know something about the causes and features of the following: CAH (congenital adrenal hyperplasia), AIS (androgen insensitivity = testicular feminization), and 5-alpha reductase deficiency ("balls at 12"). We will talk about the implications for behavior later.
- What has been the traditional medical response to intersexed infants? What does the ISNA (inter-sex society of north america) recommend, and why?