

MODULE 14 BEHAVIOR GENETICS: PREDICTING INDIVIDUAL DIFFERENCES

BIOLOGICAL PERSPECTIVE

- This module and Module 15 explore the story of how our genes (nature) and environments (nurture) define us.

GENES: OUR CODES FOR LIFE

- **BEHAVIOR GENETICISTS** study our differences and weigh the effects and interplay of heredity and **ENVIRONMENT**, every external influence, from prenatal nutrition to the people and things around us.
- There are 46 chapters called **CHROMOSOMES** is composed of a coiled chain of the molecule **DNA** (deoxyribonucleic acid). **GENES**, small segments of the giant DNA molecules, form the words of those chapters. You have 20,000 to 25,000 genes that either are active or inactive. Most of our traits are influenced by genes. Protein molecules are our building blocks within the body.
- **GENOME** researchers have discovered the common sequence within human DNA. Genomes are the complete instructions for making an organism, consisting of all the genetic material in that organism's chromosomes.

TWIN AND ADOPTION STUDIES

- In order to see the nature vs. nurture concept, experiments are framed in two ways: 1) controlling home life while varying heredity, 2) controlling heredity while varying home life.
- **IDENTICAL TWINS** develop from a single fertilized egg that splits in two (monozygotic). This means that both genes within the twins are the same. There are still differences (placenta same or separate and the amount of certain genes).
- **FRATERNAL TWINS** develop from separate fertilized eggs (dizygotic). Womb-mates, yes, but genetically not the same.

SEPARATED TWINS

- Jim Lewis and Jim Springer were separated at birth to different home lives. After 38 years of separation, the Jim Twins were reunited and put through psychological tests at University of Minnesota.
- Separated identical twins show more likeness and commonality than those separated fraternal twins.

BIOLOGICAL VERSUS ADOPTIVE RELATIVES

- There are two groups: genetic relatives and environmental relatives.

- Even when people who are not genetic relatives are reared together, personality does not fall in line to being similar.
- Heredity has implications when predispositioning our personalities.
- Even though parents with adopted children will not be able to shape their child's personality, parents can influence their children's attitudes, values, manners, faith, and politics.
- Think of the Williams sisters in Tennis!!

THE NEW FRONTIER: MOLECULAR GENETICS

- **MOLECULAR GENETICS** is a subfield of biology that studies the molecular structure and function of genes. The goal of MG is to find some of the many genes that together orchestrate traits such as body weight, sexual orientation, and extraversion. There is no single genes for these but multiple genes that predetermine this.
- Why we want to keep researching genes? Knowing a person's DNA can help predict/stop/treat any deformities/mutations the individual may encounter.
- Critics disagree that knowing the DNA of an individual is pre-exposing an individual to a label that could be discriminated against by society.
- What do you think? Should research on DNA continue?

HERITABILITY

- **HERITABILITY** of a trait – the extent to which variation among individuals can be attributed to their differing genes. We can never say what percentage of an individual's personality or intelligence is inherited. Remember that still the environment shapes you.

GENE-ENVIRONMENT INTERACTION

- The **INTERACTION** is the interplay that occurs when the effect of one factor depends on another factor (genes and environment).
- Environment triggers gene activity. We select environments well suited to our natures.
- **EPIGENETICS** is studying the molecular mechanisms by which environments trigger genetic expression. Seen with suicidal victims and child abuse victims.
- Forget nature vs. nurture but instead nature via nurture.

BE ABLE TO ANSWER: What is heritability?

PRACTICE FRQ: Explain the two positions in the nature-nurture debate.