The Major Issues

- The Mind-Brain Relationship

- Biological Psychology is the study of the physiological, evolutionary and developmental mechanisms of behavior and experience.

- A strong emphasis is placed upon brain functioning.

- Brain functioning can be explained at a more microscopic level in terms of neuron and glia activity.

- Biological explanations of behavior raise the issue of the relationship between the mind and the brain also know as the “mind-body” or “mind-brain problem”.

- The “mind-brain problem” has a variety of explanations.

- Dualism is the belief that there are different kinds of substance that exist independently.
  - Defended by French philosopher Rene Descartes.
  - Most common belief among nonscientists.
  - Rejected by most neuroscientists.

- Monism is the belief that the universe is only comprised of one type of substance.

- Forms of monism include:
  - Materialism- everything that exists is physical by nature.
  - Mentalism- only the mind truly exists.
  - Identity position- mental processes and some brain processes are the same but described in different terms.

- Explanations of the mind-body relationship do not answer some fundamental questions:
  - Why is consciousness a property of brain activity?
What kind of brain activity produces consciousness?

How does brain activity produce consciousness?

• The Genetics of Behavior

• Both genes and environment interact to shape human behavior.

• The fundamental issue is how much a role genetics play in shaping human behaviors.

— Examples: psychological disorders, weight gain, personality, sexual orientation?

• 19th century monk Gregor Mendel demonstrated that inheritance occurs through genes.

• Genes are basic units of heredity that maintain their structural identity from one generation to another.

• Genes are aligned along chromosomes (strands of genes) and come in pairs.

• A gene is a portion of a chromosome and is composed of deoxyribonucleic acid (DNA).

• DNA serves as a model for the synthesis of ribonucleic acid (RNA).

• RNA is a single strand chemical that can serve as a template/model for the synthesis of proteins.

• Proteins determine the development of the body by:
  — forming part of the structure of the body.
  — serving as enzymes, biological catalysts that regulate chemical reactions in the body.

• Almost all behaviors have both a genetic component and an environmental component.

• Researchers study monozygotic (“from one egg”) and fraternal (“from two eggs”) twins to infer contributions of heredity and environment.
Researchers also study adopted children and their resemblance to their biological parents to infer hereditary influences.

Heritability refers to how much characteristics depend on genetic differences.

Estimates of hereditary influences are often difficult to infer and are prone to error.

Sources of error include the following:

- The inability to distinguish between the effects of genes and prenatal influences.
- Environmental factors can inactivate genes.
- Multiplier effect – genetic tendencies that guide behavior will result in a change in the environment that magnifies the original tendency.
- Traits with a strong hereditary influence can be modified by environmental intervention.
  - Eg. PKU

Genes do not directly produce behaviors.

Genes produce proteins that increase the probability that a behavior will develop under certain circumstances.

Genes can also have an indirect affect.

- Genes can alter your environment by producing behaviors or traits that alter how people in your environment react to you.

Evolution refers to a change in the frequency of various genes in a population over generations

Regardless if helpful or harmful to the species.

Evolution attempts to answer two questions:

- How did some species evolve?
- How do species evolve?

Common misconceptions about evolution include the following:
— Lamarckian evolution - “The use or disuse of some structure or behavior causes an increase or decrease in that behavior.”

— “Humans have stopped evolving.”

— “Evolution means improvement.”

— “Evolution acts to benefit the individual or the species.”

• Evolutionary psychology focuses upon functional and evolutionary explanations of how behaviors evolved.

• Assumes that behaviors characteristic of a species have arisen through natural selection and provide a survival advantage.

— Examples: differences in peripheral/color vision, sleep mechanisms in the brain, eating habits, temperature regulation.

• The Use of Animals in Research

• Animal research is an important source of information for biological psychology but remains a highly controversial topic.

• Animal research varies on the amount of stress and/or pain that is caused to the animal itself.

• Reasons for studying animals include:
  • The underlying mechanisms of behavior are similar across species and often easier to study in nonhuman species.
  • We are interested in animals for their own sake.
  • What we learn about animals sheds light on human evolution.
  • Some experiments cannot use humans because of legal or ethical reasons.

• Opposition to animal research varies:
  • “Minimalists” favor firm regulation on research and place consideration upon the type of animal used and the amount of stress induced.
“Abolitionists” maintain that all animals have the same rights as humans and any use of animals is unethical.

- Justification for research considers the amount of benefit gained compared to the amount of distress caused to the animal.

- No clear dividing line exists.

- Colleges and research institutions in the United States are required to have an Institutional Animal Care and Use Committee.

- Oversees and determine acceptable procedures.