

STUDY GUIDE

Biological Bases of Behavior:

3C: Genetics, Evolutionary Psychology and Behavior

UNIT OVERVIEW

Unit 3C is concerned with the ways in which our biological heritage, or nature, interacts with our individual experiences, or nurture, to shape who we are. After a brief explanation of basic terminology, the chapter explores the fields of behavior genetics, which studies twins and adopted children to weigh genetic and environmental influences on behaviors. The next section discusses psychology's use of evolutionary principles to answer universal questions about human behavior. This section uses human sexuality to illustrate the evolutionary explanation of human behavior.

The final section of the chapter explores how genes and environment interact to shape us biologically, psychologically, and socially. In the end, the message is clear: Our genes and our experience together form who we are.

UNIT REVIEW

First, skim each section, noting headings and boldface items. After you have read the section, review each objective by answering the fill-in and essay-type questions that follow it. As you proceed, evaluate your performance by consulting the answers on page 68. Do not continue with the next section until you understand each answer. If you need to, review or reread the section in the textbook before continuing.

Introduction (p. 94)

1. Our differences as humans include our _____, and _____, and _____ backgrounds.
2. Our similarities as human beings include our common _____, our shared _____ architecture, our ability to use _____, and our _____ behaviors.
3. A fundamental question in psychology deals with the extent to which we are shaped by our heredity, called our _____, and by external influences, called our _____.

Behavior Genetics: Predicting Individual Differences (pp. 95-103)

Objective 1: Identify the types of questions that interest behavior geneticists, and describe the elements of heredity: chromosome, DNA, gene, and genome.

1. Researchers who specifically study genetic and environmental influences on behavior are called _____.
2. The term environment refers to every _____ influence.
3. The master plans for development are stored in the _____. In number, each person inherits _____ of these structures, _____ from each parent. Each is composed of a coiled chain of the molecule _____.
4. If chromosomes are the "chapters" of heredity, the "words" that make each of us a distinctive human being are called _____.
5. Most our traits are influenced by (one / many) of these units of heredity.
6. The complete instructions for making an organism are referred to as the human _____.

6. To study the power and limits of genetic influences on behavior, researchers use _____ and _____ studies.
7. Twins who developed from a single egg are genetically _____. Twins who developed from different fertilized eggs are no more genetically alike than siblings and are called _____ twins.
8. In terms of the personality traits of extraversion and neuroticism, identical twins are (more/no more) alike than are fraternal twins.
9. Twin pairs reported (being treated alike/being treated differently). However, their similarities (could/ could not) be attributed to how they were treated.
10. Through research on identical twins raised apart, psychologists are able to study the influence of the _____.
11. Studies tend to show that the personalities of adopted children (do/do not) closely resemble those of their adoptive parents. However, adoption studies show that parenting (does/does not) matter. For example, many adopted children score (higher/lower) than their biological parents on intelligence tests.

Objective 3: Explain what is meant by heritability, and give examples of the interaction of genes and environment on specific traits.

12. The extent to which variation among individuals can be attributed to differing genes is called _____. Heritable individual differences (imply/do not necessarily imply) heritable group differences.
13. Genes are self _____; rather than acting as _____ that always lead to the same result, they _____ to the environmental context.
14. For _____ phenomena, human differences are nearly always the result of both _____ and _____ influences.
15. Throughout life, we are the product of the _____ of our _____ predispositions and our surrounding _____.
16. Environments trigger activity in _____ and our genetically influenced traits evoke _____ in other people. This may explain why _____ twins recall greater variations in their early family life than do _____ twins.

Objective 4: Identify the potential uses of molecular genetics research.

17. The subfield of biology that seeks to identify some of the many genes that influence normal human traits is _____.
18. To uncover the genes, researchers in this field seek links between certain _____ or _____ segments and specific disorders. They find families with the disorder over several generations, and they compare the _____ of affected and unaffected members, looking for differences.

Evolutionary Psychology: Understanding Human Nature (pp. 103-107)

Objective 5: Describe the area of psychology that interests evolutionary psychologists, and point out some possible effects of natural

1. Researchers who study natural selection and the adaptive nature of human behavior are called _____ .
2. Researchers in this field focus mostly on what makes people so (much alike/different from one another).
3. According to the principle of _____ , traits that lead to increased reproduction and survival will be most likely to be passed on to succeeding generations.
4. Genetic _____ are random errors in genetic replication that are the source of all genetic _____ .
5. Genetic constraints on human behavior are generally (tighter/looser) than those on animal behavior. The human species' ability to and therefore to _____ in responding to different _____ contributes to our _____ , defined as our ability to _____ and _____ . Because of our genetic legacy, we love the tastes of sweets and _____ , which we tend to _____ , even though famine is unlikely in industrialized societies.

Objective 6: Identify some gender differences in sexuality and mating preferences, and describe evolutionary explanations for those differences.

6. Compared with women, men are (equally/more/less) likely to desire more frequent sex, and they are (equally/more/less) likely to initiate sexual activity. This is an example of a _____ difference.
7. The _____ explanation of gender differences in attitudes toward sex is based on differences in the optimal strategy by which women and men pass on their _____ . According to this view, males and females (are/are not) selected for different patterns of sexuality.
8. Cross-cultural research reveals that men judge women as more attractive if they have a _____ appearance, whereas women judge men who appear _____ and _____ as more attractive.

Objective 7: Summarize the criticisms of evolutionary explanations of human behaviors, and describe the evolutionary psychologists' responses to these criticisms.

9. Critics of the evolutionary explanation of the gender sexuality difference argue that it often works (forward/backward) to propose a _____ explanation.
10. Another critique is that gender differences in sexuality vary with _____ expectations. Gender differences in mate preferences are largest in cultures characterized by greater gender (equality / inequality).
11. Evolutionary psychologists counter the criticisms by noting that the sexes, having faced similar adaptive problems, are more (alike/different) than they are (alike/different). They also note that evolutionary principles offer testable _____ .

Reflections on Nature and Nurture (pp. 108-110)

Objective 8: Discuss some of the ways heredity and environment interact to both "control" who we are and allow us to become who we want to be.

1. As human strength becomes (more/less) relevant to power and status, gender roles are (converging / diverging)

2. We are the product of both _____ and _____, but we are also a system that is _____. We know this because a _____ approach to development shows that no single factor is all-powerful.
3. The principle that we should prefer the simplest of competing explanations for a phenomenon is called _____.

PROGRESS TEST 1

Multiple-Choice Questions

Circle your answers to the following questions and check them with the answers beginning on page 68. If your answer is incorrect, read the explanation for why it is incorrect and then consult the appropriate pages of the text (in parentheses following the correct answer).

1. Dr. Ross believes that principles of natural selection help explain why infants come to fear strangers about the time they become mobile. Dr. Ross is most likely a(n)
 - a. behavior geneticist.
 - b. molecular geneticist.
 - c. evolutionary psychologist.
 - d. molecular biologist.
2. A pair of adopted children or identical twins reared in the same home are most likely to have similar
 - a. excitability.
 - b. personalities.
 - c. religious beliefs.
 - d. emotional reactivity.
3. If a fraternal twin develops schizophrenia, the likelihood of the other twin developing serious mental illness is much lower than with identical twins. This suggests that
 - a. schizophrenia is caused by genes.
 - b. schizophrenia is influenced by genes.
 - c. environment is unimportant in the development of schizophrenia.
 - d. identical twins are especially vulnerable to mental disorders.
4. Of the following, the best way to separate the effects of genes and environment in research is to study
 - a. fraternal twins.
 - b. identical twins.
 - c. adopted children and their adoptive parents.
 - d. identical twins raised in different environments.
5. Through natural selection, the traits that are most likely to be passed on to succeeding generations are those that contribute to
 - a. impulsivity.
 - b. survival.
 - c. social influence.
6. Evolutionary psychologists attribute gender differences in sexuality to the fact that women have
 - a. greater reproductive potential than do men.
 - b. lower reproductive potential than do men.
 - c. weaker sex drives than men.
 - d. stronger sex drives than men.
7. According to evolutionary psychology, men are drawn sexually to women who seem _____, while women are attracted to men who seem _____.
 - a. nurturing; youthful
 - b. youthful and fertile; mature and affluent
 - c. slender; muscular
 - d. exciting; dominant
8. Unlike twins, who develop from a single fertilized egg, twins develop from separate fertilized eggs.
 - a. fraternal; identical
 - b. identical; fraternal
 - c. placental; nonplacental
 - d. nonplacental; placental
9. When evolutionary psychologists use the word fitness, they are specifically referring to
 - a. an animal's ability to adapt to changing environments.
 - b. the diversity of a species' gene pool.
 - c. the total number of members of the species currently alive.
 - d. our ability to survive and reproduce.
10. A molecular geneticist would be most interested in studying
 - a. why most parents are so passionately devoted to their children.
 - b. environmental influences on skin color.
 - c. why certain diseases are more common among certain age groups.
 - d. which genes influence extraversion.

Matching Items

Match each term with its corresponding definition or description.

Terms

- ___ 1. natural selection
- ___ 2. genome
- ___ 3. fraternal
- ___ 4. genes
- ___ 5. DNA
- ___ 6. identical
- ___ 7. behavior genetics
- ___ 8. chromosomes
- ___ 9. molecular genetics
- ___ 10. mutation
- ___ 11. environment

Functions or Descriptions

- a. the biochemical units of heredity
- b. twins that develop from a single egg
- c. the complete set of instructions for making an organism
- d. driving principle behind evolutionary psychology
- e. twins that develop from separate eggs
- f. threadlike structures composed of DNA
- g. nongenetic influences
- h. subfield of biology that studies the structure and function of genes
- i. study of the relative power of genetic and environmental influences
- j. a complex molecule containing the genetic information that makes up the chromosomes
- k. random error in gene replication

PROGRESS TEST 2

Progress Test 2 should be completed during a final unit review. Answer the following questions after you thoroughly understand the correct answers for the section reviews and Progress Test 1.

Multiple-Choice Questions

1. Each cell of the human body has a total of
 - a. 23 chromosomes.
 - b. 23 genes.
 - c. 46 chromosomes.
 - d. 46 genes.
2. Genes direct our physical development by synthesizing
 - a. hormones.
 - b. proteins.
 - c. DNA.
 - d. chromosomes.
3. The genome is best defined as
 - a. a complex molecule containing genetic information that makes up the chromosomes.
 - b. a segment of DNA.
 - c. the complete instructions for making an organism.
 - d. the code for synthesizing protein.
4. Most human traits are
 - a. learned.
 - b. determined by a single gene.
 - c. influenced by many genes acting together.
5. Mutations are random errors in ___ replication.
 - a. gene
 - b. chromosome
 - c. DNA
 - d. protein
6. Evolutionary explanations of gender differences in sexuality have been criticized because
 - a. they offer "after-the-fact" explanations.
 - b. standards of attractiveness have not changed over time.
 - c. they overestimate cultural influences on sexuality.
 - d. they suggest that environment overrides genetic influences.
7. Several studies of long-separated identical twins have found that these twins
 - a. have little in common because of the different environments in which they were raised.
 - b. have many similarities, in everything from medical histories to personalities.
 - c. have similar personalities, but very different likes, dislikes, and life-styles.
 - d. are no more similar than are fraternal twins reared apart.

8. Adoption studies show that the personalities of adopted children
 - a. closely match those of their adoptive parents.
 - b. bear more similarities to their biological parents than to their adoptive parents.
 - c. closely match those of the biological children of their adoptive parents.
 - d. closely match those of other children reared in the same home, whether or not they are biologically related.
9. Chromosomes are composed of small segments of
 - a. DNA called genes.
 - b. DNA called neurotransmitters.
 - c. genes called DNA.
 - d. DNA called enzymes.
10. When the effect of one factor (such as environment) depends on another (such as heredity), we say there is a(n) between the two factors.
 - a. norm
 - b. positive correlation
 - c. negative correlation
 - d. interaction
11. An evolutionary psychologist would be most interested in studying
 - a. why most parents are so passionately devoted to their children.
 - b. hereditary influences on skin color.
 - c. why certain diseases are more common among certain age groups.
 - d. genetic differences in personality.

True-False Items

Indicate whether each statement is true or false by placing T or F in the blank next to the item.

- _____ 1. Gender differences in mate preferences vary widely from one culture to another.
- _____ 2. Most human traits are influenced by many genes acting together.
- _____ 3. Research on hvins shows a substantial genetic influence on attitudes toward organized religion and many other issues.
- _____ 4. Genes act as blueprints that lead to the same result no matter the context.
- _____ 5. Compared with identical twins reared in different families, fraternal twins recall their early family life more differently.
- _____ 6. Women are more likely than men to take a relational view of sexual activity.
- _____ 8. Heritable individual differences in a trait always explain group differences in the same trait.
- _____ 9. Women increase their fitness by searching for mates with the potential for long-term investment in their joint offspring.
- _____ 10. Environmental events “turn on” genes.
- _____ 11. People who grow up together tend to have similar personalities.

PSYCHOLOGY APPLIED

Answer these questions the day before a test as a final check on your understanding of the unit’s terms and concepts.

Multiple-Choice Questions

1. If chromosomes are the “chapters” of heredity, the “words” are the
 - a. genes.
 - b. molecules.
 - c. genomes.
 - d. DNA.
2. After comparing divorce rates among identical and fraternal twins, Dr. Alexander has concluded that genes do play a role. Dr. Alexander is most likely a(n)
 - a. evolutionary psychologist.
 - b. behavior geneticist.
 - c. molecular geneticist.
 - d. divorcee.
3. Despite growing up in the same home environment, Karen and her brother John have personalities as different from each other as two people selected randomly from the population. Why is this so?
 - a. Personality is inherited. Because Karen and John are not identical twins, it is not surprising they have very different personalities.
 - b. Gender is the most important factor in personality. If Karen had a sister, the two of them would probably be much more alike.
 - c. The interaction of their individual

- accounts for the common finding that children in the same family are usually very different.
- d. Their case is unusual; children in the same family usually have similar personalities.
4. One of the best ways to distinguish how much genetic and environmental factors affect behavior is to compare children who have
 - a. the same genes and environments.
 - h. different genes and environments.
 - c. similar genes and environments.
 - d. the same genes but different environments.
 5. My sibling and I developed from a single fertilized egg. Who are we?
 - a. opposite-sex identical twins
 - h. same-sex identical twins
 - c. opposite-sex fraternal twins
 - d. same-sex fraternal twins
 6. Of the relatively few genetic differences among humans _____ are differences among population groups.
 - a. less than 1 percent
 - h. less than 10 percent
 - c. approximately 25 percent
 - d. approximately 40 to 50 percent
 7. A person whose twin has Alzheimer's disease has ___risk of sharing the disease if they are identical twins than if they are fraternal twins.
 - a. less
 - b. about the same
 - c. a much greater
 - d. an unpredictable
 8. Which of the following is an example of an interaction?
 - a. Swimmers swim fastest during competition against other swimmers.
 - h. Swimmers with certain personality traits swim fastest during competition, while those with other personality traits swim fastest during solo time trials.
 - c. As the average daily temperature increases, sales of ice cream decrease.
 - d. As the average daily temperature increases, sales of lemonade increase.
 9. Which of the following most accurately summarizes the findings of the 40-year fox-breeding study described in the text?
 - a. Wild faxes cannot be domesticated.
 - h. "Survival of the fittest" seems to operate only when animals live in their natural habitats.
 - c. By mating aggressive and unaggressive faxes, the researchers created a mutant species.
 - d. By selecting and mating the tamest males and females, the researchers have produced affectionate, unaggressive offspring.
 10. Which of the following is true of women, as compared with men?
 - a. They are less likely to be concerned with their partner's maturity.
 - b. They are more likely to initiate sexual activity.
 - c. They are more likely to perceive warm responses as a sexual come-on.
 - d. They are less likely to sacrifice to gain sex.

Essay Question

Lakia's new boyfriend has been pressuring her to become more sexually intimate than she wants to at this early stage in their relationship. Strongly gender typed and "macho" in attitude, Jerome is becoming increasingly frustrated with Lakia's hesitation, while Lakia is starting to wonder if a long-term relationship with this type of man is what she really wants. In light of your understanding of the evolutionary explanation of gender differences in sexuality, explain why the tension between Lakia and Jerome would be considered understandable.

KEY TERMS

Using your own words, on a piece of paper write a brief definition or explanation of each of the following terms.

behavior genetics

environment

chromosomes

DNA

genes

genome

identical twins

fraternal twins

heritability

interaction

molecular genetics

evolutionary psychology

natural selection

mutation