

# TOTAL ASSESSMENT GUIDE

## Chapter 2 Heredity and Environment

Learning Objectives	Remember the Facts	Understand the Concepts	Apply What You Know	Analyze It
<b>2.1.1:</b> Explain the four major functions of genes.	1, 3–6	2	83	91
<b>2.1.2:</b> Explain how genes get passed from generation to generation and produce variability in human development.	7, 8, 12, 16		9, 14, 15, 17, 84, 92, 93	10, 11, 13
<b>2.1.3:</b> Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.	18, 20, 21	22	19, 94	
<b>2.1.4:</b> Describe the cause and the main characteristics of two instances of chromosomal errors.	23, 24, 26, 28, 29	25, 30	27, 85, 95	
<b>2.1.5:</b> Describe what genetic counselors do to help prospective parents consider whether to have a child.	31			32
<b>2.2.1:</b> Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.	33–37, 40		38, 39, 86, 97, 98	41, 96, 99
<b>2.2.2:</b> Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.	42, 44, 46	43, 48, 49	45, 47, 50, 87	100
<b>2.2.3:</b> Explain limitations involved in estimating hereditary and environmental influences on behavior.				51, 52, 101

(Continued on next page)

<b>Learning Objectives</b>	<b>Remember the Facts</b>	<b>Understand the Concepts</b>	<b>Apply What You Know</b>	<b>Analyze It</b>
<b>2.3.1:</b> Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.	53, 55	54, 56, 57	58–60, 88, 89, 102	
<b>2.3.2:</b> Explain how scientists obtain evidence for gene–environment interactions in humans.		61, 62		63, 103
<b>2.3.3:</b> Describe evidence from animal and human studies about how environments influence gene expression.	65, 67	64, 66, 68	104	105
<b>2.4.1:</b> Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.	69, 74, 75	70–72, 76	73, 106	
<b>2.4.2:</b> Explain how the influences of different levels of the external environment might be studied, using the example of obesity.	79	77, 78, 81, 82	80, 90, 107, 108	

## **Chapter 2: Heredity and Environment**

### **Multiple-Choice Questions**

1. A \_\_\_\_\_ is a segment of DNA that serves as a template for making one or more proteins.
- gamete
  - gene
  - phenotype
  - chromosome

Answer: b

Learning Objective: 2.1.1 Explain the four major functions of genes.

Topic/Concept: The Nature of Chromosomes, Genes, and Sexual Reproduction

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

2. The 23 pairs of chromosomes in every human being are stored in \_\_\_\_\_.
- the master cell
  - the RNA
  - the brain
  - every bodily cell

Answer: d

Learning Objective: 2.1.1 Explain the four major functions of genes.

Topic/Concept: The Nature of Chromosomes, Genes, and Sexual Reproduction

Difficulty Level: Easy

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

3. The basis of the genetic code in all living things is the \_\_\_\_\_.
- sequence of chemical bases in DNA
  - types of proteins contained in the DNA
  - arrangement of chromosomes in the cell
  - pattern in which the DNA strand coils

Answer: a

Learning Objective: 2.1.1 Explain the four major functions of genes.

Topic/Concept: The Nature of Chromosomes, Genes, and Sexual Reproduction

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

4. The process by which cells divide and multiply is \_\_\_\_\_.
- a. mitosis
  - b. meiosis
  - c. DNA
  - d. unknown to scientists

Answer: a

Learning Objective: 2.1.1 Explain the four major functions of genes.

Topic/Concept: The Nature of Chromosomes, Genes, and Sexual Reproduction

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

5. The type of cell division that occurs only in men's and women's reproductive cells is called \_\_\_\_\_.
- a. gametes
  - b. the genetic code
  - c. meiosis
  - d. mitosis

Answer: c

Learning Objective: 2.1.1 Explain the four major functions of genes.

Topic/Concept: The Nature of Chromosomes, Genes, and Sexual Reproduction

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

6. The name for reproductive cells is \_\_\_\_\_.
- a. meiosis
  - b. proteins
  - c. gametes
  - d. mitosis

Answer: c

Learning Objective: 2.1.1 Explain the four major functions of genes.

Topic/Concept: The Nature of Chromosomes, Genes, and Sexual Reproduction

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

7. A(n) \_\_\_\_\_ is an alternate form of a gene—generally one comes from the mother and one comes from the father.

- a. phenotype
- b. genotype
- c. allele
- d. polygenic inheritance

Answer: c

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

8. The \_\_\_\_\_ is the observable trait or disease in an individual, influenced by genotype and environment.
- a. phenotype
  - b. allele
  - c. X chromosome
  - d. Y chromosome

Answer: a

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

9. Kara has red hair, and Nora has dark brown eyes. These descriptions represent the \_\_\_\_\_.
- a. phenotype
  - b. allele
  - c. genotype
  - d. Y chromosome

Answer: a

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

10. Two people with curly hair (a dominant trait) are wondering how likely it is that their first child will have curly hair. A geneticist determines that they are both heterozygous for curly hair (meaning they have one dominant and one recessive allele each). She tells them the probability of their first child having curly hair is about \_\_\_\_\_ percent.

- a. 100
- b. 75
- c. 50
- d. 25

Answer: b

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.3 Describe applications of psychology.

11. Huntington's disease \_\_\_\_\_.

- a. can only be passed on if both parents have the allele for the disease
- b. can be passed on if one or the other parent has the allele for the disease
- c. can only be passed on if one parent has begun to show symptoms of the disease
- d. will not be passed on if one parent has the allele for the disease and the other does not

Answer: b

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

12. The majority of genetic disorders involve \_\_\_\_\_ traits.

- a. unknown
- b. dominant
- c. chromosomal
- d. recessive

Answer: d

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

13. A woman who is a carrier of the disease PKU and a man who is also a carrier have a child. What are the child's chances of actually having the disease?
- 100 percent
  - 50 percent
  - 25 percent
  - 0 percent

Answer: c

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.3 Describe applications of psychology

14. Color blindness runs in Shari's family. She just found out that she is pregnant with a boy. Shari is concerned that her baby may be color-blind because color blindness is more likely to occur in \_\_\_\_\_.

- females because they have two X chromosomes
- females because the effects of any genetic disorder are stronger for them
- males because the Y chromosome does not have a corresponding allele to counteract the color-blindness allele on the X chromosome
- males because the effects of any genetic disorder are stronger for them

Answer: c

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

15. Pat has one X chromosome and one Y chromosome. Therefore, Pat is a(n) \_\_\_\_\_.
- male
  - female
  - PKU carrier
  - example of X-linked inheritance

Answer: a

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

16. \_\_\_\_\_ refers to traits or disorders influenced by the combined effects of more than one gene.
- Polygenic inheritance
  - Down syndrome
  - Fragile X syndrome
  - X-linked

Answer: a

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

17. Seo-yun is one of four children. Her mother is short, and her father is tall. In all likelihood, when they are grown, Seo-yun and her siblings will have heights \_\_\_\_\_.
- like her mother
  - in an intermediate range between the heights of her parents
  - like her father
  - all precisely in the middle between her mother's height and her father's height

Answer: b

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

18. Gene \_\_\_\_\_ is the extent to which a gene can perform its functions of regulating other genes or producing proteins used in the body.
- expression
  - meiosis
  - mitosis
  - inheritance

Answer: a

Learning Objective: 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Topic/Concept: Understanding the Path from Genes to Behavior: Fragile X Syndrome

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

19. Patricia has fragile X syndrome, in which a gene on her X chromosome \_\_\_\_\_.
- a. functions normally
  - b. is found only in females
  - c. is silenced
  - d. is damaged, affecting locomotion

Answer: c

Learning Objective: 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Topic/Concept: Understanding the Path from Genes to Behavior: Fragile X Syndrome

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

20. In fragile X, deficient levels of the FMRP protein affect which of the following?
- a. height
  - b. executive functions of the brain
  - c. color blindness
  - d. the ability to roll the tongue

Answer: b

Learning Objective: 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Topic/Concept: Understanding the Path from Genes to Behavior: Fragile X Syndrome

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

21. Studies of brain functioning, cognition, and behavior in children with fragile X syndrome reveal that the pathway from genes to behavior \_\_\_\_\_.
- a. involves atypical brain development but not atypical cognitive functioning
  - b. involves atypical aspects of both brain development and cognitive functioning
  - c. is influenced more by the environment than by alterations in brain development
  - d. involves atypical cognitive functioning but not atypical brain development

Answer: b

Learning Objective: 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Topic/Concept: Understanding the Path from Genes to Behavior: Fragile X Syndrome

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

22. Who is most likely to experience extreme effects of fragile X syndrome?
- males
  - females
  - Males and females are equally likely to experience extreme effects.
  - It is unknown if males or females experience extreme effects.

Answer: a

Learning Objective: 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Topic/Concept: Understanding the Path from Genes to Behavior: Fragile X Syndrome

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

23. Of the following, which is the most common source of cognitive disabilities?
- chromosomal errors
  - the absence of an extra chromosome
  - single-gene disorders
  - exposure to radiation

Answer: a

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

24. Chromosomal errors generally occur during the process of \_\_\_\_\_.
- mitosis
  - meiosis
  - protein synthesis
  - pregnancy

Answer: b

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

25. The absence of chromosomes or presence of extra chromosomes in a fetus usually results in \_\_\_\_\_.

- a. death of the fetus
- b. a normal baby of either gender
- c. a boy
- d. a girl

Answer: a

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

26. Having an infant with Down syndrome is more common if \_\_\_\_\_ is older.

- a. the mother, but not the father,
- b. the father, but not the mother,
- c. more than one sibling
- d. the mother or the father

Answer: d

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

27. Down syndrome is caused by \_\_\_\_\_.

- a. a missing chromosome
- b. two X chromosomes
- c. an extra 21st chromosome
- d. the presence of an X and a Y chromosome

Answer: c

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

28. Down syndrome is associated with \_\_\_\_\_.
- a. typical cognitive development
  - b. heart conditions
  - c. typical motor development
  - d. typical physical development

Answer: b

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

29. The most common type of biologically based mild to moderate intellectual disability is \_\_\_\_\_.
- a. Down syndrome
  - b. fragile X syndrome
  - c. Klinefelter syndrome
  - d. PKU

Answer: a

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

30. The symptoms of Klinefelter syndrome result from \_\_\_\_\_.
- a. heart conditions
  - b. progressive dementia
  - c. low testosterone levels
  - d. intellectual disability

Answer: c

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

31. The role of a \_\_\_\_\_ includes helping potential parents consider genetic risks for disorders in their offspring.
- social worker
  - mental health counselor
  - genetic counselor
  - psychologist

Answer: c

Learning Objective: 2.1.5 Describe what genetic counselors do to help prospective parents consider whether to have a child.

Topic/Concept: Genetic Counseling

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

32. In genetic science, having a susceptibility gene \_\_\_\_\_.
- determines whether a person will develop a genetic disorder or not
  - indicates that a person has an increased likelihood for developing a particular genetic disorder
  - accounts for a large portion of the susceptibility to a particular disorder
  - eliminates the influence of the environment on the likelihood of developing a genetic disorder

Answer: b

Learning Objective: 2.1.5 Describe what genetic counselors do to help prospective parents consider whether to have a child.

Topic/Concept: Genetic Counseling

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.3 Describe applications of psychology.

33. \_\_\_\_\_ is a field in which scientists study genetic and environmental contributions to psychological and physical traits.
- Twin studies
  - Behavior genetics
  - Adoption design
  - Social work

Answer: b

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

34. \_\_\_\_\_ is a research design in which the contributions of genes and environment are teased apart by comparing individuals who share 100 percent or 50 percent of their segregating genes.
- a. The twin design
  - b. Heritability
  - c. The adoption design
  - d. Epigenesis

Answer: a

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

35. In a(n) \_\_\_\_\_, biological parents, their adopted-away children, and the adoptive parents and siblings are compared.
- a. twin design
  - b. singleton design
  - c. adoption design
  - d. polygenic inheritance

Answer: c

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

36. Correlations for the IQ scores of identical twins raised in the same home \_\_\_\_\_ those for fraternal twins raised in the same home.
- a. are lower than
  - b. cannot be compared to
  - c. are the same as
  - d. are higher than

Answer: d

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

37. The correlations for IQ scores of biologically related parents and children \_\_\_\_\_ those for adoptive parents and children.
- are higher than
  - are lower than
  - cannot be compared to
  - are the same as

Answer: a

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

38. As identical twins, Kijana and Elroi share what percentage of their segregating genes?
- 25 percent
  - 50 percent
  - 75 percent
  - 100 percent

Answer: d

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

39. As fraternal twins, Oscar and Frank share about \_\_\_\_\_ percent of their segregating genes.
- 10
  - 20
  - 50
  - 90

Answer: c

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

40. The IQ scores of adoptive parents are correlated with their adopted children, which represents a(n) \_\_\_\_\_.
- a. genetic influence
  - b. coincidence
  - c. environmental influence
  - d. design error

Answer: c

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

41. Identical twins reared apart still have substantial correlations between their IQ scores, suggesting a role for \_\_\_\_\_, but the correlations are lower than those recorded for identical twins reared together, suggesting a role for \_\_\_\_\_.
- a. environment; genes
  - b. genes; genes
  - c. genes; environment
  - d. environment; environment

Answer: c

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

42. \_\_\_\_\_ is the proportion of variance in a trait that is due to variation in genes.
- a. Shared environment
  - b. Heritability
  - c. Non-shared environment
  - d. Gene–environment correlation

Answer: b

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

43. An important insight to take from the data on heritability of different traits and disorders is that \_\_\_\_\_.
- a. traits tend to be heritable, but disorders are not
  - b. disorders tend to be heritable, but traits are not
  - c. most traits and disorders are moderately to strongly heritable
  - d. very few traits and disorders are heritable

Answer: c

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

44. \_\_\_\_\_ refers to influences that make children and adults raised in the same circumstances similar.
- a. Shared environment
  - b. Nurture
  - c. Behavior genetics
  - d. Non-shared environment

Answer: a

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

45. Timo, age 7, and Nora, age 9, had the same parents, rode the bus every day to the same school, and had their rooms at home across the hall from each other. These experiences represent the \_\_\_\_\_.
- a. non-shared environment
  - b. genetic influence
  - c. shared environment
  - d. heritability estimate

Answer: c

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

46. Behavior geneticists use the term \_\_\_\_\_ to refer to influences that make children and adults raised in the same circumstances different.
- shared environment
  - twin design
  - direct index
  - non-shared environment

Answer: d

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

47. Mina and Lee are siblings who live in the same home. Mina has played soccer since she was 3 years old, and Lee has played the piano since he was 4 years old. Playing soccer and taking piano lessons are differences that are examples of \_\_\_\_\_.
- genetic variation
  - non-shared environment
  - an adoption study
  - shared environment

Answer: b

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

48. Adoption studies have shown that \_\_\_\_\_ children become \_\_\_\_\_ similar with age in general cognitive ability.
- genetically unrelated; more
  - genetically identical; less
  - genetically related; more
  - genetically related; less

Answer: c

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

49. Twin studies show that some personality traits, such as antisocial behavior and religiousness, show \_\_\_\_\_ with age.
- increasing heritability
  - decreasing heritability
  - no change in heritability
  - increasing shared environmental influences

Answer: a

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

50. Tonya and Tamika are raised by the same parents, but Tonya is adopted and Tamika is a biological child. Their level of general cognitive ability will likely show \_\_\_\_\_ with age.
- increasing similarity
  - decreasing similarity
  - no change in similarity
  - increases in both cases

Answer: b

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

51. Children with PKU may show very different outcomes with and without exposure to phenylalanine in the diet. This demonstrates the role of \_\_\_\_\_.
- a genetic disorder
  - gene–environment interaction
  - heritability
  - variable phenotypes

Answer: b

Learning Objective: 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

Topic/Concept: Limitations of Behavior Genetic Studies

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 2.1 Use scientific reasoning to interpret psychological phenomena.

52. Svetlana's parents grew up in Russia, with many food shortages. When they immigrated to the United States, there was plenty of food for Svetlana. Svetlana's parents were of average height, but Svetlana was much taller. Presumably her parents had genes that would have enabled them to be taller than they were if they'd had adequate nutrition. The difference in the heights of Svetlana and her parents illustrates how \_\_\_\_\_.

- a. environments influence gene expression
- b. gene expression and environments are unrelated
- c. gene expression influences environments
- d. environments have no effect on gene expression

Answer: a

Learning Objective: 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

Topic/Concept: Limitations of Behavior Genetic Studies

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 2.1 Use scientific reasoning to interpret psychological phenomena.

53. \_\_\_\_\_ refers to differences in experiences that are based in part on genetic variations among different people.

- a. Epigenesis
- b. Distal influence
- c. Gene–environment correlation
- d. Gene–environment interaction

Answer: c

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

54. In \_\_\_\_\_ gene–environment correlations, children inherit genotypes correlated with their family environment.

- a. active
- b. passive
- c. evocative
- d. epigenetic

Answer: b

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

55. The finding in Tucker-Drob & Harden's (2012) longitudinal twin study that child cognitive ability at age 2 predicted parental stimulation of the child at age 4, and that this relationship was largely a genetic one, based on analyses of twin data, provided evidence for \_\_\_\_\_.
- a. a gene–environment interaction
  - b. environments influencing gene expression
  - c. a passive gene–environment correlation
  - d. an evocative gene–environment correlation

Answer: d

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

56. In \_\_\_\_\_ gene–environment correlations, people elicit different responses from the people in their environments on the basis of their genetic predispositions.
- a. active
  - b. passive
  - c. evocative
  - d. epigenetic

Answer: c

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

57. In \_\_\_\_\_ gene–environment correlations, people seek out or create environments correlated with their genetic predispositions.
- a. active
  - b. passive
  - c. evocative
  - d. epigenetic

Answer: a

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

58. Zoe, age 2, likes to create music by hitting pots and pans with a spoon. Her mother decides that Zoe has musical ability, and so she enrolls Zoe in music classes. Assuming Zoe actually has genes predisposing her to musical talent, the example demonstrates the \_\_\_\_\_ gene–environment correlation.

- a. active
- b. passive
- c. evocative
- d. epigenetic

Answer: c

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

59. Antonio, an athletic and muscular boy, decides to play high school soccer. Assuming some of Antonio’s athleticism has a genetic origin, this is example of a(n) \_\_\_\_\_ genetic–environment correlation.

- a. active
- b. passive
- c. evocative
- d. epigenetic

Answer: a

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

60. Twila and Jerome are actors. They enroll their daughter Marla in children’s theater. This is an example of a(n) \_\_\_\_\_ genetic–environment correlation.

- a. active
- b. passive
- c. evocative

d. epigenetic

Answer: b

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

61. In a study of adults, scientists found that those maltreated in childhood had the greatest likelihood of depression as adults if they had \_\_\_\_\_ serotonin transporter gene allele.

- a. the short-long (heterozygous)
- b. the long
- c. the short-short (homozygous)
- d. an unknown type of

Answer: c

Learning Objective: 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

Topic/Concept: Gene–Environment Interactions

Difficulty Level: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

62. In the study by Caspi et al. (2003) discussed in the text, genetic testing of males who were followed from childhood into adulthood revealed that individuals with a genetic vulnerability in the serotonin transporter gene (the s/s genotype) were \_\_\_\_\_.

- a. more likely than individuals without such a vulnerability (the l/l genotype) to be depressed as adults, regardless of the level of maltreatment in childhood
- b. more likely than individuals without such a vulnerability (the l/l genotype) to be depressed as adults, but only when child maltreatment was likely to have occurred
- c. equally likely to be depressed in adulthood as individuals without such a vulnerability (the l/l genotype) when both had a history of severe maltreatment
- d. depressed from childhood through adulthood

Answer: b

Learning Objective: 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

Topic/Concept: Gene–Environment Interactions

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.3 Describe applications of psychology.

63. Many studies demonstrate interactions between a single gene and specific environmental factors. However, in the real world, the most common interactions probably take place between \_\_\_\_\_ of genes and \_\_\_\_\_ environments.

- a. large numbers; diverse
- b. small numbers; diverse
- c. small numbers; limited
- d. large numbers; limited

Answer: a

Learning Objective: 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

Topic/Concept: Gene–Environment Interactions

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

64. The experiment by Meaney and colleagues (Meaney, 2010; Weaver et al., 2004) on rats raised by nurturant and non-nurturant mothers concluded that early experience \_\_\_\_\_.

- a. cannot modify gene expression
- b. can modify gene expression if it starts before birth
- c. can modify gene expression
- d. has no impact on gene expression

Answer: c

Learning Objective: 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

Topic/Concept: Environmental Influences on Gene Expression

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

65. \_\_\_\_\_ is a mechanism in which chemicals attached to the genes can turn gene expression on or off, based on input from other genes or from the environment.

- a. Epigenesis
- b. Distal influence
- c. Heritability
- d. Proximal influence

Answer: a

Learning Objective: 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

Topic/Concept: Environmental Influences on Gene Expression

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.2 Develop a working knowledge of psychology’s content domains.

66. As an epigenetic mechanism, methyl groups \_\_\_\_\_.
- have no impact on the expression of genes
  - alter the sequence of letters in the DNA code
  - attach to DNA and reduce the expression of some genes
  - are present in DNA due to rare mutations

Answer: c

Learning Objective: 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

Topic/Concept: Environmental Influences on Gene Expression

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

67. Studies have found that life stress \_\_\_\_\_ is associated with higher degrees of methylation in genes involved in brain development.
- after age 5
  - at any point in the life span
  - never
  - in the first four years of life

Answer: d

Learning Objective: 2.3.3 Describe evidence from animal and human studies that environments influence gene expression.

Topic/Concept: Environmental Influences on Gene Expression

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 2.5 Incorporate sociocultural factors in scientific inquiry.

68. Which of the following statements about epigenetics is true?
- Epigenetic changes are only one of many ways that experience can modify DNA expression.
  - Epigenetic findings are rejected by most developmental scientists because they contrast with traditional views of heredity and environment.
  - Epigenetics has proven that there is no biological mechanism through which experiences can affect gene expression.
  - Through over a century of research, epigenetics has contributed substantially to the body of developmental knowledge.

Answer: a

Learning Objective: 2.3.3 Describe evidence from animal and human studies that environments influence gene expression.

Topic/Concept: Environmental Influences on Gene Expression

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

69. The \_\_\_\_\_ approach claims that the emergence of social smiling results from factors ranging from genetic activity to the social environment.
- developmental systems
  - traditional nature–nurture
  - polygenetic inheritance
  - segregating gene

Answer: a

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 1.3 Describe applications of psychology.

70. According to Gottlieb, development is probabilistic, meaning that \_\_\_\_\_.
- developmental systems are in place from birth
  - the environment does little to influence genetic expression
  - development is not influenced by any specific factor with certainty
  - epigenetic changes are the only way the environment influences genetic expression

Answer: c

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Difficult

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

71. In Gottlieb's developmental systems model, the influences of genetic and neural activity are \_\_\_\_\_.
- deterministic of behavior
  - part of the species-typical rearing environment
  - bidirectional
  - indistinguishable

Answer: c

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

72. Gottlieb proposed that each species inherits not only species-typical genes, but also \_\_\_\_\_.

- a. the same environmental context
- b. a species-typical rearing environment
- c. species-atypical genes
- d. identical epigenetic factors

Answer: b

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 2.1 Use scientific reasoning to interpret psychological phenomena.

73. Abnormal development resulting from the experience of institutionalized children in Romania who remained in the institutions for 18 months or more could be attributed in Gottlieb's model to \_\_\_\_\_.

- a. genetic activity
- b. neural activity
- c. epigenesis
- d. a major alteration to the species-typical rearing environment

Answer: d

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

74. According to Gottlieb, the inevitability of development is \_\_\_\_\_.

- a. the fundamental principle of human development
- b. a result of genetically controlled maturation and a species-typical rearing environment
- c. a result primarily of genetically controlled maturation
- d. applicable to humans in all circumstances

Answer: b

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Moderate

Skill Level: Remember the Facts

APA Learning Objective: 2.1 Use scientific reasoning to interpret psychological phenomena.

75. The first environment in which genes begin functioning is \_\_\_\_\_.
- a. different cell types
  - b. a single cell
  - c. the womb
  - d. a variety of chemicals

Answer: b

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

76. The developmental systems model is best thought of as a(n) \_\_\_\_\_.
- a. conceptual framework
  - b. specific theory about development
  - c. concept that no longer applies to developmental science
  - d. complex theory that is quite easy to test

Answer: a

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

77. Because the problem of obesity has occurred across children as a group, \_\_\_\_\_.
- a. it is entirely due to genetic factors
  - b. it should probably no longer be viewed as a problem
  - c. it is entirely due to environmental factors
  - d. it cannot be entirely due to genetic factors

Answer: d

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 2.3 Engage in innovative and integrative thinking and problem solving.

78. Explanations for the rise in childhood obesity using the bioecological model of development highlight the role of \_\_\_\_\_.

- a. genetics
- b. the environment
- c. epigenetics
- d. nutrition

Answer: b

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 2.3 Engage in innovative and integrative thinking and problem-solving.

79. \_\_\_\_\_ refer(s) to environmental influences that are not present in the child's immediate environment, but can have an effect through the immediate environment.
- a. Proximal influences
  - b. Epigenesis
  - c. Distal influences
  - d. Adoption design

Answer: c

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Easy

Skill Level: Remember the Facts

APA Learning Objective: 1.3 Describe applications of psychology.

80. In Caleb's house, snacks are readily available, and this contributes to his weight gain. According to the bioecological model of development, snacks in the home are \_\_\_\_\_.
- a. proximal influences
  - b. biological factors
  - c. distal influences
  - d. inevitable

Answer: a

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

81. A(n) \_\_\_\_\_ influence on eating habits is the large portion sizes sold by fast-food restaurants.

- a. healthy
- b. proximal
- c. distal
- d. epigenetic

Answer: c

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

82. The federal policies set to govern what children eat in school lunches represents a(n) \_\_\_\_\_ influence on eating habits.
- a. healthy
  - b. proximal
  - c. distal
  - d. epigenetic

Answer: c

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Moderate

Skill Level: Understand the Concepts

APA Learning Objective: 1.3 Describe applications of psychology.

### **Short-Answer Questions**

83. How do boys and girls differ in their chromosomal makeup?

Answer: The ideal answer should include:

1. Boys have an X and a Y chromosome.
2. Girls have two X chromosomes.

Learning Objective: 2.1.1 Explain the four major functions of genes.

Topic/Concept: The Nature of Chromosomes, Genes, and Sexual Reproduction

Difficulty Level: Easy

Skill Level: Apply What You Know

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

84. How are genotype and phenotype different? Provide an example of each.

Answer: The ideal answer should include:

1. The genotype is a set of one or more genes of an individual, and the phenotype is the observable expression of those genes in a given environment of rearing, in terms of the person's physical and psychological makeup.
2. For example, the PKU genotype contains a recessive allele.
3. The phenotype of PKU varies depending on how much phenylalanine is present in the individual's diet.

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

85. John has Down syndrome. What can we infer about his chromosomal makeup?

Answer: The ideal answer should include:

1. Down syndrome is caused by an extra 21st chromosome.
2. Therefore, we can infer that John has three copies of the 21st chromosome instead of the typical two copies.

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

86. Kallie and Kaylie are identical twins. How are identical twins formed?

Answer: The ideal answer should include:

1. Identical twins are formed when two identical collections of cells in an early phase of development divide into two identical copies of the cells, both of which develop in the mother's womb.
2. Kallie and Kaylie formed from one zygote that divided into two identical copies.

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

87. Genie and Susie are siblings who are both interested in music and play in the school band. Behavior geneticists explain the similarities between these siblings in what two ways?

Answer: The ideal answer should include:

1. They explain it in terms of shared genes as well as a shared environment.

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Easy

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

88. Explain what is meant by the transactions between genes and the environment. Provide an example to support your response.

Answer: The ideal answer should include:

1. Genes and the environment continuously work together to produce developmental change.
2. The example may include a gene–environment correlation, in which the child’s genetic characteristics are associated with the child’s environment.
3. For instance, a child born to very athletic parents may have a genetic predisposition that includes athletic talents and interests. The genetic predisposition may lead to the child being exposed to greater-than-average amounts of experience with sports.

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

89. What are the sources of the passive gene–environment correlation? Provide an example to support your response.

Answer: The ideal answer should include:

1. The sources of the passive gene–environment correlation are parents, siblings, and other genetically related individuals who are also part of the child’s home environment.
2. An example is that parents who are musically talented might enroll their children in music classes.

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

90. From an evolutionary perspective, why have humans evolved to prefer foods that are sweet and foods with dietary fat?

Answer: The ideal answer should include:

1. When food was scarce, early humans needed to search for ripe fruits and vegetables, which would have a sweeter taste, and sources of protein and fat, such as nuts and meat.

2. These were necessary as sources of energy and in order to survive.

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

## **Essay Questions**

91. Compare and contrast the four major functions of genes.

Answer: The ideal answer should include:

1. Genes are used in four different processes that enable various functions critical to development.
2. Genes are used to make proteins. The DNA sequence is used as a template for making proteins in the cell.
3. Genes duplicate themselves. The DNA sequence is duplicated when a cell divides by mitosis, an essential process in the growth of the body.
4. Genes enable sexual reproduction. Each chromosome pair duplicates itself and gamete cells are formed containing one of each pair of chromosomes (23 total) in the sperm cell and the ovum. These combine during fertilization to produce a zygote with 46 chromosomes that mingle the father's and mother's DNA.
5. Genes are used to regulate other genes.

Learning Objective: 2.1.1 Explain the four major functions of genes.

Topic/Concept: The Nature of Chromosomes, Genes, and Sexual Reproduction

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

92. How does dominant-recessive inheritance work? Apply this to a specific example of dominant-recessive inheritance.

Answer: The ideal answer should include:

1. One of the two alleles is dominant in dominant-recessive inheritance. This means that the dominant allele is expressed, and the other allele is recessive.
2. Recessive alleles are expressed only when a child receives one recessive allele from each parent.
3. The text gives several examples of dominant-recessive inheritance patterns, including tongue rolling, dimpled cheeks, Huntington's disease, and PKU.

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

93. Peter, a junior high school student, is color-blind. Why is Peter, a boy, more likely than a girl to be color-blind?

Answer: The ideal answer should include:

1. Color blindness is caused by a recessive allele on the X chromosome.
2. Boys have only one X chromosome, while girls have two.
3. Boys are more likely to be color-blind than girls because they only need inherit one allele on an X chromosome, whereas girls must inherit two recessive alleles.
4. The recessive allele on the X chromosome is expressed as color blindness in boys because there is no corresponding allele on the Y chromosome.

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Topic/Concept: Patterns of Inheritance

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

94. Explain how genes affect behavior using the example of fragile X syndrome.

Answer: The ideal answer should include:

1. Genetic level: Fragile X occurs when a gene on the X chromosome is silenced due to a mutation. The gene thus fails to instruct the cell to assemble a particular protein known as FMRP that is used in building the brain.
2. Neural level: A brain deficiency of FMRP leads to reduced neural activity and widespread low-level impairment of brain areas involved in executive functions and other cognitive processes.
3. Cognitive level: Executive functioning, memory, speech, language, and spatial dysfunctions occur, leading to poorer performance on tests of these abilities.
4. Environmental level: The cognitive impairments affect the way the individual selects and responds to environmental stimuli.
5. Behavioral level: The individual has problems such as hyperarousal, lack of inhibitions of behavior, and social anxiety.

Learning Objective: 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Topic/Concept: Understanding the Path from Genes to Behavior: Fragile X Syndrome

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

95. Describe the chromosomal basis of Down syndrome and the physical and behavioral characteristics of typical children with this disorder.

Answer: The ideal answer should include:

1. Down syndrome occurs when there is an extra 21st chromosome in the ovum, and an individual is born with three instead of two 21st chromosomes.
2. The physical characteristics include a shorter-than-average height, flattened face, protruding tongue, small ears and mouth, and distinctive eye shape.
3. Children have varying degrees of intellectual impairment resulting in slow development of motor, social, and cognitive skills.
4. Individuals with Down syndrome often suffer heart problems and have a shortened life span.

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Topic/Concept: Chromosomal Errors

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

96. Compare and contrast how identical and fraternal twins are formed. Then, link this to the percentage of genetic similarity in each.

Answer: The ideal answer should include:

1. Identical twins are formed when two identical collections of cells in an early phase of development divide into two identical copies of the cells, both of which develop in the mother's womb.
2. Fraternal twins are formed when two separate ova are fertilized, both of which develop in the mother's womb.
3. Because identical twins are formed from one zygote that splits into two, they are 100 percent genetically similar. Because fraternal twins form from two separate ova, they are 50 percent genetically similar.

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Analyze It

APA Learning Objective: 1.2 Develop a working knowledge of psychology's content domains.

97. Explain how the twin design is used to separate influences of genes and environment on human behavior. What types of conclusions can be drawn from the different types of twin designs?

Answer: The ideal answer should include:

1. Identical twins share 100 percent of their genes and fraternal twins only 50 percent.
2. In comparison studies, if identical twins are more similar on a given physical or psychological trait than fraternal twins, it provides evidence that genes make an important contribution to that trait.
3. Because the environments of identical twins may be more similar than those of fraternal twins, the twins reared apart design is an important method of examining

whether identical twins are still more similar than fraternal twins even when raised in different homes and cultural environments.

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

98. Explain how the adoption design is used to separate influences of genes and environment on human behavior. What types of conclusions can be drawn from an adoption study?

Answer: The ideal answer should include:

1. A comparison is made between the child's psychological traits and those of the adoptive parent, who shares no genes but raised the child, and the biological parent, who shares 50 percent of the child's genes but did not raise the child.
2. Conclusions that can be drawn include the relative role of genetics and the environment in development. For instance, increased similarity on a given trait between the biological parent and child indicates genetic influence. Increased similarity on a given trait between the adoptive parent and child indicates environmental influence.

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

99. Compare and contrast twin designs and adoption designs. What conclusions can be drawn from each design about the relative influence of genetics and the environment on development?

Answer: The ideal answer should include:

1. In twin designs, identical twins share 100 percent of their genes and fraternal twins only share 50 percent. In one type of twin designs, identical and fraternal twins who are reared in the same home are compared on various traits.
2. In comparison studies, if identical twins are more similar on a given physical or psychological trait than fraternal twins, it provides evidence that genes make an important contribution to that trait.
3. In some twin design studies, identical twins who are reared apart are compared to fraternal twins who are reared together. If identical twins who are reared apart are more similar to one another compared to fraternal reared together, the role of genetics is highlighted.
4. Because the environments of identical twins may be more similar than those of fraternal twins, the twins reared apart design is an important method of examining whether identical twins are still more similar than fraternal twins even when raised in different homes and cultural environments.

5. In adoption designs, a comparison is made between the child's psychological traits and those of the adoptive parent, who shares no genes but raised the child, and the biological parent, who shares 50 percent of the child's genes but did not raise the child.

6. A positive correlation between the biological parent and the child on a particular trait indicates a genetic influence. A positive correlation between the adoptive parent and child on a particular trait indicates an environmental influence.

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Topic/Concept: Using Family Resemblance to Study Heredity and Environment

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

100. Compare and contrast the concepts of heritability, shared environment, and non-shared environment. Why is the non-shared environment typically viewed as more influential in development compared to the shared environment?

Answer: The ideal answer should include:

1. Heritability is the proportion of variation on a trait within a population that is due to genetic variation.
2. Shared environment is part of the environmental variation—specifically, influences that make children or adults raised in the same environment more similar than people raised in different environments.
3. Non-shared environment refers to influences that make children or adults raised in the same general environment different from one another.
4. Some of these differences may also be due to error of measurement, which is indistinguishable from non-shared environmental influences.
5. The non-shared environment is typically viewed as more influential in development compared to the shared environment because the non-shared environment reflects different, individual experiences. These different experiences may help account for the individual differences seen in children, especially among children who grow up in the same home and thus also have many shared experiences.

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Topic/Concept: Heritability and Shared and Non-Shared Environment

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

101. Describe the limitations to behavior genetics studies. How do these limitations impact the types of conclusions that we can draw from behavior genetics studies?

Answer: The ideal answer should include:

1. There are three limitations that are important to consider in behavior genetic studies:
2. Genes influence environments.

3. Gene–environment interaction occurs.
4. Environments influence gene expression.
5. The impact on conclusions drawn means that we must always consider the role of both the environment and genetics in understanding development. The constant, bidirectional processes that occur must always be considered when explaining development.

Learning Objective: 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

Topic/Concept: Limitations of Behavior Genetic Studies

Difficulty Level: Moderate

Skill Level: Analyze It

APA Learning Objective: 2.1 Use scientific reasoning to interpret psychological phenomena.

102. Explain and give examples of passive, evocative, and active gene–environment correlations.

Answer: The ideal answer should include:

1. A passive gene–environment correlation refers to a situation in which children inherit a genotype that is correlated with their family environment. For example, a child with genes predisposing him to be a strong reader also is likely to have more experiences with books because his parents carry similar genes and they provide experiences with books in the home environment.
2. An evocative gene–environment correlation refers to a situation in which individuals evoke reactions from other people on the basis of their genotype, thus changing the environment to be more consistent with their genotype. For example, a physically active child induces her parents to provide her with more exercise and experience with sports.
3. An active gene–environment correlation refers to a situation in which individuals seek out or create environments that are correlated with their genetic predispositions. For example, children who are more sociable seek out more occasions for interacting socially with peers or adults, and thus gain in social skills not only because of their genetic tendencies, but the altered environment they experience.

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Topic/Concept: Gene–Environment Correlations

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

103. Describe research evidence for gene–environment interactions in human behavior. What types of conclusions can be drawn from these studies?

Answer: The ideal answer should include:

1. The two studies by Caspi and colleagues provide such evidence.
2. In Caspi et al. (2002), adults with low MAOA activity showed a larger effect of degrees of maltreatment in their earlier years on later antisocial behavior than individuals with high MAOA activity.

3. We could say that low MAOA activity is a genetic risk factor for negative effects of maltreatment on antisocial behavior, and high MAOA activity is a genetic protective factor for reduced effects of maltreatment on antisocial behavior.
4. In Caspi et al. (2003) adults with a short allele in the 5-HTT serotonin transporter gene showed a larger difference in rates of adult depression as a function of variations in severity of maltreatment in their earlier years than was the case for individuals with either a combination of long and short alleles or with two long alleles.
5. We could say that two long alleles were a protective genetic factor for negative influences of maltreatment on depression, and two short alleles were a genetic risk factor for negative effects of maltreatment on depression.
6. Conclusions from these studies support the role of genes and the environment in influencing developmental outcomes. Results from these studies demonstrate that genetic inheritance may put one at increased risk for maladaptive outcomes, provided that the individual has the requisite experience.

Learning Objective: 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

Topic/Concept: Gene–Environment Interactions

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 2.1 Use scientific reasoning to interpret psychological phenomena.

104. Describe how epigenetics works in the expression of genes. Then, apply this to explaining why the epigenetic profiles of identical twins may become less similar as they age.

Answer: The ideal answer should include:

1. Epigenesis is a mechanism in which chemicals such as methyl groups attach to the genes and can control where and when genes get expressed.
2. The DNA code itself is not altered. This occurs based on input from other genes, or from the environment.
3. Biologists and developmental scientists increasingly believe that environmental effects on gene expression may operate partly through epigenesis. There is some evidence that this may be the case.
4. Epigenetic profiles of identical twins may become less similar with age because as twins age, they may have fewer of the same environmental experiences. For instance, one twin may exercise regularly, and the other does not. One twin may begin smoking cigarettes, and the other does not.
5. These different experiences may lead to differences in the epigenetic profile between identical twins.

Learning Objective: 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

Topic/Concept: Environmental Influences on Gene Expression

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 2.1 Use scientific reasoning to interpret psychological phenomena.

105. Describe evidence from animal and human studies that environments influence gene expression. What types of conclusions can be drawn from these studies?

Answer: The ideal answer should include:

1. Studies show that mother rats vary genetically in their tendency to lick and groom their offspring and engage in arched back nursing.
2. To determine whether differences in offspring behavior were due to genes or environment, the pups of nurturant mother rats were switched to the care of non-nurturant rats and vice versa (cross-fostering).
3. The results were that the type of mothering mattered more for the behavior of the pups than the genetic predispositions of the rats.
4. Studies of the baby rats' brains indicated that those raised by less nurturant mothers had reduced protein-making activity of genes controlling the brain's system for producing stress hormones.
5. One conclusion that can be drawn is that genetic expression can be modified by early experience. This means that the quality of the environment may have important implications for the offspring's behavior. In this case, environmental experience has the potential to modify the way that the brain functions, particularly in the management of the stress hormone response.

Learning Objective: 2.3.3 Describe evidence from animal and human studies that environments influence gene expression.

Topic/Concept: Environmental Influences on Gene Expression

Difficulty Level: Difficult

Skill Level: Analyze It

APA Learning Objective: 2.4 Interpret, design, and conduct basic psychological research.

106. Explain why development is viewed as probabilistic in Gottlieb's model. Despite this, why do most human beings develop motor and language skills in a similar way?

Answer: The ideal answer should include:

1. Development of a particular behavior is not determined with any certainty by any single factor (from among genetic, neural, cognitive, behavioral, and environmental influences).
2. If all of these factors push development in a particular direction, it is more likely to happen.
3. We do not see the probabilistic nature of development until one of the factors is strongly out of sync with the others. For example, in the Caspi study, genetically susceptible individuals had about the same levels of antisocial behavior and depression as less genetically susceptible individuals. However, when exposed to a grossly abnormal early environment (severe maltreatment), the genetically susceptible individuals were more likely than less susceptible individuals to have behavior problems and mental health issues.
4. Outcomes are probabilistic because both genes and environment play a role in development, and it is the particular combination that determines outcomes.
5. Gottlieb proposed that basic developmental outcomes (e.g., learning to walk and talk) are similar across human beings because development is a result of both species-typical

genes and a species-typical rearing environment, and most human beings are exposed to a species-typical rearing environment.

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Topic/Concept: The Developmental Systems Framework

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.1 Describe key concepts, principles, and overarching themes in psychology.

107. Explain and give an example of proximal and distal influences on the trend for American children to be overweight or obese.

Answer: The ideal answer should include:

1. Distal influences are outside the immediate environment of the child. Examples include the tendency for fast-food restaurants to offer high-fat and high-sugar foods in large portions for an economical price and to give free refills of sodas.
2. Proximal influences are in the immediate environment of the individual. One family going to the restaurant may read the menu and choose lower-fat and lower-sugar items. In this family, the proximal influences overrode the distal influences of the type of menu.
3. Another family going to the restaurant might give in to their children's desire for higher-fat and higher-sugar content, and so the proximal influence tends to reinforce the distal influence of menu type.

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Moderate

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

108. Explain and give an example of proximal and distal influences on the trend for American children to increasingly use technology.

Answer: The ideal answer should include:

1. Distal influences are outside the immediate environment of the child. Examples include the increasing role that technology plays at a macrosystem level, such as the influence of technology companies in influencing public policy or the increasing adoption of technology in education on the whole.
2. Proximal influences are in the immediate environment of the individual. In the child's home, proximal influences may include access to various forms of technology, from tablet/computer access in the home to the child having his or her own smartphone. In the school, the child may have access to laptops that are funded by technology companies and the teacher may use free educational software funded by technology companies.
3. In this example, the proximal and distal influences work together to support a child's use of technology.

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Topic/Concept: Bioecological Systems Model

Difficulty Level: Difficult

Skill Level: Apply What You Know

APA Learning Objective: 1.3 Describe applications of psychology.

## Revel Quizzes

The following questions appear at the end of each module and at the end of the chapter in Revel for *The Dynamic Child*, Second Edition.

### Quiz: The Dynamic Gene

#### EOM Q2.1.1

Which of the following is the process in which a cell duplicates the DNA strand and divides into two cells?

a. mitosis

b. gene expression

Consider This: Gene expression refers to the extent to which a gene can perform its function. 2.1.1 Explain the four major functions of genes.

c. polygenic inheritance

Consider This: Polygenic inheritance refers to traits or disorders influenced by the combined effects of more than one gene. 2.1.1 Explain the four major functions of genes.

d. meiosis

Consider This: Meiosis is the division of reproductive cells into daughter cells containing only one strand of DNA. 2.1.1 Explain the four major functions of genes.

Answer: a

Learning Objective: 2.1.1 Explain the four major functions of genes.

Difficulty: Moderate

Skill: Remember

#### EOM Q2.1.2

For an individual to have the behavioral expression of the disorder PKU, the individual must inherit a recessive combination of alleles and \_\_\_\_\_.

a. be exposed to phenylalanine in the diet

b. a neurocognitive deficit

Consider This: PKU can cause neurocognitive deficits but is not caused by them. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

c. an X-linked trait

Consider This: PKU is not an X-linked trait like fragile X. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

d. be exposed to a negative social environment

Consider This: The social environment may modify a child's behavior but the actual PKU disorder is not caused by the social environment. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Answer: a

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Difficulty: Moderate

Skill: Understand

EOM Q2.1.3

Fragile X is typical of genetic disorders in that it involves \_\_\_\_\_.

- a. the silencing of a gene that is critical to normal development
- b. building up of the X chromosome, causing it to block other chromosomes

Consider This: In fragile X syndrome, a portion of the X chromosome can break down.

2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

- c. more severe effects in girls because they have two X chromosomes

Consider This: Girls with fragile X often show lessened effects of the disorder because they have a normal version of the fragile X gene on the unaffected chromosome.

2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

- d. no noticeable effect on the patient's life, thus making it difficult to diagnose

Consider This: Although fragile X can vary in its expression (and hence severity) across individuals, in most people it leads to problems in development. 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Answer: a

Learning Objective: 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Difficulty: Moderate

Skill: Remember

EOM Q2.1.4

When many genes act together, this is called \_\_\_\_\_.

- a. polygenic
- b. a phenotype

Consider This: A phenotype is an observable trait or disease shown by an individual, influenced in varying degrees by genotype and by environment. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

- c. mitosis

Consider This: Mitosis is the process in which a cell duplicates the DNA strand and divides into two cells. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

- d. meiosis

Consider This: Meiosis is the division of reproductive cells into daughter cells containing only one strand of DNA. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Answer: a

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Difficulty: Moderate

Skill: Understand

EOM Q2.1.5

The increased risk of having a baby with Down syndrome is for mothers who are \_\_\_\_\_.

a. over the age of 35

b. between the ages of 25 and 34

Consider This: It is true that 80 percent of Down syndrome cases in the United States occur to mothers younger than 35, because they are more likely as a group to have babies. However, risks for an individual woman within this particular group are not as high as at other ages. 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

c. between the ages of 18 and 24

Consider This: It is true that 80 percent of Down syndrome cases in the United States occur to mothers younger than 35, because they are more likely as a group to have babies. However, risks for an individual woman within this particular group are not as high as at other ages. 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

d. white

Consider This: Down syndrome is not related to race or ethnicity. 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Answer: a

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Difficulty: Moderate

Skill: Remember

## Quiz: Genes and Environment in Human Behavior

### EOM Q2.2.1

One of the problems in determining the meaning of extremely high correlations of the cognitive ability scores of identical twins is that they share genes and a common environment. A design that gets around this limitation is \_\_\_\_\_.

- a. the study of identical twins reared apart and reunited
- b. the study of parents who raised their biological children

Consider This: A study of parents and biological children raised by the parents does not distinguish between genetic and environmental contributions to variation in cognitive ability. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

- c. the study of fraternal twins reared apart

Consider This: Studying fraternal twins alone does not tease apart genes and environment, as they are no more genetically similar than any other set of biological siblings. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

- d. an intervention attempting to raise the cognitive ability of twins

Consider This: Intervention studies can show whether environments can modify cognitive ability but do not provide an estimate of the relative roles of genes and environment in contributing to the variation in cognitive ability. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Answer: a

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Difficulty: Difficult

Skill: Understand

### EOM Q2.2.2

Which of the following definitions corresponds to the term “segregating genes”?

- a. genes that have different alleles and hence can produce variation among people
- b. structures that contain the DNA strands

Consider This: Chromosomes are structures that contain the DNA strands. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

- c. the fertilized ovum, containing the full complement of chromosomes from mother and father

Consider This: The zygote is the fertilized ovum, containing the full complement of chromosomes from mother and father. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

- d. the particular combination of alleles present in an individual

Consider This: The genotype is the particular combination of alleles present in an individual. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Answer: a

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Difficulty: Moderate

Skill: Remember

EOM Q2.2.3

The variability of IQ in children is found to be about half attributable to genetic differences.

Approximately \_\_\_\_\_ is attributable to variation in shared environment, and \_\_\_\_\_ is attributable to variation in non-shared environment or error.

a. 25 percent; 25 percent

b. 64 percent; 62 percent

Consider This: These percentages reflect the heritability of the traits of sociability and activity-impulsivity. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

c. 22 percent; 50 percent

Consider This: These percentages reflect the heritability of the traits of processing speed and conservatism. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

d. 50 percent; 50 percent

Consider This: The heritability for IQ is estimated to be about 48 percent for adoption studies and 52 percent for twin studies. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Answer: a

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Difficulty: Difficult

Skill: Analyze

EOM Q2.2.4

Heritability of intelligence \_\_\_\_\_ with age, and the contribution of shared environment to variations in intelligence \_\_\_\_\_ with age.

a. increases; decreases

b. decreases; also decreases

Consider This: Heritability does not decrease with age. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

c. increases; also increases

Consider This: For most characteristics, the contribution of shared environment decreases. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

d. decreases; increases

Consider This: The developmental pattern in adoption studies indicates that genetically related children become more similar with age in general cognitive ability. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Answer: a

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Difficulty: Moderate

Skill: Understand

EOM Q2.2.5

Children of immigrant parents who moved from a country in which nutrition was inadequate often grow up to be taller than their parents. But the taller parents among the immigrant group tend to have taller children. This indicates that \_\_\_\_\_.

- a. without adequate nutrition, some genes affecting height might not get fully expressed
- b. height is not heritable

Consider This: Height is estimated from twin studies to be about 90 percent heritable.

2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

- c. eating adequate amounts of food is a strong genetic trait

Consider This: Food availability is an environmental factor. 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

- d. height is primarily influenced by environmental factors

Consider This: Height is estimated from twin studies to be about 90 percent heritable.

2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

Answer: a

Learning Objective: 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

Difficulty: Moderate

Skill: Apply

## Quiz: Gene–Environment Transactions

### EOM Q2.3.1

Passive gene–environment correlations are \_\_\_\_\_.

- a. present from childhood and correlated with the family environment
- b. those in which individuals seek out or create environments correlated with their genetic predispositions

Consider This: Active gene–environment correlations are those in which individuals seek out or create environments correlated with their genetic predispositions. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

- c. present when a child is adopted into a family to which s(he) is not genetically related
- d. likely to increase between childhood and adulthood

Consider This: Passive gene–environment correlations can only occur if a child is raised by a biological parent. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Consider This: The evocative and active gene–environment correlations tend to increase between childhood and adulthood. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Answer: a

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Difficulty: Difficult

Skill: Analyze

### EOM Q2.3.2

In the study by Tucker-Drob and Harden (2012), higher cognitive ability at age 2 was correlated with parents providing more cognitive stimulation at age 4, taking into account the parents' tendency to provide cognitive stimulation at age 2. This provides evidence for \_\_\_\_\_.

- a. evocative gene–environment correlations
- b. passive gene–environment effects

Consider This: Because the child's cognitive ability is thought to elicit parental stimulation in this study, this does not fit the definition of a passive gene–environment correlation. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

- c. active gene–environment correlations

Consider This: Because the parents are providing stimulation in response to children's cognitive ability, and the child is not described as actively seeking out new experiences, this does not fit the definition of active gene–environment correlations. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

- d. a pure environmental influence of parents on children

Consider This: The results of this study provided impressive support for the idea that child behavior and the environment influence each other bidirectionally over time. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Answer: a

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Difficulty: Moderate

Skill: Understand

#### EOM Q2.3.3

In the studies by Caspi and colleagues shown in Figures 2.6 and 2.7, gene–environment interaction occurred when levels of maltreatment were associated with different outcomes (in this case, antisocial behavior or depression) for children with different \_\_\_\_\_.

a. genotypes

b. gametes

Consider This: Gametes are the reproductive cells, e.g., sperm in males or ovum in females. 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

c. personalities

Consider This: Children were not put into groups on the basis of personality. 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

d. epigenomes

Consider This: The study presented no direct evidence that any of the effects in the study were effects of the environment on genetic expression through epigenetic mechanisms.

2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

Answer: a

Learning Objective: 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

Difficulty: Moderate

Skill: Remember

#### EOM Q2.3.4

Experiments by Meaney and colleagues used a technique called cross-fostering to provide direct evidence that early experience can modify \_\_\_\_\_ in rats.

a. gene expression

b. selective breeding

Consider This: Selective breeding was used to develop the nurturant and non-nurturant strains of mother rats. 2.3.3 Describe evidence from animal and human studies that environments influence gene expression.

c. environment

Consider This: These studies dealt with the effect of environment on genes, not effects of experience on environments. 2.3.3 Describe evidence from animal and human studies that environments influence gene expression.

d. genotype

Consider This: The studies did not provide evidence that genotype (i.e., the DNA sequence) was altered by early experience. 2.3.3 Describe evidence from animal and human studies that environments influence gene expression.

Answer: a

Learning Objective: 2.3.3 Describe evidence from animal and human studies that environments influence gene expression.

Difficulty: Moderate

Skill: Understand

EOM Q2.3.5

One mechanism by which experience can “get under the skin” is epigenesis, in which

\_\_\_\_\_.

a. experiences influence chemical processes that control where and when genes get expressed

b. experience leads individuals to associate stressful experiences with certain stimuli through classical conditioning

Consider This: Epigenesis is a chemical response, not a psychological one. 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

c. experiences lead individuals to injure themselves

Consider This: Epigenesis operates at the level of the DNA, rather than at the level of overt injury to the body. 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

d. experience causes mutations in genes that control whether other genes are expressed

Consider This: Epigenesis does not involve a process of mutating DNA. 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

Answer: a

Learning Objective: 2.3.3 Describe evidence from animal and human studies that environments influence gene expression.

Difficulty: Difficult

Skill: Understand

## Quiz: Developmental and Bioecological Systems Approaches

### EOM Q2.4.1

In Gottlieb's model, the *probabilistic* aspect of development refers to the idea that the characteristics of organisms at any point in their development (such as the current status of brain development or behavior) \_\_\_\_\_.

a. are determined by genetic and environmental factors and the interaction of such factors, but not with absolute certainty

b. are determined by genetic mutations that are probabilistic

Consider This: Gottlieb's theory does not discuss the process by which genetic mutations occur. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

c. are completely determined by genes operating on brain development

Consider This: Gottlieb's theory proposes that influences on brain development go beyond simply genetic influences. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

d. are completely determined by the environment operating on behavior

Consider This: Gottlieb's theory is based on more than just environmental influences on behavior or brain development. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Answer: a

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Difficulty: Moderate

Skill: Understand

### EOM Q2.4.2

According to the developmental systems model, normal or typical developmental sequences occur due to both the influences of species-typical genes and the influences of \_\_\_\_\_.

a. a species-typical rearing environment

b. atypical environmental influences

Consider This: Atypical environmental influences would tend not to produce normal or typical developmental sequences. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

c. the prenatal environment, but not the postnatal environment

Consider This: Environmental influences and interactions with other factors could occur at any point in development, not just the prenatal period. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

d. rare genetic disorders

Consider This: Gottlieb's model focused primarily on genes and environments that would commonly occur. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Answer: a

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Difficulty: Moderate

Skill: Understand

EOM Q2.4.3

Because of the relatively rapid increase in obesity (over the past 30 to 40 years), it is likely that the change stems mostly from changes in the \_\_\_\_\_.

a. environment or environmental contexts

b. genetic variation among people

Consider This: Although genes predispose some people to gain weight, the weight gain has occurred across children as a group, and hence cannot be due entirely to genetic factors.

2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

c. exosystems of families only

Consider This: Influences in multiple ecological systems are thought to underlie the rapid increase in obesity.

2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

d. microsystems of children only

Consider This: Influences in multiple ecological systems are thought to underlie the rapid increase in obesity.

2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Answer: a

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Difficulty: Easy

Skill: Understand

EOM Q2.4.4

Changes to fast-food restaurants (which now generally display the caloric content of items on the menu) would be considered a(n) \_\_\_\_\_ influence, whereas a parent who lets the child decide to select an extra-large helping of cheese would be considered a \_\_\_\_\_ influence.

a. distal; proximal

b. microsystem; macrosystem

Consider This: Changes to fast-food restaurants might be considered a macrosystem, or chronosystem, influence, whereas family eating habits are a microsystem influence.

2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

c. exosystem; macrosystem

Consider This: Fast-food restaurants are not an exosystem influence because they potentially affect the entire population, not just the child's family; family eating habits are part of the microsystem, not the macrosystem.

2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

d. genotypical; phenotypical

Consider This: Genotypes are the particular combinations of alleles present in an individual; phenotypes are the observable traits or diseases shown by an individual, influenced in varying degrees by genotype and environment.

2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

influences of different levels of the external environment might be studied, using the example of obesity.

Answer: a

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Difficulty: Moderate

Skill: Understand

## Chapter Quiz: Heredity and Environment

### EOC Q2.1

The sex of the offspring is determined \_\_\_\_\_.

- a. at fertilization by the 23rd chromosome pair
- b. by genes located on several of the chromosomes

Consider This: Genes relevant to sex determination are only found on one chromosome pair. 2.1.1 Explain the four major functions of genes.

- c. by which ovum (X or Y) the sperm penetrates

Consider This: The sperm, not the ovum, determines sex, because sperm can have an X or Y chromosome, but ova have only an X chromosome. 2.1.1 Explain the four major functions of genes.

- d. by any of several sperm cells that simultaneously penetrate the ovum

Consider This: Only one sperm cell can penetrate each ovum. 2.1.1 Explain the four major functions of genes.

Answer: a

Learning Objective: 2.1.1 Explain the four major functions of genes.

Difficulty: Moderate

Skill: Remember

### EOC Q2.2

When genes switch on or off during development, this specifically refers to \_\_\_\_\_.

- a. whether they make proteins (on) or not (off)
- b. whether there is a disorder (on) or not (off)

Consider This: Disorders can occur either when a gene is switched on or when it is switched off, but usually occur when a gene is switched off. 2.1.1 Explain the four major functions of genes.

- c. whether they cause a disease (off) or not (on)

Consider This: Many diseases are caused by genes that are switched off, as in fragile X, but much of normal development depends on switching genes on and off at various points. 2.1.1 Explain the four major functions of genes.

- d. whether they contain the correct DNA sequence inherited from the parent (on) or not (off)

Consider This: The DNA sequence inherited from the parents remains the same during development, but certain portions can be turned on or off. 2.1.1 Explain the four major functions of genes.

Answer: a

Learning Objective: 2.1.1 Explain the four major functions of genes.

Difficulty: Moderate

Skill: Understand

### EOC Q2.3

A dominant gene for a disorder, such as the gene for Huntington's disease, \_\_\_\_\_.

- a. can be inherited if only one parent carries the Huntington allele
- b. can be inherited only from the father

Consider This: The Huntington's gene is located on chromosome 4, not 23, and hence is not classified as a sex-linked disorder. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

c. can be inherited only from the mother

Consider This: The Huntington's gene is located on chromosome 4, not 23, and hence is not classified as a sex-linked disorder. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

d. can be inherited only if both parents carry the gene

Consider This: Recessive disorders can be inherited only if both parents carry the gene, and the child inherits both recessive alleles, but this is not how dominant genes work.

2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Answer: a

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Difficulty: Easy

Skill: Analyze

#### EOC Q2.4

The inheritance pattern in most single-gene disorders in human beings is \_\_\_\_\_.

a. recessive

b. dominant

Consider This: Dominant disorders such as Huntington's Disease are rare. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

c. X-linked

Consider This: Although some single-gene disorders (such as fragile X) are sex-linked, there are 22 other chromosomes on which single-gene disorders can be found, and hence most are on non-sex chromosomes. 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

d. via chromosomal errors

Consider This: Chromosomal errors can involve displacement or deletion of portions of chromosomes during the process of meiosis, and hence are not really inherited from the parent (meaning the disorder was not present in the parent's genetic line). 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Answer: a

Learning Objective: 2.1.2 Explain how genes get passed from generation to generation and produce variability in human development.

Difficulty: Difficult

Skill: Understand

#### EOC Q2.5

When an individual has a disorder, such as fragile X, but the effects of the disorder on the brain are lessened by some factor (such as the sex of the offspring—male or female), these are effects on \_\_\_\_\_.

a. gene expression

b. gene mutation

Consider This: Gene mutations affect the DNA sequence and can cause disorders such as fragile X, but this is not the term used to refer to lessening of the effects of these disorders. 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

c. the DNA sequence

Consider This: The DNA sequence remains unchanged in the bodily cells of the organism during its lifetime. 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

d. the environment

Consider This: Although the environment might be involved in lessening genetic effects, it is not the term used to refer to them. 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Answer: a

Learning Objective: 2.1.3 Explain the indirect pathway by which genes affect human behavior, using the example of fragile X syndrome.

Difficulty: Moderate

Skill: Analyze

#### EOC Q2.6

The most common cause of Down syndrome is an extra 21st chromosome \_\_\_\_\_.

a. in the ovum

b. in a parent older than 35

Consider This: Eighty percent of cases of Down syndrome occur with parents younger than 35 because they have more babies as a population than parents over 35. 2.1.4

Describe the cause and the main characteristics of two instances of chromosomal errors.

c. in a father over 35

Consider This: Older fathers may supply an extra 21st chromosome in a sperm cell, but this is not the most common source of Down syndrome. 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

d. in the sperm cell

Consider This: The extra chromosome can come from an older father, but this occurs in only a small number of cases. 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Answer: a

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Difficulty: Easy

Skill: Remember

#### EOC Q2.7

Klinefelter syndrome, in which a male is born with an extra X chromosome, manifests itself typically as \_\_\_\_\_.

a. specific deficits in verbal, academic, attention, and motor skills

b. widespread, severe intellectual impairment

Consider This: Boys with Klinefelter syndrome tend to have specific, rather than global, intellectual impairment. 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

c. high estrogen levels, leading to feminization of the body

Consider This: Some of the physical characteristics of those with Klinefelter syndrome include enhanced breast development and female body fat distribution, but this is the result of low testosterone, not high estrogen levels. 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

d. low estrogen and high testosterone levels, which result in early development of male secondary sex characteristics

Consider This: Delayed puberty and infertility, symptoms of Klinefelter syndrome, are caused by low testosterone levels. 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Answer: a

Learning Objective: 2.1.4 Describe the cause and the main characteristics of two instances of chromosomal errors.

Difficulty: Moderate

Skill: Understand

#### EOC Q2.8

Genetic counselors help prospective parents and other individuals \_\_\_\_\_.

a. navigate a bewildering number of potential genetic tests and access what their family history and genetic test results might mean for a future offspring

b. make a decision based on the exact probability their child will have a serious medical or mental disorder

Consider This: Genetic counselors discuss possibilities and help individuals deal with possible risks. 2.1.5 Describe what genetic counselors do to help prospective parents consider whether to have a child.

c. understand the laws of genetics, but leave counseling to psychologists

Consider This: Certified genetic counselors generally have a master's degree in their specialty, in addition to other training in biology and psychological counseling techniques. 2.1.5 Describe what genetic counselors do to help prospective parents consider whether to have a child.

d. make use of new tools that allow a pinpoint diagnosis of disorders such as autism and schizophrenia in a child they may conceive

Consider This: Genetic counselors cannot make pinpoint diagnoses but discuss possibilities. 2.1.5 Describe what genetic counselors do to help prospective parents consider whether to have a child.

Answer: a

Learning Objective: 2.1.5 Describe what genetic counselors do to help prospective parents consider whether to have a child.

Difficulty: Easy

Skill: Remember

EOC Q2.9

The pattern of findings in family studies (higher correlations for IQ scores among relatives that are genetically more similar) \_\_\_\_\_.

a. supports the influences of both genes and environment

b. generally supports a small role for environment in human psychological traits

Consider This: Behavior genetics studies generally find evidence of environmental contributions to variation in traits. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

c. reveals that neither genes nor environment strongly influence IQ

Consider This: The values of heritability for common traits and for major mental disorders are significant, and also leave room for environmental contributions to variation in psychological traits. Shared environment, for example, is estimated to account for about 25 percent of the variability in IQ in children. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

d. generally supports a small role for heredity in human psychological traits

Consider This: The upshot of several decades of twin and adoption studies is that virtually all psychological characteristics of interest have some degree of heritability. 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Answer: a

Learning Objective: 2.2.1 Explain how scientists identify genetic and environmental contributions to complex traits such as IQ.

Difficulty: Difficult

Skill: Analyze

EOC Q2.10

Which term refers to the proportion of variation of a trait (such as IQ) within the population that can be attributed to variation in gene expression?

a. heritability

b. polygenic inheritance

Consider This: Polygenic inheritance refers to traits or disorders influenced by the combined effects of more than one gene and does not refer to a proportion of variance. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

c. gene expression

Consider This: Gene expression means the extent to which a gene can perform its function (of regulation of other genes or production of proteins used in the body). 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

d. segregating genes

Consider This: Segregating genes have different alleles and therefore can be inherited in different patterns from one person to another, but they do not provide any information about proportion of variance in a trait. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Answer: a

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Difficulty: Easy

Skill: Remember

EOC Q2.11

In many developmental and mental disorders, the heritability is very high (between 70 percent and 90 percent). This means that \_\_\_\_\_.

- a. there is still room for an impact of the environment
- b. the shared environment makes up the remaining 10 to 30 percent

Consider This: Behavior geneticists break environmental influences into two broad categories: shared environment and non-shared environment. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

- c. the non-shared environment generally makes up the remaining 10 to 30 percent

Consider This: Both shared environment and non-shared environment make contributions to most traits. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

- d. the disorder is generally worse than disorders with lower heritability

Consider This: Heritability refers to the proportion of variance in a trait or disorder due to genes and has nothing to do with the severity of the disorder, which can depend on multiple genetic and environmental factors. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Answer: a

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Difficulty: Moderate

Skill: Understand

EOC Q2.12

In the Colorado Adoption Study, the correlation in adolescence between the IQ scores of biological parents and adopted-away children was \_\_\_\_\_ the correlation between adoptive parents and their adopted children.

- a. higher than
- b. the same as

Consider This: Correlations for adoptive parents and their adoptive children are small and decline over time. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

- c. lower than

Consider This: Correlations for adoptive parents and their adoptive children are small and decline over time. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

- d. much lower than

Consider This: Correlations for adoptive parents and their adoptive children are small and decline over time. 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Answer: a

Learning Objective: 2.2.2 Explain the concepts of heritability and shared and non-shared environment and how their contributions change with age.

Difficulty: Moderate

Skill: Remember

EOC Q2.13

A child who is adopted by parents who are not frequent readers keeps showing an interest in reading. Eventually, the adoptive parents respond by getting the child a library card and reading along with the child to help him. This is an example of one factor that has been proposed as a limitation to the behavior genetics approach. The factor that fits best here is \_\_\_\_\_.

- a. gene–environment correlation
- b. gene–environment interaction

Consider This: Gene–environment interactions have been found, but a better example would be that children with PKU show different outcomes in different environments (those with and without phenylalanine). 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

- c. high heritability of reading skill and interest

Consider This: Although reading ability does have significant heritability, this only can explain the child’s interest in reading, not the adoptive parents’ response. 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

- d. environmental impact on genetic expression

Consider This: Environments influence gene expression, but a better example would be that parents who grow up in poverty in one country and immigrate to another country may have children who grow up to be considerably taller than the parents. 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

Answer: a

Learning Objective: 2.2.3 Explain limitations involved in estimating hereditary and environmental influences on behavior.

Difficulty: Difficult

Skill: Understand

EOC Q2.14

A child impresses her science teacher with her high interest in science and quick learning of science in the classroom. The teacher chooses her as one of only two children from her class that will prepare an exhibit for the district-wide science fair. This most likely represents \_\_\_\_\_.

- a. both evocative and active gene–environment correlations
- b. an evocative gene–environment correlation

Consider This: In an evocative gene–environment correlation, individuals evoke reactions on the basis of their genetic predispositions but do not create them. This is not the only correlation that applies here. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

- c. an active gene–environment correlation

Consider This: In an active gene–environment correlation, individuals seek out or create environments correlated with their genetic predispositions, but this is not the only

correlation that applies here. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

d. a passive gene–environment correlation

Consider This: In passive gene–environment correlation, the individual providing the environmental stimulation is genetically related to the child. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Answer: a

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Difficulty: Difficult

Skill: Apply

#### EOC Q2.15

In the study by Tucker-Drob and Harden (2012), the relationship between parental stimulation at age 2 and child cognitive ability at age 4 was found to be primarily \_\_\_\_\_.

a. an environmental influence

b. a genetic influence

Consider This: Although parental stimulation could be part of a passive gene–environment correlation, the researchers used twin data to determine whether relationships were primarily genetic or environmental, and this particular relationship was not primarily genetic. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

c. an instance of an evocative gene–environment correlation

Consider This: In an evocative gene–environment correlation, children evoke reactions from the parents and other family members. 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

d. an instance of gene expression

Consider This: Gene expression is the extent to which a gene can perform its function (of regulation of other genes or production of proteins used in the body). 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Answer: a

Learning Objective: 2.3.1 Describe how the three types of gene–environment correlations help explain findings of twin and adoption studies.

Difficulty: Moderate

Skill: Understand

#### EOC Q2.16

Suppose scientists identify a gene related to shyness in children, but not in all cases. They find that children with this gene were more likely to withdraw from social situations when subjected to the stress of moving to a new school than when they stayed in the same school. By contrast, children without the gene showed no difference in social withdrawal in the two types of situations. This example fits most closely to the concept of \_\_\_\_\_.

a. a gene–environment interaction

b. an evocative gene–environment correlation

Consider This: Gene–environment correlation refers to genetic variation among people that influences the environments to which they are exposed, and the environment in this case is described as independent of the child’s genes. 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

c. an active gene–environment correlation

Consider This: Gene–environment correlation refers to genetic variation among people that influences the environments to which they are exposed, and the environment in this case is described as independent of the child’s genes. 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

d. a strong effect of environment on behavior

Consider This: A strong environmental influence would be more likely if scientists observed similar reactions to switching schools in children with varying genotypes. 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

Answer: a

Learning Objective: 2.3.2 Explain how scientists obtain evidence for gene–environment interactions in humans.

Difficulty: Moderate

Skill: Apply

#### EOC Q2.17

As demonstrated by Meaney et al. in their experiments with nurturant and non-nurturant rat mothers, one way that epigenesis works is by increasing the extent of attachment of chemicals called \_\_\_\_\_ to DNA, which tends to reduce the expression of certain genes.

a. methyl groups

b. chromosomes

Consider This: Chromosomes are structures that contain the DNA strands. 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

c. RNA

Consider This: RNA is a partner compound to DNA, which is not associated with reducing the expression of certain genes. 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

d. ATCG

Consider This: The genetic code consists of a string of four different chemical bases (signified with the letters A, T, C, and G) that is approximately 3 billion letters long. 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

Answer: a

Learning Objective: 2.3.3 Describe evidence from animal and human studies about how environments influence gene expression.

Difficulty: Moderate

Skill: Remember

EOC Q2.18

According to Gottlieb’s developmental systems model, the fact that if one twin has schizophrenia, only 41 percent to 65 percent of identical twins have the disorder indicates that \_\_\_\_\_.

a. the gene (or genes) for schizophrenia could have been turned on by stressful experiences in the environment for one member of a twin pair but not for the other in some cases

b. the twins must not have shared the gene for schizophrenia

Consider This: Identical twins share all their genetic material. Any differences between them must be caused by environment. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

c. genetic influences on schizophrenia are very small

Consider This: The concordance rate for fraternal twins is 0 percent to 28 percent, which is lower than the concordance rate for identical twins, indicating schizophrenia is influenced in part by genes. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

d. influences on schizophrenia are not bidirectional, as was previously thought

Consider This: Genes create proteins, which form the basis for nerve cells, and nerve cells are organized into the brain. But influences are bidirectional because the activity of the nerve cells can turn on or off particular genes. 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Answer: a

Learning Objective: 2.4.1 Describe how the developmental systems framework explains relationships among genes, the brain, behavior, and environment.

Difficulty: Easy

Skill: Understand

EOC Q2.19

A higher rate of obesity is found among poor families living in the inner city. Using Bronfenbrenner’s bioecological model, this is likely due to \_\_\_\_\_.

a. influences at both the microsystem and the exosystem levels

b. a great interest among children of poor families in playing video games rather than outdoor sports

Consider This: Families in low-income neighborhoods are likely interested in their children playing sports but are less able to afford the money and time to enroll their children in organized sports. Recreational sports and casual outdoor activities are less available to inner-city families due to overcrowded and busy streets and safety concerns of the parents. 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

c. working parents cooking unhealthy food rather than relying on the portion control provided by prepared foods

Consider This: More parents are working and there are more single-parent homes, meaning that families often do not have time to prepare meals at home and hence are more likely to eat out. 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

- d. genetic differences between poor and middle-class families in proneness to obesity  
Consider This: Because the rise in obesity has occurred across children as a group, it is likely that most of the rise in obesity is due to environmental, rather than genetic, factors.  
2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Answer: a

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Difficulty: Easy

Skill: Apply

### EOC Q2.20

Understanding the interactions between biology and environment is complicated by \_\_\_\_\_.

a. the fact that environmental contexts have multiple levels of potential influence on the child

b. the fact that behavior genetics studies have not been as rigorous or complete in measuring genes as they have been in measuring the environment

Consider This: Behavior genetics studies have not been as rigorous or complete in measuring the environment as they have been in measuring genes. 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

c. the fact that these two influences are impossibly intertwined and should no longer be studied as influences on development

Consider This: One way to explore how influences at multiple levels affect the child is to examine a problem that has environmental origins and investigate multiple levels of influence. 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

d. the interplay of genes and chromosomes

Consider This: The interplay of genes and chromosomes occurs at a genetic level and hence is not relevant to understanding biology–environment interactions. 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Answer: a

Learning Objective: 2.4.2 Explain how the influences of different levels of the external environment might be studied, using the example of obesity.

Difficulty: Moderate

Skill: Analyze