

CHAPTER 6

GENETICS, EVOLUTION, AND PERSONALITY

CHAPTER OUTLINE

- Determining Genetic Influence on Personality
 - Twin Study Method
 - Adoption Research
- What Personality Qualities are Genetically Influenced?
 - Temperaments: Activity, Sociability, and Emotionality
 - More Recent Views of Temperaments
 - Inheritance of Traits
 - Temperaments and the Five-Factor Model
 - Genetics of Other Qualities: How Distinct Are They?
 - Environmental Influences
- New Approaches to Genetics and Personality
 - Correlations Between Genetic and Environmental Influences
 - Gene-by-Environment Interactions
 - Environmental Effects on Gene Expression
 - Molecular Genetics
- Evolution and Human Behavior
 - Sociobiology and Evolutionary Psychology
 - Genetic Similarity and Attraction
 - Mate Selection and Competition for Mates
 - Mate Retention and Other Issues
 - Aggression and the Young Male Syndrome
- Assessment
- Problems in Behavior, and Behavior Change
 - Schizophrenia and Bipolar Disorder
 - Substance Use and Antisocial Behavior
 - Evolution and Problems in Behavior
 - Behavior Change: How Much Is Possible?
- Genetics and Evolution: Problems and Prospects
- Summary

CHAPTER SUMMARY

The approach to personality rooted in inheritance and evolution has two facets. One of them emphasizes that your personality is tied to the biological body you inherit. This idea goes far back in history, but today's version of the idea is quite different, emphasizing the role of genes.

Behavior genetics provides ways to find out whether personality differences are inherited. In twin studies, correlations among identical twins are compared with correlations among fraternal twins; in adoption studies, children are compared with their biological and adoptive families. Studies of identical twins raised apart provide yet a different look at the effects of inheritance and environment.

Twin research has been used to look at genetic contributions to a variety of dispositions, starting with *temperaments*: broad inherited traits that appear early in life. Evidence supports genetic influences on activity level, emotionality, and sociability. Other temperaments have been suggested, including temperaments for approach, avoidance, and effortful control. There also is evidence of genetic influence in the big five supertraits and other variables. It's unclear whether the big five derive from (or duplicate) the temperaments studied under other names. It is also unclear whether hereditary influences on other variables depend on associations between the other variable and a temperament. Recent developments in molecular genetics provide a new tool in the

search for genetic influences on personality. Now there is evidence of specific genes playing roles in traits, including novelty seeking and neuroticism.

The idea that dispositions are genetically influenced can be extended a step further, to the suggestion that many aspects of human social behavior are products of evolution. This idea is behind an area of work termed *sociobiology* or *evolutionary psychology*. Sociobiologists propose ways to account for various aspects of human behavior, even behavior that on the face of it seems not to provide an evolutionary advantage. *Altruism*, for example, is understood as people acting for the benefit of their family groups, so that the family's genes are more likely to be continued (kin selection). This idea has been extended to the notion that people are attracted to other people who share their genetic makeup.

The evolutionary view also has implications concerning mate selection, including the idea that males and females use different strategies. The male strategy is to mate whenever possible, and males are drawn to signs of reproductive capability. The female strategy is to seek the best male available, and females are drawn to signs of resources. People use the relevant strategies and act in ways that make them seem better candidates as mates. Mating pressures also may lead to aggression among young men. Theory suggests that violence is most likely among men of reproductive age who are in poor reproductive circumstances. Evidence seems to bear this out, along with the idea that much violence concerns conflicts over status.

The genetic approach to personality says little about assessment except to suggest what dispositions are particularly important to assess—those that have biological links. Assessment directly from genes seems unlikely soon, due to the probable involvement of many genes in any given trait. With regard to problems in behavior, there is substantial evidence that schizophrenia and manic-depressive disorder are affected by heredity, as are substance abuse tendencies and antisocial tendencies. As elsewhere, this area is beginning to use the tools of molecular biology to search for genetic influences.

With regard to therapeutic behavior change, this approach raises a question on the basis of studies of temperament: How much can people be expected to change, even with therapy, in directions that deviate from their biological makeup?

KEY TERMS

Adoption study: A study of resemblances between children and their adoptive and biological parents.

Allele: Some version of a particular gene.

Approach temperament: Temperamental tendency to approach rewards.

Assortative mating: Mating based on choice of specific characteristics rather than random.

Avoidance temperament: Temperamental tendency to avoid threats.

Behavioral genetics: The study of inheritance of behavioral qualities.

Candidate gene strategy: Testing specific genes because evidence links them to particular biological processes and theory links those processes to personality.

Concordance: Agreement on some characteristic between a twin and a co-twin.

Directional selection: Evolution in which one extreme of a dimension is more adaptive than the other.

Dizygotic (DZ) twins: Fraternal twins (overlapping genetically 50%, on average).

Ectomorphy: A tendency toward frail thinness.

Effortful control: A tendency to be focused, restrained, and planful.

Endomorphy: A tendency toward obesity.

Epigenetic: An effect that is not on DNA but affects DNA functioning and can be inherited.

Gene expression: Activity in which the gene engages in the processes that create a protein.

Genetic similarity theory: The idea that people work toward reproducing genes similar to their own.

Genome: The sequence of the genes contained in the full complement of chromosomes.

Genomics: See molecular genetics.

Genome-wide association study (GWAS): Study in which all genes are tested at once.

Genotype: The particular version of a gene that a given person or group has.

GxE: Gene by environment interaction, in which the environment produces different outcomes depending on genetic composition.

Heritability: An estimate of how much variance of some characteristic is accounted for by inheritance.

Inclusive fitness: The passing on of genes through the survival of relatives.

Mesomorphy: A tendency toward muscularity.

Methylation: The attachment of methyl chemical groups to a gene or surrounding material.

Molecular genetics: The study of how alleles of specific genes relate to other observed differences.

Monozygotic (MZ) twins: Identical twins (overlapping genetically 100%).

Nonshared environment effect: Effect of the environment that makes twins differ.

Polymorphism: The characteristic of having more than one allele for a given gene.

Reciprocal altruism: Helping others with the expectation the help will be returned.

Siblings: Brothers and sisters.

Sociobiology The study of the evolutionary basis for social behavior.

Stabilizing selection: Evolution in which intermediate values of a dimension are most adaptive.

Temperaments: Inherited traits that appear early in life.

Twin study: A study comparing similarity between MZ twins against similarity between DZ twins.

Quantitative genetics: The study of how much variance in a characteristic is attributable to genetics versus environment.

TEST ITEMS

Multiple Choice

- (a/112) 1. Hippocrates proposed _____ personality types.
- 4
 - 6
 - 8
 - 10
- (d/112) 2. Galen added to Hippocrates' four personality types the idea that:
- there were two additional types.
 - the personality types could be combined.
 - the personality types could not be combined.
 - each type reflect an excess of some bodily fluid.
- (b/112) 3. In the first half of the twentieth century, physical makeup referred to _____, whereas now it refers to _____.
- genes, physique
 - physique, genes
 - genes, brain processes
 - brain processes, genes
- (c/113
Box 6.1) 4. Kretschmer examined the relationship between physique and:
- body type.
 - physical sensitivity.
 - psychological disorders.
 - bodily humors.
- (b/113
Box 6.1) 5. Compared to Kretschmer's theory, Sheldon's theory concentrates more on:
- early childhood vulnerabilities.
 - normal qualities of personality.
 - gender differences in body type and personality.
 - skeletal and muscular differences.
- (a/113
Box 6.1) 6. According to Sheldon, each body characteristic reflects:
- an overemphasis on one of the layers of the embryo.
 - the interaction between genetically-determined physiology and environmental pressure.
 - brain-wave activity.
 - hormone level fluctuations.

- (c/113) 7. When twins have no more in common than other siblings, they are said to be _____ twins.
- monozygotic
 - identical
 - dizygotic
 - congenital
- (a/113) 8. Dizygotic twins:
- share the same amount of genetic material as a pair of brothers/sisters.
 - are the result of an unusual occurrence shortly after conception.
 - develop from one fertilized egg.
 - all of the above
- (d/114) 9. Twin studies are based on the assumption that:
- fraternal twins raised together are exposed to much the same life experiences.
 - fraternal twins raised together are treated differently because of their differing physical characteristics.
 - identical twins raised together are treated differently because of their differing personalities.
 - both identical and fraternal twins raised together are exposed to much the same life experiences.
- (b/114) 10. If dizygotic twins think they are monozygotic twins:
- they are more resentful of their siblings.
 - they are less resentful of their siblings.
 - they are more like their siblings.
 - they are less like their siblings.
- (c/114) 11. If the correlation for a given personality trait in a set of same-sex fraternal twins is .25 and the correlation for that same personality trait is .75 in a set of identical twins, we can assume the heritability estimate is approximately:
- .50
 - .25
 - 1.00
 - none of the above
- (d/114) 12. In an adoption study, resemblances are measured between the adopted child and:
- the biological parent.
 - the biological parent and siblings (if any).
 - the adoptive parent and siblings (if any).
 - both biological parent and adoptive parent.

- (b/115) 13. If heredity is REALLY important, then:
- fraternal twins should be more similar than identical twins if they have been raised apart.
 - identical twins raised apart should be nearly as similar as identical twins raised together.
 - fraternal twins raised apart should be more similar than identical twins raised together.
 - there should be no differences between identical twins and fraternal twins raised together.
- (d/115) 14. According to Buss and Plomin, temperaments include:
- activity level.
 - sociability.
 - emotionality.
 - all of the above
- (a/115) 15. The two aspects of activity level are:
- vigor and tempo.
 - vigor and arousal.
 - tempo and arousal.
 - arousal and responsiveness.
- (c/115) 16. Emotionality is defined by Buss and Plomin as the:
- tendency to experience positive emotion.
 - tendency to experience disgust.
 - tendency to become aroused easily.
 - all of the above
- (c/115) 17. Parent ratings of Buss's and Plomin's temperaments for their twins are:
- weakly correlated for both monozygotic and dizygotic twins.
 - strongly correlated for both monozygotic and dizygotic twins.
 - strongly correlated for monozygotic twins, but virtually uncorrelated for dizygotic twins.
 - weakly correlated for monozygotic twins, but virtually uncorrelated for dizygotic twins.
- (d/116) 18. A recent developmental approach to understanding temperaments suggests which of these?
- approach
 - avoidance
 - effortful control
 - all of the above

- (b/116) 19. When researchers examine whether the five basic factors of personality are genetically influenced, they have found:
- a. no evidence for a genetic influence.
 - b. self-report evidence suggests that they are but observer reports are inconclusive.
 - c. self-report and observer reports both suggest that they are, but research has not been done cross-culturally.
 - d. self-report, observer report, and cross-cultural research all suggest that they are.
- (a/116) 20. Neuroticism is highly similar to the temperaments of:
- a. emotionality and avoidance.
 - b. emotionality and need for intimacy.
 - c. emotionality and dependence.
 - d. none of the above
- (c/116) 21. According to Eysenck, the big-five trait of extraversion may be a blend of which of the following temperaments?
- a. emotionality and sociability
 - b. activity and emotionality
 - c. activity and sociability
 - d. none of the above
- (b/116) 22. The concept of emotionality is most similar to the big five trait of:
- a. extraversion.
 - b. neuroticism.
 - c. openness.
 - d. agreeableness.
- (b/117) 23. Recent evidence suggests that _____ has all the characteristics Buss and Plomin use to define temperaments.
- a. hostility
 - b. intelligence
 - c. conscientiousness
 - d. greediness
- (b/118) 24. The environment tends to affect twins:
- a. by making them more similar.
 - b. by making them more different.
 - c. by making dizygotic twins more similar.
 - d. not at all in terms of similarity/difference.

- (c/119) 25. Which of the following is true about what psychologists have thought about the interplay between genes and environment?
- a. It was originally assumed these influences are distinct, and that has been supported by the evidence.
 - b. It was originally assumed these influences are distinct, and that has turned out to be overly simplified.
 - c. It was originally assumed these influences are independent, and that has been supported by the evidence.
 - d. It was originally assumed these influences are independent, and that has turned out to be overly simplified.
- (d/120) 26. Methylation:
- a. affects gene expression.
 - b. can be affected by stress.
 - c. can be affected by diet.
 - d. all of the above
- (c/121) 27. When different patterns of genetic differences can occur at a particular location, they are called:
- a. polymorphisms.
 - b. mutations.
 - c. alleles.
 - d. genomes.
- (b/121) 28. The attempt to relate differences in gene locations with other differences in persons is called:
- a. quantitative genetics.
 - b. molecular genetics.
 - c. bio-behavioral genetics.
 - d. none of the above
- (d/122) 29. Single-gene discoveries have found genetic influences for:
- a. novelty-seeking.
 - b. neuroticism.
 - c. agreeableness.
 - d. all of the above

- (d/123
Box 6.2) 30. There is evidence that higher levels of disease prevalence in a given environment is associated with:
- a. more neuroticism.
 - b. less neuroticism.
 - c. more openness to experience.
 - d. less openness to experience.
- (c/123
Box 6.2) 31. _____ is a process in which one version of a characteristic (or one end of a dimension) is represented in the next generation to either a greater or lesser degree.
- a. Extremity selection
 - b. Allele selection
 - c. Directional selection
 - d. Stabilizing selection
- (d/123
Box 6.2) 32. _____ is a process in which the intermediate value of some characteristic is more adaptive than is the value at either end of the distribution.
- a. Adaptive selection
 - b. Allele selection
 - c. Directional selection
 - d. Stabilizing selection
- (b/124) 33. Sociobiologists explain altruism by invoking the concept of:
- a. docility.
 - b. inclusive fitness.
 - c. imprinting.
 - d. moral exclusivity.
- (c/124) 34. There is evidence that _____ explains the effect of genetic relatedness on altruism.
- a. similar upbringing.
 - b. parental directives.
 - c. emotional closeness.
 - d. all of the above
- (a/125) 35. Rushton's genetic similarity theory suggests that:
- a. people will be more attracted to those who resemble them genetically.
 - b. same-sex pairs do not contribute to gene reproduction.
 - c. altruism toward one's kinship group is maladaptive.
 - d. opposites attract.

- (c/125) 36. Recent research on sexually involved couples indicated that genetically similar couples:
- a. were less likely to get divorced.
 - b. were more likely to get married.
 - c. were more likely to have reproduced.
 - d. all of the above
- (b/126) 37. The idea that people choose mates on the basis of particular characteristics is called:
- a. directional selection.
 - b. assortative mating.
 - c. selective mating.
 - d. intuitive mating.
- (d/127) 38. In the competition for mates, Buss found that women tend to:
- a. play hard to get.
 - b. enhance their physical appearance.
 - c. are drawn to cues regarding availability of resources.
 - d. all of the above
- (c/128) 39. Both men and women view the following qualities as necessities in a potential mate:
- a. attractiveness and status
 - b. intelligence and status
 - c. intelligence and kindness
 - d. attractiveness and kindness
- (d/128) 40. Compared to women, men are:
- a. less selective in their criteria for one-night stands.
 - b. more interested in casual sex.
 - c. more easily excited by visual erotica.
 - d. all of the above
- (a/129) 41. Compared to women, men are:
- a. more concerned about thoughts of sexual infidelity.
 - b. more concerned about thoughts of emotional infidelity.
 - c. equally concerned about sexual and emotional infidelity.
 - d. none of the above

- (a/129) 42. According to the evolutionary perspective on sex differences in mating tendencies, women are most jealous of _____ whereas men are most jealous of _____.
- a. emotional infidelity, sexual infidelity
 - b. sexual infidelity, emotional infidelity
 - c. emotional infidelity, emotional infidelity
 - d. sexual infidelity, sexual infidelity
- (c/129) 43. Men tend to _____ cues from potential mates in terms of implying sexual interest; women tend to _____ cues from potential mates in terms of commitment levels.
- a. overinterpret, overinterpret
 - b. underinterpret, underinterpret
 - c. underinterpret, overinterpret
 - d. overinterpret, underinterpret
- (c/130) 44. The *young male syndrome* refers to the fact that:
- a. when given a choice most parents would rather adopt a young male.
 - b. young men often father unwanted children.
 - c. young males may have evolved to behave violently when confronted with scarce resources.
 - d. none of the above
- (c/130) 45. The current sociobiological view is that aggression:
- a. is part of human nature, expressed indiscriminately.
 - b. is both a male and a female phenomenon.
 - c. results from sexual selection pressures.
 - d. all of the above
- (a/131
Box 6.3) 46. Which of the following is NOT a valid concern about mapping the human genome?
- a. It will take many more years to complete.
 - b. It could lead to discrimination against people with certain genetic profiles.
 - c. It could lead to so-called "designer babies."
 - d. All of the above are valid criticisms.
- (c/132) 47. In terms of assessment, the biological orientation to personality is most similar to the:
- a. psychodynamic perspective.
 - b. learning perspective.
 - c. trait perspective.
 - d. phenomenological perspective.

- (d/132) 48. Molecular genetics researchers suggest that, in terms of genes contributing to personality, effects are likely due to:
- single genes exerting large effects.
 - multiple genes, each exerting large effects.
 - singles genes exerting small effects.
 - singles genes, each exerting small effects.
- (b/132) 49. The majority of behavioral genetics research on problem behavior has focused on:
- alcoholism and schizophrenia.
 - schizophrenia and bipolar disorder.
 - depression and alcoholism.
 - bipolar disorder and alcoholism.
- (d/133) 50. The interaction between genetic susceptibility for schizophrenia and an environmental context that touches it off resembles the _____ model.
- cross-over
 - inclusive fitness
 - heritability
 - diathesis-stress
- (c/132-133) 51. The concordance rate for schizophrenia among identical twins is _____; among fraternal twins, it is _____.
- 20%, 12%
 - 35%, 35%
 - 50%, 9%
 - 75%, 20%
- (c/133) 52. The long allele on DRD4, a gene related to measures of reward seeking, has been linked to:
- alcoholism but not heroin addition.
 - heroin addition but not alcoholism.
 - both alcoholism and heroin addition.
 - none of the above, it is only related to schizophrenia
- (c/134) 53. According to Barash, behavior problems reflect the fact that:
- biological evolution has progressed faster than cultural evolution.
 - there is more biological variability in the present than ever before.
 - cultural evolution has progressed faster than biological evolution.
 - none of the above

- (b/136) 54. Both sociobiology and evolutionary psychology have been criticized because:
- they are not theoretically grounded.
 - their statements have disturbing political overtones.
 - there are no data to support either of them.
 - all of the above
- (a/135-136) 55. Which of the following is NOT a valid criticism of the sociobiology and evolutionary psychology approaches?
- Early arguments were derived from evidence but provided no theoretical interpretation.
 - Some of the ideas are not falsifiable.
 - Some of the ideas are not testable.
 - All of the above are valid criticisms.

True and False

- (T/112) 1. In discussing physical makeup, psychologists early in the last century meant physique whereas now they mean genetics.
- (F/112) 2. Hippocrates proposed that there were 12 different personality types.
- (T/112) 3. Galen added to Hippocrates' ideas by arguing that each personality "type" reflects an excess of some bodily fluid.
- (T/112) 4. Behavioral genetics is the study of genetic influences on behavioral expression.
- (F/112) 5. Behavioral genetics examines genetic influences on behavior but not personality.
- (F/112) 6. Identical twins are the result of two eggs being fertilized at the same time.
- (T/112) 7. Monozygotic twins are 100% alike genetically.
- (F/113) 8. Identical twins are known as *dizygotic twins*.
- (T/113) 9. Opposite-sex twins are, by definition, dizygotic.
- (T/113) 10. Genetically, dizygotic twins are like any other pair of brothers, pair of sisters, or brother and sister.
- (F/113) 11. If two eggs are released from the mother's ovary and both are fertilized and develop simultaneously, the result is monozygotic twins.
- (T/Box 6.1) 12. Kretschmer believed that people with different body types were susceptible to different kinds of disorders.
- (T/Box 6.1) 13. Sheldon believed that each somatotype reflected an overemphasis, during development, of one of the layers of the embryo.

- (F/113 Box 6.1) 14. *Endomorphy* reflects predominance of the skin and nervous system.
- (F/113 Box 6.1) 15. *Viscerotonia* is a temperament characterized by apprehensiveness, avoidance of social interaction, and physical and emotional restraint.
- (T/114) 16. The basic assumption of twin studies is that both identical and fraternal twins who are raised together are exposed to essentially the same life experiences.
- (F/114) 17. Adoption studies are a means of studying the effects of adoption on a child's psychological characteristics such as self-esteem.
- (T/115) 18. Activity level consists of two aspects, *vigor* and *tempo*.
- (T/115) 19. *Emotionality* is the tendency to become aroused easily.
- (F/115) 20. Buss and Plomin proposed the three basic temperaments of *neuroticism*, *sociability*, and *emotionality*.
- (F/115) 21. Research has found that parent ratings of the temperaments were strongly correlated for both monozygotic and dizygotic twins.
- (T/115) 22. In addition to research using parent ratings, adoption research has also supported the notion that temperaments are genetically influenced.
- (T/116) 23. Mary Rothbart and colleagues proposed three different temperaments: *approach*, *avoidance*, and *effortful control*.
- (T/116) 24. Effortful control involves attentional management in addition to the ability to suppress behavior when situationally inappropriate.
- (F/116) 25. There's not much evidence for the heritability of personality factors in general.
- (T/116) 26. There are a number of similarities between the five-factor model of personality and biologically-based temperaments.
- (T/116) 27. Evidence for the heritability of the five personality dimensions is consistent across all of the traits.
- (F/116) 28. Although there is good evidence for the heritability of the five personality dimensions in the West, there is no evidence that this holds cross-culturally.
- (F/116) 29. When researchers tried to videotape behavior and have people who didn't know participants code their behavior, they did not find evidence for genetic influences on traits.
- (T/116) 30. Eysenck has suggested that extraversion may be a blend of sociability and activity.
- (T/117) 31. Intelligence has the qualities that Buss and Plomin use to define temperaments.

- (F/117) 32. Heredity does not appear to influence how much social support people have.
- (T/117) 33. Risk of divorce is related to heredity.
- (T/118) 34. The environment affects twins' personality primarily by making them different from one another.
- (F/119) 35. According to Dickens and Flynn, researchers have a clear understanding of the correlations between genetic and environmental influences on the same outcome.
- (T/120) 36. *Gene expression* is the term used to describe the process of genes creating protein.
- (F/121) 37. Twin research is referred to as *molecular genetics*.
- (T/122) 38. Researchers have suggested that most genetic influences involve small contributions from many genes.
- (F/123 39. Directional selection occurs when an intermediate value of some characteristic is more adaptive than the value at either end of the distribution.
Box 6.2)
- (T/124) 40. According to sociobiologists, *inclusive fitness* explains why human beings are altruistic.
- (T/126) 41. The general idea that people choose mates on the basis of particular characteristics is called *assortative mating*.
- (F/126) 42. In the competition for mates, Buss reports clear cultural differences in what attracts males and females.
- (T/127) 43. The mere presence of women tends to lead men to flex their muscles, brag about earning capacity, and display expensive items.
- (F/128) 44. Exposure to a dominant man does nothing to affect women's commitment if they are already in a relationship.
- (F/129) 45. There's little difference between men and women in the circumstances that elicit jealousy.
- (T/129) 46. According to Buss, married men try to retain their wives by spending money on them and by giving in to their wives' wishes.
- (F/129) 47. Men and women have very similar needs in communication.
- (T/130) 48. The *young male syndrome* is more likely to appear among unmarried, unemployed men.
- (F/131) 49. Genetic competition does not play a role in violence within families.
- (T/132) 50. Research has shown that there is a genetic component to schizophrenia.

- (T/133) 51. Fifty percent of identical twins of people diagnosed with schizophrenia also have schizophrenia.
- (F/133) 52. Researchers have not yet found a genetic component to bipolar disorder.
- (T/133) 53. Research has identified a particular gene that is associated with alcohol cravings after consuming a small amount.
- (T/133) 54. Eysenck has found high concordance rates in identical twins for alcoholism.
- (T/134) 55. Barash has argued that the speed of cultural evolution relative to biological evolution has contributed to behavior problems.
- (F/135) 56. Sociobiology has been criticized for not having enough theory to explain relevant data.
- (T/136) 57. Evolutionary psychology has been criticized for some of its political and social implications.

Short Essay

(113

- Box 6.1) 1. Briefly describe the three temperaments that Sheldon proposed and their corresponding somatotype.

VISCEROTONIA: relaxation, tolerance, sociability, love of comfort, and easygoingness. Corresponds to endomorphy (plumpness).

SOMATOTONIA: courage, energetic assertiveness, and desire for adventure, risk, and physical activity. Corresponds to mesomorphy (muscularity).

CEREBRATONIA: mental overintensity, inhibition and avoidance of social interaction, physical and emotional restraint, and tendency toward privacy. Corresponds to ectomorphy (thinness).

- (112-114) 2. Briefly explain the steps involved in conducting twin studies.

(1) Pairs of identical twins are compared with each other on a particular characteristic, as are pairs of (same-sex) fraternal twins; (2) these two correlations are compared with each other. If identical twins are more similar to each other than fraternal twins, it must be due to the differences in genetic similarity. (This conclusion could not be drawn if parents treated fraternal twins differently from identical twins.)

- (113-114) 3. Briefly explain what a *heritability estimate* represents.

The *heritability estimate* represents the amount of variance in a trait that is accounted for by inheritance. It can be considered an index of the genetic influence on a personality trait. The higher the heritability estimate, the stronger the evidence that genes matter.

- (115) 4. Define and briefly describe Buss and Plomin's concepts of *activity level*, *sociability*, and *emotionality*.

ACTIVITY LEVEL: Refers to overall output of energy or behavior. It has two intercorrelated aspects: (1) vigor, i.e., intensity/amplitude of behavior; (2) tempo, i.e., speed of activities.

SOCIABILITY: The tendency to prefer being with others rather than being alone. Involves the desire for other people's attention, to share activities and for the responsiveness and stimulation that are part of social interaction. To be sociable is to intrinsically value the interaction process.

EMOTIONALITY: The tendency to become autonomically (physically) aroused in upsetting situations. Only pertains to three emotions (distress, anger, and fear).

- (116-117) 5. Choose two traits from the five-factor model of personality and describe how they relate to the different temperament categories.

NEUROTICISM: same concept as the temperament of emotionality.

EXTRAVERSION: linked to sociability and activity level.

AGREEABLENESS: has overtones of sociability

CONSCIENTIOUSNESS: partly defined by lack of impulsiveness.

OPENNESS or INTELLECT: linked with intelligence.

- (124) 6. How would a sociobiologist account for the existence of altruism?

The process of evolution is not really a matter of individual survival. What matters is a gene "pool," distributed across a population. If one group survives and reproduces at a high rate, its genes move on to subsequent generations more than other groups' genes do. In addition to individual reproduction, genes are carried forward to the next generation by anything that helps your part of the gene pool reproduce (inclusive fitness). If you do an altruistic deed for a relative, it helps the relative survive. If an altruistic act (in which you die) saves a great many of your relatives, it helps aspects of your genetic makeup to be passed on, because your relatives are genetically similar to you, i.e., "kin selection." Thus, the tendency to be altruistic may be genetically based.

- (128-129) 7. Explain the different circumstances for which men and women experience jealousy. Why do these differences exist (from an evolutionary psychology viewpoint)?

Men are more jealous about acts of sexual infidelity because it is evolutionarily important for men to be concerned about paternity so that they are not supporting someone else's children. Women are more jealous about acts of emotional infidelity because women are theoretically more concerned with whether the man will be there to support her and her children.

(130) 8. Briefly describe the *young male syndrome* and its evolutionary pressures/roots.

"When there is competition for scarce resources (females), the result is confrontational behavior and potentially serious violence." This pattern is known as the *young male syndrome*. It may partly be the consequence of long-ago evolutionary pressures and partly a response to situational demands. Although the pattern of behavior may be coded in every man's makeup, it is likely to appear among men whose present situations predict reproductive failure, e.g., unmarried and unemployed males.

(131) 9. What are the implications of mapping the human genome for dealing with disease?

Having a map of the human genome will make it easier to locate the genes that cause a specific disorder. People could be warned if they carry a gene for a disorder they might pass on to a child. Extensive "gene therapy" could actually alter genetic instructions to eliminate defects. In addition, by permitting identification of a person's genetic weaknesses, a map of the genome will usher in a new era of preventive medicine, which will dramatically change the way we deal with disease.

TEST YOURSELF 6-1

Source: Buss, A. H., & Plomin, R. (1984). *Temperament: Early developing personality traits*. Hillsdale, N.J.: Erlbaum.

Description of Scale: This book presents items from the EAS Temperament Survey for adults (Buss & Plomin, 1984). The EAS provides scores on five separate dimensions--sociability, activity level, distress, fear, and anger. These last three dimensions--distress, fear, and anger--are all measures of components of emotionality. Students respond to each item by using a five-point scale to indicate the extent to which each statement is typical of themselves (ranging from 1 [not at all typical] to 5 [very typical]). Sample items include "I like to be with people" (sociability) or "My life is fast-paced" (activity level).

The personality traits measured by this instrument are *temperaments*--biologically based dispositional tendencies that are inherited. The three basic qualities measured by these scales--i.e., sociability, activity level, and emotionality--are characteristics that are very pervasive in their influence. They affect what people do (e.g., engaging in solitary versus group activities). They also affect how people do virtually everything they do (e.g., quickly and with a lot of vigor, versus slowly and casually). Indeed, these qualities of temperament may be at the heart of all of personality, in the sense that other personality dispositions may be built on them as a foundation.

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