Nature, Nurture & Human Diversity

Ψ 100/101
Oct 19 '09

Overview

- Genes & Behaviour Genetics
  - Heritability
  - Nature vs Nurture
- Evolutionary Psychology
- Environmental Influences
  - Parents & Peers
  - Cultural Influences
- Gender Development

True or False

1) Even complex human traits are determined by a single gene.
2) People's differing divorce risks are about 50 percent attributable to genetic factors.
3) Adoptees' traits bear more similarities to their adoptive parents than to their biological parents.
4) Two children in the same family are on average as different from one another as are pairs of children selected randomly from the population.
5) If after a worldwide catastrophe only Icelanders or Kenyans survived, the human species would suffer a huge reduction in its genetic diversity.
6) In many places around the world, females are more likely than males to initiate sexual activity.
7) A child who hears English spoken with one accent at home and another in the neighbourhood and at school invariably adopts the accent of his or her peers, not the parents.
8) Compared with Westerners, people in Japanese cultures exhibit greater concern for social harmony and loyalty.
9) Seven weeks after conception, males and females remain anatomically indistinguishable.
10) Even when families discourage traditional gender-typing, children still organize themselves into "boy worlds" and "girl worlds," each guided by rules for what boys and girls do.

Learning Objectives

- Give examples of differences and similarities within the human family.
- Describe the types of questions that interest behaviour geneticists.
- Define chromosome, DNA, gene, and genome, and describe their relationships.
- Explain how identical and fraternal twins differ, and cite ways that behaviour geneticists use twin studies to understand the effects of environment and heredity.
- Cite ways that behaviour geneticists use adoption studies to understand the effects of environment and heredity.
- Discuss how the relative stability of our temperament illustrates the influence of heredity on development.
- Discuss heritability's application to individuals and groups, and explain what we mean when we say genes are self-regulating.
- Give an example of a genetically influenced trait that can evoke responses in others, and give another example of an environment that can trigger gene activity.
- Identify the potential promise and perils of molecular genetics research.
- Describe the area of psychology that interests evolutionary psychologists.
- State the principle of natural selection, and point out some possible effects of natural selection in the development of human characteristics.

Learning Objectives

- Identify some gender differences in sexuality.
- Describe evolutionary explanations for gender differences in sexuality.
- Summarize the criticisms of evolutionary explanations of human behaviours, and describe the evolutionary psychologists' responses to those criticisms.
- Describe some of the conditions that can affect development before birth.
- Describe how experience can modify the brain.
- Explain why we should be careful in attributing children's successes and failures to their parents' influence.
- Evaluate the importance of peer influence on development.
- Discuss the survival benefits of culture.
- Describe some ways that cultures differ.
- Explain why changes in the human gene pool cannot account for culture change over time.
- Identify some ways a primarily individualist culture differs from a primarily collectivist culture, and compare their effects on personal identity.
- Describe some ways that child-rearing differs in individualist and collectivist cultures.
- Describe some ways that humans are similar, despite their cultural differences.

Behaviour Genetics

- **Behaviour Genetics: The study of genetic and environmental influences on behaviour**
  - **Behavior Geneticists study our differences and weigh the relative effects of heredity and environment**
  - **Environment ... every non-genetic influence, from prenatal nutrition to the people and things around us**

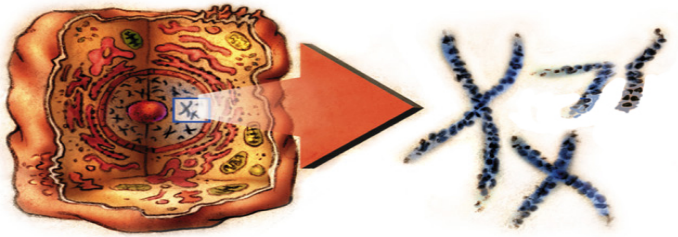
Learning Objectives

- Identify some biological and psychological differences between males and females.
- Summarize the gender gap in aggression.
- Describe some gender differences in social power.
- Discuss gender differences in connectedness, or the ability to "tend and befriend."
- Explain how biological sex is determined, and describe the role of sex hormones in biological development and gender differences.
- Discuss the importance of environment in the development of gender roles, and describe two theories of gender typing.
- Describe the bio-psychosocial approach to development.

Genes

Nucleus
(the inner area of a cell that houses chromosomes and genes)

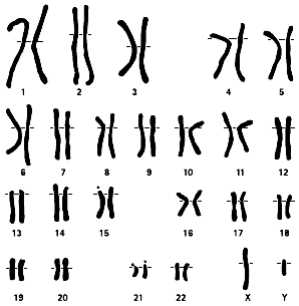
Chromosome
(threadlike structure made largely of DNA molecules)



Cell
(the basic structural unit of a living thing)

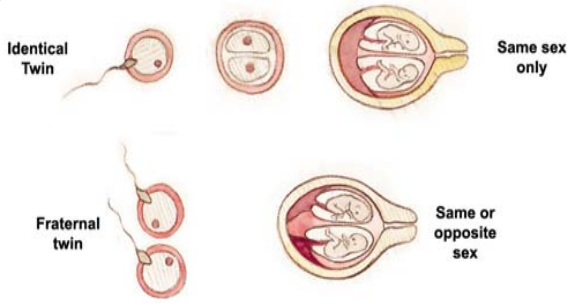
Chromosomes

- Humans have 23 pairs of chromosomes, including the pair of sex chromosomes (either two X chromosomes for females, or an X and a Y chromosome for males)
- X chromosome from the mother, plus either an X or Y chromosome from the father



Twin Studies

- **Behavior geneticists have used twin studies to separate effects of shared and unique environments on genetics**



Genes Dominance

- **We inherit one set of 23 chromosomes from each parent**
- **These two sets form pairs that contain alternate genes for the same trait**
- **Sometimes, one gene is 'dominant' and overrides the 'recessive' gene**

		Father's 2 Genes	
Mother's 2 Genes		Brown	Blue
	Brown	Brown	Brown
	Blue	Brown	Blue

Twin Studies

- **Have compared identical twins versus fraternal twins**
- **Fraternal twins are genetically no more similar to each other than are any other siblings**
  - **On both extraversion & neuroticism, identical twins are much closer to each other than fraternal twins**
  - **Risk of Alzheimer's disease is related to twin status**
  - **Risk of divorce is related to twin status**
- **However: Identical twins, more than fraternal twins, report being treated alike**

Separated Twins

- Studies comparing identical twins raised separately from birth
- Seems like the ideal experimental preparation for separating the influence of genetics and environment
  - Compared to identical twins reared together, those raised apart from each other had more dissimilar personalities – patterns of thinking, feeling and acting
  - However, even separated twins are far more similar than fraternal twins

Heritability

- Heritability refers to the extent to which the differences among people are attributable to genes
- Thus, to say that the heritability of happiness is, say, 50 %, does not mean that your happiness is 50 % genetic. Rather, it means that we can attribute to genetic influence 50 % of the observed variation in happiness among people

Adoption Studies

- A situation where it is possible to compare two groups of relatives:
  - The adoptees' genetic relatives
  - The adoptees' environmental relatives
- Results:
  - People who grow up together, whether biologically related or not, do not much resemble each other in personality
  - Adoptees' traits bear more resemblance to their biological parents than their adoptive parents
  - Environmental factors … seem to have virtually no impact on personality
  - Parents do influence their children's attitudes, values, manners, faith and politics

Heritability

- Heritability differ less from trait to trait than anyone initially imagined
- Personality: Bouchard reports that the genetic influence is in the range of 40 to 50 % and is approximately the same for different traits. Some large studies have examined whether the genes that influence personality traits differ in the sexes, and the answer seems to be "no."
- Mental Ability: Early in life, shared environmental factors are the dominant influence on IQ. Gradually, genetic influence increases. For example, Bouchard reports heritability of .22 at age 5. In old age (75+ years) it is .54 to .62.
- Psychological Interests: Little variation in heritability is reported for realistic, investigative, artistic, social, enterprising, and conventional interests. It averages .36.

Heritability

- Psychiatric Illnesses: The most extensively studied psychological disorder is schizophrenia, and it shows a very high degree of genetic influence. Heritability is about .80. Major depression is less heritable (about .40). The heritability of anxiety disorders is from .20 to .40, alcoholism is in the range of .50 to .60, and antisocial personality disorder ranges from .41 to .46.
- Social Attitudes: Twin studies show only environmental influences on conservatism up to age 19; after this age, heritability increases, with one large study yielding heritabilities of .65 for males and .45 for females in adulthood. Religiousness is only slightly heritable (.11 to .22) in 16-year-olds; for adults, it is in the .30 to .45 range. Membership in a specific religious denomination is largely due to environmental factors.

Gene-Environment Interactions

- **Genes can influence traits which affect responses, and environment can affect gene activity**
- **We are the product of interactions between our genetic predispositions and our surrounding environments**
  - **Parents who are verbally articulate may pass on their genes to their children. Because the parents are highly verbal they may also buy a lot of books**
  - **Parents may start treating their children the same, but over time, because of the children's different responses, they cuddle one much more than the other. As a result, differences in the children's sociability grow**

Nature & Nurture

- **Nature & nurture ... work together like two hands clapping; genes respond to environments**
- **Rather than acting as blueprints that lead to the same result no matter the situation, genes react**
  - **Girls raised in fatherless households experience puberty earlier**
  - **People have the capacity for complex, grammatical language ... but if children are not exposed to spoken language during a critical period, they will always struggle with speech**

Molecular Genetics

- **Molecular genetics ... is a branch of behavior genetics that asks "Which genes influence which behavior?"**
  - **Medical personnel may also soon be able to give parents a read-out on how their fetus's genes differ from the normal pattern and what this might mean**
  - **With gene therapy, scientists say that they will be able to change a child's characteristics before she or he is born**
  - **Clearly, in the future scientists will be able to cure a child's inherited disease before birth**

Evolutionary Psychology

- Evolutionary psychology studies the evolution of behavior and mind *using principles of natural selection*
- Natural selection: the principle that, among the range on inherited trait variation, those that lead to increased reproduction and survivial will most likely be passed on to succeeding generations
- EP addresses the distinction between the proximal causation (immediate inducers of behavior) and ultimate causation (the evolutionary advantage served by the behavior)

Human Traits

- A number of human traits have been identified as a result of pressures afforded by natural selection
  - Why do infants fear strangers when they become mobile?
  - Why are most parents so passionately devoted to their children?
  - Why do people fear spiders and snakes and not electricity and guns?
- All organisms, including humans, are "gene-producing machines" with the basic motivation of perpetuating their own genetic pool

Evolutionary Psychology

- Natural selection is an evolutionary process through which adaptive traits are passed on to ongoing generations because these traits help animals survive and reproduce
- Artificial selection: Biologists like Belyaev and Trut were able to artificially rear and domesticate wild foxes, selecting them for friendly traits

Human Traits

- Males and females, to a large extent, behave and think similarly, but differences arise in regards to reproductive behaviors

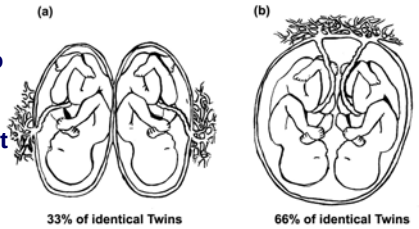
Question (summarized)	Male	Female
Casual sex	60%	35%
Sex for affection	25%	48%
Think about sex everyday	54%	19%

Mating Preferences

- Males look for youthful appearing females in order to pass their genes into the future, while females look for maturity, dominance, affluence and boldness in males
  - Natural selection has caused males to send their genes into the future by mating with multiple females since males have lower costs involved
  - Females select one mature and caring male because of the higher costs involved with pregnancy and nursing

Different Environments

- Genes influence our developmental differences. What about the environment? How do our early experiences, our family, our community and our culture affects these differences?
- Identical twins who share the same placenta (b) are more alike than those who do not (a), suggesting prenatal influences on psychological development

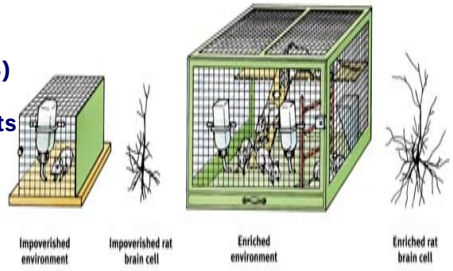


Critiquing EP

- EP is based on hindsight
- What men & women seek in a mate is remarkably similar
- Show me a culture with gender equity, and I will show you a culture with smaller gender differences in mate preference

Experience & Brain Development

- Early postnatal experiences affect brain development. Rosenzweig et al. (1984) showed that rats raised in enriched environments developed a thicker cortex than those in impoverished environment.



Peer Influence

- Children, like adults, attempt to fit into a group by conforming
- Peers are influential in such areas as learning to cooperate with others, gaining popularity, and developing interactions

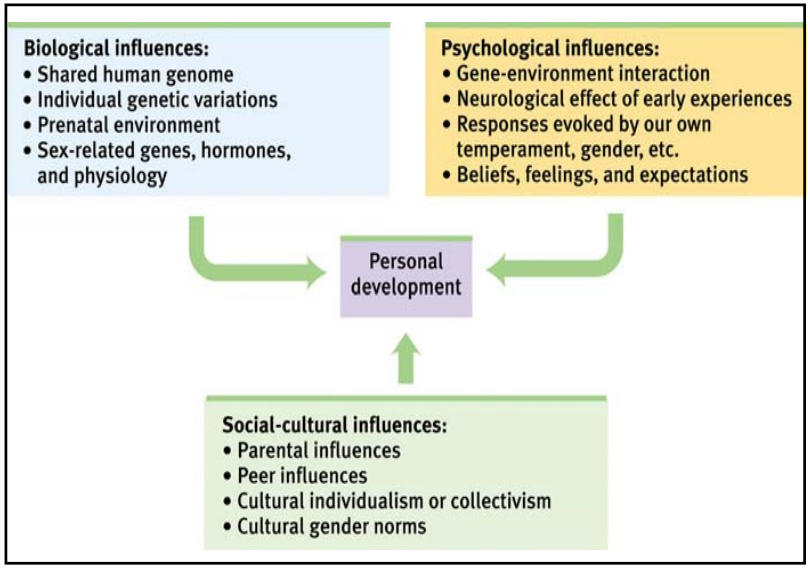
VALUE CONTRASTS BETWEEN INDIVIDUALISM AND COLLECTIVISM

Concept	Individualism	Collectivism
Self	Independent (identity from individual traits)	Interdependent (identity from belonging)
Life task	Discover and express one's uniqueness	Maintain connections, fit in, perform role
What matters	Me—personal achievement and fulfillment; rights and liberties; self-esteem	Us—group goals and solidarity; social responsibilities and relationships; family duty
Coping method	Change reality	Accommodate to reality
Morality	Defined by individuals (self-based)	Defined by social networks (duty-based)
Relationships	Many, often temporary or casual; confrontation acceptable	Few, close and enduring; harmony valued
Attributing behavior	Behavior reflects one's personality and attitudes	Behavior reflects socail norms and roles

Sources: Adapted from Thomas Schoeneman (1994) and Harry Triandis (1994).

Cultural Influences

- Culture is composed of behaviors, ideas, attitudes, values and traditions shared by a group
- Each culture develops norms – rules for accepted and expected behavior: Men holding hands in Saudi Arabia is the norm (closer personal space), but not in North American culture
  - Cultures change over time. The rate of this change may be extremely fast. In many Western countries, culture has changed rapidly
  - This change cannot be attributed to changes in the human gene pool because genes evolve very slowly



Gender Roles in the Home

Father	Mother	
----	----	1. When you go out, who drives?
----	----	2. Who fills out the income tax forms?
----	----	3. Who writes the “Thank you” notes for the gifts received?
----	----	4. Who is more likely to ask, “Where are my socks/stockings?”
----	----	5. When the car needs repair, who takes it to the garage?
----	----	6. Who does the laundry?
----	----	7. Who dusts and vacuums?
----	----	8. Who knows where to find the thermometer?
----	----	9. Who knows where to find the pipe wrench?
----	----	10. Who knows where to find the summer clothes?
----	----	11. When you had guests for dinner, who made the drinks?
----	----	12. When you had guests for dinner, who made the coffee?
----	----	13. Who waters the house plants?
----	----	14. Who waters the lawn?
----	----	15. When you went on a trip, who packed the suitcases?
----	----	16. When you went on a trip, who packed the car?

This survey gives you an indication of the kind of gender role modelling to which you were exposed as a child!

Preference Scale

Respond to each of the items below using the following scale: **5 = strongly agree; 4 = moderately agree; 3 = neutral; 2 = moderately disagree; 1 = strongly disagree**

1) I am probably too much of an individualist to be a good team member.
2) When there is a choice between working by myself and working together with some friends, I ordinarily choose to work with my friends.
3) I would suspect that few group reports or papers can match the quality of those turned in by individuals.
4) I would rather do a group paper or lab than do one alone.
5) The spirit of togetherness can easily be overdone and stifle individual initiative and creativity.
6) What I want most from my neighbors is respect for my privacy.
7) I would prefer a neighborhood in which everyone pretty much goes their own way.
8) I would like to live in a neighborhood where everybody knows everybody else.
9) Neighbors should take a personal interest in each other.
10) It is very important to me to know that there is a group, clique, neighborhood, or community to which I can belong.
11) For me, life would be pretty empty without some kind of group to identify with, belong to, feel a part of.
12) In life, an individual should for the most part “go it alone,” assuring oneself of privacy, having much time to oneself, attempting to control one’s life.
13) To me, one of the most attractive features of family life is the very deep sense of belonging it provides.
14) My freedom and autonomy mean more to me than almost anything else.
15) The best way to avoid trouble is to be as completely self-sufficient as possible.

To compute your score, reverse the numbers for items 1, 3, 5, 6, 7, 12, 14, and 15 (1 = 5, 2 = 4, 3 = 3, 4 = 2, 5 = 1). Then add all the numbers for a total score, which ranges from 15 to 75. The higher the score, the greater the collectivist tendency.

MATE SELECTION

Rate the following characteristics in terms of their importance to you in choosing a mate. Use the following scale: **0 = irrelevant; 1 = desirable but not important; 2 = important but not indispensable; 3 = indispensable**

1. ambition and industriousness
2. chastity (no previous experience in sexual intercourse)
3. dependable character
4. desire for home and children
5. education and intelligence
6. emotional stability and maturity
7. favourable social status or rating
8. good cook and housekeeper
9. good financial prospect
10. good health
11. good looks
12. mutual attraction—love
13. pleasing disposition
14. refinement, neatness
15. similar education
16. similar religious background
17. similar political background
18. sociability

Characteristics Preferred by Males	Characteristics Preferred by Females
Kindness & Understanding	Kindness & Understanding
Intelligence	Intelligence
Physical attractiveness	Exciting personality
Exciting personality	Good health
Good health	Adaptability
Adaptability	Physical attractiveness
Creativity	Creativity
Desire for children	Good earning capacity
College/University	College/University
Good heredity	Desire for children
Good earning capacity	Good heredity
Good housekeeper	Good housekeeper
Religious orientation	Religious orientation

Temperament Survey

To assess your own temperament, rate each of the tems using the following scale: **1 = Not at all characteristic of me; 2 = Somewhat uncharacteristic of me; 3 = Neither characteristic nor uncharacteristic of me; 4 = Somewhat characteristic of me; 5 = Very characteristic of me**

1. I like to be with people.
2. I usually seem to be in a hurry.
3. I am easily frightened.
4. I frequently get distressed.
5. When displeased, I let people know it right away.
6. I am something of a loner.
7. I like to keep busy all the time.
8. I am known as hot-blooded and quick-tempered.
9. I often feel frustrated.
10. My life is fast-paced.
11. Everyday events make me troubled and fretful.
12. I often feel insecure.
13. There are many things that annoy me.
14. When I get scared, I panic.
15. I prefer working with others rather than alone.
16. I get emotionally upset easily.
17. I often feel as if I’m bursting with energy.
18. It takes a lot to make me mad.
19. I have fewer fears than most people my age.
20. I find people more stimulating than anything else.

To score the survey, students should reverse the number they gave for items 6, 18, and 19 (that is, 5 = 1, 4 = 2, 3 = 3, 2 = 4, 1 = 5). Then, they should add the scores for items 2, 7, 10, and 17 for an Activity score, and the scores for 1, 6, 15, and 20 for a Sociability score. The Emotionality disposition consists of three parts: The total of 4, 9, 11, and 16 gives a Distress score; 3, 12, 14, and 19 give a Fearfulness score; and 5, 8, 13, and 18 give an Anger score.

Activity: ___
Sociability: ___
Distress: ___
Fearfulness: ___
Anger: ___

SA Questions

- Complete this sentence: Behavior genetics is the study of …
- Explain why children's successes or failures may not be attributable to their genetic parents?
- What is a 'dominant' gene and what is a 'recessive' gene?
- What can we learn from twin studies and from adoption studies?
- What is heritability?
- What is natural selection and what is artificial selection?
- How might an enriched environment affect brain development?
- What do children/youth learn from peers? Cite a few examples.