

Nature-Nurture: Not Mutually Exclusive

Intro: Identical twins living in parallel universes – identical lives?

Intro: Jim and Jim Twins.

Intro: Development of cloned organisms – implications?

Vocabulary

heredity (*nature*) – an organism's biological inheritance.

environment (*nurture*) – influence of the social and physical world.

trait vs **state** – fixed vs context-specific personality feature (trait vs state anxiety)

genes – units of hereditary information composed of DNA.

critical periods – a fixed period in development during which certain behaviors emerge (e.g., critical period for language acquisition)

maturation – the orderly sequence of changes dictated by the genetic blueprint that each individual has.

development – changes in the individual that occur between conception and death

Question: What causes individuals to *develop*?

1. **Maturation** – the biological unfolding of the individual according to a plan contained in the genes, the hereditary material passed from parents to their child at conception.
2. **Learning** – the process through which people's experiences produce relatively permanent changes in their feelings, thoughts, and behaviors.

The 3 Laws of Behavioral Genetics

The 1st Law All human behavioral traits are heritable.

The 2nd Law The effect of being raised in the same family is smaller than the effect of the genes.

The 3rd Law A substantial portion of the variation in complex human behavioral traits is not accounted for by the effects of genes or families.

The Nature vs Nurture Controversy

(*heredity vs environment, biology vs culture, maturation vs learning, innate vs acquired abilities, maturation vs experience*)

A poor question to ask about nature, nurture, and human development:

Are human development, knowledge, and behavior primarily the result of nature (biological forces) or nurture (environmental factors)?

- Plato (427-327 BC): Ideas are innate (inborn) because the soul, which exists before birth in the realm of ideas, is trapped by the body at birth.
- Decartes (1596-1650): Certain ideas are innate (inborn).
- Milton (1608-1674): "Childhood shows the man as morning shows the day."
- Locke (1632-1704): A newborn's mind is a *tabula rasa* (blank slate) on which experience writes.
- Pope (1688-18734): "Just as the twig is bent, the tree's inclined."
- Rousseau (1712-1778): People have an innate goodness.
- Wordsworth (1770-1850): "The child is father of the man."
- Wiggam, 1923: "Heredity, and not environment, is the chief maker of man ... nearly all the misery and nearly all of the happiness in the world are due not to environment. The differences among men are due to differences in germ cells with which they were born."
- Watson, 1925: "Give me a dozen healthy infants, well formed, and my own specified world to bring them up in and I'll guarantee to take any one at random and train him to become any type of specialist I might select – doctor, lawyers, artist, merchant, chief, and yes, even beggar-man and thief, regardless of his talents, penchants, tendencies, abilities, vocations, and race of his ancestors, There is not such thing as an inheritance of capacity, talent, temperament, mental constitution, and behavioral characteristic."
- Lenin, 1917: Give me a child until the age of 7 and I will give you back a communist for life."
- Jesuit proverb: Give me the child for the first seven years, and I'll give you the man."
- Sandra Scarr, 1996: Unless a child's family is specifically abusive or fails to provide "average expectable" conditions, parental differences in child-rearing styles, social class, and income have only small effects on differences in children's intelligence, personality, and interests.
- Gardner, 1994: "In the years to come, we will come to discover than heredity and environment are each more important than we ever thought they were."
- Pinker, 2002: "The heritability of intelligence increases over the lifespan, and can be as high as .8 later in life. Forget "As the twig is bent"; think, "Omigod, I'm turning into my parents!"

What do research findings show?

Studies over the past 25 years on twins and adopted children have established that there is *a genetic component* to just about every human trait and behavior, including personality, general intelligence, and behavioral disorders such as schizophrenia and autism.

How large a component?

1. Genetic influences account for 70-80% of the variance in human development (Jensen, 1969)
2. The genetic influence on traits and behaviors is partial. Genetics accounts, on average, for half of the variance of most traits. Environment accounts for the other half (Plomin, 1990).
3. Behavior is determined 100% by heredity and 100% by environment (Hebb, 1980).

The contention of most researchers.

"Most human behaviors are not influenced by nature *or* nurture but by nature *and* nurture" (Robert Plomin).

"We are coming to understand that heredity and environment are *each more important* than we ever thought they were" (Howard Gardner).

"Genes are never expressed directly in behavior. There is a long chain of events involving genes, physiological processes, and the environment. The way that heredity is expressed depends on the specific environment in which this expression occurs" (Miller, 1996).

1. A given hereditary influence can have different behavioral effects in different environments. (*The Being in the Wrong Place at the Wrong Time Effect*).

Example: Assertiveness and individuality can aid the development of a child in Western society but create problems in the development of a child in an Oriental culture.

Example: High cognitive ability is sought after and rewarded in democratic cultures but seen as a threat in repressive and authoritarian cultures.

Example: Being a scrawny computer nerd with pimples can keep you out of most high school parties but will eventually make you the wealthiest man in the world.

2. A given environment can have different effects on people with different genetic makeups (*The One Size Does Not Fit All Effect*).

Example: A jack-in-the box might delight a placid baby but disturb a nervous, reactive infant who is upset by sudden appearances of strange lifeless objects propelled by a metal coil.

Example: Intense stressful life events that cause disturbances in most children have little effect on *resilient* children.

A better question to ask about nature, nurture, and human development:

What is the nature of the interaction between genes and the environment, between nature and nurture? (Anastasi, 1958)

What do research findings show?

Nature and nurture are inextricably intertwined, and it is a complex intertwining. How do heredity and environment interact?

1. **Passive interaction** – genes and the environment can be correlated. Occurs because parents transmit genes that promote a certain **trait** and also construct the rearing environment, which will likely support a child's genetic propensities.

Example: If musical ability is genetic, musically gifted children will likely have musically inclined parents who provide them with genes and an environment that promotes the development of musical ability. So . . . musical parents can pass on to their children a genetic talent toward music *and* provide an environment that encourages the development of musical ability.

Example: Shy parents can pass on to their children a genetic tendency toward shyness *and* provide an environment that encourages shyness.

Example: Parents with strong verbal ability can pass that ability to their children *and* provide opportunities to increase those talents (plenty of books at home, an interest in reading and writing, reading to children when they are little).

2. **Active interactions** – genes not only influence behavior directly but may also influence the environment – **niche-picking**. Occurs because people may actively select experiences that fit with their genetically influenced preferences.

Example: Musically gifted children may seek out musical friends and opportunities.

Example: An innately active, exuberant child and a passive, quiet, reflective child will select different types of play settings. Thus, they are exposed to different types of experiences.

Example: An athletically inclined student selects athletic activities; an artistically inclined student selects artistic activities.

3. **Evocative interaction** – a child's genotype elicits certain types of physical and social environments. Occurs because genetically distinct people evoke different reactions from parents, peers, and others.

Example: Teachers may select musically talented children for special opportunities.

Example: Active, smiling, cooperative babies receive more social stimulation than passive, quiet babies.

Example: A *high-maintenance child* may receive more rebukes and negative messages than a *low-maintenance child*.

Example: Cooperative, attentive children evoke more pleasant and instructional responses from their teachers than uncooperative, distractible children.

4. The balance between genetic and environmental influences on certain traits change and often increase as people age.

Example: General cognitive ability between adopted children and their birth parents increase dramatically from ages 3 to 16. In contrast, there is no relationship between cognitive ability of adopted children at age 16 and their adoptive parents, indicating that *general rearing environment* has little impact on cognitive ability.

5. There may be maturationally directed **critical periods** in people's lives during which people are especially sensitive to a particular experience.

Example: the window of opportunity for language

Example: the window of opportunity for developing *trust and confidence* may be between birth and six months of age (Erikson).

What are the major sources of environmental influences?

1. **Shared environmental factors** (common to children reared together) cause *similarities* in behavior.

Example: Parents with two unrelated adopted children provide a shared environment for each child that makes the unrelated children similar in some ways

- a. the games they play at home.
- b. eating habits – including choice of foods, eating times, etc.
- c. influence of places that the family visits.
- d. influence of shared relatives.

2. **Nonshared (unique) environmental factors** (*unique* to children reared together) cause *differences* in behavior.

Example: Unrelated children in similar environments have unique and distinct interactions with parents and distinct perceptions of family encounters.

- a. the effects of children's "preferences" – tv shows watched, books selected.
- b. the influence of peers and friendship groups selected.
- c. the influence of different teachers at school.
- d. effects of different work opportunities – mow the lawn or deliver papers.

Nonshared (unique) environments account for most of the environmental influence on children's personalities and moods – which is why siblings can differ so markedly.

"When it comes to genes, people suddenly lose their ability to distinguish 50 percent from 100 percent, "some" from "all," "affects" from "determines." The diagnosis for this intellectual crippling is clear: if the effects of the genes must, on theological grounds, be zero, then all nonzero values are equivalently heretical."

Seven Pinker, *The Blank Slate*

What aspects of nonshared environments contribute to child adjustment?

Nonshared Environment and Adolescent Project (NEAD) – David Reiss, GW, Plomin, Mavis Hetherington at UVA -

Purpose - to pin down some general principles of nonshared environments that affect all people in similar ways (e.g., children whose fathers treated them roughly but treated their siblings nicely might all suffer similar developmental problems).

study included twins, full siblings, half siblings, step-siblings

Finding 1. If parents direct more negative attention toward one child than toward another, that child is more likely to experience adjustment difficulties (depressive symptoms and antisocial behavior).

Finding 2. Correlation between parental treatment and child adjustment virtually disappeared when the researchers accounted for genetic influences on how parents treat their children. i.e. *parents' behavior seemed to be highly influenced by each child's own genetic propensities.*

Remember **Evocative Interaction.**

This finding – that a seemingly environmental measure such as parental behavior is influenced by genetics – is called *the nature of nurture.*

Genetics partially mediate relationships between children's home environment and their psychological development, language development, and general cognitive ability (Colorado Adoption Project).

This does not mean that there are not purely environmental effects on behavior. For example: Kendler (Virginia Commonwealth) found that *loss of a parent during childhood is directly correlated with alcoholism in women.*

"Researchers must address the notion that environment is important but, in large measure, may not be independent of genetics. Developmental researchers must link their work with genetics – it should be a central part of the developmental psychology curriculum to be used as a fundamental tool."