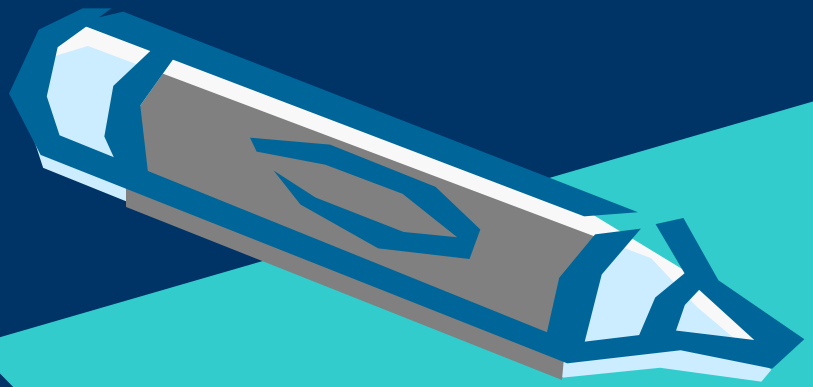


Developmental Psychology

Lecture 2

The Interaction of genes and Environment in Human Development.

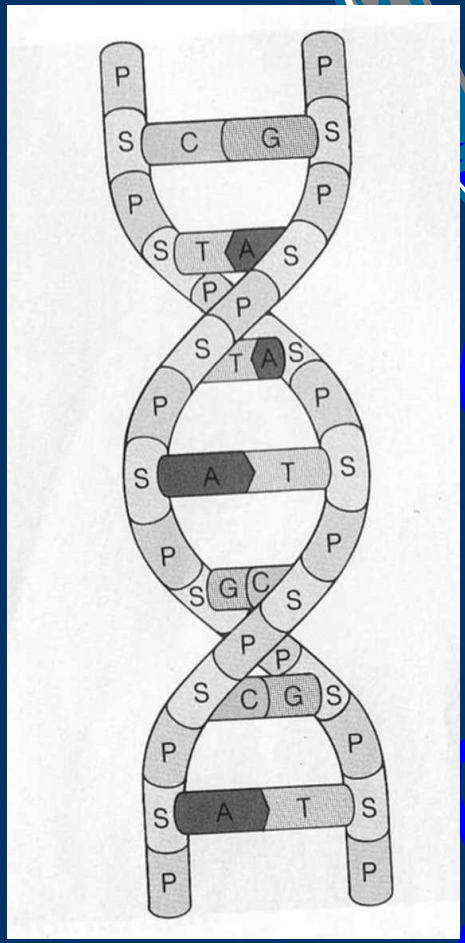
1) Nature: the role of heredity in human development.
2) Nurture: the role of experience and the environment in human development.

Fundamental Issues: Nature vs. Nurture

Nature=Genetics=Heredity

What are genes?

- A gene is a chromosome or DNA found in each human cell. The arrangement of the gene material (nucleotides) provides a template for building and copying the cell.
- Genes are bound together in long strands called chromosomes made of material called DNA (deoxyribonucleic acid) that looks a twisted ladder.
- A gene is just one segment of this ladder.



Person's genotype.

- The sperm and ovum contain all the hereditary material of the child and this is set at conception when the union of a sperm and an egg forms a single cell.
- The 23 pairs of chromosomes (22 matched and the twenty-third sex chromosomes) form what is termed the person's genotype.
- About 20,000 DNA segments called genes, which serve as the key functional units in hereditary transmission, are carried on any one chromosome.

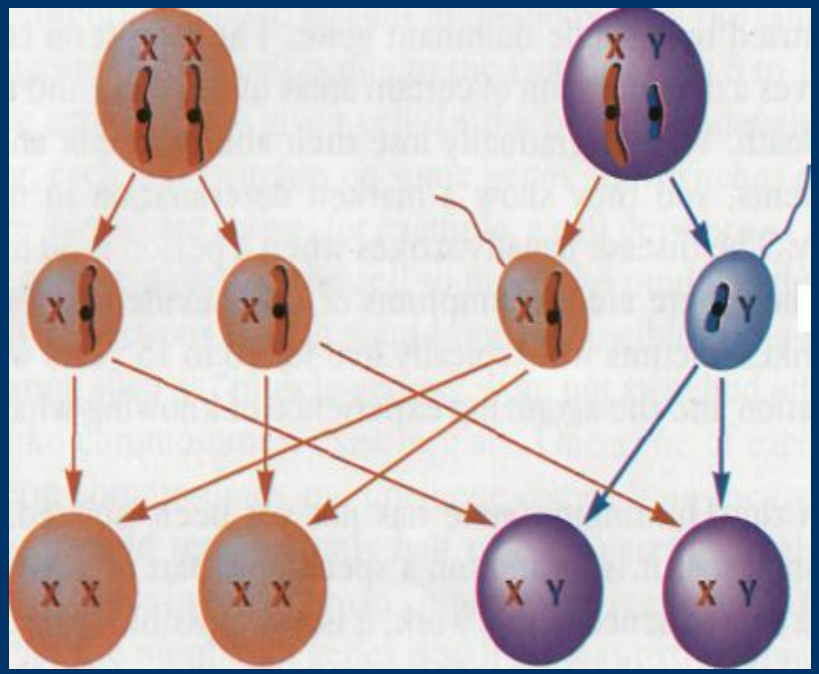
Each gene has a Unique arrangement:

In each human cell there are tens of thousands of different genes arranged along 23 chromosomes.

They come in pairs, one from Mum and one From Dad.

female male

eggs



sperms

Gifts from Mum and Dad

Who's got dark hair?
Who could have a blond child?

- **Genes are passed on from parent to child and each human cell has two versions (alleles) of each gene ; one on the chromosome inherited from mother and one that from father .**
- **Alleles can be the same or different and they can interact in complicated ways. If they are different , they may simply add together and the result will be a mixture (skin colour genes). But sometimes , one will be the dominant (active) gene and the other recessive (silent).**

Dominant and Recessive Genes

- Genotype—underlying genetic makeup
- Phenotype—traits that are expressed
- Dominant genes—will always be expressed if present
- Recessive genes—will not be expressed unless they are in a pair

Bosses and workers

- Ear cell in the ear and brain cell in the brain if all goes to the plan

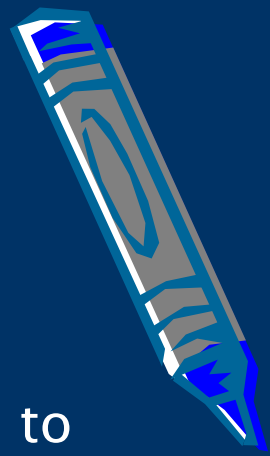
  Question : How do these different types of cell grow?

  Answer : There is another type of gene in the cells that acts like a boss or a switch (operator genes) to tell the builders (structural genes) when to start and stop work.

  In some cases the bosses can hold the workers in check for years and will only throw the on-switch at a set 'maturational' time in the human lifespan (puberty)

  Bosses can also be affected by the environment and may not throw the switch if conditions are not good (poor diet)

Genotype and phenotype.



Nonetheless, even if an ability or feature is directly due to genes, it still has to emerge or develop within a certain environment. For example, you may have the genetic potential (genotype) for being tall, but a malnourished diet in childhood may mean that your actual height (phenotype) is short.

Phenotype is the actual behaviour or feature that develops and may differ from the genotype (genetic template or potential) because of the interaction of genes with environmental factors.

Can genes affect behavior and abilities?

- It has been known for a long time that genes can affect physical features like hair colour. But can genes affect behaviour or complex abilities like memory or musical skill? Genes may affect some basic aspects of human behaviour but may not control complex capacities in a simple direct way .

- However , genes can influence brain cells just as they do body cells. For example, genes may affect how many neurons grow in particular areas of the brain and how many connections are made amongst these neurons. In this way genes can influence the basic capacity of the brain for processing information and so have some impact on learning, memory and problem-solving abilities.

Crucial study: links between genes and behavior.

A long history of selective breeding studies with animals has confirmed that genes can affect animal behavior such as learning. In one classic study (Trion, 1934,and Pinel , 2000)

Two distinct groups of rats were bred by selective mating:

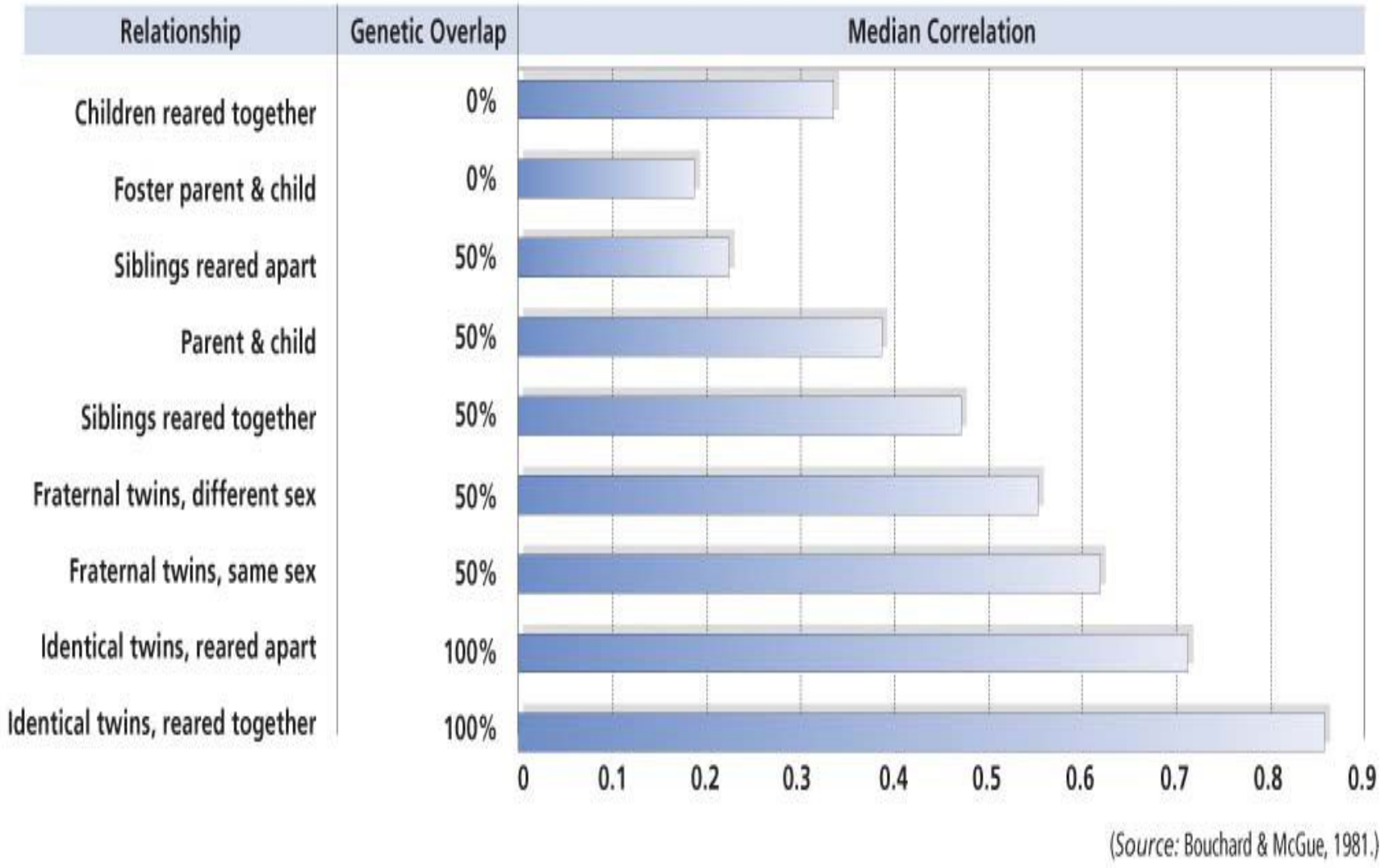
one group that were very good at finding mazes (maze-bright) and another group that were maze-dull. Even if babies of these two groups were cross-fostered after birth (maze-bright babies were reared by maze-dull parents and maze-dull babies by maze-bright parents) , the maze-bright offspring still made fewer mistakes in the mazes than the maze-dull offspring: strong evidence that genetic factors were at work in their learning abilities.

Fundamental Principle

Within debate about relative influence of nature and nurture

- – Role of **genetics** is often to produce tendency toward future course of development
- – Role of **environment** affects when and whether a certain behavioral characteristic will actually be displayed

Genetics and I.Q.



Nurture=Environment=Experience

Physical factors:	Interpersonal factors
Basic aspects of life, nutrition, sensory perceptual stimulation *Impact in positive and negative ways*	Family, cultural environment, exposure to language and knowledge. *Impact in positive and negative ways*

Children's cognitive and language development is enhanced by -

1. Stimulating and encouraging home environment.
2. Children's emotional, personality and social development is enhanced by-

Accepting and responsive to children's needs parents but who keep reasonable and consistent discipline , which will give rise to a higher self-esteem, greater social competence. (in contrast to permissive or overly controlling)

Educational video: Thinking twice about twins

- https://www.youtube.com/watch?v=mMUryFgD25Y&ab_channel=TEDxTalks
- Questions:
- 1. How many twins worldwide did he mention? Are more twins born since 2018 in USA? Is there enough research done about their development? Why did he call twins clones?
- 2. How different are twins from non-twins in terms of sense of identity? (compare individual and collective identity) How effective are twins in this differentiation? Give examples.
- 3. How strong is their motivation to compare themselves ? Give examples
- 4. Do twins cooperate or compete more? Why?
- 3.

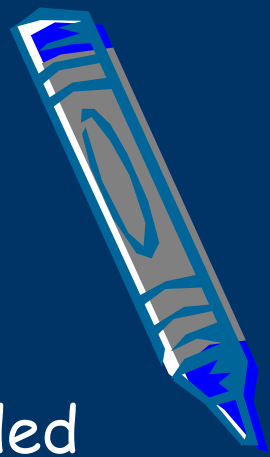
Summary:

- Even if all human beings were clones of each other with exactly the same genes, we could still develop different attributes and abilities due to the unique environmental experiences that each of us would invariably have.
- Human characteristics and behavior are a joint outcome of genetic and environmental factors.
- Genetic influences have been identified in physical characteristics, intelligence, personality traits and behaviors, and psychological disorders.
- There is some speculation that entire cultures may be predisposed genetically toward certain types of philosophical viewpoints and attitudes.

Seminar 2 case studies

- 1. Role-play a story about dominant and recessive genes. You may support the story with any pictures . (about 10 min). Show how they interact and which results we can get . – one team- TEMPERAMENT
- 2. School experience: small conference where school teachers share their experience of working with children with genetic disabilities (ADHD, autism, visual/hearing impairment). Why is inclusion important for these children? (10 min) – one team – INTELLIGENCE
- 3. Research exploration: what does behavioral genetics say about twin studies? Report about latest research findings. (10 min)- one team- MOTIVATION
- 4. Design a presentation for adolescent students that dramatically emphasises the dangers of common teratogens(agents that can cause malformation in the embryo are called teratogens.) ; include the information illustrating the effects of consumption of alcohol and drugs during pregnancy. (10 min)-one team- EMOTION
- Read 'Developmental and Educational Psychology for Teachers', Ch. 2, (pp23-48)

Reflection task on lecture 2



- Consider your mother, father, siblings, and extended family. What strong genotypical characteristics are shared? What diverse characteristics are represented in your family group? Consider whether these diverse characteristics are more or less likely to be the result of genes, environment, or a combination.
- Write between 150-200 words.
- Developmental and Educational Psychology for Teachers . Ch. 2,(pp23-48)