

Genetic Bases of Child Development

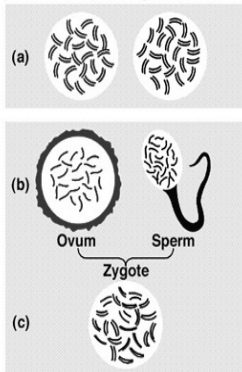


Conception & The Genetic Code

- Conception
- Zygote

Heredity Composition of the Zygote

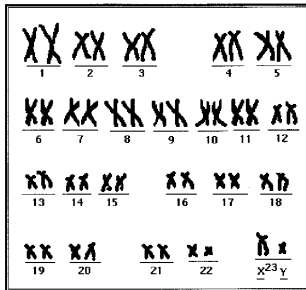
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Determination of Sex

- The first 22 pairs of chromosomes, called autosomes,
- The 23rd pair is the sex chromosome.

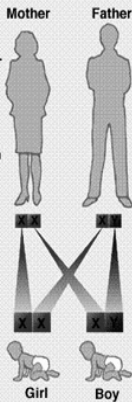
Karyotype



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Determination of Sex

Father has an X chromosome and a Y chromosome. Mother has two X chromosomes. Male baby receives an X chromosome from the mother and a Y chromosome from the father. Female baby receives X chromosomes from both mother and father.



Mechanisms of Heredity

Terms:

Genotype

Phenotype

Mechanisms of Heredity

- Single Gene Inheritance
- Behavioral Genetics
(Polygenic Inheritance)

Single Gene Inheritance

- Some human characteristics are influenced by only one pair of genes.

Single-Gene Inheritance

- Each member of a pair of genes is referred to as an allele.
 - Homozygous
 - Heterozygous

Single Gene Inheritance (cont'd)

- Dominant genes
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- Recessive genes

DOMINANT TRAITS

RECESSIVE TRAITS

Eye coloring

brown eyes

grey, green, hazel, blue

Vision

farsightedness
normal vision
normal vision
normal vision

normal vision
nearsightedness
night blindness
colorblindness*

Hair

dark hair
non-red hair
curly hair
full head of hair
widow's peak

blonde, light red hair
red hair
straight hair
baldness*
normal hairline

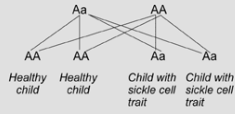
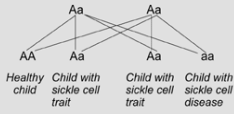
Facial features

dimples
unattached earlobes
freckles
broad lips

no dimples
attached earlobes
no freckles
thin lips

Single Gene Inheritance

Glenn is Heterozygous



Incomplete Dominance

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Codominance

- Person's physical makeup is a comprise of the two genes

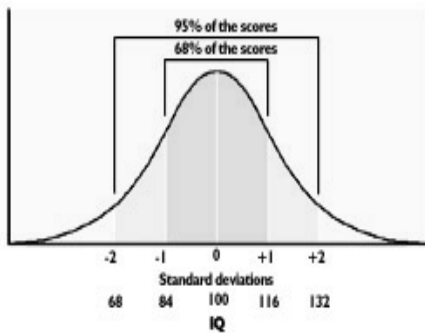
Behavioral Genetics

- Polygenic Inheritance

Polygenic Inheritance

- Most human characteristics are determined by multiple genes (rather than a single gene pair).

(B) THE NORMAL DISTRIBUTION OF IQ



The Normal Distributio

Methods of Behavioral Genetics

- Twin Studies
- Adoption Studies

Genetic Uniqueness/Relatedness

- Identical Twins

- Fraternal Twins

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a. Twin studies

- Identical twins reared together
- Identical twins reared apart

- Fraternal twins reared together
- Fraternal twins reared apart

b. Adoption studies

- Child and adoptive parents

- Child and biological parents

Genetic and Environmental Determinants of Temperament

Temperament

- Emotionality
- Activity
- Sociability

- Identical twins:
 - Emotionality (.63)
 - Activity (.62)
 - Sociability (.53)
- Fraternal twins:
 - Correlations not much greater than 0

Genetic and Environmental Determinants of Psychological Problems

Schizophrenia

Concordance rates:

Identical Twins: 46%

Fraternal Twins: 14%

Mood Disorders

	Identical twins	Fraternal twins
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<u>Depression</u>	50%	25%
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<u>Bipolar Disorder</u>	70%	15%
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Identical genes do not make
for identical people.

Genetic Disorders

Down Syndrome (Trisomy 21)

- 47 chromosomes (instead of the normal 46)
- 3 rather than 2 21st chromosomes (Trisomy 21)

Characteristics of Down Syndrome

- Mentally retarded (IQ range 20-50 usually)
- Cheerful, gregarious but stubborn
- Physical characteristics:

Down Syndrome (cont.'d)

- Acquire motor skills later than normal children.
- May have other defects like heart and intestinal defects.

Frequency of Down Syndrome:

- Overall:
- Risk increases with mothers' age

Phenylketonuria (PKU)

- Missing an enzyme that breaks down phenylalanine
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Abnormalities of Sex Chromosomes

Abnormalities of Sex Chromosomes

- **Turner syndrome**
 - A female with a single X chromosome
- **Klinefelter syndrome**
 - Male with a extra X chromosome



Turner syndrome X O

- 1 in 2500 –8000 female births.
- Impaired spatial skills
- Incomplete sexual development
- Short stature

Klinefelter syndrome XYy

- 1 in 500-1000 male births.
- Impaired verbal intelligence
- Tall
- Incomplete sexual development
