

# Personality

What makes us who we are?

## **Psych 305A: Lecture 14**

### **Biological Approach: Genetics**

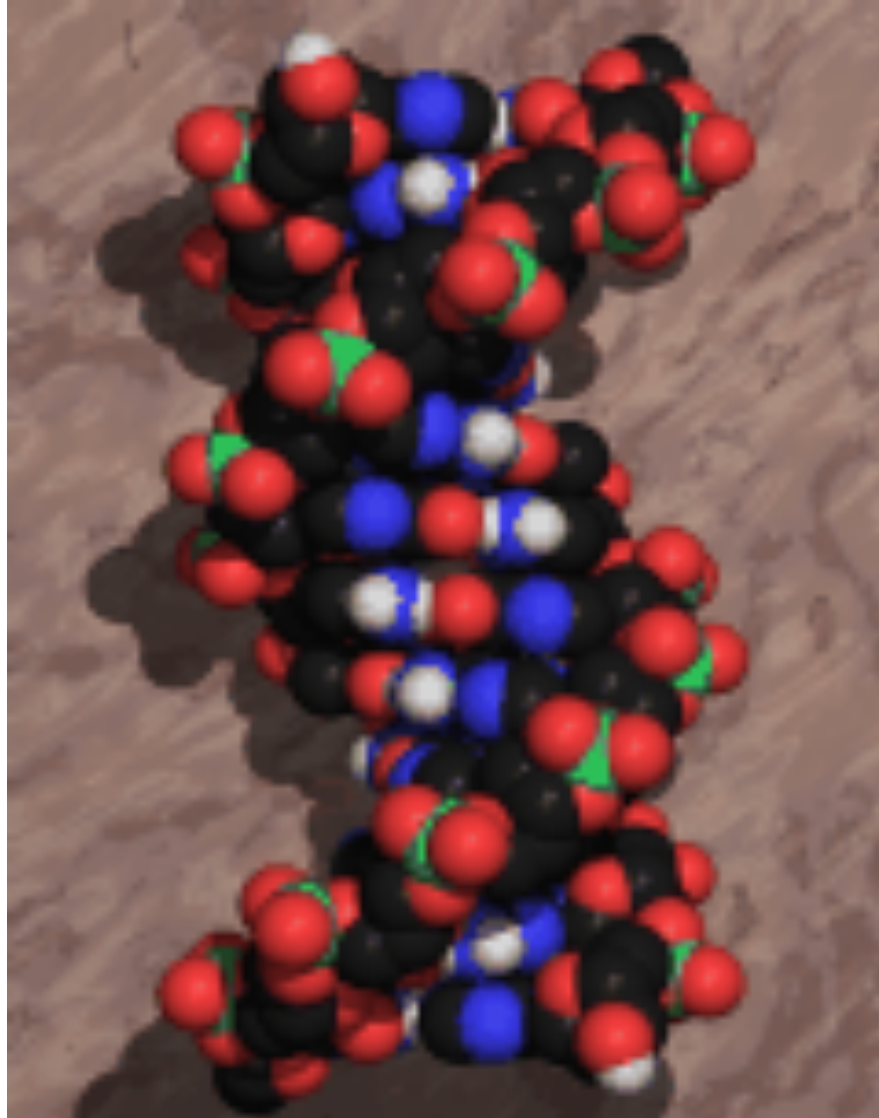
International Service Learning Course: **April/May-October, 2014**  
Psychology 417A: Psychology and Developing Societies

- Instructor: Dr. Sunaina Assanand ([assanand@psych.ubc.ca](mailto:assanand@psych.ubc.ca)).
- June-August: 12 week placement in Africa.  
July: Mid-placement reflection sessions.
- ARA funding available to BA students in Psychology; will offset 70-100% of program and flight costs.
- Accepting applications until November 17. For information, visit: <http://www.students.ubc.ca/global/learning-abroad/international-service-learning/current-programs/psych-417-developing-societies/>.

## Exam 3

- Mean = 74%
- Range = 30% - 100%
- Scores posted online!

# Modern Biological Approach: Genes



# Genetic Approach to Personality

- Genes are the building blocks of personality
  - Inherited through evolutionary processes
  - Shape personality and behavior by shaping physiological responses
  - Behavioral genetics = the study of how genes shape behavior

# Assumptions of Behavioral Genetics

- Nature ~~vs.~~ Nurture
  - Behavior (i.e., personality) is shaped, in part, by genes we inherit
  - Behavior is also shaped by the environment
- NO traits are caused entirely by nature or nurture; it's always both

# Basic Assumptions of Genetic Approach

- *Genotypes* are genetic potentialities
  - E.g., genes for eye color, height
- *Phenotypes* are manifest characteristics.
  - E.g., actual eye color and height; influenced by mix of genes and environment
- *Genetic determination*
  - If gene, then phenotype, irrespective of environment
- *Gene-environment interaction*
  - If gene and a particular environment, then a particular phenotype

# Genetic Heritability

- Heritability is the extent to which individual differences in a trait, *within a group of people*, are due to differences in genes
  - Heritability can only apply to groups → based on individual differences
  - Does NOT mean how much of a trait within a single person is due to genetics



# Behavioral Genetics

- Used to identify genetic differences between individuals within a group
- Allows researchers to determine the extent to which individual differences in a trait are due to genetics and to the environment

# Misconceptions about Heritability

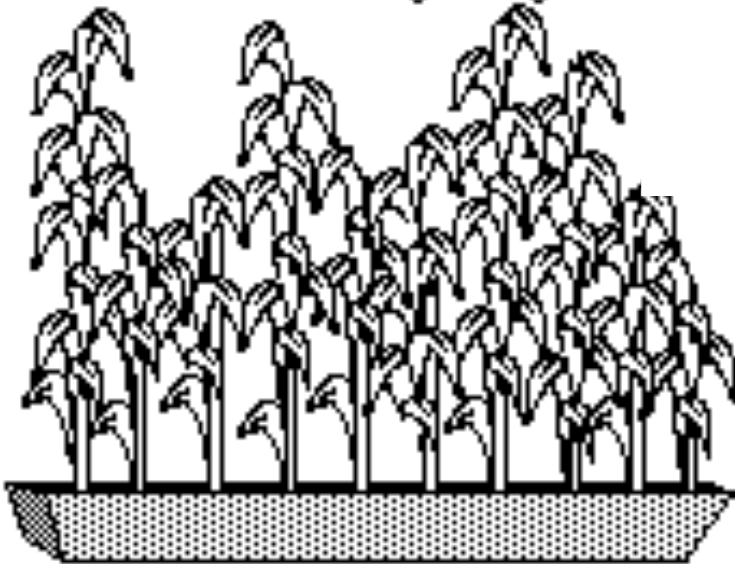
- Group differences are (most typically) NOT explained by genetic differences
  - E.g., African-American vs. Caucasian IQ scores
  - Numerous studies have found that *average* IQ for U.S. African-Americans is 10 to 15 points lower than for U.S. Caucasians
  - This difference has been assumed, by some, to be due to genetics
  - What is wrong with this explanation?

# Where are the Genetic Differences?

Heritability = 100%



Uniform lighting



Uniform nutrient solution: Normal

Heritability = 100%



Uniform lighting



Uniform nutrient solution: Deficient

# Group differences due to environmental differences between groups

- The difference in average racial IQs decreases when environments are matched on SES
- Average IQ for U.S. African-Americans adopted into white middle-class households is 110
  - 25 points higher than average African-Americans, 10 points higher than average Caucasians

# Group Differences Due to Different Environments

- Race differences in IQ differ by age
  - No difference in infancy
  - 4 point difference at age 4
  - From ages 4-24 years African Americans lose  $6/10^{\text{th}}$  of a point per year

# What's the environmental difference?

- African American children more likely to be raised by single parent
  - Single parent homes less cognitively complex
- Attend schools with lower average IQ, so high achievers don't need to achieve as high

# Behavioral Genetics

# Research in Behavioral Genetics: Twin Studies



- Twin studies help us understand the importance of genetic and environmental influences on social development
  - Identical (MZ) vs. Fraternal (DZ) twins
  - Reared together vs. reared apart





# Shared Traits in Identical Twins

- Who has an identical twin?
- What personality dispositions do you and your twin share?
- Why do ID twins share traits?

# Twin Study Research Diagram

	Monozygotic (MZ) Twins	Dizygotic (DZ) Twins
Environment	same	same
Genetics	same	different

# Behavioral Genetics Methodology

- Twin Studies: compare concordance (similarity) of trait in MZ vs. DZ twins
- Adoption Studies: compare concordance of trait between parents and biological vs. adopted kids
- MZ Twins Raised Apart
  - Best Design: Simply look at the concordance of the trait → that's its heritability

*Table 10.3* Within-Pair Extraversion Correlations for MZ and DZ Twins

	<i>MZ Twins</i>	<i>DZ Twins</i>
Swedish sample	.47	.20
Finnish sample	.46	.15

*Source:* From Floderus-Myrhed et al. (1980) and Rose et al. (1988).

Is Extraversion more heritable in Swedes or Finns?

# Behavioral Genetics

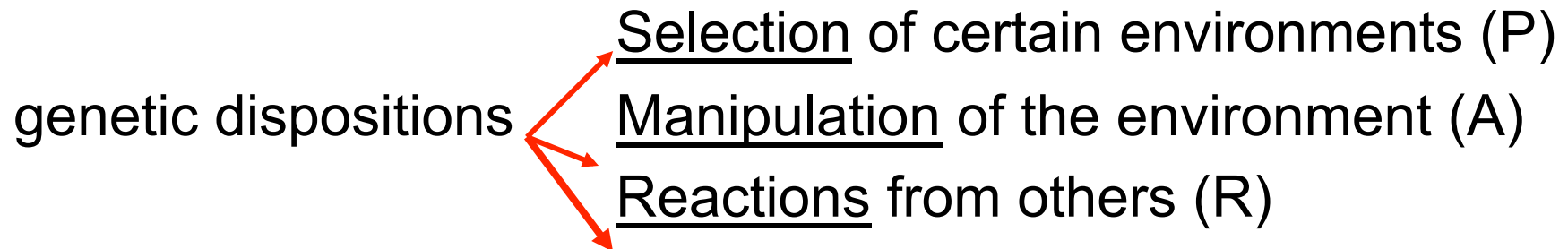
## Methodological Issues

- Twin Studies
  - Equal Environments Assumption
    - Is amount of shared environment really the same for DZ vs. MZ twins?
- Adoption Studies
  - Representativeness
  - Selective placement

# More General Limitation

- Assumption that genes and environment are independent
- In fact, certain genotypes and environments may be associated with each other (genotype-environment correlation)

Passive, Active, Reactive



# Findings of Behavioral Genetic Research

- Twin studies have revealed 3 important influences on personality:
- **Genetic influences:** Genes individuals inherit from their parents
- **Shared Environment:** Environmental effects shared by family members (parenting style, family environment, schools, neighborhood, material resources)
- **Non-shared Environment:** Environmental effects unique to the individual -- NOT shared by family members (illnesses, friends, teachers, being treated differently by your parents)



# Genetic and Environmental Effects

- Genetic effects
  - What parents pass on to their children
  - 100% shared in MZ twins, 50% in DZ twins
- Environmental effects
  - Shared: Family and environmental influences that affect MZ/DZ twins similarly
  - Non-shared: Family and environmental influences that affect MZ/DZ twins differently

# Heritability of Personality

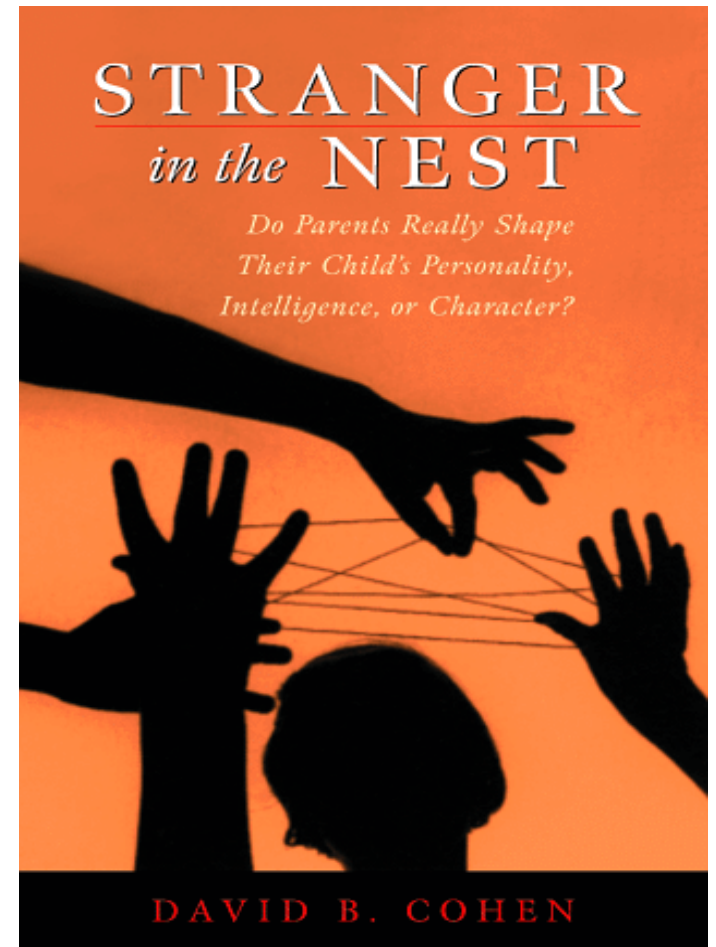
	<i>Genetic</i>	<i>Shared</i>	<i>Non-shared</i>
Extraversion:	.49	.02	.49
Agreeableness:	.35	.11	.54
Conscientiousness:	.48	.07	.45
Neuroticism:	.41	.07	.52
Openness to Experiences:	.45	.06	.49

\*\*Genetics and non-shared environment important

\*\*Shared environment has little influence on personality

## CONCLUSION FROM TABLE:

- Most personality traits have some genetic component
- Non-shared environmental experiences have a very strong impact on personality
- Shared environmental experiences have little impact on personality
  - Do parents matter??



# Where do non-shared environmental effects come from?

New Zealand Twin Study



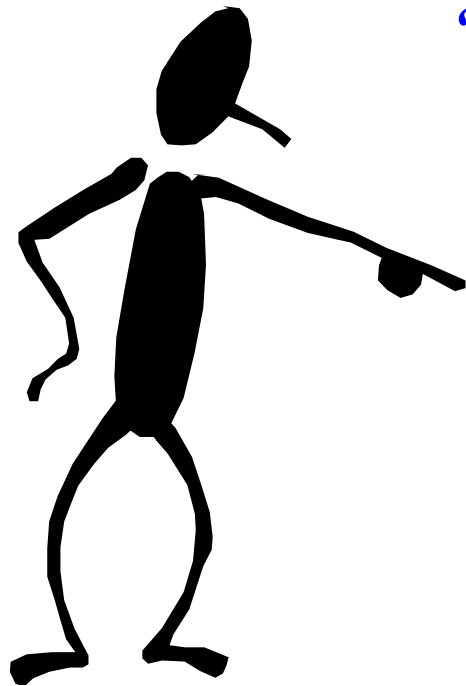
# Genetic and Environmental Effects Study

- Measured self-esteem: two teachers reported (age 5 & 7)
- Measured parent-child relationship
  - Mother's expressed emotion (child at age 5)
  - Mothers spoke about each twin for 5 minutes
  - Negative emotion expressed towards child coded from tapes

# Negative Expressed Emotion

“She always does it, I’ve never met such a clumsy child. We think ‘oh here we go again, she’s done it again.’ It drives me mad! Why doesn’t she look where she’s going? I’m constantly having to look after her, she’s constantly breaking things. Sometimes I think she’s stupid. She never learns.”

# Does unique parenting (non-shared environmental effect) influence self-esteem?



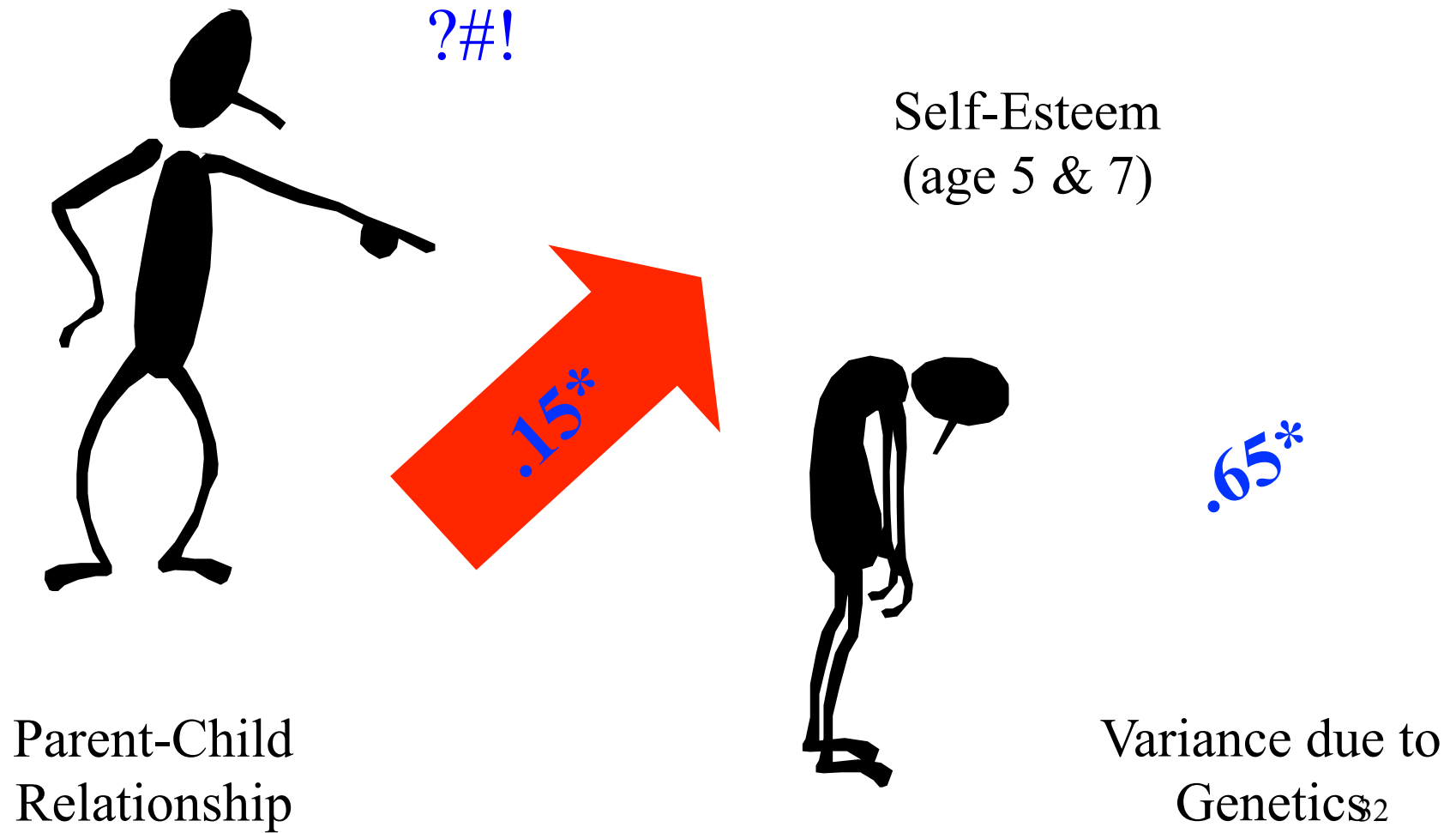
?#!

Self-Esteem  
(age 5 & 7)



Parent-Child  
Relationship

# Parenting and Self-Esteem





# Parenting and Self-Esteem

- Do parents matter?
  - Yes
  - The unique relationship between the mother and each child predicts the unique self-esteem of each child
    - Non-shared environmental effect
  - This effect cannot be explained by genetic or shared environment influences

# Conclusions from Behavioral Genetic Research

- All personality traits are at least partially heritable
- The effect of being raised in the same family is smaller than the effect of genes
- Much of the variance in personality is not due to genes or shared family experiences
  - Personality differences are strongly influenced by unshared or idiosyncratic experiences, or unique parent-child relationship

# Shared Family Environment

- Does influence other aspects of a person
  - Attitudes
  - Religious beliefs
  - Political orientations
  - Health behaviors
    - Strong correlation between adopted siblings on smoking and drinking tendencies

# Which traits are most heritable?

- Which traits have strongest genetic component?

# Twins Separated at Birth

<u>Very Heritable</u>	<u>MZ Twins Raised Apart</u>
Neuroticism	.70
Imagination	.74
Aggression	.67
<u>Moderately Heritable</u>	
Traditionalism	.59
Sense of Alienation	.59
Social Potency	.57
Sense of well-being	.49
Risk Taking	.45
<u>Somewhat Heritable</u>	
Achievement Orientation	.38
Social closeness	.15

# Next Class

- Wrap up Genetics, begin physiological approach
- Read Larsen & Buss, Chapter 7