

Psych 3102

Introduction to Behavior Genetics

LECTURE 1

INTRODUCTION

- Syllabus
- Homework
- Introduction to the course

Introduction

- Study of how genes influence behavior
 - recent recognition
 - individual differences within species
- quantitative genetics
 - twin, family, adoption studies
 - empirical knowledge
 - genetic and environmental effects

- **molecular genetics**

- positional cloning of genes
- therapeutic uses

- **population genetics**

- allele frequencies, differences between populations
- evolutionary aspects

psychopathologies
cognitive disabilities
personality

- **Recent developments**

- health psychology (behavioral medicine)
- aging
- evolutionary psychology



USE OF TWIN STUDIES

monozygotic identical twins

dizygotic fraternal twins

Why are twins so useful?

clones

inbred lines (strains) rats mice fruit flies



Need measurements of differences and similarities between family members

- **variance** how variable the trait measurements are
- **covariance** how similar the variation is between 2 sets of variables (a measure of shared variance)
- **correlation** standardized measure of covariance
- **concordance** measure of shared phenotype between pairs of relatives

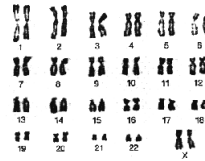
What have we got so far?

Alzheimer disease (AD)

- age-related decline, memory loss, confusion
- 1 in 5 who reach 80 years
- early-onset cases
 - runs in families
 - data suggests single gene(s)
 - genes found (ApoE gene on chromosome 14 first in 1992)
- late-onset cases (more common)
 - tendency in some families
 - MZ concordance 60%
 - DZ concordance 30%
 - predisposing genes found (increase risk only)

finding specific genes that increase risk has greatly increased knowledge of etiology of AD

Common causes of mental impairment



- Down syndrome (trisomy 21)
 - single most common genetic cause of mental retardation
- Fragile-X syndrome
 - second single most common genetic cause
- Microdeletions
 - recently-discovered common genetic cause of mental retardation

Disorders once thought to be environmentally-caused

- Schizophrenia

MZ twins 45% concordance

DZ twins 17% concordance

prevalence 1%

- Autism

MZ concordance 60%

DZ concordance 10%

prevalence 0.06% (DSMIV criteria for disorder, not spectrum)

Normal variation

Traits studied:

weight, cognitive abilities, personality traits
school achievement, self-esteem, drug use

How might genes influence these traits?

Do genes influence development of these traits?

Does gene influence change over time?

How does the environment interact with genes to influence these traits?