POPULATION STATISTICAL METHODS

BY:- SHUBHANSHRI JADHAV & AL AMIN

POPULATION


GENETICS
FEBRUARY 2019 • VOLUME 211 • ISSUE 2
dynein motor
glp–1
mutant
C. elegans
gld–3
mRNA
proliferation
pachytene
P granule
germline
genotype
RNAi
tumor
sterility
wild type
gonad
mitosis
GLD–1
meiosis
oocytes
RNA binding
DLC–1
sperm
transgenic
gld–2
phenotype
gld–1
gene
GSA
Genetics Society of America

INTRODUCTION

- Population genetics is the study of change in the frequencies of allele and genotype within a population.
- Population geneticists study the genetic structure of populations, and how they change geographically and over time.

- Gene – a discrete unit of hereditary information consisting of a specific sequence of DNA
  - Alleles – alternative forms f a gene

- Genotype – the genetic makeup of an organism
- Phenotype – the physical traits of an organism

HARDY WEINBERG PRINCIPAL

$$p^2_{(AA)} + 2pq_{(Aa)} + q^2_{(aa)} = 1$$

Under certain condition, allelic frequencies remain constant from generation to generation.

If any one condition is not made, genetic equilibrium will be disturbed and the population may evolve.

Why allele frequencies change

Five evolutionary forces can significantly alter the allele frequencies of a population

i. Mutation
ii. Migration
iii. Genetic drift
iv. Non-random mating
v. Selection

MUTATION

- Errors n DNA replication result in mutation.
- Mutation can also be caused by mutagens.
- It is the ultimate source of new variation n a population.

MIGRATION

- Movement of individuals from one place to another.
- There are 2 toes of migration :
  a. Immigration : movement into a population
  b. Emigration : movement out of a population

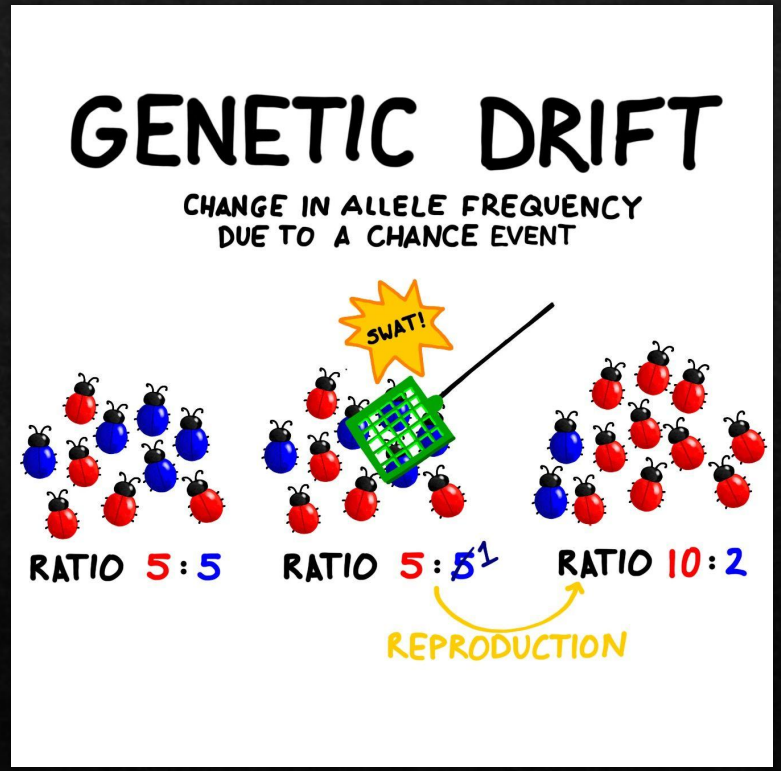
Genetic Drift

- Founder effect

  Small group of individuals establishes a population in a new location.

- Bottleneck effect

  A sudden decrease in population size due to natural forces



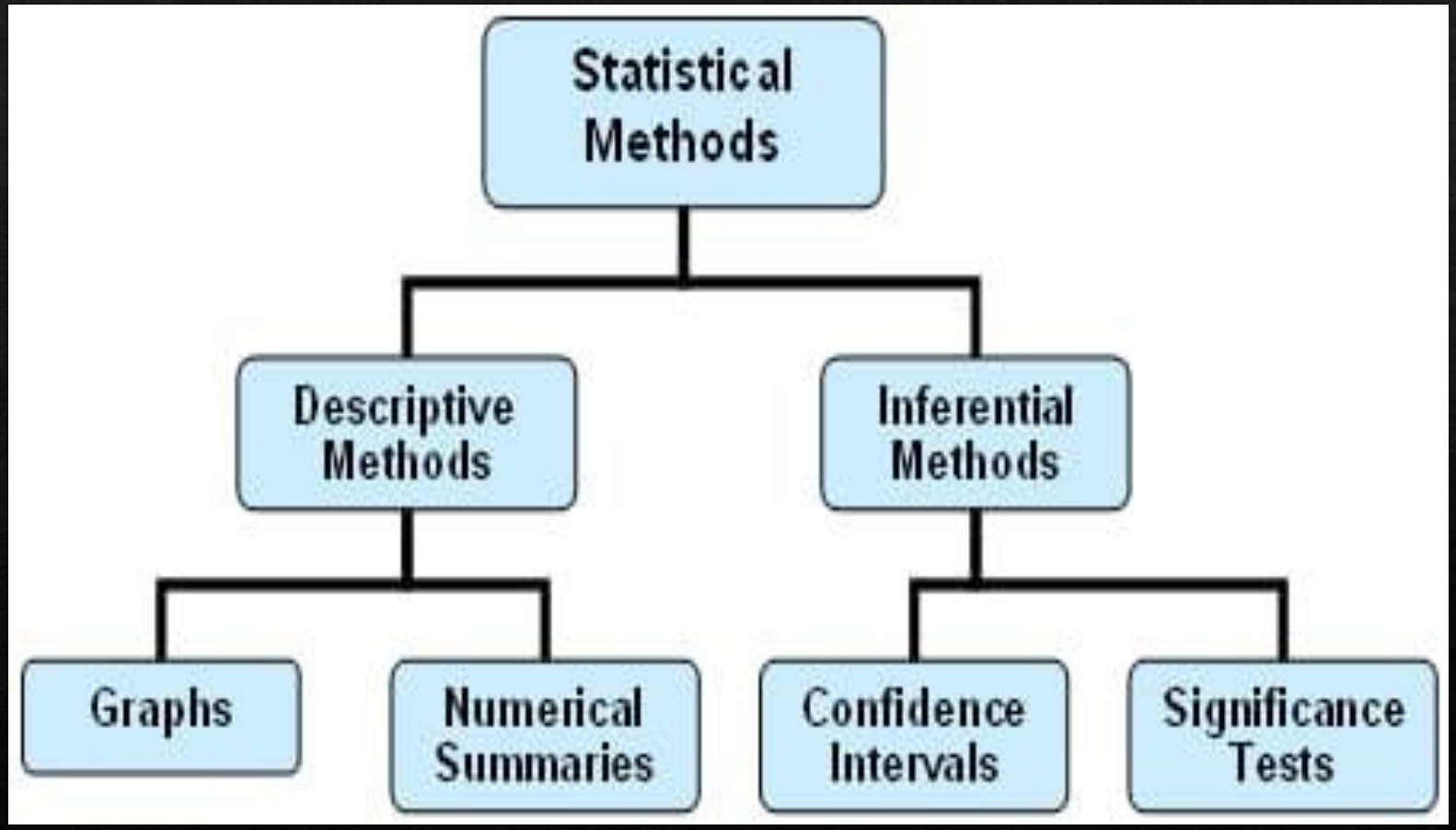
NON-RANDOM MATING

- Mating that occurs more or less frequently than expected
- Inbreeding
  - Mating with relatives
  - Increases homozygosity
- Outbreeding
  - Mating with non-relatives
  - Increases heterozygosity

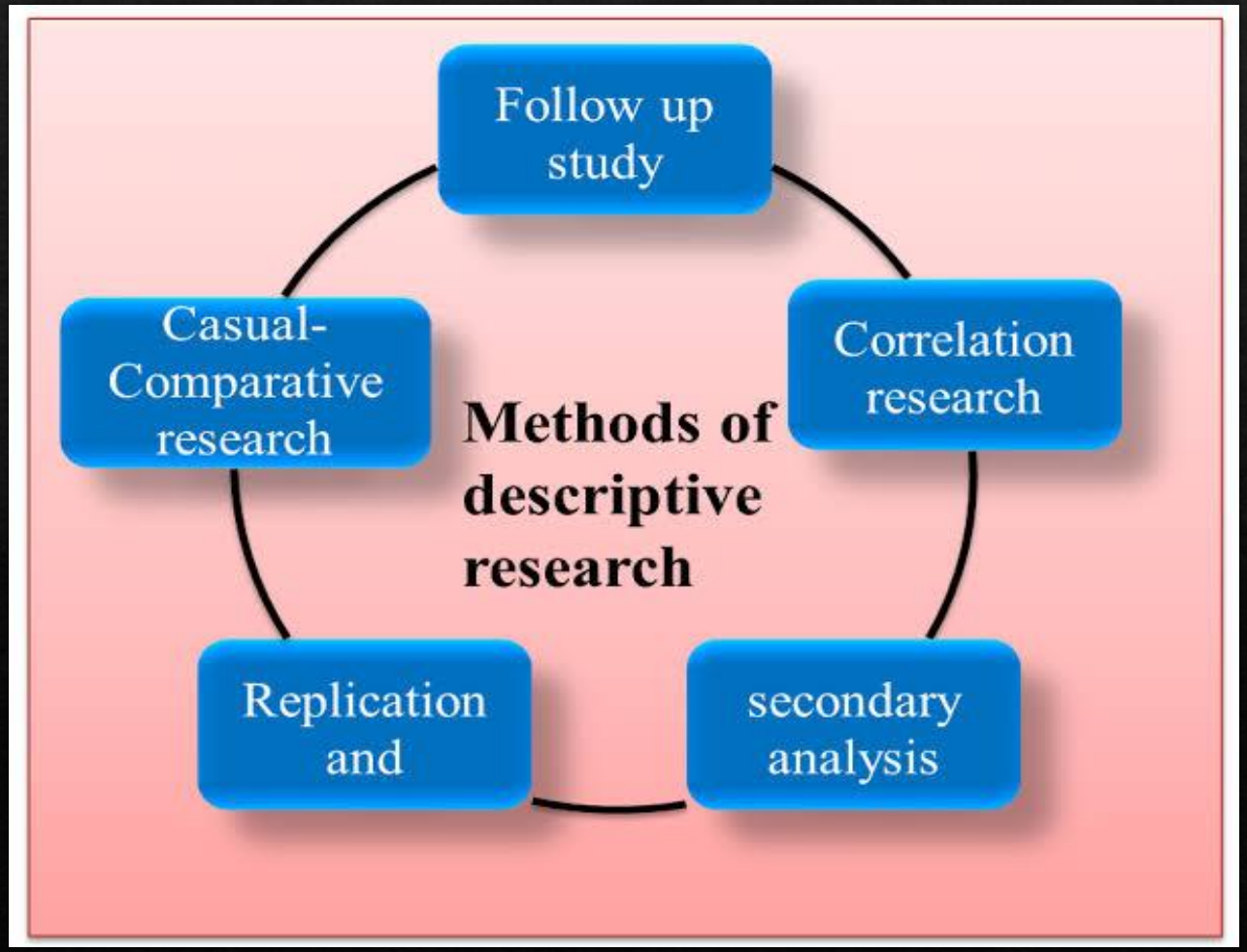
SELECTION

- Natural selection
  - Environment selects for adapted characteristics
- Artificial selection
  - Breeder selects for desired characters

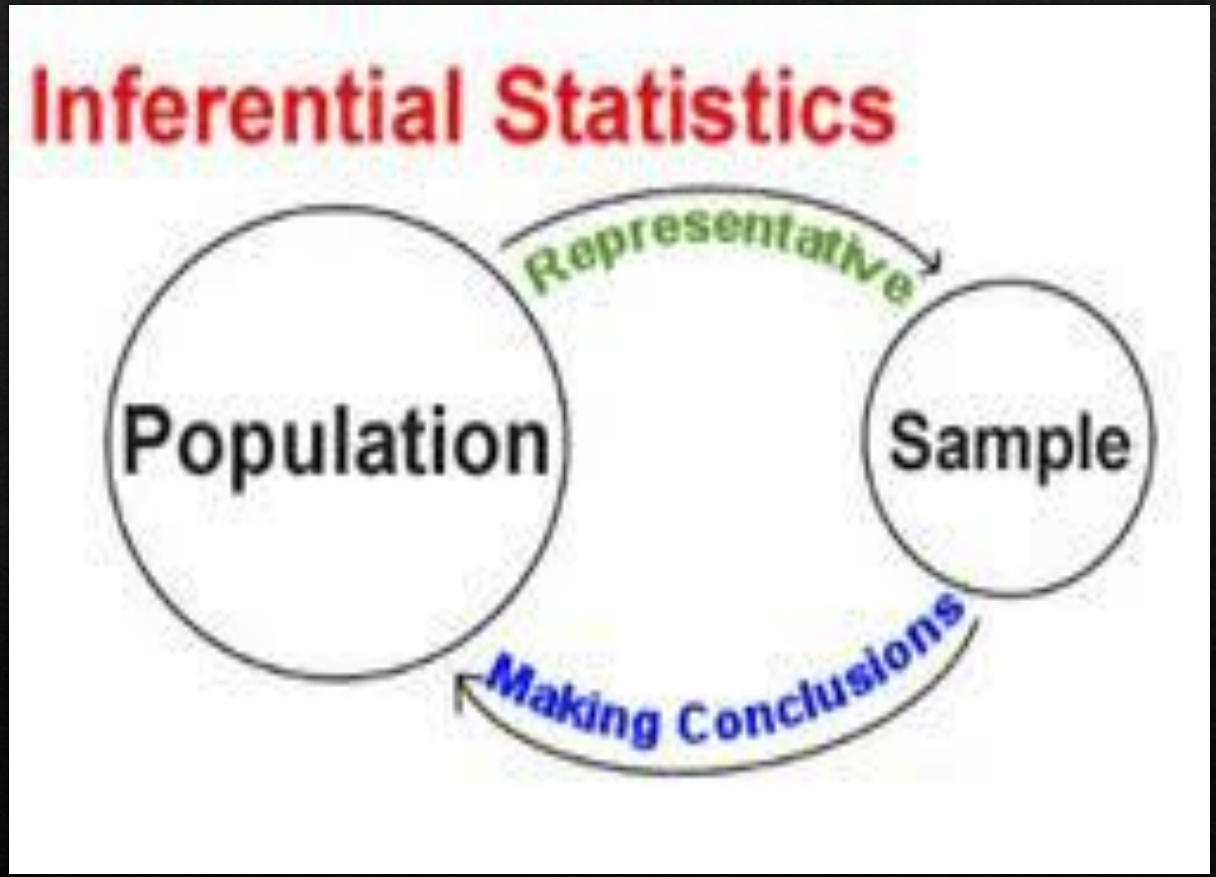
TYPES OF POPULATION STATISTICAL METHODS



DECRIPTIVE METHODES



INFERENTIAL METHODES



External links

- https://en.wikipedia.org/wiki/Population_genetics
- https://www2.le.ac.uk/projects/vgec/highereducation/topics/population-genetics
- https://www.sciencedirect.com/topics/neuroscience/population-genetics
- https://www.nature.com/subjects/population-genetics