

Sampling and Experimental Design

How do we get data?

Round 1 Matchups

Observational Studies vs. Experiments

Watch & Record

Administer
Treatment

Populations vs. Samples



Parameters vs. Statistics

Sampling Methods

The SRS - Simple Random Sample

Every sample has an equal chance of being selected

Stratified Random Sample

Break into groups, choose from each group

Cluster Sample

Break into groups, select groups

Systematic Random Sample

Every n^{th} person

The Dreaded Convenience Sample - Booooo

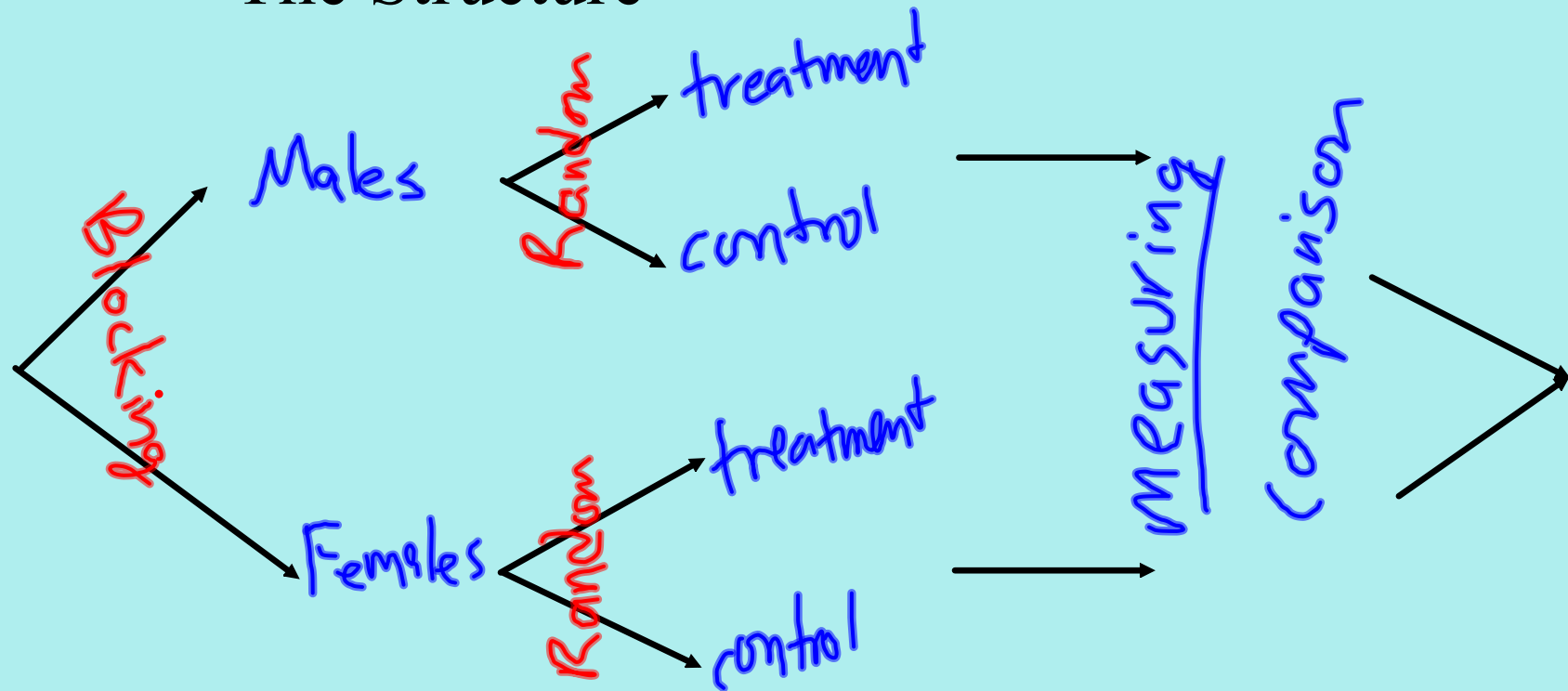
Cautions in Sampling

Generic Bias - Systematic Skewing

- ✓ Wording Bias
- ✓ Undercoverage
- ✓ Response Bias
people lie
- ✓ Non-Response Bias
- ✓ Voluntary Response

Experimental Design

The Structure



Terminology

Factors

Levels ✓ amount of treatment(s)

Treatment ✓

Placebo - looks, feels, tastes, sounds, smells like treatment

Blind - Subjects do Not know whether or not they get the treatment

Double Blind - Subjects and Evaluators do not know who gets the treatment

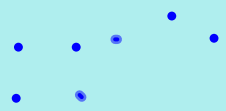
Tips for Success

✓ Completely Randomized Design

✓ What are you measuring?

✓ Who's blind (and how)?

Identify confounding variables



The Mantra

Block for variables you know about

and

Randomize for variables you don't.

Special Designs

Matching

Before : After

Pairs (blocking)

Randomly
- one gets treatment
- one gets control

Generalizability

Specifically...to whom or what does the experiment apply

Consider the sample

Principles

Control ✓ allow causation

Randomization ✓

Replication - sample size

Simulation

- ✓ What constitutes one trial
- ✓ Random Digit Assignment (table)
#1-100 → 00-99 or 01-00

Sampling Frame - table of results

Repetitions ↓

How do we get data?

Surveys *no causation*

Experiments *possibly causation*

Simulations - *probabilities /
must be known*