Experiments

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PSY 3500

Experiments

Manipulating a factor (some attribute of a participant) to discover a causal relationship

Independent Variables

The manipulation of different conditions that a researcher controls

E.g., intervention or control

Dependent Variables

The outcome (the measurement of interest) that may be cased by the independent variables

E.g., depression, correct responses

Validities

An experiment is valid if the relationship it claims to explore is actually the relationship it explores

Internal

The way it was conducted supports the conclusion that the independent variable caused any observed differences in the dependent variable

External

The way it was conducted supports generalizing the results to people and situations beyond those actually studied

Construct

The quality of the experiment's manipulations (how well we operationalized)

Statistical

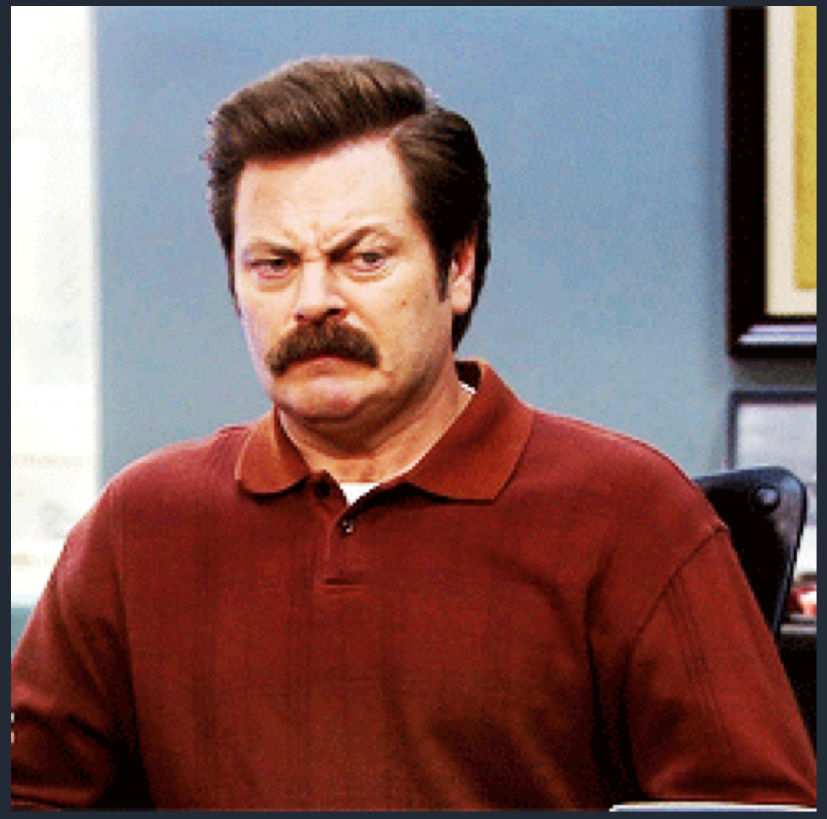
Whether the statistics conducted in the study support the conclusions that are made

Controlling Extraneous Variables

To find a causal relationship, we should not have extraneous variables impacting results

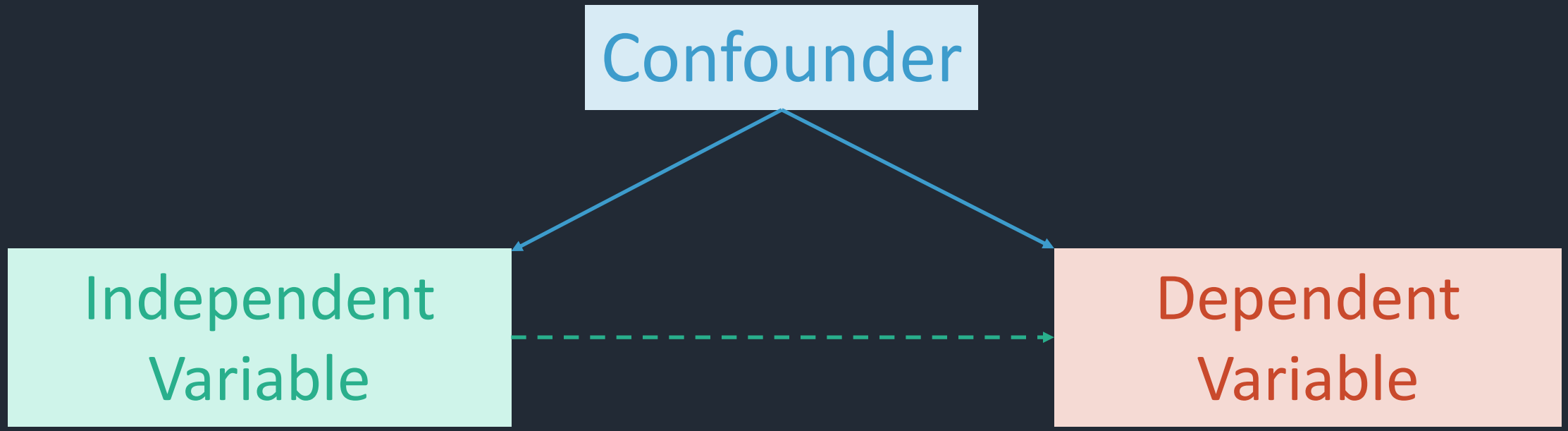
Extraneous variables add noise and confound the relationship

Extraneous are variables we aren't interested in



Confounders

A third variable that explains the relationship between the independent variable and the dependent variable



Confounders

A third variable that explains the relationship between the independent variable and the dependent variable

Reduce the Risk of Confounding by:

- Random assignment
- Double Blinding
- Measure covariates and include them in the statistical analyses

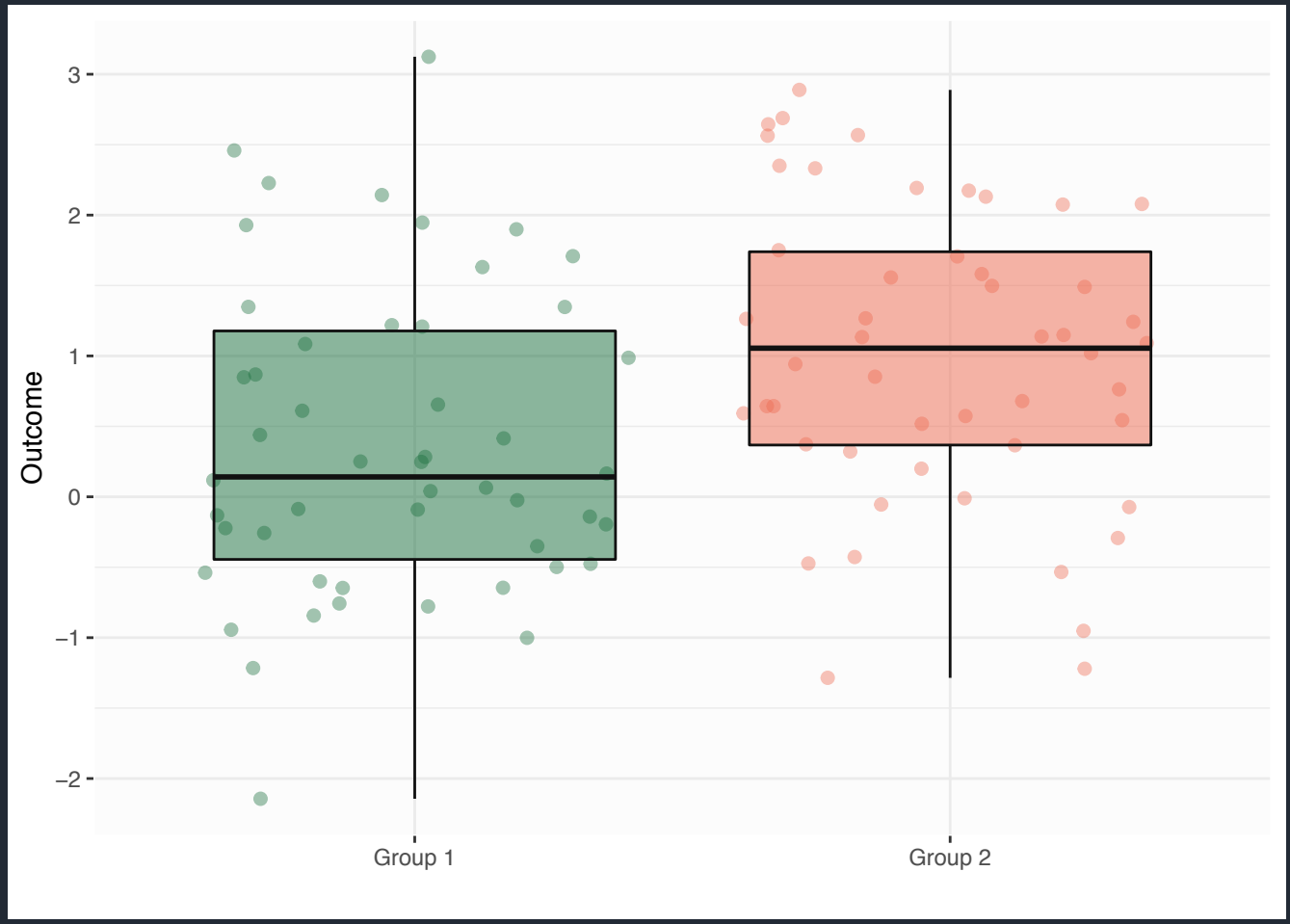
Experimental Design

There are many ways to design an experiment

Between-Subjects Design

Random assignment

Treatment and control (including placebo)



Experimental Design

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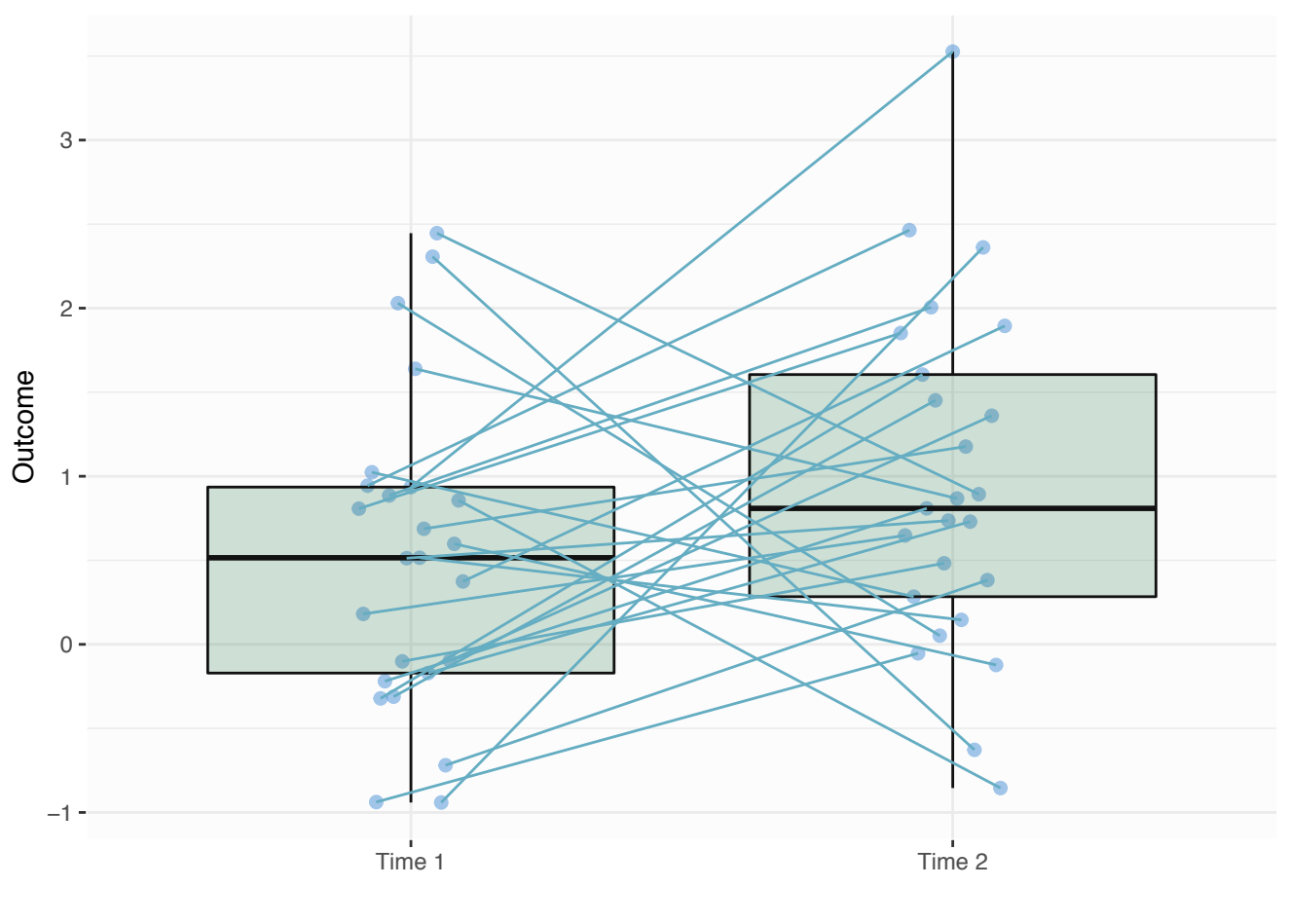


Within-Subjects Design

Random assignment

Carryover Effects and counterbalancing

Single Factor Design (2 levels)

A single independent variable with 2 levels (e.g., treatment and control)

Manipulations

1) present/absent
2) differing magnitudes
3) qualitatively different conditions.

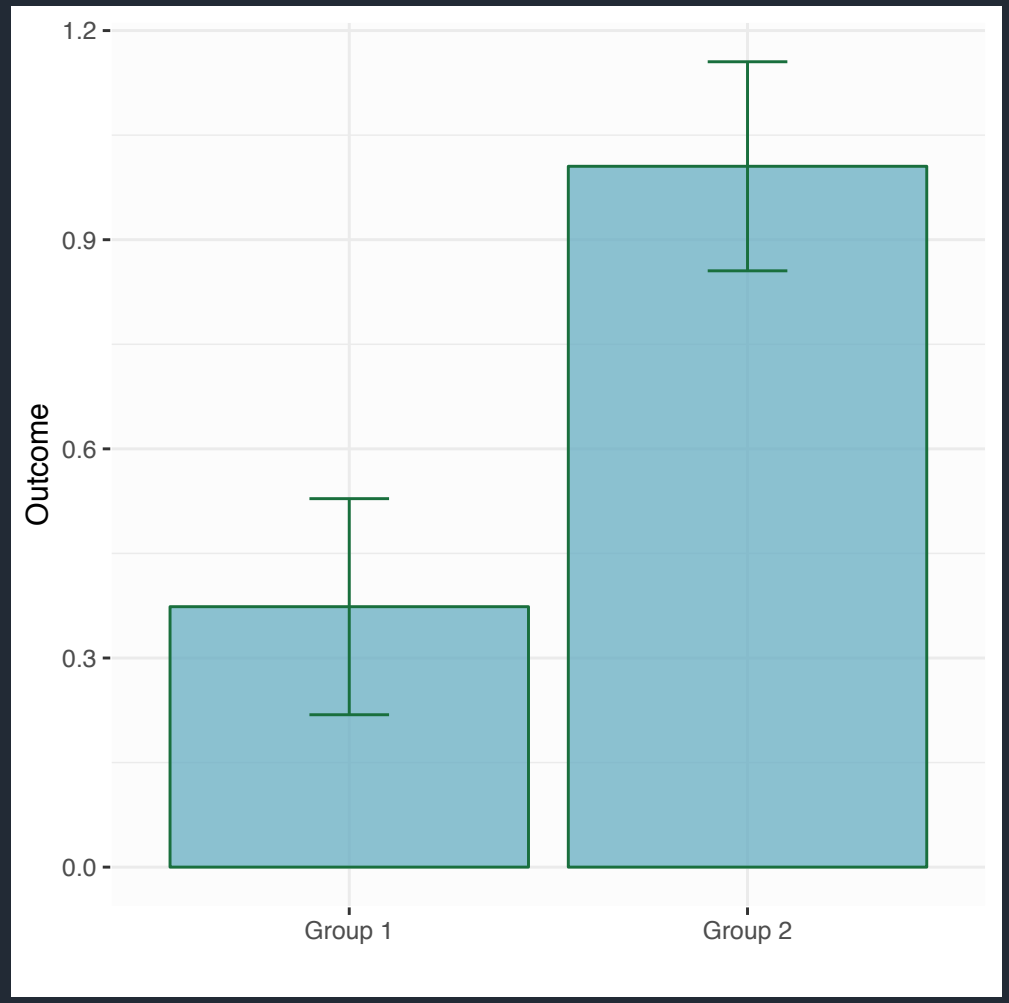
The ultimate question:
Is there a difference?

Single Factor Design (2 levels)

The ultimate question:
Is there a difference?

Chance or Change?

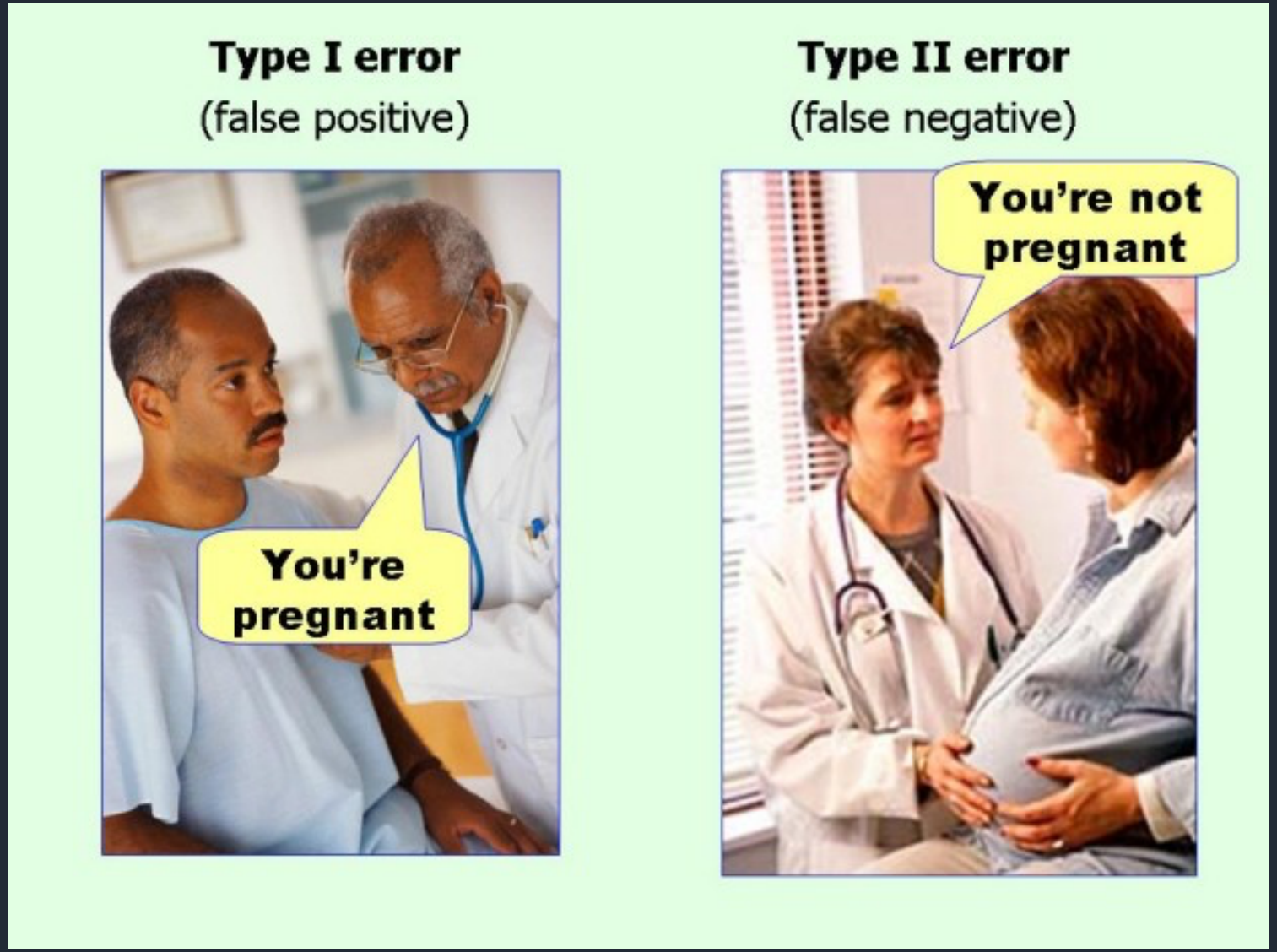
At some point, we say the difference is too big to be due to chance alone



Proof?

There is always a chance that we are wrong so we never say we have proof

We should use the term “evidence”



Conducting an Experiment

Recruitment	Get participants (Mturk, SONA, ads, clinics)
Standardizing the Procedure	Want every participant in each group to have the same procedure
Record Keeping	Keep accurate records and collect as much information as reasonably possible
Pilot Testing	Try the procedure on small sample first to see if it is working and feasible

Final Notes

Quantitative Variables

Many possible values (continuous)

Age, Likert scales

Qualitative Variables

A few set possible values that may or may not have order

Sex, race, group