



Praktika z experimentální psychologie

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Designing your own experiments

Step 1: Formulate causal relationship ... that develops theory

Writing diary about traumatic experience => better physical health	Psychosomatic medicine / The effect of psychotherapy on physical health
Decrease of blue dots' prevalence => broadening the definition of blue	Prevalence-induced concept change
Free recall after learning words from list => false recognition of non-presented but associated words	The influence of semantic association on creation of false memories (DRM paradigm)
Belief that I had exert self-control during the task => higher probability of self-control failure in consequent task	The theory of self-control strength (self-licensing as an alternative explanation)

Step 2: Choose design

... to rule out confounds



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PROVE IT!

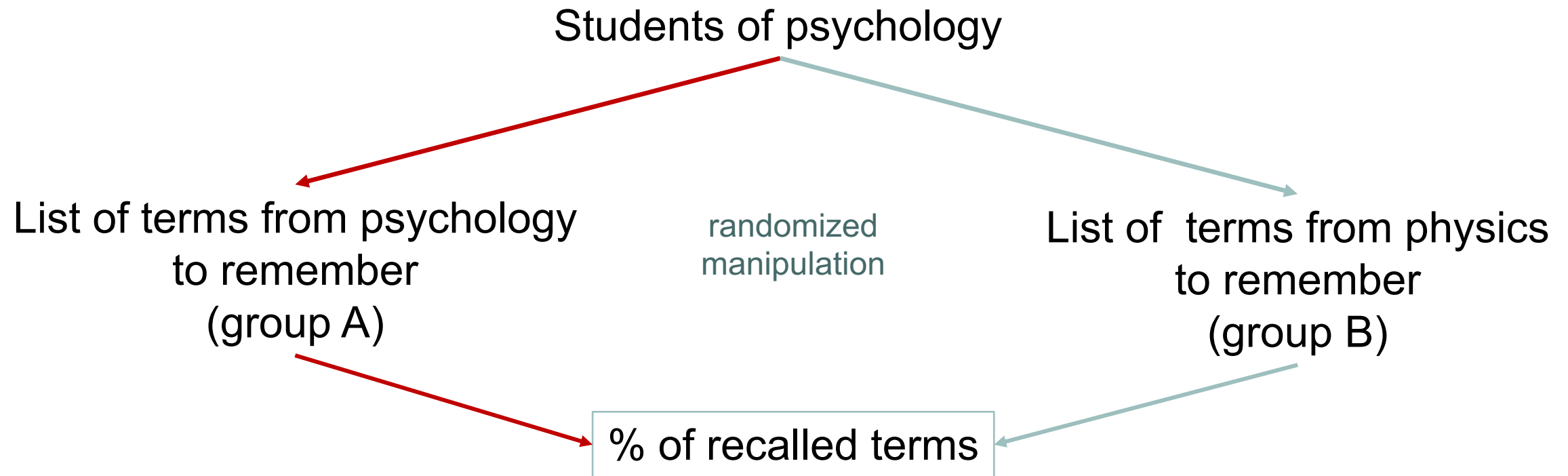
Threats to internal validity

- Group threats
- Regression to the mean
- Time threats
- History
- Maturation
- Instrument change
- Reactivity and Experimenter Effects

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design 1.0

between-subjects



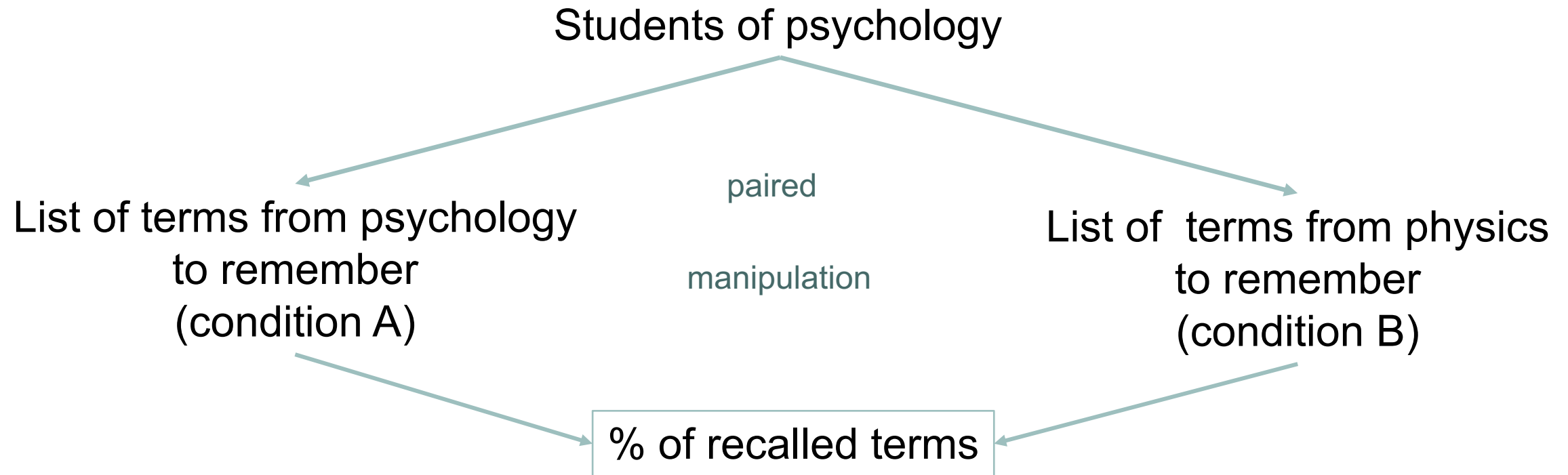
If group A outperforms group B, the causal relationship is true...(?)

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design 1.1

within-subjects

counterbalancing



If participants will score higher in condition A than in B, the causal relationship is true...(?)

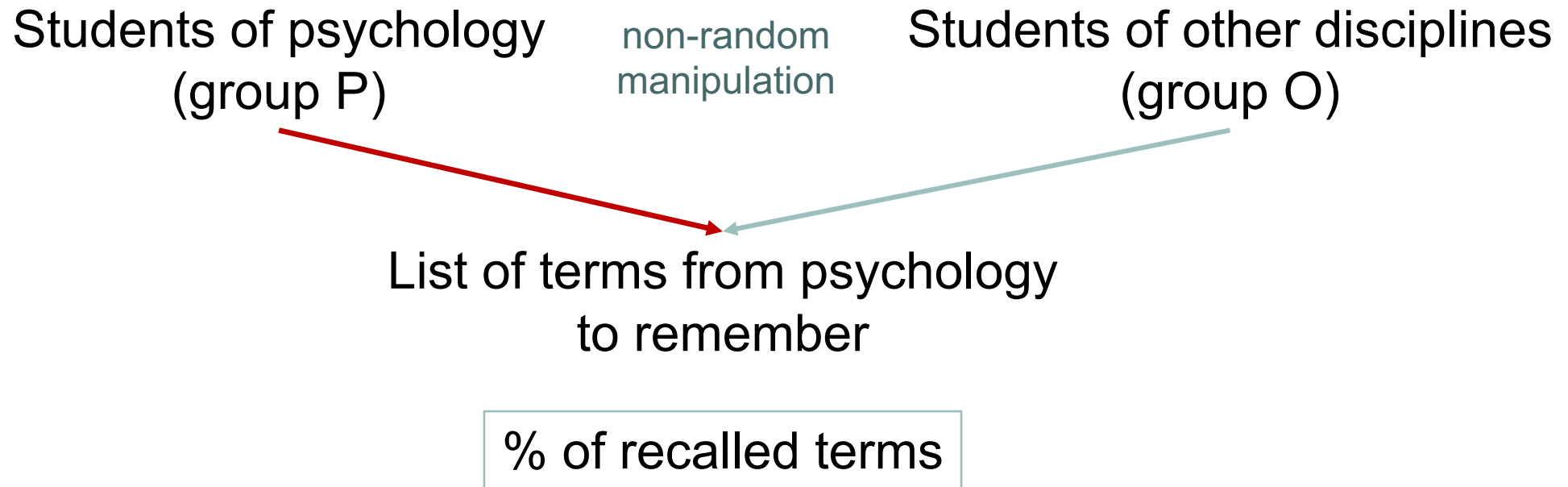
LOW INTERNAL VALIDITY (CONFOUNDS LEFT)...

e.g. Terms from physics were more difficult to remember (or recall).

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design 2.0

**between-subjects
quasi-experiment**



If group P outperforms group O, the causal relationship is true...(?)

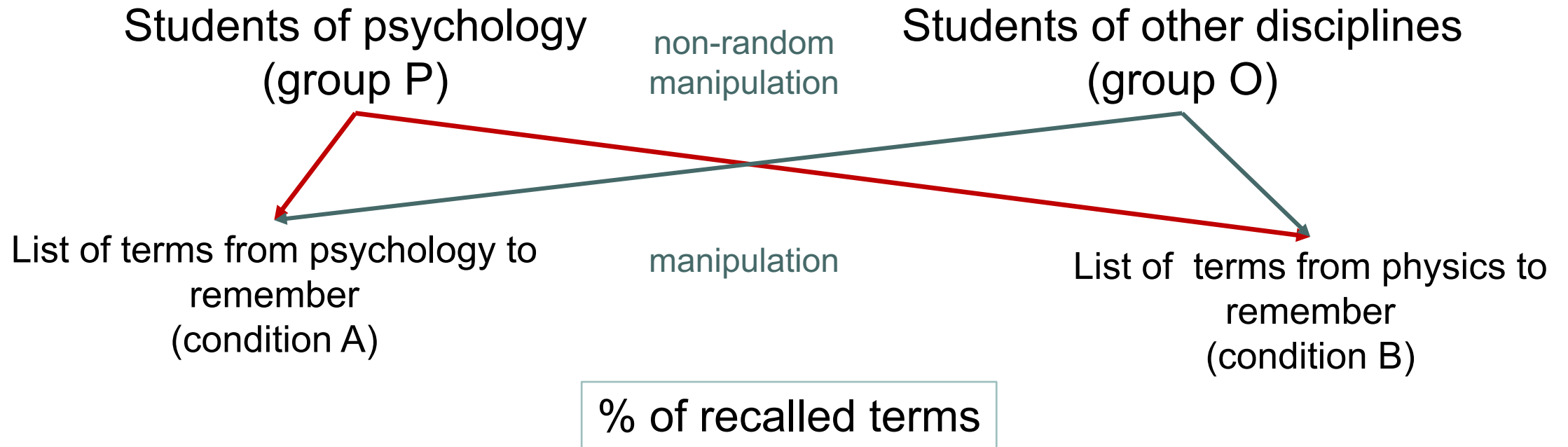
LOW INTERNAL VALIDITY (CONFOUNDS LEFT)...

e.g. Students of psychology have generally better memory than students of other disciplines.

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design 3.0

**mixed
quasi-experiment**



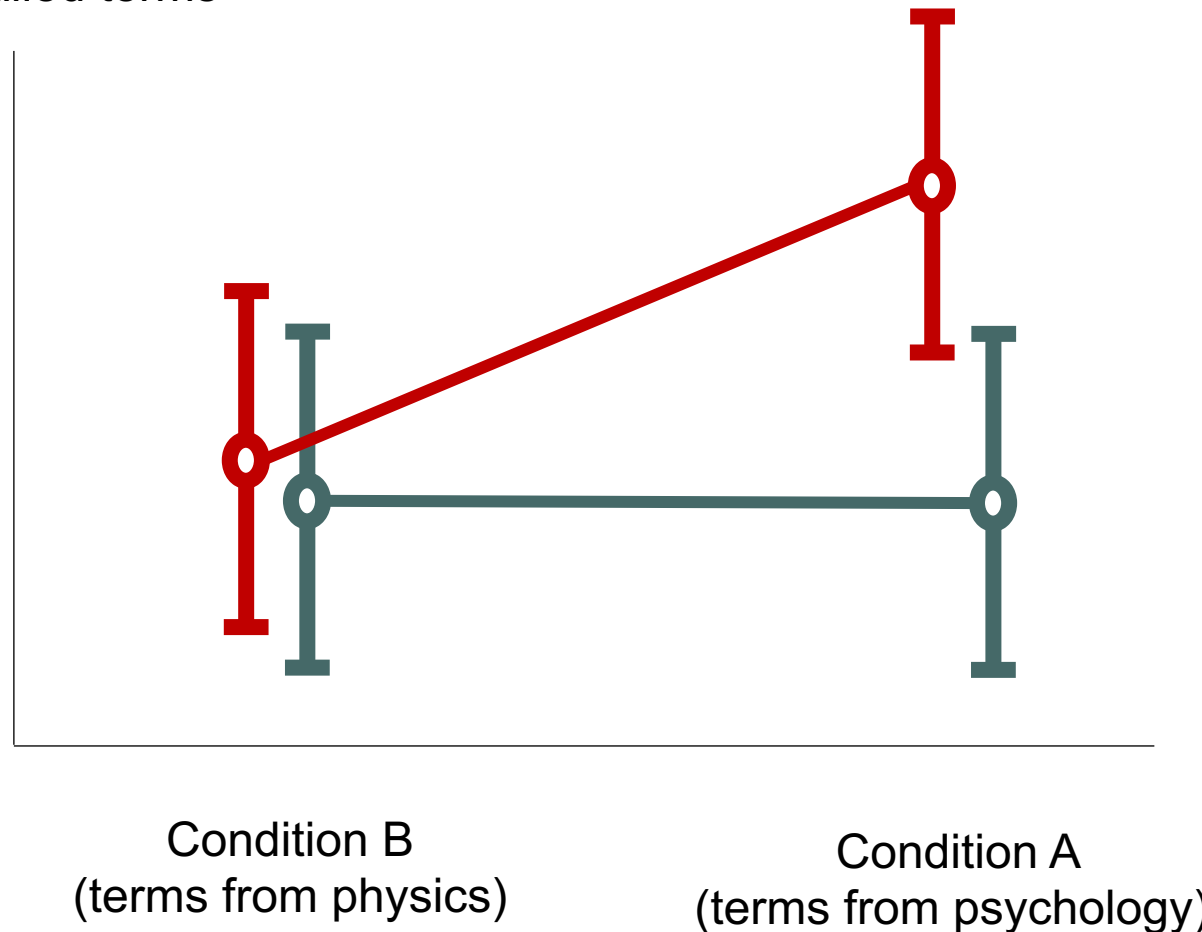
If group P outperforms group O significantly more in condition A than in condition B,
the causal relationship is true...(?)

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design 3.0

**mixed
quasi-experiment**

% of recalled terms



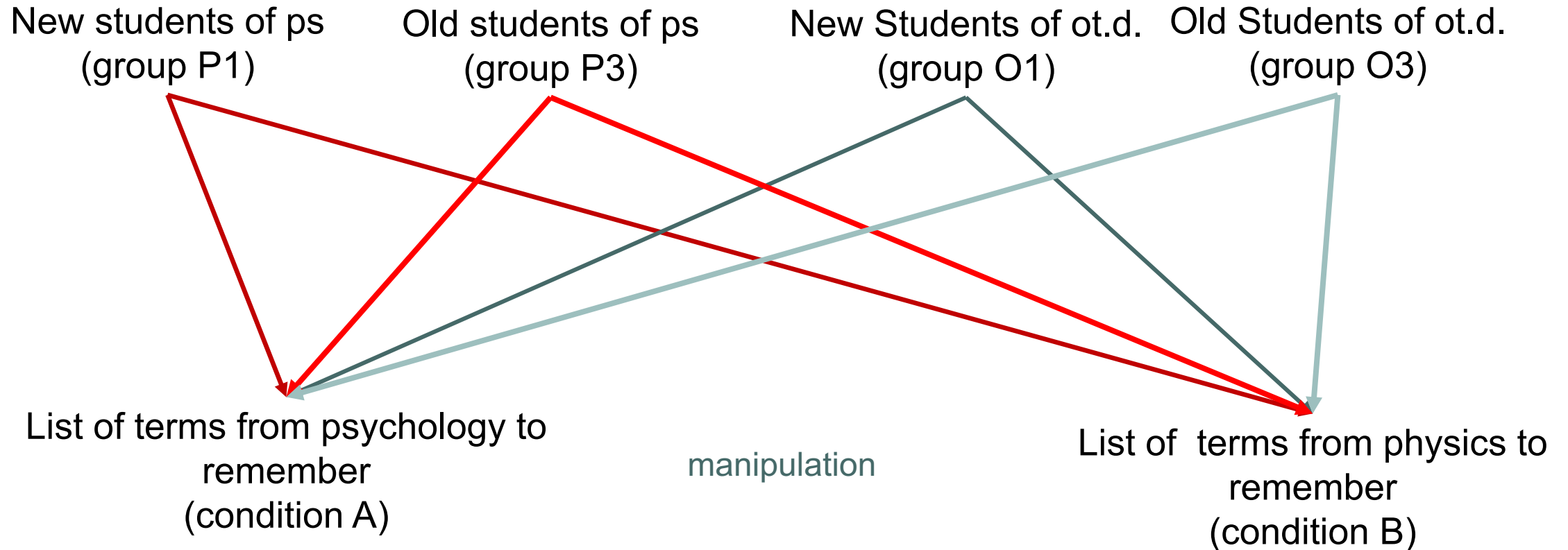
— group P
— group O

If group P outperforms group O significantly more in condition A than in condition B, the causal relationship is true...(?)

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design 4.0

**mixed
quasi-experiment**



% of recalled terms

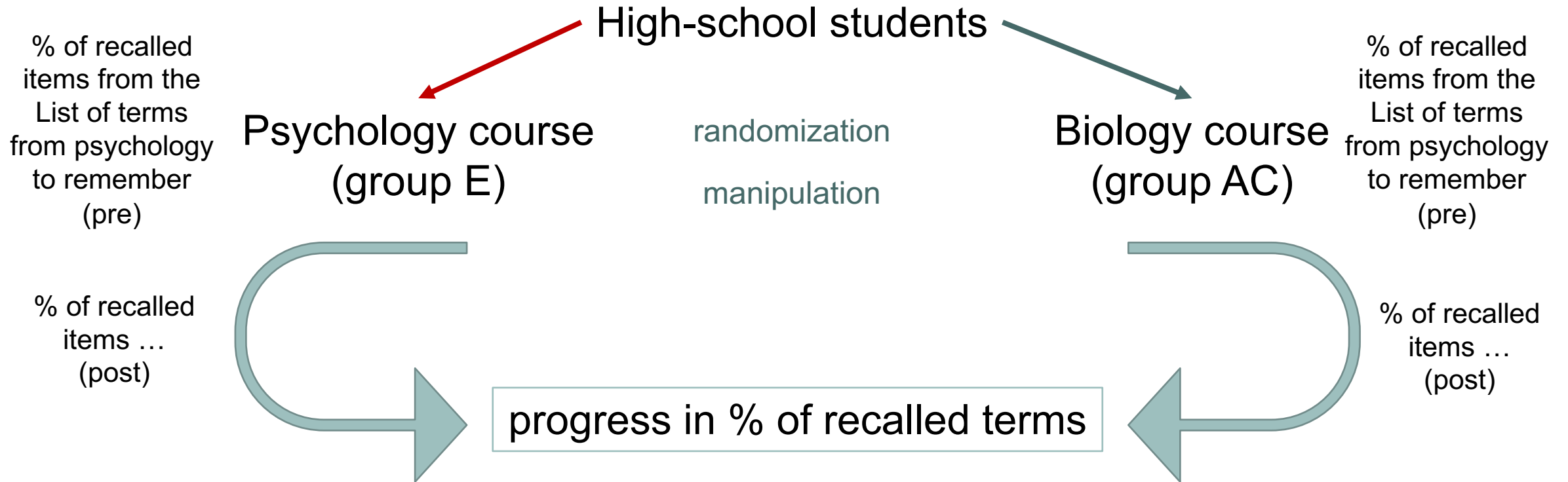
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Can we do randomization?

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design 5.0

randomized control trial

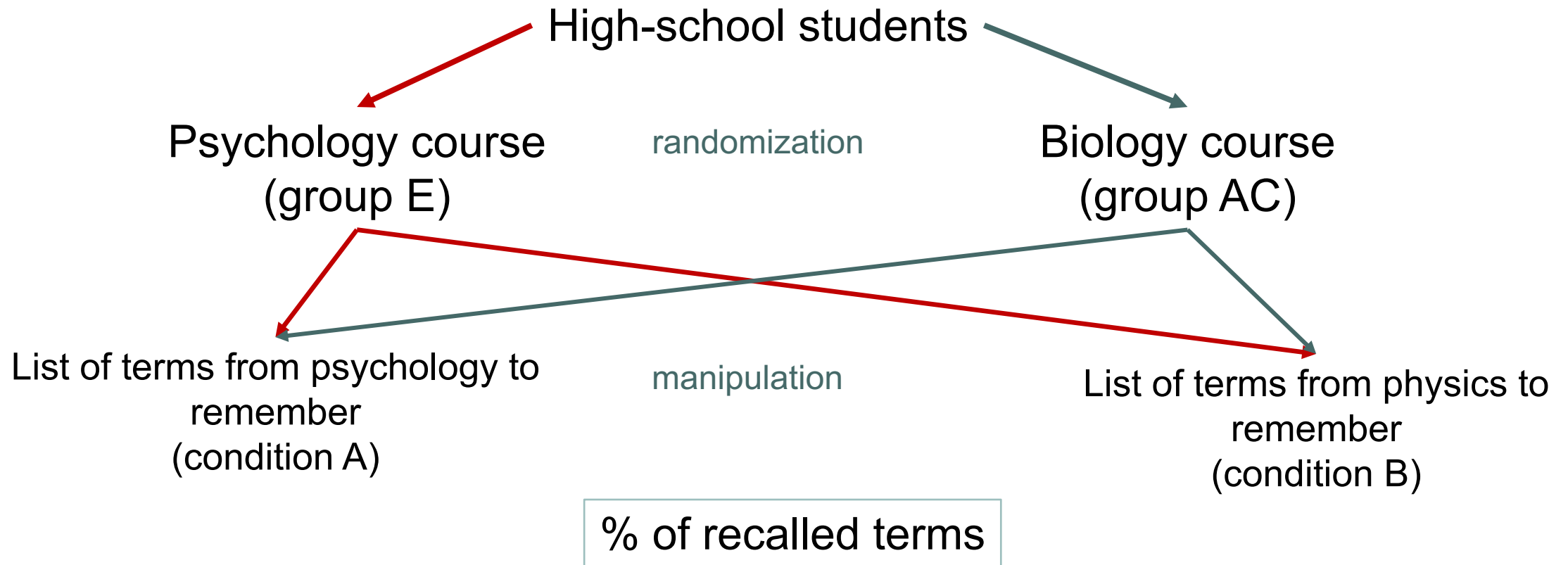


If the **progress** of group E (before-after) will be significantly higher than the progress in group AC, the causal relationship is true (?)

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design 6.0

**randomized control
trial**

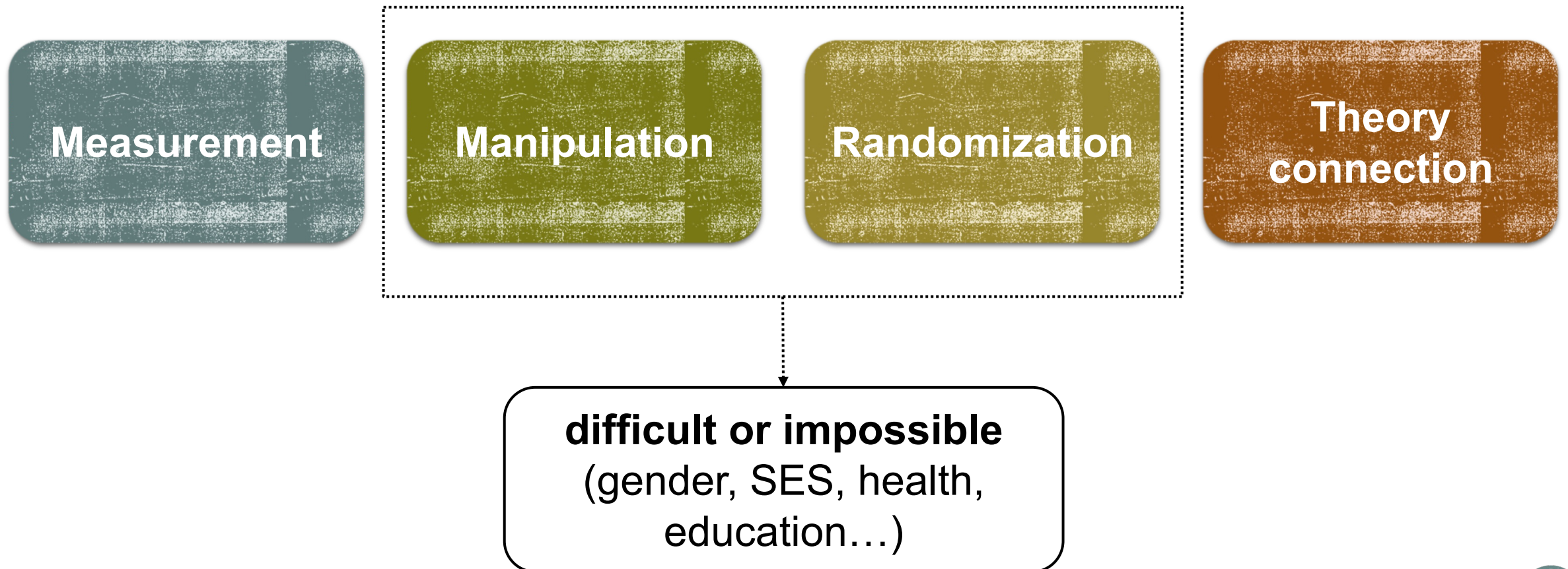


If the **progress** of group E (before-after) in condition A will be significantly higher than in condition B and higher than in group AC (in condition A), the causal relationship is true (?)

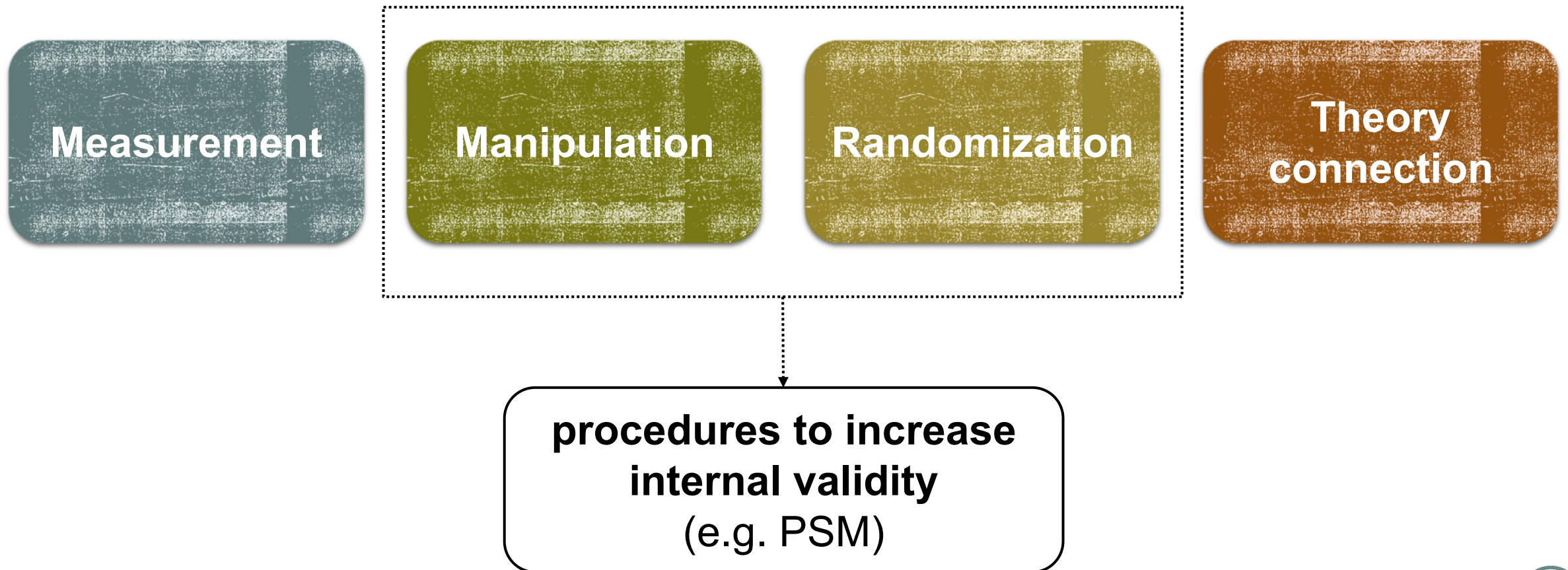
Threats to internal validity

- Group threats
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Quasi-experiments



Quasi-experiments



Step 3: propose **reliable and **valid**
measurement for variables**

Note on measurement...

Le Bon (1879):

“In the most intelligent races, as among the Parisians, there are a large number of women whose brains are closer in size to those of gorillas than to the most developed male brains. This inferiority is so obvious that no one can contest it for a moment: only its degree is worth discussion. All psychologists who have studied the intelligence of women. . . recognise today that they represent the most inferior forms of human evolution and that they are closer to children and savages than to an adult, civilised man.”

**Is brain weight a valid measure
of intelligence?**

Step 3: propose **reliable** and **valid** measurement for variables

- In psychology, this can be tricky...

objective

subjective

continuous

discrete

Nominal measure usually states whether the property is or is not present (e.g. someone is or is not smoker) or categorize different types of assessed property – e.g. when assessing caffeine use I can label someone as a (1) coffee drinker or (2) tea drinker or (3) energy-drinks user or (4) mix consumer etc.). Numbers are only labels and cannot be mathematically operated with.

Ordinal measure express whether the property is present less or more – e.g. school grades in Hogwarts say that someone who acquired “Outstanding” (grade 1) - performed better than someone who acquired “Poor” (grade 4), but we cannot tell that interval between points on scale are equal – e.g. the difference in performance between “Outstanding” (1) and “Good” (3) is not necessary the same as is the difference between “Poor”(4) and ”Troll”(6).

Interval measure on the other hand presumes the equal intervals between points on scale – e.g. when assessing temperature I can say that the difference between 20 and 24 degrees of Celsia is the same as is the difference between 5 and 9 degrees of Celsia. But I cannot say that when the temperature is 27 degrees Celsia that it is three times warmer weather than when it is 9 degrees Celsia.

Ratio measure provides values that we can handle as real numbers, because they are expressed in standard units such as centimeters, grams, lumens etc.