

## Topic 3: Experiments

### Four Principles of Experiment Design

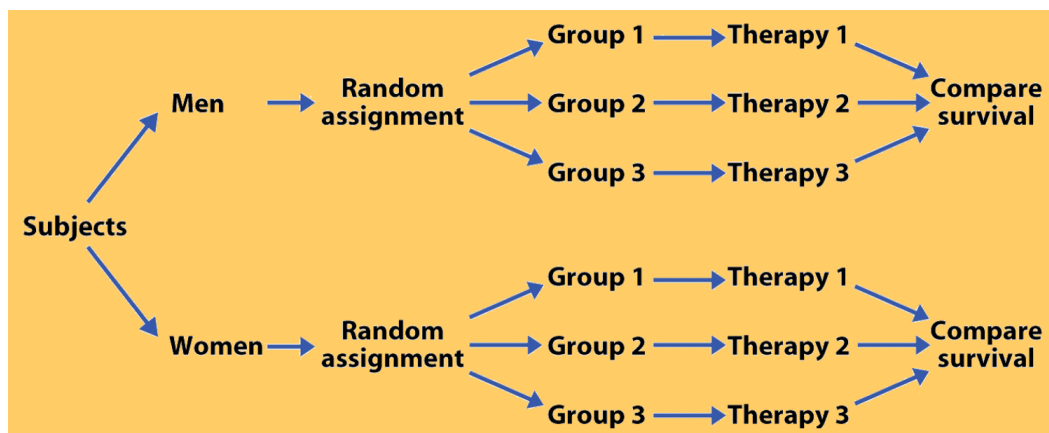
#### 1. Control



#### 2. Randomize

#### 3. Replicate

#### 4. Block





## Experiments vs. Observational Studies: A Comparison

<i>ideal experiment</i>	Random assignment	No random assignment	<i>most observational studies</i>
Random sampling	Causal conclusion, generalized to the whole population.	No causal conclusion, correlation statement generalized to the whole population.	Generalizability
No random sampling	Causal conclusion, only for the sample.	No causal conclusion, correlation statement only for the sample.	No generalizability
<i>most experiments</i>	Causation	Correlation	<i>bad observational studies</i>

More practice: Choose the option(s) below that describe differences between observational studies and experiments.

- (A) Experiments take place in a lab while observational studies do not need to.
- (B) In an observational study we only look at what happened in the past.
- (C) Experiments use random assignment while observational studies do not.
- (D) Observational studies are completely useless since no causal inference can be made based on their findings.
- (E) Experiments involve active intervention/treatment, while observational studies are passive.