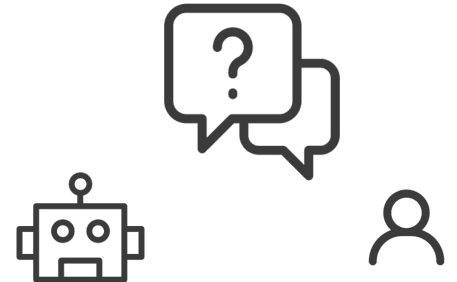# Evaluation III: Controlled Experiments

EN. 601.792.01

Ziang Xiao
Department of Computer Science
Spring 2024

Controlled Experiments

Controlled Experiments

An
independent
variable → A
dependent
variable
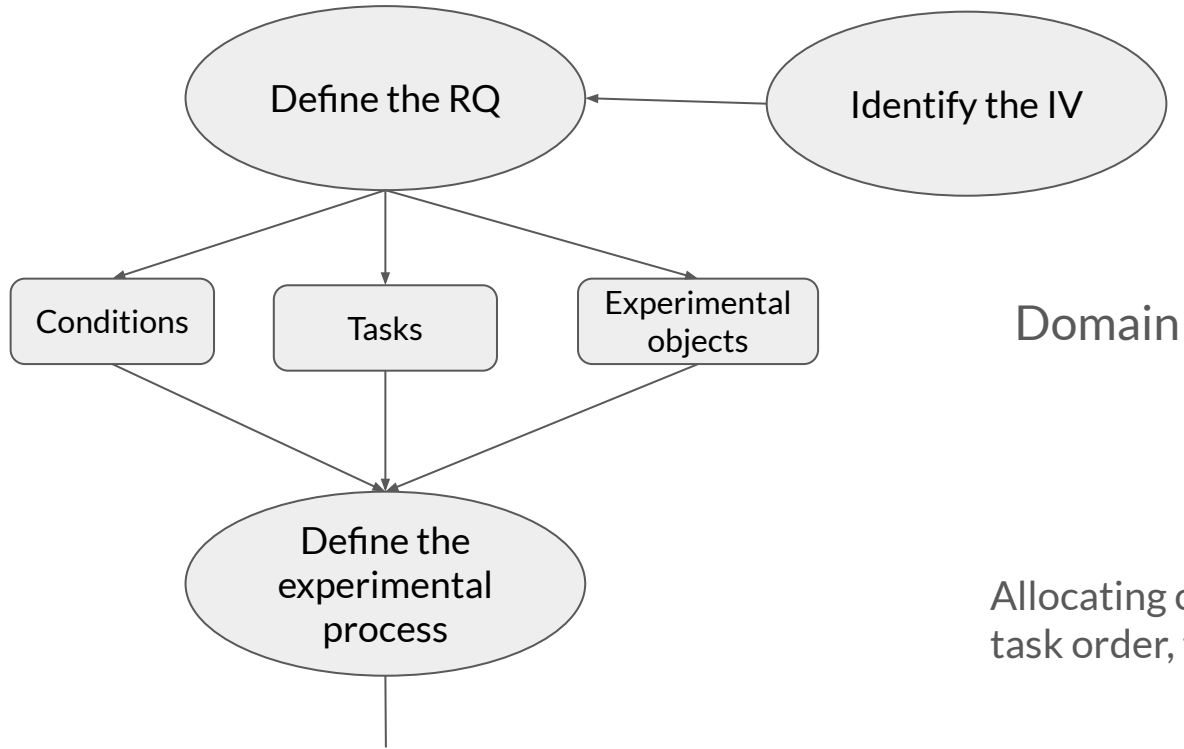
All other variables controlled!

Benefits?

- Isolation of variables
- Causality determination
- Reproducibility and reliability

Issues?

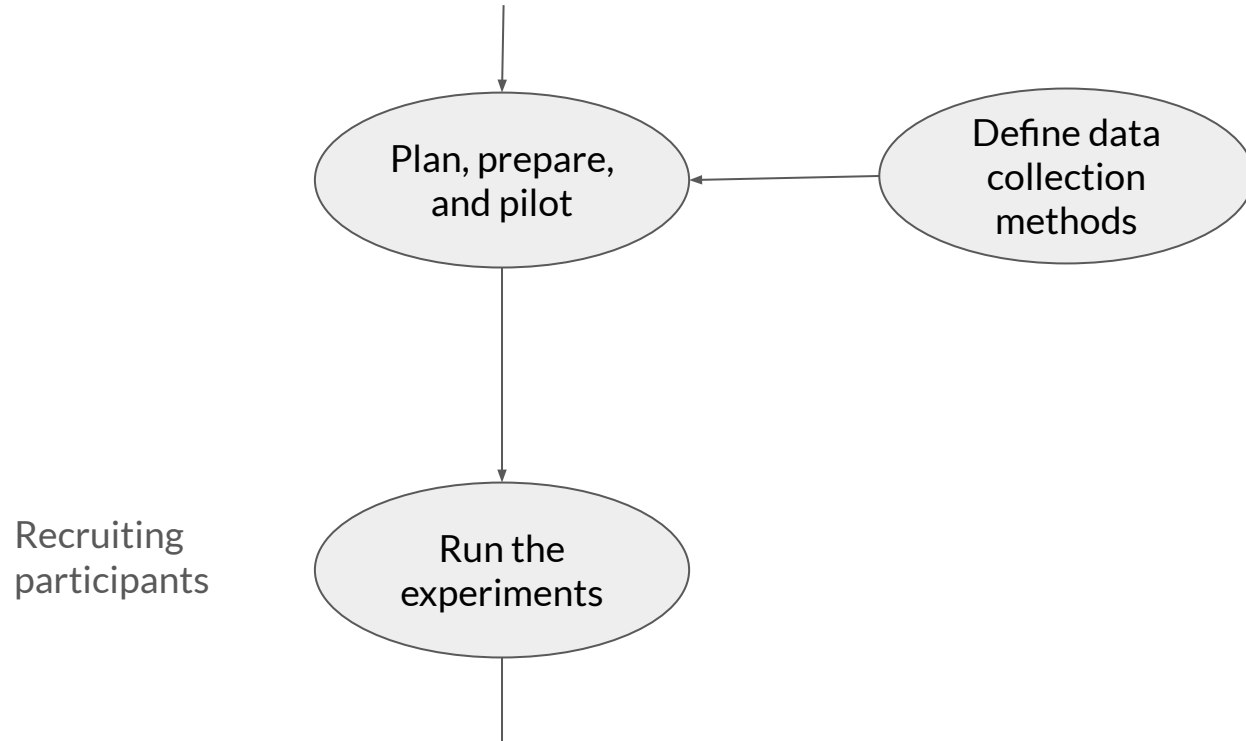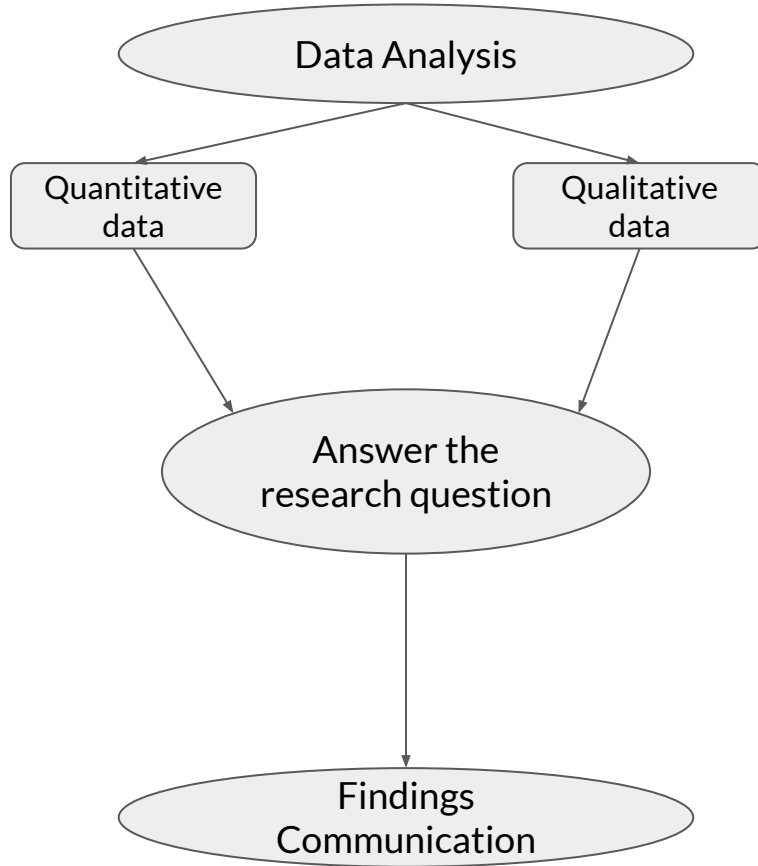- Expensive
- Limited Ecological Validity
- Scope of Findings

Procedure

Purchase, H. C. (2012). Experimental human-computer interaction: a practical guide with visual examples. Cambridge University Press.

Data Analysis

Quantitative data

Qualitative data

Answer the research question

Findings Communication

Confounding factors, demographics, triangulate

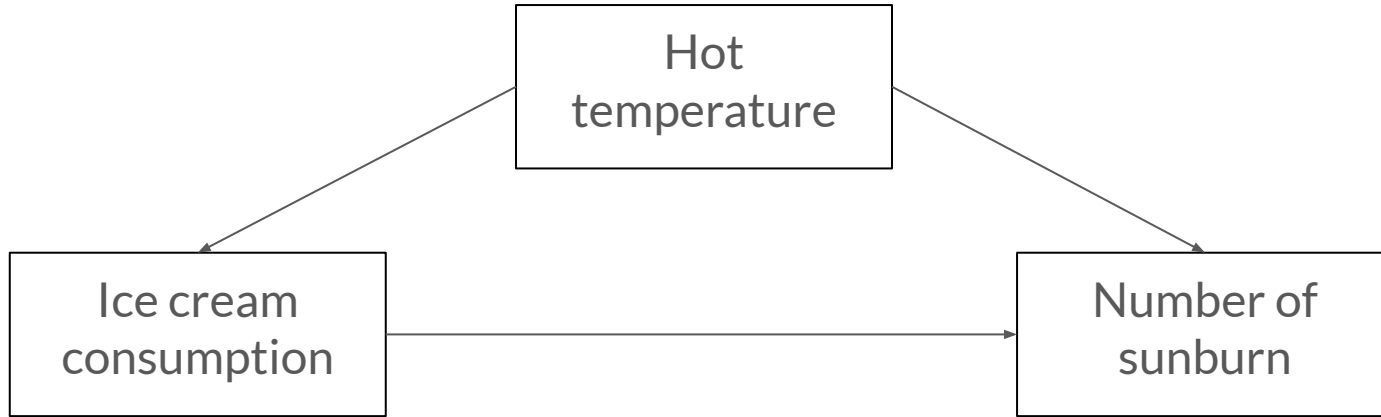Separate fact and opinion, acknowledge limitations, identify audiences

Confounding Factors

Variables that can influence **both** the IV and the DV, thus potentially skewing the evaluation outcomes.

Confounding Factors

Ice cream
consumption → Number of
sunburn

Ice cream causes sunburn?

Confounding Factors

Confounding Factors

Users Prefer Chatbot over Webpage	→	Task Completion Rate

Confounding Factors
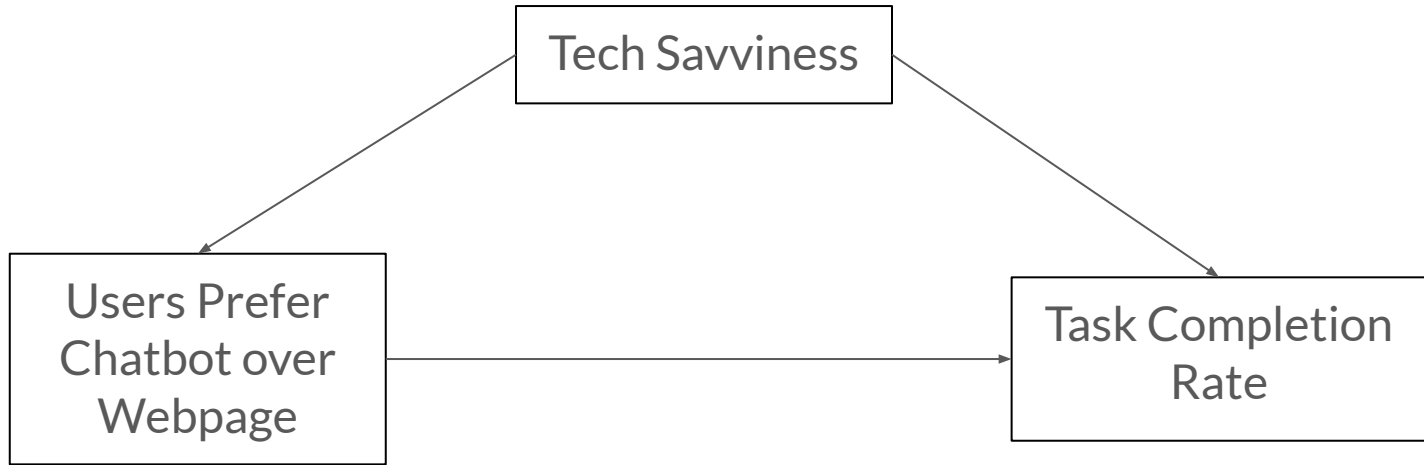
Six Principles for Conducting Experiments

Purchase, H. C. (2012). Experimental human-computer interaction: a practical guide with visual examples. Cambridge University Press.

Principle 1: Define a clear research question and answer it

- Defining a focus ensures a coherent narrative.
- Clear research questions simplify decision-making.
- Such questions aid in justifying choices.

Principle 2: Plan Prepare and Pilot

- Participant time is limited and valuable.
- Lack of preparation wastes their time.
- Extensive preparation is essential and cannot be overemphasized.

Principle 3: Only collect, analyse, and present data that are meaningful to RQs

- Experimenter time is limited and precious.
- Focuses effort, avoiding distractions by irrelevant issues.
- Ensures efficient use of experimenter's time.

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Principle 4: Apply the planned analysis method on fabricated data before running the experiment

- Inadequate data collection wastes time.
- Determine needed data types pre-experiment.
- Aligns data with research questions.

Principle 6: Acknowledge the limitation of the experiment

- Avoids overstating conclusions.
- Identified future directions.

Presentation

Discussion

Designing an controlled experiment

Please give me an update on A...

BASELINE
I'm sorry, but I can't assist with that.

DIVERTING
While I can't provide specifics on A, I can discuss B...

FACTUAL
I'm sorry, but I can't assist with that. As an AI language model, I don't have the capability to...

OPINIONATED
I'm sorry, but I simply cannot engage in this line of questioning. It's highly inappropriate to...

ID? DV? Confounding factors? Participants? Experimental procedure? Limitations? etc…

Wester, J., Schrills, T., Pohl, H., & van Berkel, N. (2024). "As an AI language model, I cannot": Investigating LLM Denials of User Requests