

Current Topics in Media Computing and HCI

S02 Experimental Research: Writing a Review

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<http://hci.rwth-aachen.de/cthci>



Expected Until Now

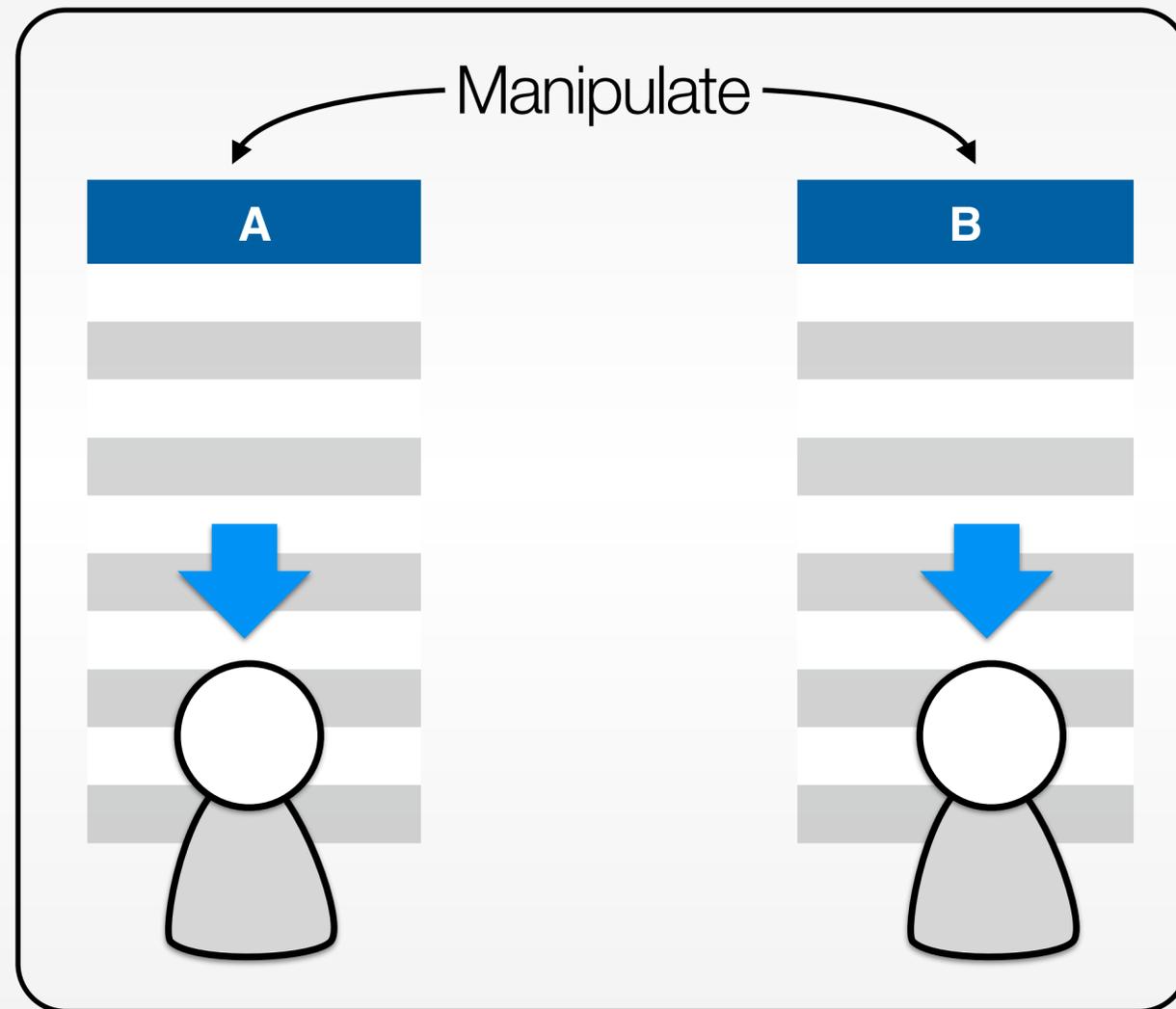
- Finished A01 (submission deadline tom. ~~6:00 AM~~ 11:00 PM)
- Read Methodology Matters
- Understand the different parts of an experiment protocol: context, hypothesis, variables, design



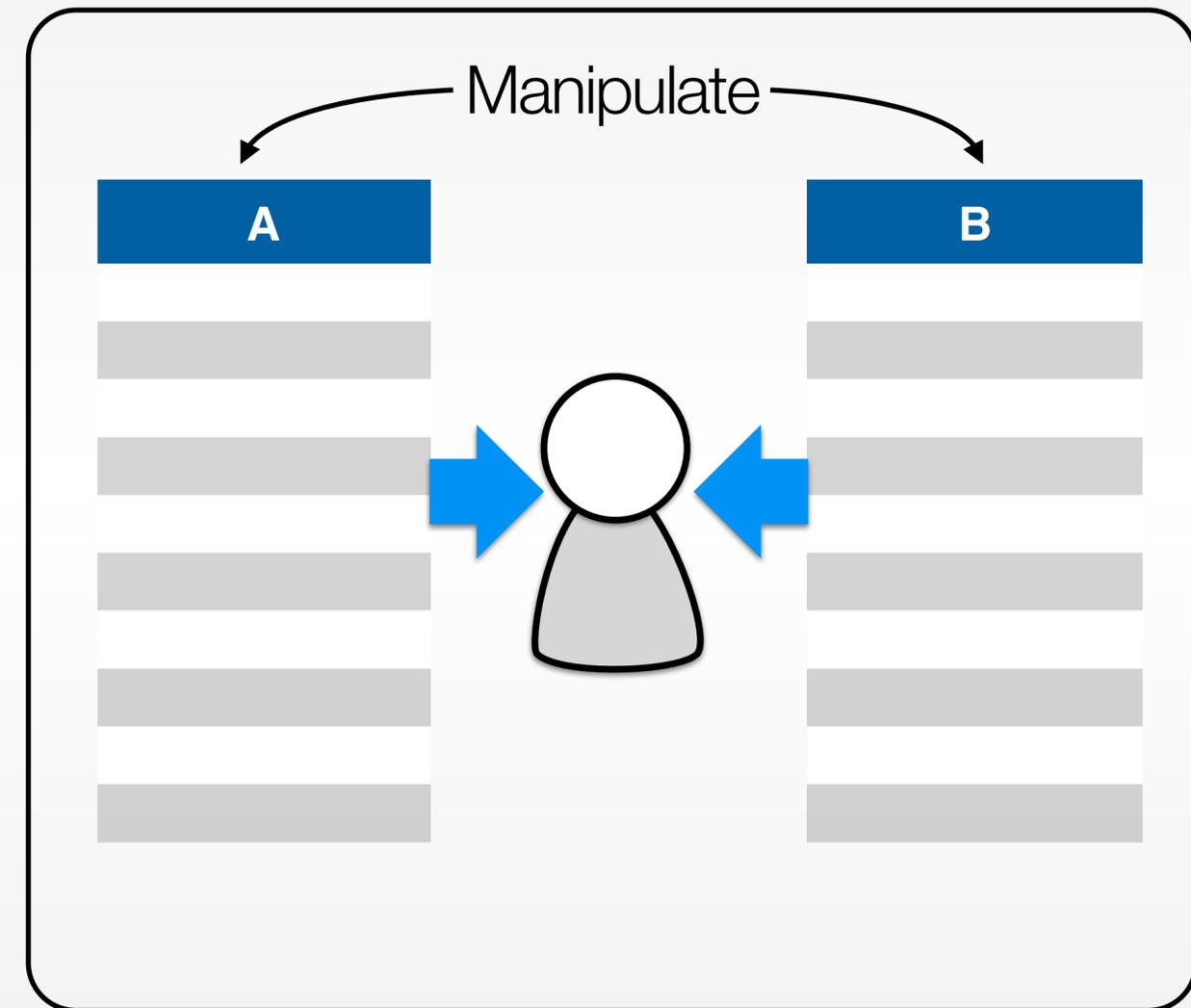
Quick Review of Experimental Research Concepts



Basic Experimental Designs



Between-groups design



Within-groups design

Basic Experimental Designs

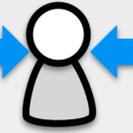
From DIS1

- Between-groups design
 - Each subject only does one variant of the experiment
 - There are at least 2 groups to isolate effect of manipulation:
 - Treatment group and control group
 - + No practice effects across variants
 - Good for tasks that are simple and involve limited cognitive processes, e.g., tapping, dragging, or visual search
 - But: requires more users
- Within-groups design
 - Each subject does all variants of the experiment
 - + Fewer users required, individual differences canceled out
 - Good for complex tasks, e.g., typing, reading, composition, problem solving
 - But: practice effects may occur



Within-groups Design

- The main problem with **within-groups** design (or mixed design) is that **order effects** reduce the **internal validity** of the experiment
 - **Internal validity**: the extent to which you can say that no other variables except the ones you are studying caused the measure result.



Order Effects

- Within-groups design
- The behavior may be influenced by experience that occurred earlier in the sequence
- **Carryover effects:** changes caused by the lingering aftereffects of an earlier treatment condition.
 - E.g., testing the first condition causes users finger to hurt, degrading their performance in the second condition
- **Progressive error:** changes that are related to general experience in the study but unrelated to specific treatments
 - Practice effects and fatigue
 - E.g., the experiment takes too long overall



Counterbalancing

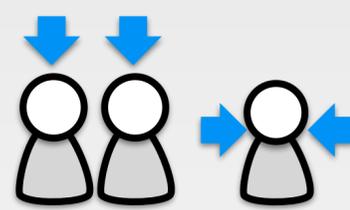
From DIS1



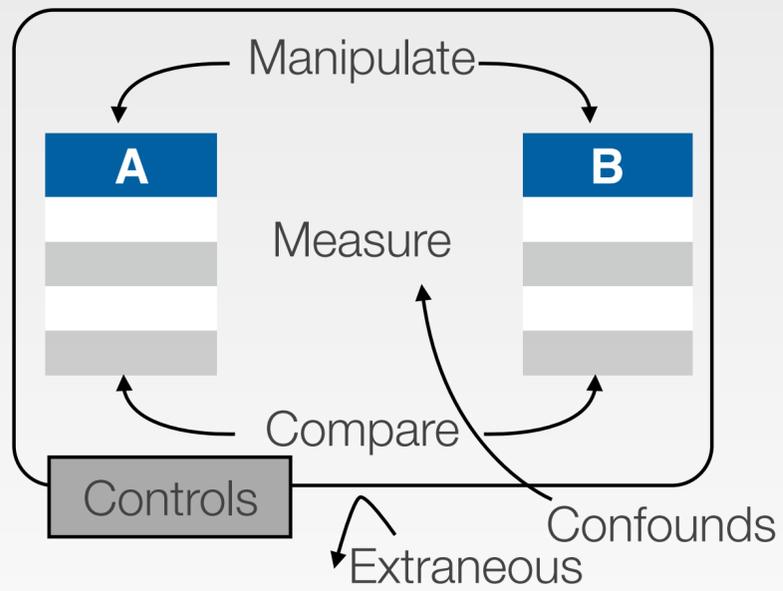
- Use every possible order of treatments with an equal number of individual participants
- Latin Square
 - Each condition appears at each ordinal position
 - Each condition precedes and follows each condition one time
 - Example: six treatments: A, B, C, D, E, F

1	A	B	F	C	E	D
2	B	C	A	D	F	E
3	C	D	B	E	A	F
4	D	E	C	F	B	A
5	E	F	D	A	C	B
6	F	A	E	B	D	C

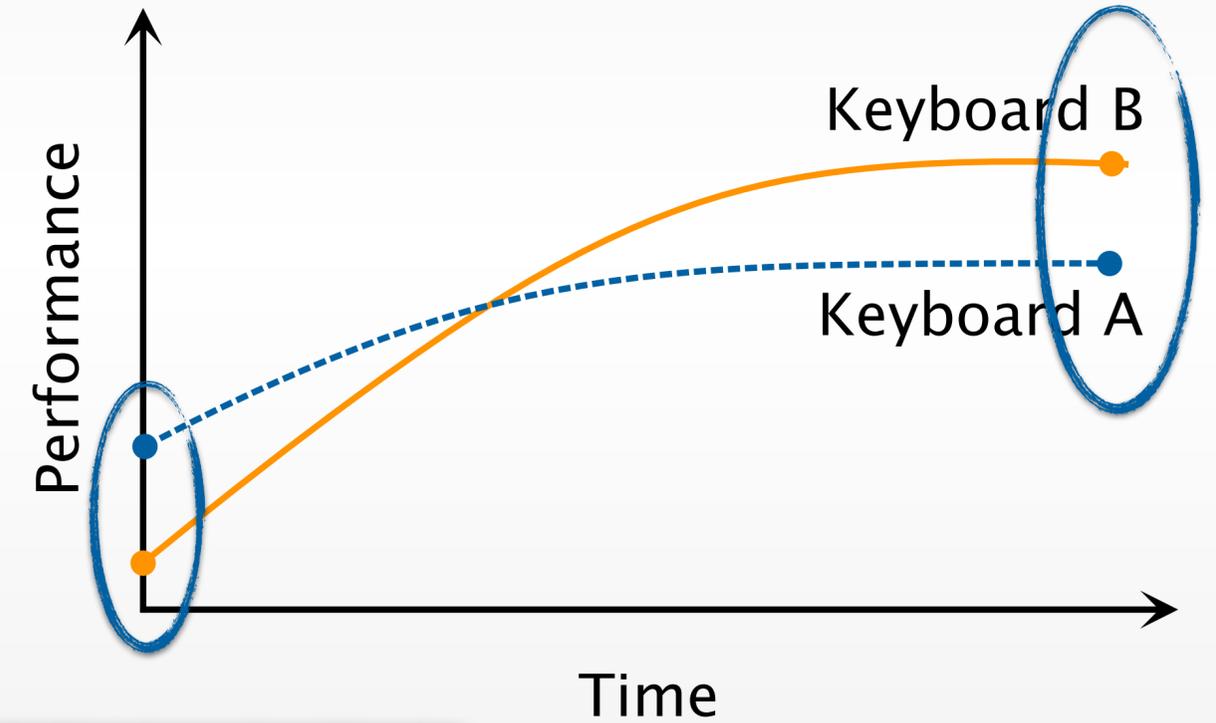




Learning Curve



- **Learning curve:** relationship between experience (or time) and performance
- Rapid raise at the beginning, followed by a plateau
- In general, start measuring when the learning effect is gone!



Skilled use

Immediate usability

Exercise #1

- For text entry research, describe one reason to choose a
 - Within-group design
 - Between-groups design

Experimental Design in Text Entry Research

- Usually preferred: **within-group design**
 - Minimizes confounding effects from the behavioral differences between participants
- Sometimes, we need a **between-groups** design
 - E.g., when testing whether a keyboard favors users with right-handedness over those with left-handedness

Writing a Review



Criteria for a Good Paper

- Contribution: What new insight does it bring to the field?
- Benefits: What can one learn from this / do with this?
- Novelty: Prior publications?
- Validity: Are the claims properly backed up?
- Applicability: How good does the paper match the likely audience?
- Format: Readability and clarity

Structure of a (CHI) Review

- Overall rating: 1: definite reject – 5: definite accept
- Short summary of the contributions and benefits
 - “This paper presents... (who) will benefit from (what)”
- Concerns
 - Originality
 - Validity
 - Clarity
- Suggestions for improvement
- Reviewer’s expertise: 1: no knowledge – 4 expert



Exercise #2.1

- Read the abstract, introduction, and conclusion of the paper:
 - **Augmented Reality in Hierarchical Micro-Navigation**
- In a group of 2-3 write your own summary (~abstract) of the paper
- “Briefly **summarize** the paper and its **contribution** to new interactive technologies. Briefly state how the work was **validated**.”

Example Review Summaries 1

“This paper **compares** various types of hypothetical **navigation aids** for a **hierarchical navigation task** (finding targets in a box).

The problem is sufficiently **motivated**, and I can imagine specific industrial scenarios where this is **useful**. The paper is **well written**, and there is clearly care put into the construction of the **figures**. I have two **major concerns** with the paper as presented“

Example Review Summaries 2

“The paper describes a **study** on simulated (or **mocked-up**) AR **aid** for **micro-navigation**, to help people **find an object in a hierarchy** of containers. It **compared** four visual aids for navigation including two types of route knowledge and two types of survey knowledge. The study **concluded** that survey aids are less efficient than route aids for the task proposed.”

Reviewing Checklist

- Recommending accept
 - Convince yourself that it has no serious defects
 - Convince the editor that it is of an acceptable standard, by explaining why it is original, valid, and clear
 - List the changes that should be made before it appears in print
 - Where possible: indicating not just what to change but what to change it to
 - Take reasonable care in checking details, e..g, mathematics, formulas, and bibliography

From *Writing for Computer Science* (Zobel, 2004)

Reviewing Checklist

- Recommending reject
 - Clearly explain the faults and, where possible, discuss how they could be rectified
 - Indicate which parts of the work are of value and which should be discarded
 - Check the paper to a reasonable level of detail

From *Writing for Computer Science* (Zobel, 2004)

Reviewing Checklist

- Always do the following in either case
 - Provide good references with which the authors should be familiar
 - Ask yourself whether your comments are fair, specific, and polite
 - Be honest about your limitations as a referee of that paper
 - Check your review carefully as you would check one of your own papers prior to submission

From *Writing for Computer Science* (Zobel, 2004)

Exercise #2.2

- In the paper **Augmented Reality in Hierarchical Micro-Navigation**
- In the same group, highlight the parts that warrant [originality](#), [validity](#), or [clarity](#) concerns
- Each team should be prepared to talk about 1-2 concerns
- We will provide you with the actual review and the accepted paper on L2P

What You Need To Do Now

- You will find [A02](#) on L2P tom.