CS 598 ACK
Experimental HCI & Interactive Technologies

Defining the research (Part 2 of 2)
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Experimental Objects

“Aside from the requirement that each condition of the independent variable must be able to be represented within each experimental object and must provide the same functionality (see Section 2.2), experimental objects need to be chosen carefully.

Although it is true that having experimental objects of a differing nature permits generalizability of the results to a wider range of objects, they should not be too different from each other – a careful balance needs to be maintained:
Experimental Objects

“If the experimental objects are too different from each other, then it will be inappropriate to aggregate the data over them, and the data will need to be analyzed separately for each experimental object.

For example, the performance data for using a mobile device for navigating one floor of a building may need to be analyzed separately from the data obtained when the device is used for navigating a large park, simply because the two environments are so different that they bear no relation to each other, and because any conclusions made about the floor navigation are unlikely to also be applicable to the park.”

HEURISTIC: Think of these objects the way you think about subjects: you want heterogeneity to ensure generalization from the sample to the population, yet too much heterogeneity limits your ability to aggregate data across them.
Experimental Tasks

“The definition of the experimental tasks is often one of the most difficult aspects of experimental design, especially if a cognitive activity (e.g., analysis of a scenario, comprehension of a diagram) is involved.

Tasks for more physical activities are easier: participants can be asked to select objects on a screen using a cursor, or wave a remote control device in the correct manner so as to turn onscreen pages.

If we are interested in cognitive activities, then the tasks are more difficult to define. It is important to remember that we cannot ever measure what is actually going on in a participant’s mind, we can only measure observable behavior; therefore, we need to choose tasks that will produce behaviors that appropriately relate to the cognitive activity in which we are interested.”
Defining the research (Part 2 of 2)

Experimental Tasks

Tasks Must:

- require the participant to use the experimental stimuli (i.e., if any participant can complete the task correctly, based simply on their prior knowledge, then the experiment will be pointless);
- require the participant to use all aspects of the stimuli that are being tested, not just part of them (i.e., if the answer can be obtained by using only some aspects of a stimulus, then conclusions cannot be made about it as a whole);
- be answerable using all conditions (otherwise, some conditions will be naturally favoured over the others);
- allow for a range of answers to be possible using the different experimental objects (i.e., if all answers are the same for all experimental objects, the participants will realise soon enough);
“We have already noted that the combination of a condition and an experimental object is called a stimulus. The combination of a stimulus and a task is called a trial.”
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Nature of the domain

“A choice needs to be made as to whether real world data or scenarios will be used, or whether information will be fabricated for the purposes of the experiment.

Using a “real world” domain is good if it is possible, but often doing so makes it more difficult to identify appropriate experimental objects, choose tasks that have a range of possible answers, and phrase the tasks in terms of the semantics of the domain.”

Sometimes it may be appropriate to use information from a real domain, but adapt it to make it appropriate for the experiment.” [For experimental convenience of one type or another, or to make its source anonymous, etc.]
Defining the research (Part 2 of 2)

Nature of the domain

708 E Michigan Ave,
Urbana, IL 61801

3 beds · 1 bath · 1,250 sqft

This well maintained 3 bedroom 1 bath home with attached oversized single car garage is beautiful. When you enter into the home, you can’t help but notice the beautiful hardwood flooring. In the living room there is a wood burning fireplace as well. Oak Schrock cabinets welcome you into the kitchen where all appliances stay. There is a bonus room that would be great for a home office. Don’t miss the beautiful fenced backyard with generous shade. The patio is perfect for outdoor entertaining.

FACTS
- Lot: 0.3 acres
- Single Family
- Built in 1955
- 212 days on Zillow
- Views since listing: 3,685

- All time views: 3,758
- 37 shoppers saved this home
- Cooling: Central
- Heating: Forced air
- Last sold: Jun 2007 for $105,500

Price/sqft: $88
MLS #: 2163229
View Virtual Tour

FEATURES
- Attic
- Parking: Garage
- Fireplace

FOR SALE
$109,500

Price cut: $400 (1/17)
Zestimate: $111,591

EST. MORTGAGE
$415/mo

Get pre-qualified

CONTACT AGENT

Your Name
Phone
Email

I am interested in 708 E Michigan Ave,
Urbana, IL 61801.

Contact Agent

I want financing information

Ryan Elwell

Betty Gauze

Joe Zabak

Matt Orlаниз

Learn how to appear as the agent above
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Summary

“This chapter addressed the decisions that need to be made when designing an experiment... Taking time over these decisions is crucial for the success of your test of the HCI idea – you will not regret spending time on thinking things through very carefully in advance!

It is important to note that, with such a range of decisions to be made, it is easy to (consciously or otherwise) make decisions that are biased towards a desired result.

This could be done by choosing tasks or experimental objects that will naturally favor one condition over another – clearly inappropriate if the experiment is to be “fair.”

HEURISTIC: Seek critiques of your experimental designs from those with less of a stake in the findings, or better, those who do not know your hypotheses.