Methods to measure usability of secure/private systems (contd.)

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CS 60081
Autumn 2024

Avoid order bias

- Ordering of questions change responses
    - Online survey: people pick top choice
    - On phone: they pick last choice

- Randomize questions and answers

Demographic questions and stereotyping

- Don't randomize the order in which demographic questions appear

  - Question affect the answer to later questions
  - Finding: Asking women and minorities about their demographics make them perform worse in maths

- Rule of thumb: Ask demographcs questions at the end

Length/compensation for the survey

- Longer survey -> worse response
  - 20 minutes is a good rule of thumb
  - Think: How hard are the questions
  - Do piloting

Grounding your survey (data/interface/situation)

- Ask "How do you comfortable with privacy settings of your Facebook posts"

    - Most common answer "Its ok"

- Ask "Do you want to change the privacy settings of post X"

    - Answer will be a better reflection

6. Survey and question creation

Questions to ask

Biases to avoid

Pre-testing / piloting

Pre-test your questions

- Automated tools
  - QUAID: http://quaid.cohmetrix.com/

Pre-test your questions

How To Use The Tool

Unfamiliar Technical
Term

Vague or Imprecise

Relative Term

Vague or Ambiguous

Noun-phrase

Complex Syntax

Working Memory

Overload

Home

Question:

Do you update your software?

Context:

Enter context here...

Answer:

Enter answer here...

Submit

1. Unfamiliar technical terms: update, software

The following term may be unfamiliar to some respondents: update, software, in sentence 1 in the Question.

Pre-test your questions

- Automated tools

  - QUAID: http://quaid.cohmetrix.com/

- Cognitive interviews

  - Have respondents think aloud as they answer questions
  - Prompt them on terms that they may struggle with

- Expert review

- Piloting

  - Run a small sample of the survey
  - just because you get answers you like might not mean they are accurate

More on pilots

- Check wording

- Encourage pilot participants to tell you when there is ambiguity or uncertainty

- Verify that you're getting the measurements you thought and that your software works

- Have people talk through even protocols that will be conducted remotely

Use existing validated questions as elements
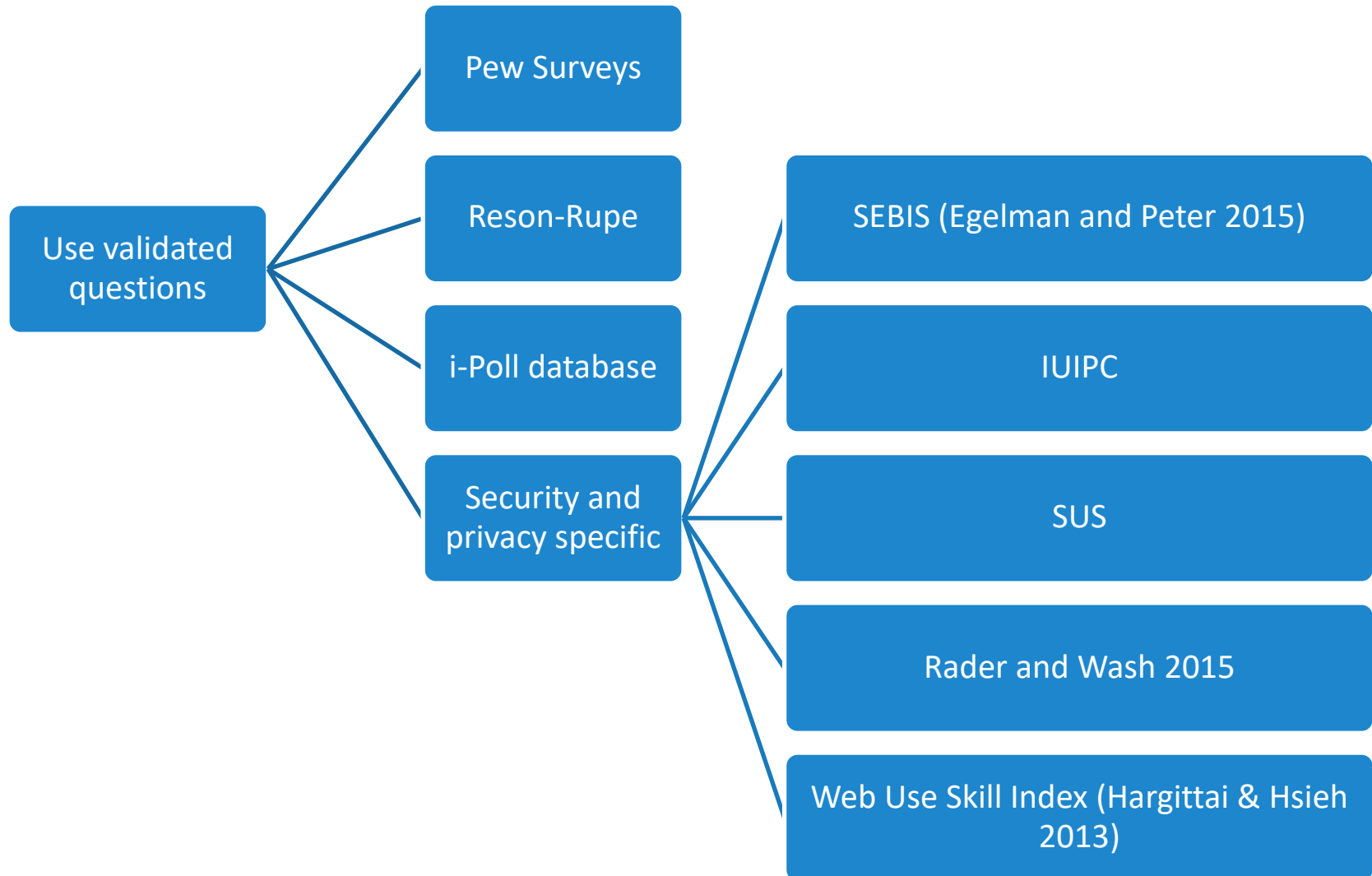
1. Define your research question

2. Identify your variables

3. Pick one/multiple study methods

4. Run your study

5. Evaluate the outcome

Logistics for a study

- How many participants?
  - Statistical power
  - Time, budget, participants' time
- What kind of participants?
  - Skills, background, interests
  - Their motivations
  - Often not a representative sample

Validity

- Internally valid: To what degree are we confident that X causes Y

- Externally valid: To what degree can we generalize about our results

  - What biases does our sample introduce?

- Ecological validity: Does it mirror real-life conditions and context?

- Balancing all of these is hard!

There might be factors you are not considering which are the primary explanatory variable for your observations

Confounds / biases

Potential confounds (1)

- Measurement accuracy / resolution

- Differences caused by different experimental platforms and conditions

- Time of day for recruiting matters

- Failing to account for study dropout or nonparticipation (very subtle!)

Potential confounds (2)

- Learning effect

  - Randomize order of tasks
  - Consider learning effect as a covariate

- Different instructions for different participants

- Biases of recruitment / representativeness

- Self-report biases

  - Don't ask people to rate expertise

Potential confounds (3)

- Different demographics in conditions

- Placebo effect

  - Why you need a control condition

- Hawthorne effect (changing behavior in response to being observed)

- Chilling effect

  - Fear of repurcassion

- Participants try to please experimenter

  - I like yours better!
  - Minimize knowledge of what's being tested

How to conduct the study?

- Deploy a study remotely (online), e.g., taking an online survey

- Ask participants to come to your lab

- Ask them to let you into their context

- Observe people (take their consent, if not possible, consider necessity of design)

How to recruit participants

- Recruitment mechanism
  - Craigslist, participant pools, representative sample, Mturk, Prolific
- How to compensate?
  - Too little vs. too much
- How to get informed consent?
- How to handle their data ethically?

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- ~~How to handle their data ethically?~~

Overall considerations for running a survey

- How do we distribute it?

- How long should it be?

- One-time survey? Longitudinal survey?

- Will you use personalized data?

- What will participants learn?

  - What can we randomize to minimize this?

- Can we randomize the answer choices?

Cover all answer choices

- With whom do you regularly share posts on social media?
    - Family
    - Friends

- Allow multiple answers?

- Include "other" option?

- I connect to Facebook using https: ◯ Yes ◯ No
    - **What about I don't know?**

Should we force an answer?

- What gender are you? (* required) ◯ Female ◯ Male

- What gender are you? ◯ Female ◯ Male ◯ I prefer not to answer

- With what gender do you identify? ◯ Female ◯ Male ◯ Non-binary ◯ I prefer to self describe___ ◯ I prefer not to answer

What demographics should we collect?

- Tech expertise, age, domain knowledge, gender, location, employment, etc.

- Don't ask people to self-rate expertise

  - Ask questions with concrete answers
  - e.g., Have you earned a degree in, or held a job in, computer science, IT, or…
  - Include a knowledge test if you want to know about expertise

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