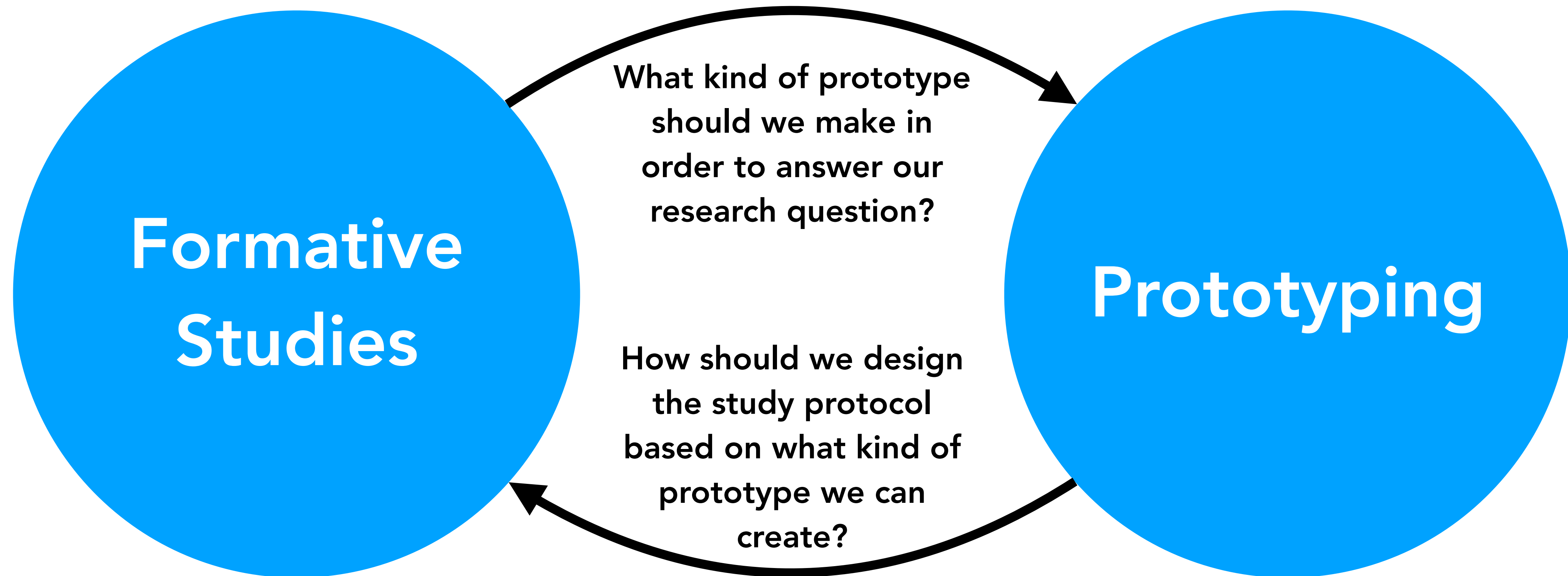# Qualitative Formative Research

Reading Reflection

- Based on important themes from earlier in the course, come up with at least two additional cons around relying on think-aloud data, beyond the cons listed in the readings.
- Is there anything about talk-aloud protocols that should make us a little less nervous about these?
- Do you feel like you could already design a talk-aloud study for the language or tool you're designing for your final project?
  - If yes, what would you do?
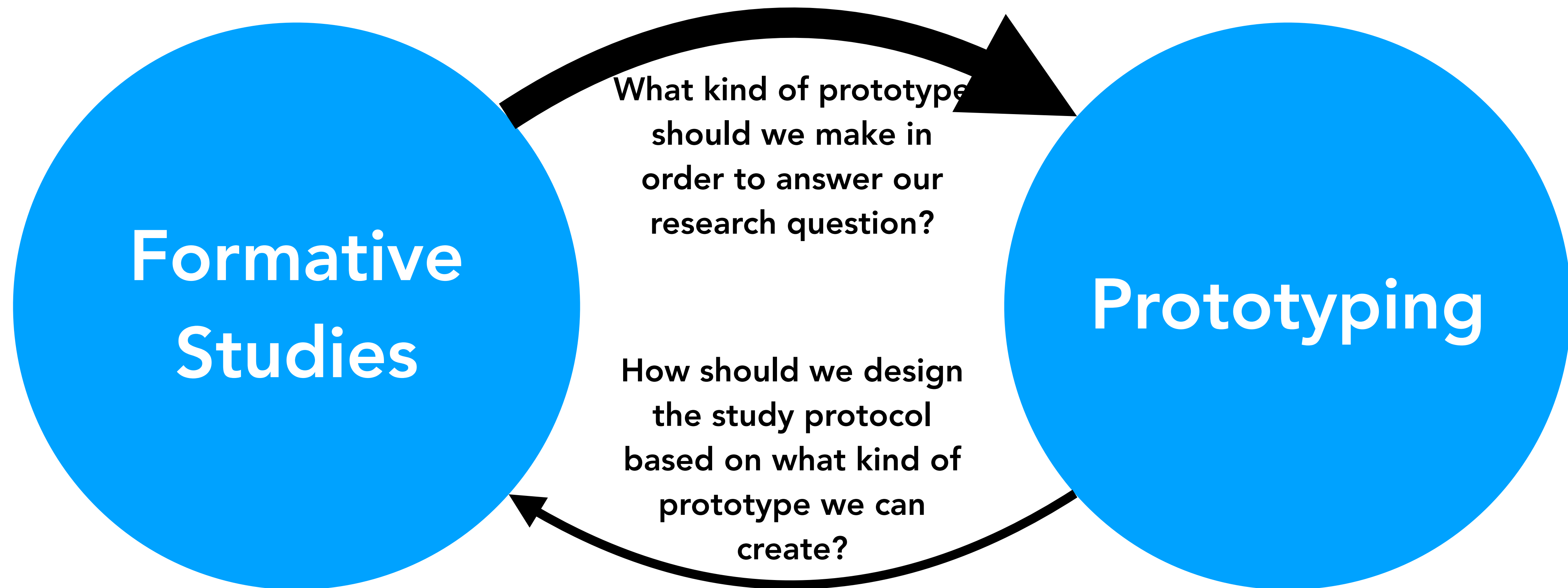 - If no, what part of that design process is the barrier?
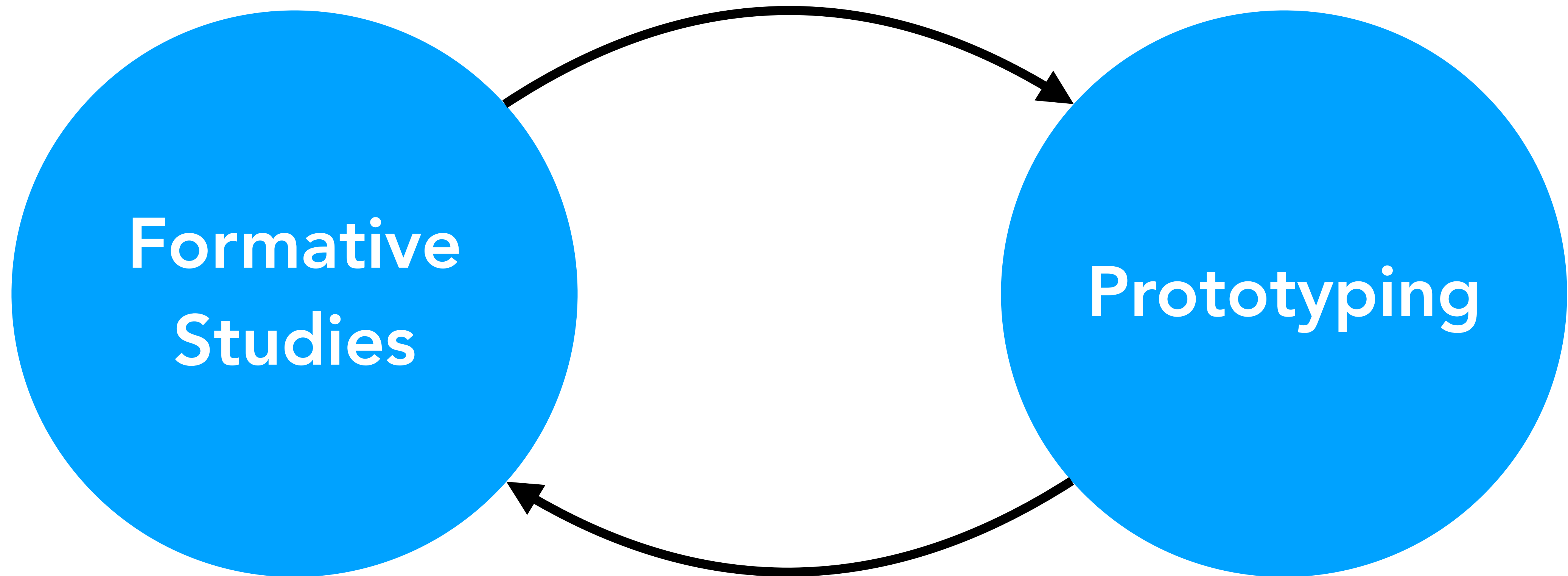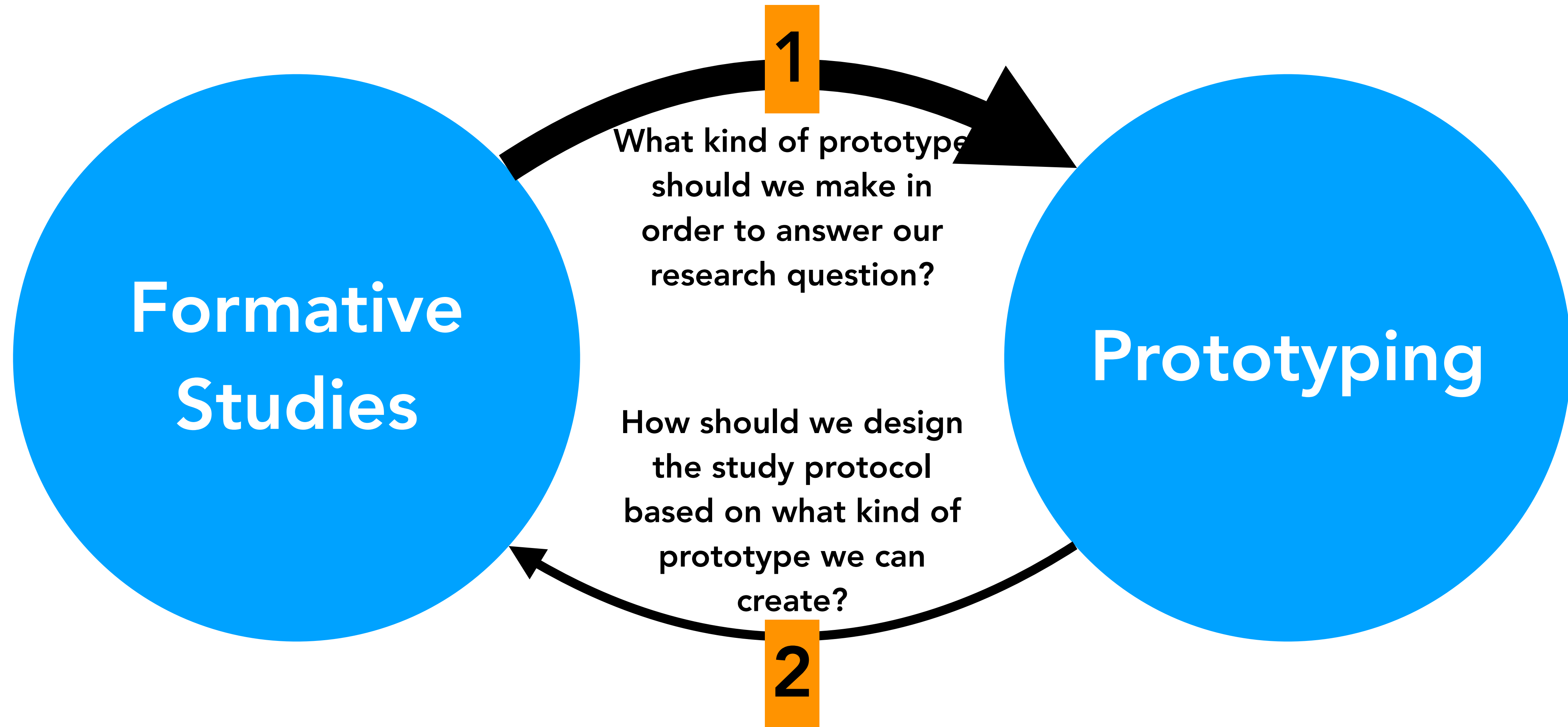
Why are we treating Formative Studies and Prototyping together?

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Formative Studies

Prototyping

What kind of prototype should we make in order to answer our research question?

How should we design the study protocol based on what kind of prototype we can create?

Why are we treating Formative Studies and Prototyping together?

Formative Studies

What kind of prototype should we make in order to answer our research question?

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Prototyping

Why are we treating Formative Studies and Prototyping together?

Formative Studies

Prototyping

1 What kind of prototype should we make in order to answer our research question?

2 How should we design the study protocol based on what kind of prototype we can create?

There's a spectrum

User-Centered
language design
on easy mode

User-Centered
language design,
the full experience

User-Centered PL: Easy Mode

> EASY
MEDIUM
HARD

Motivation:
I think programming languages and programming tools are for humans. I want to make PLs that useful and usable. But I don't care about contributing to generalizable human-centered programming knowledge.

Approach:
• Before implementation, make slides or other documents showing worked examples for multiple approaches and discuss them with users. (Relates to HW, see writeup.)
• Throughout implementation, regular think-alouds with current prototype.

User-Centered PL: The Full Experience

Motivation:
I think programming languages and programming tools are for humans, and every part of my process from deciding what need to tackle to deciding how to tackle it to refining my PL will be driven by understanding users.

Approach:
- Contextual inquiry and ethnographic studies for need finding
- Formative studies and thorough prototyping (see prior slide, plus add the option of formal formative studies during prototyping)
- Usability studies play a role in evaluation

Pop Quiz

Regardless of whether we're doing easy mode or hard mode, what one step should we **always always always always** start with, when we're designing a user study?

Turn to the person next to you and discuss.

Pop Quiz

Figure out what you're trying to learn! What's your **research question**?

Qualitative Research Takeaways

…qualitative research helps us understand:
- Behaviors, attitudes, and aptitudes of potential product users
- Technical, business, and environmental contexts — the domain — of the product to be designed
- Vocabulary and other social aspects of the domain in question
- How existing products are used

About Face: The Essentials of Interaction Design, Cooper et al.

Qualitative Research Takeaways

To get the really exciting stuff from qualitative studies:

- Interview where the interaction happens
- Avoid a fixed set of questions
- Focus on goals first, tasks second
- Avoid making the user a designer
- Avoid discussions of technology
- Encourage storytelling
- Ask for a show and tell
- Avoid leading questions

Would you use this tool feature if it were available?
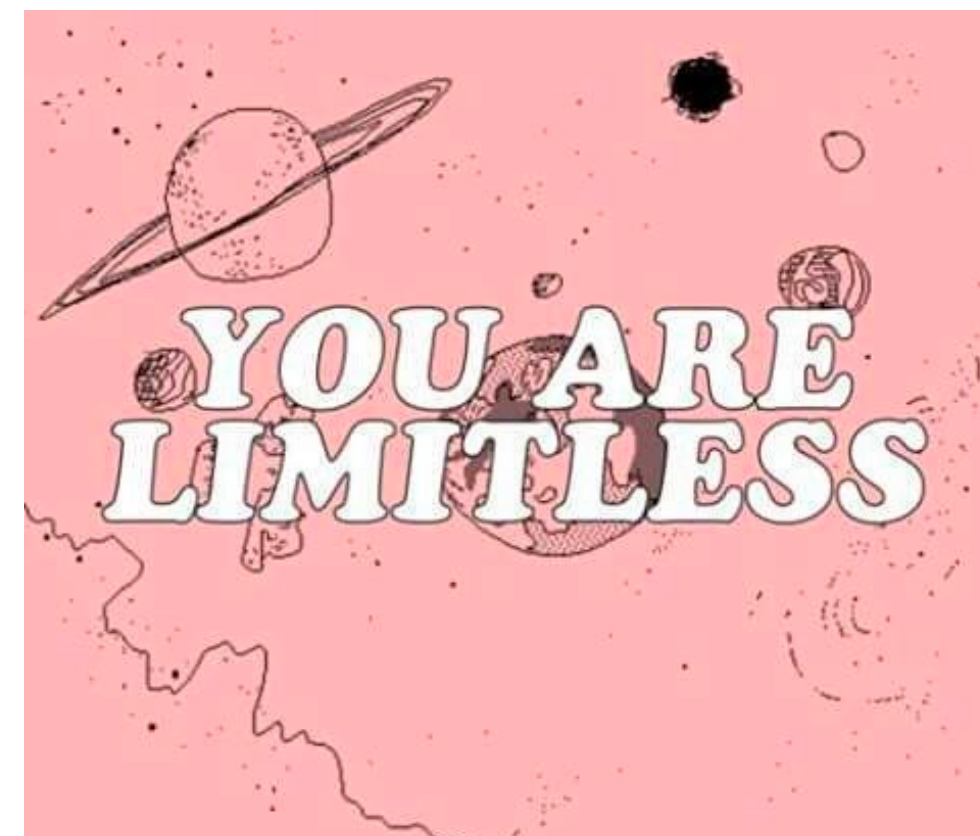
Your answer

About Face: The Essentials of Interaction Design, Cooper et al.

Qualitative Research Takeaways

You've already seen what you can learn from qualitative research in the context of need finding

But we're not limited to need finding activities!

Qualitative **Usability** Studies

…which brings us back to think-aloud studies

- Minimal planning — pick a task
- Easy and fast to run a session
- Useful at any stage of brainstorming or implementation
- Shockingly informative
- Shockingly persuasive to others
  - Great way to persuade your advisor something actually matters :)

Qualitative Usability Studies

Usability testing is especially effective at determining:

► **Naming** — Do section/button labels make sense? Do certain words resonate better than others do?

► **Organization** — Is information grouped into meaningful categories? Are items located in the places customers might look for them?

► **First-time use and discoverability** — Are common items easy for new users to find? Are instructions clear? Are instructions necessary?

► **Effectiveness** — Can customers efficiently complete specific tasks? Are they making missteps? Where? How often?

About Face: The Essentials of Interaction Design, Cooper et al.

Qualitative Usability Studies

Programming languages, to the extent that they require even more time and effort to learn than traditional user interfaces, exacerbate some of the existing problems of usability studies (both qualitative and quantitative).

focused on assessing the first-time use of a product. It is often quite difficult (and always laborious) to measure how effective a solution is on its 50th use — in other words, for the most common target: the perpetual intermediate user. This is quite a conundrum when one is optimizing a design for intermediate or expert users. One technique for accomplishing this is the use of a *diary study*, in which subjects keep diaries detailing their interactions with the product. Again, Mike Kuniavsky provides

Quantitative Formative Usability Studies

If you're thinking of going quantitative instead:

- Can you actually measure the thing you're trying to measure? (How, specifically?)
- Will the particular experiment you're planning actually succeed in measuring the thing you're trying to measure?
- If you measure it successfully, will it actually help you improve your design?

If any "no"s, head back to qualitative.

Qualitative Usability Studies

Even though qualitative usability may be more flexible, easier for you to adapt in the moment, you don't completely escape the need to plan the design!

- Am I interacting with the right users?
- Do I know what kinds of information I'm seeking? (So that I can watch the right tasks, design the right tasks, ask the right questions?)
- And remember, always always always start by knowing your research question! Why are you bothering to run this study in the first place? What's that core question you're trying to answer?

Analysis of Qualitative Studies

This is a huge topic, and you could take multiple whole classes about it. I recommend two starting points.

- Grounded Theory:
  - If you have the time and resources to keep collecting data until there are no more surprises
- Thematic Analysis:
  - If you just want to collect some data and get some sense of what themes come up frequently

Analysis of Qualitative Studies

No looking at sessions, noticing a few things, and calling it an analysis! These are well-developed techniques with long histories and lots of long ways to do them wrong.

My suggested starter resources:
- Grounded Theory:
  - Curiosity, Creativity, and Surprise as Analytic Tools: Grounded Theory Method: https://umich.instructure.com/courses/122789/files/4114866/download?verifier=wB3gw3tsPbBciw6ts3mKitsQIpOPb4U8nMwVUF0y&wrap=1
  - Reducing Confusion about Grounded Theory and Qualitative Content Analysis: Similarities and Differences : https://nsuworks.nova.edu/cgi/viewcontent.cgi?article=1028&context=tqr
  - Grounded theory research: A design framework for novice researchers: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6318722/

- Thematic Analysis:
  - A nice starter/summary resource: https://medium.com/usabilitygeek/thematic-analysis-in-hci-57edae583ca9
  - Thematic analysis inventors' own guide: https://cdn.auckland.ac.nz/assets/psych/about/our-research/documents/Reading%20List%20and%20Resources%20for%20Thematic%20Analysis%20April%202019.pdf

Analysis of Qualitative Studies

Other advice:

- Record sessions
- Use software to support your qualitative coding (e.g., MAXQDA)
- I have yet to meet anyone who's managed to really learn this except via learning by doing, but…
- …you can avoid some of the pitfalls by talking to someone who's done a similar study and a similar analysis recently
  - Everything from tips for using qualitative coding software to what kinds of open codes you'll find most useful later in the grouping process
- Some over-specific but helpful tips for qualitative coding:
  - Apply open codes for things users do, not just what they say
  - *Distinguish between* things users say and things they do (color code in software, for example)
  - When you apply the first layer of open codes, use complete sentences. Short summaries or key phrases make it too easy to leave out detail you'll need later, and then you'll keep having to dive into the video.
  - When you apply the first layer of open codes, don't do **any analysis**. Be purely descriptive. You don't need to include every single detail down to the exact string the user typed, but you shouldn't be making any assumptions, generalizations, or speculations at this stage.

Personas (Preemptive note before Thursday reading)

- Personas are **based on research**
- Personas are represented as individual people
- Personas **represent groups of users**
- Personas explore ranges of behavior
- Personas must have motivations

> Personas are user models that are represented as specific, individual human beings. They are not actual people but are synthesized directly from observations of real people. One of the key elements that allow personas to be successful as user models is that they are *personifications*.[2] This is appropriate and effective because of the unique aspects of personas as user models: They engage the *empathy* of the design and development towards the human target of the design.

About Face: The Essentials of Interaction Design, Cooper et al.

Personas Takeaways

- What personas are and aren't
  - Many people will claim they're using personas. If someone tells you this, make sure they've actually done their research

- You've probably all used n = 1 personas when you've designed for your own preferences or the needs of a particular user you've discovered
  - This experience probably gives you a sense of why personas are so powerful and effective
  - But ideally we want n > 1 ! Thus the research that precedes persona creation

Discussion Break

I've noticed that everyone seems to end up having different questions about qualitative studies, so…let's chat! Break into groups to ask each other questions. If there are still questions lingering after those discussions, we'll come back together and discuss them as a group!

Final Project Chat!

IRB…another reminder!

If you intend to publish the findings from your interactions with users/potential users, bear in mind that the IRB approval process typically takes 2 weeks.

- Submit at: https://eprotocol.berkeley.edu/userLogin.do
- For support:
  - https://cphs.berkeley.edu/eprotocol_faqs.html
  - Slack—your fellow students are experts!
  - Me

For figuring out if you need IRB approval: https://cphs.berkeley.edu/review.html

- Scroll to "Activities that Generally Require Review" and "Activities that May Not Require Review"

No High-Risk Studies!

Even if you do *not* intend to publish the findings from your interactions with users/potential users, make sure you've carefully analyzed any risks to your participants. **If you identify any risks higher than the risks of day-to-day computer use, please come talk to me.**

Roadmap

A roadmap for the next segment of class sessions:
- **Today/this week's HW**: concretizing the tasks that motivate your final project; finalizing scoping for your project
- **Tuesday**: building on those tasks, coming up with task walkthrough stories for 3 alternative designs
- **Thursday**: sharing Tuesday's output/design critique/getting to know what your classmates are up to, and to get early feedback

Rest of Today

- Start this week's HW. If we don't get a chance to do this in class, please still **take at least 10 minutes to start this week's HW before reading Thursday's reading**! You'll get more out of Thursday's reading if you're already thinking about a concrete formative study that you plan to run soon.
- Call me over if there are elements of your final project design that you want to discuss!