

Human-Computer Interaction

# How to Conduct Online Studies

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# This Lecture

This is a brief, bonus lecture to give you guidance on designing and conducting online studies. We will cover:

- » Different types of online studies
- » Best practices and rules of thumb
- » Key challenges and considerations

*What is an online study?*

**Definition:** Empirical research studies involving human participants where recruitment, study administration, data collection, and compensation occurs over the Internet.



*What are different kinds of online studies?*

1. Moderated online studies
2. Unmoderated online studies
3. Observational online studies



# *Moderated online studies*

What are **moderated online studies**?<sup>1</sup>

system / stimulus

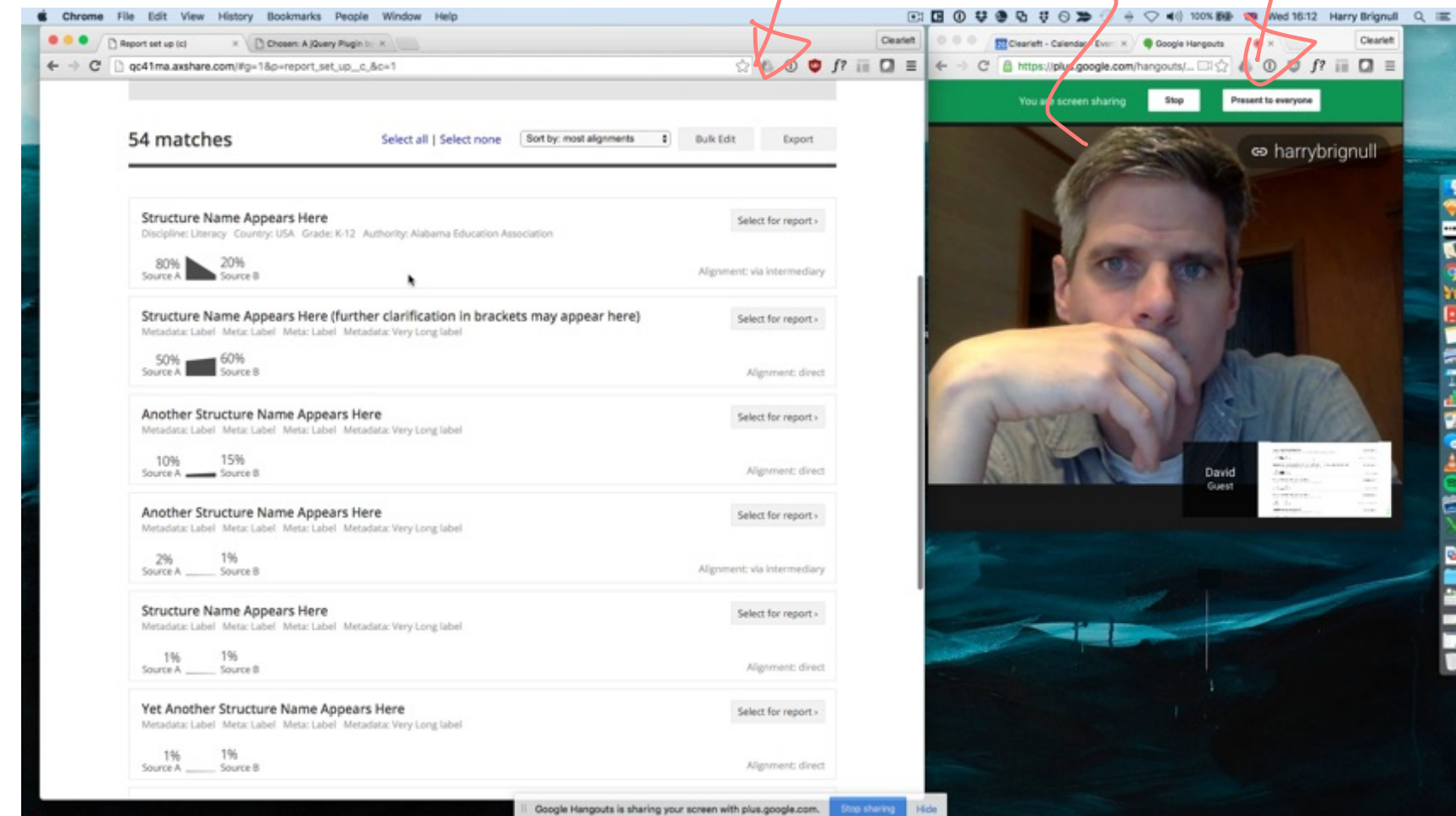
task

participant behavior

**Definition:** Studies where a moderator administers a study protocol over videoconferencing and/or screensharing.

The moderator administers study protocol, observes participant behavior, and captures qualitative and quantitative data.

Participants may use software on their computers, on the Web, or on the moderator's computer.



<sup>1</sup>Image source

## *What are characteristics of moderated online studies?*

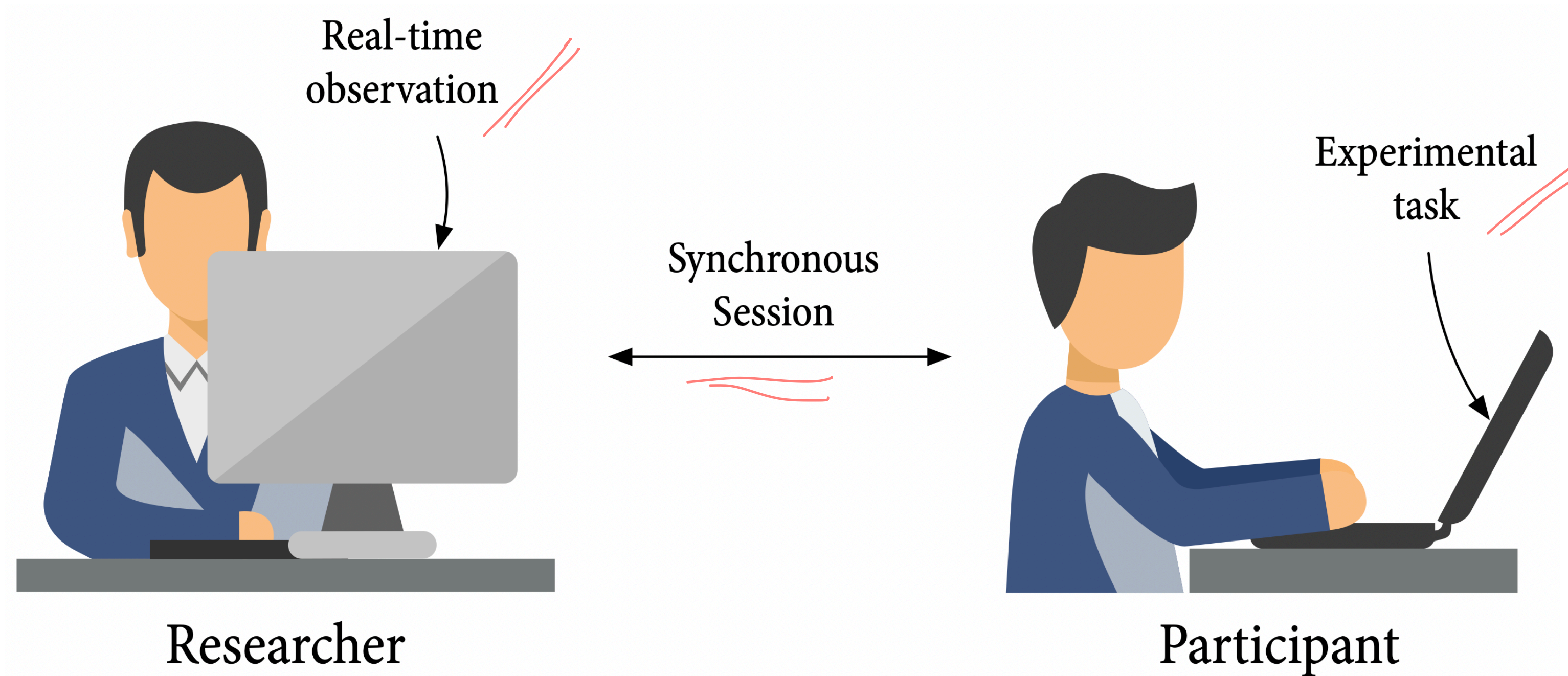
- » Very similar to an in-person laboratory study, but limited primarily to tasks that can be completed on a computer or a limited environment.
- » Screensharing is used to observe participant task behavior; videoconferencing is used to observe participant body language and to build rapport.
- » Participants may not be able to install complex software or know how to remotely operate an experiment computer, so best suited to study Web tools.

*What does this mean for us?*

# You could conduct your study remotely!

If the following conditions can be satisfied:

- » An experimental task performed on a computer can help you *validly* test your hypotheses
- » You have access to a *representative sample* of the population of interest
- » The population is tech savvy enough to participate in a remote study



## What are some best practices?

- » Very similar to running in-person studies, so follow best practices from experimental research.
- » **Study administration:** Web-based application or presentation of stimuli/software installed on the experimenter's computer with remote access by the participant, e.g., using Zoom, video conferencing with session recording.  $2 \times 2 = 4 \times 8 = 32$
- » **Minimum number of participants:**  $n \geq 2 \times k$ , where  $n$  is the total number of participants, and  $k$  is the number of unique study conditions (for statistical analysis).  $2-8$
- » **Types of studies:** Quantitative (e.g., controlled experiment) or qualitative (e.g., contextual inquiry, thinkaloud studies).

# *Unmoderated online studies*



What are *unmoderated online studies*?

**Definition:** Instrumented, automated data collection carried over the Internet for A/B testing or surveys.

What is *A/B testing*?

**Definition:** A/B testing compares two different versions of a design to determine which one more effectively achieves a design objective.<sup>2</sup>

What is a *survey*?

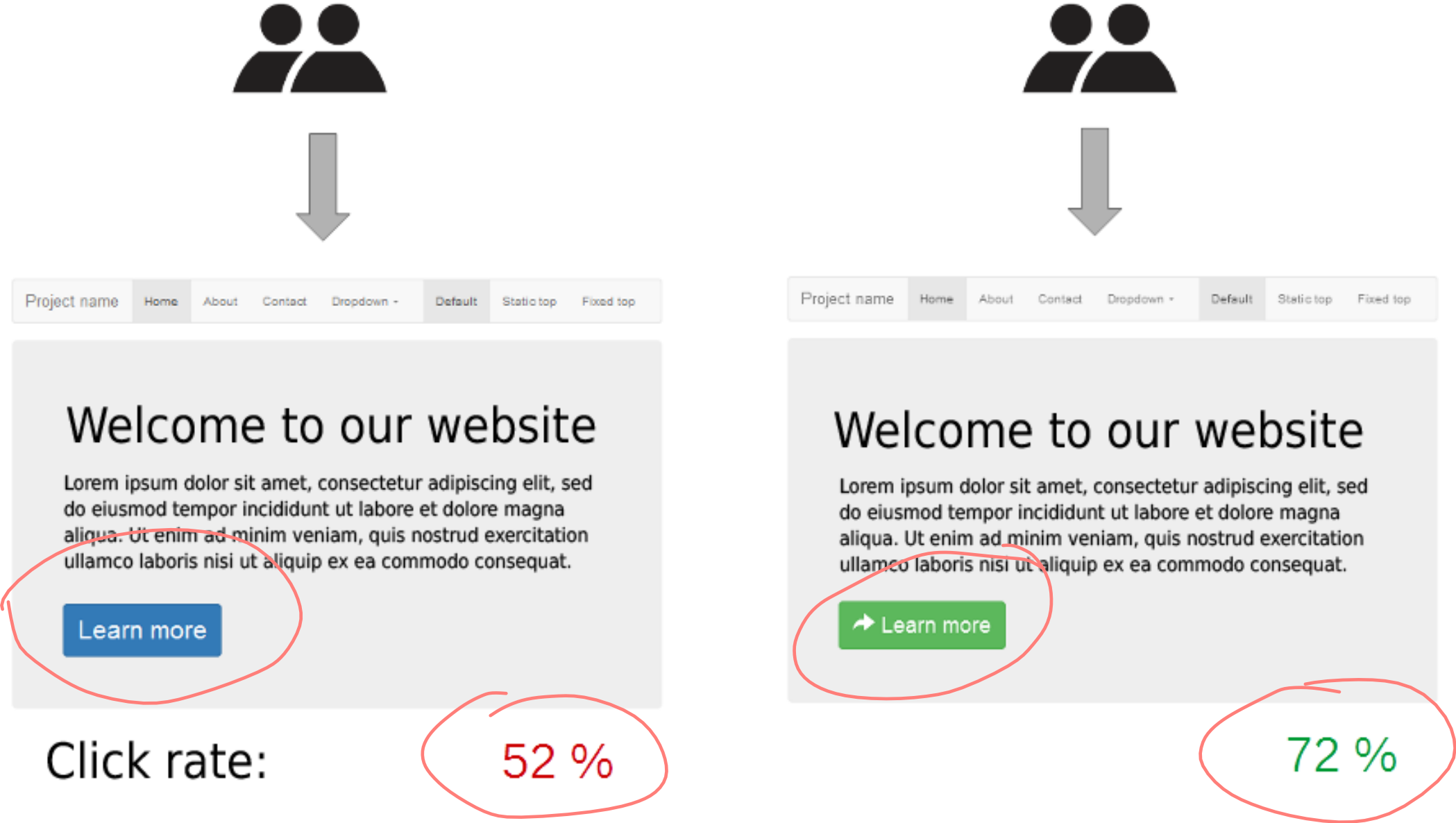
**Definition:** A method of collecting self-reported data from people about characteristics, thoughts, feelings, perceptions, behaviors, or attitudes.<sup>2</sup>

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<sup>2</sup>Hanington & Martin, 2012, Universal Methods of Design



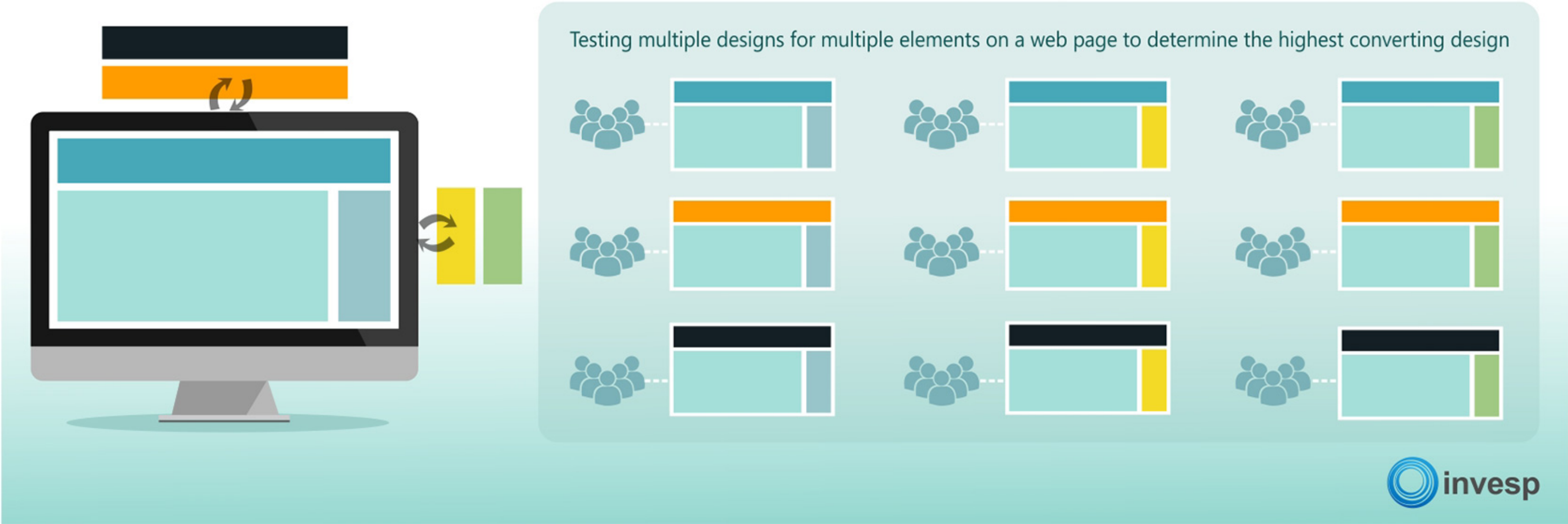
# How does A/B testing work?<sup>3</sup>



<sup>3</sup>Image source

What if I want to test multiple design dimensions?<sup>4</sup>

# **MULTIVARIATE TESTING**



<sup>4</sup> Image source

## How about online surveys?<sup>5</sup>

Online surveys allow the collection of self-reported data and allow reaching a large population with different characteristics.

Surveys are (generally) *descriptive* and not *causal*.

You find it difficult to introduce yourself to other people.

AGREE        DISAGREE

You often get so lost in thoughts that you ignore or forget your surroundings.

AGREE        DISAGREE

You try to respond to your e-mails as soon as possible and cannot stand a messy inbox.

AGREE        DISAGREE

You find it easy to stay relaxed and focused even when there is some pressure.

AGREE        DISAGREE

You do not usually initiate conversations.

AGREE        DISAGREE

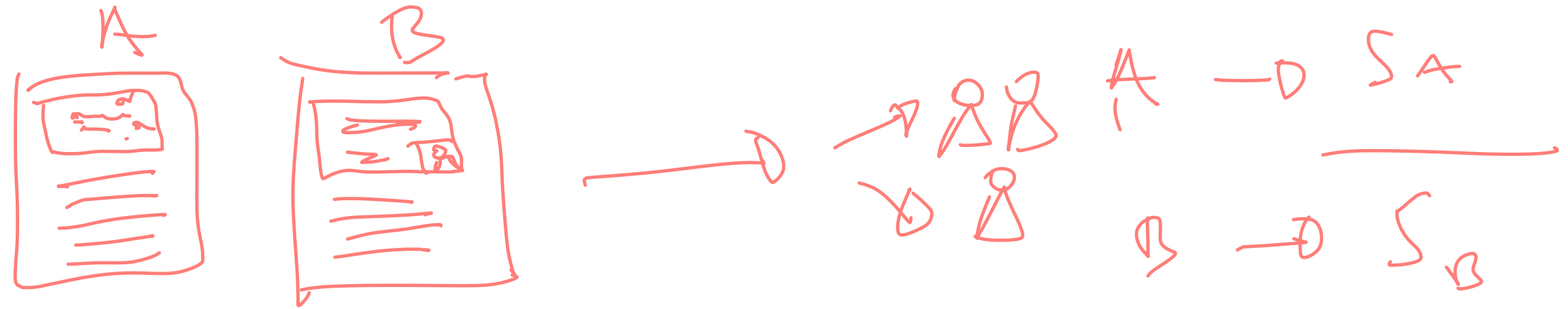
You rarely do something just out of sheer curiosity.

AGREE        DISAGREE

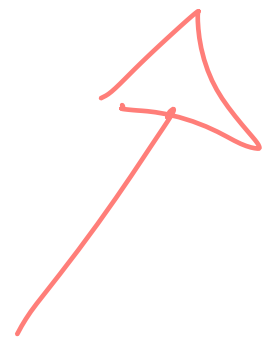
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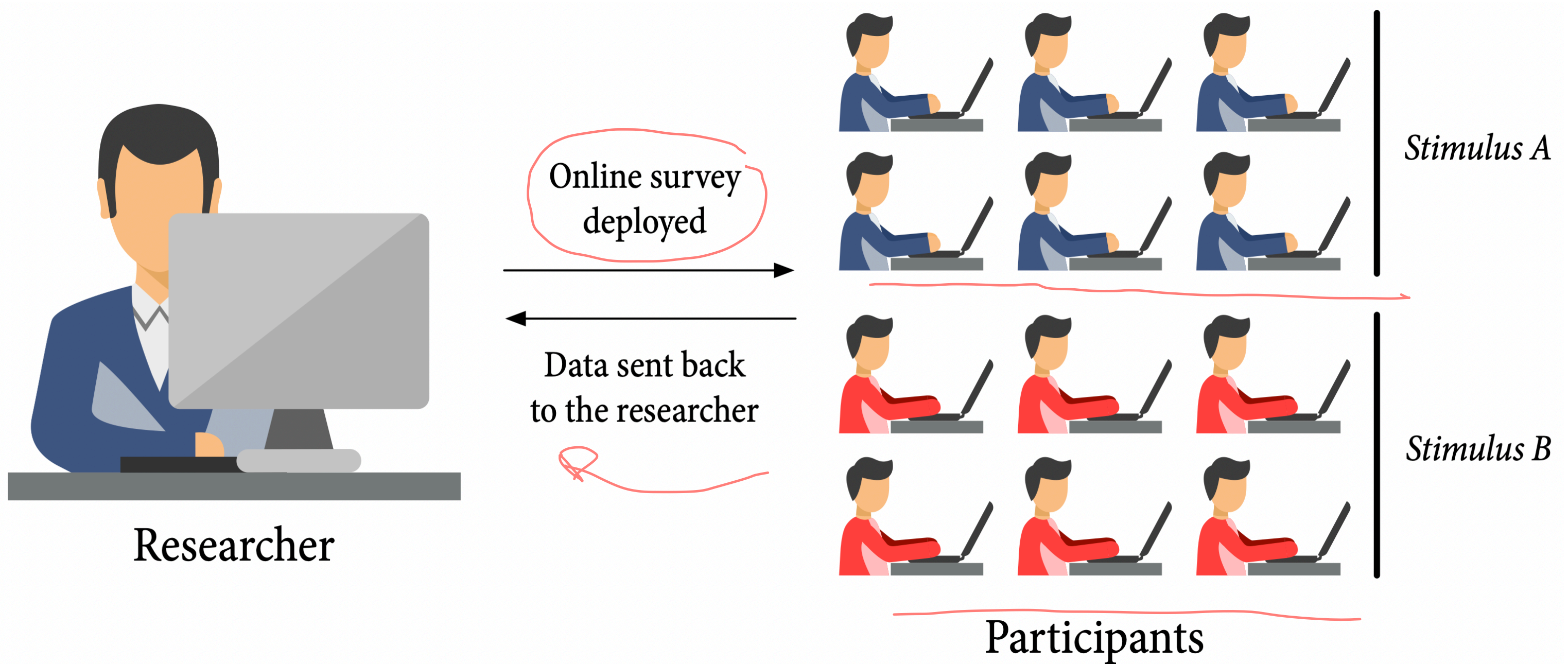
<sup>5</sup>Image source

So what this mean for us?



# A/B/Multivariate Testing + Online Survey = Online Experiment

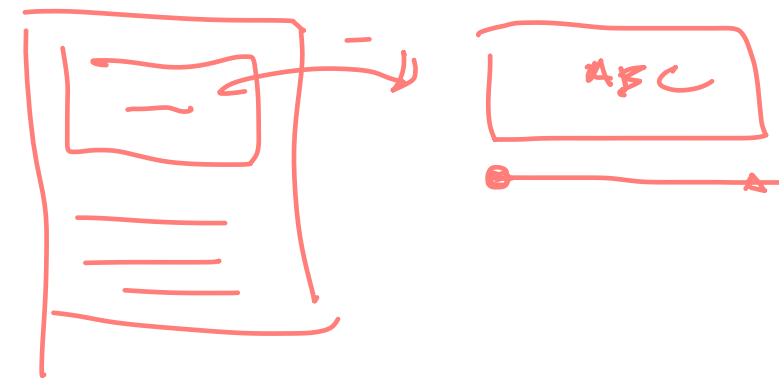






What are some best practices?

- » **Data collection:** Surveys can be built using Google Forms (simple) or UW Qualtrics (sophisticated)
- » **Counterbalancing:** Use randomization, e.g., using Randomizer in Qualtrics, for (1) random assignment and (2) counterbalancing in within-participants study designs
- » **Recruitment:** Use an online marketplace (semi-random sampling from population), e.g., Mechanical Turk, Clickworker, Figure Eight, or distribute via social media (convenience sampling)
- » **Data quality:** Keep studies short ( $t < 10 \text{ min}$ ) and build in engagement checks (e.g., a code that participants have to copy)



# *Observational online studies*

What are **observational online studies**?

**Definition:** Observational, qualitative and quantitative studies of online activity in social media platforms, discussion forums, blogs, wikis, etc.

Similar to *ethnography*, but there are more qualitative, quantitative, and mixed-methods possibilities, e.g., social network analysis, quantitative ethnography.

As in ethnography, we find an *online* "setting" and ask a broad research question that get refined over time.



*What are example studies that can be conducted with this approach?*

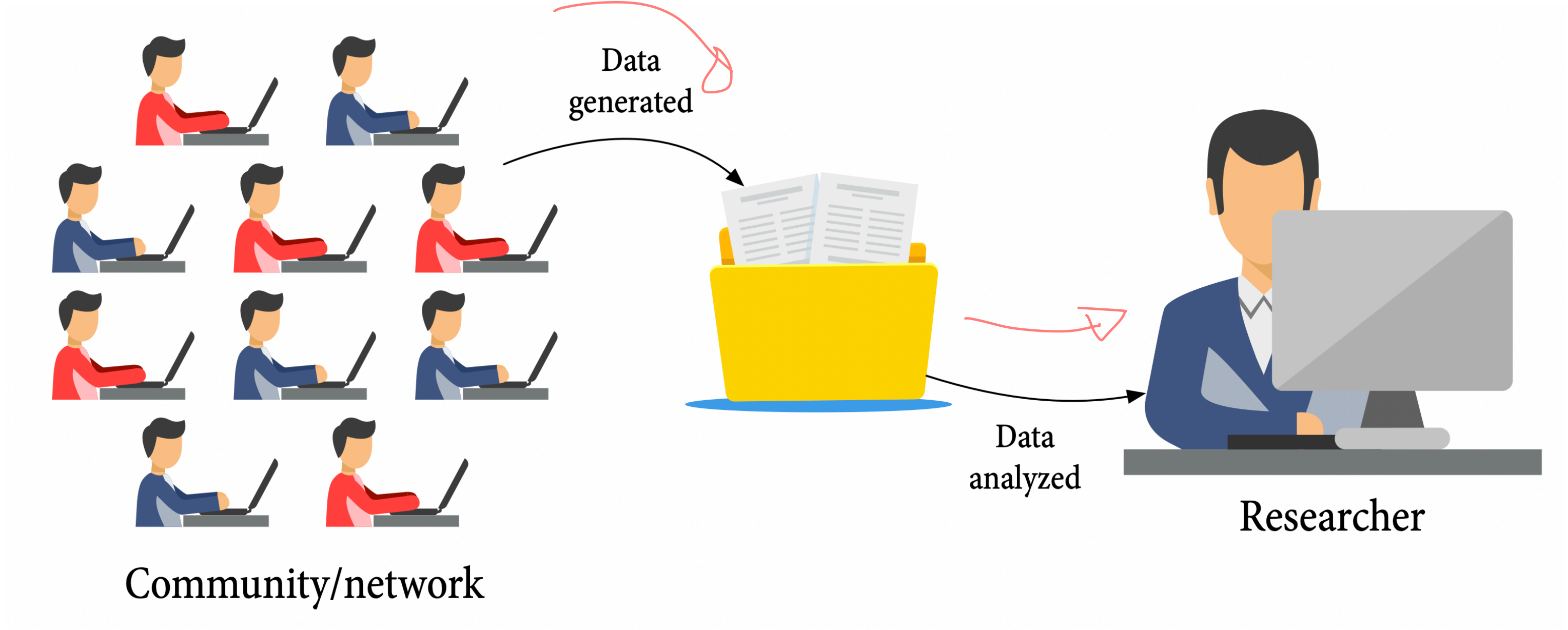
**Example 1:** Ammari et al. (2018)<sup>6</sup> studied how new moms and dads on Reddit expressed parenting roles and identities using quantitative (LDA-based) topic modeling.

**Example 2:** Seering et al. (2018)<sup>7</sup> studied how automated bots affect discussions among online communities using quantitative analyses of Twitch data.

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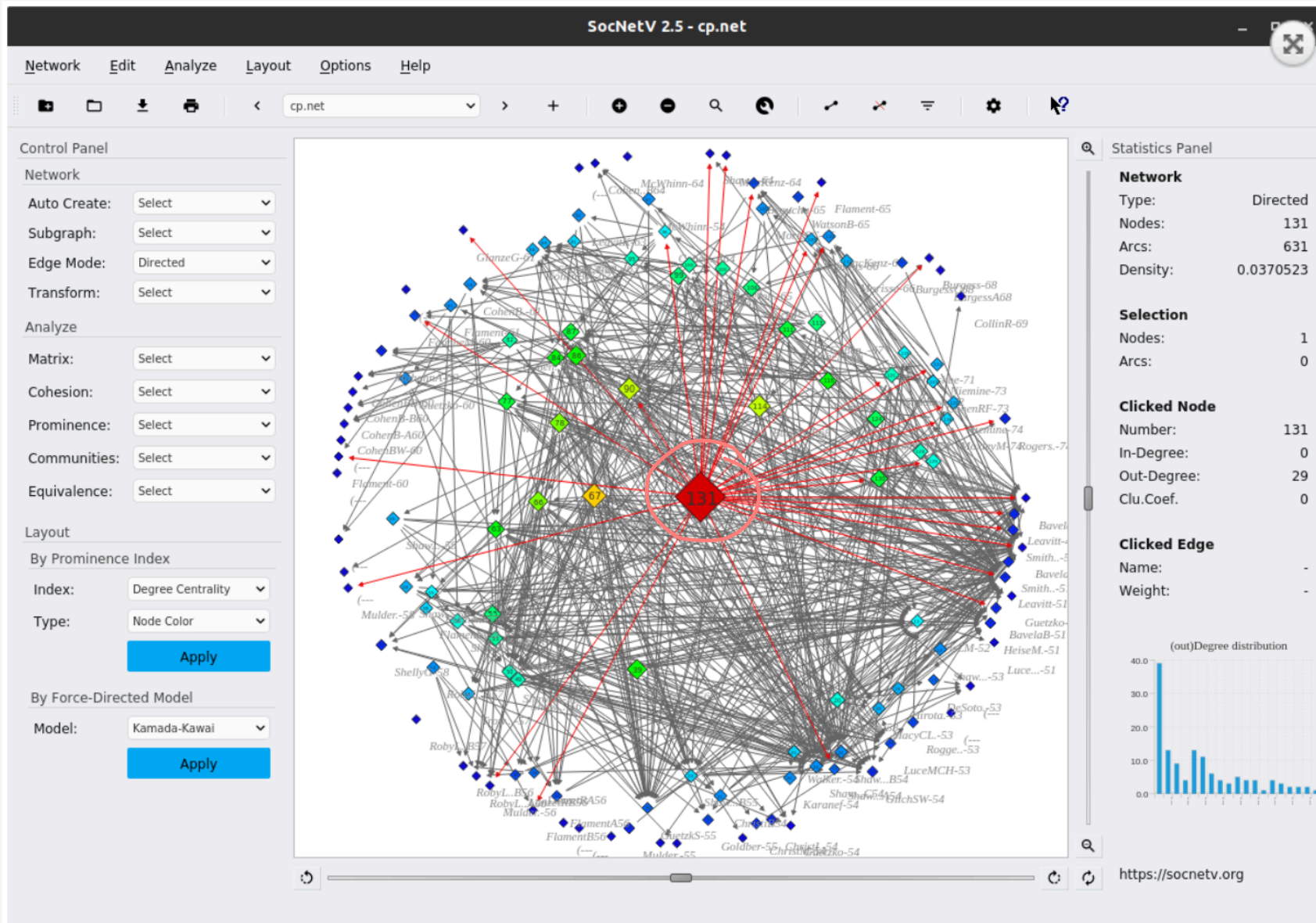
<sup>6</sup> Ammari et al., 2018, Pseudonymous Parents

<sup>7</sup> Seering et al., 2018, The Social Roles of Bots



What are some best practices?<sup>8</sup>

- » **Data access:** To obtain large amount of data, use APIs provided by platforms, such as Twitter.
- » **Data analysis:** Descriptive statistics on behavior or events; social network analysis using graph algorithms, tools, e.g., SocNetV, Gephi; qualitative analysis for content and semantics. Most studies will involve a mixed-methods approach.



<sup>8</sup>Image source

*What are key considerations in conducting online studies?*<sup>9</sup>

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<sup>9</sup>Lazar et al., 2017, Research Methods in Human-Computer Interaction



1. **Appropriate topics for online research:** Some research questions will be appropriate to investigate online and others will not be.
2. **Recruiting:** Blessing and a curse; access to a broader population and special populations (e.g., individuals with disabilities), but only Internet users who are willing to participate.
3. **Anonymity:** Potential for more disclosure, but also for deception; creating incentives is difficult.
4. **Study design:** Some measures are easier to capture (e.g., self-reported) than others (e.g., performance); dropouts need handling.
5. **Ethical concerns:** Issues surrounding privacy and informed consent, e.g., when data posted online is used for research; informed consent and debriefing are challenging.

# Questions?

