

AI 507 – Research seminar AI & Society

**#RS3 from research
question to designs**

Associate Prof. Dr. Lena Frischlich

Flashlight

Flashlight

Theories

Science →
knowing

Theory →
looking at

Why

Prediction
Causality

What

Core terms

- Constructs (= most abstract)
- Concepts (= a little more concrete)
- Variable = what we actually measure

Categorical



Ordinal



Parametric



Independent versus
dependent variables

Links between variables

How

Theoretical statements

- Hypotheses $A \rightarrow B / A > B$
- Research questions $A:B?$
- Propositions: $A =$
- Assumptions: $A \rightarrow B | A =$

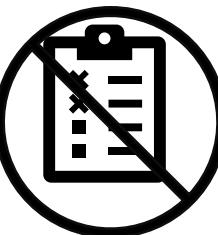


Principle of falsification

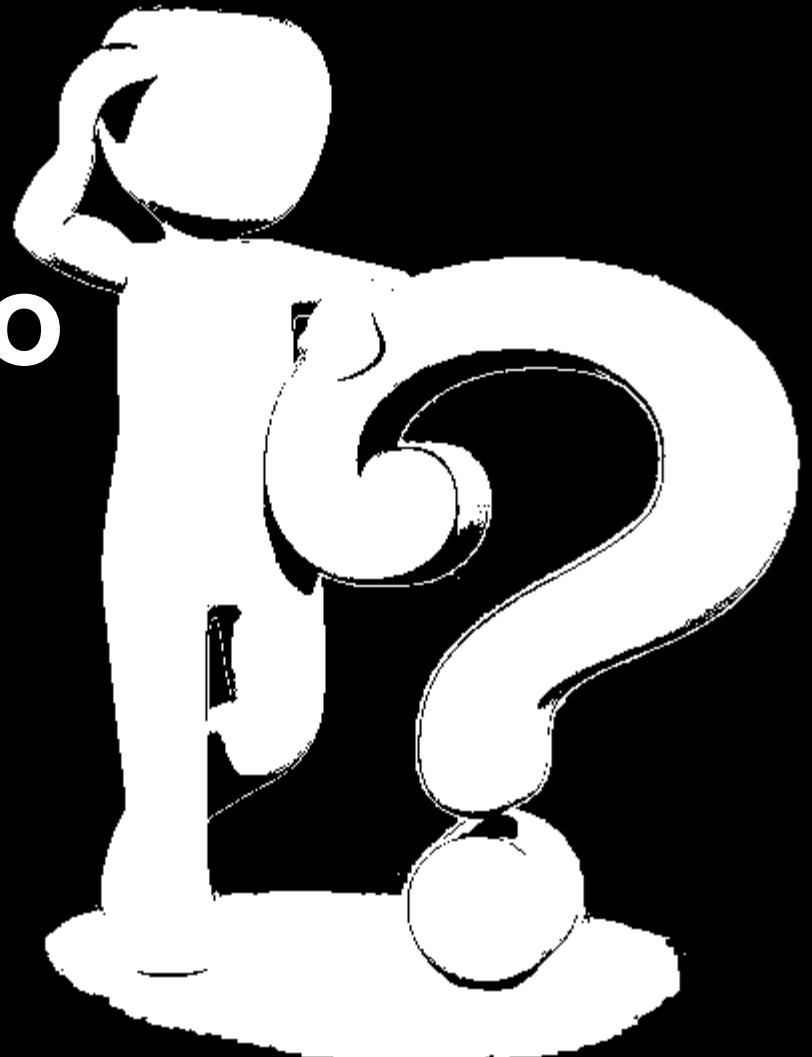
Theoretical linkage

Operational linkage

How to find a research
question



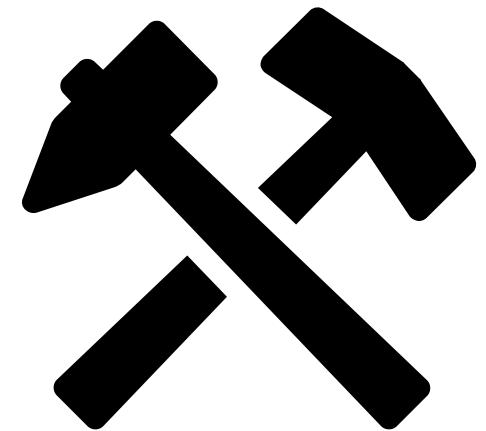
**Do you have questions to
last Tuesdays' lesson?**



Then I hope,

at the end of today's lesson, you will...

- ...know what the differences between qualitative and quantitative research methods
- ...have gotten to know four prominent methods for working with human data
- ... can make informed decisions to choose a methodological approach to answer your research question/ test your hypothesis



Qualitative versus quantitative methods

Think back to the research ideas you brainstormed last week

(Smith, 2024)

- Now: how do we answer our research question/ test our hypothesis?
- Two research paradigms

Qualitative

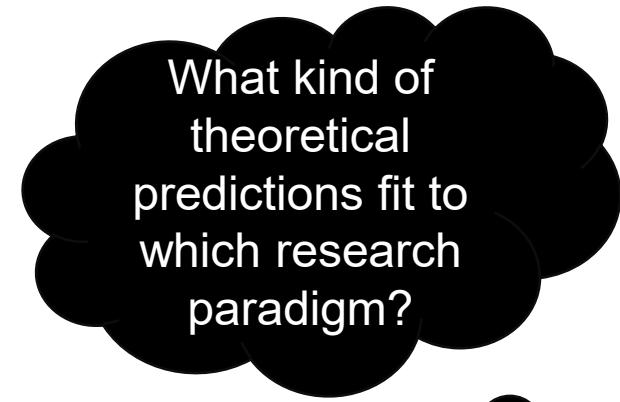
- Explores the how and why
- Focus on the subjective experience of the human data owner, the research subject
- Enables in-depth insights on topics that are not well understood
- Rooted in constructivist/ normative research traditions (→humanities)

Research questions

Quantitative

- Tests the "what," "how many," or "how often" using numerical, statistical data
- Focus on generalisable data and descriptions of the population
- Enables testing theoretical statements
- Rooted in positivist research traditions (→ natural sciences)

Hypotheses



What kind of theoretical predictions fit to which research paradigm?

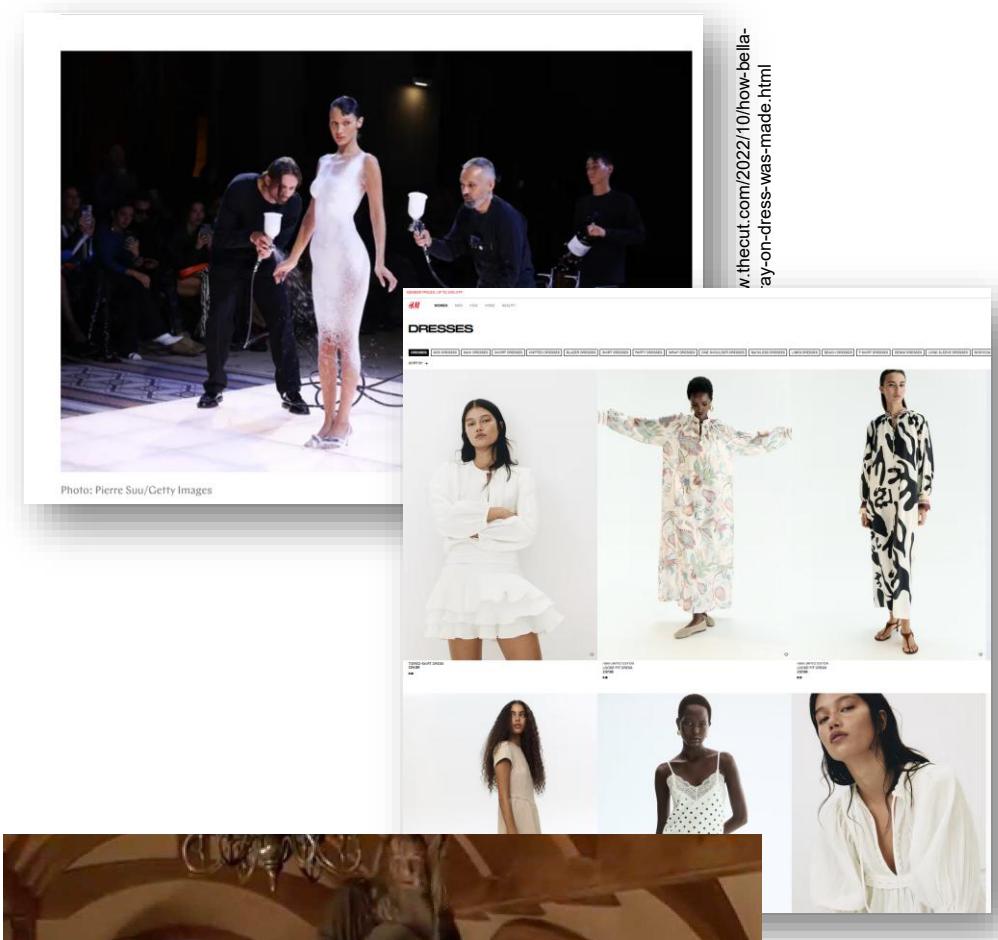
“Quali-quanti wars”

(Smith, 2024)

- Fundamentally different function in the research process – not necessarily better or worse

	Qualitative	Quantitative
When	Explorative, hypothesis generating, theory-building	Confirmatory, Hypothesis testing, theory testing
Whom	Few theoretically-sampled respondents	Many representatively sampled
What	Summarizing, interpreting, categorizing data	Statistical analysis of data (Frequentist or Bayesian)
How	Results expressed in words	Results expressed in numbers

- Mixed-methods combine the best of both worlds (“pragmatic approach”)



**“It is tempting, if the
only tool you have is a
hammer, to treat
everything as if it were
a nail”**

(Maslow, 1966)

Questions?



**But how do you get the
data?**

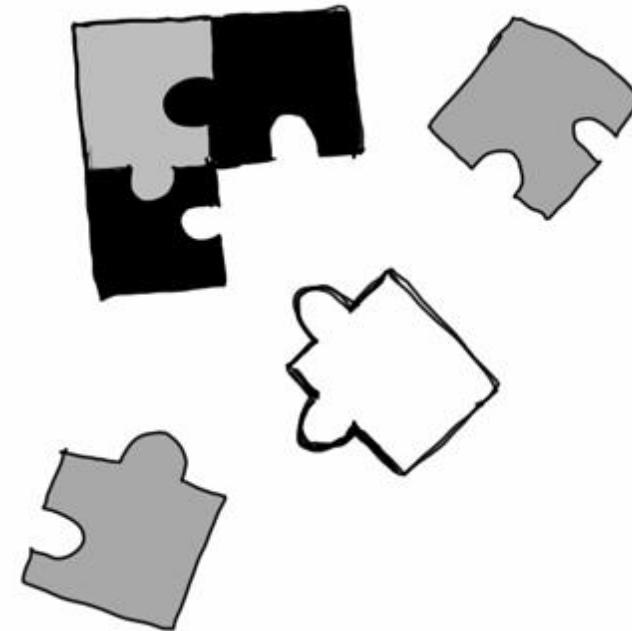
Four prominent methods of data collection

Quantitative

- Interviews
- Manual qualitative content analyses

Quantitative

- Online-questionnaires (“surveys”)
- Experiments



Interviews



Interviews

(Knott et al., 2022)

- Follow a familiar logic of human interaction: people talk with each other, interact and pose and answer question
- Provide a space for extended conversations that allow the researcher insights into how people think, how they feel, and what they believe
- Asymmetric: Interviewer poses questions – interviewee answers them
- Despite the “natural feeling”: posing the right questions and being a good interviewer is a skill on its own!

From the archive, 6 May 1977: Yours regretfully, R. Nixon

The Frost/Nixon interview is the closest we will get to a trial, but it is unlikely to have changed public opinion



David Frost interviewing former US president Richard Nixon, 1977. Photograph: John Bryson/Time Life Pictures/Getty Images

Interviews

(Knott et al., 2022)

- Research interviews do not try to “reveal” misdeeds – but they also want to create an atmosphere where things can be said
- Differ in their level of structure
 - **Highly structured:** All questions are defined and standardized in advance – often including offering answers (how much do you like... not at all / somewhat/ very much)
 - **Highly unstructured:** Narrative, free floating approach
 - **Semi-structured:** Using a topic guide to ensure that all relevant aspects are covered while allowing for free formulations, different orders of questions and additional topics

Semi-structured interviews

(Knott et al., 2022)

Topic-guide

- Start with easy questions (“icebreakers”)
 - E.g., socio-demographic data (if needed)
 - Broad questions to the topic → Help the interviewee to “ease” into the conversation
- More direct questions on the research topic
 - Start with concrete questions (how do you do XYZ, what is your experiences with...)
 - Follow with more abstract questions (how you feel with regards too...)
- Close-up: Open topics, something you want to have more details on, something that you missed

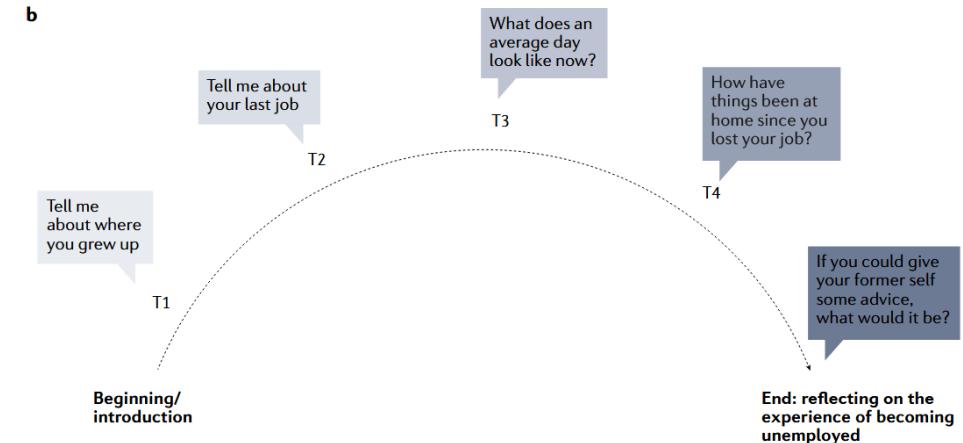


Fig. 1 | How to develop a topic guide arc. a | Elaborated topics the researcher wants to cover in the interview and example questions. b | An example topic arc. Using such an arc, one can think flexibly about the order of topics. Considering the main question for each topic will help to determine the best order for the topics. After conducting some interviews, the researcher can move topics around if a different order seems to make sense.

(Knott et al., 2022, p.3)



<https://www.pickpik.com/couple-guy-girl-love-dating-people-69120>

Selecting interview partners

et al., (2010), White & Cooper, 2022))

- Often guided by the principles of **grounded theory**
- Theory-building is grounded in the data
- Systematic data analysis aimed at generating theories
- Collecting data, analysing it, interpreting it are related to each other – a collection of interwoven methods
- Central for data collection: **Theoretical sampling**
 - Start with an initial data collection, identify first themes (“codes”) in the data and then collect further data till you reach **saturation**
 - **Saturation = theoretical** (new interview partners do not change the developed theory), **code saturation** (now new codes from new interview partners), **information saturation** (new interviewees do not provide new information)
- Often something between 20 to 50 interviews



Barney G. Glaser via
https://de.wikipedia.org/wiki/Barney_G._Glaser



Anselm Strauß via
<https://sociopedia.co/author/strausse-ansehm>

Selecting interview partners

(Fassinger, 2005; Patton 2002; 2015)

- Thinking about sampling requires thinking about inclusion and exclusion criteria: who or what do we want to hear from, and who or what do we not want to hear from.
- Qualitative researchers often aim to sample for
 - diversity of perspectives (maximum variation or maximum heterogeneity sampling)
 - typicality of perspectives (homogeneity sampling),
 - or something in between
- Different types do not allow for generalization but because heterogeneous people can plausibly provide a more complex picture of the phenomenon of interest
- Interviewees as experts for their own lived experience



Conducting the Interview

(Gläser & Laudel, 2010)

- Online or offline?
- One or two interviewers?
- Informed consent
- Record, record, record!
- Not too many interviews in a row
- Realistic time frames

Afterwards:

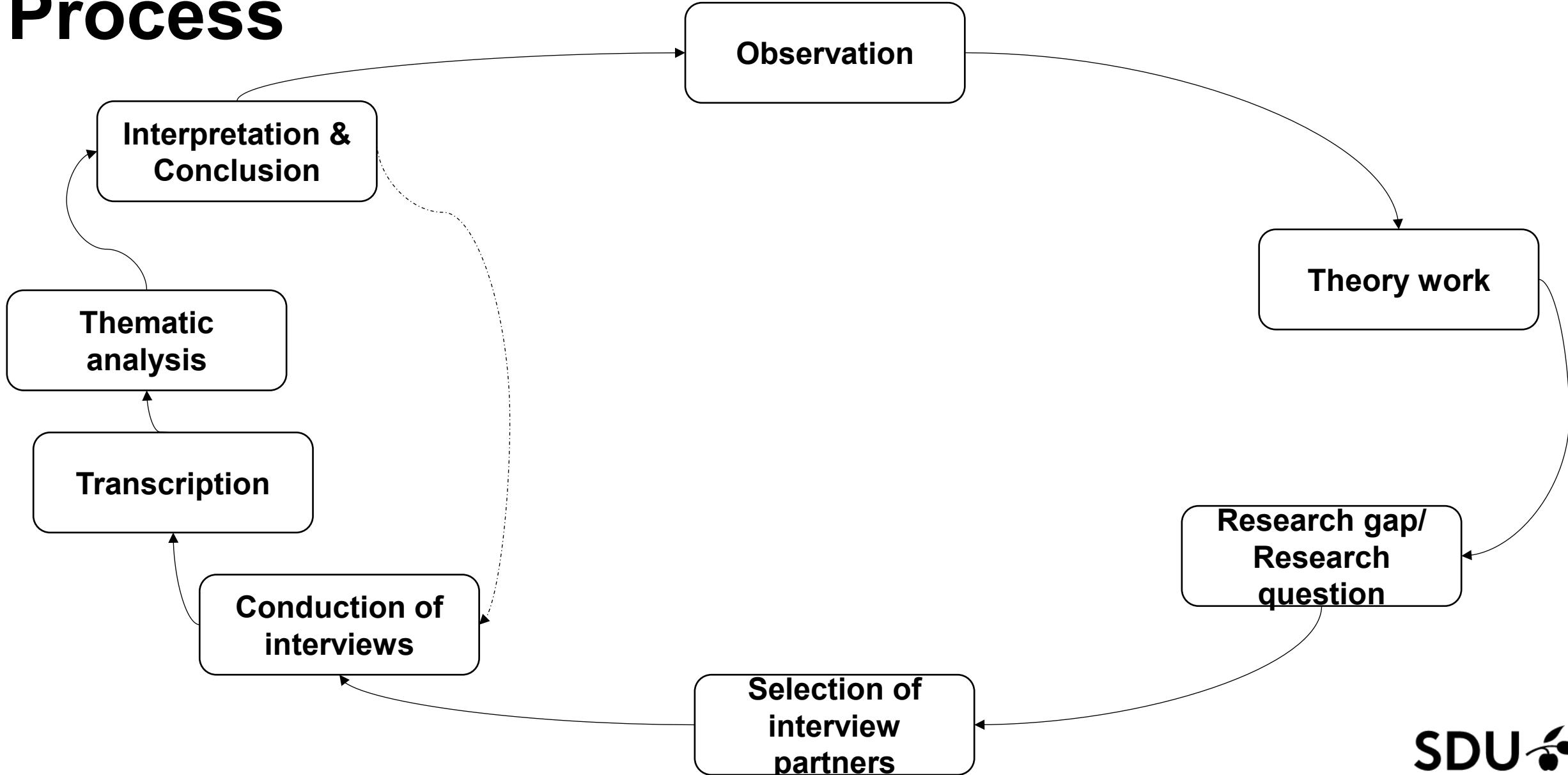
- Transcription
- Analysis

AI-enhanced transcription at SDU (<https://libguides.sdu.dk/nvivo/transskribering>)

- Transcriber via Ucloud (has to be registered in advance, <https://docs.cloud.sdu.dk/Apps/transcriber.html>)
- SDU microsoft 365: 300 min./ month in Word



Process



Questions?



Time for a break



Content Analysis

Content analysis

(Lacy et al., 2015; Mayring, 2000; Riffe et al., 2023)

- All human exchanges involve messages (content) - thus content analysis is particularly important for the study of communication
- Examples include interviews, social media posts, comment sections, news coverage, visual content, lyrics, advertisement etc.
- Systematic approach to reduce large amounts of (communicated) data to meaningful and intersubjectively reliable categories
- Central part: Assigning the data in a rule-based approach to categories
- Can be one part of the grounded theory process (then coding, theory, and recruiting are interwoven)
- Here: Based on pre-existing material and with a set research question or even hypotheses (i.e., more qualitative/ more quantitative forms)

Content analysis

(Lacy et al., 2015; Mayring, 2000; Riffe et al., 2023)

Qualitative content analysis

- Inductive thematic coding
- Developing of themes/ codes based on the text (sometimes starting with the interview guide as starting point)
- Refinement over the process of engagement with the material
- Codebook as the outcome of the process
- E.g., via NVivo

→ Exploratory & theory-developing

Quantitative content analysis

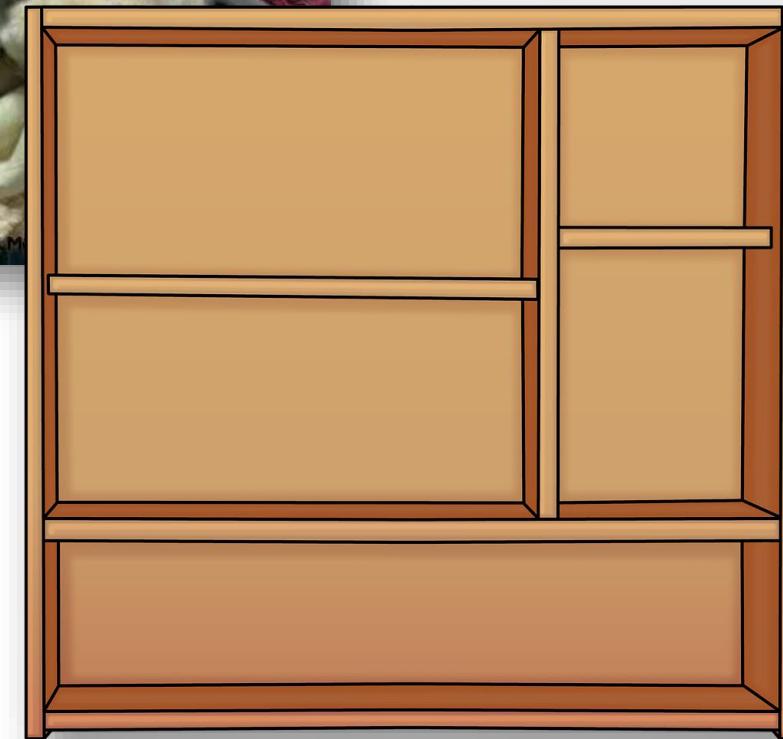
- The systematic assignment of communication content to categories according to rules specified in a coding protocol, and the analysis of relationships involving those categories using statistical methods
- Here you start with the codebook and then assign text to the categories in the codebook – often using 0/1 codes
- E.g., via spreadsheets

→ More theory-testing

Qualitative-oriented content analysis

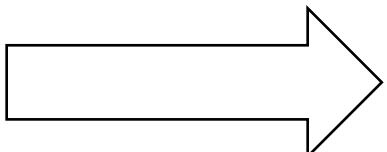
(Mayring, 2000, Riffe et al., 2023)

- Combines the technical expertise of quantitative content analysis (can handle large amounts of material) with a qualitative interpretative approach to capture latent meaning
- Strictly rule-based and therefore highly intersubjectively reliable
- Rules are based on psychological and linguistic theory of everyday text comprehension
- Codebook is developed inductively and then applied to the text



The Codebook

Category	Definition	Anchor example	Boundary



- Very rule-based approach
- Trained coders instead of majority votes (often in computer science)
- Can inform machine-learning/ AI-pipelines

Cup



Bowl

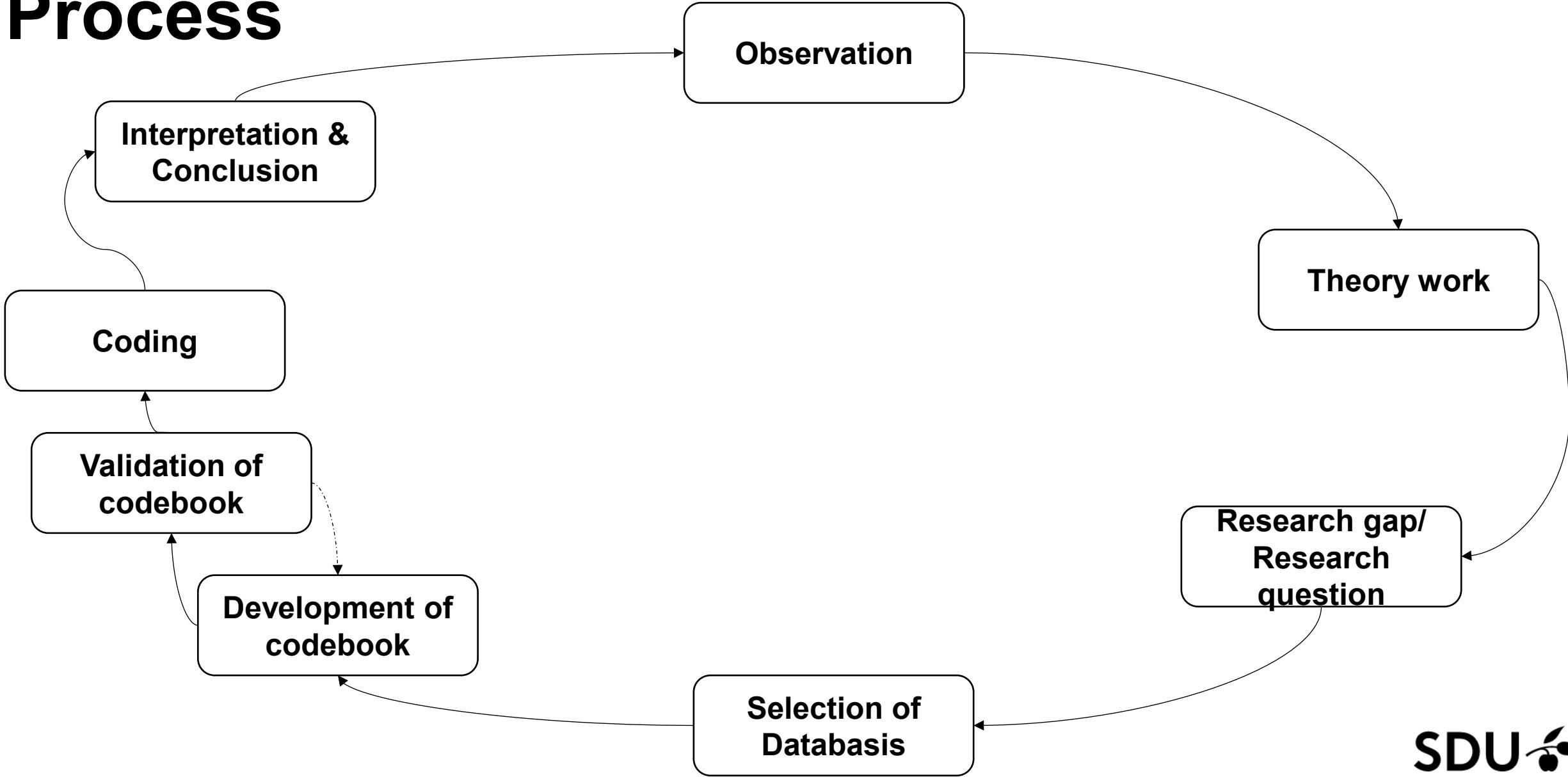


Glass

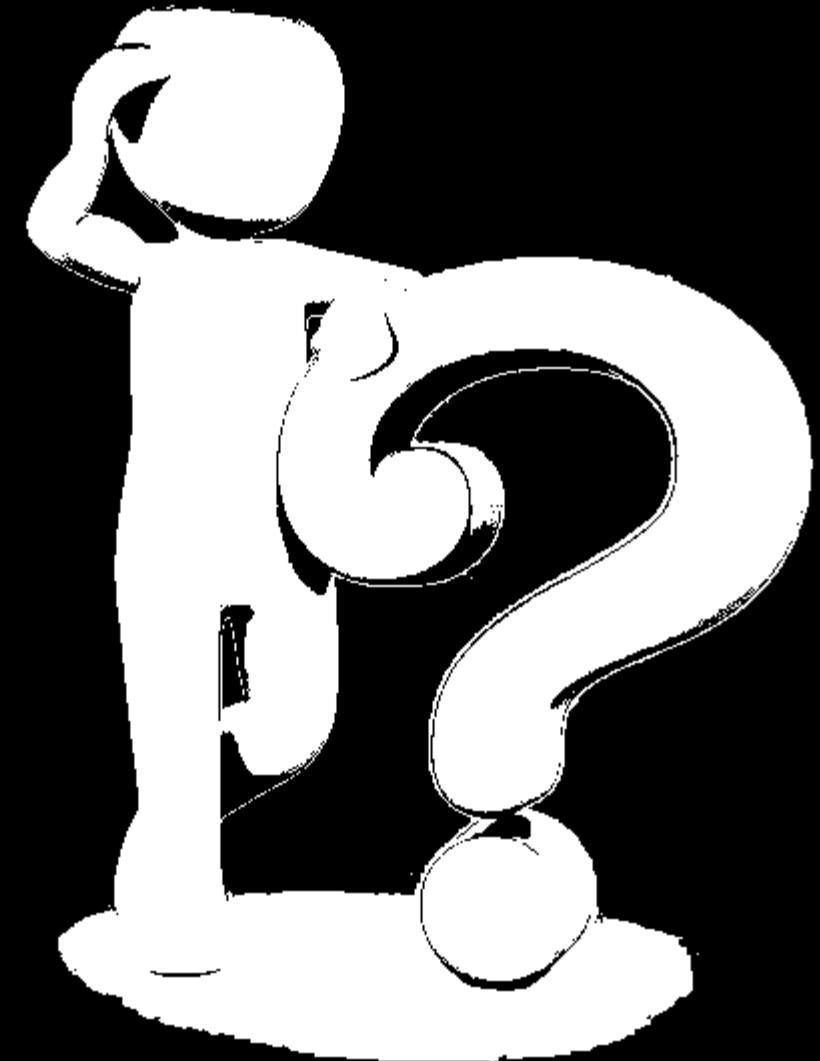
Database

- Define the population of interest (e.g., Danish news coverage)
- Sampling
 - Convenience sampling/ snowball sampling (→ not representative, potentially biased)
 - Purposeful sampling (e.g., theoretical sampling in grounded theory)
 - Stratified sampling (e.g., articles from DR, TV2, Berlingske etc.), ensures that different subgroups are equally represented
 - Random sampling from the population (→ allows for generalisability)
- For qualitative approaches: often ~300 articles/ posts etc. – the more quantitative, the more can be coded
- If the codes should inform machine-learning models more is better

Process



Questions?



Surveys & Experiments

Surveys

(Atkeson & Alvarez, 2018; Brady, 2000, Oberski, 2018, Zieser et al, 2025)

- Quantitative form of asking people for their opinions, feelings, behavioral intentions etc.
- Aims for results that are applicable to a wider population (→ random/ representative samples, avoidance of sampling biases)
- Administration of questionnaires that include measures for the variables of interest
- Nowadays often as either computer-assisted web-interview (great to avoid people not finishing) or self-administered survey (great for anonymity and more honest answers)
- Typically, closed questions (in contrast to interviews)
- Often ordinal or parametric variables (e.g., how much do you like... 1 = not at all, 5 = very much)
- Similar to interviews: The order of question matters for responses and prior questions can influence what people say next

Surveys

(Atkeson & Alvarez, 2018; Brady, 2000, Oberski, 2018, Zieser et al, 2025)

- Formulation of questions is key: Avoid double-barreled questions and negatively formulated questions (do you agree that using this method is a bad idea or not? 1 = disagree, 5 = agree)
- Your participants must understand all the different words in your question and construct the meaning behind it
- Rule of thumb: Find someone else to blame – take measurements that have been tested before (ideally in your context)
- If possible, use direct questions (“Is AI good for society”) instead of more complex agreement statements (“do you agree with the following statement: AI is good for society”) – but be aware of social desirability bias



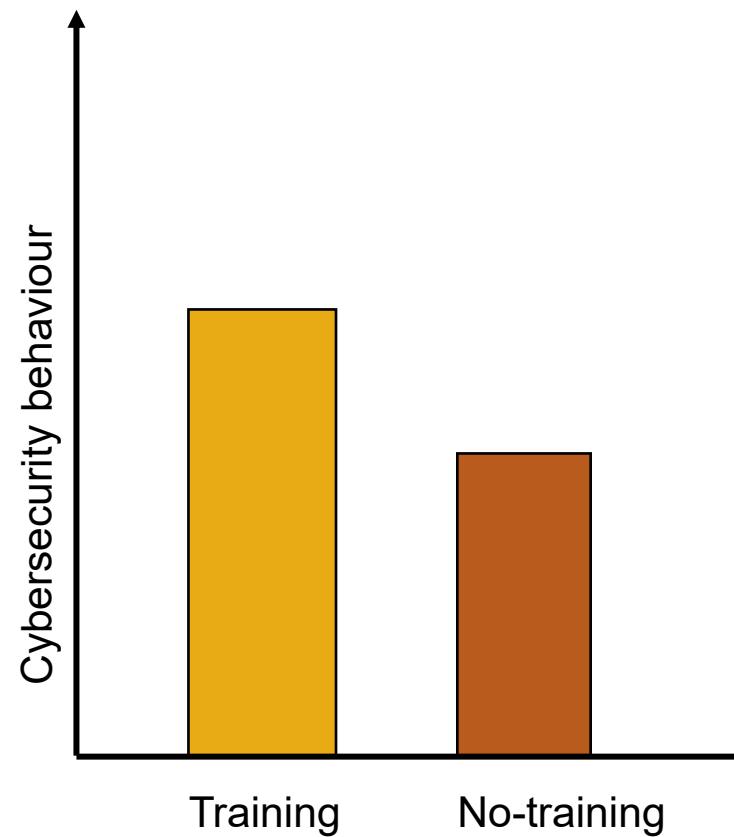
Analyses

- Quantitative, often hypothesis testing
- Typically describing the distributions of the measures of interest (e.g., average AI-literacy, average age)
- Attention: Cross-sectional data does not allow for causal conclusions
- Often focus on correlations (e.g. older people are less literate when it comes to AI)
- Even if predictive models such as regressions are used: No final decision about causal direction!
- However, competing models can be tested to falsify causal assumptions (increase the plausibility that there is a causal process)

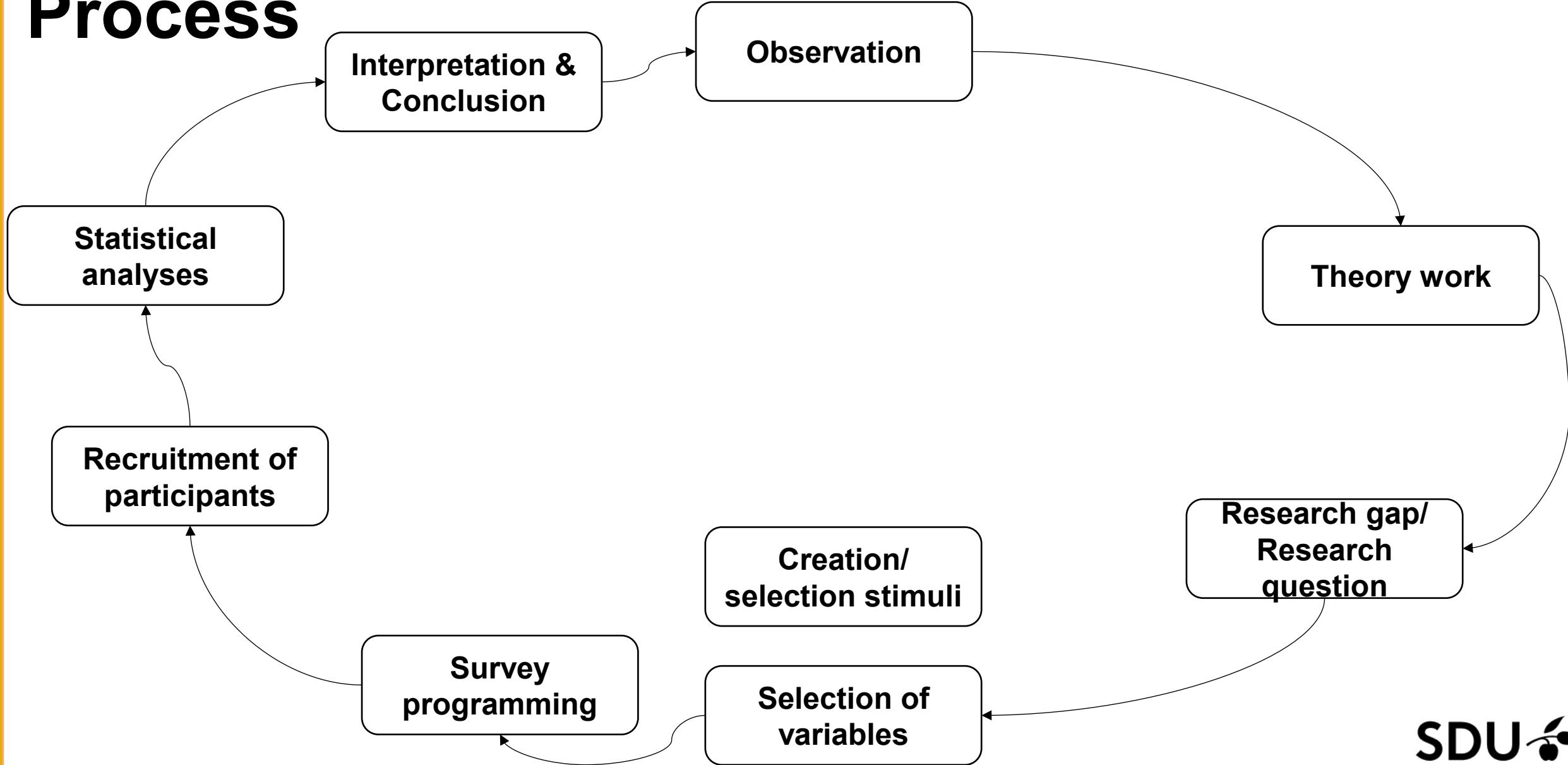
Can be combined with an experiment

(Field & Hole, 2023)

- Last week, we already talked about independent and dependent variables
- Experiments compare at least two groups that differ from each other on the independent variable: Experimental group and control group
- We then measure differences on the dependent variable between these two groups
- Participants should be randomly assigned to these groups
- Groups should be large enough to control for “confounding variables” and to detect the smallest effect size of interest
- If all of this is the case and we observe a statistically significant difference between the groups: causal hypotheses can be retained (if there is no difference – hypothesis is falsified)



Process



**Where do I have to do with
which method?**

Case study: CPH 5 AI start-ups (<https://www.seedtable.com/>)

Easysize

Pricing Case studies Partnerships Blog Company ▾

Book a demo

**Sizing and returns cause problems.
We have the solution.**

Our size and fit recommendation solution is loved by shoppers and fashion brands all over the world.

Works for Shopify and popular e-commerce platforms.

Book a demo FIND IT ON THE Shopify App Store

Your customers will love it.

See how our Fit Quiz product lets shoppers find their perfect size with just a few clicks. No sensitive questions about weight or body measurements and no body scans.

<https://www.easysize.me/>

EasySize

1 Funding Rounds \$10.0K Money raised

Easysize delivers actionable insights into consumer fashion choices.

Industries: Analytics E-commerce Fashion

Location:

Gulnaz K. · 2 · Helping online shoppers buy fashion that fits · Kopenhagen, Hauptstadtregion, Dänemark · Kontaktinfo · 500+ Kontakte · Catherine Marie Lamm Nielsen ist ein gemeinsamer Kontakt.

Info
I'm an entrepreneur, passionate about making fashion more sustainable

Im Fokus

Beitrag: After a stellar Black Friday/Cyber Monday and holiday sales...
Beitrag: In the last few weeks, Shopify announced some major product...
Link: Easysize
Easysize – making fashion more sustainable through data and AI. easysize.me
Easysize predicts the perfect size and fit for fashion online shoppers – for any brand, type of fashion and geo – to boost user confidence, increase sales and reduce returns...
<https://www.linkedin.com/in/iamgulnazk?originalSubdomain=dk>

SDU DDC
digital democracy centre

How human-data could play a role in the build-up phase

- Research question stage
 - How do customers describe their size?
 - Which concepts are familiar to them?
- Hypothesis stage
 - Preferences predict fit
 - Fit reduces returns and increases profit

Research questions stage

- How do people engage with the tool?

The image displays four examples of the Easysize Fit Quiz widget, each highlighting a different feature:

- Clothing and shoes**: A quiz asking "What shoes size do you usually wear?" with options in EUR, UK, and US sizes. It notes that it works for most fashion items, including sportswear and swimwear.
- Multilingual and localised**: A German version of the quiz asking "Was ist die gängigste Jacken Größe in deinem Kleiderschrank?" with options from 2XS to XL. It explains that the widget detects the primary language of the shop and localises content into 11+ languages.
- Internationally minded**: A quiz asking "What dress size do you usually wear?" with options in International (Int), US, and UK sizes. It supports various common size formats.
- Supports unisex**: A quiz asking "What's my size?" and "Which type of sizing do you prefer?", with options for Men's and Women's sizing.

<https://www.easysize.me/>

Now it's your turn

- Get back to your research ideas from last week
- Which methods would you choose and why?

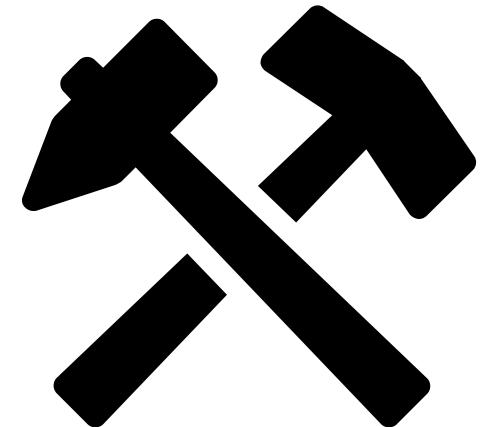
Questions?



Then I hope,

You now...

- ...know what the differences between qualitative and quantitative research methods
- ...have gotten to know four prominent methods for working with human data
- ... can make informed decisions to choose a methodological approach to answer your research question/ test your hypothesis
- Bring your ideas next week – tomorrows' session is cancelled



AI 507 – Research seminar AI & Society

**Have a wonderful rest of
the day!**

Associate Prof. Dr. Lena Frischlich

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