

# gesis

Leibniz Institute  
for the Social Sciences



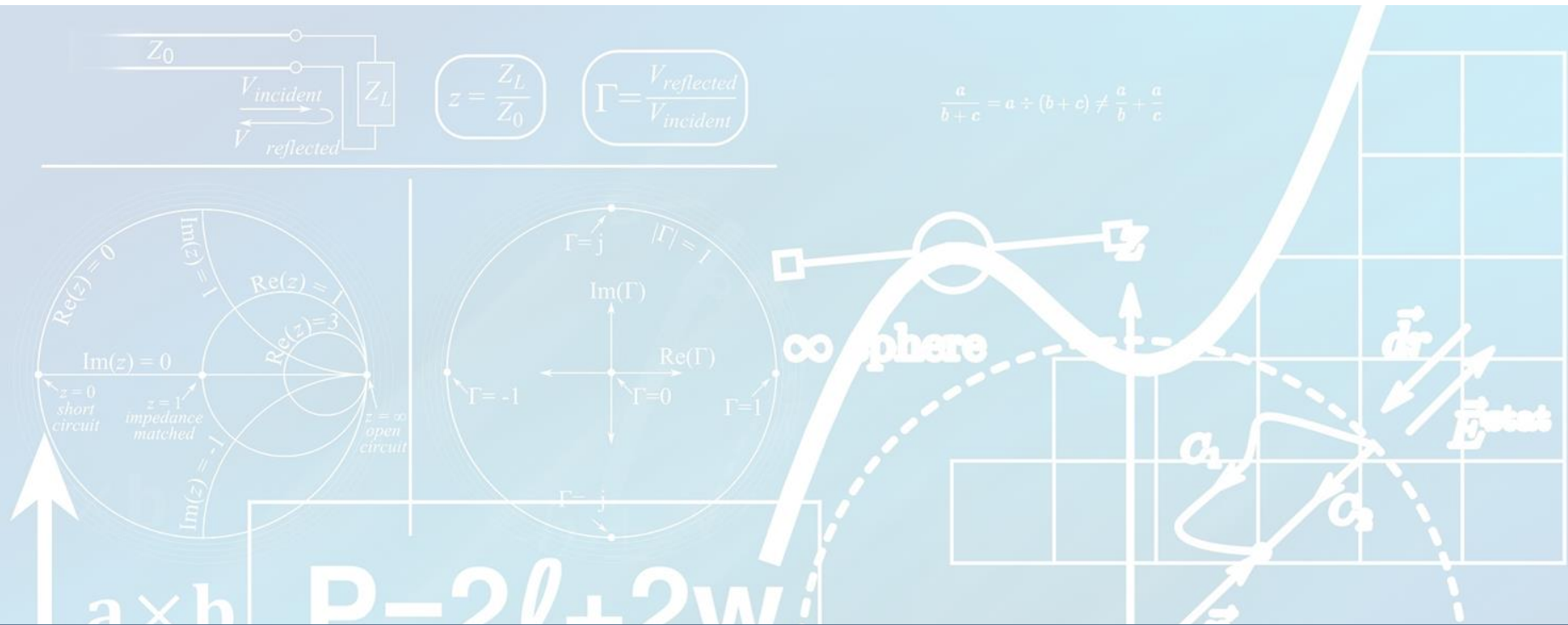
## Supplementary Material

### Die Fakten dicke! Der GESIS Podcast #1

*„Andere Wissenschaften haben auch schöne Daten“*

*November 2020*

*Lydia Repke & Johanna Dölken*



# The Philosophy of Science

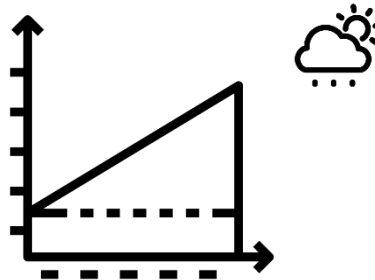
$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

# Hypotheses and Variables

## Hypothesis

is a statement that postulates a relationship between at least two variables.

*e.g., “In summer it is warmer than in winter.” (relationship between temperature and season)*



## Variable

is a name for the set of characteristic values that are assigned to objects.

*e.g., temperature and season*

# Laws and Theories

## Law

is a statement that has already proven itself many times in reality. It is structurally similar to hypotheses.

*e.g., Law of Gravitational Force*



## Theory

is a system of statements that includes several hypotheses or laws.

*e.g., Rational Choice Theory*

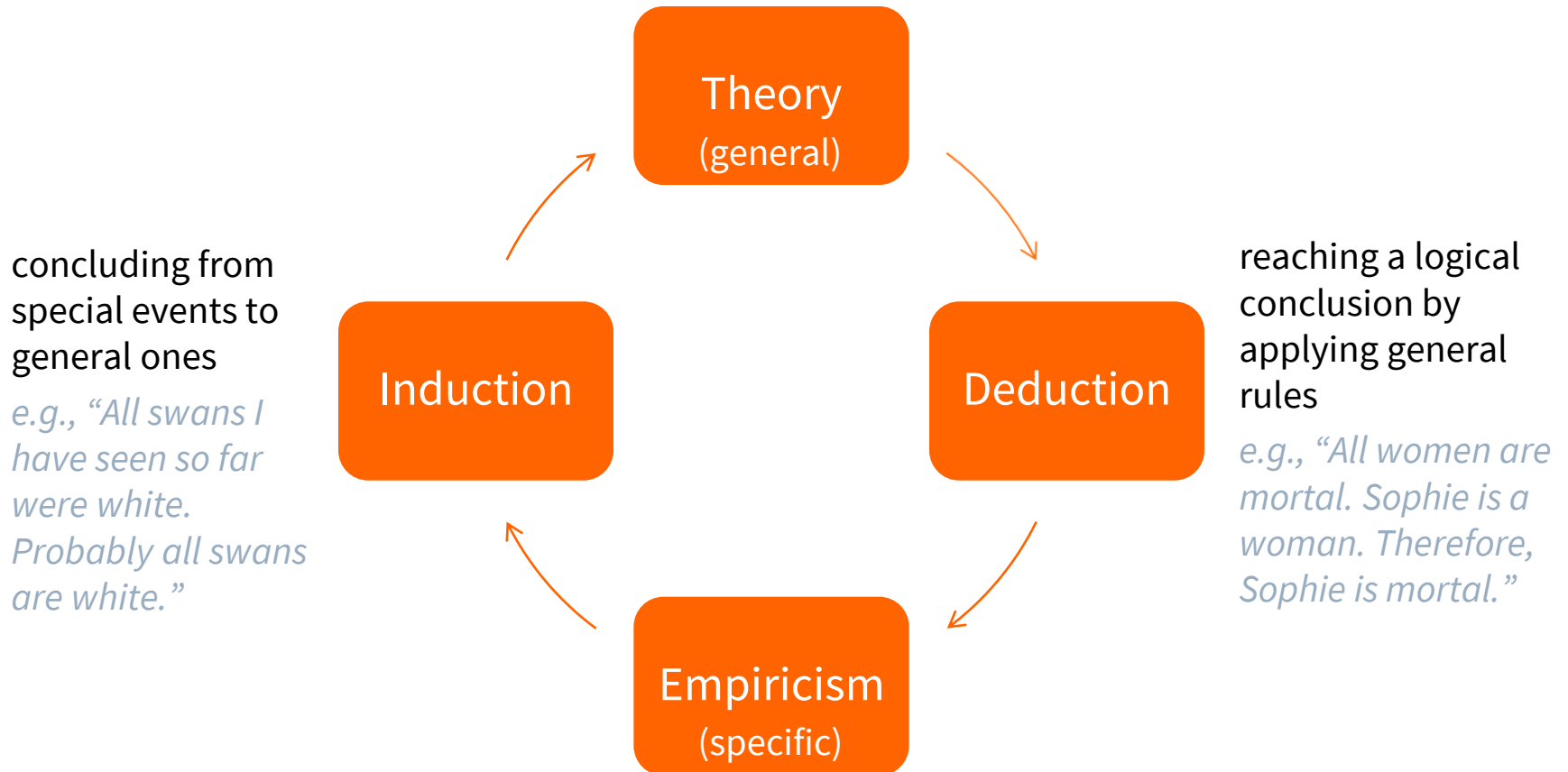
# Scientific Explanation



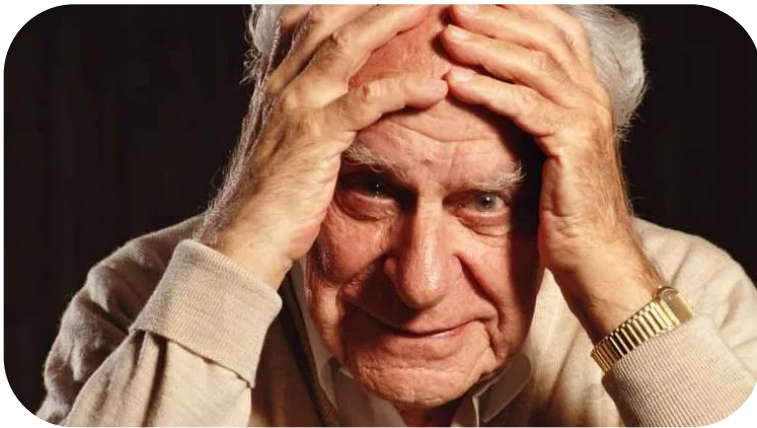
## **Explanation**

has a clear structure of argumentation, is logically correct, and empirically founded.

# The Logic of Reasoning I



# The Logic of Reasoning II



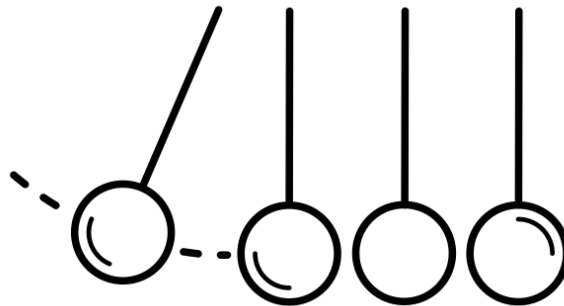
Karl Popper (1902-1994)

## The Falsification Principle

A hypothesis can never be verified, it can only be falsified.

*e.g., “I can never be sure that all swans are actually white since I cannot check them all.”*

# Causality



A law or a hypothesis postulates a **causal link** between two events or states in form of a cause-and-effect relationship.

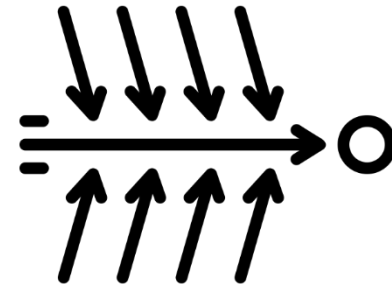
*e.g., “Smoking cigarettes causes lung cancer.”*

Causality in itself is not observable or testable.

A relationship can be interpreted as causal when several criteria are met.

# Criteria for Causality

A **relationship** between cause and effect can be assumed to be **causal** if (Hill, 1965):



- The relationship is **strong**.
- The relationship can be found in **different** research **contexts** in different **populations**.
- The **cause precedes** its effect in time.
- A **plausible mechanism** can be specified that underlies the causal relationship.
- There should be a **monotonous function** between cause and effect (the more A, the more B).

# Data in the Social Sciences

# Types of Data

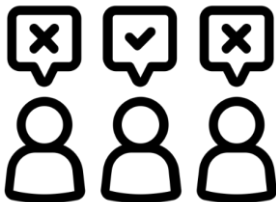
## Data

is the attribution of numbers to objects or events.



## *Qualitative Data*

- Gathered through open interviews or focus groups
- To develop ideas or hypotheses



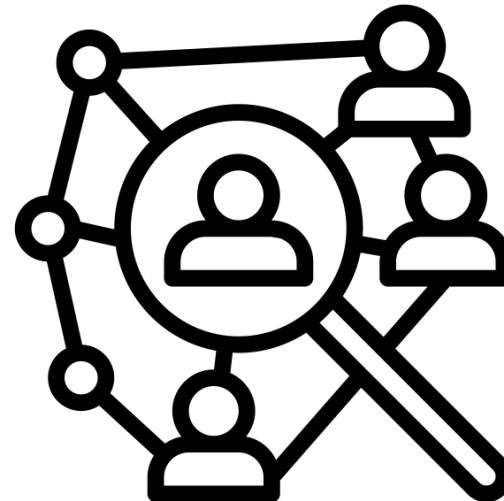
## *Quantitative Data*

- Gathered through standardized surveys, observation, or experiments
  - To test hypotheses

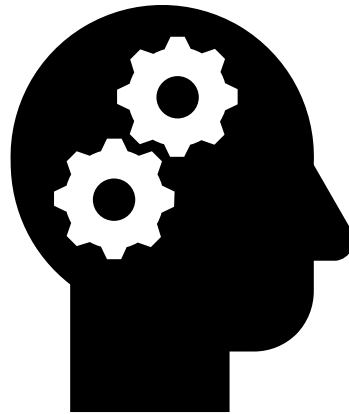
# The Social Sciences I

The **Social Sciences** comprise a number of disciplines devoted to the study of societies and the relationships among individuals in these societies.

- Sociology
- Political science
- Social psychology
- Economics
- Anthropology
- Communication studies
- ...



# The Social Sciences II



## Social Sciences

are interested in extracts of **social reality**

*e.g., behaviors or attitudes*

that cannot be measured like temperature but need to be measured  
through carefully designed **measurement instruments**.

*e.g., survey questions*

# Surveys

## Survey

is a *systematic method* for data collection on humans using questionnaires.



e.g.,

the General Population Survey (ALLBUS), **ALBUS**

the GESIS Panel, 

the European Social Survey (ESS), 

the International Social Survey Programme (ISSP), 

the European Values Study (EVS),  European **Values** Study

the German Longitudinal Election Study (GLES), 

the Programme for the International Assessment of Adult Competencies (PIAAC)



# From Concept to Measurement

## Concept of interest

theoretical term, not directly observable *(e.g., religiosity, identity)*

## Concept specification

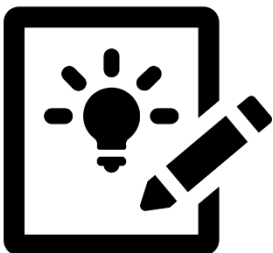
defining the concept we want to measure and specifying its dimension(s)

*(e.g., religiosity is the religious orientation and the involvement with religion)*

## Operationalization

translating the concept into a set of specific operations and procedures that are suitable to empirically capture the concept's meaning

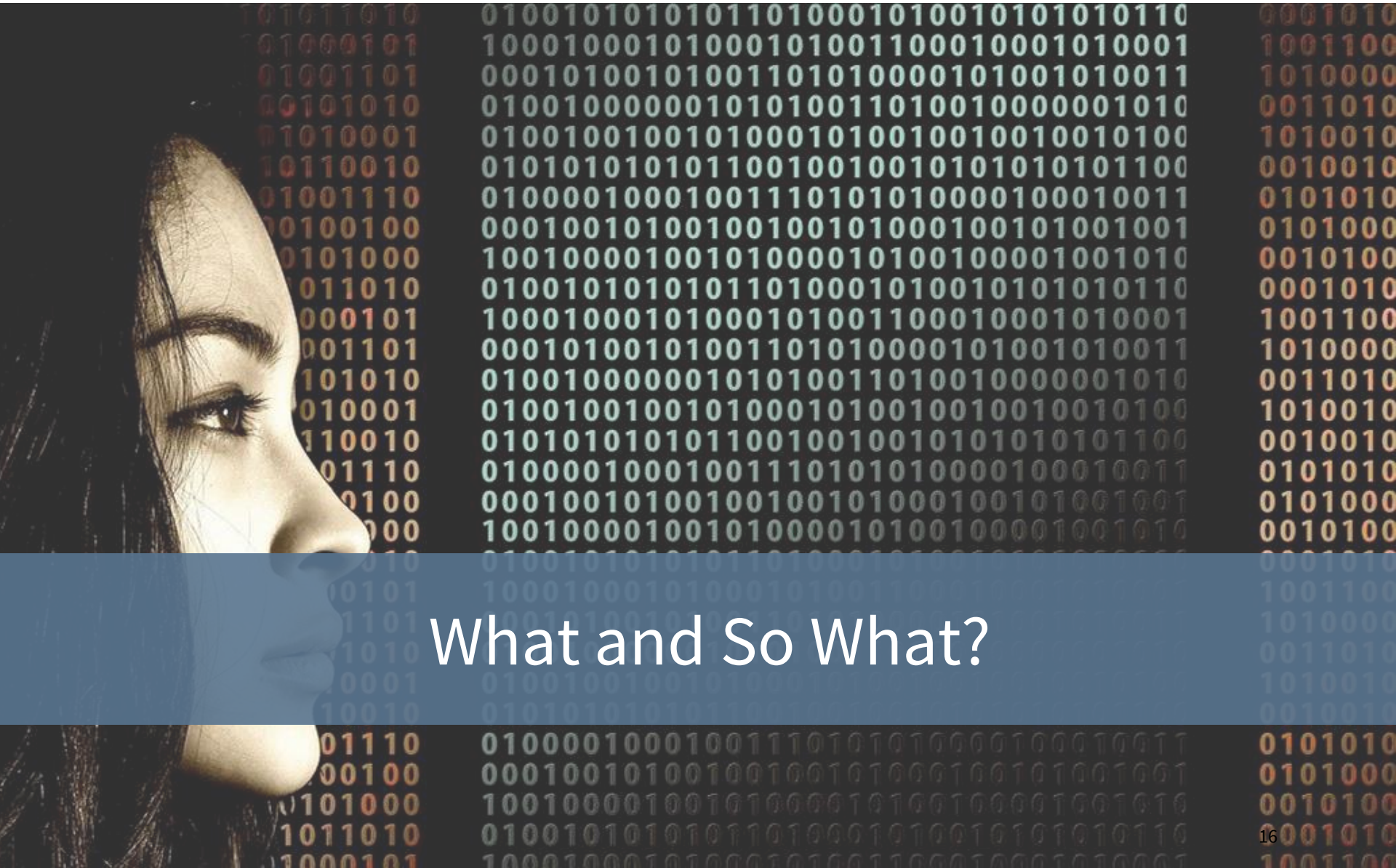
*(e.g., frequency of church attendance, frequency of praying, type of religion believed in)*



## Measurement

assigning numbers to objects according to defined rules in a way that a structurally accurate mapping is created

*(i.e., low/high values reflect low/strong religiosity)*

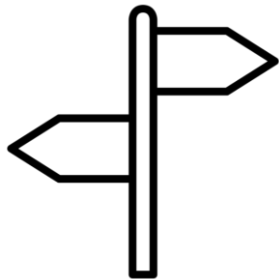


# What and So What?

# Science and Society

## What

describes what science wants to know and refers to the basic scientific knowledge



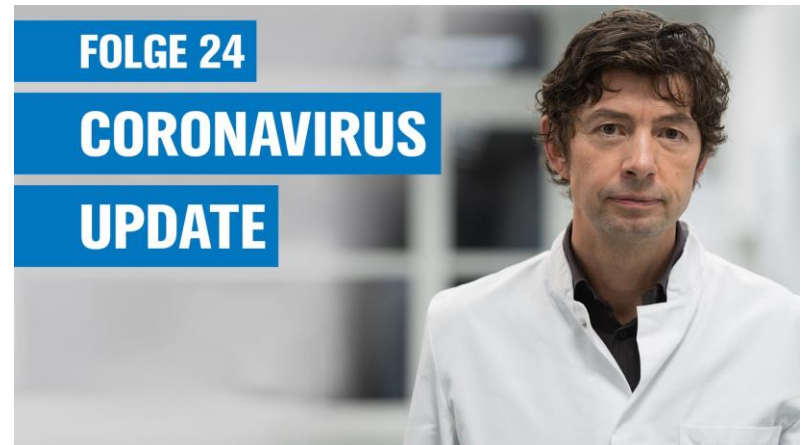
## So what

refers to what society wants to know and includes specific recommendations for actions

# Media Mentioned in the Podcast



MaiLab: „Virologen-Vergleich“  
(<https://www.youtube.com/watch?v=u439pm8uYSk>)



Episode 24 of the NDR-Podcast  
„Corona-Update“ with Christian  
Drosten  
(<https://www.ndr.de/nachrichten/info/24-Coronavirus-Update-Wir-muessen-weiter-geduldig-sein,podcastcoronavirus166.html>)

## For Further Inspiration



MaiLab: „Wissenschaftler irren“ (<https://www.youtube.com/watch?v=DHyRaUeHcGY>)



# References and Sources

# References

- Diekmann, A. (2007): Empirische Sozialforschung. Grundlagen, Methoden, Anwendungen. Rohwolt.
- <https://www.gesis.org/en/institute>
- <https://www.gesis.org/institut/digitale-verhaltensdaten>
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- <https://wirtschaftslexikon.gabler.de/definition/sozialwissenschaften-52181/version-275327>, Revision von Sozialwissenschaften vom 19.02.2018
- <https://www.youtube.com/watch?v=DHyRaUeHcGY>
- <https://www.youtube.com/watch?v=u439pm8uYSk>
- <https://www.ndr.de/nachrichten/info/24-Coronavirus-Update-Wir-muessen-weiter-geduldig-sein,podcastcoronavirus166.html>

# Icon Sources



<https://www.gesis.org/en/institute>



<https://www.gesis.org/en/research>



variable by ArmOkay from the Noun Project



Variable Weather by Slavko Janjic from the Noun Project



theory by Nithinan Tatah from the Noun Project



explanation by Adrien Coquet from the Noun Project



Cause Effect by Olena Panasovska from the Noun Project



priyanka from Noun Project



interview by Matthias Hartmann from the Noun Project



Adrien Coquet from Noun Project



social science by Becris from the Noun Project



Microsoft PowerPoint



Survey by Michael Thompson from the Noun Project



BomSymbols from Noun Project



faisalovers from Noun Project



concept by Adrien Coquet from the Noun Project

# Image Sources



Gerd Altmann from Pixabay



<https://mylifeandrhymes.wordpress.com/2013/08/30/karl-popper-and-the-falsifiability-criterion/>



Lennart Demes from Pixabay



Gerd Altmann from Pixabay



<https://www.ndr.de/nachrichten/info/24-Coronavirus-Update-Wir-muessen-weiter-geduldig-sein,podcastcoronavirus166.html>



<https://img.youtube.com/vi/DHyRaUeHcGY/maxresdefault.jpg>



<https://img.youtube.com/vi/u439pm8uYSk/maxresdefault.jpg>



Gerhard G. auf Pixabay

# Enjoy (social) data(ing)!

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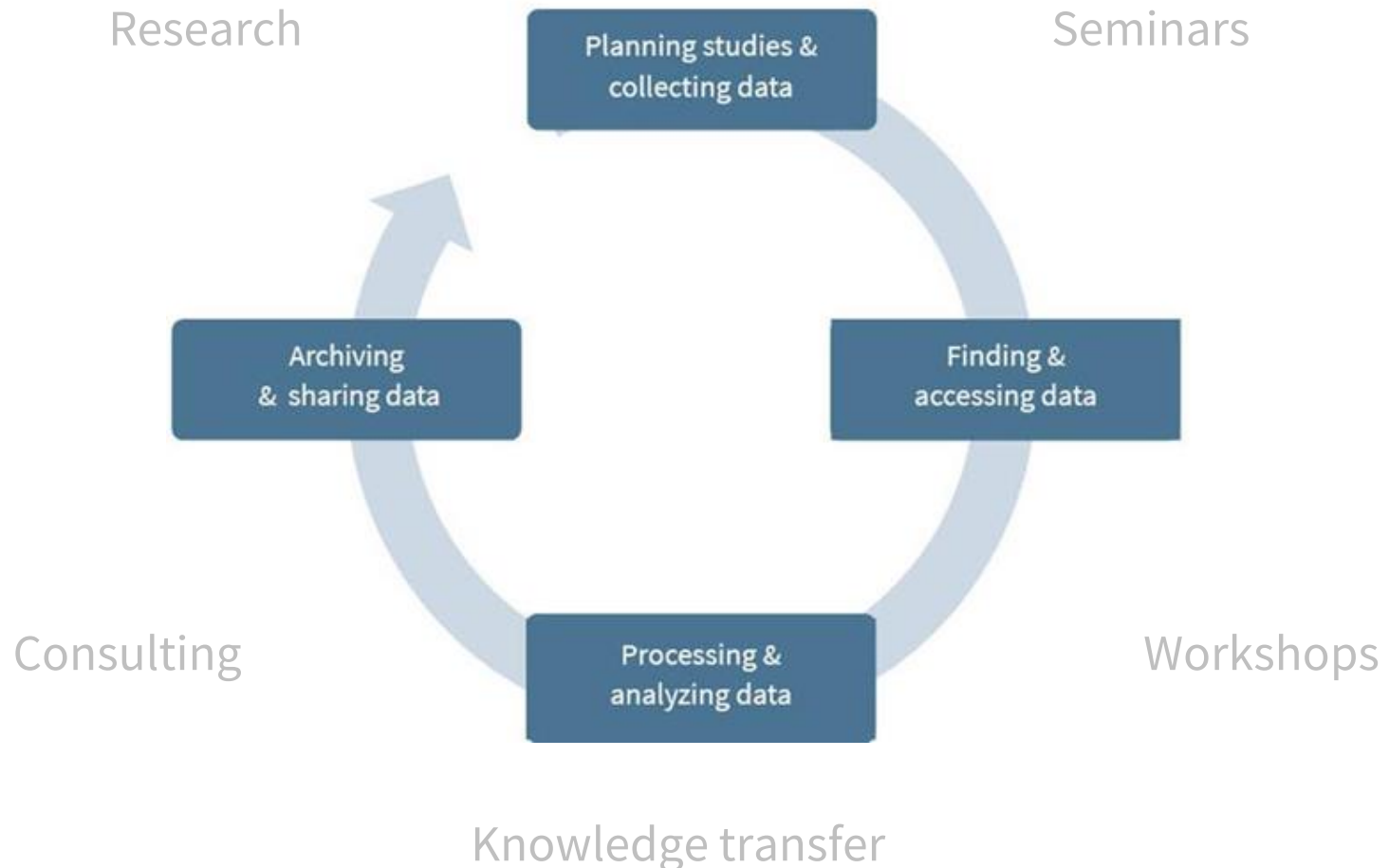
# About GESIS – Leibniz Institute for the Social Sciences

# GESIS

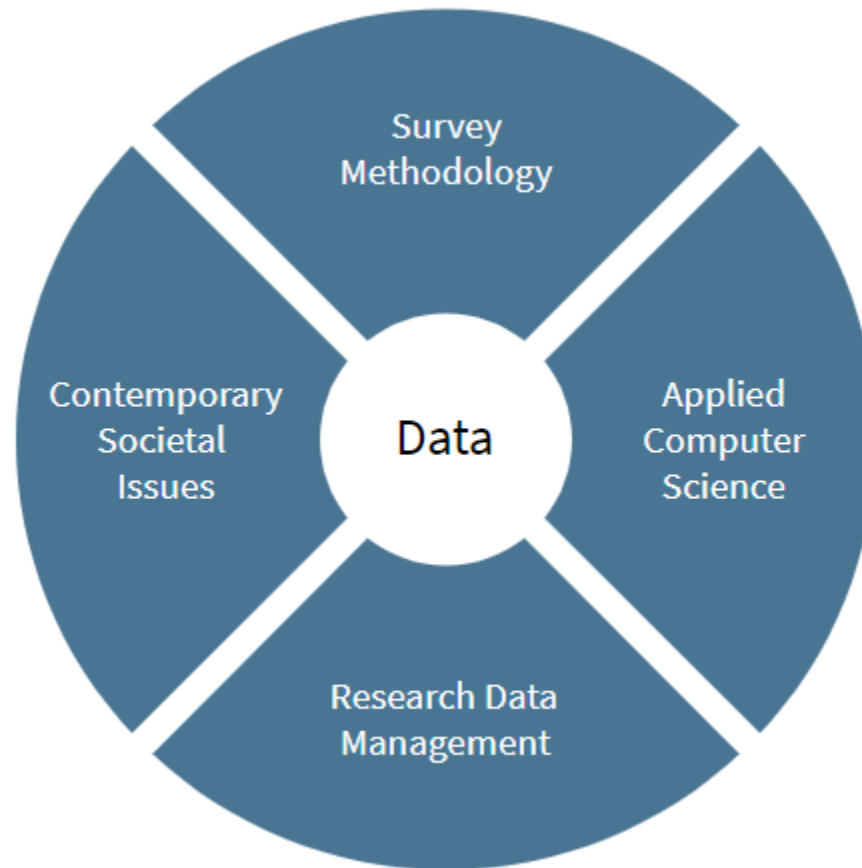
- ... is the largest European infrastructure facility for the social sciences
- ... provides research-based services throughout all stages of quantitative empirical social research projects



# GESIS' Infrastructure Services



# Interdisciplinary Research at GESIS



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