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UNIVERSITÀ DEGLI STUDI DI BERGAMO

# Missione 4 Istruzione e Ricerca

## Rethinking, Understanding Modal Particles (RUM)

# Multimodal Profiles of Modal Particles
## Tracking *schon* in German Political Discourse

Paula Rebecca Schreiber (Università degli Studi di Bergamo)

2025-09-24

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# Multimodal Profiles of Modal Particles
## Tracking *schon* in German Political Discourse

das habe ich eben **schon** mal erwähnt

*I've **already** mentioned that once before*

[ConcRUM_6097]

temporal reading

und da sind wir auf einem kleinen Weg irgendwo **schon** am Wegesrand stehen geblieben

*and at **some point** along a small path we ended up stopping by the side of the road*

[ConcRUM_2239]

scalar reading

das BSI schon irgendwie richten wird

*the BSI will **surely** sort it out somehow*

[ConcRUM_3493]

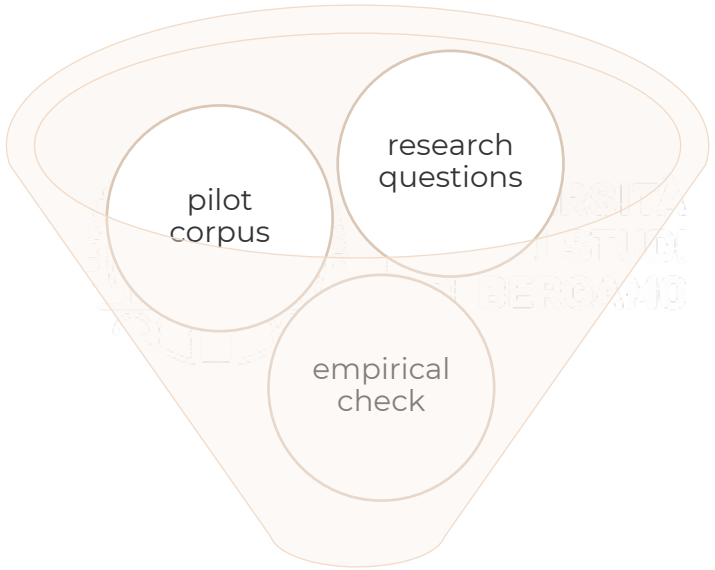
modal reading

The polyfunctionality of ***schon*** and its readings

# Outline

- The German Bundestag Dataset
- Corpus-Driven Analysis of Frequency & Collocation
- From Data to Multimodal Annotation
- Towards Cross-Linguistics Multimodal Analysis

# The German Bundestag Dataset




constraints ⇄ corpus refinement ⇄ data sources

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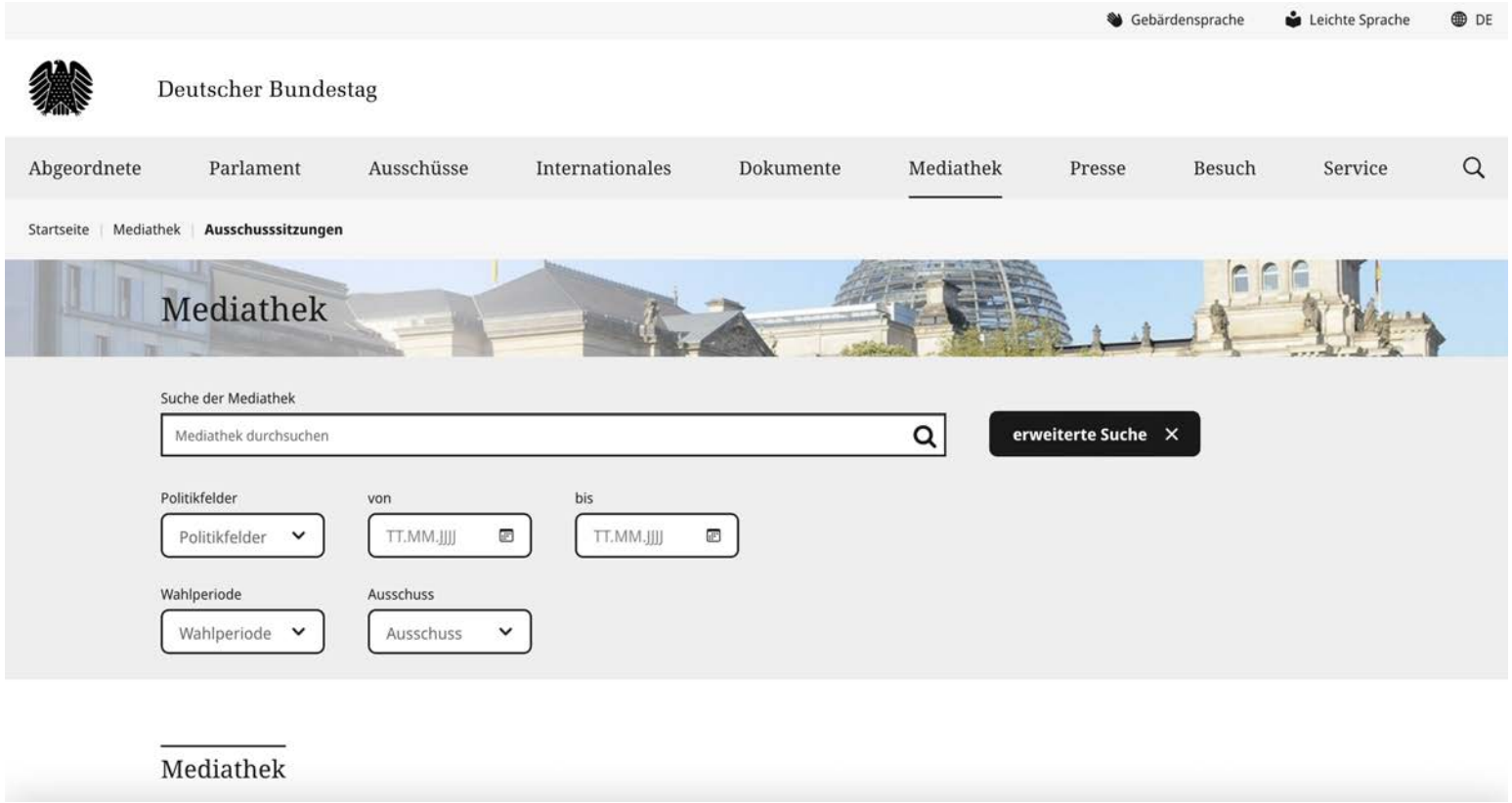


- source: **German Bundestag Mediathek**
- openly accessible
- educational/research use permitted
- download formats: multiple qualities available
- chosen format: .mp4
  - stable
  - annotation-friendly
  - space-efficient

URL: https://www.bundestag.de/mediathek/ausschusssitzungen [2025-09-18]

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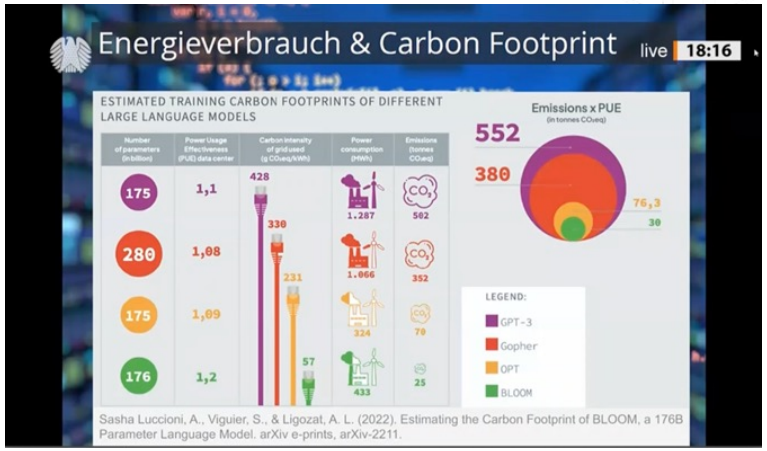
# The German Bundestag Dataset


roundtable arrangement


auditorium setup




presentation mode


honorary guest arrangement

URL: https://www.bundestag.de/mediathek [2025-09-22]

# The German Bundestag Dataset

**Type**: Committee meetings
**Video material**: 186 recordings
**Duration**: 301 hours, 40 minutes, 05 seconds
**Timeframe**: January 1, 2024 – December 31, 2024
**Tokens**: 2.476.276
**Types**: 94.103
**Potential occurrences**: 85.170

**Automated Speech Recognition** (ASR)
**Model**: Whisper large-v3
**Layers**: 32
**Width**: 1280
**Heads**: 20
**Parameters**: 1550M

| auch | bloß | denn | doch | eben | halt | ja | mal | nur | schon |
|---|---|---|---|---|---|---|---|---|---|
| 44.712 | 37 | 2.884 | 1.417 | 4.837 | 409 | 8.335 | 9.092 | 5.981 | 7.466 |

**Table 1**: Token counts of particles with potential modal function

# The German Bundestag Dataset

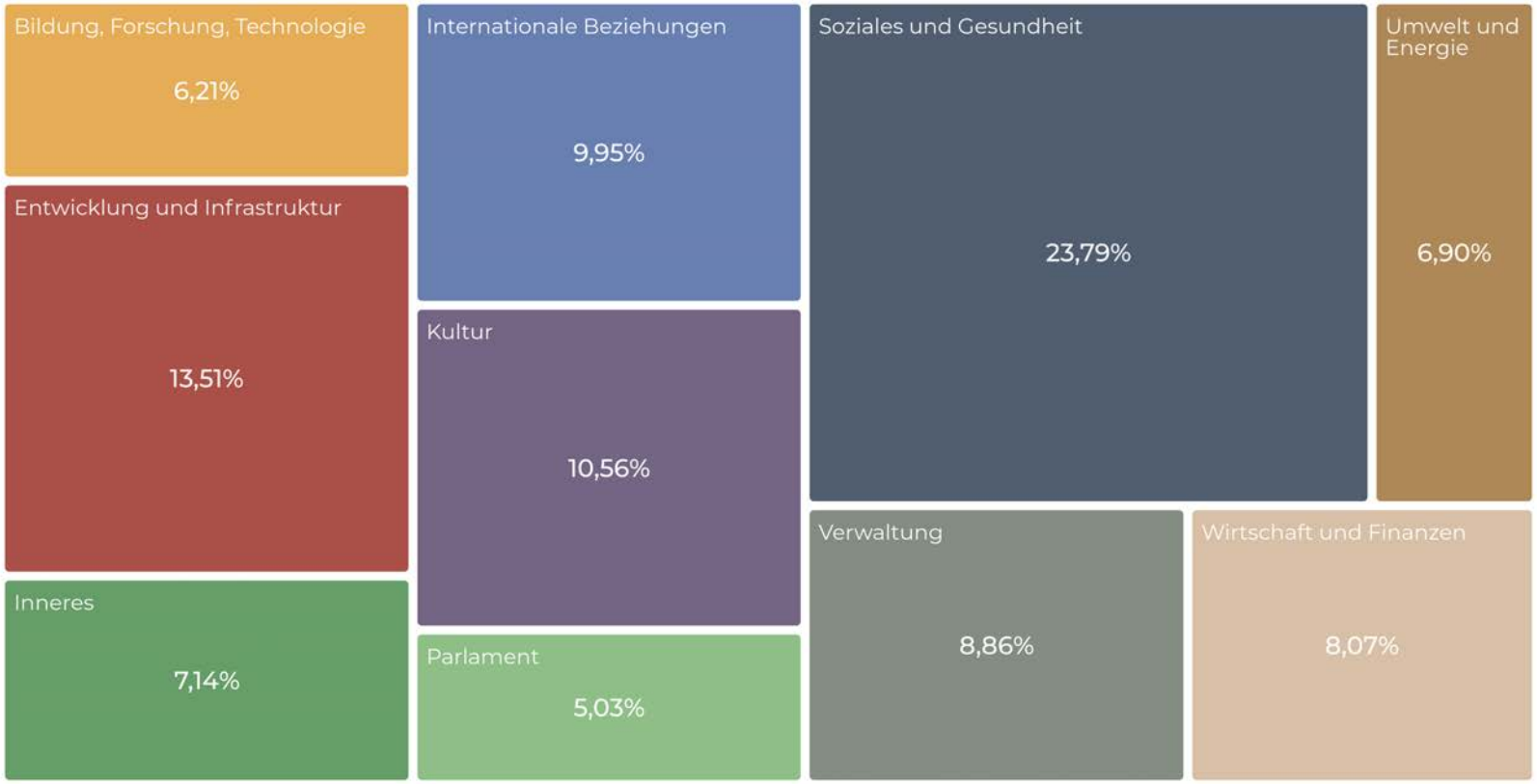



**Figure 1:** Distribution of committee meetings from the German Bundestag corpus across thematic domains (percentages)

# Corpus-Driven Analysis of Frequency & Collocation

- quantitative approach (Gries 2025)
- core measures
  - **frequency**
  - **association**
- bootstrapping to address statistical uncertainty (Gries 2022)
  - confidence intervals from repeated resampling
  - provides robust estimates, not just point values
- collocation profiles
  - advanced filtering
  - case analysis
  - multimodal annotation

# Corpus-Driven Analysis of Frequency & Collocation

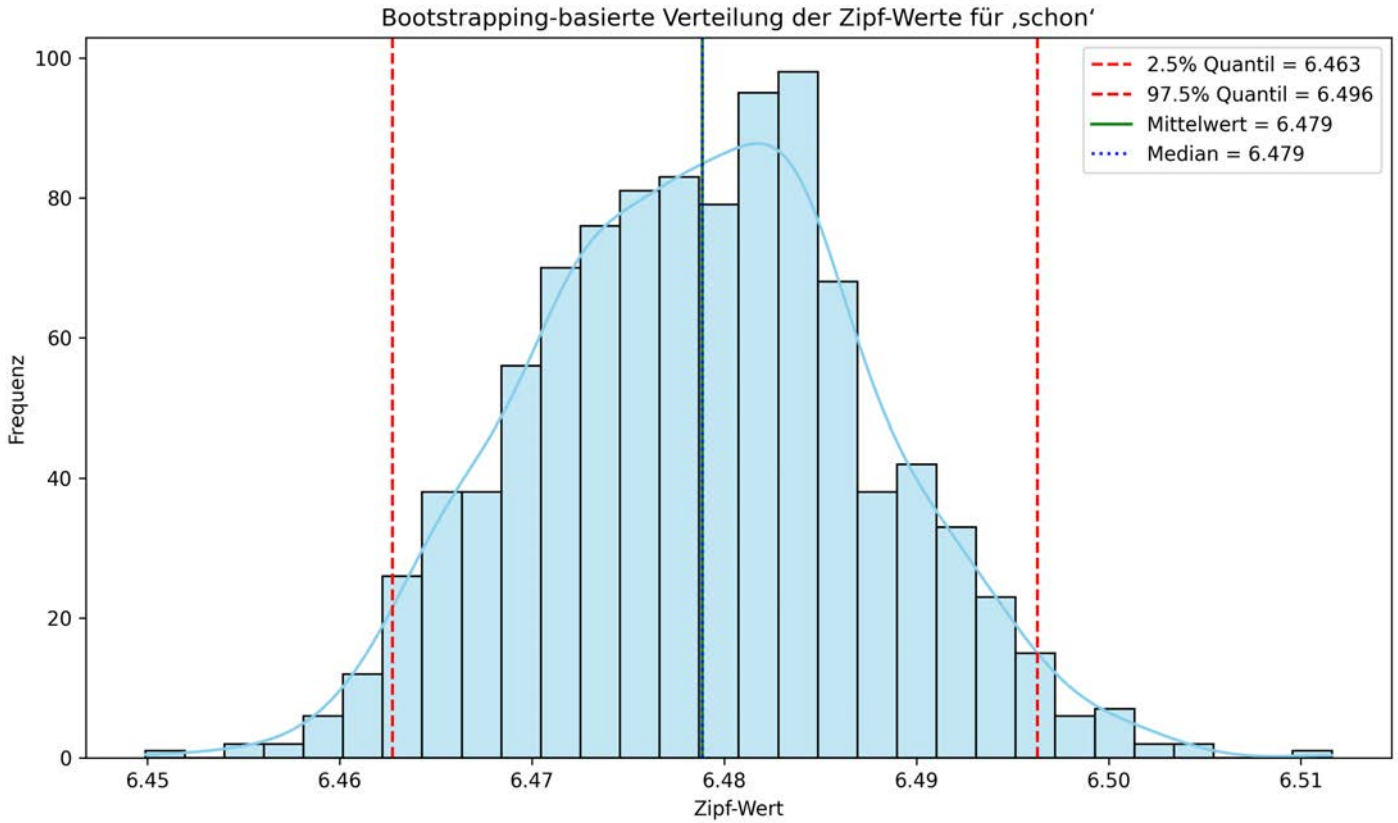



**Figure 2:** Zipf value distribution of ***schon*** with 95% confidence interval (1,000 resamples)

# Corpus-Driven Analysis of Frequency & Collocation

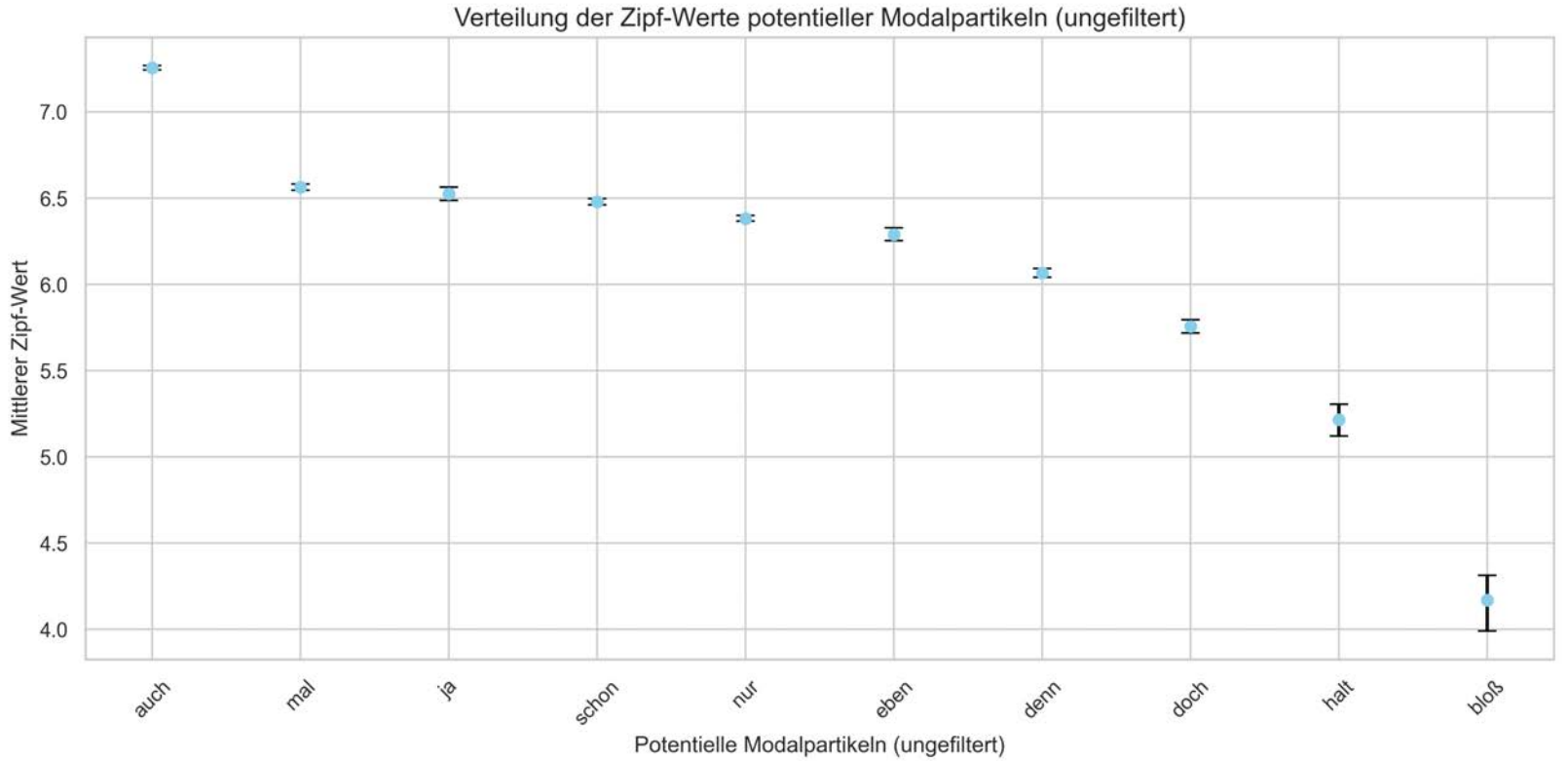



**Figure 3:** Mean Zipf values and 95% confidence intervals of potential modal particles (1,000 resamples)

## Corpus-Driven Analysis of Frequency & Collocation

- corpus segmented into bigrams (pairs of consecutive tokens)
- target word: ***schon***
  - L1 = immediately preceding collocate
  - R1 = immediately following collocate
- association strength measured with:
  - log-likelihood (LL) from 2×2 contingency tables (Gries 2016, 2025)
  - directional association measures (ΔP): ΔP(X|schon) and ΔP(schon|X)
- distinguishes symmetrical vs. asymmetrical collocational attraction
- null cells (0 values) explicitly marked as “not computable”

# Corpus-Driven Analysis of Frequency & Collocation

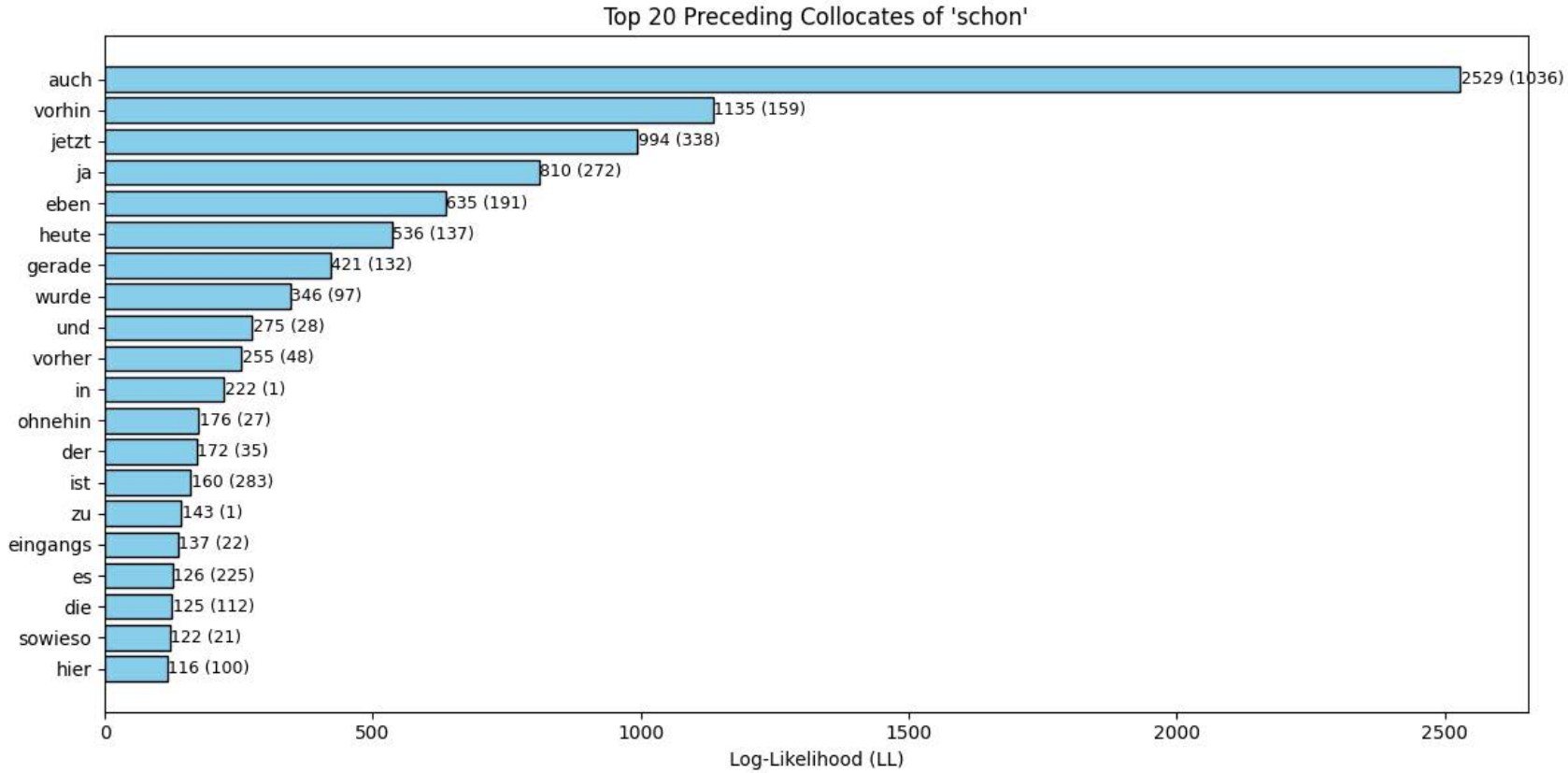



**Figure 4:** Preceding collocates of ***schon*** (ranked by LL values)

# Corpus-Driven Analysis of Frequency & Collocation

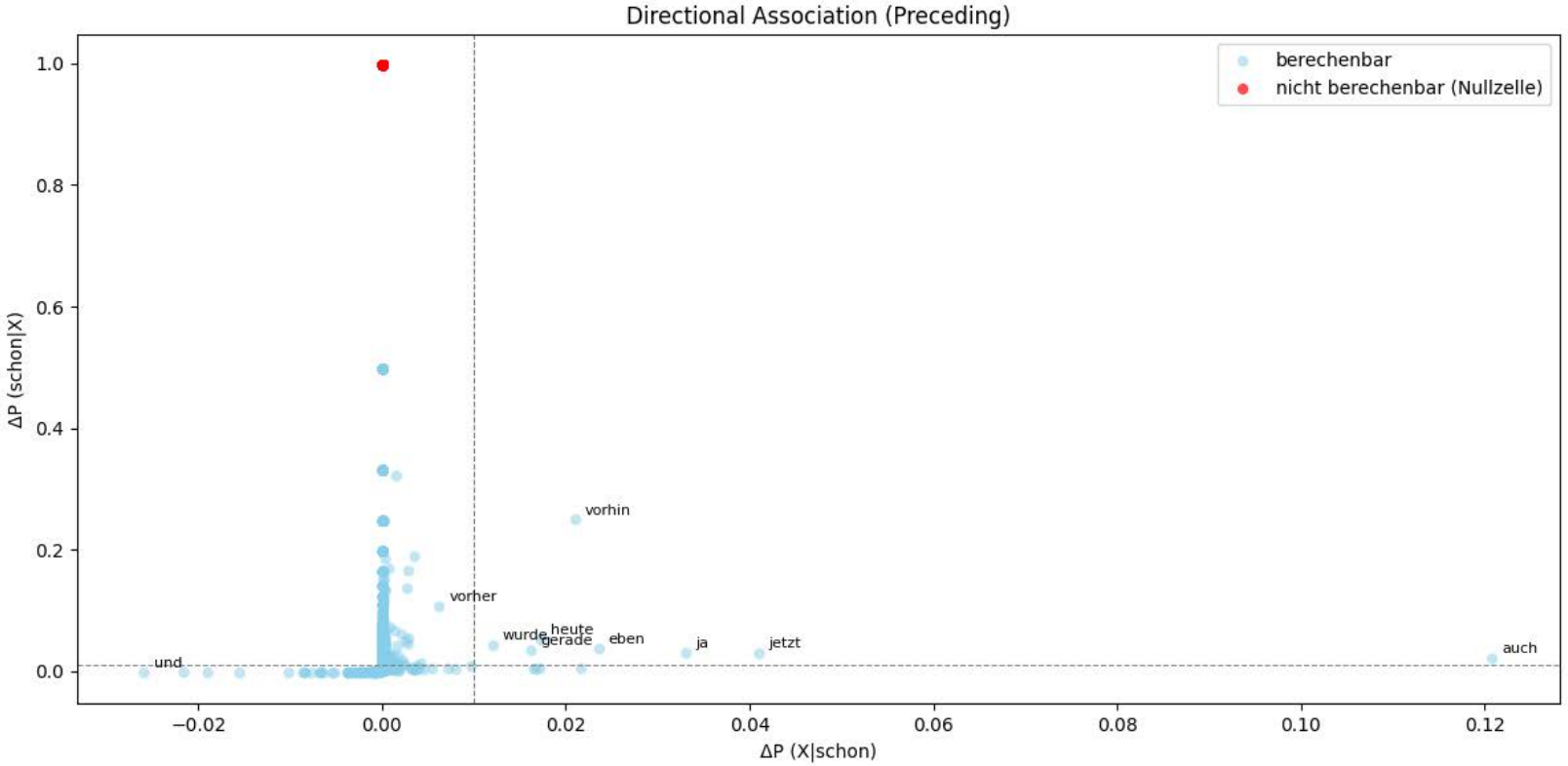



**Figure 5:** Association profile of ***schon*** and its preceding collocates

# Corpus-Driven Analysis of Frequency & Collocation

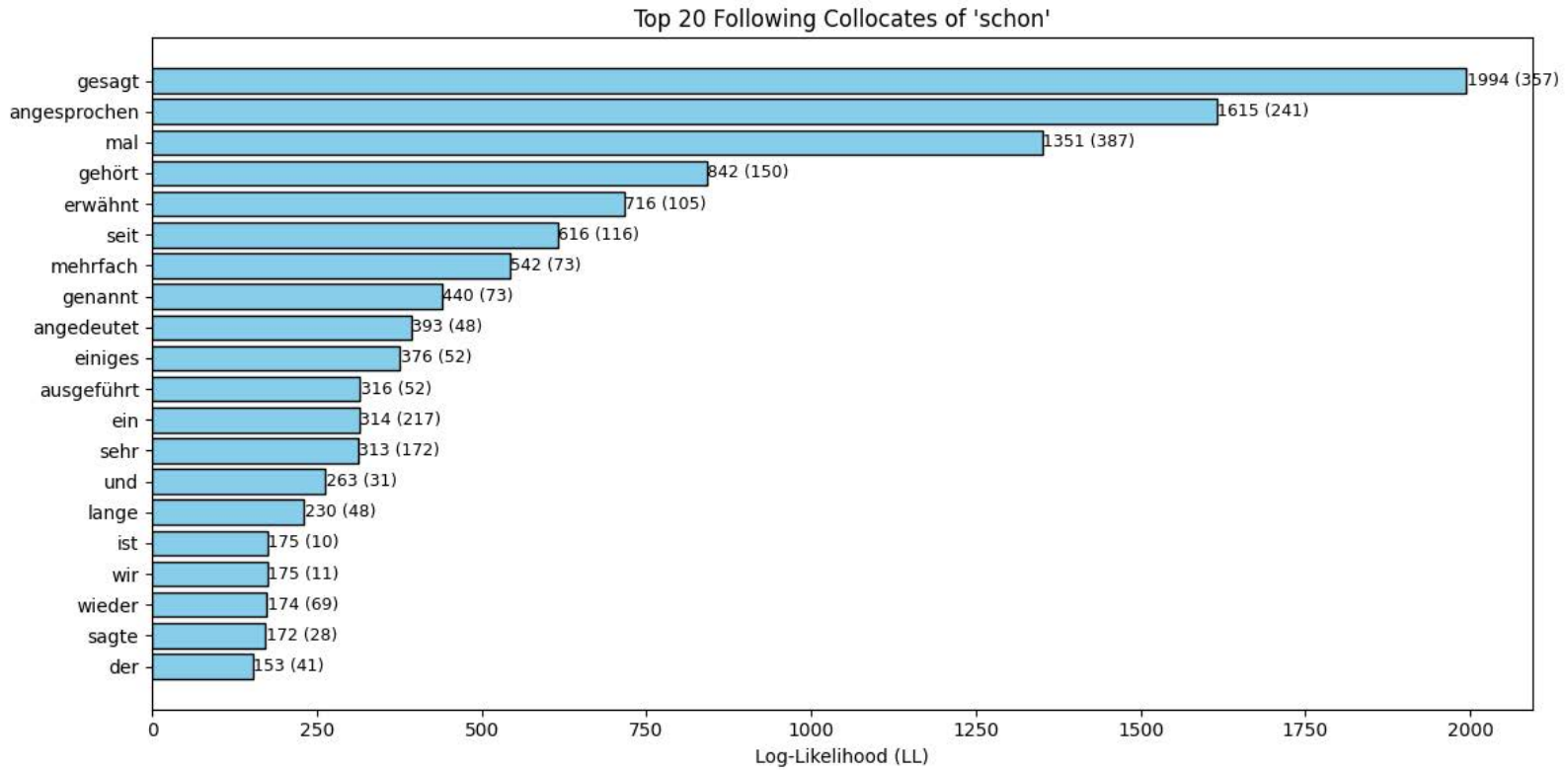



**Figure 6:** Following collocates of ***schon*** (ranked by LL values)

# Corpus-Driven Analysis of Frequency & Collocation

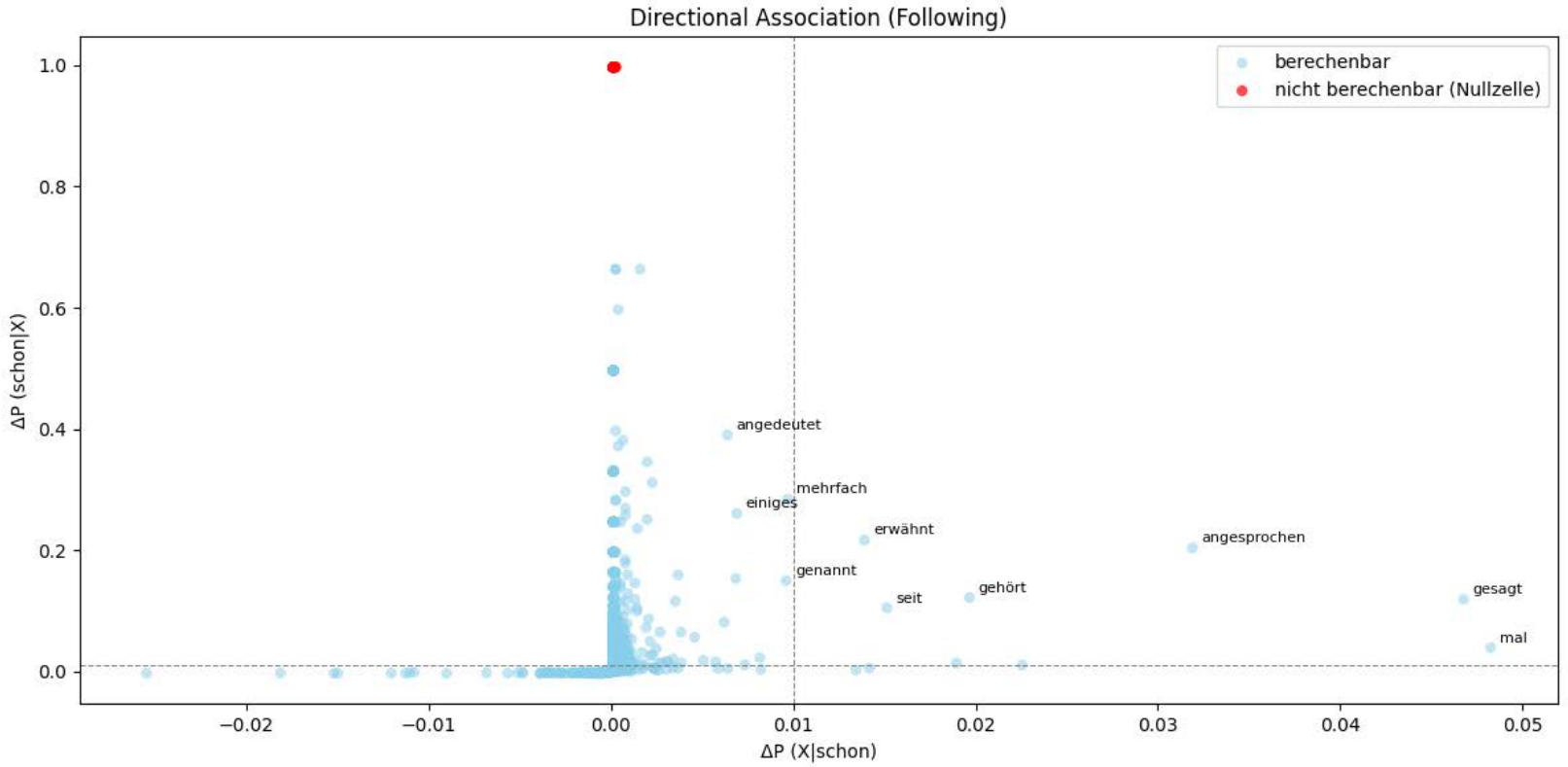



**Figure 7:** Association profile of ***schon*** and its following collocates

# Corpus-Driven Analysis of Frequency & Collocation

| ID_Collocation | Collocation | a (schon & X) | total_schon | total_X | LL | ΔP (X\|schon) | ΔP (schon\|X) |
|---|---|---|---|---|---|---|---|
| IDU1_0001 | ('auch', 'schon') | 1036 | 7463 | 44711 | 2529,22 | 12,1% | 2,0% |
| IDU2_0436 | ('schon', 'auch') | 110 | 7466 | 44711 | 5,80 | -0,4% | -0,1% |

**Table 2**: Association values for ***auch schon*** and ***schon auch*** presented in comparative table form

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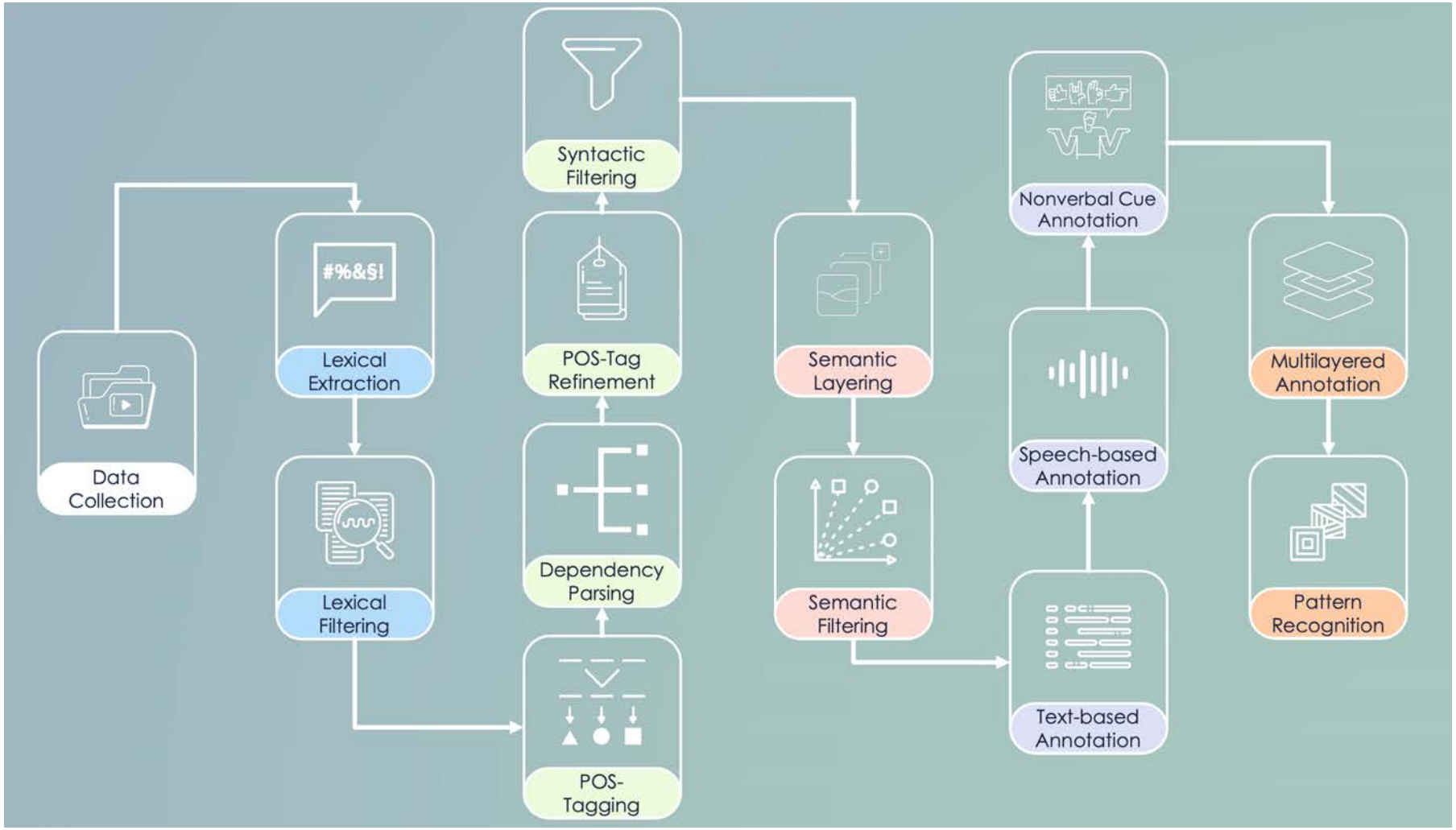
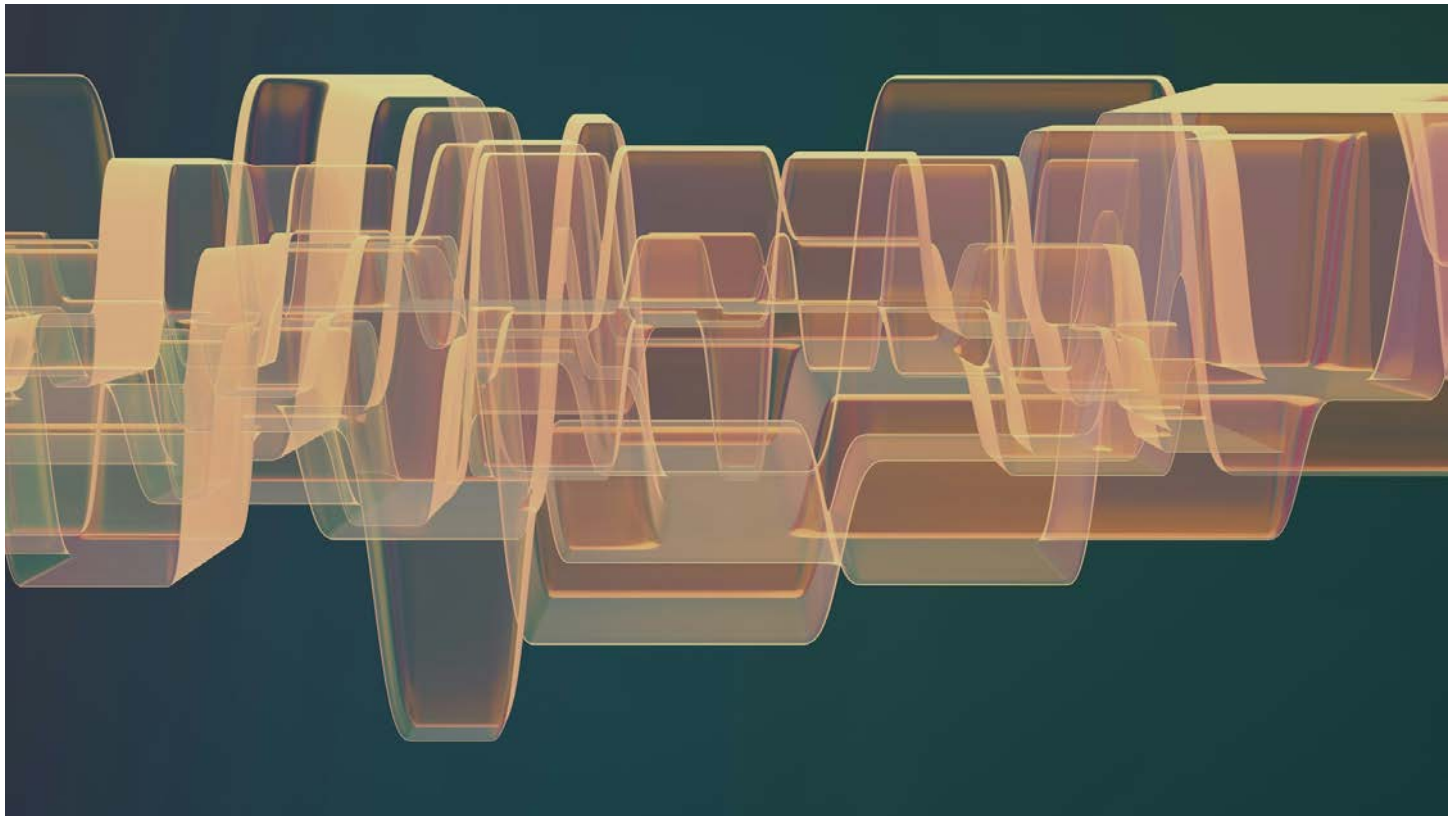
# From Data to Multimodal Annotation

Workflow Overview



# From Data to Multimodal Annotation

Data Complexity



# From Data to Multimodal Annotation

Managing Data Complexity – Filtering

- pipeline cycles
- data extraction & segmentation
- data modularisation
- feature evaluation
- operationalisation
- manage data density without loss

# From Data to Multimodal Annotation

## Establishing Taxonomies

**Cognola, Palilla & Petrocchi (2024), building on Schoonjans (2018)**

- Hand use – right, left, both
- Hand shape – e.g., ring, flat, plate, finger, carciofo
- Hand orientation – body-directed, outward, up, down, center
- Hand movement
  - Type – straight, arc, circle, zigzag, spiral
  - Direction – right, left, forward, back, up, down, diagonal
  - Character – big/small, fast/slow, long/short, flowing/jerky
  - Number – single, repeated
- Hand position – height (upper, lower, center) and depth (near, far, touching, behind)
- Head orientation – lift, tilt, direction (left, right, forward)
- Head movement
  - Direction – left, right, forward, back, up, down, diagonal
  - Character – big/small, fast/slow, long/short, flowing/jerky
  - Number – single, repeated

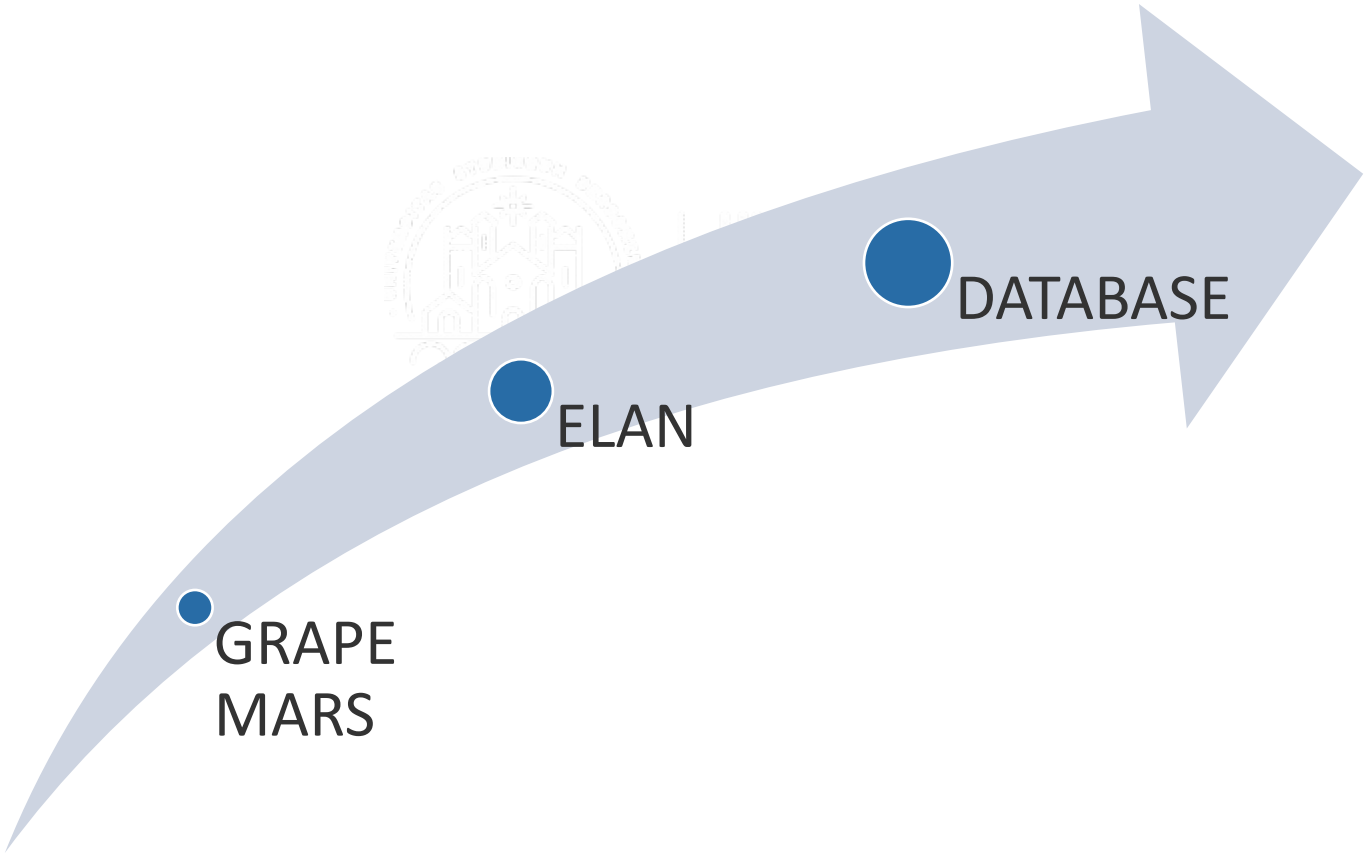
# From Data to Multimodal Annotation

Integrating Taxonomy of Cognola, Palilla & Petrocchi (2024) into the workflow

- Taxonomy of Cognola, Palilla & Petrocchi (2024)
  - fine-grained, systematic, qualitative depth
  - essential framework for multimodal analysis
- Mapped taxonomy (pipeline layer)
  - broader categories: head, facial, hand gestures
  - parameters: amplitude, duration, repetition, appearance
  - enables filtering & operationalisation
- Complementarity
  - Mapping = manageable in pipelines
  - Detailed taxonomy = interpretive richness
  - Both are indispensable in our corpus design

# Towards Cross-Linguistics Multimodal Analysis

Fine-Grained Annotation in ELAN – Exporting to Database



# Towards Cross-Linguistics Multimodal Analysis

- Methodological impact
  - workflow of filtering, taxonomies, and tool interoperability as a model for multimodal corpus construction
- Scientific impact
  - new insights into the polyfunctionality of modal particles like *schon* in institutional discourse
- Resource creation & scalability
  - towards a reliable multimodal database that balances manageability with descriptive depth
  - framework adaptable to other particles, constructions, and languages
- Collaboration & standards
  - basis for shared taxonomies and annotation protocols across research groups
  - integration into the broader goals of the RUM project and cross-linguistic analysis