

# MODELLING AS A SCHOLARLY PROCESS

The impact of modelling decisions on  
data-driven research practices



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# OUTLINE

1. Introduction – The importance of data models for the scholarly process
2. Case Study: “Identity construction in funeral status networks of the Late Bronze Age”
  - a. What is a burial?
  - b. Spatial relations in a grave
3. Conclusions

01

# INTRODUCTION

The importance of data models  
for the scholarly process

# DATA MODELLING AS A SCHOLARLY PROCESS

- Process of research by means of digital methods and on digital data starts with the creation of a data model:
  - Effect on research process: Data modelling as thinking about data → data model shapes scholarly process; possibly manifests one particular way of thought
  - Critical reflection of modelling practices: e. g. according to “symmetrical archaeology” (Shanks 2007), study of the past is recreation of the past → shaped by modern biases, conventions, habits
  - Societal relevance of knowledge representation: “digital objects as externalized memories that condition our retrieval of the past and our anticipation of the future” (Hui 2012, 390)

# DATA MODELLING AS SUBJECT OF DH

“Data modelling decisions taken today will deeply **shape and affect the kind of research that will or will not be feasible tomorrow**. The challenge is, thus, to make modelling choices in such a way that the highest possible degree of data **reusability and sustainability** can be guaranteed, while **respecting the particular source** modelled as well as the specific nature of historical data, such as ambiguity, uncertainty, incompleteness, and change over time.”

*(CfP “Data for History 2020: Modelling Time, Places, Agents”*

*May 28-29, Berlin)*

# RESEARCH-DRIVEN DATABASES

Increasingly, next to large-scale **curation-driven** projects, individual scholars create project-specific **research-driven** databases\*:

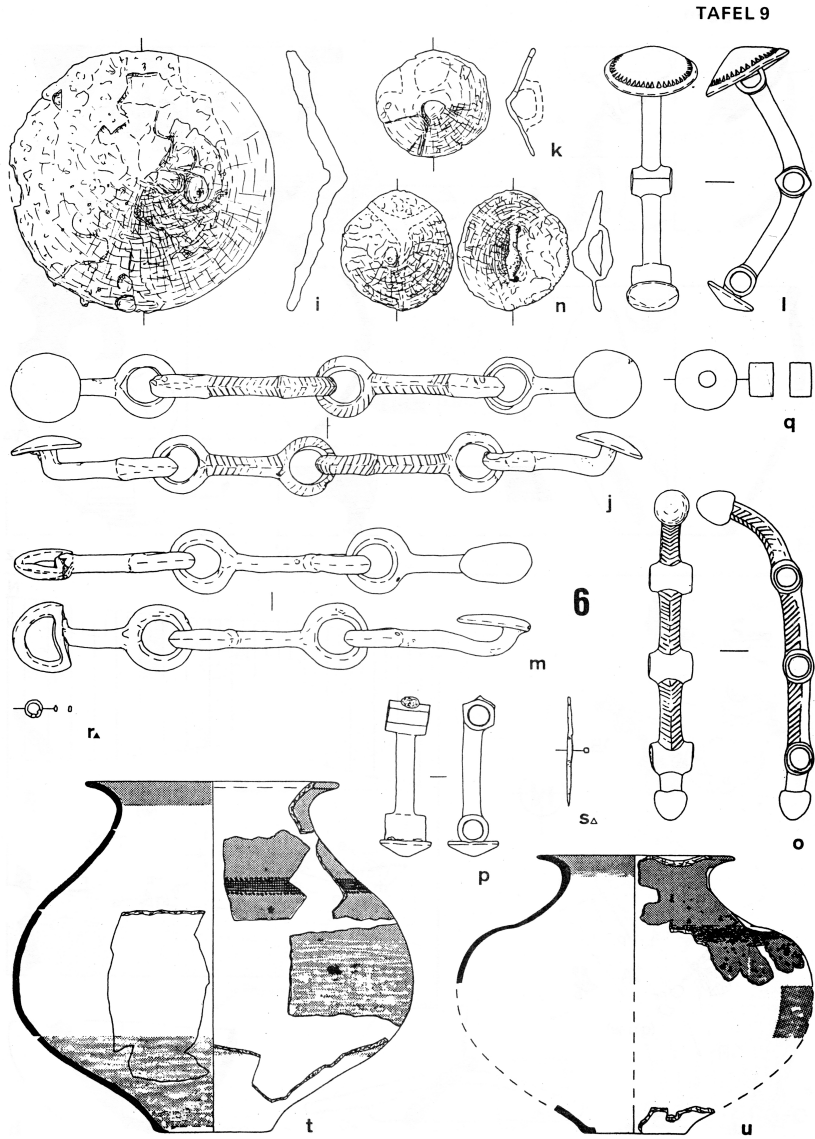
- Purpose of data base to manage data for specific methods of analysis asking specific research questions (e.g. quantitative analysis like network research) → specific model
- Interoperability might be of secondary concern
- Different ways of modeling domain reflect for example different theoretical frameworks

\*see also Flanders/Jannidis 2015, 4-5.

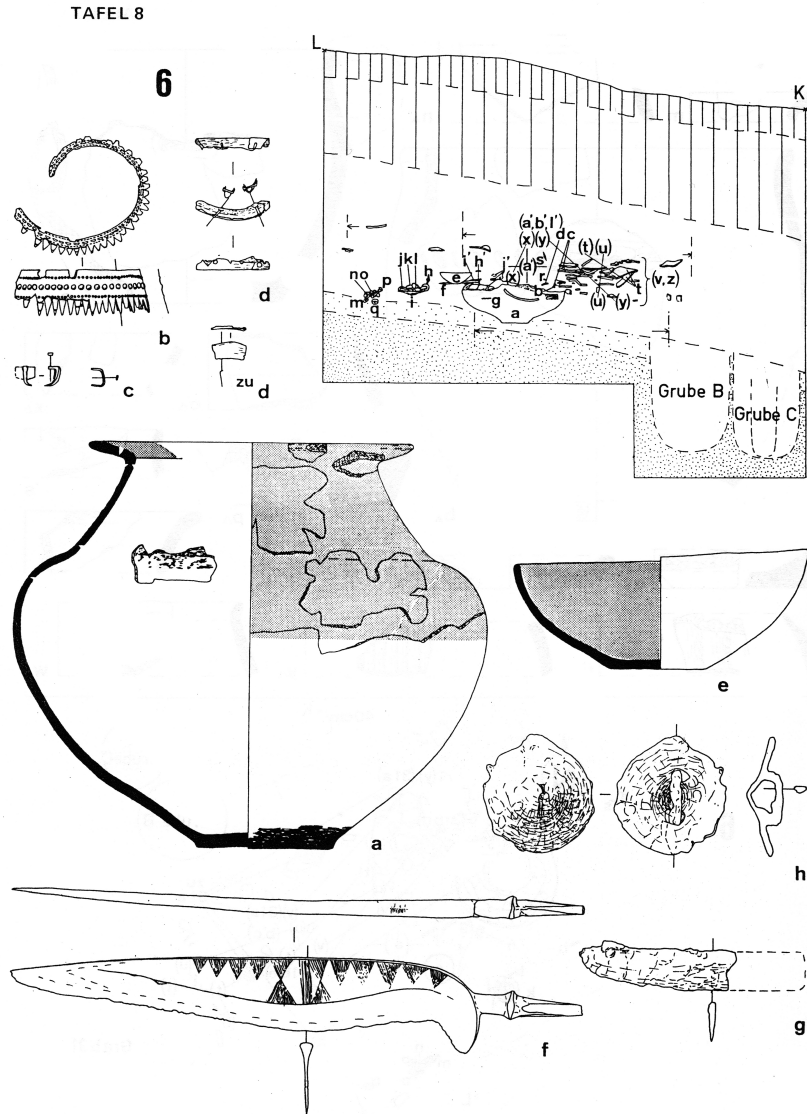
02

CASE STUDY:

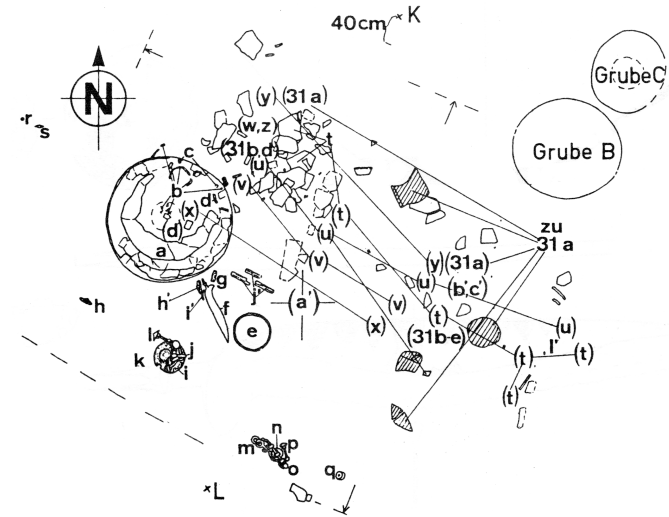
“IDENTITY CONSTRUCTION IN  
FUNERAL STATUS NETWORKS OF  
THE LATE BRONZE AGE”



Grab 6: 6i–u.  
M 1:4 – 6t, 6u; Bronze – 6j, 6l, 6m, 6o–s; Eisen – 6i, 6k, 6n.

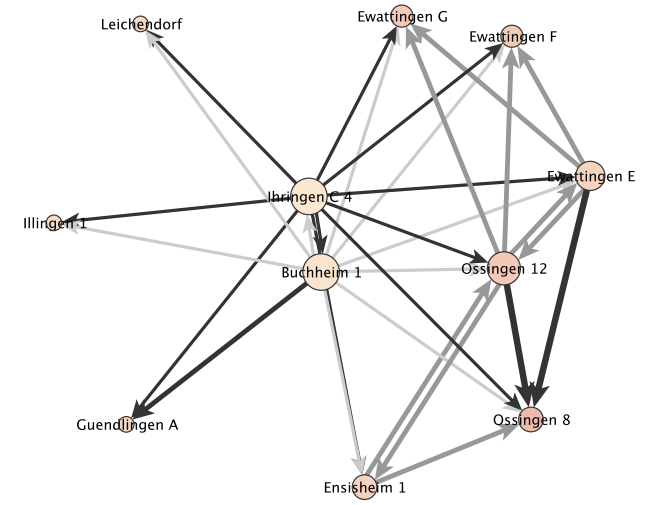
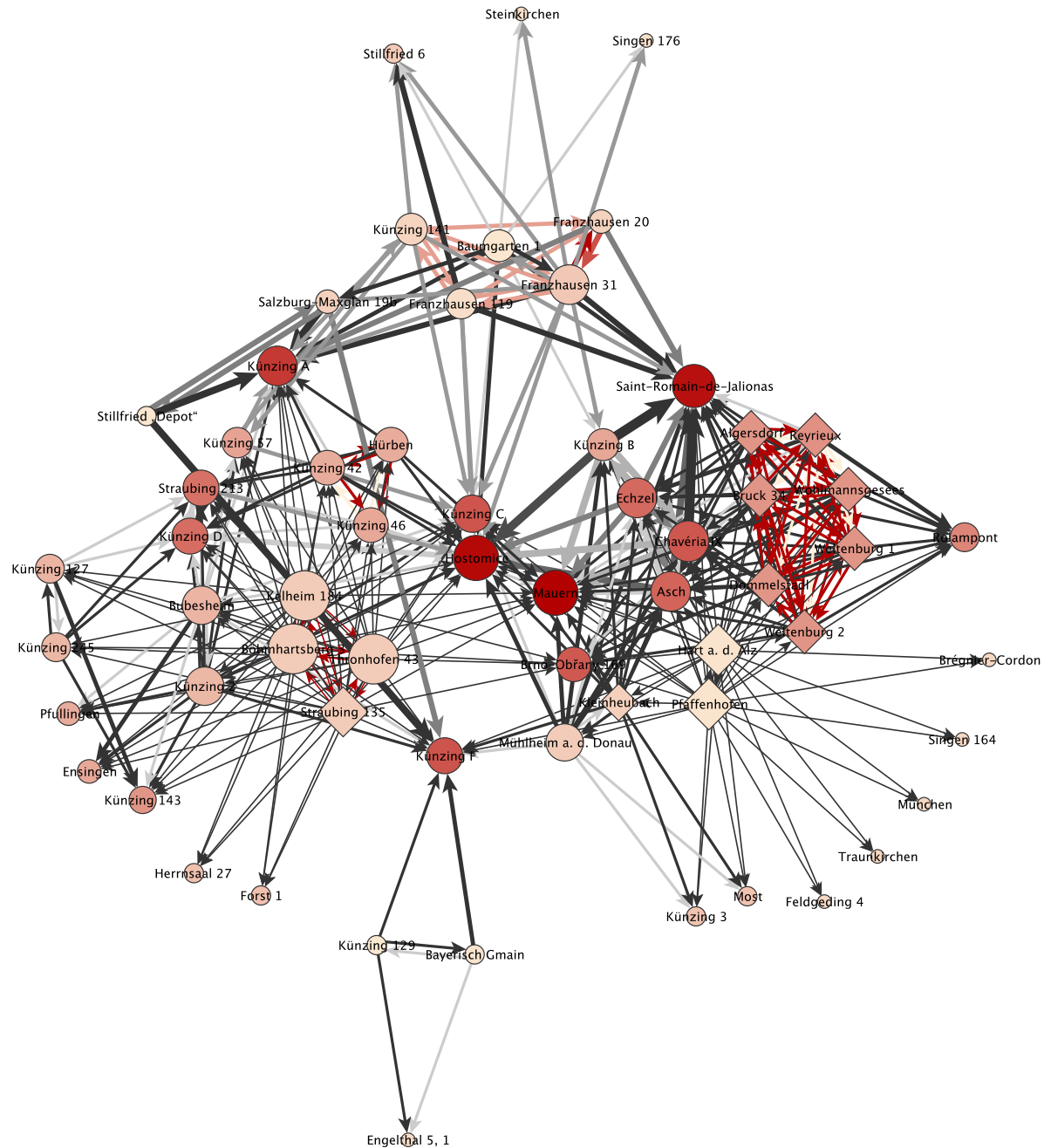


Grab 6: Grabplan-Seitenansicht; 6a–h.  
M 1:4 – 6a; Bronze – 6b–d, 6f; Eisen – 6g, 6h.



Stillfried, grave 6  
(Kaus 1984, Pl. 8–9)





Künzing 220    Künzing 95    Stillfried 38  
 Uttenhofen-Ost 13    Kirchleimbach II    Obereching 74  
 Singen 163    Zaboři    Senica





02A

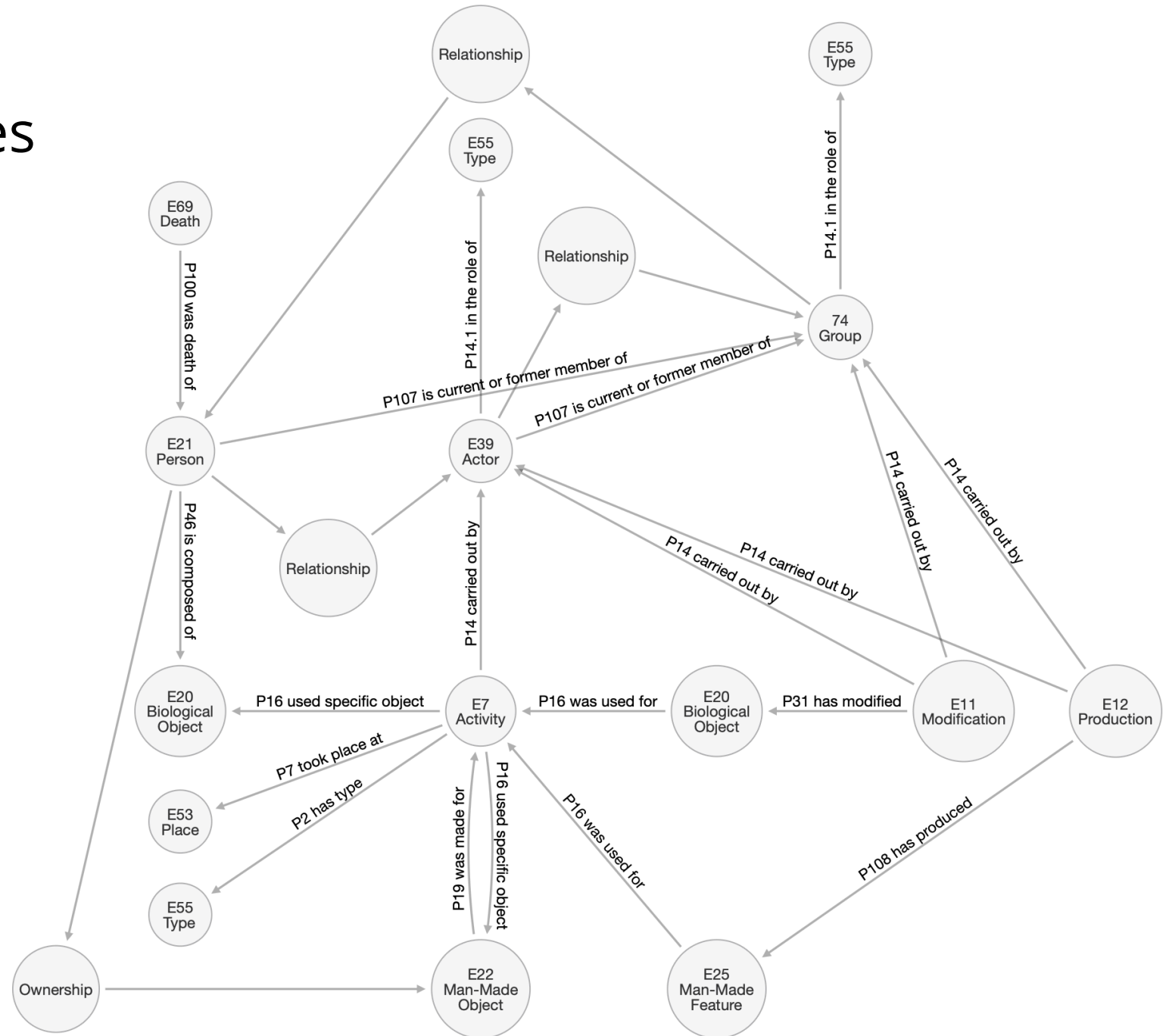
WHAT IS A BURIAL?



Research question:  
Which social processes  
constitute a burial?

→ CRMsoc

(<http://www.cidoc-crm.org/crmsoc/>)



02B

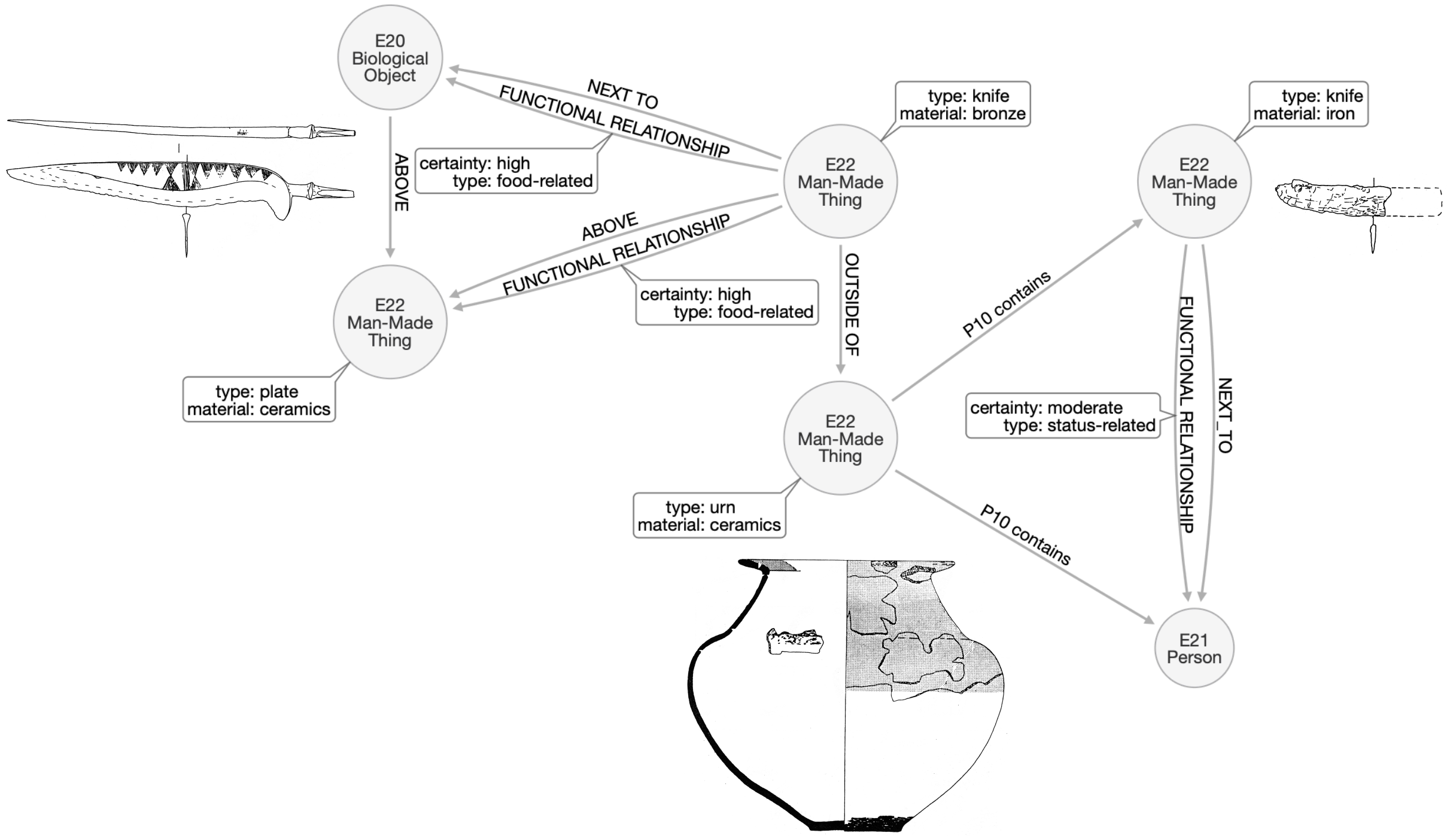
SPATIAL RELATIONS IN A GRAVE





# HOW TO MODEL SPATIAL RELATIONS

- Objects in a geospatial coordinate system?
  - Documentation, e.g. for excavations
- Objects in relation to the burial pit/chamber?
  - Standardization of activities, e.g. deposition patterns
  - Social construction of space, space as an acteur
- Objects in relation to each other?
  - Function and meaning of objects



03

CONCLUSIONS

# QUESTIONS

1. Goal not to “streamline” but to embrace diversity in data models based on specific research questions

→ How can we further integrate the task of modelling into the scholarly process, and disclose the choices that lead to specific models?

2. How can scholars navigate expectations between universal interoperability and case-specific models when working with specific research-centered databases?

→ How to integrate specific models in wider knowledge domain/network?

# PUBLICATION AND DOCUMENTATION

Publication of

1. Databases along with the analyses based on them
2. Data models and their documentation

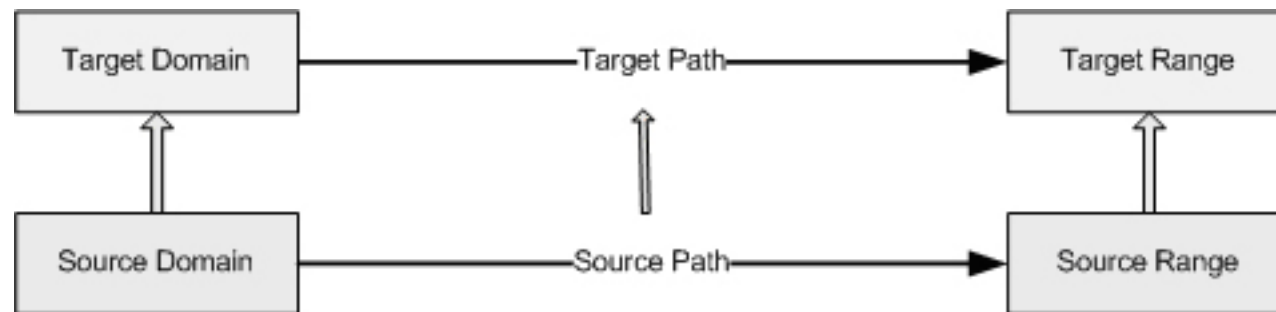
→ Make explicit underlying reasoning and purposes

→ Need for a critique and a critical approach to the practices of modelling

→ If data model and data base not published and documented → not verifiable how certain analysis results have been reached

# INTEROPERABILITY: MAPPING/MATCHING

Provide mappings/ matchings of very specific models onto "standard" models and ontologies?



<http://www.cidoc-crm.org/short-intro-mappings>

HETEROGENITÄTSPROBLEME				
Strukturelle Probleme			Semantische Probleme	
Bilaterale Konflikte: Vollständigkeit / Ganzheit, verschiedene Datentypen und Namen	Multilaterale Konflikte: Unterschiedlich genaue Beschreibungen, verschiedene Repräsentanten, fehlende Werte	Meta-level Konflikte: Vermischen von Klassen, Instanzen und Datentypen, im- und explizite Beschreibungen	Datenkonflikte: Unterschiedliche Einheiten oder Wertebereiche, Beschreibung trifft auf Wert	Domainkonflikte: Subsumption, Überlappungen, Inkonsistenz

# THANK YOU FOR YOUR ATTENTION!

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Dröge 2010: [E. Dröge, Leitfaden für das Verbinden von Ontologien. Information — Wissenschaft und Praxis 61/2, 2010, 143–147.](#)

Flanders/Jannidis 2015: J. Flanders, F. Jannidis, Knowledge Organization and Data Modeling in the Humanities (2015). [urn:nbn:de:bvb:20-opus-111270](https://nbn-resolving.org/urn:nbn:de:bvb:20-opus-111270).

Hui 2012: [Y. Hui, What is a Digital Object? Metaphilosophy 43/4, 2012, 380–395.](#)

Kaus 1988: M. Kaus, Das Stillfrieder Gräberfeld. In: F. Felgenhauer et al. (Eds.), Stillfried. Archäologie – Anthropologie. Veröff. Mus. Ur- u. Frühgesch. Stillfried Sonderbd. 3 (Stillfried 1988) 113–119.

Shanks 2007: [M. Shanks, Symmetrical archaeology. World Archaeology 39/4, 2007, 589–596.](#)

A. Jones, arrowtool (<http://www.apcjones.com/arrows/>).