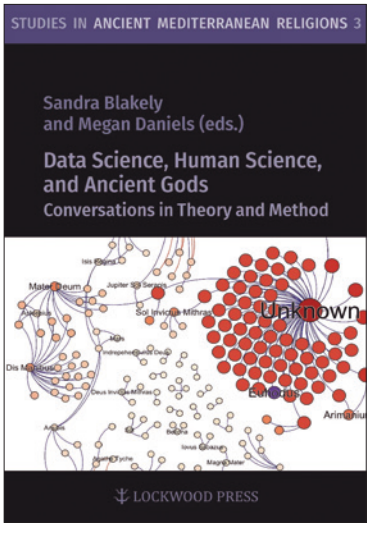
Data Science, Human Science, and Ancient Gods



BLAKELY, SANDRA & DANIELS, MEGAN (EDS.) (2023). *Data Science, Human Science, and Ancient Gods. Conversations in Theory and Method.* Columbus: Lockwood Press. xiv, 344 pp., 79,95 $ [ISBN 978-1-948488-51-8]

FRANCESCA MAZZILLI
University of Bari Aldo Moro
francesca.mazzilli1@uniba.it – https://orcid.org/0000-0003-4097-9121

Ian Rutheford (p. 320) brings the essence of the volume in the epilogue: it "is an ambitious exercise in bringing together three disciplines": ancient religion, the interrelated human science and data science. Before diving into the content of each chapter, it is important to define broadly the three interconnected subjects of the volume, following its introduction and epilogue suggestions, and highlight its novelty by contextualising it in the broader current research agenda.

The long-term debate in defining religion by cognitive science of religion (CSR) has been presented in the volume's introduction, which accurately indicates that "religion is not a discrete category, separated from its cultural and historical settings, but

one of the key cognitive and cultural factors that have structured social complexity" (p. 9). I would be inclined to add Brent Norbri's work on the terminology of religion[1] and a recent overview of how religion is embedded in past societies and the degree of inclusivity in the socio-political and cultural sphere.[2] What is clear from the title and the volume is, nevertheless, that the contributions do not study gods, myths and rituals in a vacuum but embedded in human movements and traditions, every-day life and socio-political and geographical contexts in the Mediterranean either in the Greek (from Bronze-Iron Age transition to the Classical period) or the Roman world. The exception is Sandra Blakely's chapter that expands gaming applications to Mayan context apart from the Greek case study (pp. 283-320).

Human and data sciences can respectively go under the broad category of theoretical/qualitative and methodological/quantitative approaches (as hinted by the volume's title). The volume's contributions refer to human science as "broadly all aspects of human life from the biological to the cultural" (p. 1). Its first four chapters on human science use discipline and models from evolutionary psychology and behavioural science (p. 321), anthropology, CSR, evolutionary science of religion (ESR), and cognitive or cultural memory studies. Data science means any mathematical, statistical, or quantitative techniques used to examine a large dataset. It is a tool that enables visualising and organising religious activities and beliefs (p. 321) through a different light to reflect and attempt to understand about how religion was viewed, understood and experienced in the past. Chapters on data science cover the second half of the volume, consisting of two chapters specifically on network models (section 2) and four for data-driven approaches (section 3).

Although the volume is divided into three sections, the looseness of the groupings and their overlapping are evident and explicitly pointed out (*e.g.*, pp. 11 and 320). Human and data sciences and, specifically the contributions of the volume, share the exploration of the human agency, especially the agency of the individuals, in religious practices (rituals, feastings, parades, festivals) and beliefs (gods) through archaeological, epigraphic or literary data. It is in line with current and growing interest in investigating religion by experiencing and living it at an individual level,[3] through its materiality, senses, or cognitive science.[4] This does not

1. Nongbri, 2008 and 2013.
2. Mazzilli & van der Linde, 2021b, pp. 27-34.
3. Rüpke, 2016; Albrecht *et al.*, 2018; Fuchs *et al.*, 2019; Gasparini *et al.*, 2020; Rask, 2023.
4. Graham, 2025 provides a list of recent projects and publications on recent studies of material and experiential religion in Antiquity. For senses in Antiquity through textual evidence see Alvar Nuño *et*

imply that the choice of individuals was not influenced by the society where they lived and belonged to, the so-called "social agentivity",[5] especially considering how religion triggered human cooperation and collectivity (pp. 31-92).

Recent edited volumes and conferences specifically on the latest methodological approaches in religion in Antiquity[6] have often focused on CSR, cognitive science, and senses,[7] more recently with a focus on the sacred place as a place of belonging[8] or in relation to objects and participants to explore religious experiences in Antiquity.[9] Conferences or publications specifically on digital applications to religion in Antiquity are, instead, still rare: online digitalisation, mapping and online interface for network visualisation on cult epithets in epigraphic record of Greek and West-Semitic worlds (*ca.* 1000 BCE – 400 CE) from the ERC project "Mapping Ancient Polytheisms",[10] two conferences focusing on religious networks in religion Antiquity,[11] and a special Issue on "Digital Religioscapes. Current Methodologies and Novelties in the Analysis of Sacr(aliz)ed Spaces", edited by Anaïs Lamesa and Asuman Lätzer-Lasar. However, in the latter, only two articles discuss religion in the Classical world.[12] Amongst various interesting international meetings discussing religion in Antiquity organised by the Universidad Carlos III de Madrid (UC3M), the conference "Steps Ahead. New Trends in the Analysis of Roman Polytheism", conversing the latest trends in Roman religion, had only two papers on digitisation and network applications.[13] This resonates with the scarcity of volume papers on social network analysis and the overall work on digital and analytical approaches to ancient religions.

---

al., 2021. For cognitive science see especially Larson, 2016; Eidinow *et al.*, 2024; Misic & Graham, 2024.

5. Alvar Ezquerra, 2018, pp. 221-224.
6. It does not aim to be an exhaustive list but a quick overview of some key publications and conferences.
7. See n. 4.
8. Belonging and Sacred Places in Antiquity workshop: https://www.uni-muenster.de/imperia/md/content/religion_und_politik/aktuelles/belonging_and_sacred_places_in_antiquity_-programme.pdf.
9. Woolf, Bultrighini & Norman, 2024.
10. Plutniak, 2021; https://map-polytheisms.huma-num.fr/?lang=en.
11. https://connectedpast.net/bergen-workshop-2022/ and https://connectedpast.net/other-events/vancouver-2024/.
12. Susmann, 2024; Kubiak-Schneider & Mazurek, 2025.
13. https://www.uc3m.es/instituto-julio-caro-baroja/media/instituto-julio-caro-baroja/doc/archio/doc_triptico-rico-oct/programa-rico.pdf .

By contextualising "Data Science, Human Science, and Ancient Gods" volume in the current research agenda, its novelty in discussing jointly the main recent methodological approaches from a theoretical and analytical perspective in the ancient Mediterranean stands out. It is a first volume that brings together anthropological models, CSR, ESR, and analytical digital approaches.

Megan Daniels and Sandra Blakely (pp. 1-30) introduce the volume by providing an exhaustive chronological historiography of ancient religions and human and data sciences. This historical journey starts with the emergence of evolutionary, comparative and quantitative studies, highlighting the division between anthropology and classics in the 20th century. They share the value of primary data and interpretive paradigms derived from fieldwork and common topics (religious experience, including feasting and giving gifts, and the conception of the divine) from the late 19th century. However, classical scholars did not keep up with the new theories and methods developed in social science in the late 20th and 21st centuries. This can be seen in the creation of only one significant exhaustive database explicitly focusing on ancient religion (*Database of Religious History*), which is reviewed in this volume (pp. 223-246). In response to data science, scholars investigated how religion was embedded in society and institutional forces, resulting from the *polis* model coming from structural functionalism. This city-centric focus has been criticised, and research has been shifted on human agency, especially of individual, networks, materiality (non-human agency, see the material or ontological turn) and evolutionary and cognitive sciences to explain the workings of ancient religion. Nevertheless, I would explicitly add that perhaps this volume shows how the study of ancient religions was also affected by the three science revolutions outlined in the volume's introduction: deep time and evolutionism (late 19th century), scientific dating and statistics (after World War II) and big data (current revolution) (pp. 8-9). The volume covers studies using ESR and CSR first, followed by work using scientific and quantitative approaches, like network analysis and big data-driven papers. After a clear outline of each chapter and their connection, the introductory chapter concludes by saying that the volume represents a conversation of theory and method with a critical evaluation and self-reflection of the limitations of their approaches.

By considering archaeological evidence from Olympia and Kalapodi, Megan Daniels (pp. 31-70) explores how ritual consumption in extra-urban sanctuaries functions as a significant means of political and economic organisation in Early Iron Age Greece in a time of no centralised authority and stateless institutions according to anthropological and evolutionary models. Undertaking communal eating and drinking consumption requires creating social norms, manufacturing, distributing

and organising large-scale food processing, storage and surpluses (visible from impressed *pythoi* and quern stones at Kalapodi) and organising human labour. This set of activities associated with feasting develops communal consciousness, identities, cohesion, wealth accumulation (see tripods at Olympia), and the rise of the centralised elite (visible in rich Iron Age grave goods).

Following ESR and CSR, Jennifer Larson (pp. 71-92) also tackles the development of Greek large complex societies. She argues that the emergence of complex social institutions was not facilitated by the fear of punishment of (big) gods (so-called "big gods theory" or "all-seeing moralistic god"), as previously sustained. It was, instead, triggered by the role of emotion and perception at the individual level, the moral domain in kin relationships, interactions between strangers, and norms that shape institutions between and beyond the poleis. Oath was an effective key means to control divine power and cooperation between groups that did not necessarily need to belong to the same community or worship the same god. Other strategies were prayers for justice, sacred truces, trade and banking conducted within the sanctuaries, the display of law codes on temples, sacral manumission and sacral *asyla*.

Maggie L. Popkin (pp. 93-116) examines terracotta figurines with inscribed dates from Roman festivals in Cologne through the lens of cognitive memory studies. They help us consider these souvenirs as active agents in shaping individual and collective memories, constructing conceptions of time extending the participants' memories to past and future performances. The souvenirs were portable objects, so they also transcended the physical boundaries of sanctuaries. They forged various connections at local, regional, and superregional levels, linking people (horizontal levels), connecting people to Cologne, its festivals, Germania, gods (vertical levels) and the broader empire (considering festivals and customs of manufacturing figurines were widespread customs in the Roman world). The chapter also discusses the importance of materiality of religious objects.

Jacob Latham (pp. 117-134) also disputes the "big gods" theory, arguing that the execution of *Pompa Circensis* (a spectacular procession to escort the gods to the games from the Capitol to the Circus Maximus) was not a matter of religious fear and vigilance. Through cultural memory widely used in anthropology, the parade was performed in the proper way because it was a Roman *habitus* of social performances moulded by mandates beyond the individual actor and non-self-conscious but deeply rooted in the ritual. It needed to adhere to the past while demanding its evolution over time as its social success was shaped by the intersection of the ritual actor's innovation and his audience's responses.

Sebastian Heath (pp. 135-174) discusses 246 amphitheatres in use in the 2nd century CE in the Roman Empire through a combined quantitative and qualitative approach. Central Italy has the highest density of these public buildings and the highest value of closeness degree (a method used to measure how many other nodes are on the shortest path between any two nodes in the network). It is followed by *Africa Proconsularis*. The degree values has been compared with the amphitheatre's capacity through box plots, revealing the density of structures and seating diminished away from Italy. This decrease might have been correlated with the instability in behaviour due to the perceived presence of the emperor. The qualitative approach to amphitheatres attempts to reconstruct the experience, the issues and themes at play inside them, through textual and iconographic evidence. They were bloody violence, crowd participation and religion (amphitheatres also serve as venues for procession or sacrifice). The chapter ends with opportunities to explore the link between amphitheatres, urban population, and the areas where *Capitolia* or temples dedicated to *Iuppiter Optimus Maximus*, *Iuno Regina* and *Minerva Augusta*, considering these temples widely appear in Italy and *Africa Proconsularis*. However, religion does not seem to be the main focus on this chapter, in contrast to other contributions in the volume.

Lindsey A. Mazurek, Kathryn A. Langenfeld and R. Benjamin Gorham (pp. 175-204) provide a self-reflexive critique of their digital praxis coming from the *Mediterranean Connectivity Initiative* (MCI), formerly *Ostia Connectivity Project*, while showing interesting results with the application of SNA (social network analysis) and GIS (Geographic Information System) mapping visualisations of around 6500 inscriptions in 460 georeferenced data points in Ostia Antica. This approach can help us to think about how people intertwined religious and social activities in urban contexts. SNA has identified clusters of dedicators around certain gods, which reflect or reify the cultic boundaries of these gods within Ostia's social networks, like Cybele in the Campus of Magna Mater. However, it shows that at the same time, the dedicators of certain gods were influential across the city, and the social interactions of people triggered religious dedications of certain gods in cultic boundaries of other gods (for example, Isis and Anubis in Campus of Magna Mater). In this analysis, individuals are the main agents, but objects, in this case, gods, are also actors of connectivity, and both are placed in a structured physical context that plays a role in social and religious networks. In this analysis, inscriptions manifest the force of prospective memory. SNA also highlights incomplete data (dedications to unknown gods). This study calls the data the researchers work with "capta" to emphasise the more reflective agency of the research designers.

Sarah Murray (pp. 205-222) proposes a critical review of using big data to provide valuable insight into the archaeological record by considering a case study in the mainland of Greece and Crete in the Late Bronze to Early Iron Age transition to identify patterns between rural sites with ritual practices, their elevation and their extend in the territory through GIS. The chapter focuses on the drawbacks of using big data, considering its case study and broadening to any archaeological investigation. The archaeology of Crete and the mainland has a different historiography, including an investigation of their rural sites. This produced unbalance and biased results in the recovery of sites and affected their analysis. Attributing a religious meaning to artefacts remains an interpretative exercise. It is impossible to systematically control negative data when dealing with diachronic and spatial patterns. However, the author does not point out that these limitations also apply to qualitative studies of sites and artefacts. Any researchers working in the past deal with the incomplete and contingent nature of any record, not just in the field of archaeology that the author proposes.

M. Willis Monroe's paper (pp. 223-246) seems an excellent response to the previous chapter. While he also provides a critical review of big data projects (specifically the DRH, *Database of Religious History*), the chapter appears to be a productive and more profound reflection of big data projects by considering what historians' work involves rather than listing the pitfalls of a quantitative approach to examining ancient past. DRH is an online digital reference and platform for testing hypotheses in the study of religion built by experts. He acknowledges the "justified reluctance of the historian" to use numbers (meaning quantitative approach) (p. 243) and stresses the importance of qualitative and quantitative data in history and how historians work within historical records and form opinions about historical facts. The paper shows no absolute division between qualitative and quantitative research by investigating the role of thick description and quantitative historiography within the DRH aims. In thick descriptions, which examine contextualised social and cultural behaviours and actions contributed to a deeper understanding of the face of culture, the reported data are contextually dependent on the research's backgrounds and biases (as every research investigation). Additionally, at its core, there is an indirect element of quantification and accumulation of recorded data. In the DRH qualitative data and approaches are essential to determine how to quantify and what is worth quantifying in the first place. Even in quantitative methods, the preservation accuracy in data recording and contingency and uniqueness to a particular religious group are considered. Additionally, based on the experts' data entry, the DHR methodology and project are constantly refined and improved.

Dan-el Padilla Peralta (pp. 247-282) examines the symbolic content of the Roman Republic's earliest numismatic iconographies through a combined quantitative and qualitative approach. On the one hand, he looks at the iconographies of 3,660 Roman and 3,188 non-Roman coins from 69 Italian hoards from 300-212 BCE. On the other hand, he considers the political semiotic meaning of the widespread numismatic depiction of Janus. Coins are "image worlds" and they are read as responses to evolving personal, regional, and imperial circumstances. According to this chapter, we need to consider the subjective experience of handling coins despite the epistemological limitations of etic investigators. At the same time, coins are symbols of the general narrative of Roman cultural and political contestations during the 3rd century BCE. They were shaped by hyperreal habitus beyond the critical capacity of any other user.

Sandra Blakely (pp. 283-320) attempts to restore the voices of "the missing individual" through archaeogaming in Greek and Mayan contexts. However, she points out that the crowd-sourced data comes from modern players (a major limitation in this approach) and is transformed and translated into the virtual reality that the programmer can produce. However, this limitation, which is a common issue in creating virtual realities, is counterbalanced by the fact that the virtual reconstructions of archaeological worlds rely on the agency of the dynamic relationships between humans and non-human entities, meaning structure, landscape, affect and action (including movement through the space) that constitute religion. In *Palenque* (a videogame based on a Mayan occupation with temples, houses and palaces on terraces against the Chiapas Mountains of Mexico), monuments and landscapes shape the players' choices. For *Sailing with the Gods* (a videogame based on proxenic networks in the Samothracian Sea where men, gods, poets and the moral imagination were co-travellers), epigraphic materials are used to reconstruct social networks and direct the choices players encounter in port and on high sea.

Ian Rutherford (pp. 321-326) summarises and discusses all the contributions to the broader research context. He points out how they all present scientific approaches to ancient religion – which is nothing new considering the use of sociology and anthropology over a century ago. What is important is the emphasis on individual experience, belief, and agency in contrast with the outdated work focusing on sociology. The volume shows how rigorous methodology combining control of theory and engagement with data, a theme of central concern to this volume, can significantly impact ongoing research development. The volume's chapters contribute to disputing the debatable "all-seeing moralistic god" theory (pp. 71-92), discussing the origin of reli-

gion (pp. 31-92) and transformative role in teaching and research using interactive digital visualisation of rituals and sacred places (pp. 283-320).

The epilogue encourages the integration of science and theory into the research and teaching agenda. While emphasising the importance of CSR, the epilogue also points out the importance of establishing cross-cultural databases of religious practices with a standard system of categories (ontologies) to facilitate a dialogue between different fields with shared knowledge. The epilogue concludes by wishing for the study of ancient religion to apply models from other disciplines (as this volume has shown) and be a forerunner in creating their models and impacting more general debates.

It is surprising that only data science approaches to ancient religion are considered cautiously in the volume. However, whether we consider big data or models from human science, we face common limitations that the first four papers do not stress, or at least not as much as the second half of the volume (especially pp. 205-222). In Murray's chapter (pp. 205-222), the big-data approach appears undermined, stating that it provides "superficial patterns" (p. 210), "flatting human experience to graphs and distantly beheld patterns" (p. 213), and "the big data (…) has tended to undermine rather than elevate humanity at an individual and collective level" (p. 214). However, big data is widely used in academic investigations, including disciplines that examine historical data where they develop hypotheses from observation of past phenomena, and these can be constructed and assessed in their validity against a range of past evidence. Morris provides the Big Bang or the origin of life as examples (p. 236). Moreover, network analysis using big data, for instance, has been used in discussing different topics in ancient history and archaeology.[14]

Most importantly, Morris correctly reminds us that "no set of data is complete" (p. 237), and there is no research without incomplete data and decision-making dealing with data from the past. "In our qualitative scholarship, we make choices about the data from which we derive our conclusions" (p. 235). "The decision to answer yes or no to a particular question is, in fact, a quantifiable answer" (p. 235). We, researchers, should strive for a combination of qualitative and quantifiable approaches if such a big difference between the two can always be drawn. Furthermore, we should point out the limitations of the data of our investigation no matter which approach we take or what kind of research we undertake.

14. Brughmans & Peeples, 2023. https://historicalnetworkresearch.org/, https://connectedpast.net/ and https://jhnr.net/

The volume is the first step in combining theory and method, data and human sciences. It shows that research projects on ancient religion often, indeed all the papers in this volume, deal with data and the agency of individuals integrated into a social-construct environment and physical space. The volume also urges the creation of a standard system of categories (ontologies) and more comprehensive cross-disciplinary digital big-data projects and discussions specifically addressing ancient religions.

BIBLIOGRAPHY

Albrecht, Janico, Degelmann, Christopher, Gasparini, Valentino, Gordon, Richard L., Patzelt, Maik, Petridou, Georgia, Raja, Rubina, Rieger, Anna-Katharina, Rüpke, Jörg, Sippel, Benjamin, Urciuoli, Emiliano Rubens & Weiss, Lara (2018). Religion in the Making. The Lived Ancient Religion Approach. *Religion*, 48.4, pp. 568-593.

Alvar Ezquerra, Jaime (2018). Social Agentivity in the Eastern Mediterranean Cult of Isis. In Gasparini & Veymiers, 2018, pp. 221-247.

Alvar Nuño, Antón, Alvar Ezquerra, Jaime & Woolf, Greg (2021). *Sensorium. The Senses in Roman Polytheism*. Leiden & Boston: Brill.

Brughmans, Tom & Peeples, Matthew A. (2023). *Network Science in Archaeology*. Cambridge Manuals in Archaeology. Cambridge: Cambridge University Press.

Eidinow, Esther, Geertz, Armin W. & North, John (eds.) (2022). *Cognitive Approaches to Ancient Religious Experience*. Cambridge: Cambridge University Press.

Fuchs, Martin, Linkenbach, Antje, Mulsow, Martin, Otto, Bernd-Christia, Bjørn Parson, Rahul & Rüpke, Jörg (eds.) (2019). *Religious Individualisation. Historical Dimensions and Comparative Perspectives*. Berlin & Boston: De Gruyter.

Gasparini, Valentino, Patzelt, Maik, Raja, Rubina, Rieger, Anna-Katharina, Rüpke, Jörg & Urciuoli, Emiliano R. (eds.) (2020). *Lived Religion in the Ancient Mediterranean World. Approaching Religious Transformations from Archaeology, History, and Classics*. Berlin & Boston: De Gruyter.

Gasparini, Valentino & Veymiers, Richard (eds.) (2018). *Individuals and Materials in the Greco-Roman Cults of Isis, Agents, Images and Practices*. Leiden & Boston: Brill.

Graham, Emma-Jane (2025). Material and Experiential Religion. *The Classical Review*, pp. 1-11. DOI:10.1017/S0009840X25000344.

Kubiak-Schneider, Aleksandra & Mazurek, Sebastien (2025). Goats and Goddesses. Digital Approach to the Religioscapes of Atargatis and Allat. *Open Archaeology*, 11.1, 20240024. DOI: https://doi.org/10.1515/opar-2024-0024.

Larson, Jennifer (2016). *Understanding Greek Religion*. London & New York: Routledge.

Mazzilli, Francesca & van der Linde, Dies (eds.) (2021a). *Dialectics of Religion in the Roman World*. Stuttgart: Franz Steiner.

Mazzilli, Francesca & van der Linde, Dies (2021b). Dialectics of Religion and the Roman World: Relations, Inclusivity, and Change. In Mazzilli & van der Linde, 2021a, pp. 21-43.

Misic, Blanka & Graham, Abigail (eds.) (2024). *Senses, Cognition, and Ritual Experience in the Roman World*. Cambridge: Cambridge University Press.

Nongbri, Brent (2008). Dislodging "Embedded" Religion. A Brief Note on a Scholarly Trope. *Numen*, 55.4, pp. 440-460.

Nongbri, Brent (2013). *Before Religion. A History of a Modern Concept*. New Haven, CT: Yale University Press.

Plutniak, Sébastien (2021). *MAP Syntax diagrams. Visualiser, décrire et comparer les séquences onomastiques divines de l'Antiquité*. ⟨hal-02532617v2⟩

Rask, Katie A. (2023). *Personal Experience and Materiality in Greek Religion*. London & New York: Routledge.

Rüpke, Jörg (2016). *On Roman Religion. Lived Religion and the Individual in Ancient Rome.* Cornell: Cornell University Press.

Susmann, Natalie M. (2024). Seeing Sacred for Centuries. Digitally Modeling Greek Worshipers' Visualscapes at the Argive *Heraion* Sanctuary. *Open Archaeology*, 10.1, 20240016. DOI: https://doi.org/10.1515/opar-2024-0016.

Woolf, Greg, Bultrighini, Ilaria, & Norman, Camilla (eds.) (2024). *Sanctuaries and Experience. Knowledge, Practice and Space in the Ancient World*. Stuttgart: Franz Steiner.