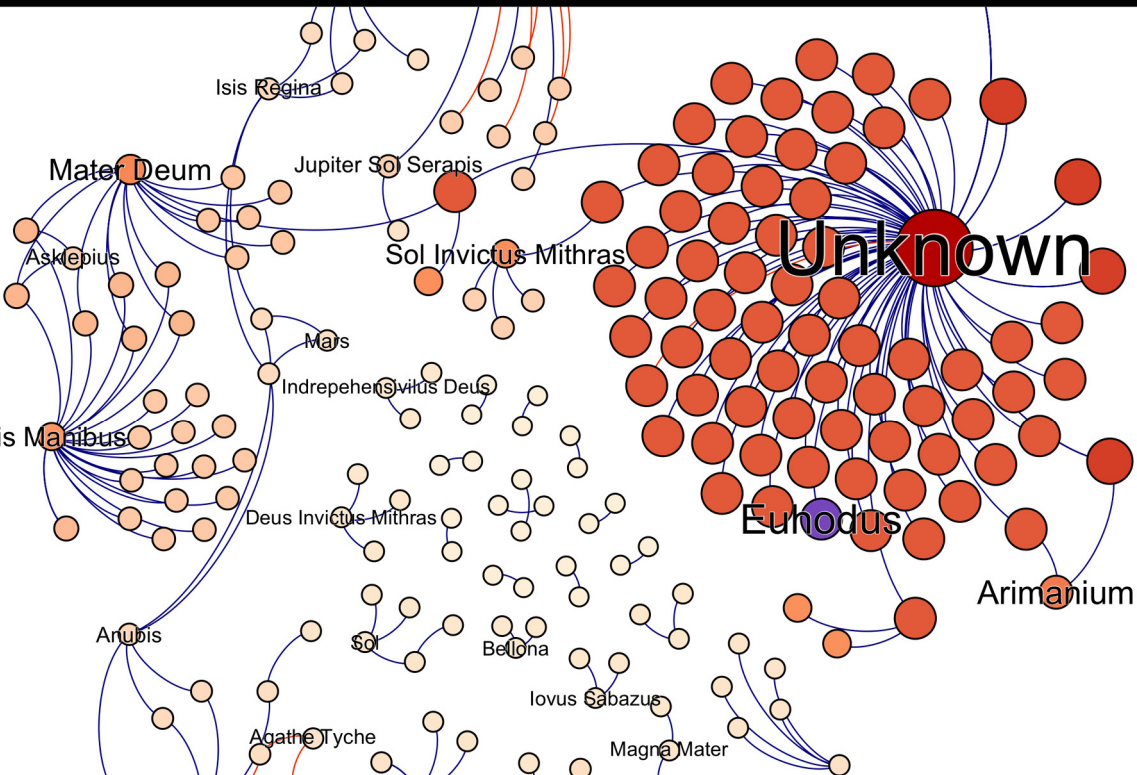Sandra Blakely
and Megan Daniels (eds.)

Data Science, Human Science, and Ancient Gods

Conversations in Theory and Method

Isis Regina

Mater Deum

Jupiter Sol Serapis

Asklepius

Sol Invictus Mithras

Unknown

Mars

Indrepehensivilus Deus

is Manibus

Deus Invictus Mithras

Eunodus

Anubis

Arimanium

Sol

Bellona

Iovus Sabazus

Agathe Tyche

Magna Mater

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Data Science, Human Science, and Ancient Gods

Conversations in Theory and Method

Edited by

Sandra Blakely and Megan Daniels

Data Science, Human Science, and Ancient Gods

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Data Driven Approaches: Quantifying, Digitizing, and Describing

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Abbreviations

AA	*Archäeologischer Anzeiger*
ΑΔ	*Αρχαιολογικόν Δελτίον*
Adv. nat.	Arnobius, *Adversus nationes*
Aem.	Plutarch, *Aemilius Paulus*
Aen.	*Aeneid*
Aesch.	Aeschylus
Agr.	Cato, *De agricultura*
AJA	*American Journal of Archaeology*
AJN	*American Journal of Numismatics*
AJP	*American Journal of Philology*
AJS	*American Journal of Sociology*
An.	Xenophon, *Anabasis*
Ann.	Tacitus, *Annales*; Ennius, *Annales*
Ant.	Sophocles, *Antigone*
Ant. Rom.	Dionysius of Halicarnassus, *Antiquitates Romanae*
AP	Anthologia Palatina
App.	Appian
Ap. Rhod.	Apollonius Rhodius
Apollod.	Apollodorus mythographus
Ar.	Aristophanes
AR	*Archiv für Religionsgeschichte*
Archil.	Archilochus
ARD	Varro, *Antiquitates rerum divinarum*
Argon	Apollonius Rhodius, *Argonautica*
Arn.	Arnobius
Aug.	Suetonius, *Divus Augustus*
August.	Augustine
BARIS	BAR International Series
BASOR	*Bulletin of the American Schools of Oriental Research*
BCH	*Bulletin de Correspondance Hellénique*
B. Civ.	Appian, *Bella civilia*
Bibl.	Apollodorus, *Bibliotheca*
BICS	*Bulletin of the Institute of Classical Studies*
BICSSup	Bulletin of the Institute of Classical Studies Supplement
BSA	*Annual of the British School at Athens*
BSAS	British School at Athens Studies

BSASup	British School at Athens Supplementary Volume
BzA	Beiträge zur Altertumskunde
CA	*Current Anthropology*
Caes.	Plutarch, *Caesar*
CAH	Cambridge Ancient History
Calig.	Suetonius, *Gaius Caligula*
CÉFR	Collection de l'École française de Rome
CGRN	*Collection of Greek Ritual Norms.* http://cgrn.ulg.ac.be/.
ch(s).	chapter(s)
Cic.	Cicero
CIL	*Coprus Inscriptionum Latinarum.* Berlin, 1862–.
ClAnt	*Classical Antiquity*
Claud.	Claudianus
Clem.	Seneca, *De clementia*
Comp. hist.	*Historiarum Compendium*
Coriol.	Plutarch, *Coriolanus*
CP	*Classical Philology*
CSR	cognitive science of religion
De civ. D.	Augustine, *De civitate Dei*
Dem.	Demosthenes
De spect.	Terullian, *De spectaculis*
DHA	*Dialogues d'histoire ancienne*
Dio Cass.	Dio Cassius
Dion. Hal.	Dionysus of Halicarnassus
Div.	Cicero, *De divinatione*
Div. inst.	Lactantius, *Divinae institutiones*
DOP	*Dumbarton Oaks Papers*
Ep.	Horace, *Epodi*; Seneca, *Epistulae*
EPRO	*Études* préliminaires aux religions orientales dans l'empire romain
ESR	evolutionary science of religion
ETCSL	*Electronic Text Corpus of Sumerian Literature.* http://etcsl. orinst.ox.ac.uk
Eum.	Aeschylus, *Eumenides*
Eur.	Euripides
Fast.	Ovid, *Fasti*
Fest.	Sextus Pompeius Festus
FGH	Jacoby, Felix. *Die Fragmente der griechischen Historiker.* Berlin: Weidmann; Leiden: Brill, 1923–1959.
frag(s).	fragment(s)
FRHist	Cornell, Timothy J., ed. *Fragments of the Roman Historians.* 3 vols. Oxford: Oxford University Press, 2014.
GRF	*Grammaticae Romanae fragmenta*

HCS	Hellenistic Culture and Society
HdO	Handbuch der Orientalistik
Hdt.	Herodotus
Heliogab.	Scriptores Historiae Augustae, *Heliogabalus*
Hipp.	Euripides, *Hippolytus*
Hist. eccl.	Eusebius, *Historia ecclesiastica*
HN	Pliny, *Naturalis historia*
HN³	Rutter, Keith, et al. *Historia Numorum.* 3rd ed. London: British Museum Press, 2001–.
Hom.	Homer
HTR	*Harvard Theological Review*
Hymn. Hom. Ap.	Phokis, *Homeric Hymn to Apollo*
IG	*Inscriptiones Graecae.* Berlin: de Gruyter, 1924–.
Il.	Homer, *Iliad*
ILLRP	Degrassi, Attilio, ed. *Inscriptiones Latinae Liberae Rei Republicae.* 2 vols. Rome: La Nuova Italia, 1963, 1965.
Iul.	Suetonius, *Divus Iulius*
JAAR	*Journal of the American Academy of Religion*
JAJ	*Journal of Ancient Judaism*
JAR	*Journal of Archaeological Research*
JArS	*Journal of Archaeological Science*
JBL	*Journal of Biblical Literature*
JFA	*Journal of Field Archaeology*
JHS	*Journal of Hellenic Studies*
JMA	*Journal of Mediterranean Archaeology*
JNG	*Jahrbuch für Numismatik und Geldgeschichte*
JRA	*Journal of Roman Archaeology*
JRASup	Journal of Roman Archaeology Supplementary Series
JRS	*Journal of Roman Studies*
Lactant.	Lactantius
LCL	Loeb Classical Library
Leg.	Plato, *Leges*
LH	Late Helladic
LIMC	*Lexicon Iconographicum Mythologiae Classicae.* Düsseldorf: Artemis, 1981–.
Ling.	Varro, *De lingua Latina*
LTUR	Steinby, Margareta, ed. *Lexicon Topographicum Urbis Romae.* 6 vols. Rome: Quasar, 1993–2000.
Lyc.	Plutarch, *Lycurgus*
Lys.	Lysias
MAAR	*Memoirs of the American Academy in Rome*
Macrob.	Macrobius
Marc.	Plutarch, *Marcellus*

Mart.	Martial
Med.	Euripides, *Medea*
MEFR	*Mélanges de l'École française de Rome*
Mem.	Xenophon, *Memorabilia*
Merc.	Plautus, *Mercator*
Min. Fel	Minucius Felix
MnSup	Mnemosyne Supplements
Mor.	Plutarch, *Moralia*
MTSR	*Method & Theory in the Study of Religion*
Nat. D.	Cicero, *De natura deorum*
NC	*Numismatic Chronicle*
Nic. Dam.	Nicolaus of Damascus
NS	new series
NSA	*Notizie degli Scavi di antichità*
Num.	Plutarch, *Numa*
Oct.	Minucius Felix, *Octavius*
Od.	Homer, *Odyssey*
OGR	*Origo Gentis Romanae*
Ol.	Pindar, *Olympian Ode*
Op.	Hesiod, *Opera et dies*
Ov.	Ovid
Pan. Ter. Hon.	Claudianus, *Panegyricus de Tertio Consulatu Honorii Augusti*
Paus.	Pausanius
PBSR	*Papers of the British School at Rome*
PCPS	*Proceedings of the Cambridge Philological Society*
Petron.	Petronius
PG	Protogeometric
Phil.	Sophocles, *Philoctetes*
Planc.	Cicero, *Pro Plancio*
Plin.	Pliny (the Elder)
Plut.	Plutarch
PNAS	*Proceedings of the National Academy of Sciences*
Poen.	Plautus, *Poenulus*
Pol.	Aristotle, *Politica*
Ran.	Aristophanes, *Ranae*
REL	*Revue des études latines*
Resp.	Plato, *Respublica*
RG	Augustus, *Res Gestae Divi Augusti*
RGRW	Religions in the Graeco-Roman World
RIC	Sutherland, Carol H. V., and R. A. G. Carson. *Roman Imperial Coinage.* Rev. ed. London: Spink & Son, 1984.
RIDA	*Revue Internationale des Droits de l'Antiquité*
Rom.	Plutarch, *Romulus*

RRC	Crawford, Michael H. *Roman Republican Coinage*. 2 vols. London: Cambridge University Press, 1974.
Rust.	Columella, *De re rustica*
Sat.	Macrobius, *Saturnalia*; Petronius, *Satyrica*; Horace, *Satirae*; Juvenal, *Satirae*
ScAnt	*Scienze dell'Antichità*
SCI	*Scripta Classica Israelica*
SCJud	Studies in Christianity and Judaism
SEG	Supplementum epigraphicum graecum
Sen.	Seneca
Serv.	Servius
SHA	Scriptores Historiae Augustae
SNG	*Sylloge Nummorum Graecorum*
Soph.	Sophocles
De spect.	Tertullian, *De spectaculis*
Suet.	Suetonius
Supp.	Aeschylus, *Supplices*
Tab. Her.	*Tabula Heracleensis*
Tac.	Tacitus
TAPA	*Transactions of the American Philological Association*
Ti. Gracch.	Plutarch, *Tiberius Gracchus*
Thgn.	Theognis
Theog.	*Theogonia*
Thuc.	Thucydides
trans.	translator
UET	Ur Excavations: Texts
Val. Max.	Valerius Maximus
Varr.	Varro
Vesp.	Suetonius, *Divus Vespasianus*
WAW	Writings of the Ancient World
WGRWSup	Writings from the Greco-Roman World Supplement
YCS	Yale Classical Studies
Xen.	Xenophon
ZPE	*Zeitschrift für Papyrologie und Epigraphik*

EPILOGUE
Ancient Religion and Modern Science: A Coevolution

Ian Rutherford

This volume is an ambitious exercise in bringing together three disciplines: on the one hand the study of ancient religion and on the other hand two interrelated forms of science, human science and data science. "Human science" includes various disciplines that have come to be grouped under that name in modern universities such as psychology, including evolutionary psychology and behavioral science. And data science covers mathematical and statistical techniques, greatly enabled by digital technology, which open up new possibilities in the analysis, organization, and presentation of information. These two are conceptually distinct, but in practice mutually dependent: it seems obvious that human science, like any theory about the world, needs a supply of good data; but data in the human sciences is not just a given in the physical universe; it is something that researchers have a role in identifying and organizing into an intelligible form.[1] For students of ancient religion, the challenge is bringing science and historical data together into a fine-tuned methodological harmony, a process of "consilience," to use Edward Wilson's (1998) term. Students of ancient religion can draw on human science and data science individually or in combination or themselves find a way of combining them.

Scientific approaches are nothing new for the study of ancient religion. A century ago (as the introduction showed) it was drawing on insights from anthropology and sociology, work that went on to become mainstream in the second half of the twentieth century. In fact, scholars working on ancient religion seem to have had a particular fondness for these approaches, perhaps because religious systems resembling Greco-Roman polytheism seem to be universal in early cultures, not just within the broader region of the ancient Mediterranean and Western Asia, but more broadly in the tribal cultures studied by early anthropologists. This insight actually goes right back to the ancient Greeks (e.g., Herodotus). Such parallels naturally raise broad questions about why these beliefs and practices seem to be so widespread, and how things came to be that way, whether it's a matter of human nature or something else. And it seemed logical to join forces with scholars in other disciplines to explore such

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1. See Johanna Drucker's distinction between data and capta mentioned by Mazurek, Langenfeld, and Gorham, ch. 7 in the present volume.

questions. Religion has thus been good to compare with and good to theorize with for a very long time.

The disciplinary dynamics are similar, then, but the science has changed. The emphasis now is on the human mind: how it works, how it understands the world and relates to other people; how it is organized; what its main components are—emotions, sense, memory, language, sense of self—and how it came to be that way. And to answer these questions scientists have fine-tuned methods of analyzing data beyond anything known in the nineteenth century. For students of ancient religion this means a shift away from a focus on sociology, which dominated the twentieth century, and toward individual experience, agency, and belief. The volume of new research being published all the time can seem daunting, particularly for scholars in the humanities who don't necessarily have experience with scientific techniques of proof and analysis. But it is important that they keep abreast of new approaches; the alternative is the tendency, still often found in the humanities, including ancient religion, to hang on to old and long outdated work.[2]

The papers in this volume set out to explore how scholars of ancient religion use and often combine human sciences and data science in their work. Some papers focus on explanatory models drawn from the human sciences. Maggie Popkin's (ch. 4) data are statues that she takes to be festival souvenirs from Roman Cologne, and she illuminates these by applying the concept of memory studies from psychology. She shows how the implied social use of these figures implies both retrospective memory (episodic, semantic) and probably also prospective memory. For Dan-el Pedilla Peralta (ch. 10) the data are the images on Roman coins from the third century BCE to which he applies Baudrillardian semiotics, seeing them as embodying "hyperreal" image worlds that reinforce the ideological message of the Roman state. Megan Daniels (ch. 2) looks at archaeological evidence for communal feasting in Early Iron Age, interpreting this through the lens of recent work on ritual and state formation that is based on the model of evolutionary game theory developed by economists. In his contribution Jacob Latham (ch. 5) interrogates the evidence for one of the great Roman festivals, the spectacular *Pompa Circensis*, using analytic tools derived from anthropology ("liturgical order"), religious studies ("ritualization"), and social theory ("habitus").

Other papers address the equally complex issue of data. First, there is the problem of uncritical use of data. In her analysis of the location of sanctuaries in Crete and Greece Sarah Murray (ch. 8) shows how the crude use of published

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2. Joseph Carroll in the introduction to *Darwin's Bridge* (2016, xxii) mentions a number of such cases. An example of an outdated model in the study of ancient religion might be the notion of "rites of passage," the canonical statement of which was by Arnold van Gennep in 1908 (drawing on even earlier anthropological work).

archaeological data without consideration of how it was acquired can result in widely misleading conclusions. Lindsey Mazurek, Kathryn Langenfeld, and Benjamin Gorham (ch. 7) make a related point in their study of the rich epigraphical evidence from Roman Ostia; they warn that this is not strictly objective data available to researchers in the natural world, but rather something doubly shaped by human agency, first when it was created, and then when it was put to use by modern researchers.

Second, digital technology enables us to find patterns in data and visualize it in ways that give us new insight into how ancient people experienced their world. In the chapter on Ostia Mazurek, Langenfeld, and Gorham (ch. 7) show how the inscriptions allow them to reconstruct and visualize social and religious networks there, mapping them onto the topography of the town. Similarly, Sebastian Heath's (ch. 6) dazzling analysis of the spatial distribution of amphitheaters in the Roman Empire yields new insight into the significance of relative positions and its implications for human interactions. Sandra Blakely's (ch. 11) case study shows how by engaging interactively with a simulation of the past by a video game, players can get more authentic experience than is available from other sources (e.g., either reading about in in a book or watching a film). She illustrates this with examples from Mayan culture and from the religious networks round Samothrace in the Aegean. In both of these the players have to make decisions and engage emotionally in the situation, experiencing something of the individual agency that must have been involved in the original situations.

The elephant in the room is the emergent field known as the cognitive science of religion (CSR), which uses both these approaches (see, e.g., Geertz 2016, 2020). It applies cognitive science and psychology to understanding religion and its origins, debating whether it is a natural, adaptive capacity of some sort (because religion is prosocial), or a byproduct of some natural capacity, or a cultural response to the emergence of the earliest complex societies. It also uses data from different cultures to support these arguments. As has often been observed, this is not entirely new: broad questions about the origin of religion have been asked since the nineteenth century, and people were compiling religious encyclopedias then as well (Strenski 2018, Smith 2009, 41). Still, rapid advances in cognitive science in the last few decades allow these questions to be asked in new ways. Thus far, it must be said, CSR has done no more that sketch out general possibilities, and there is little agreement, except perhaps that however it came about religion was in some sense an asset to early humans.

Cognitive science of religion is by this point well known to students of ancient religion (see in particular Jennifer Larson's 2016 monograph on Greek religion, or Brett Maiden's 2020 book on Israelite religion). While the present

volume inevitably engages with some of the key issues of interest to CSR (e.g., the origin of religion: Daniels [ch. 2], Larson [ch. 3]), the range of topics covered are not limited to those, and the emphasis is more on the psychological and social processes that religion uses and instantiates. One issue in CSR that is addressed here is the controversial hypothesis that belief in an "all-seeing moralistic god" was crucial condition for the development of complex societies (i.e., societies post-Neolithic; Norenzayan 2013). This has become intensely controversial recently: an article published in *Nature* in 2019 (Whitehouse et al. 2019) seemed to have established the reverse position, that complex societies precede the emergence of all-seeing gods, but this thesis has in turn been challenged because of gaps in the big-data repository used (http://seshatdatabank.info/) and the article retracted (see Beheim et al. 2021). This hypothesis of the "all-seeing moralistic god" is discussed by Jennifer Larson (ch. 3) in this volume, showing that the data (mostly literary texts) for early Greece don't fit any formulation of it: big gods seem to be active in some areas, but not in others. There could be no better illustration of a theme of central concern to this volume: the need for a rigorous methodology combining control of theory and engagement with data.

We are clearly living at the start of a new and very intense phase of scientific research, perhaps even a new age, as it has been called. People might be understandably alarmed. Data science in particular has even been presented as a threat to humanity—and so presumably to the humanities as well (Harari 2016). In fact, of course, it's a massive opportunity and the potential seems almost unlimited. How things will develop in the next few decades is anyone's guess. Even if we don't swap the library for a metaversal simulation anytime soon, it seems likely that we will be accessing, processing, and visualizing data faster and in greater quantities than we ever imagined. Meanwhile, interactive digital visualizations of rituals and sacred places could play a transformative role in teaching and research.

It is also to be expected that human sciences will have a bigger profile. People in the humanities sometimes resent interference from science because they see it as reductive or because the humanities is supposed to have its own methodologies (i.e., they reject the idea of consilience). But this seems misguided: we are not going to be pressured into accepting some monolithic scientific ideology. Rather, the human sciences will continue provide a rich discourse of ideas, models, arenas of intense speculation and debate. It is obviously desirable that research and teaching on ancient religion should include some general familiarity with the forms of science discussed in this volume. In the same way, perhaps, that people working on literature and other aspects of the humanities presuppose familiarity with various forms of theory, the study

of ancient religion needs an agreement on terminological language and on the sort of methodologies that can be used.[3]

As this work proceeds, it seems likely that we will want to establish cross-cultural databases of religious practice—of the sort that M. Willis Monroe (ch. 9) discusses in his paper—with a common system of categories (ontologies, as they are sometimes called) to make it easier for people working in different fields to share knowledge. It would not be surprising if there is a resurgence of interest in comparing cultures, both ancient and modern. Some things may turn out to be more or less panhuman and universal, while other things vary from one region to another. A second form of variation is chronological: we need to understand how forms of religion map onto changing political and social systems, but also why some religious elements seem to be stubborn skeuomorphs from earlier stages. It would be too much, perhaps, to imagine a new form religious history on a panhuman scale, along the lines of Michael Witzel's work on panhuman mythology. A more manageable outcome, perhaps, is that we come to understand our own field, ancient Mediterranean religion, better. One question that might be raised, for example, is to what extent the religions of the ancient Mediterranean and Western Asia constitute a sort of religious "koine," being more similar to each other than they are to religious systems elsewhere in the world. Are there greater differences between, say, Mediterranean and Chinese culture, of the sort recently discussed by Geoffrey Lloyd (2018)? And how can we begin to quantify this sort of difference? In that case, just as we have come to think of modern Western cultures as WEIRD (western, educated, industrialized, rich, and democratic) and thus different from other cultures, could it be argued that we have a distinctive ancient Mediterranean-Western Asiatic (AMWA) religious zone?

Finally, in all of this, it is important to remember that consilience is a two-way street: as well as importing theoretical models from the sciences, scholars of ancient religion could in principle help to shape those models, or even be contribute theoretical models of their own. A good example of this is the late Walter Burkert, who developed his own methodology, drawing on a wide range of theoretical sources; it has been suggested that Burkert's approach is as good as anything offered by CSR, and one could even see it as an early form of CSR.[4] This should not be an exception. Scholars of ancient religion need to be exporters of theory: cognizant of current work in the sciences, marrying this to data from their own discipline in which they have unique expertise, and so coming up with theoretical models that are at once psychologically and histori-

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3. It is disappointing that the recent *Thesaurus Cultus et Rituum Antiquorum* (2004–2006) doesn't contain an entry on theory, science, etc.

4. Smith 2009, 49–54, thinking in particular of Burkert 1996.

cally realistic. Is it too much to dream that they should be thinking beyond the narrow comfort zone of their own discipline, and aiming as well to have an impact on more general intellectual debates?

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