

Editorial

Special Issue “Historical Network Analysis in the Study of Chinese Religion” — Introduction

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The seven articles in this Special Issue use historical network analysis to investigate aspects of Chinese religious traditions. Both concepts—“historical network analysis” and “Chinese religious traditions”—deserve a closer look, if only to delineate how they are used in this Special Issue.

Historical network analysis (HNA), or historical network research, uses algorithmic methods to visualize and analyze historical sources. “Network” in HNA is understood not in the wider, colloquial sense as used, for instance, in Latour’s Actor Network Theory or Deleuze and Guattari’s image of rhizomes. Instead, it denotes a particular data structure used to minimally model information as a finite set of nodes and edges. In mathematics, network graphs have been studied since the 18th century,¹ and in 20th-century information science, graph theory became a crucial mathematical resource for data modeling. Due to their discrete nature and unambiguous order, certain types of networks, such as arrays or trees, are especially efficient to compute with, and graphs have been used to model many different types of real-world systems, be they biological, social, or technological. Many algorithms have been discovered to solve graph-related problems or at least give approximate solutions: finding shortest paths, clustering nodes into communities, ranking entities by various centrality measures, and so forth. It is no coincidence that our most fundamental IT infrastructure, the “internet” itself, is commonly conceptualized as a network.

In the social sciences and the humanities, graph theory had a slow start. In the 1930s, Jacob Moreno and Helen Jennings used network analysis to model social networks. Moreno’s study of school children, dramatically titled *Who Shall Survive?*, is widely seen as the pioneering work in the field.² However, it was only after the development of a more robust computation infrastructure—accessible hardware and the algorithms to run on it—that modern, data-driven network analysis was used more widely. In the field of history, although quantitative approaches had been around for some time, network analysis as a method arrived only in the 1990s.³ A turning point was perhaps in the early 1990s when the seminal paper by Padgett and Ansell (1993) used network analysis to analyze marriage patterns in Medici Florence and when the first comprehensive overview of social network methods by Wasserman and Faust (1994) attracted the attention of historians (Erickson 1997). These developments can be traced in some detail now by the large bibliography of historical network research that is maintained online at <https://historicalnetworkresearch.org/bibliography/> (accessed on 30 October 2023). It shows how, after only a handful of publications before 1980, the method quickly gained traction: while the bibliography for the time contains only 8 items until 1980, it lists more than 470 items for the decade spanning 2010–2019.

One of the greatest obstacles to historical network research remains a lack of open-access network data. For the study of Chinese history and religion, the two most relevant accessible sources for social network data are the *China Biographical Database* (CBDB) and the *Historical Social Network of Chinese Buddhism*.⁴ Although large datasets like these are foundational, most historians will have specific research questions for which they will need to mine their own sources. Neither manually extracting network data from analog historical sources nor data mining digitized sources are trivial tasks, however, and it makes sense



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to share the data widely. It is in our communal interest to publish the datasets on which our research is based, as it allows for a degree of reproducibility and adds to the pool of open data that is available for other projects. The datasets used in the seven articles of this Special Issue are made available as a single archive at the Zenodo repository: DOI: 10.5281/zenodo.10004109 (<https://zenodo.org/records/10004109> accessed 30 October 2023).

As the networks discussed in this Special Issue show, HNA is not always about *social* networks. Whereas in Chu, Bingenheimer, Sokolova, and Van Cutsem, nodes indeed represent humans, Nehrdich uses networks to cluster textual relationships, Goossaert relates gods and texts, and Chen maps cults and locations. All studies, however, deal with historical network data. “Historical” here simply means in the historical past and does not necessarily imply a historical process. Like data about the present, HNA might or might not have a diachronic, dynamic dimension. A diachronic perspective *qua* historical change is relevant only in the research of Van Cutsem, Nehrdich, and Bingenheimer. Against that, the diachronic *spread* of the contributions ranges across two millennia: from the 4th–7th centuries (Nehrdich), the Tang and Five Dynasties (Sokolova and Van Cutsem), the Song (Chen and Chu), to the Ming and Qing (Bingenheimer and Goossaert).

Regarding the definition of the second critical term in the title, “Chinese religious traditions,” the literature is already extensive, especially regarding the nature of Confucianism,⁵ the place of Christianity and Islam in China, and the categorization of folk religious practices that cannot be easily characterized as Buddhist or Daoist.⁶ These categories are not merely academic but had and have far-reaching implications. Examples include the Chinese Rites controversy among Catholic missionaries in the 17th or 18th century,⁷ the legal status of temple real estate during the temple destruction movement in the early 20th century⁸ or the fate of the Uighurs in the 21st century. However, for the contributions in this Special Issue, the conceptual difficulties of defining “Chinese religious tradition” are not all that relevant. Only with Chu, perhaps the least “religious” of the papers, must we allow for Confucianism and its concepts to be included as religious, a case that Chu convincingly makes in his introduction. Perhaps owing to the bias of my own social network, the majority of papers are based on Buddhist sources (Bingenheimer, Nehrdich, Sokolova, Van Cutsem), while Goossaert and Chen work with data on popular cults, deities, and temples, all of which are clearly understood, emically and etically, as religious in nature.

As far as we are aware, this is the first collection of essays that applies historical network research to Chinese religious traditions. In the wider field of Chinese Studies, however, network research has gained traction with the recent publication of two Special Issues. While the present issue is focused on religion, the contributions in *Journal of Historical Network Research* (2021, Vol. 5, No. 1: Beyond Guanxi) and *Shuzi Renwen* 数字人文 (2022, Vol. 1) address a broader range of topics, with history and literature being especially prominent. It seems that datasets, tools, and graduate training for network analysis in the humanities are slowly catching up.

The overarching question when introducing a new methodological approach is that of value addition. What does a new method bring to the table in terms of new perspectives? Here, it should be remembered that new insights are usually only gained after some time and that, at first, one usually sees only what is familiar. DH approaches are sometimes dismissed as adding nothing new, or as a critic put it: “what is robust is obvious and what is not obvious is not robust.”⁹ However, with new methods, it is almost unavoidable that first outcomes confirm the overall landscape of what is known of a field. It is, in fact, generally a good sign when exploratory outputs reflect familiar features because that means data and the toolchain have not gone haywire. If in a social network of, say, the Song dynasty, Su Shi 蘇軾 (1037–1101) or Wang Anshi 王安石 (1021–1086) would *not* have high centrality measures, one would have to suspect that there is a problem with the data or in the workflow. It is true that, eventually, new approaches need to deliver new knowledge about the subject matter and not about their own pitfalls, but that process is not as straightforward as one might imagine. To learn how to think in terms of computational analysis of language, geo-referenced data, or network data takes time. New methods allow

us to ask new questions, but what these questions are is not always immediately obvious to the beginner. Finding a good question can be just as difficult and as precious as finding a good answer. Graduate training involves learning concepts and research tools as well as learning to ask the right questions. With new methods, we all go back to graduate school.

Below, I will focus on how the contributions to this Special Issue use network analysis. As all articles come with their own abstract explaining the research question and subject matter, I will limit myself to pointing out some methodological issues and clarifying how the specific application of HNA fits into the evolving landscape of its use.

The contribution by Song Chen shows what network science can do in the hands of an experienced practitioner. Chen has published widely on network research and has long been actively involved with the largest open social network dataset in Chinese Studies—the *China Biographical Database* (CBDB).¹⁰ The relationship between network and spatial analysis is complex, and beginners often underestimate what is involved in bringing both together. A map can be understood as a network of locations connected by routes, but to connect that meaningfully with, for instance, a social network is not straightforward. People move about more easily than places, and the topology of the network is not necessarily a good fit for the geography of the map. There are cases—e.g., data on airports and flights or epistolary networks¹¹—where network data can be well visualized in terms of a geographic map, but generally, bringing HNA and GIS together is tricky. Chen solves this issue elegantly by using bi- and tri-modal networks without getting bogged down in defining exact historical locations (using polygons instead of points and nearest cities instead of villages). His visualizations combine maps not with network graphs but with the statistical output of the network analysis. Of special interest for network analysis in the humanities, Chen was also able to make good use of community detection algorithms to come up with meaningful groupings of regional cults.

Ming-Kin Chu analyzes a discussion of the Confucian ideal of being “a sage inside, outwardly regal.” While network analysis does not play a direct role in his reading of the ideal itself, it helps Chu to visualize and communicate the shape of his data. Chu bases his analysis on the 1839 letters written by two figures, Sun Di and Li Gang, to c. 500 different recipients. The letters have been preserved in the humongous collection *Complete Prose of the Song*, and the network visualization allows us to quickly identify common recipients in relationship to their correspondence networks as a whole.

Anna Sokolova and Laurent Van Cutsem focused their attention on Buddhist social networks in the Tang and Five Dynasties. Sokolova uses transmitted epigraphic texts originating from south and central China that were preserved in ancient collections, such as the *Wenyuan yinghua* 文苑英華 (987 CE), to construct a valuable, novel dataset of c. 700 actors and 2400 connections. She is especially interested in how the network can be used to understand the relationship between monastics and their secular patrons and how network analysis can be used to identify bridge actors that connect regional “monastic-secular” networks.¹² She then presents a case study of one of these bridge actors, Fayun 法雲 (d. 766), who in her network appears well connected in both monastic and secular circles in different regions. In a move that I hope will become part of the repertoire of digital historians, Sokolova then manages to merge her own data with the larger “Historical Social Network of Chinese Buddhism” to gain yet another view of Fayun and his patrons. Such merging and mixing of openly available data exemplifies the usefulness of open data collections. The larger network confirms that the officials identified as central in the epigraphic dataset were also connected to several other important figures in the Buddhist world of 8th-century China. The analysis confirms again that school affiliation, a prism popularized only by later generations, is not indicative of the actual social networks as they appear in the sources.

Van Cutsem uses network analysis to visualize the lineage information contained in the mid-10th century *Zutang ji* 祖堂集, a foundational source for the early history of the Chan school, and explores the relationship between the resulting network and the text.¹³ His aim is explicitly to test whether network analysis is a “useful heuristic” for textual studies. His methodological insight is to combine network analysis with textual features such

as the length and number of bio-hagiographic entries for a fuller account of sectarian bias in these written accounts of lineages. Van Cutsem’s visualizations of a single complex text clearly help to “read” it and are a good example of what Franco Moretti envisioned in the essay “Network Theory, plot Analysis” collected in *Distant Reading* (Moretti 2013). The network model allows us to see the underlying structures “like an X-ray” (ibid., p. 218). Chan lineage claims play a crucial role in the later institutional history of Chinese Buddhism, and to present them work by work as networks is rather more insightful than depicting them in the synthesized and streamlined tree diagrams presented in, for instance, Mochizuki’s *Bukkyō daijiten* 佛教大辭典 or the Komazawa *Zengaku daijiten* 禪學大辭典.

Vincent Goossaert uses, like Song Chen, a bi-partite network that was manually assembled from a group of rarely used sources that associate Chinese gods with particular altars, where they appear as parts of rituals such as spirit writing.¹⁴ His dataset maps 649 links between 13 altars and 478 gods. The data structure allows for clear visualizations that show how only a very few gods (c. 3%) are highly popular among all or several altars, while the great majority of deities are only associated with one single altar. Goossaert also shows how to read such a network through different ways of categorizing gods, such as social roles in deified persons (generals, poets, or Confucians) or via different traditions (Buddhist, Daoist, Confucian). As so often, the role of quantitative analysis is not to identify the *most* important nodes (these are usually obvious) but the second-tier actors, such as the thunder gods, which might not first come to mind when considering the Chinese pantheon yet are still relevant in the context of spirit writing.

Sebastian Nehrdich has worked extensively on textual reuse and is responsible for the online tool *BuddhaNexus*, which, for the first time, allows researchers to study textual reuse within and between language corpora of Buddhist texts.¹⁵ In his contribution to this Special Issue, he uses network analysis to visualize the (undirected) citation network graph of the translation corpus of Xuanzang 玄奘 (602–664), one of the most prolific translators in Asian history. The overlap (i.e., shared passages) between texts is expressed as weighed links between texts, which, in combination with a carefully chosen community detection algorithm and sizing the nodes via PageRank, results in the best visualization (Figure 1) of genres in Xuanzang’s corpus thus far. To contemplate Xuanzang’s work in this way allows us to understand the *gestalt* of his corpus in a completely new fashion. Quantitative measures of textual overlap are also brought into conversation with our historical and textual understanding of Xuanzang’s achievements. Nehrdich’s contribution goes methodologically far beyond basic visualization and network metrics, as he applies advanced graph theoretical concepts such as the Maximum Spanning Tree algorithm devised by Kruskal to obtain a history of Abhidharma literature. His Figure 3 describes the genetic relationship between early Abhidharma works in unprecedented detail. Future stemmatic studies will start from here.

Less sophisticated and based mainly on the interpretation of visualizations, Marcus Bingenheimer uses the large *Historical Social Network of Chinese Buddhism* that he assembled from marked-up biographical literature and the Dharma Drum Person Authority database to focus on the late Ming to early Qing transmission.¹⁶ While histories of the period tend to highlight the prolific, literary monks of the late Ming, the social network suggests that Miyun Yuanwu 密雲圓悟 (1567–1642), whose influence is not generally appreciated, was the pivotal figure for early and mid-Qing institutional Buddhism, his legacy extending far into the 18th century, and far beyond China’s borders into East Asia.

In summary, the main point turns out to be that, in spite of a fairly well-defined common thematic focus, the articles collected in this issue use HNA in many different ways. To me, this suggests a rich and promising future for the method as we continue to explore the many possible ways to apply network research.

Conflicts of Interest: The author declares no conflict of interest.

Notes

- ¹ Biggs et al. (1976) provide a detailed history of the developments since Euler's first use of a network graph in a proof.
- ² Moreno (1934). For the contributions of Helen Jennings to Moreno's work, see Freeman (2004, chp. 3).
- ³ For quantitative approaches in history, see, e.g., the essays in Rowney and Graham (1969) or the ones written between 1968 and 1970 collected in Le Roy Ladurie (1973, pp. 3–75).
- ⁴ For a description of the CBDB, see Fuller and Wang (2021). For a description of the *Historical Social Network of Chinese Buddhism*, see Bingenheimer (2021). Beyond these readily available datasets, network data can be mined from Wikidata as suggested by Blouin et al. (2021).
- ⁵ On the debate of the religious nature of Confucianism, see the essays in Taylor (1990) and his overview article (Taylor 1998). For a more recent treatment and bibliography, see Sun (2013).
- ⁶ On the issue of defining popular religion, see Teiser (1995), Goossaert (2004), and Clart (2012).
- ⁷ The interpretation of ancestor worship led to a conflict between the Catholic church and the Chinese court and resulted in a ban of missionary activities in China in 1721 (Mungello 1994). For an historical overview including its impact on the mission in Japan, see Minamiki (1985). For detailed treatments and bibliographies, see the edited volumes by Županov and Fabre (2018).
- ⁸ See Duara (1991) and Goossaert and Palmer (2011). A recent overview from an economic perspective (Wang and Zhang 2023) contends that up to 70% of primary schools in the period (c. 1900–1940) were founded as a result of the movement to convert temples into schools.
- ⁹ Da (2019, p. 601). Among the many refutations, Jannidis (2020) and Underwood (2019) are perhaps the most comprehensive.
- ¹⁰ See, e.g., Chen (2016), Chen and Rudolph (2021), and Chen and Zhao (2022).
- ¹¹ Especially pre-modern letter networks like the “Republic of Letters” have attracted a lot of attention. See, e.g., Hotson and Wallnig (2019, esp. chp. IV.5.) or the various sub-projects of the group *Mapping the Republic of Letters* (<http://republicofletters.stanford.edu/publications/>, accessed on 30 October 2023) and their datasets.
- ¹² On the secular-monastic relationships in the Tang, see also Sokolova (2020).
- ¹³ This article is part of a larger project on the *Zutang ji* (see Van Cutsem 2023).
- ¹⁴ On the history and practice of spirit writing, see Goossaert (2022).
- ¹⁵ BuddhaNexus compares Buddhist texts in Chinese, Sanskrit, Tibetan, and Pāli: <https://buddhanexus.net> (accessed on 30 October 2023).
- ¹⁶ For previous attempts to use this data, see Bingenheimer (2018, 2020).

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