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Studying Professional Careers as Hierarchical Networks: A Case Study on the Careers of Chief Judges in the Ottoman Empire (1516–1622)

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Abstract In the Ottoman Empire, the scholarly-bureaucratic career track comprised several interconnected paths of teaching and judgeship positions. Scholar-bureaucrats, the civil servants of their day, chose from a variety of career options, and those who were especially successful could rise through the ranks to achieve the top positions in the land. In recent decades, several major studies have examined the careers of scholar-bureaucrats, but most have approached the topic using such conventional methods as qualitative analysis of historical texts and manual manipulation of data. In this article, distinct from previous studies, we adopt the perspective of social network analysis (SNA) to analyze the positions in the careers of Ottoman scholar-bureaucrats as a hierarchical network. Using formal SNA methods, we examine the careers of the 56 scholar-bureaucrats (*ulema*) in Ottoman government service who reached the two top positions – the chief judgeships (*kazaskerlik*) of Anatolia and Rumelia – during the period 1516–1622. As this article will show, this approach makes it possible to produce new knowledge that is difficult to acquire through conventional historical research, as well as to confirm, correct, and qualify existing knowledge on the subject.

From the late fifteenth century onward, the professional lives of scholar-bureaucrats in the Ottoman Empire followed clear trajectories.¹ They began as students at the madrasa, where they would acquire legal and administrative skills as well as knowledge in language, law, and theology. Upon graduation, they would start in low-paying or low-prestige professorship or judgeship positions and gradually climb to positions with higher pay and prestige. Along the way, they would have to choose from alternative career paths that offered different incentives and opportunities: some paid more in the short run; others paid less but ultimately led to higher positions; and still others provided openings for scholar-bureaucrats whose career prospects had faltered. Not only individual preferences but also family backgrounds, scholarly competences, patronage ties, marital relationships, and even sheer coincidence played a role in the development of the careers of individual scholar-bureaucrats.²

The inception of the Ottoman scholarly-bureaucratic career track dates to the time of Mehmed II (r. 1451–81). In a law code issued toward the end of his reign, Mehmed II arranged the educational and judicial positions in the empire into a hierarchy, prescribing that Ottoman scholars would teach in a series of ranked madrasas before being appointed as professor to the highest madrasas in the land, the Sahn Madrasas,³ which he had built in 1463–70.⁴ They would then be appointed to the lucrative judgeships of the central cities, such as Bursa, Edirne, and Istanbul. Finally, they would be promoted to the chief judgeships (*kazaskerlik*) of Anatolia and Rumelia. Scholar-bureaucrats who followed the professional path of teaching in a series of madrasas and then served in lucrative top judicial positions were called dignitary scholar-bureaucrats (*mevâli*). Alternatively, im-

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- 1 The Ottoman scholarly-bureaucratic structure resembled the *cursus honorum*, the Roman career and rank structure for political and administrative cadres. For more on the Roman system, see Hans Beck, *Karriere und Hierarchie: Die römische Aristokratie und die Anfänge des cursus honorum in der mittleren Republik* (Berlin: De Gruyter, 2005).
- 2 Abdurrahman Atçıl, *Scholars and Sultans in the Early Modern Ottoman Empire* (Cambridge: Cambridge University Press, 2017), 170–187.
- 3 The Sahn Madrasas are the eight madrasas in the complex built by and named after Mehmed II.
- 4 Abdülkadir Özcan, ed., *Kânûnnâme-i Âl-i Osman* (Istanbul: Kitabevi, 2003).

mediately upon graduation, or after receiving a few low-level professorships, one could move to a judgeship position and become a town judge (*kasabat kadısı*). This paid better in the short run, but in the long term it eliminated one's chances of graduating to the lucrative top judgeship positions, which one could attain only after teaching in a series of madrasas.⁵

The scholarly-bureaucratic track that Mehmed II defined began to take on a life of its own in the sixteenth century, when it expanded and ultimately exceeded the law code and precedent of Mehmed II's time. As new madrasas were built, new professorships were created, sometimes serving as a new step in the established career line, sometimes as a step of equal rank with existing positions, and sometimes even as something of a parallel path on the traditional career ladder. Judgeships, too, were reorganized along similar lines, with some positions also merging with others to create new positions. Within this system, some high-ranking positions occasionally lost their prestige and were demoted, and lower-ranking positions were sometimes elevated in their stead. The government appears to have been the primary actor here, presiding over this system through its control of appointments; however, other actors, such as the founders of madrasas (Ottoman sultans, members of the dynasty, the ruling elite, and other patrons) and the appointees themselves, also affected the structure through their acts, demands, and decisions.⁶

The Ottoman scholarly-bureaucratic career track was thus dynamic, making it difficult for historians to capture. They use metaphors of ladders, avenues, and paths, often picking a certain period, generally the second half of the sixteenth century, to produce a best-fit model of the hierarchy, diagramming the career track and the alternative lines within it, and using this as the basis for analyzing developments within the system.⁷ Developments in the careers of scholar-bureaucrats are then treated as leading towards or digressing away from the model, instead of being evaluated in their own terms.

5 Richard C. Repp, *The Müfti of Istanbul: A Study in the Development of the Ottoman Learned Hierarchy* (London: Ithaca, 1986), 27–72.

6 Atçıl, *Scholars and Sultans in the Early Modern Ottoman Empire*, 119–211.

7 Repp, *The Müfti of Istanbul*; Mehmet İpşirli, “Osmanlı İlmiye Mesleği Hakkında Gözlemler, XVI–XVII. Asırlar,” *Osmanlı Araştırmaları* 7 (1988): 273–85; Yasemin Beyazıt, *Osmanlı İlmiye Mesleğinde İstihdam (XVI. Yüzyıl)* (Ankara: Türk Tarih Kurumu, 2014); Atçıl, *Scholars and Sultans*; Baki Tezcan, “The Law School of Mehmed II in the Last Quarter of the Sixteenth Century: A Glass Ceiling for the Less Connected Ottoman Ulema,” in *Ottoman War and Peace: Studies in Honor of Virginia H. Aksan*, ed. Frank Castiglione, Ethan Menchinger, and Veysel Şimşek (Leiden: Brill, 2019), 237–82; Cornell H. Fleischer, *Bureaucrat and Intellectual in the Ottoman Empire: The Historian Mustafa Âli, 1541–1600* (Princeton: Princeton University Press, 1986), 191–231; Madeline C. Zilfi, *The Politics of Piety: The Ottoman Ulema in the Postclassical Age (1600–1800)* (Minneapolis: Bibliotheca Islamica, 1988); Denise Klein, *Die osmanischen Ulema des 17. Jahrhunderts: Eine geschlossene Gesellschaft?* (Berlin: Klaus Schwarz, 2007).

We propose a novel approach that will aid historians in surmounting this problem. Our approach is to model and represent the Ottoman scholarly-bureaucratic career track as a hierarchical network of positions. Envisaging the positions in the careers of scholar-bureaucrats as nodes and appointments between them as directed edges, we analyze the career paths as networks with the tools of social network analysis (SNA). This hierarchical network of positions can be characterized as informal, as the ranks and positions of the actors in it (i.e., the teaching and judicial positions) were not entirely prescribed from above but developed semi-informally through the participation of multiple actors over time. However, this network differs from the most common type of informal hierarchical network in one significant respect: the relationship between positions did not signify a relationship of authority. In other words, the holders of the higher positions did not have the right to give orders to the holders of lower-level ones.⁸ In terms of authority, all positions and their holders were equally subordinate to the central government, which managed the appointments and gave orders to all. “Hierarchical” here is thus used in a limited sense, signifying only the level of prestige that each position carried and its distance from the top level.

We collect relational data for the positions from the careers of 56 dignitary scholar-bureaucrats who held the chief judgeships of Anatolia and Rumelia during the period 1540–1622. We then divide the network into two, representing two different periods, 1516–1569 (Period I) and 1570–1622 (Period II), in order to identify the changes in the network over time. Revealing general and local patterns and outliers, we identify structural characteristics and transformations in the careers of chief judges during these periods. In addition, zooming in and out on the networks of positions by setting a frequency cut-off, we reach conclusions about the patterns of solidification and dispersion in the career paths of chief judges in different periods. Where our findings are particularly revelatory, we compare the results of our analysis with existing knowledge about the careers of scholar-bureaucrats to indicate the areas where SNA methods and visualizations confirm, correct, or add to knowledge acquired through traditional historical methods.

8 Charles Kadushin, *Understanding Social Networks: Theories, Concepts, and Findings* (New York: Oxford University Press, 2012), 39–40; Herbert A. Simon, *The Sciences of the Artificial* (London: The MIT Press, 1996), 183–86; David Krackhardt, “Graph Theoretical Dimensions of Informal Organizations,” in *Computational Organizational Theory*, ed. Kathleen Carley and Michael Prietula (Hillsdale, NJ: Lawrence Erlbaum Associates, 1994), 89–91.

The Data and Analyses

We examine the professional careers of the 56 scholar-bureaucrats who received an appointment to one or both of the two top positions, the chief judgeships of Rumelia and Anatolia, during the period extending from 1540, the beginning of the reliable documentary record, to 1622, the year of Osman II's dethronement and death.

We draw upon two key sources from the period, both biographical dictionaries of scholars and Sufis: Ahmed Taşköprizade's (d. 1561) *Al-Shaqa'iq al-Nu'maniyya fi 'Ulama' al-Dawla al-'Uthmaniyya* (*The Crimson Peonies: Scholars of the Ottoman State*) and Nevizade Atayi's (d. 1635) *Hada'iq al-Haqa'iq fi Takmilat al-Shaqa'iq* (*The Gardens of Truths: Sequel to the Crimson Peonies*).⁹ These sources provide information about the careers and life stories of all 56 scholar-bureaucrats who served in the chief judgeship positions during the period concerned. These two sources are not without their limitations,¹⁰ but for our purposes here – examining professional appointments from one position to another – the information they provide matches the evidence on professional appointments in contemporary Ottoman government documents.¹¹ We therefore accept them as trustworthy, but we also supplement the data they offer in cases where official documents contain additional information about the professional appointments of the scholar-bureaucrats being studied.

To compile the information these sources contain on the careers of all the chief judges who held office during the period 1540–1622, we created a data set with all their appointments to professorship and judgeship positions prior to their chief judgeships, as well as the dates for these appointments. The data set contains a total of 122 positions (99 teaching positions and 23 judicial positions) over a

9 Taşköprülüzâde Ahmed Efendi, *Eş-Şekâ'iku'n-Nu'mâniyye fî Ulemâi'd-Devleti'l-Osmâniyye*, ed. Muhammet Hekimoğlu (Istanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, 2019); Nevizâde Atâî, *Hadâiku'l-Hakâik fî Tekmileti's-Şakâ'ik*, ed. Suat Donuk (Istanbul: Türkiye Yazma Eserler Kurumu Başkanlığı, 2017).

10 For example, the authors had their own networks in the scholarly world, which affected the flow of information to them as well as their interpretation of intellectual and personal characteristics of particular scholars. For further information about the family and intellectual background and scholarly network of Ahmed Taşköprizade, see Abdurrahman Atçıl "Osmanlı Dünyasında Değişen Şartlar Karşısında Taşköprülüzâdeler (XV. ve XVI. Yüzyıllar)," in *Taşradan Merkeze Bir Osmanlı Ulemâ Ailesi: Taşköprülüzâdeler ve İsmüddin Ahmed Efendi*, ed. Müstakim Arıcı and Mehmet Arıkan (Istanbul: İLEM Yayınları, 2021), 167–91, esp. 180–86. For Atayi, see Suat Donuk, "Giriş," in *Hadâiku'l-Hakâik*, 109–54.

11 For the available official documents on the professional appointments of scholar-bureaucrats from the sixteenth century, see Ercan Alan and Abdurrahman Atçıl, *XVI. Yüzyıl Osmanlı Ulema Defterleri* (Ankara: Türkiye Bilimler Akademisi, 2018).

period of about 100 years, from 1516 (the date of the earliest post in the careers of the selected chief judges) to 1622 (the date our last chief judge was appointed).¹² Because one of our goals is to account for change in the appointment patterns and career trajectories of scholar-bureaucrats, we then divided our data into two periods of roughly 50 years each: Period I (1516–69) and Period II (1570–1622). This division enables us to read our results in parallel with the existing literature, which takes the second half of the sixteenth century, and especially the 1570s, as a turning point in the career track of scholar-bureaucrats.¹³

Here a caveat is in order. The career track of scholar-bureaucrats was, as we have noted, dynamic – each appointment either opened a new path or strengthened or weakened an existing one, meaning that the network was always changing. But any representation of it for the purpose of analysis or visualization, including the graphs we offer below, must by necessity be static – unless we give a series of snapshots of the network at each and every appointment. Though our graphs may be imperfect vessels, they are based on a data set that preserves the dynamism of the network. Because that data set contains the dates for all the appointments, it gives us the ability to “take time seriously,” to divide the network into different periods and account for change through SNA analysis and visualization.¹⁴

Attending to the sequence of the appointments, we record an appointment as a directed relation between two positions represented by nodes, so each “appointment” is really a transition, or promotion, from one position to another. For example, the appointment of Malul Emir Efendi (d. 1555) to one of the Sahn Madrasas as professor after teaching in the Bursa Sultan Madrasa as professor (without occupying any other teaching or judicial position in between) is recorded in our data set as a relation directed from the latter post to the former post.¹⁵ Similarly,

12 We could not find information in our sources about the first teaching positions of seven chief judges; we thus refer to these as “anonymous madrasas” in our data set.

13 The gradual increase in the number of scholar-bureaucrats put a strain on the system, leading, around 1570, to adjustments to the existing rules of appointment and promotion to allow the system to handle a greater number of people. Around the same time, some families increased their power in the scholarly career track by their members occupying the top positions more frequently than others did. See Abdurrahman Atçıl, “The Route to the Top in the Ottoman İlmiye Hierarchy of the Sixteenth Century,” *The Bulletin of the School of Oriental and African Studies* 72 (2009): 489–512; Beyazıt, *Osmanlı İlmiyye Mesleğinde İstihdam (XVI. Yüzyıl)*, 36–37, 107–145; Baki Tezcan, “The Ottoman Mevali as ‘Lords of Law,’” *Journal of Islamic Studies* 20 (2009): 383–407; Tezcan, “The Law School of Mehmed II.”

14 For further discussion on this topic, see Claire Lemerrier, “Taking Time Seriously: How Do We Deal With Change in Historical Networks?,” in *Knoten und Kanten III: Soziale Netzwerkanalyse in Geschichts- und Politikforschung*, ed. Markus Gamber, Linda Reschke, and Marten Düring (Bielefeld: Transcript Verlag: 2015), 183–211.

15 Taşköprülüzâde, *Eş-Şekâ’ik*, 763.

Period	Number of positions			Number of appointments	Number of unique appointments (duplicates removed)
	Teaching	Judicial	Total		
Period I (1516–69)	72	16	88	253	170
Period II (1570–1622)	53	18	71	382	175
Both periods (1569–1622)	99	23	122	635	308

Tab. 1 Summary of the Data of the Professional Appointments of 56 Chief Judges

Bostan Efendi's (d. 1570) appointment to the judgeship of Bursa after teaching in the Sahn Madrasas (without occupying any other teaching or judicial positions in between) is represented as a directed relationship from the Sahn Madrasas to the Bursa judgeship.¹⁶ In our database, we have 635 appointments recorded as directed relations, 253 for Period I and 382 for Period II. Some of these repeat, such as the directed relationship in the example of Malul Emir Efendi above, between the Bursa Sultan Madrasa and Sahn Madrasas – four other scholar-bureaucrats connected these two positions in the same way, moving from a teaching position at the former to one at the latter. For each such directed relation between two positions, which we dub a “unique appointment,” we treat the frequency as indicating the strength of the relationship between the two positions.

We have not come across any SNA tools specifically developed to examine professional career paths as a hierarchical network. Thus, we use a combination of analysis and visualization tools readily available in the UCINET 6 package and in NetDraw.¹⁷ We first visualize the network of positions as color-coded graphs with a graph theoretic layout. We then use David Krackhardt's criteria for measuring informal hierarchical networks to detect hierarchy in our networks. Though Krackhardt's measures were developed to examine the structure of command hierarchies, we nevertheless find them useful for detecting the level of hierarchy in the networks in our case, even though they involve no chain of command.

¹⁶ Atâi, *Hadâik*, 527–31.

¹⁷ Stephen P. Borgatti, Martin G. Everett, and Linton C. Freeman, UCINET 6 for Windows: Software for Social Network Analysis (Harvard, MA: Analytic Technologies, 2002); Stephan P. Borgatti, Netdraw Network Visualization (Harvard, MA: Analytic Technologies, 2002).

Afterwards, we recode our data with different cut-off values in order to distinguish between deep-rooted norms and new tendencies in appointment patterns. We also use betweenness centrality analysis, which enables us to determine the importance of particular positions as bridges, or stepping-stones, between other positions, and to trace the rise and fall of this bridging role over time. Finally, in order to examine different layers within the network, we utilize clustering analysis based on the structural equivalence of the nodes.

Visualizing the Careers of Scholar-Bureaucrats

As the Ottoman bureaucracy grew in the sixteenth century, so too did the empire's madrasa system. More than 150 new madrasas were built in Istanbul and other cities to supply graduates to meet the empire's demand for scholar-bureaucrats.¹⁸ The new madrasas also drove growth, creating a demand for new positions for their swelling ranks of new graduates. In response, the Ottoman government created new judgeships and teaching positions for scholar-bureaucrats, which allowed it to maintain the integrity of the system.¹⁹

The incorporation of these new positions into the career line of scholar-bureaucrats was a complex and gradual process. Multiple actors, often with conflicting motivations, interacted and changed the structure of the career track. Some government decisions concerning the rank of specific positions proved unsustainable, and some unexpected patterns of appointments emerged out of the preferences of scholar-bureaucrats themselves.

The statistics in Table I indicate a change from Period I (1516–69) to Period II (1570–1622). The number of teaching positions decreased from 72 to 53, while the number of judicial positions increased from 16 to 18. Since all of the positions in the table were stops in the careers of scholar-bureaucrats who ultimately went on to hold a chief judgeship, these data suggest that some of the teaching positions which led to the top positions in Period I must have lost significance and been excluded from the path in Period II. Simultaneously, new judgeships were introduced into the career track in Period II. The overall size of the network of positions decreased from 88 to 71; however, the significance of this decrease is difficult to assess based on these numbers alone. Perhaps the career paths be-

18 Gülru Necipoğlu, *Architecture, Ceremonial, and Power: The Topkapı Palace in the Fifteenth and Sixteenth Centuries* (New York: Architectural History Foundation, 1991), 119–21; İ. Aydın Yüksel, *Osmanlı Mimarisinde Kanuni Sultan Süleyman Devri (1520–1566): İstanbul* (İstanbul: İstanbul Fetih Cemiyeti, 2004), xi–xii, 745–80; Hüseyin Demir, *Die osmanischen Medresen: Das Bildungswesen und seine historischen Wurzeln im Osmanischen Reich von 1331–1600* (Frankfurt: Peter Lang GmbH, 2005), 97.

19 Atçıl, *Scholars and Sultans*, 145–69; Beyazıt, *Osmanlı İlmiye Mesleği*, 107–69.

came shorter from Period I to Period II, or perhaps they merely became clearer, with fewer possible avenues available for scholar bureaucrats en route to a chief judgeship. However, because the number of total appointments increased substantially (from 253 to 382), even as the number of unique appointments – that is, unique transitions from one position to another within the network – held steady (170 vs. 175), Period II was in fact the denser network. From Period I to Period II, there was a substantial increase in both the average number of appointments per position (2.9 vs. 5.4) and, because of the declining size of the network, the average number of unique appointments (1.9 vs. 2.5). This suggests that scholar-bureaucrats received new appointments, or promotions, more frequently in Period II on their way to the top of the hierarchy. This much is apparent from the raw data. However, as will be made clear below, SNA methods offer much greater insights, making it possible to visualize the general and local patterns within the data and to detect turning points in the changing structure of the careers of scholar-bureaucrats.

The directed graph in Figure 1 represents all the unique appointments in the Period I data – 72 teaching positions (blue nodes) and 16 judicial positions (red nodes) – and the relations between them. The layout of the graph represents geodesic distances – that is, the place of each node in the graph is computed and automatically determined in NetDraw according to its distance from other nodes in the network. Since the direction of edges represents a transition or promotion from one position to another, this layout provides insights into the career prospects of scholar-bureaucrats in each position – that is, the holder of a position most likely moves to the nearest position to which an arrow is directed in the graph. For example, the early positions of scholar-bureaucrats (such as Molla Yegan Madrasa, Yörgüç Pasha Madrasa, Hüsamiye Madrasa, and Molla Hüsrev Madrasa) are located at the periphery of the graph because access/mobility from these positions to the rest is limited to a few channels. The figure shows all the potential career paths through which scholar-bureaucrats reached one of the two chief judgeships during the period 1516–69. It also reveals that during this period, teaching positions and judgeships largely constituted two separate groups. Most teaching positions were stepping-stones to other teaching positions, though a few, such as positions at the Sahn Madrasas, Şehzade Madrasa, Ayasofya Madrasa, and Süleymaniye Madrasas, also served as paths to judgeships. Likewise, judgeships mostly connected to other judgeships. Only in exceptional cases was a relationship directed from judicial positions to teaching positions – for example, the judgeship positions of Kütahya and Balat.

Such exceptional cases may prove to be just that, exceptions, or they may indicate a new pattern emerging in the careers of scholar-bureaucrats – treated in isolation, it is difficult to say. Our analyses and visualizations for this period merely alert us to these developments; however, by comparing these results with those for the following period, as we do below, we gain the ability to draw more useful conclusions.

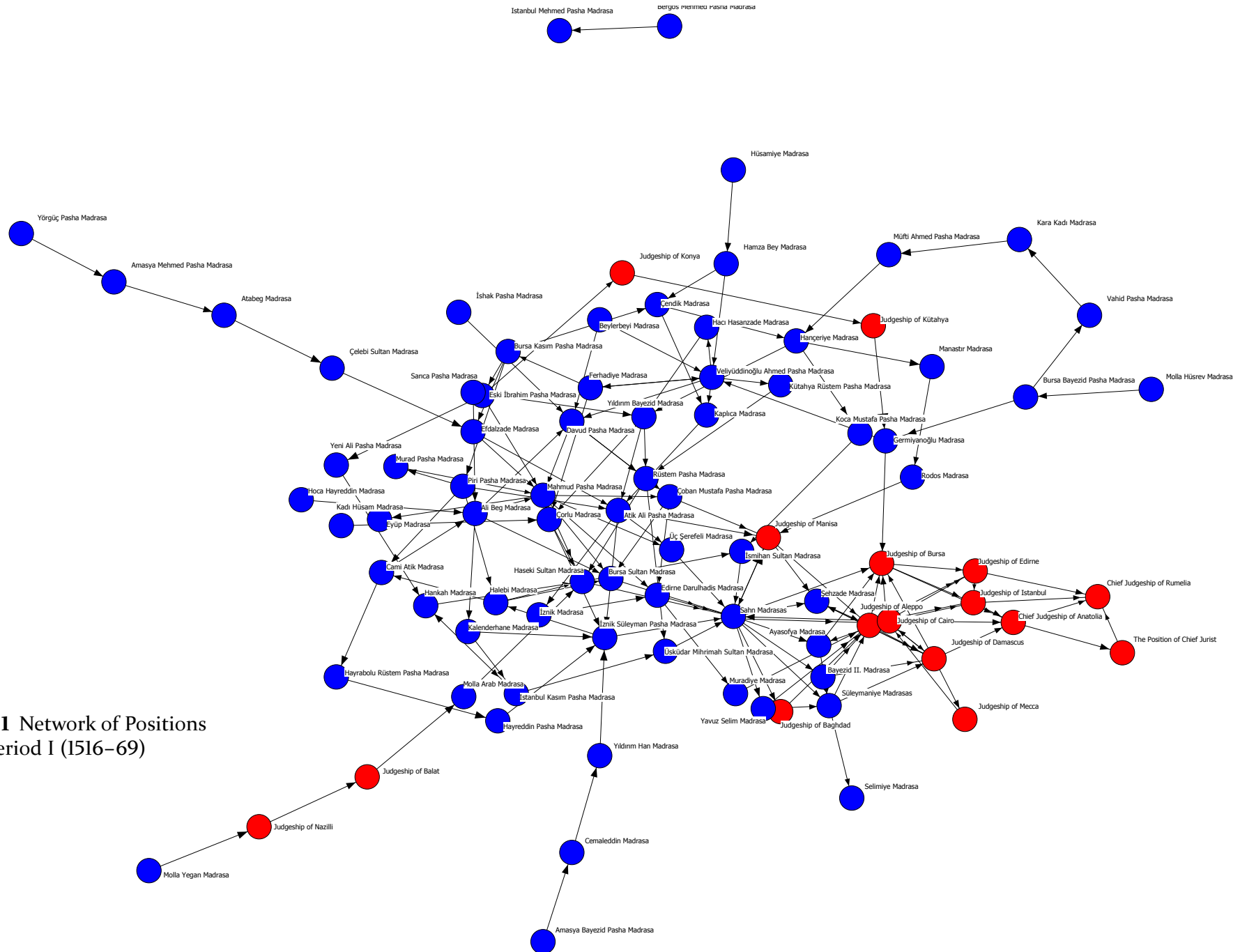


Fig. 1 Network of Positions
in Period I (1516–69)

Fig. 2 Network of Positions during Period II (1570–1622)

The graph in Figure 2 shows all 175 unique appointments of scholar-bureaucrats during Period II (1570–1622), to 71 positions – 53 teaching positions (blue nodes) and 18 judicial positions (red nodes). As in Figure 1, above, the automatically configured graph layout in NetDraw represents the geodesic distance of all the nodes from one another.

A comparison between the graphs in Figure 1 and Figure 2 allows us to see the continuities and changes in the network structure of positions from Period I to Period II. The concentration of professorships and judgeships into distinct clusters on either side of the graph suggests that the overall distance between the groups of teaching and judicial positions observed in Period I (Figure 1) continued in Period II (Figure 2). Namely, teaching positions direct arrows to other teaching positions, while judicial positions direct arrows to other judicial positions. The Süleymaniye Darülhadis Madrasa in Figure 2 appears as an exception, because the blue node representing it is located among the red nodes. As was the case in Figure 1, the Sahn Madrasas occupy the center of the graph, acting as outlets for different paths to the top positions.

Yet unlike the situation in Figure 1, where a position at the Sahn Madrasas was the final teaching position held prior to a move to one of the judgeships, in Figure 2, the occupants of a teaching position at one of the Sahn Madrasas mostly went on to serve in other teaching positions before taking up a judgeship en route to the positions of chief judgeship. This indicates a turning point in the status of the Sahn Madrasas in the network of the positions in the careers of chief judges from the 1570s. This changing status is something that existing scholarship has pointed to;²⁰ our analysis corroborates this and brings precision to scholarship's insights on the matter.

We observed the exceptional locations of the judgeships of Balat and Kütahya in the networks of positions in Period I (Figure 1), where they were among the few judicial positions that directed relationships to teaching positions. Of the two, Balat disappears from the network in Period II. This indicates that its appearance in the network in Period I was irregular. However, the judgeship of Kütahya now appears as part of an alternative path, one that did not exist in Period I at all. This alternative path started from the Sahn Madrasas and continued exclusively through judgeships (Diyarbakır–Kütahya–Yenişehir–Medina–Istanbul). In addition to this new finding, which should be of interest to Ottomanists as a potentially noteworthy new trend in the career ladder, Figure 2 also helps qualify and add nuance to what historians already know about the career paths of chief judges. Atçıl mentions the rise of over a dozen new dignitary (*mevleviyet*) judge-

20 Repp, *The Müfti of Istanbul*, 42–45; Atçıl, “The Route to the Top,” 499–502; İpşirli, “Osmanlı İlmîye Mesleği Hakkında Gözlemler, XVI–XVII. Asırlar.”

ship positions, which could become steps to top positions, after 1570.²¹ Of these, Figure 2 indicates that only three – Diyarbakır, Kütahya, and Yenişehir – became steps in the careers of chief judges in Period II, which indicates their relative superiority to others, namely that their holders continued their way to the top chief judge positions, while the careers of the occupants of the other new *mevleviyet* judgeships plateaued somewhere on the way.

Detecting the Hierarchy in the Network of Scholarly Positions

We propose that the career track of scholar-bureaucrats can be conceived as a hierarchical network – teaching and judicial positions as nodes, and appointments between them as edges. The government did not single-handedly determine the structure of this career line. It issued no organizational chart defining the ranks of positions or guiding the appointments and promotions of scholar-bureaucrats, at least not during the period concerned in this study. Instead, the patterns of appointments and promotions that formed the career track arose from a combination of ad hoc decisions by the government and a host of different acts and demands on the part of many other actors. We can therefore treat it as an informal organization.²² In order to test the viability of conceiving the career track of scholar-bureaucrats as a hierarchical network, we use graph theoretical dimensions (GTD) developed by David Krackhardt to measure the structure of informal organizations.

Krackhardt takes an out-tree structure as the model of the perfect arrangement of nodes in a hierarchical network, and calculates four measures to assess the level of hierarchy by using graph theory: (1) Connectedness, (2) Hierarchy, (3) Efficiency, and (4) Least Upper Boundedness (LUBness).²³ Any violation of the perfect arrangement detracts from the perfection of the hierarchy. By dividing the number of such violations by the total number of possible violations and subtracting the result from a perfect score of 1, we are left with a value of between 0 and 1 for each of the criteria, with a higher score indicating greater similarity to the out-tree.

21 These were Diyarbakır, Filibe, Galata, İzmir, Konya, Kütahya, Manisa, Maraş, Sarajevo, Thessaloniki, Tabriz, Tripoli, Yenişehir, Gallipoli, Kayseri, Üsküdar, and Cyprus. Atçıl, *Scholars and Sultans*, 197.

22 Simon, *The Sciences of the Artificial*, 183–86.

23 Krackhardt, “Graph Theoretical Dimensions,” 89–111. See also Martin Everett and David Krackhardt, “A Second Look at Krackhardt’s Graph Theoretical Dimensions of Informal Organizations,” *Social Networks*, 34, no. 2 (2011): 159–63, <https://doi.org/10.1016/j.socnet.2011.10.006>.

Krackhardt's model is a popular way of measuring the level of effectiveness of the flow of commands in informal organizations.²⁴ But as mentioned above, the career line of scholar-bureaucrats was not a hierarchy of command. Regardless of their place in the organization, the holders of positions along the career line took commands solely from the central government; those in higher positions did not have the right to give commands to those below them. Instead of a hierarchy of command, the positions in the career track of scholar-bureaucrats were ranked according to their prestige and the income they would bring. Keeping this difference in mind, we will apply Krackhardt's model to our data and calculate scores for his four criteria in UCINET to detect the level of hierarchy in the networks of positions visualized in Figures 1–2, and interpret what these scores may signify.

Maximal scores for the four GTD in Table 2 indicate that our graphs in Figures 1–2 are likely to be out-tree shaped and indicate the viability of our conception of the career track of scholar-bureaucrats as a hierarchical network.

Connectedness concerns the availability of access from one node to the others in the graph, which is treated as an undirected graph. This measure is irrelevant for our data, as the connectedness is inherently maximal (i.e., 1), since every point represents a position occupied by a scholar-bureaucrat en route to another – there are no positions that do not connect to another position. The apparent deficiency in the connectedness score for the network in Period I (0.9551) results from our division of the network into two periods. Some nodes in the whole network in Period I appear unconnected because the data for the nodes that connect them are treated in Period II.

Hierarchy concerns the availability of reciprocal access between nodes in a directed graph. The hierarchy score is maximal if there is no reciprocal access. In a situation of maximal hierarchy, all the nodes are expected to be in a clear relationship of superiority and inferiority vis-à-vis one another. As far as the career line of scholar-bureaucrats is concerned, a less-than-maximal hierarchy score may indicate the frequency of positions with uncertain ranks, the addition of new positions whose rank was not clear, or exceptional appointments in a given period. For example, during Period I, when the network has a hierarchy score of 0.9596, the Sahn Madrasas and the judgeship of Manisa had reciprocal rela-

24 For example see, Pietro Beritelli, "Tourist Destination Governance through Local Elites: Looking beyond the Stakeholder Level" (Post-doctoral thesis, University of St. Gallen, 2011); Annika Baumann, Benjamin Fabian, Stefan Lessmann, and Lars Holzberg, "Twitter and The Political Landscape – A Graph Analysis of German Politicians," *ECIS Research Papers* (2016); Ryan Whalen, "The Structure of Federal eGovernment: Using Hyperlinks to Analyze the .gov Domain," *Open SIUC* (2011).

Krackhardt's GTD Measures	Period I (1516–69)	Period II (1570–1622)
Connectedness	0.9551	1.0000
Hierarchy	0.9596	0.9133
Efficiency	0.9779	0.9619
LUBness	0.8207	0.8087

Tab. 2 Krackhardt's GTD Scores for the Career Line of Chief Judges (1516–1622)

tions – that is, at least one scholar-bureaucrat was appointed to the judgeship of Manisa after teaching at the Sahn Madrasas, while at least one other followed the reverse path (Figure 1).

The decrease in the hierarchy score of the network from Period I (0.9596) to Period II (0.9133) points to a strain and a change in the structure of the network. During Period II, some positions in the network displayed an uncertainty as far as the background of appointees was concerned. For example, Eyüp Madrasa both extended and received relationships from the Sahn Madrasas (Figure 2).

The *efficiency* measure in Krackhardt's GTD indicates the level of the redundancy of edges in the network. The network with the minimum number of edges for the undirected network to become connected ($N - 1$, N = the number of nodes) is considered maximally efficient and given a score of 1. An increase in the number of edges beyond the minimum required will result in redundancy by creating multiple paths and cycles between nodes, thus decreasing the efficiency score.

As far as the career line of chief judges is concerned, assuming that there are no reciprocated connections among the positions in the network (Krackhardt ignores the direction of edges in his first three measures), the efficiency score could be taken as an indicator of the level of differentiation among the ranks of positions. A high efficiency score indicates consistency in promotions, while a low efficiency score suggests the existence of multiple paths between positions, thus the lack of an identifiable pattern in appointments.

The efficiency score for Period I is 0.9779, while the score for Period II is 0.9619. Although not maximal, these scores are relatively high, showing that our networks of positions in Figures 1–2 are highly efficient, and suggesting that there was a consistent pattern of promotion, with little redundancy in the form of multiple paths between positions.

LUBness concerns the frequency with which pairs of nodes in the network receive a connection from another node of a higher rank (least upper bound), which

in turn can receive a connection from a node with an even higher rank.²⁵ The lack of a least upper bound for a pair decreases the LUBness score for the hierarchical network. This is the only measure among Krackhardt's four measures that takes the direction of edges into consideration. It appears that the LUBness measure is intended to test the availability of appeal for actors in a command-based hierarchical network. Because the career line of scholar-bureaucrats is not a command-based hierarchical network, and because the edges are directed to the top positions rather than the reverse – that is, it appears closer to an in-tree than an out-tree – the LUB scores are of little relevance in our case.

We construed the positions and their connections in the careers of scholar-bureaucrats as a hierarchical network and collected and manipulated the data accordingly. Thus, we were able to easily implement Krackhardt's GTD and swiftly obtain insights concerning the level of hierarchy in our network. High GTD scores suggests our graphs in Figure 1 and 2 are hierarchically structured, even though a cursory look at them did not allow us to notice this. Since we purposefully examine a connected network of positions, the scores of connectedness were maximal or close to maximal in both periods. However, the measures of hierarchy and efficiency help highlight the contours of the network and draw our attention to shifting tendencies and changes in the career track of scholar-bureaucrats in both networks. The rarity of redundant edges and multiple paths in a connected network of positions suggests a high level of hierarchy – that is, established patterns of appointment in the career track of scholar-bureaucrats – in both periods.

Visualizing the Established Patterns in the Network of Positions

Having determined the viability of conceiving the career track of scholar-bureaucrats as a hierarchical network, we now want to look at the structure at the very core of the network. To do so, we take the same data and set a cut-off value of 2, thereby limiting our data set to relations with a frequency of 3 or higher (Figure 3).

The graph in Figure 3 enables us to see the core of the network in Period I by showing well-trodden paths on the way to the top positions, as well as the strength of the connections between these positions. The width of the lines and the numbers on them show the frequency of the relevant appointment. In addition, we calculated Freeman betweenness centrality degree for the nodes in the network – that is, how often a node stands on the geodesic paths of any other two

25 Krackhardt, "Graph Theoretical Dimensions," 99–100; Everett and Krackhardt, "A Second Look at Krackhardt," 162.

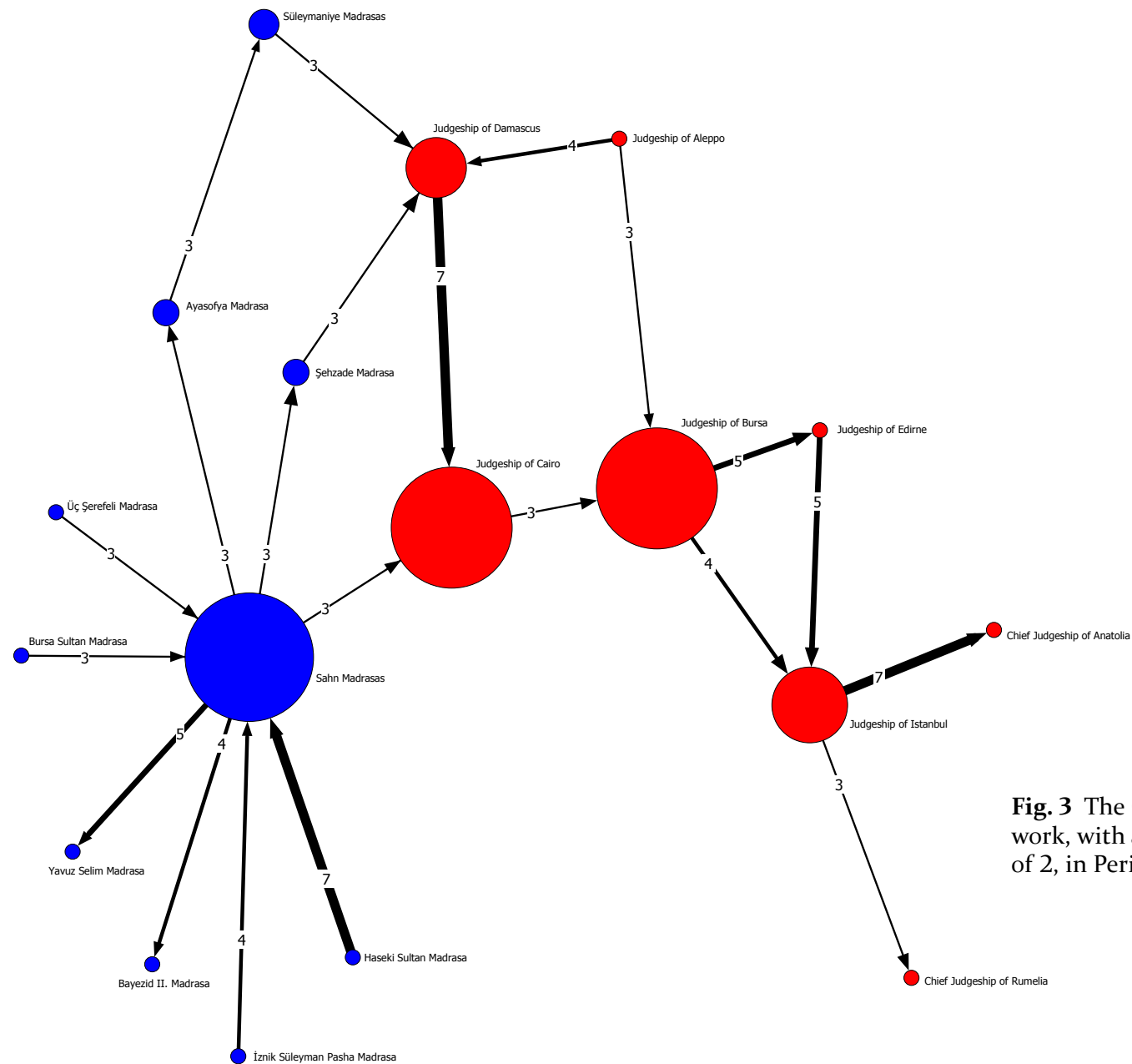


Fig. 3 The Core of the Network, with a Cut-off Value of 2, in Period I (1516–69)

nodes within an unweighted graph, indicating its bridging role – and this is represented by the size of the nodes in Figure 3.²⁶

The layout of the network graph, representing geodesic distances, and the direction of the arrows in Figure 3, make it possible to see a hierarchical pattern in the career line, likely indicating the positions' relative prestige. The madrasas of Haseki Sultan, İznik Süleyman Pasha, Bursa Sultan, and Üç Şerefeli extend connections to the Sahn Madrasas with a frequency of 3 or higher. These constitute a distinct lower tier in the hierarchy. The Sahn Madrasas then form another, middle tier and serve as a bridge – or, in SNA parlance, as “coordinator” and “representative”²⁷ – to a higher tier: the madrasas of Şehzade, Ayasofya, Bayezid II, and Yavuz Selim and the judgeship of Cairo. The Sahn positions in the middle tier have a particularly high degree of betweenness centrality (the size of the node in Figure 3), which indicates that a scholar-bureaucrat could not likely progress to the higher levels of the career line without first taking an appointment at one of the Sahn Madrasas.

Several paths extend out from the Sahn Madrasas during Period I. One has a distance of 1 (from the Sahn Madrasas to the judgeship of Cairo), another has a distance of 3 (Sahn–Şehzade–Damascus–Cairo), and a third has a distance of 4 (Sahn–Ayasofya–Süleymaniye–Damascus–Cairo). Two other paths – to the madrasas of Yavuz Selim and Bayezid II – do not appear to go anywhere in the graph; this is because, though a significant number of scholar-bureaucrats passed through these positions en route to chief judgeships, the positions did not consistently serve as stepping-stones into one of the most common career paths in the period.

The pattern of connections and the hierarchy between the judgeships of Damascus, Cairo, and Bursa appears clear: Damascus directs an arrow to Cairo, and Cairo to Bursa. The judgeships of Cairo and Bursa both have a high degree of betweenness centrality and are important as bridges. On the other hand, the place

26 For a brief introduction to Freeman's approach to betweenness centrality see Robert A. Hanneman and Mark Riddle, “Betweenness: Freeman's approach to binary relations,” in “Centrality and Power,” chap. 10 in *Introduction to Social Network Methods* (Riverside: University of California, 2005) http://faculty.ucr.edu/~hanneman/nettext/C10_Centrality.html#Betweenness. Also see John Scott, *Social Network Analysis* (London: Sage Publications, 2013) 83–98. Although we were able to visualize our data as weighted graphs in Figure 3 and 4 with valued relations based on the frequency of appointments, we had to apply Freeman's betweenness developed for binary relations to arrange the size of the nodes because NetDraw does not allow visualization by betweenness centrality developed for weighted graphs. For the purposes of our analysis and the limits of our assessments, however, this does not constitute a problem.

27 See Hanneman and Riddle, “Brokerage,” in “Ego Networks,” chap. 9 in *Introduction to Social Network Methods* http://faculty.ucr.edu/~hanneman/nettext/C9_Ego_networks.html#brokerage.

of the judgeship of Aleppo in the hierarchy is unclear. None of the positions in the network were in a directed relationship to the judgeship of Aleppo with a frequency of 3 or higher, but the judgeship of Aleppo did have directed relationships to the judgeships of Damascus and Bursa with a frequency of 4 and 3, respectively. In other words, although there were no positions that clearly served as stepping-stones to the judgeship of Aleppo, the judgeship itself clearly served as a stepping-stone to higher-level judgeships.

There are two paths from the judgeship of Bursa to that of Istanbul. The first is a direct path with a distance of 1 and a frequency of 4; the other is through Edirne with a distance of 2, with both connections having a frequency of 5. This shows that the relative position of the judgeships of Bursa and Edirne – that is, whether they were at the same level in the hierarchy or whether Edirne was higher – was ambiguous in Period I. However, the difference in the frequencies indicates that judgeship of Edirne tended to be higher in the hierarchy. The judgeship of Istanbul is clearly above both those of Edirne and Bursa and acts as coordinator between them and the chief judgeships of Anatolia and Rumelia.²⁸ Finally, the lack of a connection between the two chief judgeships with a frequency of 3 or higher indicates that there was no established hierarchy between them at the time: they served more or less equally as the highest positions in the land. In other words, during the period under study, there were two distinct peaks, not one, in the hierarchical network of scholarly-bureaucratic positions. It bears mentioning that their small size in the figure is not an indication of their importance. Their size merely indicates that they were the terminal points in the career path as reflected in our data set; these positions do not direct connections to any other nodes in the network.

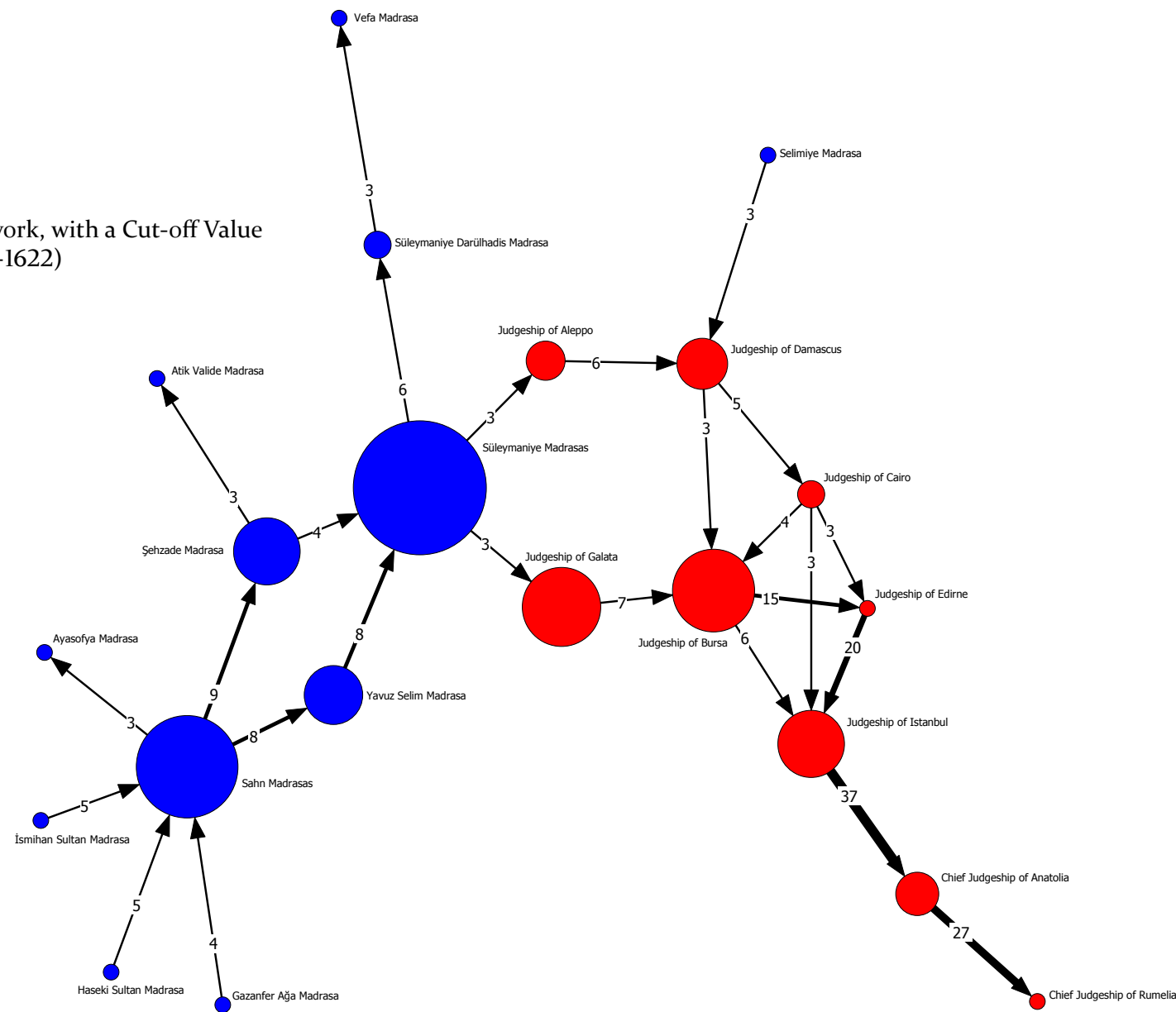
The core of the network in Figure 3 allows us to zoom in on the network of positions to see the well-established patterns where the relationships were concentrated during Period I. It shows the paths that scholar-bureaucrats most commonly used in their rise to the top positions, the two chief judgeships. As can be seen in Figure 1, there were many other paths that could lead to the same result, but these were used more rarely.

Identifying these patterns and paths, and their relative strength within a specific period, is an important accomplishment that the use of SNA techniques makes possible, one that conventional scholarship on the professional careers of scholar-bureaucrats, though sophisticated and detailed, has not been able to produce using more traditional methods.²⁹ And, as will be seen below, by allowing for an easy comparison between periods, SNA also makes it possible to de-

28 See Hanneman and Riddle, “Brokerage.”

29 For example, see Atçıl, *Scholars and Sultans*; Atçıl, “The Route to the Top;” Beyazıt, *Osmanlı İlimiye Mesleğinde İstihdam*; Tezcan, “The Law School of Mehmed II.”

Fig. 4 The Core of the Network, with a Cut-off Value of 2, during Period II (1570–1622)



termine whether relatively minor paths in one period were merely exceptions, or instead newly emerging patterns that would become more pronounced in time.

To obtain a clearer picture of the core of the network during Period II (1570–1622), we again imposed a cut-off value of 2 on the connections in our data set and implemented betweenness centrality analysis, represented by the size of the nodes. Comparing Figure 4 with Figure 3, which provided a view of the core of the network during Period I (1516–69), allows us to see the change in the structure of the network between the two periods. In addition, comparisons between Figure 2 and Figure 4 make it possible to distinguish between deeply established practices and emerging tendencies in Period II.

One thing that immediately stands out in the Period II data is the lengthening of the career line scholar-bureaucrats needed to tread en route to the top positions. For example, while in Figure 3 the shortest path from the Sahn Madrasas to the judgeship of Istanbul comprised four steps (Sahn–Cairo–Bursa–Istanbul), in Figure 4, the shortest path comprised six steps (Sahn–Şehzade/Yavuz Selim–Süleymaniye–Galata–Bursa–Istanbul). This important insight, which has been hinted at but not directly stated in the literature,³⁰ indicates that the professional mobility of scholar-bureaucrats increased – that is, they occupied more positions during their careers – during Period II. Though beyond the scope of this paper, this insight offers promising new lines of inquiry to researchers, such as the opportunity to employ temporal and spatial analysis to see how this increased mobility elongated the time required to reach the top positions and extended the geographical range of scholar-bureaucrats' physical movement from Period I to Period II.

As was the case in Figure 3, the Sahn Madrasas continued to act as a bridge, as evidenced by their betweenness centrality degree (represented by node size) in Figure 4. However, different from Figure 3, they directed relations only to the madrasas of Şehzade and Yavuz Selim, rather than enjoying direct relations to the judgeships in Figure 4. Additionally, the Süleymaniye Madrasas appear to have risen in significance in Period II, as illustrated by their high degree of betweenness centrality and their position of being representative to higher positions in Figure 4. From the perspective of existing scholarship, these findings – the fact that new steps were added to the career line in this period – are not in and of themselves new or surprising.³¹ However, the addition of betweenness centrality scores, as represented by the sizes of the nodes, adds a new dimension to our understanding of the roles these positions played by allowing us to gauge their relative strength in the network. For example, we can confidently say that the

30 Atçıl, *Scholars and Sultans*, 194–211; İsmail Hakkı Uzunçarşılı, *Osmanlı Devletinin İlmiye Teşkilâtı* (Ankara: Türk Tarih Kurumu, 1988), 55–110.

31 Atçıl, *Scholars and Sultans*, 145–55.

surest and shortest career path from teaching positions to the top judicial position, namely the chief judgeship of Rumelia, was Süleymaniye–Galata–Bursa–İstanbul–Anatolia–Rumelia. This insight and similar ones will enable researchers to know the alignment of the positions in the hierarchical network and to make inferences about the status and career prospects of their holders.

Comparing Figure 2 with Figure 4, the alternative career path leading from the Sahn Madrasas to the top via a series that is composed entirely of judgeships (Diyarbakır–Kütahya–Yenişehir–Medina–İstanbul) – discussed under Figure 2, above – disappears. The cut-off value of 2 excluded the path from the network completely. This indicates that this path was either an exception or an emerging trend during Period II. One would need to extend our analysis here to comparable data from later periods to see whether this trend solidified into an established career path over time – another potentially fruitful line of inquiry our study offers researchers.

The graph in Figure 4 shows that the judgeship of Galata, which did not exist as a step on the way to the top during Period I (Figures 1 and 3), earned a place in the career track during Period II. Similarly, the judgeship of Aleppo, whose role in the network was not clear in Period I, established a place in Period II as a step after teaching in the Süleymaniye Madrasas and as a stepping-stone to higher judgeships. To our knowledge, these nuanced observations about the relative positions of the judgeships of Galata and Aleppo are entirely new findings.

More importantly, unlike the situation during Period I, the chief judgeship of Rumelia appears as the highest position and the ultimate peak of the hierarchical network, with the chief judgeship of Anatolia reduced to a subordinate position. People moved from the judgeship of Istanbul to that of Anatolia, and then from the latter to the judgeship of Rumelia, but not vice versa. The changing hierarchy of prestige between the judgeships of Anatolia and Rumelia documented here clarifies an important ambiguity in the existing literature, which tends to assume either that the two positions were always equal, or that the judgeship of Rumelia was always superior.³² Here, our analysis shows that while in Period I the chief judgeships of Anatolia and Rumelia were positions of almost equal rank (as seen in Figure 3), in Period II, a clear hierarchy was established between them, with the latter becoming the highest position in the network.

To summarize, we have envisaged the structure of the Ottoman bureaucracy as a hierarchical network of positions. The graphs, which display relations among positions of different (color-coded) types with geodesic distances, are useful ways to display the main outline, complexity, and marginal areas of the network. And

32 Ibid., 200–201; Repp, *The Müfti of Istanbul*, 44–46; Mehmet İpşirli, “Osmanlı Devleti’nde Kazaskerlik (XVII. Yüzyıla Kadar,” *Belleten* 232 (1997), 609–11.

by imposing a cut-off value on the data and analyzing for betweenness centrality scores (Figures 3 and 4), it becomes possible to make observations about the core of the networks shown in Figure 1 and 2, the established paths in the career track. Comparing figures from different periods, cut-off values and measures allows us to see the changes in the network structure over time, as positions waxed and waned in prominence, took on a new character within the network, or even disappeared from the network entirely.

Identifying Clusters in the Hierarchical Network of Scholarly Positions

The foregoing analyses help outline the complex connections of the positions (i.e., appointments from one post to another) in the careers of chief judges, allowing us to see the structural properties of the network, and the changes within it, over time. Now we want to look at the network from the perspective of the nodes, teaching and judicial positions, in general. What is the value of a given position, and how do they compare to others in the network? Do some positions occupy strategic places that enable their holders to reach the top faster than others? Clustering the positions on the basis of their geodesic distances can help answer these questions. It can also make it possible to identify the tiers of the positions in the career paths, which are conceived as a hierarchical network.

Cluster analysis involves grouping together similar objects on the basis of set criteria.³³ Assuming that the length of the path from a position to the top in a career line gives us the value of that position,³⁴ we perform a clustering analysis on the basis of the geodesic distance of positions from the top positions – the chief judgeships of Anatolia and Rumelia for Period I, and the chief judgeship of Rumelia for Period II.³⁵

33 See Hanneman and Riddle, “Network Positions and Social Roles: The Idea of Equivalence,” chap. 12 in *Introduction to Social Network Methods*, http://faculty.ucr.edu/~hanneman/nettext/CI2_Equivalence.html.

34 Another way to measure the value of positions in a hierarchy is to cluster them based on the average time that passes after holding a position until reaching the top. Since the historical record is often spotty on this point (i.e., it often does not record a specific date for a particular appointment), we instead decided to cluster the positions on the basis of the number of appointments required to reach the top positions (geodesic distance).

35 To this end, we rearranged our data in UCINET, turning our binarized relational-data matrix into a geodesic-distances matrix. We then created a new valued-adjacency matrix containing only each node’s distance to the top positions; we used this matrix to identify structurally equivalent nodes based on Euclidean distance, which we then clustered accordingly. We applied cluster analysis only to the core of the networks for both periods – that is, for the data sets with a cut-off value of 2. The whole networks for Period I and Period II include many positions with exceptional appointments, making these broader data sets ill-suited for cluster analysis.

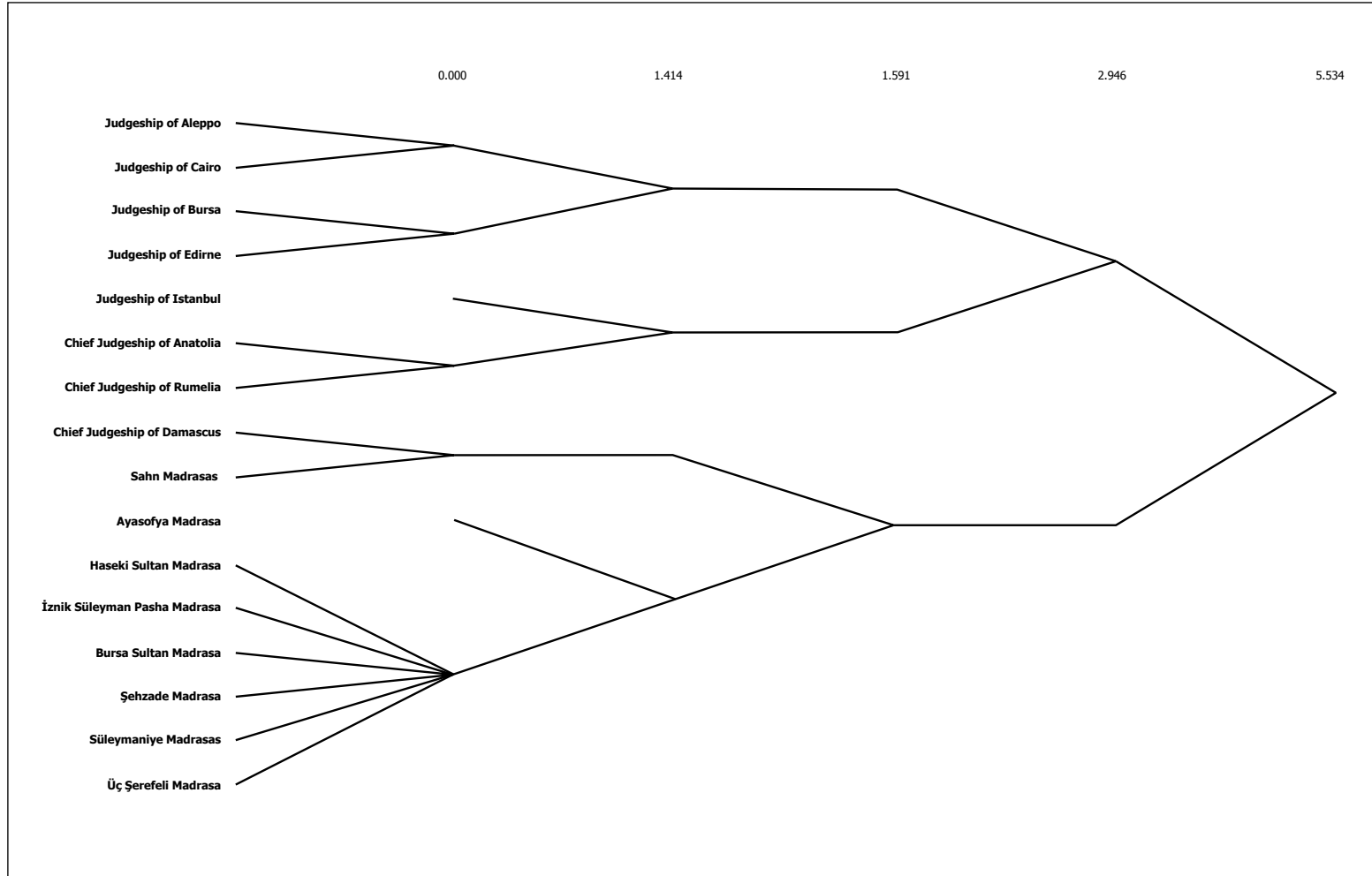


Fig. 5 Clusters of the Positions in Period I (1516–69)

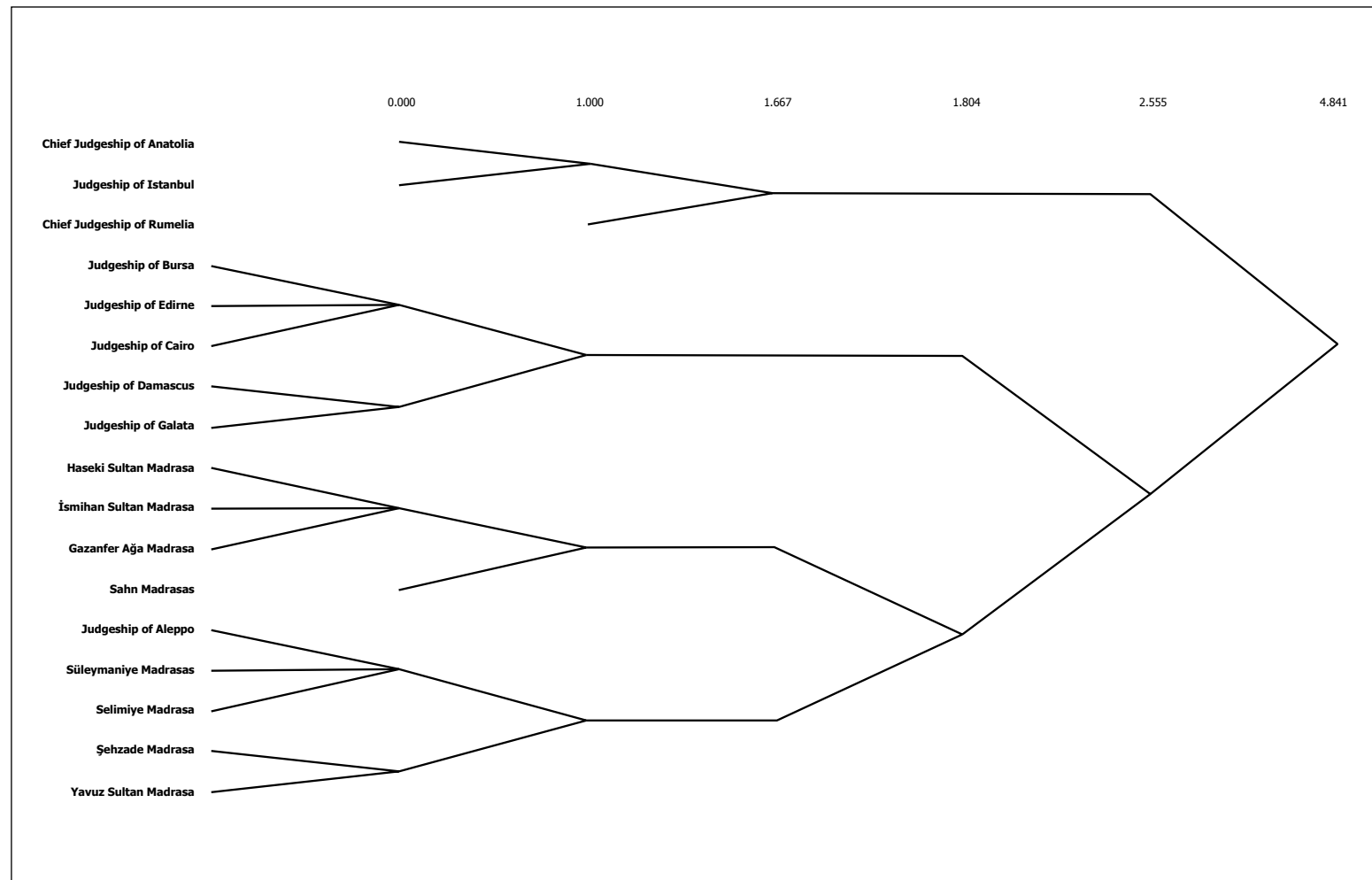


Fig. 6 Clusters of the Positions in Period II (1570–1622)

The tree diagram above (Figure 5) shows the clustering of the positions on the basis of their geodesic distances from the top positions, the chief judgeships of Anatolia and Rumelia, during Period I. At the level of zero (i.e., with no dissimilarity in terms of Euclidean distance), there are five clusters whose members are structurally equivalent: (1) The chief judgeships of Anatolia and Rumelia, which cluster together because they constitute two separate peaks (thus having a geodesic distance of 0) with unclear stratification between them (there were fewer than three, if any, connections between them during Period I); (2) the judgeships of Bursa and Edirne; (3) the judgeships of Aleppo and Cairo; (4) the judgeship of Damascus and the Sahn Madrasas; and (5) the madrasas of Haseki Sultan, İznik Süleyman Pasha, Bursa Sultan, Şehzade, Süleymaniye, and Üç Şerefeli. The judgeships of Istanbul (with a distance of 1) and Ayasofya Madrasa (with a distance of 6) each constitute a class by itself, as neither have any structurally equivalent partners in the network.

This cluster analysis on the core of the network of the positions in the careers of chief judges during Period I yields results that both confirm existing scholarship and open new avenues of inquiry. Clusters 1–2, and the fact that the judgeship of Istanbul does not cluster with any other positions, confirm our analysis above (Figure 3). Meanwhile, clusters 3–5, and the fact that the Ayasofya Madrasa does not cluster with any other positions, brings new knowledge about the relative value of these positions in the advancement of one's scholarly-bureaucratic career during the period 1516–69.³⁶

During Period II (Figure 6), the chief judgeships of Rumelia (with a geodesic distance of 0) and Anatolia (with a geodesic distance of 1) and the judgeship of Istanbul (with a geodesic distance of 2) do not cluster with each other, or any other positions at the level of zero. Each of these constitutes a separate tier in the hierarchy at the top and appears to be a class by itself within the hierarchy of positions. This confirms our finding above (Figure 4) and existing scholarship.³⁷ In addition, the Sahn Madrasas (with a geodesic distance of 6) do not group with any other position and constitute a class by themselves. This result shows the lack of a structural equivalence for the Sahn Madrasas during the period 1570–1622. In addition, it substantiates and situates in time the suggestion in the existing scholarship that they constituted a threshold.³⁸ The remaining positions constitute five clusters: (1) the judgeships of Bursa, Edirne, and Cairo; (2) the judge-

36 For the representation and discussion of the places of these positions in the scholarly career track, see for example, Repp, *The Müfti of Istanbul*, 26.

37 For example, Atçıl, *Scholars and Sultans*, 201; Repp, *The Müfti of Istanbul*, 26; Uzunçarşılı, *Osmanlı Devletinin İlmiye Teşkilatı*, 133–43.

38 Atçıl, *Scholars and Sultans*, 196–97. Ahmet Tunç Şen, “The Sultan's Syllabus Revisited: Sixteenth-Century Ottoman Madrasa Libraries and the Question of Canonization,” *Studia Islamica* 116 (2021): 203–204; Uzunçarşılı, *Osmanlı Devletinin İlmiye Teşkilatı*, 5–19; Tezcan, “The Law School of Mehmed II.”

ships of Damascus and Galata; (3) the judgeships of Aleppo and the madrasas of Süleymaniye and Selimiye; (4) the madrasas of Şehzade and Yavuz Selim; and (5) the madrasas of Haseki Sultan, İsmihan Sultan, and Gazanfer Ağa. Identifying these groups through cluster analysis is an original finding, as our existing knowledge about the relative status of these positions does not enable us to guess these clusters, with the exception of cluster 4.³⁹

Looking at the changes in the clustering patterns from Period I to Period II, it is clear that the differentiation of the positions advanced and the number of layers gradually increased. The diagrams use a Euclidian measure of distance as a measure of dissimilarity and include a numerical and graphic illustration of this. They show the level of dissimilarity required to tolerate separate clusters or to join non-clustered items together. The distance required to join all positions in Period I (five steps) is less than the distance required to do the same in Period II (six steps). This shows that the hierarchy grew increasingly stratified from Period I to Period II.

It is worth noting that in addition to the overall changes in clustering patterns, individual positions also changed their clustering partners. For example, the judgeship of Cairo clustered with the judgeship of Aleppo during Period I, but clustered with the judgeships of Bursa and Edirne during Period II. While the judgeship of Damascus was partnered with the Sahn Madrasas in Period I, it separated and instead clustered with the judgeship of Galata during Period II. Similarly, the Şehzade Madrasa left its partners from Period I and formed a new cluster with the Yavuz Selim Madrasa during Period II. The existing scholarship, to the best of our knowledge, does not provide any clue about these changes in the structural equivalence of the positions from Period I to Period II.⁴⁰

To sum up, exploring the clusters of the positions according to the criterion of geodesic distances to the top position/s helps us identify structurally equivalent positions in terms of their value as a career asset. In addition, comparing networks from different periods can show the changes in the tiers and in the groups of positions constituting these tiers. The results of our analysis broadly accord with existing scholarship, but they also go further, enabling us to learn details that could not have been acquired through traditional historical techniques.

39 For the equivalence of the madrasas of Şehzade and Yavuz Selim, see Atçıl, *Scholars and Sultans*, 147–49.

40 For example, see Cahid Baltacı, *XV–XVI. Asırlarda Osmanlı Medreseleri* (İstanbul: İrfan Matbaası, 1976); Repp, *The Müfti of Istanbul*, 26–72.

Conclusion

This study was born out of a desire to find the most efficient method to examine the professional careers of Ottoman scholar-bureaucrats. Scholar-bureaucrats typically occupied several professorships and judgeships one after another. There were no fixed rules or top-down directives imposed upon them concerning the order of the positions according to which they would pursue their careers. However, nor were their career trajectories entirely random. Rather, the order of the positions had patterned relations with multiple layers and paths; it was constantly evolving, driven by a dynamic mix of the actions and decisions of the government as well as those of scholar-bureaucrats, madrasa founders, and others. Given this dynamism, capturing and accurately representing the structural characteristics of the scholarly career track has long been a challenge for historians. Traditional historical methods, such as the qualitative examination of historical texts or manual manipulation of data, are cumbersome and poorly suited to helping historians detect and represent all the layers and paths in the professional career track, let alone how they changed over time.

In this essay, we argue that using formal SNA methods and visualizations to examine the careers of Ottoman scholar-bureaucrats helps historians to overcome some of these challenges. We conceive of the positions as nodes, which are connected through appointments represented by directed edges between them. We focused on a small subset of the overall scholarly-bureaucratic network, collecting relational data about the positions in the careers of 56 dignitary scholar-bureaucrats who held either one or both of the two Ottoman chief judgeships of Rumelia and Anatolia during the period 1540–1622. By examining these data with SNA methods and visualizations, we were able to corroborate several areas of existing knowledge concerning the career structure of scholar-bureaucrats. More importantly, however, we were able to correct, or qualify certain elements of that knowledge. For example, as opposed to the received wisdom in the literature, our analysis showed that before 1570, there was no clear hierarchy between the two chief judgeships, though many have traditionally held that Rumelia had always been the superior of the two. In addition, our analysis revealed that among a number of newly rising dignitary judgeships after 1570, only those of Diyarbakır, Kütahya, and Yenişehir served as steps in the careers of chief judges, at least during the period concerned.

By collecting data about scholarly positions and their connections, researchers are able to manipulate the data in different ways to ask new questions and to gain new perspectives. For example, in order to explore the change in the structure of the network of positions, we chronologically divided the network and the data into two: Period I (1516–69) and Period II (1570–1622). Comparing the graphs for the two different periods gave us insights about change over time that we could not have easily attained using traditional methods. We then applied Krackhardt's GTD to detect the viability of conceiving the network of positions as a hierar-

chical network, and evaluated the scores of his four measures. Krackhardt's GTD analysis suggested that our graphs for both periods were likely to be highly hierarchical. In order to reveal and examine the established hierarchy in the networks of positions for both periods, we were able to use a cut-off value to focus on only those positions that most commonly served as stepping-stones to the top. This gave us the ability to zoom in on the networks, and to gain new knowledge about the waxing and waning features in the career trajectories of chief judges. Finally, we clustered the positions in our networks according to their geodesic distance from the top positions, the chief judgeships of Rumelia and Anatolia. This enabled us to gain new insights about the relative value of the positions in the structure and see the shifts in the groups of similar positions from Period I to Period II. All in all, manipulating the data and analyzing them using SNA techniques made it possible to change, trends, and groupings in the network of positions and to arrive at findings that are difficult to attain through traditional historical research.

Our examination of the careers of chief judges during the period 1516–1622 illustrates both the utility of conceiving of the professional career track as a hierarchical network, and the potential of SNA methods to help researchers achieve insights into and better visualize its structure. Future Ottomanist research on the career line of scholar-bureaucrats could fruitfully extend this line of inquiry – for example, by collecting data about other sections of the career line of scholar-bureaucrats, especially those who never advanced to a chief judgeship, and by analyzing that data using the same approach we have adopted here. Such investigation will reveal similarities, overlaps, and divergences in the careers of different groups of scholars; by creating SNA statistics and visualizations for different parts of the network, historians can acquire new knowledge and offer their interpretations and comparisons on more solid footing than they would otherwise. In addition, researchers could also extend our line of inquiry to the hierarchical network of scholarly positions in later periods, which will enable historians to identify patterns, trends, and changes in this particular network over an extended period of time.

In addition, it is our hope that scholars researching other historical career tracks, periods, and geographic regions may consider adopting our approach to study career paths in their own respective research areas. To the best of our knowledge, no other study has yet conceived of the career path in a particular historical profession as a hierarchical network and attempted to analyze it with SNA methods. The manipulations of the data that we carried out – such as dividing the data chronologically and by frequency, and converting relational data into a distance matrix for clustering purposes – can be adapted for an SNA-based examination of the careers of such groups as bureaucrats, clergymen, and military officers in the Ottoman Empire and elsewhere.

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