Resumen del artículo

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily

Análisis de redes sociales y estructuras narrativas: midiendo comunicación e influencia en una fuente medieval para el Reino de Sicilia

Hervin Fernández–Aceves

Universidad de Leeds

hishfe@leeds.ac.uk

Doctorando en la Escuela de Historia de la Universidad de Leeds. Reino Unido

El artículo presenta la reflexión metodológica y los resultados del enfoque que he aplicado para comprender los procesos sociales y políticos presentes en una fuente textual. El tema sobre el que se fundó el estudio fueron las interacciones entre los actores sociales tal como se desarrollan en una narrativa histórica. Un enfoque relacional puede contribuir a la comprensión de las narrativas y su utilidad histórica, y las dos preguntas principales rectoras de mi investigación fueron: 1) ¿Cómo extraer datos relacionales y construir redes que representan la información contenida en una fuente narrativa; y 2) ¿qué nos dicen las redes así construidas sobre el significado y las implicaciones del espacio social presente en el mensaje? Con el fin de concentrarme en la información sociológicamente relevante que el texto ofrece, 'traduje' un informe retórico en un conjunto relacional de datos. El primer paso de este esfuerzo consistió en trasladar una estructura textual en una construcción sociológica, es decir, en un conjunto de datos socio-relacionales. Los conjuntos de datos narrativos proporcionaron una serie de sociomatrices narrativas listas para ser analizadas a través de herramientas analíticas de redes. De éstos, el uso e interpretación de las medidas de cen-

tralidad resultó ser uno de los enfoques más fructíferos para comprender las dimensiones sociales del texto. Medidas de centralidad y prestigio resultaron útiles al explorar las interacciones narrativas de comunicación e influencia social. Este estudio intenta demostrar que, a través de un enfoque relacional, se puede superar la brecha entre los puntos de vista cognitivo y estructural y, por lo tanto, avanzar hacia una mejor comprensión de las construcciones sociales 'entre líneas' de una fuente histórica textual.

Abstract

This article presents a methodological reflection and the results of a research focus that I have applied to understand the social and political processes present in a textual source. The central issue under study was the interaction among social actors as narrated in a historical text. I anticipated that a relational approach could contribute to understanding narratives and their historical utility. The two main questions that oriented my research were: 1) how can one extract relational data and construct networks that represent the information contained in a narrative source?; and, 2) what do the networks so constructed tell us about the meaning and implications of the social space present in the message? In order to focus on the information on social and political processes embedded in the text, I "translated" a rhetorical report into a relational dataset. The first step in this process required "translating" a textual structure into a sociological construct that I call the socio-relational dataset. The narrative datasets provided a series of narrative socio-matrixes that could be explored using the tools of network analysis. Of these tools, the application and interpretation of centrality measures turned out to be one of the most fruitful approaches for understanding the social dimensions of the text, while measures of centrality and prestige proved useful when exploring the narrative interactions of communication and social influence. This study attempts to prove that a relational approach makes it possible to bridge the gap between cognitive and structural perspectives, and so advance towards an understanding of the social images found 'between the lines' of a textual source.

Reflexión teórica

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily
Hervin Fernández-Aceves

Hervin Fernández–Aceves

University of Leeds

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily

Análisis de redes sociales y estructuras narrativas: midiendo comunicación e influencia en una fuente medieval para el Reino de Sicilia

Introduction.
A narrative source for the Norman kingdom of Sicily

One of the most important sources for the study of the kingdom of Sicily, the *Liber de Regno Sicilie,* attributed to 'Hugo Falcandus,' provides a vivid and detailed account of the Norman kingdom of Sicily under William I and the first years of William II (1154-1169). This narrative source has become, for better or worse, a pillar for the understanding of the kingdom of Sicily in the second half of the twelfth century.

The studies introducing both the most recent translations of the *Liber* present a comprehensive background to an initial examination of the text: whereas Loud and Wiedemann cover the historical ambiance of the text, and provide an overview of the debate (up to 1999) about the authorship of the *Liber,* as well as a philological exploration on the classical resonances in the text,[1] E. Türk offers a short summary of the possible identification of the author, and provides synthesised individual backgrounds on relevant historical characters attested in the *Liber:* Roger II, William I, Margaret of Navarre, Maio, Matthew of Salerno,[2] the bishop-elect Richard, Stephen of Perche, Archbishop Walter of Palermo, and Romuald of Salerno.[3] Additionally, M. Fuiano's treatise on 'Hugo Falcandus' has been resourceful for a broad understanding of the morphology, style and intertextuality of

1 G.A. Loud and T. Wiedemann, "Introduction," in *The History of the Tyrants of Sicily by "Hugo Falcandus,"* 1154-69 (Manchester: Manchester University Press, 1998), 1–53.

2 Attested in the source as *notarius Matheus.* Falcandus. *De rebus circa regni Siciliae curiam gestis Epistola ad Petrum de desolatione Siciliae,* ed. E. D'Angelo (Firenze: Sismel, 2014).

3 E. Türk, trans., *Hugues Falcand. Le livre du royaume de Sicile: intrigues et complots à la cour normande de Palerme (1154-1169),* Témoins de notre histoire (Turnhout: Brepols, 2011), 7–39.

the *Liber*; although slightly out-dated, Fuiano's text offers a comprehensive study of 'Hugo Falcandus.'[4]

The name 'Hugo Falcandus' appears for the first time in a printed edition published in Paris in 1550.[5] None of the surviving medieval manuscripts cite any authority by the name of 'Hugo Falcandus', and no such person can be identified in the surviving twelfth-century charters. However, there seems to be a general agreement among previous and current scholarship that although Falcandus was not necessarily one of the main characters in the narrative, he was certainly a contemporary and probably an eyewitness.[6] Nevertheless, the question of the authorship is mostly a technical one, of little relevance for the present study, and probably incapable of solution.

This research project sought an integrative approach that would allow the comprehension of social process present in a textual, narrative source. The study was founded on the interactions between social actors that were involved in the reported machinations, as narrated in the text. I assumed that a relational approach could contribute to the understanding of narrative sources, and the main aim is twofold. First, to design a method for extracting relational data, in order to construct networks that represent the information contained in a narrative source such as the *Liber*. Second, to explore the practical implications of interpreting the networks thus constructed.

The challenge of how to translate words into numbers, and then back into words became as a result the main focus of my research. In order to focus on the information on social and political processes embedded in the text, I needed to transform the rhetoricised reports into a relational dataset; it was necessary to place the relations, not the individuals, at the centre of the study. The first requirement of such an attempt was to present the process of translating a textual structure into a sociological construct, namely, a socio-relational dataset. After the whole *Liber* was rewritten through Franzosi's Quantitative Narrative Analysis, I obtained a dataset that provided a series of narrative sociomatrices ready to be parsed through network analytical tools. Of these, centrality measures turned out to be one of the most fruitful approaches for understanding the entire text's social dimensions.

4   M. Fuiano, *Studi di Storiografia Medioevale ed Umanistica*, (Naples: Giannini Editore, 1975), 105-95.

5   Edited by Martin Gervais of Tournai. The editor explained that the binding of the manuscript, which he used for this edition, was perished and rotten. *Historia Hugonis Falcandi Siculi de rebus gestis in Siciliae regno*, Martin Gervais de Tournai (ed.), (Paris: Apud Mathurinum Dupuys, 1550). The name 'Falcandus' came almost certainly from the misreading of the alleged damaged title page; see G.A. Loud, "William the Bad or William the Unlucky? Kingship in Sicily 1154-1166." *Haskins Society Journal* viii (1999): 99-113.

6   G.B. Siragusa, "Prefazione," in *La Historia o Liber de Regno Siciliae e la Epistola ad Petrum Panormitane Ecclesie Thesaurarium di Ugo Falcando*, ed. G.B. Siragusa, FSI (Rome: Forzani e C. Tipografi del Senato, 1897), VIII–XLV.,; G. Gröber, Übersicht über die lateinische Literatur von der Mitte des VI. Jahrhunderts bis zur Mitte des XIV. Jahrhunderts, (München: W. Fink 1963 [1902]); Chalandon, *Domination normande*, LII-LXI; H. Hoffmann, "Hugo Falcandus und Romuald von Salerno," *DAEM* XXIII (1967): 116–170; C.A. Garufi, "Roberto di San Giovanni, maestro notario e il "Liber de Regno Sicilie," *Archivio Storico per la Sicilia* 18 (1944): 33-128; E. Jamison, *Admiral Eugenius of Sicily. His life and work and the authorship of the Epistola ad Petrum and the Historia Hugonis Falcandi Siculi*, (London: Oxford University Press, 1957); G.M. Cantarella, "Ripensare Falcando" *SM* 3, 34 (1993): 823-

Reflexión teórica

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily
Hervin Fernández-Aceves

Methodology. Narrative network analysis

A mew method for the interpretation of narratives

The central idea of this methodological attempt is that narrative analysis yields an understanding of social relations as embedded in the text, and that the meaning of individuals and communities in a text is conditional on their position in a system of social interactions constructed by the author. One should not only recover facts from the narrative, but also find a way to make sense of it. It is here where a structural and relational analysis seems to offer a useful approach. The narrative analysis on ps. Falcandus' *Liber* helps to reveal not only its linguistic properties—a task perhaps better left in the hands of the linguists—, but also the considerable amount of sociological information present in the narrative.[7] In Laumann's words, the peculiar and distinctive feature of network analysis "is to explain, at least in part, the behaviour of network elements—i.e. the social actors—and of the system as a whole by appeal to specific features of the interconnections among the elements."[8] In approaching the author's perspective, I needed a method that would allow me not to solely gauge its ideological stand or its linguistic resonances, but to explain the social information it contains deriving from the structure of the text. Arising from the toolbox of structural analyses of narratives, the research tool that proved helpful for this endeavour was Quantitative Narrative Analysis (QNA).

QNA is a method designed by Roberto Franzosi to study the behaviour of historical actors as reported by narrative sources.[9] This approach to historical narratives, which takes advantage of the invariant structural linguistic properties of any narrative, allows historians and social scientists to study the actions and relations of actants.[10] QNA is founded on Halliday's action-verbal clause,[11] which is defined as a process that essentially consists of three components: 1) the process itself; 2) the participants in the process; 3) the circumstances associated with the process.[12] In this way, the action-verbal clause as the characteristic narrative process implies interactions among

40; G.E. Hood, "Falcandus and Fulcaudus, 'Epistola ad Petrum, Liber de Regno Sicilie.' Literary Form and Author's Identity," *SM* 40 (1999): 1-41; E. D'Angelo, *Storiografi e Cronologi Latini del Mezzogiorno Normanno-Svevo,* (Naples: Liguori Editori, 2003), 31-3, 70-81; A. Franke, "Zur Identität des 'Hugo Falcandus,'" *DAEM* 64 (2008): 1-13; R. Köhn, "Noch einmal zur Identität des 'Hugo Falcandus'" *DAEM* 67 (2011): 499-541; and the expanded and still unpublished version of G.A. Loud's paper originally presented at a conference on Norman historiography organised at Cerisy-la-Salle, Normandy (October 2009), "The Image of the Tyrant in the work of 'Hugo Falcandus.'"

7   R. Franzosi, "Narrative Analysis—or Why (and How) Sociologists Should Be Interested in Narrative," *Annual Review of Sociology* 24 (1998): 519-20.

8   E. Laumann, "Network Analysis," in *Large Social Systems: Some Theoretical and Methodological Problems*, in: *Perspectives on Social Network Research*, ed. P.W. Holland and S. Lenhardt (New York: Academic, 1979), 394.

9   For an extensive reference on Franzosi's approach, see *Quantitative Narrative Analysis* (Beverly Hills: Sage, 2009); "Grammatiche semantiche come strumenti di organizzazione e raccolta di dati narrative," *Rassegna Italiana di Sociologia* 47 (2006):465–88; and *From Words to Numbers: Narrative, Data, and Social Science* (Cambridge: Cambridge University Press, 2004). Franzosi's work has become one

of the leading contemporary efforts to construct a strong framework for quantitative narrative analysis. See also: P. DiMaggio, "Cultural networks," in *The Sage Handbook of Social Network Analysis,* ed. P.J. Carrington - J. Scott (Thousand Oaks 2011), 286-300.

10 In narrative and sociological theory, actant is a term employed in order to speak neither of "actors" (who act) nor of "systems" (which behave).

11 A great deal of QNA's theoretical framework comes from M. A. K. Halliday's *An Introduction to Functional Grammar* (London: Arnold, 1994). For Halliday, human beings experience their inner and outer worlds and represent these experiences linguistically as processes in the clause, with three primary types of processes—doing (or material processes, further divided into happening, creating/changing, and doing (to)/acting), sensing (or mental, further divided into seeing, feeling, and thinking), and being (or relational, further divided into symbolising, having identity, and having attribute). See also R. Franzosi, "Sociology, Narrative and the Quality Versus Quantity Debate (Goethe versus Newton): Can Computer-assisted Plot Grammars Help Us Understand the Rise of Italian Fascism (1919–1922)?" *Theory and Society* 39 (2010): 593-629.

12 Halliday, *Functional Grammar* 108-9.

participants. The action-verbal clauses are thus the skeleton of the language of the narrative, and the raw material for identifying the behaviours and interactions of the actants in a text.

After rewriting the entire *Liber de Regno Sicilie* through QNA, I obtained a dataset that divides the social information embedded in the narrative into 420 events. The total number of attested social interactions, coded as semantic triplets, is 1174, together with 89 social relationships also explicitly attested in the narrative. Each interaction and relationship defines an edge that connects two characters. This dataset thus provides a list of social actants and a list of edges. The different social interactions present in the narrative were labelled in 16 different categories. These were classified, filtered, and then grouped into two general types of interactions: *communication* and *influence*.

The narrative's dataset is therefore used to build up network data stored in two separated adjacency matrices: one for each type of interaction. This means that the list of nodes, interactions, and relationships needs to be transformed into sociomatrices—i.e. an adjacency matrix that offers in a tabular format the data representing interpersonal connections. The network data is not dichotomised, as it is given in valued links (namely, the links can bear a value bigger than 1), depending on how many times each pair of characters interacted in each layer.

Centrality and Prestige

Centrality measures were primarily designed, from graph theory to social network analysis, for the identification of the "more prominent" actant in a network by measuring properties of node location in the network. The degree of importance or prominence of an actant's position can be derived from the structural properties of his/her specific location within a network, for some positions turn out to be more 'strategic' than others. A location in the system can be considered 'prominent' if both its adjacent links and the indirect paths that lead to and go through it make that posi-

REFLEXIÓN TEÓRICA

SOCIAL NETWORK ANALYSIS AND NARRATIVE STRUCTURES: MEASURING COMMUNICATION AND INFLUENCE IN A MEDIEVAL SOURCE FOR THE KINGDOM OF SICILY
Hervin Fernández-Aceves

tion particularly visible in comparison to other positions in the network. As proposed and formulated by D. Knoke and R. Burt, the extent of the prominence of a position in a system can be measured with two classes: centrality and prestige.[13]

As also pointed out by D. Knoke and R. Burt, the measure of centrality is well suited to dealing with sociological concepts such as access to and control of information.[14] Especially in two of my social-interaction types, *communication* and *influence*, social actants are involved in processes of access or control of either people or information; for this reason, centrality may be an appropriate and relevant measure for *communication and influence* layers. In this way, the most 'central' actants in the *communication* and *influence* layers are likely to stand for those who have the most access or are the most active.

Both layers contain directed ties, and so the measure of centrality will indicate not just the involvement of an actant among a set of ties,[15] but also a source for such ties. Hence, two of the centrality indices may be easily applied and are relevant to the analysis of directional relations: degree and closeness.[16] These indices measure the actants as sources of interactions. The degree centrality index of an actant, for directed networks, focuses on the 'out-degree,' namely the number of ties that originated from it; whereas an actant's closeness index indicates the average of the shortest paths from the given actant to all other actants in the network. In other words, by degree centrality, the more central an actant is, the more connections it had. Conversely, by closeness centrality, the more central an actant is, the closer it is to all other actants. As such, closeness is measured using the following formula:

$$C(x) = \frac{1}{\sum_y d(y,x)}$$

where d (y, x) is the distance between actant (node) y as a target, and actant (node) x as a source. The index derived from this measure is a simple normalisation of ratings, adjusting the obtained values to a notionally common scale between 1 and 0.

13 "Prominence," in *Applied Network Analysis,* R.S. Burt and M.J. Minor (eds.) (Newbury Park, CA: Sage, 1983), 195-222.
14 "Prominence," 199.

15 For this reason, not all the centrality indices are reliable for the analysis of directed networks, since one needs to focus on the interactions that the actant initiates, not simply as a node embedded in the system.
16 S. Wasserman and K. Faust, *Social Network Analysis. Methods and Applications* (New York: Cambridge University Press, 1994), 174.

SOCIAL NETWORK ANALYSIS AND NARRATIVE STRUCTURES: MEASURING COMMUNICATION AND INFLUENCE IN A MEDIEVAL SOURCE FOR THE KINGDOM OF SICILY Hervin Fernández-Aceves

17 Wasserman and Faust, *Social Network Analysis*, 174.

On the other hand, prestige focuses on the direction of links leading to an actant; defining "a *prestigious* actant as one who is the object of extensive ties."[17] In simpler words, prestige is a measure of passive centrality in directed networks, as it focuses on the actant as a recipient of relations, not as a giver. Although the concept of 'prestige' may have a positive connotation, this is not always the case, for, in the present context, the term merely denotes the active position of an actant as recipient. For example, in the network layer of *enmity* interactions, a 'prestigious' actant would not be held in high regard by the rest of the characters in the narrative, but would instead emerge as an object of offences and other negative interactions. By measuring prestige, I can identify the most important recipients at the relevant layers of interactions: *influence* and *communication*.

For analysis, prestige can be measured in indices of degree and proximity. As is the case with measuring centrality, the degree index of an actant indicates the number of ties. However, it focuses on the actant not as a source, but as a recipient. Thus the degree index for measuring prestige takes the 'in-degree' instead. In a similar way, the proximity index is like a 'closeness measure' that focuses on distances *to* rather than *from* each actant.[18] That is, I employ the same formula for closeness centrality, but $d\,(y, x)$ is understood instead as the distance between actant (node) y as a source, and actant (node) x as a target.

18 Wasserman and Faust, *Social Network Analysis*, 203.

Alternative, more elaborate measures such as Eigenvector Centrality and Page Rank may seem very promising, but epistemologically they present severe issues, at least when dealing with historical and social network analysis. Although they are measures which explore the topological implications of the network in depth, they require making assumptions about the social system they represent. We must be careful with the way in which the algorithm for statistical or structural evaluation is assumed in advance to be how the social process unfolds. On top of this, the database for my historical research is not sufficiently robust for a topological statistical measure to be relevant, especially compared to absolute centrality measures. Furthermore, and more specifically, Eigenvector centrality should

REFLEXIÓN TEÓRICA

SOCIAL NETWORK ANALYSIS AND NARRATIVE STRUCTURES: MEASURING COMMUNICATION AND INFLUENCE IN A MEDIEVAL SOURCE FOR THE KINGDOM OF SICILY
Hervin Fernández-Aceves

only be used in undirected graphs. The Eigenvalues of an asymmetric matrix will be expressed not only as real numbers but also as imaginary ones, and consequently the Eigenvector of a directed graph will not always yield valid results.[19]

Consequently, and in order to measure centrality and prestige, I calculate first the actant's out-degree and closeness centrality. Since both the *communication* and *influence* layers display characters that did not engage in this specific type of interaction, neither as sources nor as recipients (i.e. isolates in a system), the system representing each interaction type is not strongly or unilaterally connected. Therefore, it is impossible to calculate the closeness index for the total set of characters. I thus excluded those actants with out-degrees equalling 0, and then calculated the normalised values for the reduced but unilaterally connected network.

The first network layer analysed is *influence*. The entries in this layer's sociomatrix are the interactions attested in the narrative pertaining to activities of advice, request, order, persuasion and instigation. Characters are thus central if they exercise any influence on others, as in the same way characters are 'prestigious' if they are constantly influenced in any way. The second layer to which centrality measures seem to be pertinent is *communication*. Under this type, social actants are involved with each other in processes of access to or control of information and its spread. The entries in this layer's sociomatrix are the interactions pertaining to activities of consultation, notification, divulgation, and reply. Social actants are 'central' in this layer if they constantly communicate with the rest of the social actants, as in the same way character actants are 'prestigious' here if they are the objects of several processes of communication. As in the *influence* layer, I have excluded the actants with an out-degree of 0 from the sociomatrix and produced a unilaterally connected graph. Lastly, I turn to the characters' prestige measures.

Further and distinct analysis has been conducted on this multi-layered data, such as the application and assessment of community-detection algorithms, structural equivalences and positional analysis. These other methods and results can be read in full in my 2013 MA thesis.[20]

19 On this, see the proposal and critique of K. Sugihara, 'Using complex numbers in Social Network Analysis: A Proposal of a Centrality Score for Diagraphs', forthcoming.

20 Hervin Fernández-Aceves, "A Relational View of the Norman Kingdom of Sicily and its Royal Court: The Social Space Constructed by 'Hugo Falcandus'" (Maestría, Budapest, Central European University, 2013).

Reflexión teórica   **133**

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily Hervin Fernández-Aceves

Intersticios Sociales
El Colegio de Jalisco
septiembre, 2017
núm. 14

Results and interpretations.
The analysis of the narrative's centrality measures

The centrality indices of the *influence* network layer are shown in Table 1.[21] Next is the calculation of the prestige indices; which are shown in Table 2.[22] In both tables, the first two columns display the network measures on which the indices' values are based, and the last two columns display the prestige indices of each property by means of simple normalisation of ratings. In the same way, tables 3 and 4 display the calculated measures and indices of the unilaterally directed network layer of *communication*.

At first glance, one can notice several 'central' characters. In order of decreasing degree centrality, Stephen of Perche[23] is in first place, Maio of Bari[24] in second, followed by Queen Margaret,[25] then King William I in fourth, and so on. The least central actants in this index, and hence the less demanding or influential, are a numerous group that includes 27 characters, such as William of Lesina,[26] pope Alexander III,[27] and young King William II. The closeness centrality index shows a different ordering, with the notary Matthew[28] in first place, Stephen of Perche and Margaret in joint second, followed by William I and then bishop-elect Richard[29] in fourth. The ordering of the less central characters resembles the degree centrality more strongly, a considerable exception being Matthew Bonellus,[30] who bears a low closeness index although having a not so low degree centrality.

This difference between the two centrality indices can be explained as the difference between simply influencing a lot of other characters (as indicated by the out-degree), and being able to influence people who are in turn influencing a considerable amount of the rest of the characters (as indicated by the shortest paths that have that specific actant as a source). This implies, for example, that the notary Matthew, although not engaging in many interactions, is influencing actants who affect in turn many other members of the same network. Thus, he is able to indirectly influence those to whom he is not directly tied. Although Stephen of Perche presents a very high number of interactional engagements, and Maio is very heavily linked to another central

REFLEXIÓN TEÓRICA

SOCIAL NETWORK ANALYSIS AND NARRATIVE STRUCTURES: MEASURING COMMUNICATION AND INFLUENCE IN A MEDIEVAL SOURCE FOR THE KINGDOM OF SICILY
Hervin Fernández-Aceves

Table 1. Centrality indices for the influence layer of the network (calculated by dropping the actants with out-degree=0 from the original actants set)

	Out-degree	Closeness centrality	Normalised out-degree (Degree index)	Normalised closeness centrality (Closeness index)
Stephanus	22	1.974	1.000	0.506
Maio Barense	15	2.810	0.682	0.356
Margarita regina	13	1.974	0.591	0.506
Willelmus I	10	2.154	0.455	0.464
Matheus notarius	9	1.897	0.409	0.527
Richardus electus Siracusanus	6	2.231	0.273	0.448
Plebs Panormi	5	2.359	0.227	0.424
Rogerius Reginus	5	2.462	0.227	0.406
Hugo	4	2.650	0.182	0.377
Matheus Bonellus	4	3.821	0.182	0.262
Rogerius Sclavus	4	3.024	0.182	0.331
Gentilis Agrigentinus	4	2.692	0.182	0.371
Richardus de Mandra	3	2.615	0.136	0.382
eunuchi palatii	3	2.500	0.136	0.400
Iohannes neapolitanus	3	2.923	0.136	0.342
Henricus Aristippus	3	3.000	0.136	0.333
Symon	2	3.476	0.091	0.288
Bartholomeus de Garsiliato	2	3.442	0.091	0.291
Tancredus	2	3.000	0.091	0.333
Petrus gaitus	2	2.846	0.091	0.351
Matheus de Santa Lucia	2	3.897	0.091	0.257
quibusdam vires nobiles Sicilie	2	3.897	0.091	0.257
Symon Rogerii regis filium	2	3.000	0.091	0.333

incarcerated in Palermo after the first return of William I to Sicily; *Liber*, 22-23; *The Tyrants*, 75-6.

27 Pope from 1159 to 1181, covering almost all the time scope of the *Liber* (except for the first five years of William I's reign). On his papacy and his relations with the Sicilian Kingdom, see D. Clarke and A.J. Duggan, *Pope Alexander III (1159-81): the Art of Survival* (Farnham: Ashgate, 2012).

28 Originally from Salerno, Matthew was the same notary that wrote the Treaty of Benevento in July 1156, and who is recorded as vice-chancellor in December 1169. He became a *familiaris* of the royal court throughout the reign of William II (a time posterior to the *Liber*'s timeframe), and upgraded as chancellor under King Tancred (the same Tancred attested in the *Liber*). The notary Matthew is also referred to in historiography as Matthew of Ajello; H. Enzensberger, *Beiträge zum Kanzlei- und Urkundenwesen der normannischen Herrscher Unteritaliens und Siziliens*, (Kallmünz/Opf.: Lassleben, 1971), 158-60; *The Tyrants*, 81-90; cf. 'Mathieu de Salerne,' *Le livre*, 28-30.

29 Richard, the bishop-elect of Syracuse, *The History*, 115; cf. 'Richard, élu de Syracuse,' *Le livre*, 30-2.

30 Matthew became the leader of the successful rebellion against Maio of Bari, temporally being the protagonist of the narrative, until his downfall by means of a palace conspiracy against him, led mainly by the notary Matthew; *Liber*, 31-44; *The Tyrants*, 86-98.

	Out-degree	Closeness centrality	Normalised out-degree (Degree index)	Normalised closeness centrality (Closeness index)
Rogerius comes Avellini	2	3.000	0.091	0.333
Gualterius Cephaludensis	2	3.300	0.091	0.303
Richardus (Messanensis)	2	3.821	0.091	0.262
Populus Messanensis	2	2.897	0.091	0.345
Silvester comes Marsicensis	2	3.077	0.091	0.325
Rumoaldus Salernitanus	2	2.821	0.091	0.355
Henricus (Rodericus)	2	2.897	0.091	0.345
Odo Quarrellum	2	2.846	0.091	0.351
Boamundus	2	3.795	0.091	0.264
Constantinus	2	4.154	0.091	0.241
Wilelmus Alesinus	1	4.725	0.045	0.212
Willelmus	1	3.103	0.045	0.322
Alexander papa	1	3.154	0.045	0.317
Gillebertus	1	4.795	0.045	0.209
Silvester	1	3.100	0.045	0.323
filia spuria regis Rogerii	1	4.725	0.045	0.212
Rogerius de Marturano	1	4.744	0.045	0.211
Alexander Conversanensem	1	4.725	0.045	0.212
Robertus de Sancto Iohanne	1	2.925	0.045	0.342
Lombardi	1	2.925	0.045	0.342
Willelmus de Sancto Severino	1	2.925	0.045	0.342
Robertus Calataboianensis	1	3.821	0.045	0.262
Barthololmeus Parisinus	1	3.825	0.045	0.261
Willelmus II	1	3.872	0.045	0.258
canonici Panormitani	1	2.923	0.045	0.342
Ansaldus	1	2.949	0.045	0.339
Richardus	1	3.308	0.045	0.302

SOCIAL NETWORK ANALYSIS AND NARRATIVE STRUCTURES: MEASURING COMMUNICATION AND INFLUENCE IN A MEDIEVAL SOURCE FOR THE KINGDOM OF SICILY
Hervin Fernández-Aceves

	Out-degree	Closeness centrality	Normalised out-degree (Degree index)	Normalised closeness centrality (Closeness index)
Sedictus	1	2.925	0.045	0.342
Rogerius Tironens	1	2.925	0.045	0.342
Salernus medicus	1	2.949	0.045	0.339
Willelmus de Gisoaldo	1	3.821	0.045	0.262
Richardus Balbanensis	1	3.821	0.045	0.262
Rogerius iudex	1	3.872	0.045	0.258
Barthololmeus Lusciensis	1	2.925	0.045	0.342
Egidius Venusini	1	2.925	0.045	0.342
servientes palacii	1	3.256	0.045	0.307
Robertus	1	2.925	0.045	0.342

Table 2. Prestige indices for the influence layer of the network (calculated by dropping the actants with in-degree=0 from the original actants set)

	In-Degree	Proximity Prestige	Normalised out-degree (Degree index)	Normalised Proximity Prestige (Proximity index)
Willelmus I	24	2.356	1.000	0.424
Stephanus	20	2.322	0.833	0.431
Margarita regina	14	2.186	0.583	0.457
Matheus Bonellus	13	2.847	0.542	0.351
Plebs Panormi	8	2.763	0.333	0.362
Henricus (Rodericus)	7	2.593	0.292	0.386
Petrus gaitus	6	3.271	0.250	0.306

	In-Degree	Proximity Prestige	Normalised out-degree (Degree index)	Normalised Proximity Prestige (Proximity index)
Tancredus	6	3.220	0.250	0.311
Richardus electus Siracusanus	5	2.712	0.208	0.369
Rogerius iudex	5	3.000	0.208	0.333
Populus Messanensis	4	3.136	0.167	0.319
Rumoaldus Salernitanus	4	2.610	0.167	0.383
Symon Rogerii regis filium	4	3.288	0.167	0.304
Gillebertus	4	2.712	0.167	0.369
Willelmus II	3	3.254	0.125	0.307
Matheus notarius	3	2.763	0.125	0.362
Hugo	3	1.000	0.125	1.000
Richardus de Mandra	3	2.780	0.125	0.360
Iohannes neapolitanus	3	3.102	0.125	0.322
canonici Panormitani	2	3.102	0.083	0.322
Lombardi	2	1.000	0.083	1.000
servientes palacii	2	4.627	0.083	0.216
Odo Quarrellum	2	3.305	0.083	0.303
Richardus (Messanensis)	2	3.000	0.083	0.333
Rogerius Reginus	2	3.288	0.083	0.304
Maio Barense	2	1.000	0.083	1.000
Boamundus	2	3.271	0.083	0.306
Willelmus	2	3.661	0.083	0.273
Rogerius comes Avellini	2	2.881	0.083	0.347
Salernus medicus	1	3.305	0.042	0.303
Rogerius de Marturano	1	3.305	0.042	0.303
Robertus Calataboianensis	1	4.254	0.042	0.235
Silvester comes Marsicensis	1	3.712	0.042	0.269
Constantinus	1	3.695	0.042	0.271

Reflexión teórica

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily
Hervin Fernández-Aceves

	In-Degree	Proximity Prestige	Normalised out-degree (Degree index)	Normalised Proximity Prestige (Proximity index)
Symon	1	1.500	0.042	0.667
Gentilis Agrigentinus	1	4.271	0.042	0.234
Richardus	1	3.288	0.042	0.304
Matheus de Santa Lucia	1	3.814	0.042	0.262
quibusdam vires nobiles Sicilie	1	3.814	0.042	0.262
Henricus Aristippus	1	3.339	0.042	0.299
Willelmus de Gisoaldo	1	3.271	0.042	0.306
Richardus Balbanensis	1	3.271	0.042	0.306
Alexander papa	1	3.712	0.042	0.269
Ansaldus	1	3.305	0.042	0.303

character, William II, the notary Matthew is still the more central character by closeness, and so can reach more actants in the social system in fewer steps. What is important here is not how many other characters a character is adjacent to, but the 'centrality' of those characters. On the other hand, Maio falls from the top central actants when observing his closeness centrality index, suggesting that such a recurrent character in the narrative, highlighted as a major figure of political instigation, may have been less effective as a prominent actant of influence as embedded in the text's own social milieu.

Measuring centrality allows for the identification of Stephen of Perche, Margaret, and William II as the most influential actants, both by their direct interactions and by the people they influence. Maio and the notary Matthew are also confirmed as crucial characters for understanding the process of exerting influence in the textual source, but with considerable structural limitations, making them less reliable central characters than could be expected. All these distinctions can be visualised embedded in the whole network layer in Figure 1.

Reflexión teórica

139

Intersticios Sociales
El Colegio de Jalisco
septiembre, 2017
núm. 14

Figure 1

Graph representing the *influence* layer of the network and its centrality (calculated by dropping the actants with out-degree=0 from the original actants set). The node's size is proportional to its out-degree, and the darkness of its colour is proportional to its closeness centrality index. The link's width is proportional to its weight (frequency of the interaction), and the arrowhead indicates the target of the directed interaction.

From examining Table 2, one can notice that the degree prestige index covers a wide range of values, displaying a power-law distribution. A power law is a functional relationship between two quantities, where one quantity varies as a power of another. Accordingly, the demonstration of a power-law relation suggests the existence of specific kinds of mechanisms that could underlie the observed phenomenon, and can thus be used to hypothesise on a meaningful connection between proportion and distribution within a so-cial system. In other words, in relation to the present study, a rather minimal number of characters in the *Liber de Regno Sicilie* were influenced by a vast ma-jority of social actants, whereas this majority of influenced characters were only targeted by a scarce number of interactions. As can be expected, the

Reflexión teórica

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily
Hervin Fernández-Aceves

most active target of influential interactions was the king, William I (with an in-degree=24 and holding the maximum degree prestige index). It is clear that if a social actant wanted to achieve something, or wanted to get something done, the king was unsurprisingly the actant to influence. In second position is Stephen of Perche (with a degree index of .833), making him a very 'prestigious' character when it comes to influencing someone. This position clearly highlights Stephen, and suggests a differentiation from other influential actants in the story. Stephen, after being appointed by the Queen Regent as chancellor of the kingdom, emerges not only as a central character in the exercise of influence, but also as a character that other social actants recurrently approach. Considering the development of the narrative events, it seems that the social characterisation at the *influence* layer of William I was taken over by Stephen of Perche. As is confirmed by the prestige measures, it was not the underage king (William II) or the Queen, as one might have expected in view of her position as Regent, but the newly appointed chancellor who, after the death of King William I, became the active target for the rest of the influential social actants of the royal court. Stephen is followed by Margaret and Matthew Bonellus, who, in spite of having a high degree index (.583 and .542 respectively), still rank significantly lower than him.

The proximity prestige index indicates on the *influence* layer to what extent the actants who are influencing the specific actant are themselves being 'influenced.' Thus this prestige index may be useful for revealing the indirect manipulation a character went through, as is displayed in Table 1 under the label "Normalised Closeness Centrality." The descending order of the values in this column differs significantly from the values of the degree index. As in the case of the latter, the characters are still distant from each other in terms of prestige, although the range of the proximity index is smaller. Archbishop Hugh, the Lombards,[31] and Maio of Bari occupy the top three positions (with a proximity prestige index of 1). This means that these three characters are directly tied to all the people involved in the chain of influence that targeted them. Whoever influenced these three characters was not influencing them as an 'intermediary.' Hence these actants are not only

31 The 'Lombards' in the *Liber* refers to the population of North Italian settlers that started to immigrate to the island during the time of Roger II (following the main clan of Roger's wife, Adelaide: the Aleramici of Piedmont) and inhabited the South-eastern regions of Sicily, mainly the cities of Butera and Piazza Armerina; H. Bresc, 'Gli Aleramici in Sicilia: alcune nuove prospettive', in *Bianca Lancia d'Agliano. Fra il Piemonte e il Regno di Sicilia*, ed. R. Bordone (Alessandria: 1992), 147-63. Cf. C.A. Garufi, 'Gli Aleramici e i normanni in Sicilia e in Puglia. Documenti e ricerche,' *Centenario della nascita di Michele Amari : scritti di filologia e storia araba, di geografia, storia, diritto della Sicilia medievale, studi bizantini e giudaici relativi all'Italia meridionale nel Medio Evo, documenti sulle relazioni fra gli Stati italiani ed il Levante* 1 (1910): 47-83.

32 Count of Policastro, related to the Aleramici clan by means of one of Roger II's maternal uncles, Henry of Paterno; Garufi, 'Gli Aleramici,' 50-2.

33 The Bishop of Agrigento; throughout the whole text his papal anointment is never attested, he remains all the time (and is referred to as) 'the elect'. The Bishop-elect is introduced by the author when reporting the state of the court and his officials after Queen Margaret took over as a regent; *Liber*, 90-4; *The Tyrants*, 140-1. On the origins of the Bishop-elect, see the note below.
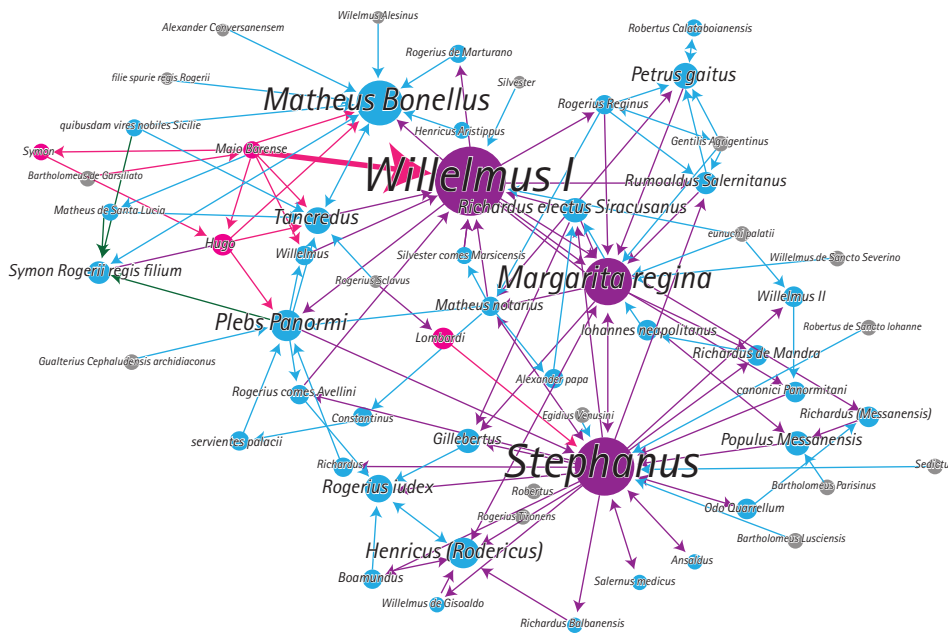
34 Gilbert, Count of Gravina, *The History*, 126; 'comte Gilbert,' *Le livre*, 93.

unprestigious actants for influence processes, having been scarcely addressed in this layer, but are also characters less prone to manipulation, without having to be omitted from the *influence* layer as targets too. The value of the proximity index drops considerably (from 1 to .667) in the following place occupied by Simon,[32] which is then followed by Margaret (with .457). As the values of the proximity index drop, the characters are presented as under the influence of actants who are in turn being influenced themselves. Thus, the influenced characters with the lowest prestige, but still greater than 0, are placed in a more vulnerable position than the most influential characters that may hide behind a chain of influence. Characters such as Pope Alexander III and Bishop Gentile of Agrigento [33] are hence placed in the narrative as social actants at a very disadvantageous place and are susceptible objects of manipulation, since people far from their reach indirectly influence them. The graph that represents the figures of Table 2 is shown in Figure 2.

Based on the degree centrality index, the most central character is Stephen of Perche, followed by Matthew. The gap between these two positions is slightly larger than the gap between the top two positions of the *influence* layer. This gap seems to indicate that the chancellor, Stephen of Perche, has a more active role in the informative processes and that he is a central actant in terms of influencing processes. Considering both the *influence* and *communication* layers, the narrative's social construction presents Stephen of Perche as an actant relying on a different strategy for collaborating with the other members of the royal court, based on influence and communication. This is opposed to the strategies of Maio of Bari, or King William I, who did not appear to be actively involved in communicative interactions.

The position of Matthew Bonellus is also noteworthy; although presented as a less influential character, his characterisation as a major social actant is given more importance in terms of his ability to communicate. I shall return to him when dealing with the closeness centrality index. Gilbert of Gravina occupies the third position by degree centrality,[34] another less influential character who becomes much more central in terms of his active characterisation as an actant engaged in many communication processes

REFLEXIÓN TEÓRICA

SOCIAL NETWORK ANALYSIS AND NARRATIVE STRUCTURES: MEASURING COMMUNICATION AND INFLUENCE IN A MEDIEVAL SOURCE FOR THE KINGDOM OF SICILY
Hervin Fernández-Aceves

Figure 2

Graph representing the *influence* layer of the network and its prestige (calculated by dropping the actants with out-degree=0 from the original actants set). The node's size is proportional to its in-degree, and the darkness of its colour is proportional to its proximity prestige index. The link's width is proportional to its weight (frequency of the interaction), and the arrowhead indicates the target of the directed interaction.

across the Sicilian narrative. Fourth place is taken by three characters, William I, Maio, and Hugo,[35] followed by Margaret, the notary Matthew, Everard,[36] and Romuald of Salerno.[37]

As displayed in Table 3, the closeness centrality index values present again a considerably different order than was the case with the degree centrality, which is even more surprising than the one revealed at the *influence* layer. Robert of S. Giovanni[38] holds the largest value in the closeness index, but in return holds a low degree centrality (.2). Even though Robert was characterised as a less recurrent actant, namely a character that communicated with other characters only on a handful of occasions, he nevertheless can reach almost all remaining communicating actants in no more than two steps. Robert of S. Giovanni thus might not have been informing a lot of people, but he was in

35 Hugh, Archbishop of Palermo, since *c*. 1150; M. Chibnall, *The Historia Pontificalis of John of Salisbury* (Edinburgh: University Press, 1956), 67.

36 Count of Squillace, introduced by the *Liber* as one of the flourishing counts during the beginning of William I's reign, otherwise unattested; *Liber*, 9-10, 18; *The Tyrants*, 61, 71-2.

37 Romuald Guarna, Archbishop of Salerno, and the author of the contemporary *Chronicon sive Annales*; see H. Hoffmann, "Hugo Falcandus und Romuald von Salerno," *DAEM XXIII* (1967): 116–170, and M. Zabbia, "La cultura storiografica dell'Italia normanna nel Chronicon di Romualdo Salernitano," in *IV Settimana di studi medievali (Roma, 28-30 maggio 2009)* (Rome: Istituto storico italiano per il Medio Evo, 2009), 4-16.

38 Robert of S. Giovanni, presented by the author as a canon of the church of Palermo; *Liber*, 66-7; *The Tyrants*, 118-9.

Reflexión teórica   **143**

SOCIAL NETWORK ANALYSIS AND NARRATIVE STRUCTURES: MEASURING COMMUNICATION AND INFLUENCE IN A MEDIEVAL SOURCE FOR THE KINGDOM OF SICILY Hervin Fernández-Aceves

Intersticios Sociales
El Colegio de Jalisco
septiembre, 2017
núm. 14

Table 3. Centrality indices for the *communication* layer of the network (calculated by dropping the actants with out-degree=0 from the original actants set)

	Weighted out-degree	Closeness centrality	Normalised out-degree	Normalised closeness centrality
Stephanus	10	2.211	1.000	0.452
Matheus Bonellus	6	3.105	0.600	0.322
Gillebertus	5	2.842	0.500	0.352
Willelmus I	4	2.684	0.400	0.373
Maio Barense	4	3.316	0.400	0.302
Hugo	4	3.211	0.400	0.311
Ebrardus	3	3.190	0.300	0.313
Margarita regina	3	3.421	0.300	0.292
Matheus notarius	3	2.316	0.300	0.432
Rumoaldus Salernitanus	3	2.947	0.300	0.339
Ascotinus cancellarius	2	4.000	0.200	0.250
Richardus de Mandra	2	3.158	0.200	0.317
Petrus gaitus	2	3.579	0.200	0.279
Odo magister stabuli	2	2.450	0.200	0.408
Henricus Aristippus	2	3.250	0.200	0.308
Stephanus	2	3.429	0.200	0.292
Andreas eunuchus	2	3.429	0.200	0.292
Richardus electus Siracusanus	2	3.053	0.200	0.328
Robertus de Sancto Iohanne	2	2.200	0.200	0.455
Henricus (Rodericus)	2	3.053	0.200	0.328
Iohannes	2	2.947	0.200	0.339
Willelmus	2	3.789	0.200	0.264
Robertus	1	4.952	0.100	0.202
Amici comitis Roberti	1	5.727	0.100	0.175
Bartholomeus de Garsiliato	1	4.143	0.100	0.241

Reflexión teórica

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily
Hervin Fernández-Aceves

	Weighted out-degree	Closeness centrality	Normalised out-degree	Normalised closeness centrality
Silvester	1	3.550	0.100	0.282
Calabria	1	4.053	0.100	0.247
Rogerius de Marturano	1	4.053	0.100	0.247
Gaufredus MontisCaveosi	1	4.263	0.100	0.235
Nicholaus logothetus	1	4.150	0.100	0.241
Amici Nicholai logetheti	1	4.952	0.100	0.202
quidem miles Mathei Bonelli	1	3.950	0.100	0.253
Adenolfus camerarius	1	4.150	0.100	0.241
Rogerius ducem	1	4.250	0.100	0.235
archiepiscopus Tranensis	1	3.095	0.100	0.323
(aliquis) lateri Mathei	1	3.950	0.100	0.253
archiepiscopus Rothomagensi	1	3.100	0.100	0.323
viri de remotis partibus	1	3.100	0.100	0.323
Rogerius Tironens	1	3.100	0.100	0.323
Robertus Bellisinensis	1	3.200	0.100	0.313
Boamundus	1	3.158	0.100	0.317
Rogerius iudex	1	3.105	0.100	0.322
Barthololmeus Lusciensis	1	3.100	0.100	0.323

touch with people that could transmit the information to a large proportion of the remaining social actants. Robert is followed by Stephen of Perche, as can be expected from a character with such a large degree centrality. In turn he is followed by two unexpected central characters: the notary Matthew, and Odo[39] (with a closeness index of .432 and .408, respectively). All of these distinctions embedded in their network layer are visualised in Figure 3.

As in the *influence* layer, the notary Matthew is here vindicated again as a character that indirectly reaches a larger number of actants in very few steps. The case of Robert of S. Giovanni and Odo is even more striking because

39 Odo, the royal marshal (master of the stables).

Figure 3
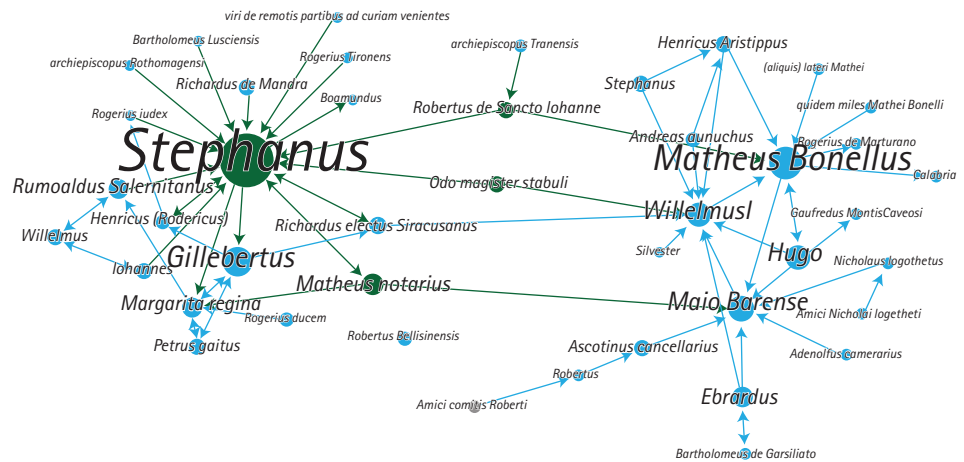
Graph representing the *information* layer of the network and its centrality (calculated by dropping the actants with out-degree=0 from the original actants set). The node's size is proportional to its out- degree, and the darkness of its colour is proportional to its closeness centrality index. The link's width is proportional to its weight (frequency of the interaction), and the arrowhead indicates the target of the directed interaction.

both their degree centrality and their direct appearance in the narrative suggest they are secondary characters, not at all central to the events reported. However, the location of the social actants with whom Robert and Odo communicate makes both of them prominent actants in the social construct of the author. I hence infer that the *Liber's* author tacitly presented Robert of S. Giovanni and Marshal Odo as highly relevant communicative actants. Even though they are not presented as leading characters in the plot, these characters were structurally placed in a strategic position as social actants in his story. It may not be incidental that precisely Robert, a notary, was cognitively described in very positive terms as "a man of high reputation and proven faithfulness, whom no party of conspirators […] No flattering good fortune had ever raised him to a point where his innate good nature was adulterated by any pride or insolence; and no bad fortune had ever cast him down to the point where he wished to hawk his loyalty for sale in exchange for the favour of powerful men or for the value of any hon-

our."[40] It is also important to remember that Robert of S. Giovanni has been suggested before as one of the possible identities of 'Hugo Falcandus' by C.A. Garufi,[41] relying on previous theories by C.H. Haskins,[42] and E. Besta[43] that identified the author of the *Liber* as a royal notary. However, as mentioned above, this theory has been contested.[44]

Following a pattern similar to the *influence* layer (as displayed in Table 2), the distribution of the in-degrees of the *communication* layer (as shown in Table 4) indicates that there are a handful of characters who concentrate the information received from other characters, whereas a significant majority of the communicative characters are only the recipients of information from a single actant, or none at all. Stephen of Perche is placed as a more prestigious actant than former King William I, and much more prestigious than his contemporary ruler, Margaret. Stephen is undoubtedly the largest recipient of information across the social construct of the narrative, since the second most prestigious characters at the *communication* layer follow him with a degree index of .588. William I and Matthew Bonellus jointly occupy these places, closely followed by Maio (with an index degree of .529). This ordering also resembles the one presented by the degree centrality index, with some minor permutations and the exception of Archbishop Hugh, a character that, despite being an important communicative actant, is presented as an unpopular target for actions of communication. However, the larger in-degree values are even larger than the top out-degrees, pointing out that the most important actants tend to be informed more and be informing less, a strategy that becomes clearer by comparing their centrality and prestige as social actants engaged in communication interactions.

The proximity prestige index reveals less insightful information here than the one provided at the *influence* layer. The communication proximity index indicates how many intermediaries the communication processes, namely the interactions that implied any sort of communication, went through before reaching a certain character. This means that the characters with a proximity index of 1 were engaged by characters that had not been targeted by people outside of their immediate circle of communica-

40 *preclari nominis et exami[nate fidei virum, quem nulla coniuratorum unquam societas], nulla [persecutio]nis procella, cum totum sepe regnum concuteret, ab eo cui semper inheserat proposito fidelitatis avulsit. Nunquam eum blanda fortuna sic extulit, ut innate benignitati superbie quicquam aut tyrannidis admisceret; nunquam sic adversa deiecit, ut fidem suam vellet potentium virorum gratia vel cuiuslibet dignitatis pretio nundinari.* Liber, 67. Translation in *The Tyrants*, 118.

41 "Roberto di San Giovanni, maestro notario e il 'Liber de Regno Sicilie,'" *Archivio Storico per la Sicilia* 18 (1944): 121-2.

42 *The Renaissance of the Twelfth Century* (Cambridge, MA: Harvard University Press, 1927), 262-3.

43 Garufi, "Roberto," 47.

44 See especially G.E. Hood, "Falcandus and Fulcaudus, 'Epistola ad Petrum, Liber de Regno Sicilie.' Literary Form and Author's Identity," *SM* 40 (1999): 5; and Loud and Wiedemann "Introduction," in *The History*, 31-2.
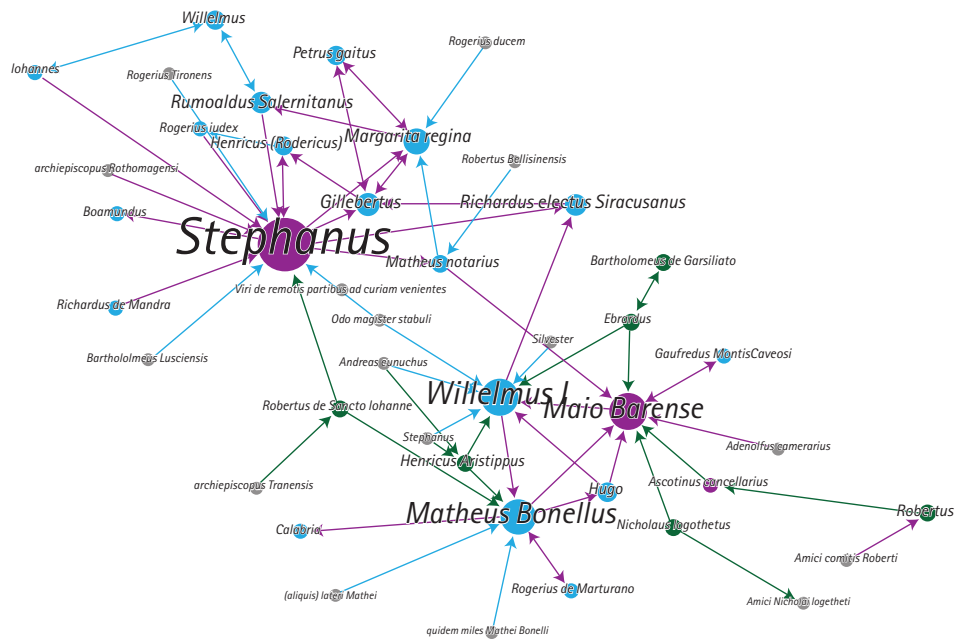
Table 4. Prestige indices for the *communication* layer of the network (calculated by dropping the actants with out–degree=0 from the original actants set)

	Weighted in-degree	Proximity prestige	Normalised in-degree	Normalised proximity prestige
Stephanus	17	2.524	1.000	0.396
Willelmus I	10	2.833	0.588	0.353
Matheus Bonellus	10	3.476	0.588	0.288
Maio Barense	9	2.452	0.529	0.408
Margarita regina	5	3.286	0.294	0.304
Gillebertus	5	2.833	0.294	0.353
Richardus electus Siracusanus	3	2.405	0.176	0.416
Rumoaldus Salernitanus	3	3.333	0.176	0.300
Robertus	2	1.000	0.118	1.000
Hugo	2	3.119	0.118	0.321
Petrus gaitus	2	3.714	0.118	0.269
Matheus notarius	2	3.452	0.118	0.290
Calabria	2	4.452	0.118	0.225
Henricus Aristippus	2	1.000	0.118	1.000
Henricus (Rodericus)	2	3.405	0.118	0.294
Willelmus	2	4.262	0.118	0.235
Boamundus	2	3.500	0.118	0.286
Ebrardus	1	1.000	0.059	1.000
Ascotinus cancellarius	1	1.500	0.059	0.667
Bartholomeus de Garsiliato	1	1.000	0.059	1.000
Richardus de Mandra	1	3.500	0.059	0.286
Rogerius de Marturano	1	4.452	0.059	0.225
Gaufredus MontisCaveosi	1	3.429	0.059	0.292
Nicholaus logothetus	1	1.000	0.059	1.000
Robertus de Sancto Iohanne	1	1.000	0.059	1.000

Reflexión teórica

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of Sicily
Hervin Fernández-Aceves

	Weighted in-degree	Proximity prestige	Normalised in-degree	Normalised proximity prestige
Iohannes	1	5.238	0.059	0.191
Rogerius iudex	1	4.357	0.059	0.230
Amici comitis Roberti	0	0.000	-	-
Silvester	0	0.000	-	-
Amici Nicholai logetheti	0	0.000	-	-
quidem miles Mathei Bonelli	0	0.000	-	-
Adenolfus camerarius	0	0.000	-	-
Odo magister stabuli	0	0.000	-	-
Stephanus	0	0.000	-	-
Andreas eunuchus	0	0.000	-	-
Rogerius ducem	0	0.000	-	-
archiepiscopus Tranensis	0	0.000	-	-
(aliquis) lateri Mathei	0	0.000	-	-
archiepiscopus Rothomagensi	0	0.000	-	-
viri de remotis partibus	0	0.000	-	-
Rogerius Tironens	0	0.000	-	-
Robertus Bellisinensis	0	0.000	-	-
Bartholmeus Lusciensis	0	0.000	-	-

tive acquaintances. Thereby the characters with a low proximity index are the recipients of information provided by people that had been engaged in communication with other people in turn. So, what the proximity index indicates here is the extent to which an actant is susceptible to receiving information which derives from outside his/her direct contact social reach; thus expanding the character's range of communication sources. Hence, it is relevant to highlight that William I and Matthew Bonellus, both of whom have a high degree prestige index and a low proximity index, are characters set in a favourable position for receiving information from a wider social scope. These indices are visualised in Figure 4.

Reflexión teórica   **149**

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of SicilyHervin Fernández-Aceves

Figure 4

Graph representing the information layer of the network and its centrality (calculated by dropping the actants with out-degree=0 from the original actants set). The node's size is proportional to its in- degree, and the darkness of its colour is proportional to its proximity prestige index. The link's width is proportional to its weight (frequency of the interaction), and the arrowhead indicates the target of the directed interaction.

Conclusion. Historical implications of a network interpretation

After conducting this experiment on narrative, several points must be made. Depending on what one seeks to focus on, or to find out from a text, one's approach should provide clearly defined tools for conducting research in systematic ways. Hence, the first challenge I faced was not only finding the names of people and their attributes as depicted in the text and also as attested in other contemporary sources (a task already done laudably by many historians), but also finding information, both explicit and implicit, on how the message presents and depicts people and their social space. What I initially imagined as my object of study, the dynamics of the Sicilian royal

court, necessarily became the analysis of narrated, and thus constructed, interactions of its actants. In order to focus on the information about social and political processes embedded in the text, I needed to transform the rhetoricised information into a relational dataset; it was necessary to place the relations, not the individuals, at the centre of the study. The first requirement of such an attempt was to present the process of *translating* a textual structure into a sociological construct, namely, a socio-relational dataset. The structural foundation and quantitative approach of R. Franzosi's narrative analysis provided the means of doing so; allowing me to present my reading of the textual source in a transparent and consistent scheme of textual interpretation. As my criteria for reading the text are explicitly stated and theoretically justified, the reader can follow the process of interpretation almost step-by-step. This is useful because of the possibility of tracing errors in the theoretical framework, and of criticising the specific principles employed during my reading; my method may thus provide a platform that can be replicated for readings of other narrative sources. I hope that my database established a controlled field for comparison of information embedded in narratives. This could be the first step into a larger enterprise of creating multiple social constructions, either for constructing a multi-voiced perspective on a specific social reality, or for integrating this social reality into a larger historical picture.

In addition to offering a transparent method that places the relations in the narrative at the centre of my reading, the present attempt also explored the possible analytical tools that can be used to interpret the social relational data contained in the narrative structure. Social network analysis provides a large and diverse number of tools for parsing relational data—as long as the selected tools are suited to the characteristics and limitations of the network data. Experimenting with a few of these tools yielded insights into a narrative social space. As in any other case, the key to conducting a relevant network analysis is having a clear research question and a theory that explains the suitability of the analytical tool for the specific substance of the data to be analysed.

Although not all the resulting measures of network analysis proved to be useful nor contributed interesting insights for understanding the *Liber*'s implications, the overall results are a valuable addition to the perspective of the source, and are particularly useful for providing more nuanced images of the text. As illustrated above, measures of centrality and prestige proved useful when exploring the narrative interactions of influence and communication. For example, I identified the prominence of Robert of S. Giovanni even though he was characterised as a less recurrent actant (namely a character that communicated with other characters only on a handful of occasions). Yet from the source's perspective, Robert of S. Giovanni is a highly relevant communicative character, connected with characters that could transfer information to a large proportion of the remaining social actants of the author's royal court. I also recognised the implicit depiction of Stephen of Perche's particular strategy for collaborating with other members of the royal court, based not only on influence, but also on communication, as opposed to the strategies of Maio of Bari and King William I, who did not appear to be actively involved in communicative interactions according to the author.

King William I, Matthew Bonellus, or any other protagonist in any historiographical account, are not the centre around which the narrative makes sense, but simply nodal points embedded in a social system that involves many other characters. Their actions play on different layers through which the narrative unfolds, offering deeper information than the morphology, style, and attributional information may suggest. In the short term, at the event level, actants appear as the makers of relations, but in the long run, at the level of the entire narrative structure, the relations are what indeed determine and make the actants in the text, for it is the entire system of relations that determines the topology of the narrative's social space. The narrative is then revealed as a repository of social relations built up by narration across time.

Networks are not only phenomenological realities, but, as pointed out buy H. White, also "measurement constructs."[45] In this way, narrative analy-

45 H. White, *Identity and Control. How Social Formations emerge.* (Princeton: Princeton University Press, 2008), 36.

sis, which is also concerned with the social space construed by the narration, can benefit from adopting network-based approaches. Through a relational approach, one can bridge the gap between cognitive and structural standpoints, and hence advance towards an understanding of the social images that lie between the lines.

Therefore, I am convinced that if one intends to use a narrative message as a source, one should consider, as one already considers other features such as intertextuality and style, the implications and significance of the social space that the author himself is constructing though narration. To restrict our vision of narrative sources to just their explicit content and formal features is to be partially blind to the complexity of the narrative that one can grasp from taking a number of points of view.

Reflexión teórica   153

Social network analysis and narrative structures: measuring communication and influence in a Medieval source for the Kingdom of SicilyHervin Fernández-Aceves

Intersticios Sociales
El Colegio de Jalisco
septiembre, 2017
núm. 14