Using Network Analysis on Parish Registers: How Spiritual Kinship Uncovers Social Structure

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Abstract

This chapter attempts to demonstrate that the information available in parish registers can provide exceptional insights into the social structure of local communities. Our approach is not based on individual attributes such as occupational data but on the relational patterns detected among spiritual kin. We discuss the characteristics of this type of network and provide results from an ongoing study of a Portuguese town where parish registers from the 17th and 18th century were analysed for this purpose. We will try to show that spiritual kinship networks have special formal characteristics that indicate that they are both a reflection of social structure (in the sense of the collective perception of different social positions) and also part of the processes by which the social structure is created and modified.

This chapter is structured in the following way: first we describe what spiritual kinship is and the processes by which it was acquired in the past; secondly we introduce a basic methodological assumption underlining this research: that the most common origin of spiritual kin, the choice of godfathers and godmothers, operated as a social positioning event, a process by which people assert their social position in relation to one another; thirdly we will describe how, on this basis, we can reconstruct a global image of the social structure as it emerges from the perceptions of social actors through the application of social network analysis methods. We will then present examples of such structures taken from the preliminary analysis of the parish records of a small town in Portugal in the Early Modern Period and make some theoretical and methodological remarks concerning the relevance of our findings for current research into social networks, providing an overview of some methodological aspects involved in the reconstruction of social networks from historical data.

Este capítulo procura demonstrar que a informação disponível nos registos paroquiais fornece perspectivas excepcionais sobre as estruturas sociais das comunidades do passado. A nossa abordagem não é baseada na análise de atributos individuais, como as profissões, mas em padrões relacionais detectáveis no parentesco espiritual. As características deste tipo de redes são apresentadas a partir dos resultados de um estudo em curso sobre o concelho de Óbidos, abarcando registos dos séculos XVII e XVIII. Iremos demonstrar que as redes de parentesco espiritual têm características formais especiais que apontam no sentido de serem ao mesmo tempo um reflexo da estrutura social (no sentido da percepção colectiva das diferentes posições sociais) e parte do processo pelo qual a estrutura social é criada e modificada.

O capítulo está estruturado da seguinte forma: inicialmente descrevemos o que é o parentesco espiritual e o modo como era contraído no passado; de seguida introduzimos o pressuposto metodológico na base deste processo: que a origem mais comum de parentesco espiritual, a escolha de padrinhos e madrinhas, tinham uma função de posicionamento social relativo, um processo pelo qual uma pessoa afirma a sua posição social relativamente a outra; em terceiro lugar mostramos como a partir deste pressuposto, através da aplicação de métodos de análise de redes sociais, podemos reconstruir uma imagem global da estrutura social, tal como ela emerge das percepções combinadas dos agentes sociais; seguidamente apresentamos exemplos dessas estruturas a partir da análise preliminar dos dados do concelho de Óbidos na Época Moderna; finalmente tecemos algumas considerações teórico-metodológicas, relacionando os nossos resultados com investigação recente em redes sociais e fornecendo uma perspectiva geral dos aspectos metodológicos relacionados com a reconstrução de redes sociais a partir de dados históricos.

Spiritual kinship as a network

In the chapter written by Elena Brambilla and Joaquim Carvalho for the CLIOHRES volume on Citizenship, there is a short reference to spiritual kinship networks (mostly godfathers and godmothers) and their role in the mechanisms that hold a community together by creating personal links across social differences[1]. In the context of that chapter the reference to spiritual kinship served the role of demonstrating the importance of sacraments in the basic 'technology' of societies.

Spiritual kinship is a form of kinship that derives from the participation in certain sacraments. The main source of spiritual kinship is baptism, with kinship acquired between the godfather, the godmother and the parents and child. Spiritual kinship is also generated between the priest who provides the sacrament and the parents. Another less frequent way of contracting contract spiritual kinship was at 'confirmation': kinship was generated between the godfather or sponsor and the person being confirmed[2].

The noun "kin" is not used in vain in the expression "spiritual kin". Spiritual kinship, like other types of kinship (consanguinity and affinity), affected the marriage horizon

of individuals, by generating impediments, which is the basic purpose of the concept of kin. Spiritual kinship interacts with other forms of kinship in defining the crucial social distinction between whom one may marry and whom one may not. This alone implies that the process by which spiritual kinship was constructed would probably be closely tied to strategies of social positioning, as is the case with affinity kinship (contracted by marriage)[3]. It is also relevant to remember at this point that adoption, another form of using kinship as a tool for social strategies, has little relevance in the societies under consideration here. Christianity minimized the role of adoption that was, in Roman society, a very central tool connecting kinship and social 'engineering'. So if we look at the three types of kinship: consanguinity, affinity and spiritual, it is clear that the last two derive from very important choices made by individuals (not always the individuals directly involved in the ties in question). It is also clear that both choices (whom to marry, whom to ask to be the godfather or godmother) are to be interpreted not only by the link they create but also by the links they make impossible (or assume impossible). At the risk of stating the obvious it helps our argument here to stress that choices regarding acquisition of new kin are some of the most important choices made in social interaction, and therefore reveal fundamental aspects of social life.

In this context spiritual kinship assumes a special role. To help us define that role we make a starting assumption regarding the choice of godfathers and godmothers at birth: one only chooses for those roles people that one considers to be of the same social level or above. One never chooses someone who is considered to be of lower status. This will sound obvious even in present day society, but we know that it was not always so in all historical contexts[4]. Within the array of possibilities created by church rules, it seems that the choice of godparents and the associated generation of spiritual kinship was used as a tool for the construction social relations with certain characteristics.

In a way one can retrace the rule of choice to immanent characteristics of the role of the actors involved. Since godfathers and godmothers are those that are supposed to replace the natural father and mother in case of necessity, it is logical that their choice falls into two categories: close blood relatives (aunts and uncles or elder siblings) or people of higher social status that could provide an upward path for the child. On the other hand, if spiritual kinship is the source of impediments, it is logical, specially in small communities, to choose people who are already in the forbidden set of the marriage strategies, either because they are consanguine relatives or because their higher social status means that they are 'out of reach' for marriage purposes (see Fig. 1). Since close relatives are normally of the same social status, we end up with the natural rule that the choice of godparents always involves people that are of the same social status or higher.

In the context of our approach, what is really relevant is that we have, in the parish registers, an enormous amount of social positioning events. Every time a child is baptised, a record is made of choices that derive from the perception by social actors of their rela-
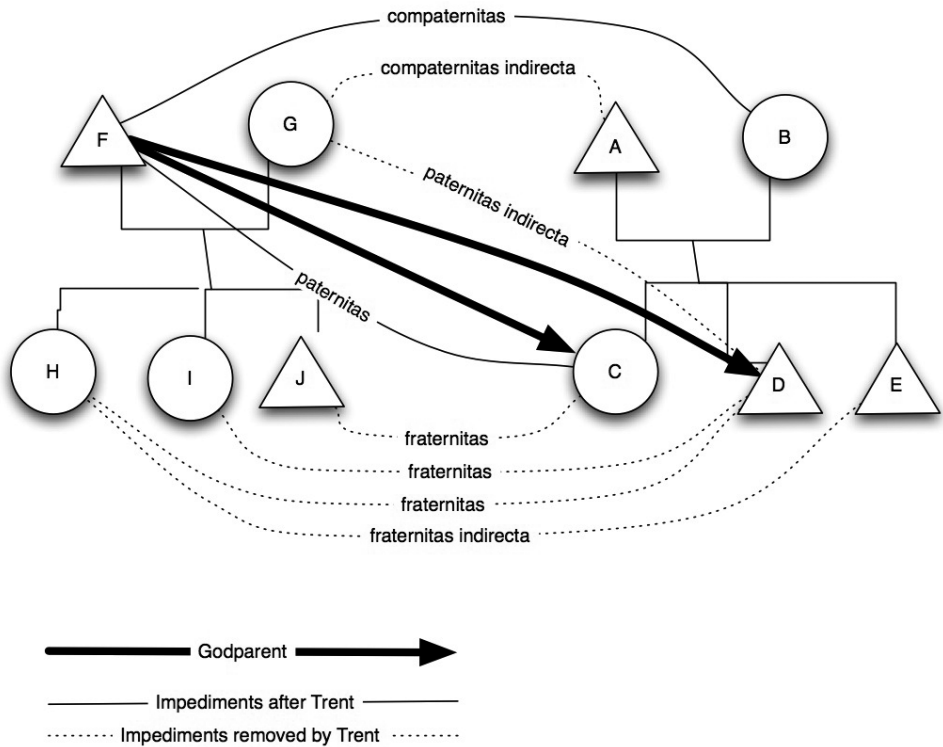
Fig. 1
Spiritual kinship affects the marriage horizon by creating impediments. The Council of Trent reduced the extent of the impediments, but spiritual kinship remained incompatible with marriage between families.

tive position in a network of relations, which is an expression of what we normally call the social structure (we will return later to the conceptual discussion that this approach triggers).

RECONSTRUCTING THE NETWORK FROM PARISH REGISTERS

To make sense of all those choices, we must devise a methodology that aggregates the individual decisions in order to give a global picture of the network. We used a technique from Social Network Analysis called prestige computation[5]. Each choice of godparent is considered a weighted vote that the father of the child casts, in appointing the godfather or godmother of the child. The number of nominations that the voter has received determines the value or weight of the vote cast. Parents who are asked to be godfathers more often cast more valuable votes when they choose the godparents of

their children. In this way a final score is calculated for each godparent in the data. The score depends not only on the number of times he or she was chosen as godfather but on the score of those that choose him or her.

Parents that are never chosen as godparents have a zero score. It is possible that a person who is godparent a single time ends up with a high score if the child's father was someone with a high score himself (see Fig. 2).
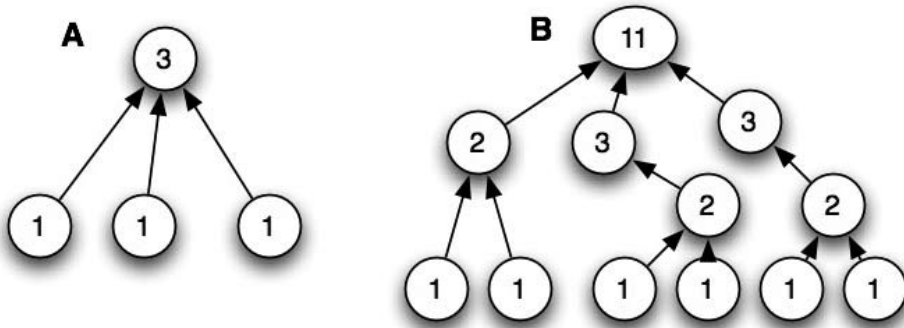

Fig. 2
Number of godchildren is an approximate measure of the godparent's prestige. Propagating prestige through the network gives a more precise quantification. Two individuals with the same number of godchildren may have a different level of prestige because A has been chosen by people with no prestige (never chosen as godfathers) while B is chosen by people who, in turn, are also chosen by others.

When this technique is applied to all the baptisms of a community, the result is a network where the edges are spiritual kin ties and the nodes parents and godparents (with many assuming both roles). Each person/node has a score attached, calculated in the way described above.

It is possible to map out this network by placing the nodes in bi-dimensional space by means of an algorithm that uses the information contained in the links between the nodes to place people closely connected in space and moving apart people that are not linked at all. Once we have a representation of the network on a plane, we can add a third dimension using the prestige scores. Each node moves above the surface proportionally to its score.

With this process we obtain a graphic representation of the network that offers interesting insights into social structure. Like all maps, the result needs to be read carefully. There are questions of scale, precision and synchrony. We will return to these problems in the methodological discussion at the end.
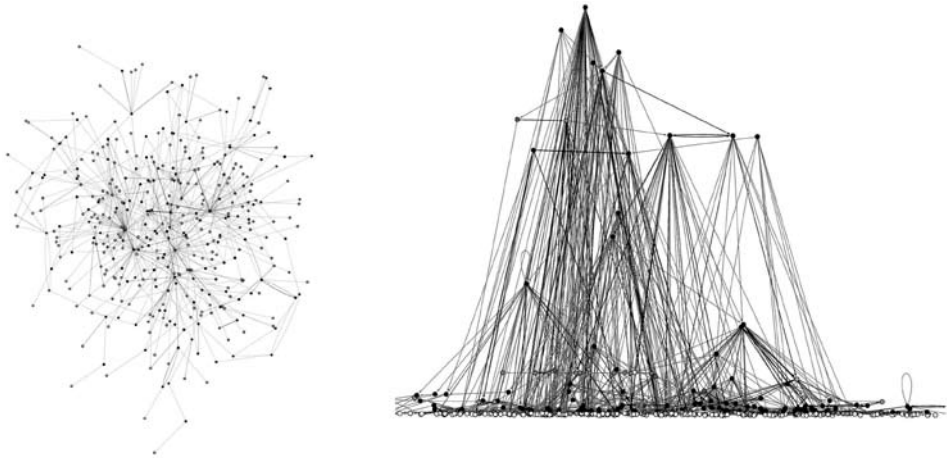
Early Modern

Fig. 3
View of a partially-reconstructed kinship network. Left: top view showing proximity between actors and links. Right: side view displaying the score of each actor on the vertical axis. Data from the parish registers of Soure, Portugal, 1680-1720; graphic rendering using the software Pajek (http://pajek.imfm.si/)

Although some tentative applications of this approach were tried with historical data from small parishes, we are currently exploring a large data set created at the request of the municipality of Óbidos. The town has the midterm goal of becoming an UNESCO World Heritage site, and initiated a vast multi-disciplinary research project to support its application. The creation of a database with information from parish registers from the beginning of registration to the end of the 18th century was launched in 2006. This chapter reports early results from that project for the first time.

The Óbidos database

The town of Obidos is situated a hundred kilometres north of Lisbon and is one of Portugal's main tourist attractions due to the beautifully preserved historic centre and walls. The region belonged to the crown and was a frequent destination of royalty[6]. In 1221, the town was associated with the "House of the Queen", the patrimony that the king's wife would receive to support her private and official activities[7]. In 1491 Queen Leonor, wife of King John II[8], created a spa and hospital near Óbidos, at a place consequently named Caldas da Rainha, providing a frequent pretext for the displacement of the royal court to the region.

This close association with the crown and the royal court is visible in the urban structures, still present today, but also in the documentation that the local institutions produced (town council, parishes, *Misericórdia*, among others). For instance, while studying the parish records, we found several baptisms in which the godparents were princes
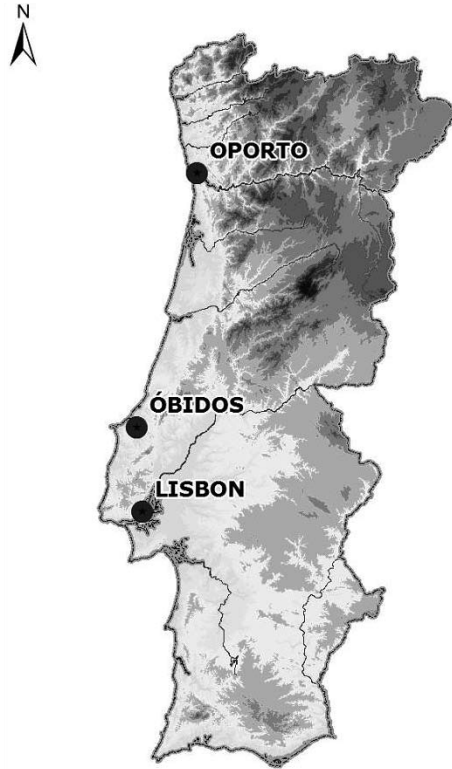
Fig. 4
Location of Óbidos, a small town of circa 2500 in-
habitants in the mid 18th century.

and princesses. We also find recurring links between Óbidos and the uppermost ranks
of the Church hierarchy, especially after the Cardinal Patriarch, D. Tomás de Almeida
promoted the construction of a devotional sanctuary near the town in the first half of
the 18th century – the sanctuary of *Senhor da Pedra*. We can trace this evolution in the
parish records as D. Tomás and other members of the Lisbon Patriarchate are chosen as
godfathers in baptisms of the sons of the local nobility.

Óbidos was a typical Early Modern Portuguese town and administratively had enough
relevance to have a magistrate appointed by the king to preside over the town council
and apply justice *(juiz de fora)*[9]. The town had four parishes: *Santa Maria, S. João, S.
Pedro* and *S. Tiago,* eleven important churches and two monasteries. Some of these
churches were collegiate churches that provided services and were an important source
income for a large number of clergymen[10], whose presence in the community is very
visible and relevant to the social fabric.

Early Modern

As far as the population is concerned, the number of inhabitants exceeded a thousand in the 16th century, tripling over the course of the 17th and 18th centuries, as the table below shows.

Table 1
The population of Óbidos (4 parishes) according to 16th to 19th century sources

Source	Date	Population	Households
Numeramento de 1527-1532 *(population count ordered by the King Jonh III)*	1527-1532	1076	
António Carvalho da Costa, *Corografia Portugueza e Descripçam Topográfica do Famoso Reyno de Portugal,* Tomo III Lisboa, 1712, p. 86-90 *(a 18th century description of Portugal, its landscape, its economic resources, history and inhabitants)*	1712	___	700
António de Oliveira Freire, *Descripçam Corografica do Reyno de Portugal*, Lisboa, 1739, p. 115. *(another 18th century description of Portugal, its landscape, its economic resources, history and inhabitants)*	1739	2416	1090
Contagem da População de 1801 *(population count made by clergymen)*	1801	3067	802

The database contains the parish registers of the four urban parishes of Óbidos (the municipality also had rural parishes around the town).

Table 2
Parish records collected (dates of available parish books)

	Baptisms	Marriages	Burials
Santa Maria	1562-1800	1566-1800	1562-1584 1587-1588 1595-1755 1764-1800
S. Pedro	1654-1662 1678-1780 1784-1800	1784-1800	1765-1776 1784-1800
S. João	1543-1580 1596-1800	1541-1580 1616-1800	1534-1580 1616-1800
S. Tiago	1600-1643 1685-1747 1764-1800	1599-1644 1695-1800	1600-1643 1751-1800

The database contains close to 28,000 acts, in which we can find 138,329 references to individuals described by 151,541 attributes (place of residence, occupation, etc). In this database, there are 13,000 baptisms with the names of 12,989 godmothers and 16,250 godfathers. One of the major difficulties that we face is correctly identifying the real people involved in order to solve the problems derived from homonymy and name variations. At the time of writing around 6363 people have been identified by linking together 43,749 individual references, which allows preliminary results to be analysed.

Some preliminary representations of the spiritual kinship network

To reconstruct the spiritual kinship networks as explained above, we need to work with individuals whose biographies have been compiled from traces in the sources. In order to do this, it is necessary to examine not only the baptisms that are of direct interest to us but also marriages and burials, in so far as these acts solve ambiguities in individual biographies. This allows us to identify related people that are not always directly involved as godparents in the spiritual kinship network. So far we have been able to reconstruct networks with around 2,400 individuals, traceable to 23,469 references in the sources. We are working with around 17% of the data. The rest are references yet to be linked together in individual biographies, a process that it is not always possible to accomplish, as explained below.

These preliminary results already show a few interesting characteristics. The basic assumption seems to hold: we have few loops (6 currently) in the network: situations where A is godparent of B who is godparent of C who is godparent of A again. Loops, if frequent, would be an indicator that the spiritual kinship network does not represent a hierarchical structure, where people look 'upward' when choosing godparents for their children, but rather a horizontal or socially neutral choice. The image of the structure, 'seen from the side', clearly shows a hierarchical structure with peaks corresponding to more socially prominent figures.

Quantitative analysis of data shows that the godparent network has characteristics similar to what is called a "small world"[11]. A "small world" is a network where every member is just a few steps away from every other member[12]. "Small worlds" are produced when there are nodes in a network with a large number of connections. These "hub type" nodes create short paths between any members of the network, because they concentrate a great number of links and therefore connect in just two steps the individuals that are directly attached to them. This means that spiritual kinship has special structural characteristics that makes possible the connection of otherwise unconnected social actors on a very large scale.

One of the quantitative indications of "small world" networks is the shape of the node distribution as indicated by the number of connections. If we rank godparents by number of godchildren, we obtain a few cases with many godchildren and, at the other

end of the axis, a large set of individuals who were chosen just once or twice. This rather obvious and predictable pattern becomes interesting when it follows with great precision a mathematical relation called a power law, a relation between size and frequency that can be found in many interesting self-organized phenomena (see Fig. 5)[13]. The high fitness of our data to a power-law could indicate that we are witnessing a self-reinforced process: the more often a person is invited as a godfather or godmother the more likely it is that he or she will be invited again. The same distribution can be observed when ranking web sites by the number of links from other web sites pointing to them. In that case it is also a self-reinforced process because the more links point to a web site the more visible it becomes in the network.

More interesting than the statistical correlation of the ranking of godfathers is the actual graphic representation of the network, which produces fascinating insights into a large amount of relational information that would be difficult to analyze in tabular form.

Local nobility, important office holders and high-ranking clergy occupy some of the topmost places in the network. So to a certain extent the structural analysis confirms what a more traditional attribute-based inquiry would reveal. But the relative position of the individuals and, especially, the structural relevance of certain people who are not associated with other visible attributes of importance provide interesting opportunities for exploration.

At the current stage of research, we have found that the graphic display is particularly interesting in the 'middle' zones between the top elite and the ordinary people. We are also aware that the potential of this technique for exploratory analysis of historical populations is just being uncovered (see Fig. 6 and 7).

A recent development has been the use of software that allows 'travel' through the three-dimensional network, using interfaces created for the visualization of virtual reality scenes. This technique greatly increases the exploratory value of the method because it enables a detailed examination of the intricacies of the network of spiritual kin and the detection of interesting actors. It is possible to link the spheres representing people to records in the population database so that a single click retrieves the biographical information of an element of the network.

Methodological Problems

It is also important to investigate the methodological and interpretative problems raised by this approach. In spite of the extraordinary regularity of the data, shown in the statistical distributions and the revealing power of the graphic representations, there are a number of difficulties and limitations that must be taken into account.
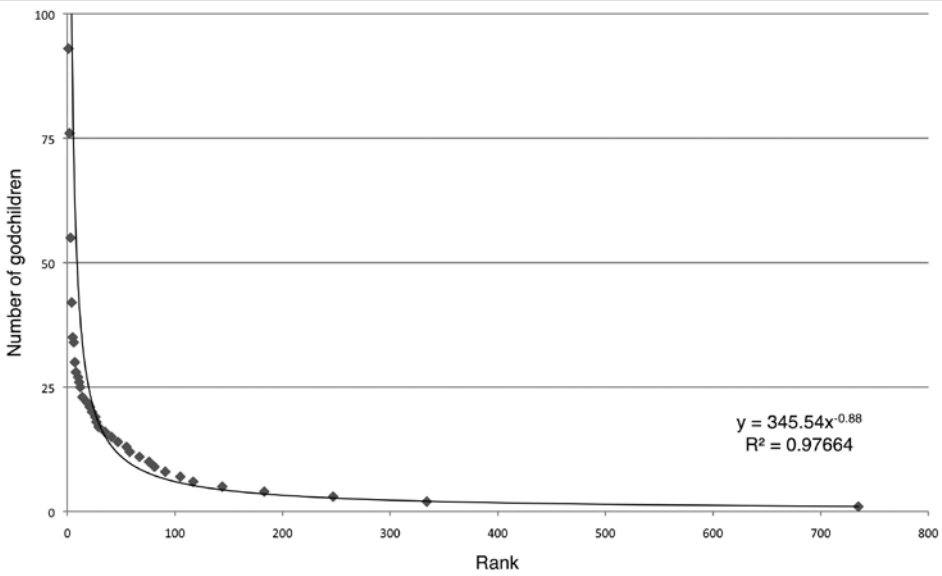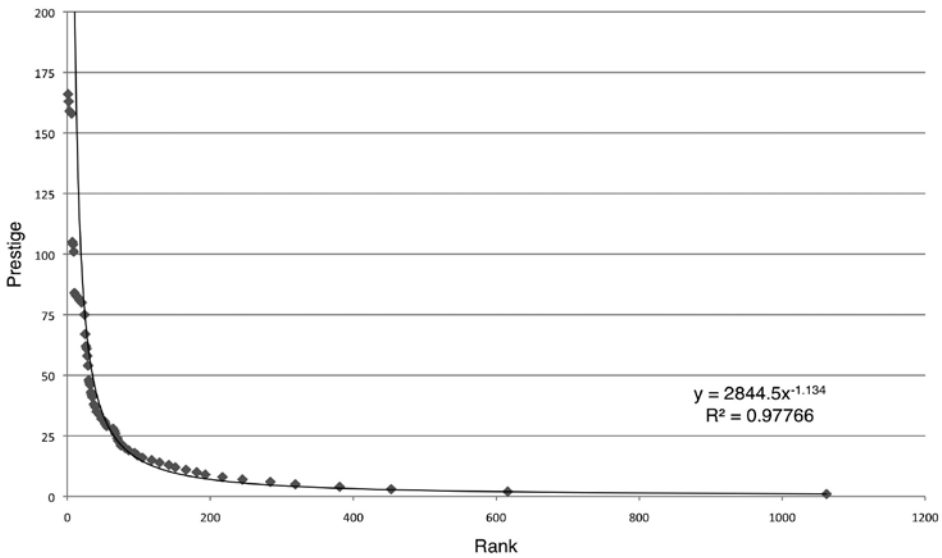
Fig. 5
The long tail distributions of ranked godparents indicates a particular type of network. When ranking godparents by number of children, a long tail distribution is obtained, indicating a self-organized, self-reinforced process producing a network with a few highly connected individuals and a great quantity of poorly connected people. Whether we use the absolute number of godchildren as a rank factor or a more sophisticated prestige computation, the fit between the long tail distribution and the data is very high, in spite of all the imperfections in the data gathering process.
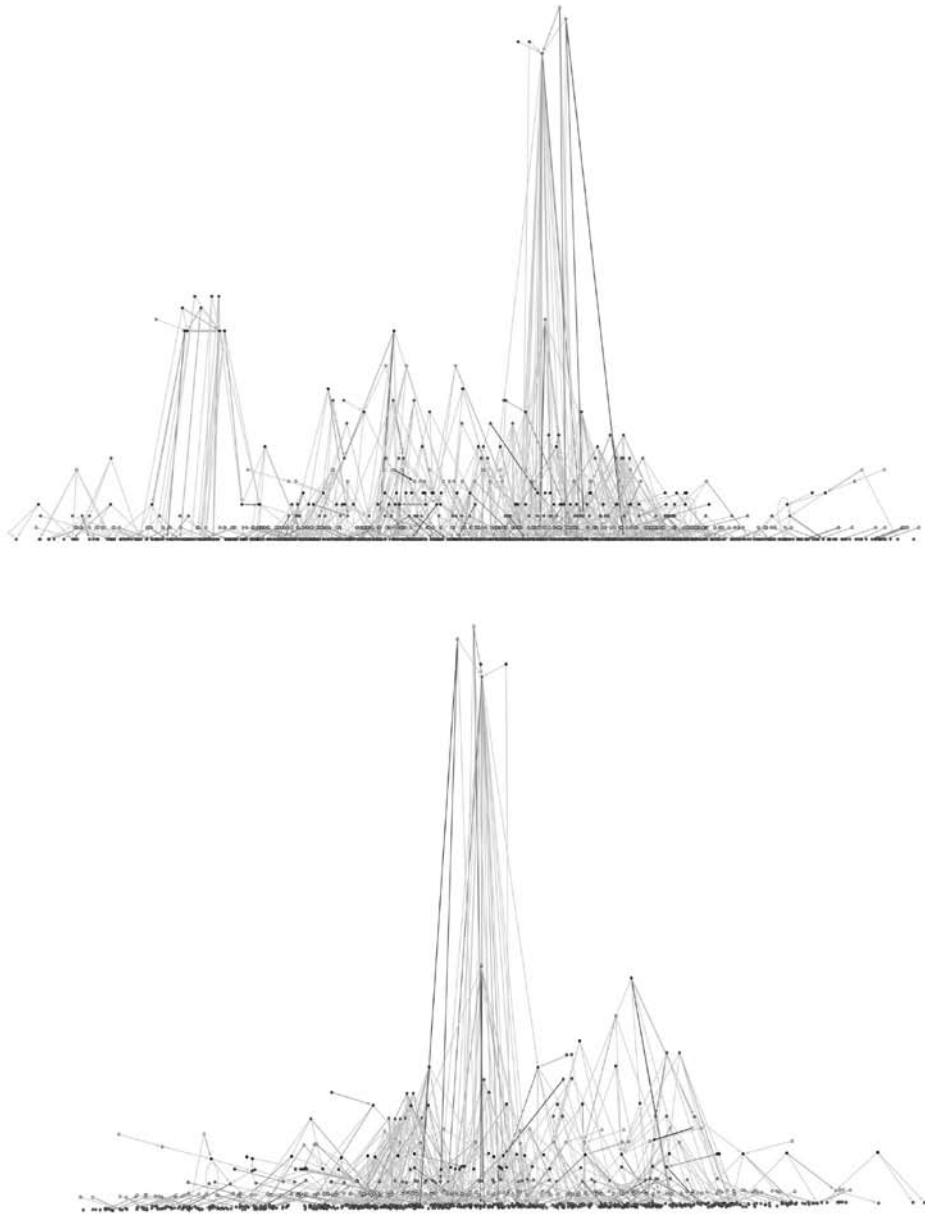
Fig. 6
Displays of the network of spiritual kinship, 'seen from the side': the first dimension represents social prestige computed according to the scheme presented in Figure 2. The top graph shows the network with data from the middle of the 16th century to the end of the 18th century. Different peaks reveal clusters of relevant people in different periods of time. The second graph is restricted to the 18th century. A more pyramidal structure emerges, tending towards a single peak. Network displays by Pajek.
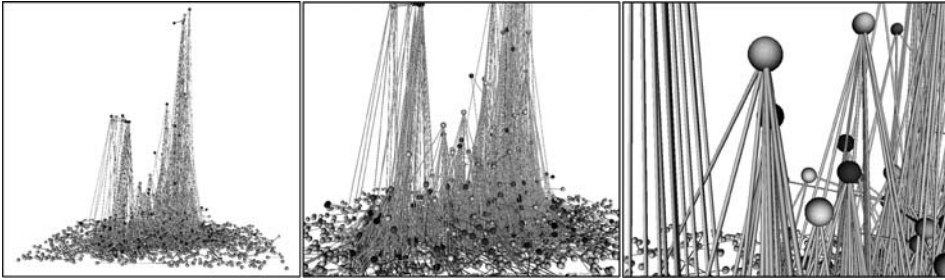
Fig. 7
Navigational view of the spiritual kin network. The three-dimensional representation of the network can be used with virtual reality software that allows the researchers to "travel" through the structure. The spheres are linked to the biographical records in the database.

Identification of individuals

The approach requires what is called "record linking", i.e. tracing the same person through the sources by collecting together references that are dispersed in the sources. We end up with godparents that cannot be reliably identified because the sources provide insufficient information to resolve ambiguities. It also necessary to identify not only the godparents but also the biological parents of the children baptized. In fact the network is constructed of individuals that are not only parents themselves (and therefore have to select godparents for their children), but are also invited to be godparents by others. These individuals, with double roles, provide most of the structural information for the middle layers of the network. This means, ultimately, that a full family reconstitution is needed to collect the necessary information.

The process is therefore highly data intensive and processing intensive. It is expensive and error prone, although the visualization of the network also helps to detect identification errors and solve some ambiguities. On the other hand, the highly spectacular graphic display and the implications of the database for genealogical research increases funding opportunities.

Representativity

Although we believe it possible to demonstrate that the choice of godparents is an expression of the perception of social position, there are exceptions to this behaviour. The first has to do with 'institutional godparents'. For instance, towards the end of the 18th century, there was an explosion of foundlings in Óbidos, motivated by a royal decree that provided funding for the care of children abandoned inside the town. Each of these children, of no known parentage, received an institutional godfather, normally

the officer of the city in charge of abandoned children. These officers therefore end up with a score that is not proportional to their real social importance.

On the opposite side, we have some evidence of very relevant people that leave a lighter imprint in the spiritual kinship network. This may be the result of the individual's personal choice (i.e. a decision to limit the amount of godchildren). The younger members of important families often appear as godparents in place of their own fathers, which would seem to indicate that an upper limit to the number of godchildren is somehow perceived as valuable for some. This issue requires further investigation, as it may prove to be a mechanism for the transmission of social role.

Synchrony

To apply this methodology, we need to collect data covering a significant amount of time, because the number of baptisms per year is too small to produce an overall image of the network. But in this process, actors from different periods (whose social relevance probably evolved during that time span) are lumped together. Thus, the images above are like long exposure photographs of moving subjects, where events that occurred over a long period of time are presented simultaneously. There is no way out of this problem; it simply has to be borne in mind by the researcher during the analysis of the results.

WIDER ISSUES

The importance of network analysis in historical research has long been recognized, even if it has never acquired the importance it has in other social sciences. One of the reasons for this is the difficulty of systematically gathering information about relationships, apart from genealogical information. In this research we demonstrate that a very significant amount of relational information, with a high interpretative value, lies buried in one of the most common sources available: the parish register in Catholic countries.

We also find that, as the network emerges, it reveals many interesting characteristics: many individuals are connected in such a way that everyone is just a few steps away from anyone else. This is a result of the fact that very relevant godparents, with many godchildren, bridge the gap with clusters of individuals that have very few other connections in common. This is a type of network called "a small world" and is one of the current topics of interest in network analysis.

It appears that spiritual kin plays an important social role in those communities. It allows the formalization of links between individuals that would not otherwise be connected by affinity or consanguinity. An important question is whether this usage of

spiritual kinship can also be fond in other Christian societies and, enlarging the inquiry, if similar phenomena can be found in more diverse cultural and religious settings.

Notes

1   E. Brambilla, J. Carvalho, *Religion and Citizenship from the Ancien Regime to French Revolution,* in S. G. Ellis, G. Halfdanarson, A. K. Isaacs. (eds.), *Citizenship in Historical Perpective,* Pisa 2006, pp. 35-60.

2   On the origins of spiritual kinship and the impediments generated see A. Fine, *Parrains, Marraines: la Parenté Spirituelle en Europe*, Paris 1994, pp. 17-26 and W. Coster, *Baptism and Spiritual Kinship in Early Modern England,* Aldershot 2002, pp. 76-79.

3   We can find two distinctive strategies concerning the use of spiritual kinship as a tool for social positioning: its role as a mechanism for the intensification of existing relationships (for instance with people with whom there is already a blood kinship) or for extension of the social network through the creation of ties to unrelated people. W. Coster, *cit.*, p. 9 and A. Fine, *cit.*, pp. 33-34.

4   For instance in Renaissance Florence, it was usual for the parents to give their co-parents gifts, so they would often choose men or women in need or from a lower social rank to become their children's godparents; the choice therefore acted as a kind of charity. L. Hass, *Il Mio Buono Compare: Choosing Godparents and the Uses of Baptismal Kinship in Renaissance Florence,* "Journal of Social History"*,* 1995, Vol. 29, nº2, pp. 344-345. On the criteria used in choosing a godparents, see also S. Gudeman, *Spiritual Relationships and Selecting a Godparent*, "Man"*,* 1975*,* New series, 10, 2, pp. 221-237.

5   S. Wasserman, K. Faust, *Social Network Analysis: Methods and Applications*, Cambridge 1999, p. 170.

6   The historical sources describe a number of visits by Portuguese kings to Óbidos throughout the middle and early modern ages. For instance between 1358 and 1356, King Pedro I stayed in the town. In 1422, João I signed the order that changed the Julian calendar to the Gregorian calendar in the town of Óbidos. In 1472, King Afonso V also stayed there, and in 1482, his son, King João II was also in the town.

7   In 1221, King Afonso II bestowed the town of Óbidos upon his wife, Queen Urraca.

8   Tradition claims that Queen Leonor went to Óbidos in order to grieve the death of her son, the royal Prince Afonso, who died on the banks of the Tagus River near Almeirim.

9   Besides this magistrate, the city council included two councillors *(vereadores),* a procurator *(procurador)* and a scribe *(escrivão da câmara).*

10   All the main churches in Óbidos parishes were collegiate churches, meaning that they supported a group of resident priests, like the chapter of a cathedral. Between them, they provided income for 26 clergymen, besides the parish-priests.

11   Similar results have been found in other godparent networks in 17th and 18th century Portuguese parishes. See J. Carvalho, M. Campos, *Reconstituição de Redes de Poder Local*, in *O Poder Local em Tempo de Globalização: uma História e um Futuro*, F. Fonseca (ed.), Viseu 2005, pp. 225-238.

12   D. Watts*, Small World: The Dynamics of Networks between Order and Randomness,* Princeton 2003.

13   For an overview of power-laws, see P. Bak, *How Nature Works: The Science of Self-organized Criticality*, Oxford 1997.

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