VennMaker for Historians:
Sources, Social Networks and Software

Marten Düring - Kulturwissenschaftliches Institut Essen (KWI). Germany
Matthias Bixler - Department of History, University of Trier. Germany
Michael Kronenwett - Department of Anthropology, University of Trier. Germany
Martin Stark - Department of History, University of Trier. Germany[1]

Abstract

This paper explores the applicability of the software VennMaker to historical research. The paper draws on two case studies from current network-oriented historical research projects, covering different time periods and sources. VennMaker's biggest advantage is that it inverts the process of data collection. While traditional software uses pre-coded data to produce a network map, VennMaker generates data while the researcher draws nodes and creates a network map. Prefabricated data matrices are no longer necessary; therefore, the software can easily be used by historians lacking training in the social sciences. Our two cases include an analysis of a family structure in ancient history and ego-networks of Jews in hiding during National Socialism. We argue that a visual representation of social relations helps to reveal unseen patterns and characteristics of networks therefore offering scholars new perspectives on their research subjects. The software offers a variety of tools to represent social relations and their development over time and space.

Key words: Visualization – Software – Data collection – Ancient History – Contemporary History

Resumen

Este trabajo explora la aplicabilidad del programa VennMaker para la investigación histórica. El documento se basa en dos estudios de caso de la actual red de proyectos de investigación orientados a la investigación histórica, los cuales abarcan diferentes períodos de tiempo y fuentes. La mayor ventaja VennMaker es que se invierte el proceso de recopilación de datos. Mientras que el software tradicional exige un tratamiento pre-codificado de los datos para producir un mapa de la red, VennMaker genera los datos al tiempo que el investigador dibuja los nodos y crea un mapa de la red. Matrices de datos prefabricadas ya no son necesarias, por lo tanto, y el programa puede ser utilizado fácilmente por los historiadores que carecen de formación en Ciencias Sociales. Nuestros dos casos incluyen un análisis de una estructura familiar en la historia antigua y las ego-redes de Judíos en la clandestinidad durante el período nacionalsocialista. Sostenemos que una representación visual de las relaciones sociales ayuda a revelar los patrones invisibles y las características de las redes y por lo tanto, se ofrece a los estudiosos nuevas perspectivas sobre sus temas de investigación. El programa ofrece una gran variedad de herramientas para representar las relaciones sociales y su evolución en el tiempo y el espacio.

---

[1] Contact information: Marten Düring at martenduering@googlemail.com, Matthias Bixler at bixl3201@uni-trier.de, Michael Kronenwett at kronenwe@uni-trier.de, Martin Stark at martinstark1@gmx.de.

Introduction

In the last decades, several studies in the social sciences have shown that formal methods derived from social network analysis can effectively be applied to selected bodies of historical data. These studies, however, tend to be strongly influenced by standards of data processing, and, above all, epistemological paradigms that have their roots in the social sciences (for example: Barkey and Rossem, 1997; Brudner and White, 1997; Padgett and Ansell, 1993; Windolf, 2007). From the point of view of a historian, the historical social scientists carrying out these studies did not, in most cases, adequately take into account the limits of historical sources and their often fragmentary and contradictory nature when they used them to extract relational data (one rare exception: Franzosi, 1996).

In contrast, historians are specially trained to consider the limits of their sources. Their entire professional education is aimed at handling sensitive information about the past. To do so, they use a methodological triad consisting of heuristics, source criticism and source interpretation. One side effect of this necessary concentration on the "historical method" as the basis of all historical research is that in most cases, historians do not receive proper training in formal socio-scientific methods. Alongside the scarcity of sources, this has hampered the comprehensive, valid and meaningful application of methods drawn from social network analysis for some time. In most cases, the term network has only been used in a purely metaphorical sense in historical research; but during the last decade, more and more historians have been facing the challenges posed by social network analysis (see for example: Boyer, 2008; Düring and Keyserlingk, forthcoming; Düring and Stark, 2011; Gorißen, 2006; Neurath and Krempel, 2008; Reitmayer and Marx, 2010).[2] However, there are still methodological issues regarding the comprehensive use of formal network analysis in network-oriented historical research projects. Several of these projects merely use features of formal network analysis for purposes of visual exploration of historical data (see: Grommes, 2008; Krempel and Lipp, 2001; Reupke and Volk, forthcoming; Stuber et al., 2008). The available software for analyzing and visualizing social networks typically processes prefabricated matrices which in turn require a considerable amount of expertise, time and manpower to code, adjust and interpret. Therefore, it is often difficult to decide whether the additional time and effort will eventually pay off in terms of valuable insights.

---

[2] For an extensive bibliography on research in historical network analysis please refer to: https://sites.google.com/site/historicalnetworkresearch (accessed 8. November 2011).

A trans-disciplinary team based in a research cluster on social networks at the Universities of Trier and Mainz[3] has developed VennMaker, software that aims to make the process of coding, visualizing and analyzing social networks simpler and faster.[4] While traditional software requires users to enter relational data in a database before they are able to produce network visualization, VennMaker generates this data while the researcher draws nodes and creates a network map. Prefabricated data matrices are thus no longer necessary. In this way, the program inverts the process of data collection and can easily be used by historians and other scholars lacking training in the social sciences.

The aim of this article is to demonstrate VennMaker's capabilities for historical research. As a heuristic tool for the visual exploration of networks, it has the potential to generate new research topics or to re-investigate old ones by supplying the researcher with a relational overview of his/her field. Secondly, the article presents two approaches to historical network research. The first case study, regarding a conflict among the Augustan family at the end of the first century BC, exemplifies how formal network analysis could be used in ancient history to explore the potential of social structures to affect the acts of individuals. This structural approach helps to reconsider and test earlier findings, which can't be gathered directly from the sources. The second case study examines autobiographical accounts by Jews during the Third Reich and provides a structured comparison of their ego-networks. This area of contemporary history is sufficiently rich in sources to provide information to reconstruct the corresponding networks.

These networks are simplified models of past social realities which in turn depend on our interpretation of historical sources. Any formal analysis of historical networks implies a systematic reduction of information, in contrast to the detailed reconstructions typically used in socio-historical or cultural-historical oriented research (Schor, 2011, p.11). The abstraction of the historical context and the standardization of relations among actors make it possible to gain a bird's eye perspective of the network structures and the relative positions of the involved actors. Mark Granovetter pointed out that "most behavior is closely embedded in networks of interpersonal relations" (Granovetter, 1985, p.504) and that it can often be seen as a reasonable response to the present situation (Granovetter, 1985,

---

[3] Further information about the research cluster „Gesellschaftliche Abhängigkeiten und soziale Netzwerke" at the Universities of Trier and Mainz is available at www.netzwerk-exzellenz.uni-trier.de (accessed on 30. November 2011).

[4] Available online at www.VennMaker.com (accessed on 6. September 2011).

p.506). This is similarly true for both contemporary and historical networks. In historical network research, with its limited analytical possibilities, social networks can be understood as potentially influential for the actions of individuals. In addition, the existence of missing ties can either enhance or obstruct an individual's scope of action. In this sense we share an understanding of networks as models of spaces of possibilities and restrictions.

The challenge of historical network research is to bring the historical context back in after the formal analysis is done. To conclude these introductory methodological remarks: While network structures can often be better examined by formal methods and visual exploration, individual actions and action strategies of individuals within these structures demand a more traditional qualitative approach. Therefore both research strategies do not contradict, but complement each other (similar points are made by Schnegg, 2010; Düring and Stark, 2011).

VennMaker: From Graphics to Data

VennMaker is a software tool for collecting, visualizing and analyzing social networks. The data collection takes place during the drawing. As in a painting program, the user itself draws the network. During the collecting process, the user paints symbols and lines into a defined area called the "digital network map".

One asset of this type of network map resides in the range of possibilities for representing and storing network information. Compared to paper-and-pencil tools and tool kits, for instance, the size, colors, and shapes of the nodes and the relations between the nodes are easily modifiable. For this reason, digital network maps can be flexibly adjusted to each research project. Since the data is very easy to modify, they are reusable and adjustable and therefore retrievable for other research projects at any other point in time (Gamper et al., forthcoming).

Actors (or nodes) are visualized as icons in a two dimensional space. Information is shown as text using different types of visual elements such as icons or lines. Visual communication allows the simultaneous perception of information, whereas information encoded as text characters, e.g. paper questionnaires, only permits a linear decoding (Krempel, 2005).

Each visual element represents a discrete scaled variable. This means that the user defines non-relational and relational attributes which can be represented by visual elements. If the value of such an attribute changes, then the corresponding visual element will also change and vice versa. Thus, for example, the importance of a person can be defined as an attribute with multiple values. The values in turn can be associated with different icon sizes. If the user changes the symbol size, the value for the importance will also change. Furthermore, it is possible to distinguish between different types of relations coded by color. Additional graphical elements, e.g. concentric circles, sectors and pie charts, allow the data input and visualization. Images, e. g. historical maps, can be added from external sources. These visual elements help to structure and standardize the network. The connection between attribute values with visual elements allows the user to continuously stay at the visual level when changing values. Therefore, he/she does not need to interrupt the working process by switching to different views, e. g. tabular view or matrix view.

The more actors and relations are drawn into the digital network map, the more complex the visualization of the network will become, which could also lead to a higher error rate of the network results. This issue of the increasing complexity was tackled by using filters which can be dynamically switched on and off during the collecting and the analyzing process (Kronenwett and Schönhuth, 2011).

While the user draws the network, VennMaker calculates some basic network metrics (e.g. density) in the background. After the user has finished the data collecting process, the network map can be exported as an image file, table or matrix to other programs such as Visone or UCINET.[5]

Structural aspects of the Augustan family and the banishment of Iulia the elder in 2 B.C.

In autumn of 2 B.C., after an important year for the final strengthening of his regime, Augustus, the first Roman *princeps*, publicly charged his daughter with adultery and banished her to an island named *Pandateria* (Syme, 1974; Kienast, 2009). At the same time, he exiled her alleged adulterers and others, both from senatorial and equestrian rank (Vell. Pat. II 100, 5), in various places. The most prominent one, Iullus Antonius, the last remaining son of Marc Antony and member of the inner circle of the Augustan family, was executed or driven into suicide (Syme,

---

[5] Visone is available online at http://www.visone.info, Ucinet at http://www.analytictech.com/ucinet/ (both accessed on 6. September 2011).

1974, p.20). This scandal of considerable political importance has been subject to a wide and controversial debate among modern scholars. The ancient sources provide little information about the course of events in general and the ambitions and motives of the main actors on either side (for sources see Meise, 1969, pp.5f and 17f). The discussion among modern scholars was characterized by substantial speculation, due to the fact that Augustus' measures affected a whole group of men belonging to distinguished families, but the sources are silent about any political motives. Edmund Groag, at the beginning of the 20th century, was the first to suppose that Augustus made use of his daughter's moral lapses to cover the suppression of a political conspiracy against him and his adopted sons, Caius and Lucius Caesares, the first of whom he presumably planned to make his successor. Subsequently, Groag's thesis was adapted and further developed by others. Today, it is widely accepted that most of the accounts found in ancient sources only provide an extremely biased official version of the scandal. Although some of the modern opinions differ considerably, most scholars refer to an explanation based on political reasons in one way or another.[6] Due to the vagueness of the ancient sources it will never be possible to clarify the circumstances with absolute certainty. The purpose of this paper is to take up a different point of view by giving a network model of the *domus Augusta*. Some of the problems already in discussion are to be reviewed in the light of a structural analysis based on network theory, in order to further reveal its potential for ancient history.[7]

In classical historiography, it was mainly the business of prosopographers to examine family ties and their influence on individual behavior. Without technical support, single researchers did not have the possibility to get an overview of complex family structures as a whole. Prosopography therefore narrowed its own scope by usually focusing on one person and his/her closer environment, while neglecting his/her embeddedness in a larger network context. The adaptation of social network analysis to ancient historiography opens the possibility to take network effects into consideration and thus to reveal further insights into the motives and restrictions of individual behavior that otherwise remained unseen.

By now the most fruitful studies in this respect most notably derive from historical sociology and social anthropology. Douglas White, for example, applied the p-graph

---

[6] Some of them just implicitly by refusing a political background and arguing that adultery was the only crime committed. Recently (Bleicken 1998).

[7] Up to this date there are only a few examples of application of social network analysis in ancient history, (Alexander and Danowski, 1990) and (Ruffini, 2008), being the most prominent.

to the lineage of the patriarchal Israelites of Canaan referred by the Old Testament (White and Jorion, 1992). Peter Bearman analyzed kinship networks of the Norfolk landholding elite in the 16th and 17th century by means of the distribution of categorical attributes and blockmodels (Bearman, 1993). His dataset contained several hundred of actors over a time period of a whole century, which makes visualizations inefficient for analysis. Padgett and Ansell also used blockmodeling in their well-known study of the rise of the Medici in Renaissance Florence (Padgett and Ansell, 1993). P-graphs can reveal social norms affecting kinship structures, such as marriage rules and incest avoidance. This is not the purpose of the particular study here, but it could provide very interesting results when applied to larger historical datasets. Our case study operates on a micro level and contains a comparatively small number of actors. A visual analysis may therefore be less confusing than tables.

Two-dimensional visualizations of ancient family structures of a certain amount of complexity, usually in the form of stemmata, can prove somewhat difficult to interpret. They become even more difficult to read when people from more than one family are involved, married and divorced a couple of times or bore children with more than one partner. In some cases, it is necessary to picture the same person more than once, which makes a stemma harder to read. One usually needs more than one stemma to see interdependences between several families. Beth Severy addressed some of these problems for the Julio-Claudian Dynasty by using a software tool for visualizing family trees in genealogy (Severy, 2003, p.65). For the purpose of this paper, a greater variety of visualization techniques is needed, which can be provided by software tools designed for Social Network Analysis.

Figure 1 shows a network map of the inner circle of the Augustan family in 2 B.C. and the lineage of its members.[8] It contains relations beyond marriages and lineages and makes them well distinguishable. Different colored segments and concentric circles refer to aspects of the social order that were valid in Roman society. The former separate the four *gentes*, or families, from each other and thus suggest a certain amount of interior cohesion between the nodes they contain.[9] The latter align

[8] The data derive from *Paulys Realencyclopädie der classischen Altertumswissenschaft*, still one of the leading encyclopedias for ancient history. As the types of consanguinity between the discussed actors are completely existant and undisputed, it is not necessary to derive them directly from ancient sources. Half-siblings are neglected.

[9] The following Figures contain three actors, that fit in neither of the four families – Fulvia, mother of Iullus Antonius, Scribonia, Augustus' first wife, and Livia Drusilla, his second wife. They are attached to the family they married into first.

family members according to their place in lineage, so that each circle contains the parental generation of the adjacent interior circle. Taking into account the *patria potestas*, the all-embracing power of control of a patriarch over all of his descendants, which was still in full power in late republican Rome, they represent a very important part of social life.

Augustus pursued a family policy of "unusually endogamous marriages and adoption patterns" (Severy, 2003, p.62) which resulted in the end in an almost complete separation of the coalition of the four depicted families from the rest of the Roman aristocracy. It played a solitary role for the succession plans up to Nero (reign 54 – 68 A.D.), the last emperor originating from the Julio-Claudian dynasty and simultaneously the first emperor whose biological father was not a member of one of the four families in discussion. For these reasons, the dynamics inside this inner part of the Augustan family can well be examined separately.[10]

The network was built in order to focus on these inner dynamics for the year 2 B.C. and hence excludes those actors which could not yet have a real effect on the structure. In this case study, a person is defined as a member of the inner circle of the *domus Augusta* by 1. direct lineage from one of the four families, either maternal or paternal, 2. marriage into one of the four families at some point in life, 3. born between 90 B.C. and 10 B.C. Additionally, Fulvia and Scribonia were included for mere reason of completion of the parental relations of Iulia and her alleged adulterer Iullus Antonius.

---

[10] Marcus Vipsanius Agrippa (died 12 B.C.), Iulias first husband, was Caligulas (reign 37 – 41 A.D.) maternal grandfather. Agrippas influence is neglected for this network and his children treated as Iulii/Octavii because of her mother Iulia.
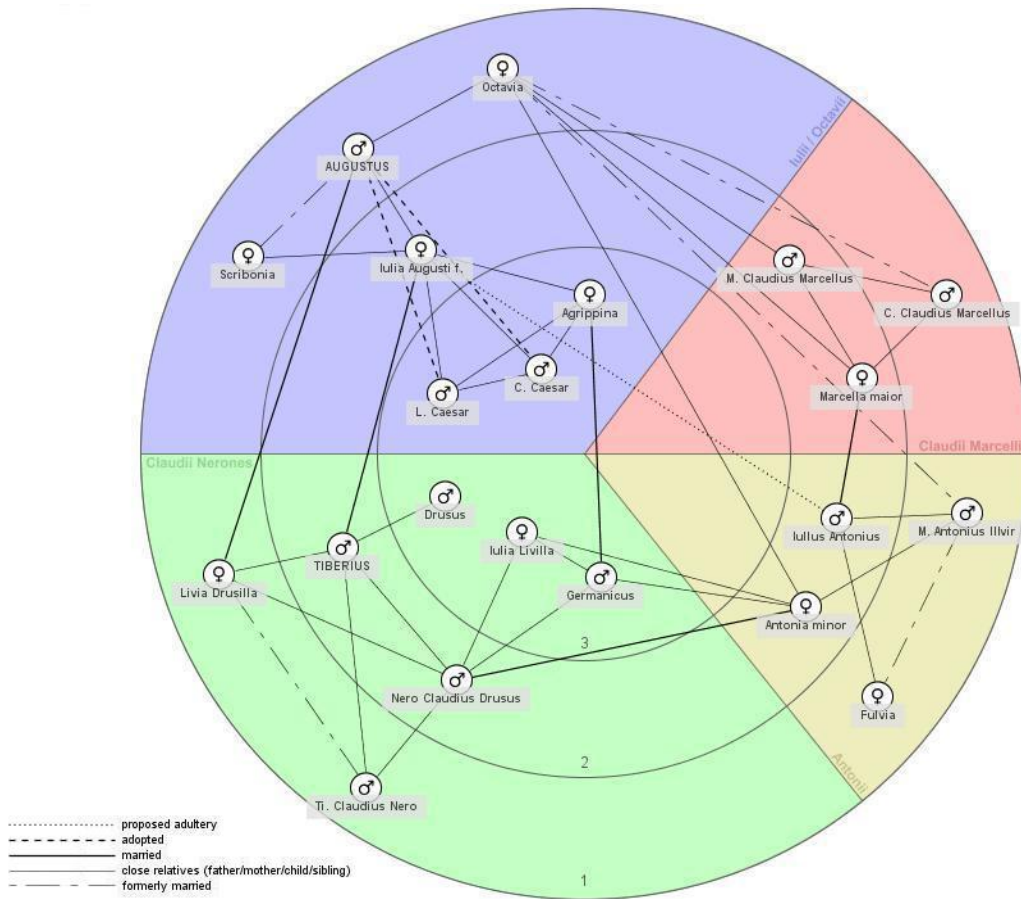
Figure 1. Kinship ties and lineage of the domus Augusta.

Figure 1 clearly shows the consequences that the mentioned "marriage patterns" had for the interconnection of the four families. A closer look reveals that almost all families were interconnected with each other, the *Claudii Nerones* (one of two patrician parts of the Claudian family) and the *Claudii Marcelli* (the plebeian part of the Claudian family) being the only exception. The ancient sources don't provide any information about a marriage or adoption between these two families in the Late Republic.

It also allows further insights to the importance of some single family members, especially women, for the integrity of the structure. Octavia, Augustus' elder sister, for example, is the only member of the Iulian/Octavian part of the family to connect it to the *Antonii* and *Marcelli*. Corbier stressed the role of female members of the Julio-Claudian dynasty in general for the transmission of legitimation to their husbands. According to Figure 1, they were also essential for the coherence of the

structure as a whole right from the outset. This may be seen as an additional effect of their higher life expectancy (Corbier, 1995). Compared to the other families, the *Iulii/Octavii* have the closest connection to the *Claudii Nerones*, the family of Augustus' wife and stepsons. There are three marriage ties: Augustus' own marriage with Livia Drusilla, his daughter's marriage to his stepson Tiberius and his granddaughter Agrippina's marriage with Germanicus, son of Drusus the elder and thus nephew of Tiberius. The *Iulii/Octavii* and the *Claudii Nerones* might therefore be considered as the core of the Augustan family structure, and the *Antonii* and *Marcelli* as its periphery.

In Figure 2, all actors that were already dead in 2 B.C. are removed. This network map shows that by this time, the family structure Augustus had established since his coming to power was highly eroded. The unexpectedly early death of important family members affected the degree of interconnection through marriage between all families except the Julio-Claudian. In fact, the Julio-Claudian marriages and one Antonio-Marcellan marriage are the only ones left from the system of interconnections Augustus created. Tiberius was still alive, but went to a self-imposed exile in 6 B.C. His marriage with Iulia was in a severe crisis before and was no longer more than a formal tie (Bleicken, 1998, pp. 634f; Sattler, 1969).
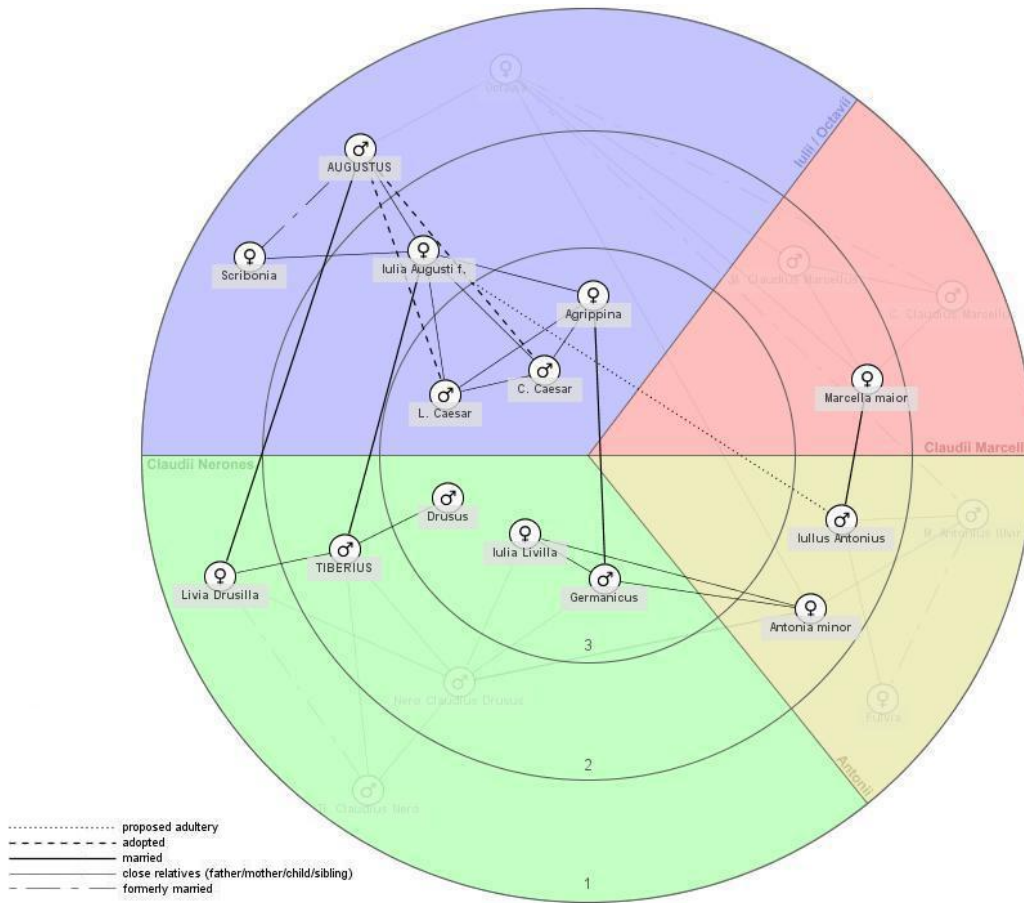
Figure 2. Domus Augusta as existant in 2 B.C.

It was against this structural background that Augustus charged and condemned his daughter and her lovers. As mentioned above, neither side has clearly distinguishable motives. Iulia's role in Augustus' marriage system has often been stressed. Her husband and thus the princeps' son-in-law always played an important part in Augustus' reign (Tac. Ann. IV 40, 6).

What can a look at the family structure reveal about these circumstances? Iullus Antonius was actually very poorly connected in 2 B.C. After Octavia's death, he and his wife Marcella were no longer in touch with the Julio-Claudians. In fact, the only remaining strong family tie from his point of view was his marriage.[11] The careers of other family members show that only those with a close connection to Augustus or his closest relatives (that is to say his wife, daughter and sister) had a chance to distinguish themselves in the course of offices or with military commands. One could say: the shorter his path length to Augustus in the kinship network, the better for the career opportunities of a man in the domus Augusta.

That Antonius was ambitious in this regard is revealed by the fact that he had already held the consulship once (in 10 B.C.). After his stepmother Octavia died in 11 B.C. (the year when he was elected for consulship), he appears just once more in an administrative function, as proconsul of Asia (RE I,2 Sp.2584). This is one of the scarce occasions in which an empirical indication supports an otherwise arguable statement in an ancient source. Plutarch gives evidence that Octavia was the main reason of her stepson's political promotion.[12] He composed his account from a retrospective view and is well known for his occasional inaccurateness and his anecdotal style. In this case however he seems to have a point, because we clearly see that the end of Antonius' political career coincides perfectly with the death of his supposed supporter and, more importantly, his resulting decoupling from the main component of the family structure. Antonius does not seem to have gotten any more support after that.

Now that Tiberius was gone, he might have seen an opportunity for coming back into the political arena, but making himself the new head of the family from such a weak structural basis must have been far from a realistic option, even for a man in the right age and of such noble descent.

---

[11] In network terms: his degree centrality for family ties is only 1 and, when putting him in the center of an ego-network, its density is even slightly raised (from 0.22 to 0.24) by removing him. On concepts of density and centrality see the basic literature, for example: (Wasserman and Faust, 1994,, pp. 101-104, 178–202).

[12] "(…) Ἀντώνιον δὲ τὸν ἐκ Φουλβίας οὕτω μέγαν ἐποίησεν ὥστε (…)" (Plut. Ant. 87,2)., literally: " (…) [Octavia] made Antonius, the son of Fulvia, so big that (…)".

Some considerations have been made concerning the point in time Augustus chose to make the affair public (Dettenhofer, 2000, p.179). Syme's remarks on Iulia's motives to engage with Antonius implicitly take it into account from her point of view (Syme, 1974, p.25). A closer look at the persons inside the innermost circle of Figure 2 shows that the years around 2 B.C. were a critical period in time for Antonius, too. This new generation was about to come very soon into an age which allowed it to carry out the duties he might have wanted to fulfill. Caius Caesar was born in 20 B.C. and entrusted with a military mission in the eastern provinces in 1 B.C. He was designated as consul for the year 1 A.D (RE X,1 Sp.424-426). Lucius Caesar, his younger brother, received the *toga virilis*, the toga of manhood, in the same year his mother was banished (Kienast, 2009, p.31). Germanicus and Drusus, by now about thirteen (RE X,1 Sp.431f), were the next to come of age. With this in mind, anyone who wanted to influence the succession on behalf of his own descendants or to improve his own position in the family structure had not much time left to come into action. Augustus' lack of able male relatives would soon be over.

Of course, the severe measures that Augustus took cannot be explained from this family structure in a positivistic manner. It however can suggest some evidence for possible spaces of action. As mentioned above, Iullus Antonius was almost isolated in the family structure after Octavia's death. It seems that Augustus did not want to consider him for important political business in the first place. In addition, after Octavia's death, he could punish him regardless of other family members. For the same reason, Antonius could challenge Tiberius' position in the family. As long as he was still in Rome, it would have been senseless. Now that Tiberius had broken with Augustus, gone to Rhodes and therefore was isolated in more than one regard, both Iulia and Antonius had no reason to take other relations into account.

With the death of Iullus Antonius and the banishment of Iulia maior, the family structure changed further, this time not accidentally as a result of natural deaths, but because of a direct control by Augustus. In this sense, we can regard Augustus as a network entrepreneur. After its transformation, the domus Augusta looked as follows in Figure 3. Scribonia, Iulia's biological mother, accompanied her daughter voluntarily into her exile. Now that the last male of the *Antonii* was removed from the family, the *Marcelli* were completely isolated; no longer did they play an important political role.
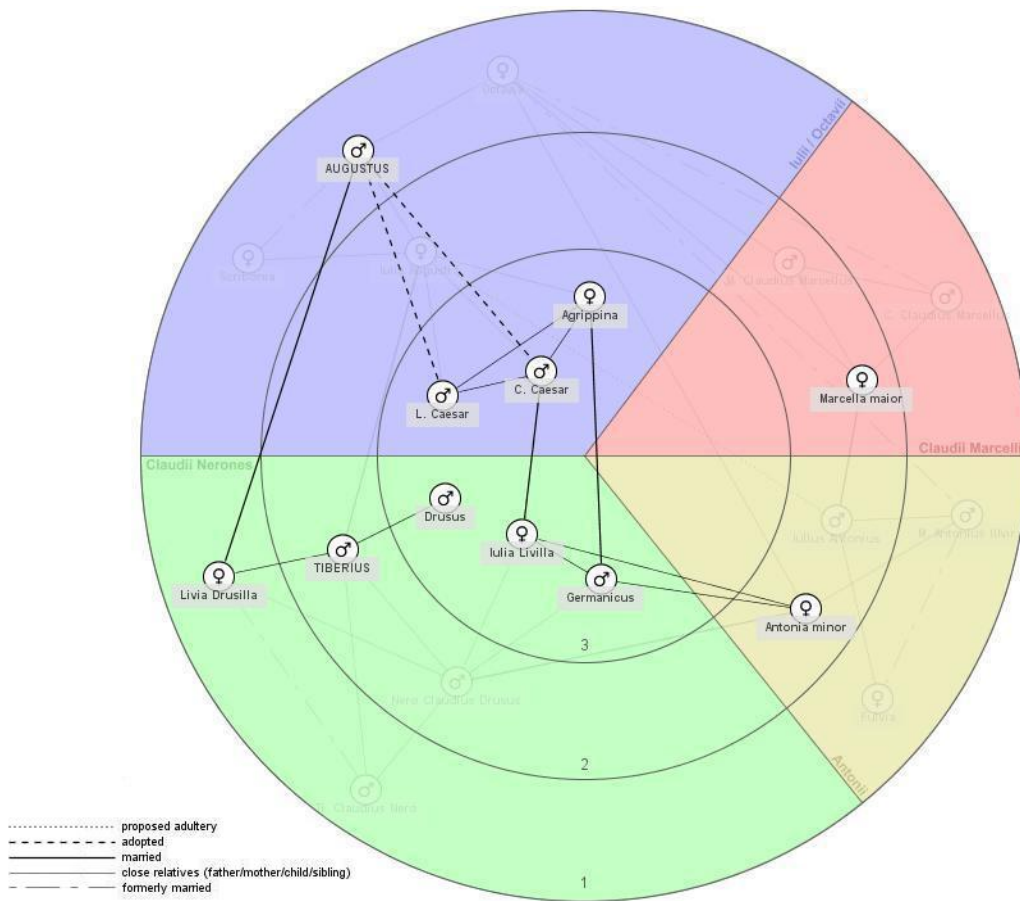
Figure 3. Domus Augusta in 1 B.C.

Together with her banishment, Augustus divorced his daughter from Tiberius. Modern scholars have very early suggested that Augustus gladly used the affair to decouple him irrevocably from the family (Groag, 1919, p.441). This might have been a good opportunity to get rid of a *persona non grata*, but it also reduced the strength of the connection between the Julian and the Claudian families, with only two intermarriages left. Very soon, Augustus compensated this loss by arranging a marriage between Caius Caesar and Iulia Livilla, a granddaughter of his wife, which brought the number of marriages between the Julio-Claudians back to three. This may be seen as a strong evidence for the assumption that Augustus was fully aware of the effects of his actions and can thus justifiably be seen in the light of network

entrepreneurship. Unlike what Padgett and Ansell concluded for Cosimo de Medici[13], we argue that Augustus knew from the outset that controlling his network environment was crucial for maintaining his rule, which, at first, he established to a large extent through military force. Further research might confirm that he gradually substituted military force through network control.

The main purpose of this case study was to show how structural approaches might be useful in ancient history as they provide an opportunity for researchers to see familiar issues from a slightly different point of view. In most cases, it will not be possible to explain precise actions directly from network structures. However, like in the case presented here, it might be helpful to see historical networks as models of spaces of possibilities and restrictions. In our example, Augustus changed his kinship network according to his needs and wishes and most notably against the will of other family members. This became possible as they lost their structural backing.

Ego-networks of Jews in hiding: A systematic comparison

It has now become common knowledge that a small minority of Jews managed to survive the Holocaust hidden and with support from a small and diverse group of helpers. Soon after the end of the Second World War, historians, sociologists, (social) psychologists and scholars from many other disciplines began to analyze stories of help and survival and found several answers to what seemed to be the key question at stake: "Why did helpers decide to help?" The most frequently used sources were collected by the Israeli memorial Yad Vashem. The institution is most famous for awarding the title "Righteous among the Nations" to individuals who were proven to have helped in a selfless manner.[14]

Many social scientists came to the conclusion that helping behavior was a consequence of certain common characteristics among all helpers. Samuel and Pearl Oliner argued that they were driven by an intrinsic sense of morality and altruism and that a specific form of upbringing, including strong ethical and political values, could explain their actions (Oliner and Oliner, 1992). Others looked at their socio-demographic background, e.g. their education and wealth (Seligman, 1992).

---

[13] "Cosimo did not create the Medici party, but he did shrewdly learn the rules of the networks around him.", (Padgett and Ansell, 1993, p. 1310).

[14] Further information is available from Yad Vashem www.yadvashem.org (accessed on November 8th 2011).

Historians have however shown that helpers not only differed with regard to the moral qualities of their actions but also with regard to the intensity and the ways in which they were active (Benz et al., 1996-2004; Grabowski, 2008; Moore, 2010; Sémelin et al., 2011). Their studies confirm that helpers came from all sorts of social backgrounds, had different motives, giving a large variety of different reasons to explain their behavior, as well, they had varying incomes and socializations. Case studies (Beer, 2010) and the history of the available sources suggest that even self-proclaimed motives of helpers underwent processes of conscious or unconscious reinterpretation and are thus not necessarily to be trusted.

Both in Germany and in the occupied countries, helpers and refugees acted under extreme pressure in a hostile environment and had to expect to be arrested immediately after their activities attracted the attention of anyone willing to denounce them. However, consequences for helpers, scopes of action and available resources varied considerably between Germany and the occupied zones and among the latter. Probably the most important difference between Germany and the occupied zones was the absence of organizations whose infrastructures could be used to help Jews and other refugees.[15] The project described here neglects an international comparison in favor of an in-depth analysis of network structures that emerged under similar conditions, namely in Berlin from 1942 onwards. Here, the vast majority of people were or at least had to be considered to be devoted Nazis; any requests for help had therefore to be made very cautiously and based on trusted relations. Refugees faced regular checks by police and Gestapo, first targeted at finding Jews, later at finding young men who had deserted from the Wehrmacht. In addition, they had to fear the so-called "Greifer", Jews who were pressured by the Gestapo to find and report other refugees and were promised freedom from persecution for themselves and their families (Tausendfreund, 2005).

---

[15] Bob Moore's excellent comparison of support networks in the Western occupied zone shows that the vast majority of all networks had their roots in earlier networks such as welfare or scout organizations, for example see: Moore (2010), p. 111f, p. 160. In Germany most organizations had either been disbanded or "gleichgeschaltet", i.e. subject to "Nazification".

These dangers, together with the efforts of the regime to control black markets and any other form of deviant behavior, meant that any written account of one's activities represented a significant threat.[16] Gestapo agents interrogated anyone they associated with support activities in order to identify all collaborators. Transcripts of these interrogations can be quite informative; they however may contain (consciously) misleading or false information. The majority of the available sources were thus produced after the war. A larger number of helpers and refugees first gave evidence of their actions in the course of applications for reparations. Detailed questionnaires asked about their political activities, experienced persecution, physical and material damage, involvement in resistance activities, religious beliefs and an extensive resume. They were then asked to write down their stories. Designed with refugees and resistance fighters in mind, these documents were meant to uncover provable participation in anti-Nazi activities and cases of illegal expropriation by the state. They were not meant to uncover the practice of help and survival. Any information the applicants provided has therefore to be weighed against their interest to receive reparation from an institution that was not necessarily acting in their best interest. In 1958, Berlin's senator for the interior, Joachim Lipschitz, brought forward an initiative to honor helpers in Berlin. Those who could present an honorable lifestyle[17] and witnesses of their actions were granted a small rent and a public acknowledgment of their help (Riffel, 2006). Again, administrators collected reports and data about both helpers and refugees are now available for research. Beginning with the applications for reparation, all the sources were thus produced in settings which encouraged stories of virtuous helpers, since the respective institutions explicitly ruled out acknowledgment of rather ambivalent or dubious motives. Somewhat more outspoken are reports by survivors. They of course focus on their story of survival; their purpose is to tell their stories from their own, often limited, point of view and are therefore not without omissions, distortions and false memories.

---

[16] Despite of this, a small number of contemporary accounts, mainly diaries, exist: Andreas-Friedrich, Ruth (2000). *Der Schattenmann: Schauplatz Berlin; Tagebuchaufzeichnungen 1938-1948.* Berlin: Suhrkamp; Behrend-Rosenfeld, Else R. (1945). *Verfemt und verfolgt: Erlebnisse einer Jüdin in Nazi-Deutschland 1933 - 1944*. Zürich: Büchergilde Gutenberg.

[17] Prostitutes were for example exempt from this initiative.

Oliner and Oliner showed that roughly two-thirds of all helpers whose cases were documented in the Israeli memorial site Yad Vashem responded to requests for help (similarly: Varese and Yaish, 2000). The vast majority of all helpers collaborated with others in order to facilitate their support for refugees.[18] This suggests that the decision to help was not only a question of personality but also one of social embeddedness.

The project aims to contribute to the existing research by understanding the decision to help and its practice as a social process. In this process, helpers typically responded to requests for help and used peers to approve of and reinforce their belief systems, which eventually lead them to act differently than the majority of the society they lived in. Many of the aforementioned studies (Oliner and Oliner, 1992; Seligman, 1992; Varese and Yaish, 2000) aimed to measure helping behavior both statistically and through the comparison of individual cases. This approach aims to reconstruct, in a formalized and thus comparable way, social networks between helpers and refugees in Berlin, in order to discuss their importance both for the motivation to help and the ability of refugees to sustain a life in the underground. Relational data is used to literally map the complex relations which emerged between helpers and refugees and among helpers. All interactions between helpers and recipients of help were coded into a database which describes the practice of help and the intensity of relations between two actors. Among them is information on the specific form and duration of help, the date of their first encounter and a rough categorization of their motives.[19]

---

[18] Research in a public database on helping behavior in Berlin compiled by the Gedenkstätte deutscher Widerstand confirms that isolated helpers are a small minority.

[19] The categories of the database were developed during the analysis of four distinct support networks. After the categories matched both the desired research questions and the available sources, all networks were coded again using the now standardized categories.

One of the aims of this research is the comparison of ego networks of Jews in hiding. VennMaker was used to explore the potential of standardized visualizations of ego networks. Two reports written by a middle-aged Jewish woman and a young Jewish man who survived the Holocaust in hiding in Germany were chosen as case studies. Both survived with the help of numerous Gentiles they had not known before. At this stage, the aim of the comparison was to explore similarities and differences in the two refugees' networks and to test VennMaker's capabilities for visualizations. The target was to develop a dense yet easily legible representation of an individual's ego network which would enable the researcher both to analyze the development of an individual's ties over time and to compare several individuals.[20]

Network visualizations of relations between helpers and refugees help to explore the complexity of these relations and to connect the actions of individuals with developments of larger structures. This way, the complexity of social relations changes from an obstacle to the object of research. In order to reconstruct relations between actors, various sources need to be evaluated with regard to their respective credibility. This process necessarily reduces historical sources to information on relational data. The resulting relational structures however can only be interpreted in a meaningful way when considered together with the detailed information and specifics of the original sources. The case studies presented here are largely based on autobiographical reports of the two refugees which could partially be validated with the aforementioned types of sources. Cross-references have shown that by-and-large they are verifiable and accurate.

In order to map the emergence and use of these relations, the following aspects were considered relevant: form of help, time of help, the intensity of the relation between ego and his/her *alteri*, all known relations among the *alteri,* and their fluctuation. The multi-plexity of these relations makes it necessary to expand the schematic representation of information to the space of the network map: the spring-embedder algorithm that is commonly used in other network software puts nodes that it considers well connected closer to one another; nodes which it considers to be poorly connected are positioned further away from each other. We know of a node's overall embeddedness because we consider its position in relation

---

[20] It may be argued that the development of ego networks could also be represented in a gallery of six maps per ego network; the current solution however uses less space and makes the comparison across several networks easier.

to its distance to other nodes. If for example node A and node B were poorly connected, it obviously does not matter whether node A is positioned in the top left and node B in the lower right or the other way round. All that matters is that they are far away from each other. In this project however, space is used to represent additional information. The segments of the network maps represent "time slices" of six months each and (in concentric circles) the quality of relations between ego and the *alteri*. The map thus shows the development of ego's network from the second half of 1942 clockwise until the first half of 1945 (Figure 4).
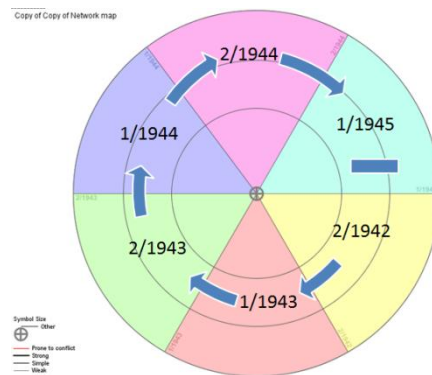
Figure 4. Time is represented as "slices". Each covers a period of six months from the second half of 1942 till 1945.

Even though this cyclic representation contradicts our understanding of the linear passage of time, it has one big advantage: Each time segment has the same size, which makes their comparison within the network and across several networks easier.
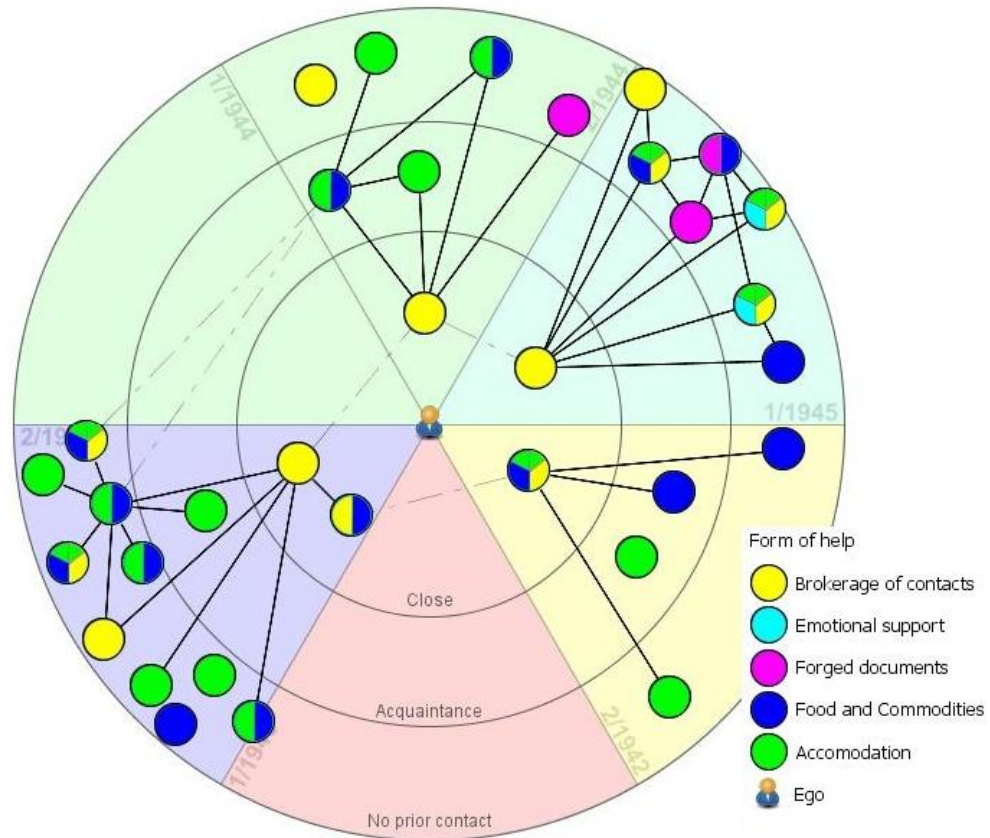
Figure 5. Ralph Neumann's network.

Ego's trusted friends or relatives are positioned in the inner circle. Acquaintances[21] are found in the second, strangers in the third ring. Whereas in most cases the respective wording allows an assessment of the intensity of relations, there are some cases in which such a categorization must rely on the historian's interpretation and context knowledge alone. Some relations between refugees and their helpers have of course intensified over time and trust has developed. This analysis however concentrates on the refugees' pre-existing social networks and their significance for their survival. It thus only considers the quality of relations at the time when the refugee went into hiding.

---

[21] We define an acquaintance as two person's ability to identify each other and smalltalk.

Relations between ego and his/her *alteri* are present by definition and are not represented by lines, in order to avoid a cluttered picture. On the other hand, relations among *alteri* are visible as well as any sub-structures in the network. It happens that helpers are present in more than one time slice. If, for example, person C provided help both in the second half of 1943 and the first half of 1944, there would be a dashed line between the node "C" in time slice 2/1943 and the node "C" in 1/1944. This provides basic information on the fluctuation of helpers and helps to distinguish the new helpers from the previously active helpers.

The colors of the actors represent their form of help. *Yellow* stands for brokering new contacts, *green* for accommodation, *blue* for food and food stamps, *purple* for forged documents and *turquoise* for the explicitly mentioned provision of emotional support. Helpers who gave support in more than one way have nodes with two or three colors. This was made possible using VennMaker's ability to import custom made icons.[22]

Figure 5 shows Ralph Neumann's ego-network. Neumann, his sister and their mother avoided their deportation and went into hiding in Berlin in February 1943 (Neuman, 1994). Neumann's mother however was arrested only weeks later and died in custody in June 1943. Leo Fraines, a friend of Ralph Neumann and fellow forced laborer, found him a hideout at a farm outside Berlin, where Ralph was safe for several weeks. Thereafter, his sister Rita found him a place with Agnes Wendland, her own helper in Berlin. Wendland brokered contacts to several other helpers in Berlin and Ralph Neumann managed to survive until the end of the war. There is a gap in his report in the first half of 1944 which is best explained by a phase of relatively stable relations. We can assume that throughout 1944, Ralph was continuously supported by the Wendland family and their network; he mentioned new contacts only towards the end of the year.

---

[22] I thank Claire Lemercier for suggesting the dimensions of (dis)continued help and multi-coloured nodes for this visualization.

Erna Segal's ego-network was chosen as the second visualization (for a more detailed discussion of this case see Düring, 2011). She, her husband and two teenage children decided to go into hiding in the summer of 1942. Even though they soon had to split up, they managed to meet regularly (Segal, 1956). The Segals survived with the help of old acquaintances who recommended them to new helpers. Among the newly met helpers is Dr. Fritz Aub, who helped both the Segal family and Ralph and Rita Neumann; however, neither the Segals nor the Neumanns knew of each other.
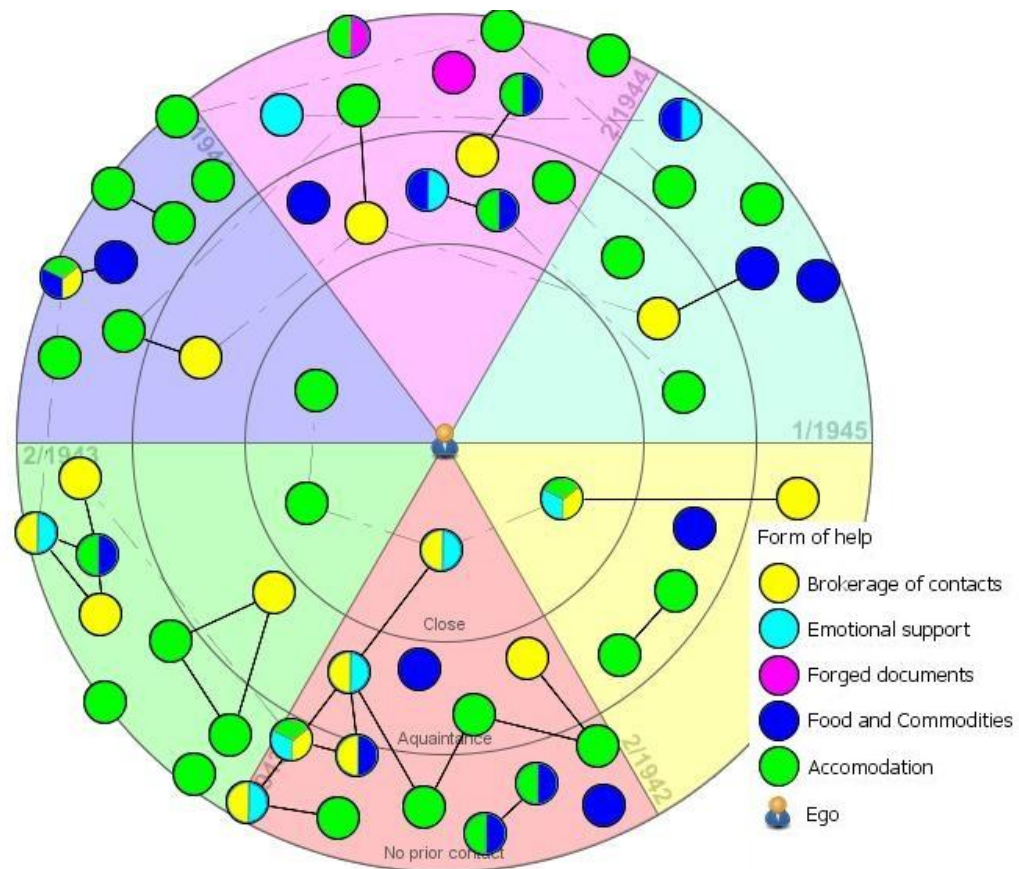
Figure 6. Erna Segal's ego-network.

A comparison between Ralph Neumann's and Erna Segal's network reveals the following similarities: both began their lives in hiding with few helpers whom they first met through trusted friends. These, "strong ties", in Granovetter's sense (Granovetter, 1973), gave the refugees access to new helpers, some of which became new trusted helpers themselves. With most helpers appearing in one time slice only, the proportion of continuous helpers is overall rather low.

Survival during the Holocaust depended on mutual trust between refugees and helpers. One trusted helper and thus opponent of the Nazis would often know others. Simple recommendations allowed refugees to enter these small and covert networks of Nazi-opponents. These networks typically did not rely on much more than the shared opposition to the Nazis. The presence of a refugee who urgently needed help could however transform passive opponents into active helpers. These would often continue recruiting other helpers and set an example for them. This simple mechanism made it possible that like-minded strangers could build trust relations even inside an extremely oppressive totalitarian system. In 1943, Erna Segal benefitted from a chain of seven of these recommendations which gave her access to very different social circles and eventually very potent helpers. By 1944, the strong fluctuation of helpers in her network forced her to continuously find new helpers and persuade them to become active. At first sight, Ralph Neumann seems to have been in a better position. His embeddedness in a pre-existing network however implied a considerable risk for himself and his helpers. Ruthless Gestapo interrogations and even torturing often meant that the arrest of one refugee most likely led to the demise of the whole network, including most helpers and other refugees. This is the reason why Neumann moved to a different network in 1945. He had been arrested, managed to flee from prison and was introduced to the second network by a trusted helper who had not been associated with the first. Neither Segal nor Neumann gained access to much needed forged documents until late 1944 and thus were not able to live under false identities or even pass regular police checks on the streets. This meant a significantly higher risk of detection and less freedom to move in the city. Especially Ralph Neumann could have easily been considered to be a deserted soldier.

These findings lead to a number of hypotheses. Few trusted actors provided essential first contacts to new helpers, indicating that refugees could not rely on other trusted friends or family to hide them.[23] Life in the underground did not necessarily mean passivity. Erna Segal's efforts to approach potential helpers and to trigger numerous recommendations between them show that support for small numbers of refugees was possible even within the Nazi regime. Ralph Neumann was more passive and benefited from his sister's and Leo Fraines' relations to helpers. In both cases, essential contributions came from victims of persecution themselves and highlight the significance of Jewish self-help. The support by the Wendland family and their network of trusted friends provided Neumann with much needed resources but highlights the danger of detection through one's connections to support networks. Gaining access to helpers through a combination of strong ties was essential for these two and many other cases. It also appears that in both networks there are some helpers who were more active than others and who acted as brokers between helpers and contact points for the refugees.

Overall, VennMaker visualizations provide an overview of the key characteristics of ego-networks. The translation of reported helping behavior into relational data helps us to move away from the isolation of single cases. Standardization and simplification make social structures become visible and comparable. Obviously, such a rigid reduction of information makes contextualization of any findings in the primary sources inevitable. Missing information – as in the case of Ralph Neumann – becomes apparent as well. In contrast to common visualizations which rely on spring-embedders or similar algorithms, this approach uses space to represent both time and the quality of relations. Positioning actors either close or further away from ego is intuitive and – as a side-effect – groups the *alteri* accordingly. Of particular value is the arrangement of a number of "time slices" in a clockwise order. Changes and continuities are now visible at a glance and reveal the development of an ego-network over time. More than most available visualization tools, VennMaker finally allows the users to have individual actors appearing more than once in a network map, with varying attributes – a pivotal precondition for this approach to the visualization of ego-network dynamics.

---

[23] For the German case, this is best explained by the ongoing segregation between "Aryans" and "Jews" and the fact that most of the refugees' family members would have already been deported by 1942.

Conclusion

This paper discussed VennMaker's potential as a tool for historical analysis. Using two case studies, we explored its applicability for two historical sub-disciplines, sources and research questions. Both case studies have given examples of how embeddedness in social networks affected the actions of historical actors.

The first case study on ties in the Augustan family showed that network maps and their visual exploration can add new perspectives on old problems. The network shows clearly how isolated Iullus Antonius was in the *domus Augusta* after his stepmother had died. Thus an effort to establish a relationship with Iulia could be interpreted as an attempt to reconnect to the main component of the Augustan family to regain political power. Also the findings in the network coincide perfectly with evidence given by an ancient source, which is however known to be inaccurate in terms of its detail. Although we have no other ancient evidence, we might conclude from the network model that Plutarch at least referred to a plausible rumor that was still in circulation in his time.

The second case study discussed how visualizations of ego networks of Jews in hiding during National Socialism can contribute to our understanding of helping behavior. Refugees depended on resources which they could only obtain through contacts to trusted helpers. VennMaker was used to visualize and compare the forms of help and the intensity of relations between refugees and their helpers over time. It has been shown that pre-existing ties, self-help and recommendations by acquaintances and strangers led to new contacts and thus to the emergence of trusted relations between strangers.

VennMaker allows the intuitive drawing and analysis of social networks without requiring specific technical expertise from its users. The case studies show that the software can easily adapt to a variety of research interests, sources and types of social structures, be they ego- or whole networks. Concentric circles, circle segments and a network overlay function can be used to represent a large variety of social relations over time and space.

The software however also has its limitations. VennMaker loses its advantages over comparable software when there are too many actors and ties to draw; it is only able to display networks of limited complexity. The larger the network structures become, the harder it is to represent them within the boundaries of the map and to position actors and their relations. While too much information may render a network map unreadable for untrained viewers and audiences, researchers may still find ways to gather information from them based on their experience and context knowledge.

By not offering any predefined templates, VennMaker encourages researchers to reflect on their data, to explore various ways of visualizing it and eventually helps to develop new research questions. We see VennMaker primarily as a heuristic tool that supports the gathering and interpretation of data. Its ability to visualize relations in a quick and effortless way allows researchers to gain a different perspective on their field of study.

Bibliography

Alexander, Michael C. and Danowski, James A. (1990). "Analysis of an ancient network: Personal communication and the study of social structure in a past society". *Social Networks*, nº 12, pp. 313-335.

Andreas-Friedrich, Ruth (2000). *Der Schattenmann: Schauplatz Berlin. Tagebuchaufzeichnungen 1938-1948*. Berlin: Suhrkamp.

Barkey, Karen and Rossem, Ronan van (1997). "Networks of Contention: Villages and Regional Structures in the Seventeenth-Century Ottoman Empire". *The American Journal of Sociology*, nº 102, pp. 1345-1382.

Bearman, Peter (1993). *Relations into Rhetorics: Local Elite Social Structure in Norfolk, England: 1540-1640*, (American Sociological Association, Rose Monograph Series) New Brunswick, NJ: Rutgers University Press.

Beer, Susanne (2010). "Helene Jacobs und die 'anderen Deutschen'. Zur Rekonstruktion von Hilfeverhalten für Juden im Nationalsozialismus", in Schmidt-Lauber, Brigitta; Schwibbe, Gudrun (Ed.). *Alterität. Erzählen vom Anderssein*. Göttingen: Schmerse (Göttinger kulturwissenschaftliche Studien, n° 4), pp. 85–110.

Behrend-Rosenfeld, Else R. (1945): *Verfemt und verfolgt: Erlebnisse einer Jüdin in Nazi-Deutschland 1933 - 1944*. Zürich: Büchergilde Gutenberg.

Benz, Wolfgang et al. (Ed.) (1996-2004). *Solidarität und Hilfe für Juden während der NS-Zeit*, (Volumes 1-7). Berlin: Metropol.

Bleicken, Jochen (1998). Augustus. Eine Biographie, Berlin: Alexander Fest Verlag.

Boyer, Christoph (2008). "Netzwerke und Geschichte: Netzwerktheorien und Geschichtswissenschaften", in Unfried, Berthold (Ed.). *Transnationale Netzwerke im 20. Jahrhundert: Historische Erkundungen zu Ideen und Praktiken, Individuen und Organisationen*. (ITH-Tagungsberichte, n° 42) Leipzig: AVA Akad. Verl.-Anst, pp. 47-58.

Brudner, Lilyan and White, Douglas (1997). "Class, Property and Structural Endogamy: Visualizing Networked Histories". *Theory and Society*, nº 26, pp. 161-208.

Corbier, Mireille (1995). "Male power and legitimacy through women: the *domus Augusta* under the Julio-Claudians", in Hawley, Richard and Levick, Barbara (Ed.). *Women in Antiquity*, London New York: Routledge, pp. 178-193.

Dettenhofer, Maria H. (2000). *Herrschaft und Widerstand im augusteischen Principat. Die Konkurrenz zwischen* res publica *und* domus Augusta, (Historia Einzelschriften, n° 140) Stuttgart: Franz Steiner Verlag.

Düring, Marten (2011). "Das Dilemma zwischen Effizienz und Sicherheit: Über die Beziehungen zwischen Verfolgten des Nationalsozialismus und ihren Helfern". *informationen. Wissenschaftliche Zeitschrift des Studienkreises Deutscher Widerstand 1933-1945*, nº 73, pp. 19–24.

Düring, Marten and Keyserlingk, Linda (forthcoming). "Netzwerkanalyse in den Geschichtswissenschaften. Historische Netzwerkanalyse als Methode für die Erforschung von historischen Prozessen", in Schützeichel, Rainer and Jordan, Stefan (Ed.). *Prozesse – Formen, Dynamiken, Erklärungen.* Wiesbaden: VS Verlag für Sozialwissenschaften.

Düring, Marten and Stark, Martin (2011). "Historical Network Analysis", in Barnett, George and Golson, J. Geoffrey (Ed.). *Encyclopedia of Social Networks.* London: Sage, pp.593-595.

Franzosi, Roberto (1996). "A Sociologist Meets History. Critical Reflections upon Practice". J*ournal of Historical Sociology*, nº 9, pp. 354-392.

Gamper, Markus and Schönhuth, Michael and Kronenwett, Michael (forthcoming). "Bringing qualitative and quantitative data together", in Safar, Maytham and Mahdi, Khaled (Ed.). *Social Networking and Community Behavior Modeling: Qualitative and Quantitative Measures*. Hershey: IGI Global.

Gorißen, Stefan (2006). "Netzwerkanalyse im Personenstandsarchiv? Probleme und Perspektiven einer historischen Verflechtungsanalyse", in Joergens, Bettina and Reinicke, Christian (Ed.). *Archive, Familienforschung und Geschichtswissenschaft: Annäherungen und Aufgaben.* (Veröffentlichungen des Landesarchivs Nordrhein-Westfalen, n° 7) Düsseldorf: Landesarchiv Nordrhein-Westfalen, pp. 159–174.

Grabowski, Jan (2008). *Rescue for money. Paid helpers in Poland, 1939 - 1945* (Search and research, n° 13). Yad Vashem: Jerusalem.

Granovetter, Mark (1985). "Economic Action and Social Structure: The Problem of Embeddedness". *American Journal of Sociology*, n° 91, pp. 481-510.

Granovetter, Mark (1973). "The Strength of Weak Ties". *The American Journal of Sociology*, nº 78, pp. 1360–1380.

Groag, Edmund (1919). *Studien zur Kaisergeschichte III. Der Sturz der Iulia. Wiener Studien*, nº 41, pp. 74-88.

Grommes, Gerald (2008). "Netzwerke und Geschäftsstrukturen kastilischer Messebankiers im 16. Jahrhundert",Clemens, Gabriele B. (Ed.). *Schuldenlast und Schuldenwert. Kreditnetzwerke in der europäischen Geschichte 1300-1900*. (Trierer Historische Forschungen, nº 65), Trier: Kliomedia, pp. 85-107.

Kienast, Dietmar (2009). *Augustus. Prinzeps und Monarch*, Darmstadt: Wissenschaftliche Buchgesellschaft.

Krempel, Lothar and Lipp, Carola (2001). "Petitions and the Social Context of Political Mobilization in the Revolution of 1848/49. A Microhistorical Actor Centered Network Analysis". *International Review for Social History*, nº 46, Supplement 9, pp. 151-169.

Krempel, Lothar (2005). *Visualisierung komplexer Strukturen*. Frankfurt: Campus Verlag.

Meise, Eduard (1969). *Untersuchungen zur Geschichte der Julisch-Claudischen Dynastie* (Vestigia, n° 10), München: Beck.

Moore, Bob (2010). *Survivors. Jewish self-help and rescue in Nazi-occupied Western Europe*. Oxford: New York.

Neumann, Ralph (1994). *Erinnerungen an meine Jugendjahre in Deutschland 1926-1946*, (Beiträge zum Widerstand 1933-1945), Berlin: Gedenkstätte deutscher Widerstand.

Neurath, Wolfgang and Krempel, Lothar (2008). "Geschichtswissenschaft und Netzwerkanalyse: Potentiale und Beispiele", in Unfried, Berthold (Ed.). *Transnationale Netzwerke im 20. Jahrhundert: Historische Erkundungen zu Ideen und Praktiken, Individuen und Organisationen.* (ITH-Tagungsberichte, n° 42) Leipzig: AVA Akad. Verl.-Anst., pp. 59–79.

Oliner, Samuel P. and Oliner, Pearl M. (1992). *The Altruistic Personality. Rescuers of Jews in Nazi Europe*, New York: Free Press.

Padgett, John F. and Ansell, Christopher K. (1993). "Robust Action and the Rise of the Medici, 1400 – 1434". *American Journal of Sociology*, nº 98, pp. 1259–1319.

Reitmayer, Morten and Marx, Christian (2010). "Netzwerkansätze in der Geschichtswissenschaft", in Stegbauer, Christian and Häußling, Roger (Ed.). *Handbuch Netzwerkforschung.* Wiesbaden: VS Verlag für Sozialwissenschaften, pp. 869-880.

Reupke, Daniel and Volk, Claudia (forthcoming). "Von der Akte zum Netzwerk - Erfahrungsberichte aus der Werkstatt des Historikers", in Schönhuth, Michael and Gamper, Markus and Kronenwett, Michael and Stark, Martin (Ed.). *Vom Papier zum Laptop – Perspektiven elektronischer Tools zur partizipativen Visualisierung und Analyse sozialer Netzwerke.*

Riffel, Dennis (2006). *Unbesungene Helden: Die Ehrungsinitiative des Berliner Senats 1958 bis 1966.* Berlin: Metropol.

Ruffini, Giovanni (2008). *Social networks in Byzantine Egypt*, Cambridge: Cambridge University Press.

Sattler, Peter (1969). "Julia und Tiberius. Beiträge zur römischen Innenpolitik zwischen den Jahren 12 v. Und 2 n. Chr.", in Schmitthenner, Walter (Ed.). *Augustus* (Wege der Forschung, n° 128), Darmstadt: Wissenschaftliche Buchgesellschaft, pp. 586-530.

Schnegg, Michael (2010). "Strategien und Strukturen. Herausforderungen der qualitativen und quantitativen Netzwerkforschung", in Gamper, Markus and Reschke, Linda (Ed.). *Knoten und Kanten. Soziale Netzwerkanalyse in Wirtschafts- und Migrationsforschung.* Bielefeld: transcript, pp. 55-75.

Schor, Adam M. (2011). *Theodoret´s People. Social Networks and Religious Conflict in Late Roman Syria*. Berkeley Los Angeles London: University of California Press.

Segal, Erna (1956). *Autobiographical Report*, unpublished Manuscript (copy at the Gedenkstätte deutscher Widerstand Berlin).

Seligmann, Avraham (1992). "An illegal way of life in Nazi Germany", in Grenville, John and Gross, Raphael (Ed.). *Leo Baeck Institute Yearbook*, nº 37, Oxford: Oxford University Press, pp. 327–362.

Sémelin, Jacques and Andrieu, Claire and Gensburger, Sarah (2011). *Resisting genocide. The multiple forms of rescue*. Columbia University Press: New York.

Severy, Beth (2003). *Augustus and the Family at the Birth of the Roman Republic*, New York London: Routledge.

Stuber, Martin and Hächler, Stefan and Krempel, Lothar and Ruisinger, Marion Maria (2008). "Exploration von Netzwerken durch Visualisierung. Die Korrespondenznetze von Banks, Haller, Heister, Linné, Rousseau, Trew und der Oekonomischen Gesellschaft Bern", in Dauser, Regina and Hächler, Stefan and Kempe, Michael and Mauelshagen, Frank (Ed.). *Wissen im Netz. Botanik und Pflanzentransfer in europäischen Korrespondenznetzen des 18. Jahrhunderts*, Berlin: Akademie-Verlag, pp. 347-374.

Syme, Ronald (1974). "The Crisis of 2 B.C.", in *Sitzungsberichte der Bayerischen Akademie der Wissenschaften*, nº 7, München: Verlag der Bayerischen Akademie der Wissenschaften.

Syme, Ronald (2003). *Die Römische Revolution. Machtkämpfe im antiken Rom*, Stuttgart: Klett-Cotta.

Tausendfreund, Doris (2005). *Erzwungener Verrat: Jüdische "Greifer" im Dienst der Gestapo 1943 - 1945*. (Dokumente, Texte, Materialien, n° 62) Berlin: Metropol Verlag.

Varese, Federico and Yaish, Meir (2000). "The Importance of being asked. The Rescue of Jews in Nazi Europe". *Rationality and Society*, nº 12, pp. 307–334.

Wasserman, Stanley and Faust, Katherine (1994). *Social Network Analysis. Methods and Applications*, Cambridge: Cambridge University Press.

White, Douglas R. and Jorion, Paul (1992). "Representing and Computing Kinship: A New Approach". *Current Anthropology*, nº 33, pp. 454-463.

Windolf, Paul (2007). "Sozialkapital und soziale Ungleichheit: Vergleichende Analysen zur Unternehmensverflechtung in Deutschland und in den USA (1896-1938)", in *Jahrbuch für Wirtschaftsgeschichte*, nº 2, pp. 197-230.

Online Resources

Forschungscluster "Gesellschaftliche Abhängigkeiten und soziale Netzwerke" of the Universities of Trier and Mainz at http://www.netzwerk-exzellenz.uni-trier.de (accessed 30. November 2011).

Gedenkstätte deutscher Widerstand at www.gdw-berlin.de (accessed 6. September 2011).

Historical Network Research at https://sites.google.com/site/historicalnetworkresearch/ (accessed 8. November 2011).

Kronenwett, Michael and Schönhuth, Michael (2011). *VennMaker 1.2. Manual* available at http://www.vennmaker.com/dl/VennMaker_1_2_Manual.pdf (accessed 6. September 2011).

Ucinet, Tool for Network Computation available at http://www.analytictech.com/ucinet/ (accessed 6. September 2011).

Visone, Tool for Network Visualization available online at http://www.visone.info (accessed 6. September 2011).

Yad Vashem at www.yadvashem.org (accessed 6. September 2011).