Social network analysis in literature. The case of *The Great Eastern* by A. Embirikos

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1. Introduction

The Great Eastern (Ο Μέγας Ανατολικός) by Andreas Embirikos (1901-1975), written during 1945 – 1951 and taking its final form in 1970, is allegedly the largest Modern Greek novel. It was published after the author's death during 1990-1992 and spans eight volumes, five parts, one hundred chapters and about two thousand and one hundred pages. This novel received controversial criticism, ranging from utmost enthusiasm to violent reprobation, mainly due to its bold erotic content.

Social Network Analysis (SNA) analyzes social networks using network theory and has been successfully applied in many different fields of science, from computer networks to sociology and from biology to political or organizational sciences. Recently, scholars have started to employ network-analytic methods in the studies of culture and literature.

In this paper we form and analyze the social network of *The Great Eastern*. In Section 2, we present how SNA has been applied in the field of literature. Section 3 presents the visualization of the *Great Eastern* network, in which all the characters are represented as nodes and every interaction written within the novel as an arc between two nodes. In Section 4, network metrics are used to detect the most important nodes and identify actors' communities. Then, the network of *The Great Eastern* is compared to the networks of *Iliad* and *Les Misérables*. Finally, we present the conclusions of this paper and we discuss how the application of SNA in literature can raise some interesting questions for future research.

2. SNA and literature

SNA has been widely applied in social, economic and other sciences. There is no real consensus on the exact definition of SNA as a field, since it is sometimes described as a theory or as a strategy or approach and sometimes as a set of techniques (Buch-Hansen, 2013). It has also been considered to be a "paradigm" itself, containing a set of theoretic definitions, methodologies and empirical research (Carrington & Scott, 2011; Marin & Wellman, 2011). In any case, its target is to analyze the social relations created between persons (or actors in general), the structure of these relations and the ways through these relations affect (or are affected by) social behaviour, attitudes and beliefs of actors (Prell, 2012, p. 1).

SNA shares the general belief of structural approaches for the existence of underlying deep structures (Wellman, 1983), but it should be distinguished from them, as it perceives the concept of *structure* differently: for SNA social structure is formed by patterns or regularities of relations which develop between interacting units (Freeman, 2004; Wasserman & Faust, 1994; Wellman, 1983). Being a structural perspective, it adopts a critical attitude against individualistic approaches that ignore social aspects of behavior (Freeman, 2004). A typical social research focuses on characteristics and attributes of single units – persons, while SNA focuses on relations and interactions between acting subjects (Knoke & Kuklinski, 1982; Marin & Wellman, 2011; Wasserman & Faust, 1994). Social networks are studied in the belief

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that their structure and the positions held by individuals on them can affect behaviour, perspectives and actions of both actors and the system as a whole (Knoke & Kuklinski, 1982).

SNA has been applied in many ways in cultural studies (see DiMaggio, 2011, for a comprehensive review). In literature, in particular, social networks of authors have been subjects of research in order to investigate one key hypothesis of Bourdieu's theory of the structure of cultural fields (Anheier, Gerhards, & Romo, 1995), to show off the interdependence between material and symbolic production of literature (De Nooy, 1991), to seek for similarities between narrative and social structure (De Nooy, 2001), to explore dynamic relations between author's and literary journal's prestige (De Nooy, 2002) or to study the Afrikaans literary system (Senekal, 2012).

On another approach, regarding relations between actors on drama, Moreno himself (one of the early founders of SNA), in his work *Das Stegreiftheater* produced diagrams of interactions (Freeman, 2004; Hare & Hare, 1996). He was concerned on issues like how much time does actor A spend with actor B, how often do they appear simultaneously on the stage, how often do they leave together (Moreno, 1978). During the latest years, other research studies applied SNA to represent relations and interactions between actors of works of literature as social networks. Elson, Dames, and McKeown (2010) wrote down all discussions found in quotes and investigated the networks of sixty novels of the 19th century, in order to deconstruct widely spread conceptions of literary criticism. In *Alice in Wonderland,* static and dynamic networks were created to provide insight into the roles of characters and narrator's perspective (Agarwal, Corvalan, Jensen, & Rambow, 2012).

Some studies pose the question of how similar is the network structure of characters of a literature work to real-life networks. Shakespeare's characters (Stiller & Hudson, 2005; Stiller, Nettle, & Dunbar, 2003) or characters from Marvel Comics (Alberich, Miro-Julia, & Rossello, 2002), seem to be very similar to real-life networks. Similarly, Mac Carron and Kenna (2012) compared three epic works (the *Iliad*, *Beowulf* and *Tain Bo Cuailnge*) with other random and real social networks; Mac Carron and Kenna (2013) also analyzed in the same manner the social network of *Íslendingasögur (The Sagas of Icelanders*). Furthermore, Kydros, Notopoulos, and Exarchos (in press) investigated the *Iliad's* network and compared it to other real-life networks, while in a similar study the *Iliad* was found to possess most of the properties of a real-life network (Miranda, Baptista, & Pinto, 2013). The question of similarities between narrative structure and a social network structure was set by Sack (2014), who tries to create stories from social networks based on the structural balance theory. At the same time, he compares *Don Quixote de la Mancha*, *David Copperfield* and *Mrs. Dalloway* and supports that the notable differences in their networks correspond and reflect basic differences in literary conventions between periods. Social networks have also been presented for *Les Misérables* (Newman & Girvan, 2004), for ancient Greek drama works (Rydberg-Cox, 2011) and for *Toorberg (Ancestral Voices)* by E. Van Heerden (Senekal, 2013). Finally, Moretti (2011) created and analyzed networks for *Hamlet* and some chapters of *Our Mutual Friend* by Dickens and the Chinese *The Story of the Stone.*

The Great Eastern (Ο Μέγας Ανατολικός) (Εμπειρίκος, 1990-2), written during 1945 – 1951 and taking its final form in 1970, is allegedly the largest Modern Greek novel. It was published after the author's death during 1990-1992 and spans eight volumes, five parts, one hundred chapters and about two thousand and one hundred pages. The events of the story take place mainly during the ten-day maiden

voyage of ocean liner "Μέγας Ανατολικός" (Great Eastern) from Liverpool to New York in 1867. The passengers of the liner, belonging in various nationalities and social classes, are at most the actual characters of the work. As already mentioned, this novel received controversial criticism, ranging from utmost enthusiasm (because of its human-centric, liberal and utopian character), to violent reprobation, mainly due to its bold erotic content. In the following sections we will form the social network of this work, from hereby called GEN (Great Eastern Network) and investigate its properties and topology.

3. Network formation and visualization

A social network is comprised of a set of nodes (or actors or vertices), which are the acting subjects. The nodes are interconnected through one or more relations (Marin & Wellman, 2011; Wasserman & Faust, 1994). Nodes are usually persons or organizations, but in general any unit that can connect to another can be considered as a node (web pages, journal articles, countries etc.). Different types of relations, defined as arcs, ties, links or edges, can connect nodes and may refer to biological relation (ancestry, family), communication, exchange, emotions, collaboration, power or influence, physical connections, etc. (Knoke & Kuklinski, 1982; Wasserman & Faust, 1994).

In GEN, some of the nodes are the passengers on the liner. However, there exists a number of persons coming from the past of the passengers, like parents or acquaintances which also take place in the plot, so they also belong to the nodes set. Furthermore, actors interact with other, non-living objects or animals, also to be included in the nodes set, together with the final category of actors which are persons never met by the passengers, but interact between them. The actual numbers of the described categories, together with their sex, are shown in Table 1[1].

No	Category	Count	Male	Female
1	Passengers	143	86	54
2	Persons from the past	262	143	108
3	Non-living objects	40	--	--
4	Persons never met by passengers	115	57	35
5	Animals	12	2	2
	Total	572	288	199[2]

Table 1: The categories of nodes in GEN

A first obvious result comes from the fact that only 143 out of 572 actors (25%) are actually travelling onboard. It would be tempting to keep in our discussion only the actual passengers, however this would result in valuable loss of information, since some of the other nodes are actively involved in interactions or provoke facts. Hence, all 572 of the actors are the nodes in GEN.

As a second interesting result, one could observe that males have the overall majority in all categories. It could be supported that males are more important actors in GEN (a typical result from traditional statistics); however this remains to be proved in the next sections, since their relations may differ substantially.

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[1] All raw data were recorded in a spread sheet.

[2] Some obvious inconsistencies in the cardinalities of sexes come from the fact that for some nodes there is no clear data from the author, or do not have a sex by definition (i.e. *God* or *train passengers*).

Nodes are connected to each other through links. Not all links are of the same type. Different relations (acquaintance, friendship, sexual actions) define different links. Links can also have weights: two or three meetings should mean more than one meeting. Finally, reciprocal relations define reciprocal - undirected links (edges), while non reciprocal relations (like observation) define directed links (arcs - see Kydros et al. (in press) for a thorough discussion on link differences). In GEN we identified the relations shown in Table 2, together with their actual numbers.

No	Relations	Count	Type
1	Interaction (give-and-take)	66	Undirected
2	Interaction (game)	6	Undirected
3	Interaction (physical contact)	102	Undirected
4	Bad feelings	519	Directed
5	Professional	55	Undirected
6	Communication	548	Undirected
7	Happy feelings	1207	Directed
8	Observation	1182	Directed
9	Sexual contact	581	Undirected
10	Kinship	145	Undirected
11	Fantasy	776	Directed
	Total	5187	

Table 2: Relations in GEN

Actually, not only one but at least eleven different networks could be assembled, if we use only one relation. However, for this research, we chose to fuse all these relations in one under the general meaning of *interaction*. Investigations of all other relations are a prospect for future work. Furthermore, a mixed network, containing both directed and undirected links, is not easy to interpret and process. Thus, we replaced every undirected link with two directed ones connecting the same nodes, so GEN becomes a directed network. Furthermore, as already mentioned, a large number of actions involve the same actors. The raw data were processed in order to create links with weights: if two actors interact in three different occasions, then instead of adding three different links only one link of weight 3 is added in the network. As a result, 1764 links were created in GEN. We used Gephi, an open source software, created by Bastian, Heymann, and Jacomy (2009), for the most part of our processing.

In Figure 1, GEN is pictorially represented, using a special algorithm included in Gephi, which makes important nodes larger and places closely connected nodes in closer areas. Links with large weights are also shown bolder. The labels of the nodes (i.e. the actual names of the actors) are also shown, when the Figure is magnified. We will interpret the importance of nodes in the next section.

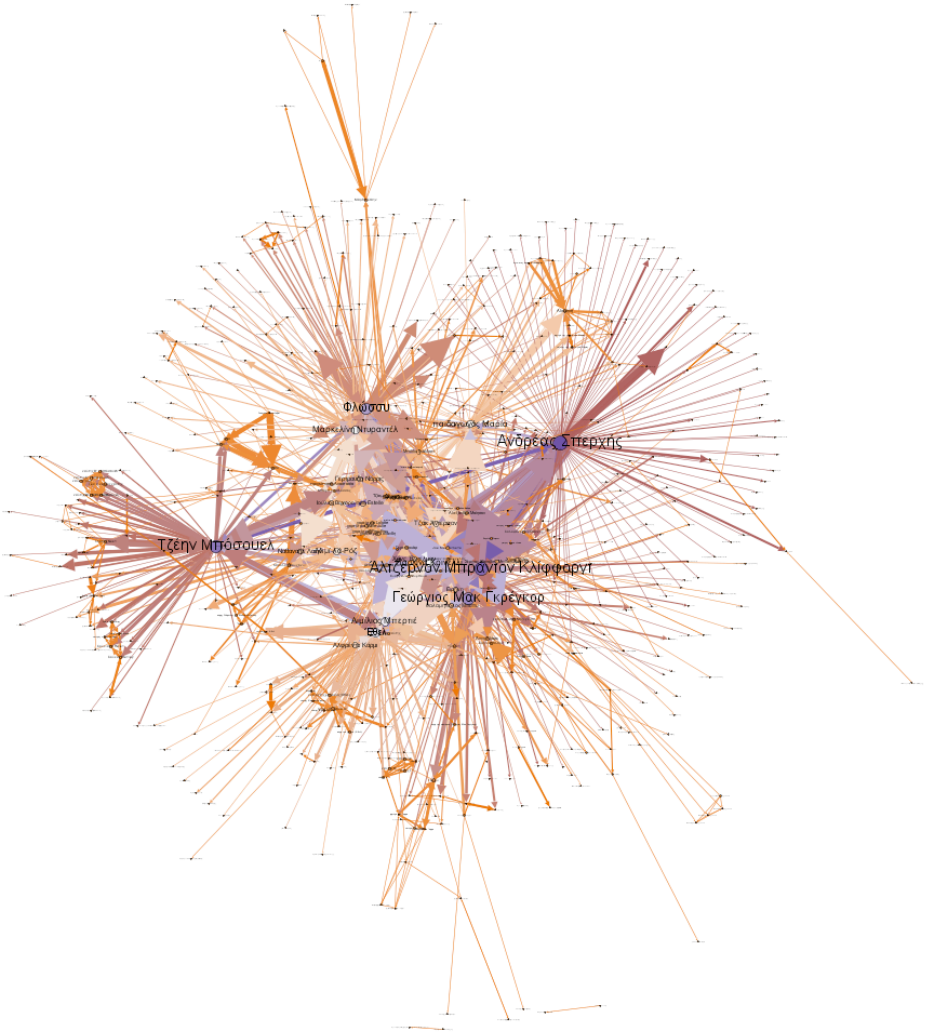


Figure 1: Visualization of GEN (the Great Eastern Network)

4. Node importance and communities

A close inspection of Figure 1 (in the lowest area) shows that 4 actors are not connected to any other nodes in the network but are only connected in pairs. GEN is thus separated in three components, one of which being the largest component. It is not rare for networks from literature to be disconnected in such a manner. Actually, the same situation arises both in Homer's *Iliad* and Hugo's *Les Misérables*, as already described in Kydros et al. (in press). Nevertheless, given the nature of the novel itself, one could expect a larger number of disconnected components, since it gives the sense that there are many parallel stories on board and from the past that evolve in time. In the following discussion we will use the largest component of 568 actors for our measurement, without serious loss of information.

Nodes are important in a variety of ways through special metrics. In this paper, four of these metrics are used, namely: degree, closeness, betweenness and eigenvector centralities. The intuitional (not formal - mathematical) definitions for the above metrics are as follows[3]:

[3] The actual formal definitions can be found in Wasserman and Faust (1994, Chapter 5).

- Degree centrality is the total number of immediate neighbors of a node. In directed networks, it can be calculated as in-degree, out-degree or total degree centrality. If a node has many direct connections to other nodes, then it should be important.
- Closeness centrality is an average on how close is a node to all other nodes in the network. Closeness is defined together with the notion of the shortest path between two nodes, which is the smallest number of links that should be traversed in order to travel from one node to the other. In this metric, smaller values mean more central nodes.
- Betweenness centrality of a node is a measurement that reflects the proportion of shortest paths between all pairs of nodes that pass through this particular node. A node with large betweenness centrality controls better the pass-through of information.
- Eigenvector centrality measures the importance of nodes according to the importance of their neighbors. Intuitively, if one has strong neighbors then he is in a better position than another node (the maximum possible value is 1).

In Table 3 we rank the ten most prominent nodes of GEN according to the above described metrics. All measurements were calculated on the undirected version of GEN.

No	Degree		Closeness		Betweenness		Eigenvector	
	Node	Value	Node	Value	Node	Value	Node	Value
1	*Ανδρέας Σπερχής*	132	*Άλτζερνον Μπράντον Κλίφφορντ*	1,894	*Ανδρέας Σπερχής*	43169	*Άλτζερνον Μπράντον Κλίφφορντ*	1
2	*Άλτζερνον Μπράντον Κλίφφορντ*	124	*Γεώργιος Μακ Γκρέγκορ*	1,995	*Φλώσσυ*	30444	*Γεώργιος Μακ Γκρέγκορ*	0,838
3	*Τζέην Μπόσουελ*	119	*Τζέην Μπόσουελ*	2,048	*Γεώργιος Μακ Γκρέγκορ*	29883	*Παολίνα Κρινέλλι*	0,728
4	*Γεώργιος Μακ Γκρέγκορ*	111	*Ανδρέας Σπερχής*	2,049	*Άλτζερνον Μπράντον Κλίφφορντ*	29450	*Τζέην Μπόσουελ*	0,69
5	*Φλώσσυ*	103	*Αιμίλιος Μπερτιέ*	2,164	*Τζέην Μπόσουελ*	28723	*Αιμίλιος Μπερτιέ*	0,68
6	*Έθελ*	76	*Παολίνα Κρινέλλι*	2,169	*Μαρκελίνη Ντυραντέλ*	19978	*Ανδρέας Σπερχής*	0,67
7	*Αιμίλιος Μπερτιέ*	71	*Χανς Έντελμαν*	2,169	*Παιδαγωγός Μαρία*	15628	*Φλώσσυ*	0,63
8	*Μαρκελίνη Ντυραντέλ*	68	*Παιδαγωγός Μαρία*	2,205	*Αιμίλιος Μπερτιέ*	11990	*Παιδαγωγός Μαρία*	0,59
9	*Παολίνα Κρινέλλι*	67	*Θαλαμηπόλος Μπέττυ*	2,224	*Έθελ*	10121	*Μιμί-λά-Ρόζ*	0,55
10	*Παιδαγωγός Μαρία*	64	*Ειρήνη*	2,235	*Αλφρέντο Κάρμι*	7448	*Τζακ Άντερσον*	0,54

Table 3: Centralities in GEN

Table 3 can be interpreted in various ways. Anyone familiar with the actual text can easily verify that main actors also hold central positions in the network. One could expect rankings 1 to 5 (mainly males) in all centralities. It seems also interesting to interpret the positions of ranking 6-10, where the majority is held by

female actors. This is consistent with the actual ratio of males/females in the text (from Table 1). Furthermore, some actors do not appear in all rankings meaning that their importance is more of "local" than "global" sense. An actual study on the sociology of all actors could reveal other aspects of their rank with respect to centralities.

Despite the small differences, the similarities of all four rankings are also important. It exhibits internal structure, a plan within the author's intentions. This result perfectly contradicts some criticism on behalf of part of critics on this novel: "..there is not one real human in Embririkos's book,… it is mere pornography, … it is a naive work with no design or plot" (as cited in Γιατρομανωλάκης, 2011; as cited in Γκιώνης, 2010). It looks that he definitely had a consistent sociological universe in his mind, neither chaotic nor completely utopian, reflecting real social structures composed of persons with real social relations. Kydros et al. (in press) have also identified a similar situation in Homer's *Iliad*.

On continuing the discussion on the sociology of actors, nodes can also cluster in groups. These groups can be cliques, cores, clans etc. according to the group definition[4]. Recently, the notion of community structure was introduced by Girvan and Newman (2002). The more general definition is based on the principle that pairs of nodes are more likely to be connected if they are both members of the same community(ies), and less likely to be connected if they do not share communities. Algorithms for detecting community structure in networks are proposed in Blondel, Guillaume, Lambiotte, and Lefebvre (2008). We applied this method on GEN using Gephi and found that all nodes can be divided in 5 communities with a resolution of 2.5. This community structure can be seen in Figure 2, with different communities having different colours.

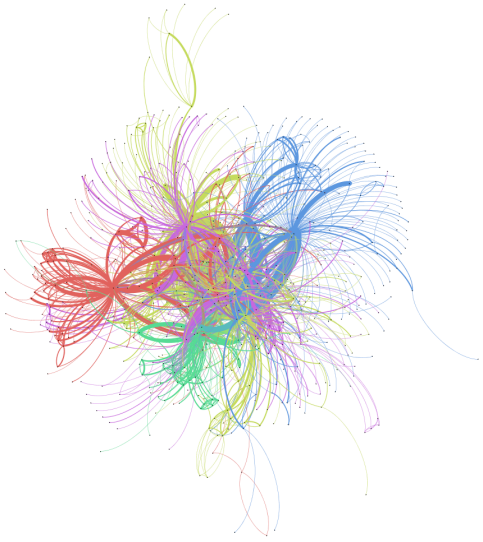
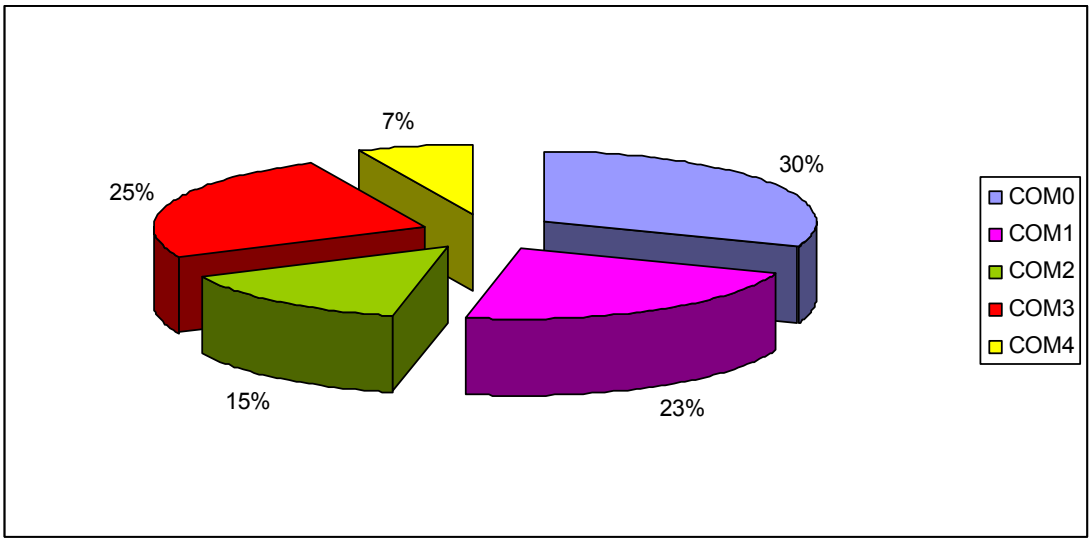


Figure 2: Five communities in GEN

After further examination in the actual names of the actors in every community one can actually name these communities as in Graph 1 that follows.

[4] See Wasserman and Faust (1994, Chapter 7) for a full presentation



Graph 1: Naming and percentage of communities

On the actual actors included in each community, the following hold:

- Community 0 (COM0): *Φλώσσυ, Μακ Γκρέγκορ* and others
- Community 1 (COM1): *Κλίφφορντ – Κρινέλλι, Λαίην –Ντυραντέλ* and their acquaintances
- Community 2 (COM2): *Μπόσουελ* and close actors
- Community 3 (COM3): *Σπερχής-Ειρήνη-παιδαγωγός Μαρία* and close actors
- Community 4 (COM4): *Έθελ-Μπερτιέ*

Actually, the main actors in each community hold a very high degree centrality ranking (see Table 3). These actors are followed by others, not so important ones, either through physical contact or through retrospection, fantasies and dreaming. For example, in COM0, most characters are not on board, but come from the past of actors *Μακ Γκρέγκορ* and *Φλώσσυ*. All other actors are mainly connected within their community (being persons from the main actors' past) and thus cannot interact with persons from other communities. Main actors operate as hubs and other actors group around hubs, forming these communities. This situation will be further analyzed in the next section, where we prove that GEN belongs in the small-world networks.

5. Topological comparison to other literature networks

In this section we compare GEN to two other networks from literature, Homer's *Iliad* and Hugo's *Les Misérables*. Newman (2002) has assembled a set of metrics regarding the topology of a simple, undirected network. We will use this approach, since it has been reported as the most inclusive and concise. More specifically, we will deal with link density, degree, distance, diameter, eccentricity, clustering coefficient and assortativity coefficient[5].

- Link density is the ratio of the actual number of links divided by the maximum possible number of links that could exist in a network. Density takes values in [0..1].
- The average degree is the average number of neighbors of all nodes.
- The average distance of a network is the average of all shortest paths in this network. The diameter of a network is the longest distance over all pairs of

[5] We prefer to define these metrics not with their mathematical formalism but in a descriptive manner.

nodes. The eccentricity of a node is the largest distance from this node to any other node in the network. All node eccentricities can be averaged yielding the average eccentricity of the network.

- The clustering coefficient is the ratio of the actual number of links between this node's neighbors, divided by the maximum possible number of links in this neighbourhood. If a node has large clustering coefficient, then its neighbours tend to form highly interconnected clusters. The average on all clustering coefficients for all nodes of a network is the average clustering coefficient of the network.
- The assortativity coefficient of a network takes values from [-1, 1] and denotes the degree-similarities between neighbouring nodes. When less than zero, a node is connected with other nodes of different degrees. However, when this metric is greater than zero and closing to one, nodes tend to connect with other nodes with similar degrees (assortative networks).

In Table 4 we list all these metrics for the comparing networks.

	the *Iliad*	*Les Misérables*	GEN
Nodes	538	77	572
Links	1557	254	1764
Density	0.001	0.087	0.008
Average Degree	5.78	3.299	3.084
Average shortest path	3.33	2.641	3.12
Diameter	9	5	7
Average eccentricity	6.56	4.32	2.342
Average clustering coefficient	0.41	0.736	0.766
Assortativity	-0.08	0.01	-0.07

Table 4: Network topological comparison

The similarities in topology of GEN and especially the *Iliad* are rather striking. The two networks differ (not substantially) only in average degree and average eccentricity. *Les Misérables* is also close, but it is much smaller, much denser (larger density) and more assortative. Furthermore, if we calculate the average shortest path and the average clustering coefficient in a random graph (3.4 and 7.28 respectively), we can positively deduce that all three networks belong to the "small world" class of networks, as described by Watts and Strogatz (1998), which are networks where most nodes are not neighbors of one another, but any node can be reached from every other by a small number of hops or steps. Small-world properties are found in many real-world phenomena, including websites with navigation menus, food chains, electric power grids, metabolite processing networks, networks of brain neurons, voter networks, telephone call graphs, and social influence networks.

Small-world networks tend to contain cliques, and near-cliques, meaning sub-networks which have connections between almost any two nodes within them. This follows from the defining property of a high clustering coefficient. Secondly, most pairs of nodes will be connected by at least one short path. This follows from the

defining property that the mean-shortest path length should be small. Several other properties are often associated with small-world networks. Typically there is an over-abundance of hubs - nodes in the network with a high number of connections (known as high degree nodes). These hubs serve as the common connections mediating the short path lengths between other edges. Actually, it seems that after the similar discussion by Mac Carron and Kenna (2012) and Kydros et al. (in press), together with this research, it seems reasonable to support that Embirikos did compose an epos and epic works seem to fall in this category (although this must be further researched).

One of the most important properties of small worlds is the distribution of the degrees of nodes. As proved by Barabási and Réka (1999), in small worlds the degree distribution follows a power-law manner, reflecting the very few nodes with large degree (hubs) and the many nodes with small degree with an exponential tail. The scale-free property strongly correlates with the network's robustness to failure. The major hubs are closely followed by smaller ones. These smaller hubs, in turn, are followed by other nodes with an even smaller degree and so on. This hierarchy allows for a fault tolerant behavior. If failures occur randomly and the majority of nodes are those with small degree, the likelihood that a hub would be affected is almost negligible. If a hub-failure occurs, the network will generally not lose its connectedness, due to the remaining hubs. On the other hand, if we choose a few major hubs and take them out of the network, the network is turned into a set of rather isolated graphs. Thus, hubs are both a strength and a weakness of scale-free networks. Furthermore, in such networks nodes with small degrees tend to form dense clusters (have high clustering coefficient) and connect to other similar small clusters through hubs.

In order to check the power-law property of the three comparing networks, we calculated and checked each distribution's fitness to power law using the R statistical package (R Core Team, 2013). Results are shown in Figure 3. A simple inspection of the cumulative log-log plots, together with the relevant computed alpha parameters (which in power-law networks must lie between 2 and 3), show that the Iliadic network and GEN are definitely scale-free networks, while *Les Misérables* is very close to belong in this category. Again GEN exhibits a clear and robust structure, together with a striking similarity to the Iliadic network.

6. Conclusions

Social Network Analysis has been widely used in social sciences, in biology, economy and other fields. Its applications in literature have been rather limited historically; however, it can contribute to theoretical explorations of the sociology of literature and literary criticism. Initially, SNA's work was mainly formal and technical, but in the 1990's there was a linguistic turn and some scholars started to explore the relational dimensions of identities, narrative and meaning (Mische, 2011). White, a sociologist and eminent figure of SNA, has developed an influential theory linking culture and networks. According to White (1992) identities are triggered by interaction and are expressed in stories. Stories structure social reality, make action interpretable and are conceived as a network among meanings. Ties, the relations between identities, are narratively constructed and can be described by stories. White argues that art offers models that people use to make up their own stories. "Imbibing a formal story or film is so similar to imbibing "real life" that their authors and directors, like gossipers in ordinary life, must have found effective shorthands for expressing identities and control in social relationships" (White, 1992, p. 67). De

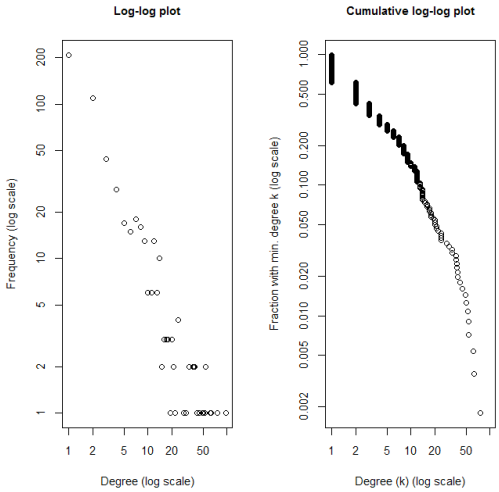
Nooy (2001) suggests applying social theories and methods to characters and plots to detect these relational models or to compare social relations to narrating relations.

These developments brought SNA and cultural studies together. Within this framework, some studies have pointed out that fictional networks of literature have the same properties as real-life networks. In this paper we used SNA methods to analyze A. Embirikos' *Μέγας Ανατολικός* in two ways: firstly by regarding the sociology of its actors and secondly by regarding its topology in the networking sense. We also compared this work with two others, well known literature works, Homer's *Iliad* (ancient Greece) and Hugo's *Les Misérables* (19th century European literature) and found interesting results.

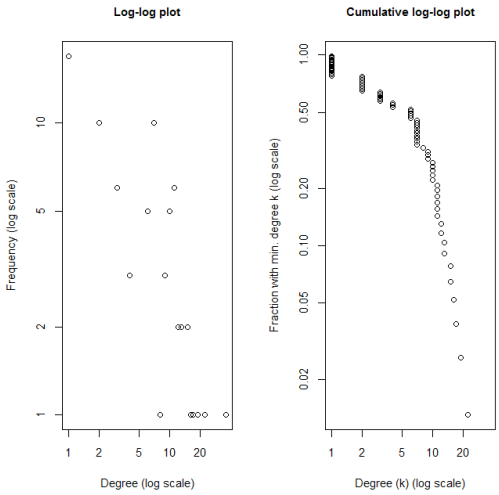
Through centrality and community analysis we contradict some criticism on behalf of part of critics on this novel. Furthermore, probably the most striking result of this research was the clear similarity of the work of Embirikos to this of Homer. It has already been reported in the relevant literature that ancient and medieval epic works share the structure of small world, power law networks. This result has been verified hereby through topological metrics and degree distribution analysis. It is an open research question to analyze other similar literature work of arts in order to verify a probable general rule. Characters' attributes vary between cultures, regions and periods of time, but perhaps the structures of their social relations can display constant and great similarities. SNA can help in this direction, because it is considered the most appropriate way for analyzing relational data.

Literary works serve as conduits transmitting ideas and information to general public. Such transmissions may be more successful when narrative structure reflects familiar social structures and natural human social groups (Stiller & Hudson, 2005). For example, a literary work that has a network which does not have small-world properties, but contains more hubs and more links, might have problematic coherence. Besides, it might be difficult for the reader to comprehend the intricate characters' relationships and perhaps discordant with his cognitive abilities and the way he perceives everyday social relationships. In contrast, small-world networks may help readers to identify the protagonists and the key points of the story easier.

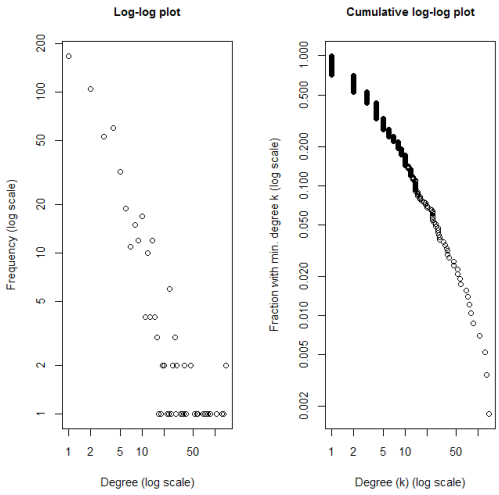
The above findings can easily merge within literature theory, especially in its structural aspect. They can also be a tool that could assist analysis of the sociology of actors, a field that can lead to other, interesting thoughts about political, sociological or other similar views of authors. Finally, SNA tools could be used a) in teaching modules, especially in creative writing courses, since it provides tools for analysis, visualization and topology checkout of literature works, b) in literary analysis, as they graphically reveal the main characters, their relationships, even the perspective of the narrator (Agarwal et al., 2012), c) in artistic production and research on artificial intelligence to produce skeletons of stories (proto-narratives) (Sack, 2014).



Iliad's plot of degree distribution:
Xmin = 10
Alpha = 2.45



Les Misérables' plot of degree distribution:
Xmin = 40
Alpha = 3.0



GEN's plot of degree distribution:
Xmin = 30
Alpha = 2.42

Figure 3: Plots of degree distributions and relative results

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