The structure and dynamics of scholarly networks between the Dutch Republic and the Grand Duchy of Tuscany in the 17th century

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CHAPTER 5
Keeping the Balance
The management of negativity in the early modern scholarly network

INTRODUCTION

“Il vedere la gran malignità che è, e qua, ed anche in buona parte costà, come V.S. Ill.ma avrà veduto dalle mie Lettere, onde non solo non mi par bene che ci tiriamo addosso gl’altri nemici, ma in oltre stimo necessario il fare più amici che possiamo, per far tanto maggiormente scoppiar d’invidia i maligni.”

Antonio Magliabechi to Jacob Gronovius, March 26, 1675

In the eyes of librarian Antonio Magliabechi, the only way to respond to malice is through the accumulation of friends. On the fact of it, that is what is being constructed in the letter of Magliabechi, written to Jacob Gronovius on the 26th of March 1675, that begins this chapter. Friendship is seen here in the context of the Republic of Letters. Magliabechi is referring to the moral foundations of the Republic of Letters in which bonds of friendship and a shared commitment to the common good linked early modern scholars in a collaborative search for knowledge. The more these bonds were strengthened, the better they could operate against their enemies, who sought to ruin their reputation and career, thereby threatening the very expansion of the Republic of Letters. The question, then, that arises from this is how did Magliabechi regulate and manage the mix of friendly and hostile relationships that took place within his network?

In most studies that map the Republic of Letters digitally, the edges of the network carry a positive meaning and are commonly interpreted as a collaboration, a membership, or the transmission of information. In many contexts, however, the edges may also be associated with negative sentiments. In fact, the network of Magliabechi was regularly beset by controversy, jealousy, disagreement, and sometimes even outright conflict. Therefore, this chapter emphasizes the importance of negative edges, showing how negativity plays a constitutive role in the very concept of the networked structure of the Republic of Letters. Specifically, the aim of this chapter is to shed light on the interplay between negative and positive connections in the network, thereby adding a new dimension to understand how the network between the Dutch Republic and the Grand Duchy of Tuscany actually took shape.

685 Magliabechi to Gronovius, 26 March 1675, LMU, Cod 4° Cod. Msc 777, f. 123, “seeing the great evilness that reigns here, and also to a large extent there, as Your Illustrious Lordship has seen from my letters, whereby I believe that it is not good that we pull ourselves other enemies, but I deem necessary that we make us as many friends we can, so that evil persons burst with envy even more.”

The previous chapter showed how Magliabechi cultivated a vast epistolary network that stretched across Europe throughout the entire second half of the seventeenth century. This network was modelled using an undirected and unsigned graph where an edge between two nodes represents a letter communication between two individuals. In such a representation of a network, the edges carry a positive meaning, creating a dense network of well-connected correspondents. Nevertheless, Magliabechi’s enormous epistolary reach exposed him to the endless conflicts of others, in addition to the ones he caused himself. Within the dynamics of cross-cultural exchanges between the Dutch Republic and the Grand Duchy of Tuscany, Magliabechi had to deal with many tensions arising from the opposing political, social and religious realities. These tensions ranged from restrictions imposed by the Sant’Uffizio to scholarly rivalries and jealousy. The feelings that accompanied these tensions and the ways Magliabechi tried to cope with these might have influenced the choices he adopted in the formation of his network.

How should we reason about the presence of both positive and negative relationships within a network? In this chapter, I will describe a rich part of social network theory, the structural balance theory, that involves the annotation of the edges in the network with positive or negative signs. In general, this conveys the idea that certain edges represent friendship while other edges represent antagonism. The notion of structural balance offers thus to capture positive and negative signs between the nodes in the network to understand the tensions between these two forces. For instance, when X and Y trust each other and Y distrusts Z, we might expect that Z and X will distrust each other as well. This rule is commonly exemplified in the balance theory by the phrase “you cannot be friends with your friend’s enemy”.

This chapter explores how the notion of structural balance can be used to reason about how fissures in an epistolary network may arise from the dynamics of conflicts, disagreement and antagonism between corresponding scholars. In particular, balance theoretic ideas are used to shed light on the following questions: How did hostile relationships affect the formation of the early modern scholarly network? Did early modern scholars strive for balance in their network? In addressing these questions, this chapter will develop as follows. In the first paragraph, we will see that in most approaches that map the Republic of Letters digitally, the edges have a rather positive meaning. Such representations reinforce the idea that the Republic of Letters was an ideal community of peaceful coexistence between intellectuals. Nevertheless, traditional literature has taught us that the harmony of the ideal of the Republic of Letters was rarely achieved in reality. In most settings, there were also negative forces at work, such as jealousy, antagonism, coercion, or even outright conflict. In this respect, the digital lags behind the traditional, ignoring the scope and significance of the phenomenon of polemics, quarrels and controversies upon the formation of the early scholarly network. In addition, the discussions in the first paragraph also serve a methodological purpose: it explores the dynamics between macroscopic and microscopic network properties. For example, a disagreement that begins between two people can affect others that were not initially involved in the quarrel. I will thus discuss the way in which the local can

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687 For a clear definition of the structural balance theory, see Easley and Kleinberg, 107.


689 This argument is central to the research paper of Marcelo Dascal and Cristina Marras, ‘The Republique des Letters: a Republic of Quarrels?’, retrieved from https://m.tau.ac.il/humanities/philos/dascal/papers/republic1.html, last accessed 3 April 2019.
have an impact on the ramifications on the rest of a social network, a theme that is of maximal importance in the analysis of networks.

The second paragraph provides an outline of the structural balance theory that informs this study. The structural balance theory, which was originally developed by the psychologist Fritz Heider in the 1950s, has shaped the field of today’s cognitive psychology and the social sciences.\(^{690}\) By contrast, in the humanities, the theory has not yet been established. Therefore, this paragraph shows how the model of structural balance provides us an interesting tool to reason about the dynamics of historical networks with positive and negative labelled edges. Importantly, the validation of this model is verified by a close reading of the letters themselves.

The third paragraph explains how the structural balance theory can be used to analyze change in networks. According to the structural balance theory, people continually reassess their likes and dislikes of others as they strive for balance and stability.\(^{691}\) In order to explain how these dynamics work, in this paragraph a brief overview will be given of the balance theory in a dynamic context. Following that, the fourth paragraph expounds the state of the art of the structural balance theory.

The fifth paragraph focuses on the description of the data that constitutes the framework – the backbone – of this chapter. Reconstructing the signed network required a combination of archival work and computational analysis. A detailed account of my method of data curation and statistical analysis will be given here.

The remaining two paragraphs present measures of balance and imbalance through time along with discussions of them. These discussions will evolve around case studies from the correspondence of Antonio Magliabechi. Specifically, the most detailed case, presented in the seventh paragraph, will revolve around a conflict that happened between the Dutch scholar Jacob Gronovius and the University of Pisa.

1. **ONE BIG HAPPY CONNECTED FAMILY?**

In the previous chapter, we have seen that the application of computational methods from the fields of network science allows us both to visually map the structure of the scholarly network and to measure the relative centrality of each of its members using a range of different mathematical tools. The analysis of the structure of networks offers insights in the underlying relationships and reveals global phenomena at scales that may be hard to detect when looking at the individual correspondences. In more general terms, this approach focused on the macroscopic properties of the networks as a whole, summarizing the network in terms of its structure, size and connectivity.

At the same time, however, there is an ongoing challenge in adopting these kinds of network approaches to the study of – past and present-day – society.\(^{692}\) People develop rich relationships with one another in many different settings, while network analysis generally reduces these relationships to simple pairwise edges. In the previous chapter, for example, the network of Magliabechi was modelled by simply encoding whether an epistolary relationships existed of not. These relationships are restricted to positive values alone in which the edges are translated in terms of memberships in the Republic of Letters.

Yet, knowing just the nodes and edges of a network is not enough to understand the full picture of the dynamics of early modern society. Only by reading social relations of network patterns one ignores the importance of more personal features that make the network properties evolve in a certain direction.

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\(^{691}\) Easley and Kleinberg, 113.

\(^{692}\) Leskovec, Huttenlocher and Kleinberg, ‘Signed Networks in Social Media’, 1.
Behind every network there are individuals who coordinate their relations to others in accordance with their own sentiments and opinions. These sentiments – either positive or negative – have strongly influenced the nature of their relationships: some relations are friendly, while others are hostile. Network annotations thus provide a next level of detail in describing the microscopic structure of the nodes and edges. Since the nodes and edges are the constituent of a complete network, annotations at a microscopic level will increase the overall accuracy at a macroscopic level as well.

In historical research, the question as to how the structure of the network interrelates with the potential of individual agency is hardly theorized and relatively unexplored. Specific decisions and strategies of individual nodes which lead to either the creation of a network in the first instance or how a network which is latent in terms of its awareness evolves into a network on which individual behavior and sentiments are actually reflected have been largely overlooked. These dynamics, though, are vital to understand how early modern scholars interacted in the creation and destruction of their network. These ideas are central in the study of April Shelford, who has argued that each individual created his own Republic of Letters through his own efforts:

“This does not invalidate more general characterizations of the Republic of Letters, but a focus on the experience of one individual clarifies important aspects of the republic that are frequently obscured by its citizen’s own universalizing rhetoric. The Republic writ large existed only at the sum of its member’s social gestures and collaborative output. Organic and dynamic, it lacked a fixed shape. Its internal configurations constantly shift as individuals made new connections or as internal dysfunctions (like quarrels) and external phenomena (like war) disrupted them. Each individual created his own Republic of Letters.”

According to Ronald S. Burt, it is analytically more useful when considering the cessation of contact between two actors as a disengagement rather than the disappearance of an edge. Two individuals who once had a connection do not revert to being two people without a connection. They have a history together and the question as to why their interactions have irreversibly altered needs to be considered to understand their choices and behavior in their future relationships. Burt argues that these choices are deliberately and thoughtfully made: people often disengage from negative relationships in favor of more positive connections.

Thus, as Burt argues, the dynamics of a network can best be explained by the existence of hidden, negative, edges rather than highlighting the absence of an edge. Similarly, Xenofontas Dimitropoulos and Dmitri Krioukov have argued that the inaccuracies associated with representing complex network topologies as simple undirected unweighted graphs “come not only from potential sampling biases in topology measurements, but also from neglecting link and node annotations.” In short, we need to annotate the edges of the network with additional information to understand why people form, end and change their relationships over time. In other words, we need to create a signed network.

Moreover, despite the fact that sentiment mining is one of the most active research areas in natural language processing, historians of emotions tend to choose more traditional methods of research. For more information about this topic, see Inger Leemans, ‘Large Data Set Mining’, in Early Modern Emotions. An Introduction, ed. Susan Broomhall (London/New York: Routledge, 2017), 27–33.

In contrast to signed networks, unsigned networks are the most common representations in network studies. They embody the idea that connectivity is key in understanding how the early modern world worked, showing how dense and well-connected everything was. Nevertheless, unsigned networks create a fundamental gap between the richness of relationships and the stylized nature of network representation of these relationships. In other words, most studies represent only successful and ideal networks – the network seen as one big happy connected family. Yet, besides positive connections, in many contexts, the social network is highly affected by the impact of negative sentiments which have strongly affected the structure of the social network.

Although unsigned networks conform to the Republic of Letters seen as an ideal society, they are not suitable to map its reality. If the network had only positive edges, then the Republic of Letters would be one of peaceful coexistence. This adheres to the ideal that, in the Republic of Letters, scholars engaged with each other in polite conversation to share knowledge. Many studies emphasized these idealistic and utopian properties. Hans Bots called it an “ideal state” and Anthony Grafton named it “Europe’s first egalitarian society”. Yet, scholars as Ann Goldgar and Paul Dibon have taught us that not everything was so harmonic and idyllic as it seems. According to Ann Goldgar “the harmony of the ideal was rarely achieved in reality” and Paul Dibon argued that the Republic of Letters “ideal as it may be, is in no way utopian but it takes form in the old human flesh where good and evil mix”. The ideal of the Republic of Letters was thus intertwined with a harder reality in which people were concerned with negative effects that arose in 17th-century interpersonal contacts, such as antagonism, jealousy, or even outright conflict. These tensions have dictated the decisions and choices early scholars had to make in the formation of their network, explaining why in some case they were forced to end a relationship with another person.

Signed networks are unique from unsigned network due to the increased complexity added to the network by having a sign associated with every edge. In general, historical studies on negative relationships are rare, likely because of the difficulty of collecting empirical data to examine such relationships. Huge repositories have been made available that enable us to digitally analyze the networks of the Republic of Letters. Early Modern Letters Online (EMLO), for example, is collecting metadata of correspondence from the fifteenth until the eighteenth century, enabling scholars to navigate the ocean of correspondence from that period. The Italian Academies project completed a list of memberships of the Italian Academies from 1525-1700, drawing on books published by the Accademie in the cities of Bologna, Naples, Padua and Siena. These are databases that represent the material present in the archive, which result in network data that carry a positive meaning, translated in terms of collaboration, exchanges and memberships.

In spite of their relative rarity, negative ties are more likely to drive attitudes, behaviors, and consequences, including network change, as compared to more frequently observed positive ties and need to be increasingly incorporated into our work. Positive relations are formed by support, endorsement and friendship and thus, create a network of well-connected scholars whereas negative

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699 Goldgar, 8. Paul Dibon, ‘L’Université de Leyde et La République Des Lettres Au 17e Siècle’, *Quaerendo* 5, no. 1 (1975): 6, “tout ideal qu’il soit, n’est nullement utopique, mais qu’il prend forme dans la vieille pate humaine qui mele le bon et le mauvais”.


702 This argument can be found in ‘Negative and Signed Tie Networks: Special Issue of Social Networks’, retrieved online: http://www.socialcapitalgateway.org/content/call/negative-and-signed-tie-networks-special-issue-social-networks, last accessed 4 April 2019.
relations are a result of opposition, distrust and avoidance.\textsuperscript{703} Negative relationships break the network down, create highly disconnected networks.\textsuperscript{704} Following this reasoning, it is fundamental not only to investigate how humans interact in the creation of their network, but also in the destruction of it. Recent work of Dániel Margócsy has drawn attention to the importance, yet unacknowledged role, of network breakdowns on the shaping of early modern society. According to Margócsy the vast majority of network studies has focused on beginnings and growth, rather than on endings. Yet, “endings are just as important as beginnings”.\textsuperscript{705} Rather than focusing on breakdowns as a negative element in history, he gives a positive account of the relevance of breakdowns as a pathway to success. Sometimes, it is necessary to break collaborations to achieve breakthroughs and to form a stronger identity. Galileo’s (1564-1642) decision, for example, to break with the Aristotelian terminology of the Jesuits, helped him to establish the identity of his own research paradigm.\textsuperscript{706} In addition, networking is time-consuming and, while it naturally has beneficial effects, it can also take a scholar away from work. Margócsy gives the example of René Descartes (1596-1650), who decided to selectively withdraw from contemporary network of correspondence, distancing himself from competing versions of scholarly thinking, in order to establish himself as the modern philosopher.\textsuperscript{707} The formation and breaking down of the scholarly network are thus the result of a strategic career management of early modern scholars. The structural balance theory is one of the frameworks to reason about why people strategically end their relationships, providing valuable navigation for close reading.

2. THE STRUCTURAL BALANCE THEORY

References to balance and equilibrium are common place in studies about the Republic of Letters. Jeanine de Landtheer and Henk Nellen, for example, have discussed how personal doubts, frictions and discontent with political and religious events are reflected in the correspondences of learned letter-writers of the sixteenth and early seventeenth century. According to them, negative expressions affected and afflicted the lives of numerous men of learning, who could not shy away from these tensions, which were impossible to ignore, “not even in the virtual space of the Republic of Letters”.\textsuperscript{708} So how did they cope with these tensions? De Landtheer and Nellen provide the following answer:

\textit{“Loath to play a marginal role in society, they fervently engaged in a struggle for a better, more harmonious world”.}\textsuperscript{709}

Similarly, Françoise Waquet argued that scholars from different background engaged in polite conversation with each other “pour atteindre une nouvelle harmonie”.\textsuperscript{710} Following these definitions, it seems that balance is a way to confront negative tensions in the Republic of Letters. To substantiate these

\begin{footnotesize}
\textsuperscript{706} Margócsy, 310.
\textsuperscript{707} Margócsy, 311.
\textsuperscript{709} De Landtsheer and Nellen, xxiii.
\textsuperscript{710} Françoise Waquet, ‘Qu’est-ce que la République des Lettres ? Essai de sémantique historique’, 495.
\end{footnotesize}
statements, we need to have a precise model to test the dynamics of balance. The structural balance theory is one of the basic frameworks for doing this.

The structural balance theory was originally introduced by the Austrian psychologist Fritz Heider (1896-1988) in the 1940s. The principle underlying his theory is based on the assumption that certain combinations of relationships are more natural for psychological reasons. Specifically, people have an innate tendency towards balanced structures that are stabilized by the relations among individuals based on sentiments. These sentiments are either positive or negative: positive relationships are representative of friendship, while negative relationships indicate hostility between people. The essential idea of the structural balance theory is that people strive for balance between these positive and negative forces in the network.

Heider’s analysis is based upon what he calls a P-O-X unit, in which P is a person, O is another person and X is conceived as an impersonal entity (another person, a situation, an event, an idea, or a thing). Each relation in the unit is reliant on each other: if P has a good relationship with O, and O likes X, then there will be a tendency for P to like X as well. On the other hand, in the event that P disliked X, the whole P-O-X unit will be placed in a state of psychological imbalance, and pressure will arise to change its state towards balanced. This means that P is motivated to restore the balance by changing the relation of affection with X, or to avoid X and O entirely to lessen the tension created by the state of imbalance. Heider’s model of social balance theory provides thus a way to systematically analyze how a social group evolves to a possible, and desired, state of balance.

In the 1950’s Heider’s theory of balance was translated into a network model in the work of the sociologists Dorwin Cartwright and Frank Harary. They developed a generalization of Heider’s theory of balance by use of concepts from the mathematical theory of linear graphs in order to extend the concept of balance to larger networks. This means that they adopted Heider’s theory of micro-structures (triads) to macro-structures (entire networks). Moreover, they generalized Heider’s psychological theory of balance in units of sentiments to a sociological theory of signed graphs. A signed graph is a network in which every edge is designated to be either positive or negative. These edges are also called signed edges. Since Cartwright and Harary, the structural balance theory has become a sub-branch of social network theory.

How is the structural balance theory explained by means of a network?

The structural balance theory is primarily focused on the perception of relationships in the form of a triad of three mutually linked nodes. A triadic relationship between these three people can take four possibilities, in which negative and positive relationships tend to decide whether the triad is balanced or not. These four possibilities are represented in figure 19. In each triad, consisting of three nodes A, B and C, a positive relationship like friendship is marked by a plus (+) while a negative relationship like hostility is represented by a minus (-).

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712 Heider, 107.
713 Heider, 108.
The first figure, figure 19a, represents a balanced network for all relationships are signed as positive. This responds to a very natural situation in which three people are mutual friends from each other. This situation is commonly simplified with the sentence: A friend of a friend is a friend. Positive triads are formed by trust, support, endorsement and friendship and thus create a network of well-connected nodes which is beneficial for the promotion and circulation of information. This type of network was central in the previous chapter on the importance of introductions and trust in the scholarly network.

A second example of a balanced network is represented in figure 19b, which consists of one positive relationship and two negative relationships. This network represents a situation in which two of the three people in the network, so A and B, are friends that have a mutual enemy, C, in common. This situation can be expressed as: an enemy of a friend is an enemy. It is thus a stable network: A and B agree over their dislike towards C, and C hates both of them.

The other two possible triangles, so figure 19c and 19d, introduce some amount of psychological stress or instability into the relationships present in the triad. The triad with two positive relationships and one negative relationship, shown in figure 19c, corresponds to a person A who is friends with B and C, but B and C do not get along with each other. As a consequence, A will be pressured to pick a side, and therefore the triad is unstable. This situation is also known as the imperative: you cannot be friends with your friend’s enemy. The last example of an unbalanced triangle is figure 19d, in which all the relationships are signed as negative. This configuration is somehow ambiguous. On the one hand, this network might seem balanced for it represents a similar configuration as the network shown in figure 1a. In this case, it consists of three people who all dislike each other, so no one is in doubt about where they stand: everyone just hates everyone else.\(^{217}\) On the other hand, the enemy of my enemy does not apply here. A and B might form an alliance in recognition of their joint dislike towards C, but find it hard to do so because they also hate each other. In many settings, this causes tensions for there is always the opportunity that one of the pairs in the triad become friends, teaming up against the common enemy. As a result, each individual in the triad is constantly suspicious of the other, not knowing when his enemies decide to collude. This rule can be summarized as: my enemy’s enemy is my friend. Whether this triad is balanced of not, it is definitely a configuration that is unstable. In fact, there is no reason for A, B and C

to relate to one other when none of them likes each other. In real life settings, we might assume that the three enemies would simply sever their edges and go their separate ways.\(^\text{718}\)

The equilibrium of three mutually connected nodes is simple to define, but its complexity increases in case more nodes are added in order to create a larger graph with many interdependent triads. In other words, the complexity reached by society goes beyond triads alone. Frank Harary and Dorwin Cartwright have extended Heider’s model in order to study a network with any number of nodes and edge, as long as their edges are signed either positive or negative. Their definition of balance for a complete graph can be stated in the following way. The balance of a signed graph depends on the signs of its cycles. The sign of a cycle is calculated by the product of the positive and negative edges that comprise the triad. Taking the four possible configurations of Heider’s balance and imbalance, Cartwright and Harary consider figure 19a as a positive cycle for the product of the three positive relationships in the triad equals +, which can be represented schematically as (+ + + = +). Similarly, figure 19b contains a positive cycle (+ – – = +) while the other configurations contain negative cycles: (+ + – = –) and (– – – = –.). Following the definition developed by Cartwright and Harary, the graph is balanced only if every cycle in the network is signed as positive (universal harmony) or if there are two fractions of friends with complete antagonism between them (bi-polar fractions).\(^\text{720}\)

In other words, it is widely assumed in social network theory that networks tend to form into groups such that everyone likes each other within their groups and dislike those in other groups.\(^\text{720}\) The balance of a signed graph depends thus on the sign of its cycles.

So, the definition provided by Cartwright and Harary allows us to move beyond triads, assessing the balance of a social network consisting of any number of nodes and edges. As a result, the theory can be used to explain how the feelings, attitudes and beliefs of an individual towards others promotes the formation of a balanced or unbalanced network. The structural balance theory can thus explain how the sentiments at the level of the individual nodes can have a radical impact on the macroscopic structure of the network. The theory connects the local and the global: a local view as a condition of each triangle of the network and a global view as a requirement that the world can be divided into two mutually opposed sets of friends.\(^\text{721}\)

Moreover, the structural balance theory allows us to analyze negative tensions in the network of the Republic of Letters by a purely mathematical analysis. The advantages of such a ‘pure’ analysis is favored by Matteo Valleriani, who recently has argued that the amount of sources now available to the historian asks for a more sophisticated approach. According to Valleriani, a historian needs to join forces with sociology to mathematically analyze large historical data sets.\(^\text{722}\)

3. Changing Dynamics in Balance

If we systematically analyze negative relationships in network models, we can obtain a better understanding of the evolution of the social network. The modelling of network dynamics is actually one of the greatest difficulties historical network research has to face. According to Johanna Drucker, for instance, the level of complexity necessary to model dynamic systems introduces a challenge into the

\(^{718}\) Ibidem, 207.


The inclusion of negative relationships into our network models might constitute an important step for exploring the dynamic evolution of network structures. Relationships are never static: people can change their sentiments towards others. Relating to one person or another is an on-going process made up of uncertain and ever-shifting edges. Trust can turn into distrust, friends can become foes and conflicts between people can be resolved.

As touched upon earlier, a fundamental claim of the structural balance theory is that only balanced triads can be stable while unbalanced triads have the tendency to decay or to change into a balanced status. Heider postulated that in unbalanced triads forces occur which determine the change of the triad: if a network is unbalanced then we have the tendency to increase balance by adapting our edges. In other words, when we feel ‘out of balance’, then we are motivated to restore a position of balance in our network.

Following this reasoning, we can expect that the triads as shown in figure 19a and figure 19b remain unchanged, while the ones shown in figure 19c and 19d are subject to change. For example, if the network starts as the unbalanced triad represented in figure 19c, balance might be achieved by either making the negative edge positive or by making one of the positive edges negative. In the first case, this means that A can relieve his stress when he manages to lure B and C into friendship, transforming his network into the triad as shown in figure 19a. Another possibility for A is to transform his network to the one shown in figure 19b. In this case, A decides to side with either B or C, turning one of the edges into negative. In many real-life situations of this kind, the tension would be resolved by one of the acquaintances (B or C) to be broken. In this case, the edge would be removed altogether. For instance, perhaps A would simply decide to stop talking to one of his friends.

For a triad with all negative edges, as illustrated in figure 1d, there is the possibility that two individuals collude against the third party so that the triad take the same shape as the network represented in figure 19b. Of course, this mechanism is not inevitable, the actor can actively resist these forces, but he will be subject under a large amount of pressure.

This essential notion of the structural balance theory can also be applied to more complex networks since every social network can be understood as composed of triads. One changing edge can induce the changing balance of other triads, and consequently modify the whole system step by step. Sociologists are particularly interested in this phenomenon. J. Antal et al., for instance have designed models to test how long it takes for an initially unbalanced network to reach a balanced state via these changing dynamics. They randomly selected unbalanced triads and flipped the sign of the relationships from positive to negative or vice versa to restore the triad to balance. This change was made regardless of whether the other triads become unbalanced in order to reflect a real-world system in which people often change their relationships without considering the consequences on the rest of their social network. Here again, the importance of the correlation between the micro- and macro properties of a network is apparent.
4. THE STRUCTURAL BALANCE THEORY IN CONTEXT

In studying models of structural balance, many scholars have formulated alternative notions of balance and imbalance in the network, by revisiting the original assumptions made by Heider, Harary and Cartwright. Although this chapter will mainly adhere to the original ideas of balance, the following studies provide crucial insights about the possibilities and liberty this theory offers to scholars interested in studying the dynamics of early modern society.

4.1. REVISION OF THE STRUCTURAL BALANCE THEORY

Several scholars have argued that the original definition of imbalance is to deterministic. Specifically, the only network configurations that are structurally balanced, as proposed by Harary and Cartwright, are the ones in which either all the nodes are friends or the network can be divided into two distinct sets of mutual friends, also called clusters, with complete mutual antagonism between the two cliques. Realistically, drawing from this definition, a network will never be balanced. For this reason, Davis has proposed a more relaxed version of structural balance in which the all-negative triad (- - -) should not be considered unbalanced. According to Davis, it is more likely that friends of friends are trying to reconcile their differences, resolving the lack of balance present in figure 19c, than two of three mutual enemies to become friendly. It is therefore more natural to ask what kind of structural properties arise when we allow triangles with three negative edges to be present in the network. As such, he showed that, when the model allows for these all-negative triads, graphs may consist of multiple clusters.729

While Davis’ theory imposes less of a restriction on what the network can look like, other studies have argued that the nature of a relationship cannot be considered as black and white as originally proposed by Heider. In real settings, there are shades of grey as well. One might expect, for example, that the relationships and the trust level between people vary considerably. An acquaintance may not result in the same type of structural constraints as a close friendship. A possible way to tackle this challenge is proposed by Yi Qian and Sibel Ali who have applied structural balance to networks in which the nodes have different strengths of relationships, ranging from strong to weak.730 This is a theme that has come up already in our discussion of Granovetter’s theory on the strength of weak ties in the third chapter of this study.731 Granovetter used the term weak tie to define a relationship that is an acquaintance, not a close friend. According to him, acquaintances are beneficial to the circulation of knowledge in the network for they have access to less privileged information than close friends.

The point made by Qian and Ali has to be kept in mind when we consider the dynamics of early modern exchange. The relationships between early modern scholars are not easy to categorize in terms of positive and negative edges alone. As shown by the introduction of this study, early modern scholars were masters of the art of dissimulation and hypocrisy and had no difficulties in maintaining a prolonged and apparently extreme friendly correspondence with persons whom they mention in their letters to others with hostility and distrust. Johan Nordström, for instance, has shown that Magliabechi was hardly a genuine friend to Niels Stensen, despite the superficial friendliness he showed him in person and in his correspondence.732 Yet, we should not forget that the structural balance theory is a model of distant

reading to find patterns in our data that require localized attention and close reading. Hence, disclose reading is needed to enrich our perception of conflicts and balance in the early modern society.

In stark contrast to the structural balance argument that people favor balanced networks, Georg Simmel (1858-1918), pioneer of social network theory, has argued that we would benefit more from exchanges when one is friends with two parties that are in a negative relationship (− + +). In this case, the two parties might compete with one another by showing off their support and affection towards the ego. This form of competition will create the opportunity for the ego of the network to exploit those who are involved in the negative tie.733 As a result, he suggests that individuals would intentionally befriend those in conflict for their own benefit. In other words, they would intentionally profit from unbalanced triads for their own self-interest.

As in the case of edges, the structural balance theory also assumes equality of nodes. Nevertheless, each individual is unique, and their similarities and differences in age, religion, sex, or views may affect their relationships. Homophily is one of the most basic notions that governs the structure of the social network. It is the principle that we tend to be similar to our friends, meaning that it is more likely that one establishes a relationship with someone who possesses the same attributes.734 Marcus W. Feldman et al. have proposed a method to optimize the structural balance theory for fully signed networks, taking into consideration the attributes of the nodes. They took homophily as their criterion: a fully signed network is balanced, if every pair of nodes with the same sign is connected by a positive edge, while every pair of nodes with different signs is connected by a negative edge.735

The structural balance theory requires that every sign in a network carries a positive or negative meaning. In many contexts however, especially when dealing with historical data, we need to deal with missing and incomplete values. Sometimes it is just not possible to express the nature of a relationship between two people. Therefore, many studies have considered neutral relationships to define non-negative and non-positive relationships.736 Moreover, David Easley and Jon Kleinberg have proposed a definition of structural balance which can be applied to arbitrary, non-complete networks. In this definition, they treat balance for non-complete networks as a problem of filling in the missing values. If the network can be completed by filling in the missing values to produce a balanced graph, the complete network can be considered balanced.737 The structural balance theory can thus be used to predict the sign of edges in cases where it is not known or cannot be assessed directly. This feature is of great importance to the study of history for it provides a way to deal with incomplete data, characteristic for that field.

4.2. APPLICATIONS OF THE STRUCTURAL BALANCE THEORY

Scholarly interactions between the structural balance theory and history are not very common. To date, only Robert Gramsch has attempted to use the theory of structural balance to substantially analyze history. In particular, he raised the question whether the structural balance theory is a meaningful historical tool. In order to answer this question, Gramsch studied the conflict that arose between the years 1225 and 1235 in Germany. He showed how a conflict between the Emperor Frederich II and his heir, Henry VII, over some disputes with the Pope, led to an expanding chasm amongst the prince-electors: some continued to support Emperor Frederick II while others decided to back his heir. To

734 This definition of homophily can be found in Easley and Kleinberg, 77.
737 Easley and Kleinberg, *Networks, Crowds, and Markets*, 120.
underline the role of the coalitions that underlie the conflict, Gramsch investigated a network composed of 68 actors, as well as the political relations between them from 1225 to 1235. On the basis of the principles of the structural balance, this network was divided into clusters of people which are internally free of conflicts. As such, Gramsch could identify which actors stayed together in one cluster and which one had changed political coalition. He observed that, in 1232, the two factions were indeed supported by either Frederick II or Henry VII, while between 1232 and 1234, when Frederick II decided to disavow and imprison his son to restore the balance of power in his empire, the two antagonistic fractions initiated to decay in 1233, and disappeared almost completely by the year 1235.\footnote{Robert Gramsch, \textit{Das Reich Als Netzwerk Der Fürsten: Politische Strukturen Unter Dem Doppelkönigtum Friedrichs II. Und Heinrichs (VII.) 1225 - 1235}, Mittelalter-Forschungen 40 (Ostfildern: Jan Thorbecke Verlag, 2013).}

In his study, Gramsch concluded that alliances and rivalries can be retrodicted using Fritz Heider's balance theory and concludes that such a network perspective can lead to a better understanding of how conflicts arise, and if they could be avoided. Yet, are there other ways to detect these type of communities in the network? In a subsequent article, Gramsch collaborated with a physicist and a computer scientist to verify the usability of the structural balance theory to detect communities in historical networks. In particular, they used a spin-glass-based community detections algorithm to see how good this method is in detecting the rift between Frederich II and Henry VII, and compare the results with the analysis performed by Gramsch using social balance theory. Their results showed that the spin-glass algorithm detects the same patterns as the analysis performed by Gramsch.\footnote{S. R. Dahmen, A. L. C. Bazzan, and R. Gramsch, ‘Community Detection in the Network of German Princes in 1225: A Case Study’, in \textit{Complex Networks VIII}, Springer Proceedings in Complexity (Workshop on Complex Networks CompleNet, Springer, Cham, 2017), 193–200.}

Ralph Kenna and Pádraig MacCarron have analyzed the network structures of four iconic European tales: the Icelandic \textit{Njálůs saga}, the Greek \textit{Iliad}, the Anglo-Saxon \textit{Beowulf}, and the Irish \textit{Táin Bó Cuailnge}. By carefully reading each of the narratives they entered characters’ names into a database and listed the character they interacted with. They defined links as positive, or friendly, when two characters know each other, are related, speak to one another, or appear in a small congregation together. Links were signed negative, or hostile, in the case that two characters meet in combat.\footnote{Pádraig MacCarron and Ralph Kenna, ‘A Networks Approach to Mythological Epics’, in \textit{Maths Meets Mystic: Quantitative Approaches to Ancient Narratives}, ed. Ralph Kenna, Máirín MacCarron, and Pádraig MacCarron (Cham: Springer International Publishing, 2017), 30–31.} Analysing the signed network of the tales, they concluded that the full networks were all structurally balanced with a minority of triangles containing an odd number of negative edges. The networks extracted from the European tales echoes thus the properties of many real-world networks. This result supported their claim that the stories in the tales were primarily driven by positive interactions between characters.\footnote{MacCarron and Kenna, 41.} Likewise, Graham Alexander Sack has used the balance theory to understand the narrative structure of Cervantes’s \textit{Don Quixote de la Mancha}, Charles Dickens’s \textit{David Copperfield} and Virginia Woolf’s \textit{Mrs. Dalloway}.\footnote{Sack, ‘Character Networks for Narrative Generation: Structural Balance Theory and the Emergence of Proto-Narratives’.}

Structural balance has been analyzed in different areas in the social sciences, to understand, for example, how people cooperate and why nations fight wars. One of the most common applications for social balance ideas is to international relations, which represent a setting in which it is natural to assume that a collection of nodes all have opinions – either positive or negative – about each other. In such a setting, the nodes are the nations, and the signed edges indicate alliance or enmity. Studies in political science have used the balance theory to offer an effective explanation for the behavior of nations during conflicts and crises. Tibor Antal, Paul Krapivsky, and Sidney Redner, for example, used the shifting alliances preceding World War I as a case to consider the role of balance theory in international relations.
They studied the evolution of the major relationship changes between the protagonists of World War I from 1872–1907 and concluded that these relationship changes gradually led to a reorganization of the relations between European nations into a socially balanced state.743

Another area in which the ideas of structural balance are relevant comes from user communities on the World Wide Web. Here, users can express positive or negative opinions about each other. Jon Kleinberg et al., for example, have investigated the social network structure from three web sites: Epinions, Slashdot and Wikipedia.744 In the online product-rating site Epinions, users can evaluate different products and also express trust or distrust of other users. The second website they analyzed was the technology blog Slashdot, where users designate others as friends and foes. The third network was defined by the votes for Wikipedia admin candidates. When a Wikipedia user is considered for a promotion to the status of an admin, the Wikipedia community is able to cast public votes in favor or against his or her promotion. They concluded that the network derived from these three social media platforms were consistent with the model of structural balance.

While structural balance is primarily shown in human social networks, Amiyaal Ilany et al. have analyzed empirical data from an animal social network to determine whether or not structural balance is present in a population of wild rock hyraxes.745 They found that, in a rock hyrax social network, balanced triads were more common, while unbalanced triads were less common. In addition, they have also shown that triads tend to change over time according to structural balance and that a rock hyrax’s sex can affect that change.

5. RECONSTRUCTING THE BALANCE NETWORK

The structural balance theory provides a way to systematically analyze data coming from early modern correspondence. To test this, we need to reconstruct a signed network in which changeable social relationships are represented as exactly as possible. In this paragraph, I start with discussing the framework of data — coming from both archival sources as online repositories — that constitutes the basis for this analysis, and I end up with explaining the computational script that enables us to extract signed networks of balance and imbalance from these data.

The fundamental unit of analysis in the structural balance theory, and of network analysis in general, is a triad of three mutually linked nodes. As shown by the previous chapter, these triads are created through the combination of two different datasets, the Catalogus Epistularum Neerlandicarum (CEN) and the digitized card catalogue of the correspondence of Antonio Magliabechi held at the National Library of Florence (CCF). In the initial stage, each edge in the network was labelled positive. These positive edges take the form of memberships in the Republic of Letters. At this stage, the network is a stacked representation of a balanced network, which will be used as the background (the input-layer) of the analysis. On top of this network, layers of data will be placed that will change the sign of the edges to negative. These layers can thus be imagined like the transparent plastic sheets used to make cartoons, in which each subsequent layer after the input layer used the output of the previous layers as its input.

The next step in creating the balance network was to transform the network consisting of triads into a signed network of positive and negative relationships, defined in terms of pluses (+) and minuses (−). The assignment of the negative edges was harvested by carefully reading each letter and entering person’s names into a database, meticulously listing the people on which Magliabechi expressed a negative opinion. In case of doubt, the sign of a relationship remained unchanged. In particular, 395 letters written
by Magliabechi to his correspondents in the Dutch Republic served as a test-bed to study to which degree his network conforms to the structural balance theory. These letters are scattered through various archives and libraries in the Netherlands, Germany and Italy and cover a period of 39 years (written between 1672 and 1711).

What is a negative tie? This judgement is often affected by the attitude Magliabechi held towards the ideals and working practices of the Republic of Letters, which rested on the imperative of sharing knowledge and mutual support. In the eyes of Magliabechi, it was the duty of each member of the Republic of Letters to support this ideal. To denote this, he praised the ones who contributed to this ideal, while he despised those who worked against it. The relationships in which Magliabechi implicitly expresses his aversion towards others have been labelled as negative. These relationships include feelings of betrayal, indifference, disapproval, distrust, hate, envy and jealousy towards others. Besides his own opinion, Magliabechi also describes relationships between others. If these relationships adhere to my definition of ideal and reality, then these were included in the analysis as well.

At last, a total number of 87 nodes was included in the analysis. This dataset is large enough to provide meaningful statistical results. In fact, according to David Easley and John Kleinberg, the structural balance model makes only sense for small groups because if applies only to signed networks. This means that each pair needs to be connected by an edge that expresses either a positive or negative relationship. The negative relations and interactions between them (according to Magliabechi) over a period of 39 years were translated into dyads. A dyad is the smallest social structure in which a node can be embedded, that is, a pair of two nodes. In order to model the changing dynamics of balance, the network was divided into seven time-frames of five years: 1672-1677 (89 dyads), 1678-1683 (98), 1684-1689 (113), 1690-1695 (122 dyads), 1696-1701 (123 dyads), 1702-1707 (126 dyads), 1708-1713 (135 dyads). For each time-frame, every dyad is a unique connection between two nodes. A dyad is generated from the first negative mention made by Magliabechi and continues until proven otherwise.

This is best illustrated by an example. On the 1st of January 1674, Magliabechi expressed for the first time his anger about the physician Giovanni Andrea Moniglia. In this letter, Magliabechi warned Gronovius against Moniglia, arguing that “quest’empio medico” is willing to do anything to get ahead. Following this first mention, Magliabechi negatively refers to Moniglia for no less than 48 times in his letters to Jacob Gronovius, Nicolaas Heinsius and Gisbert Cuper from 1674 until 1703. The fact that Magliabechi mentions Moniglia even after the death of the latter is significant for our network model. In 1703, three years after the death of Moniglia, Magliabechi remembers him as “tanto asino, e così ignorante, che ne meno sapeva mettere insieme, due parole Latine”.

Because Magliabechi remembers and avenges his enemies even after their death, these relationship continue to affect his network and are thus included in the overall analysis.

There are of course limitations and challenges to these data. Letters contain unknown or anonymous recipients, mentioned persons and/or are undated. This is especially the case for letters in which confidential information was shared. Since the focus of this chapter is on the network’s internal workings – the contents – Magliabechi’s letters in which the recipient is anonymous or unidentified are included as well. Indeed, we can capture other social links deriving from the contents of these letters. Thus, the data gathered for this chapter include anonymous letters that were excluded from the analysis of the networks in the previous chapter that focused on the connections between senders and recipients.

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746 For the letters Magliabechi wrote to the Dutch Republic, see Appendix 1
748 Magliabechi to J. Gronovius, 1 January 1674, LMU, Cod 4° Cod.Msc 777, f. 137, “that evil physician”.
749 Magliabechi to J. Gronovius, 1703, LMU, Cod 4° Cod. Msc 778, f. 12, “an ass, so ignorant that he did not even know how to bring two words of Latin together”.

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This underlines the importance of using multiple methods in the Digital humanities, each of which draws our attention to different types of data. As such, we are able to cope with the uncertainty and incompleteness of historical data. On the other hand, if I was unable to identify a person mentioned in his letters, this information has been omitted from the analysis.

In addition, a large part of the letters is undated. In many cases, from the contents of the letter, a year or period could be assigned. Since the analysis of this chapter includes a time-frame of five years, most letters could be placed in a particular time-frame. Nevertheless, in some cases it was impossible to assign a letter to a time-frame. In this case, the letter appears in the analysis of each time-frame.

Once each edge in the network had been given a positive or negative sign, python code – more specifically the algorithms contained in the Python NetworkX library – was used to create the four configurations of balance and imbalance from a signed network. The python program first established the total number of closed triads each node in the graph is part of. A closed triad pertains when all three nodes are linked pairwise. The number of closed triads Magliabechi is part of is reproduced in figure 20, showing that the number of triads in which he was involved grew from 350 to 378 triads during the period 1672-1713. It is important to notice here that the formation of these triads from a list of dyadic relationships would have been impossible by a close-reading approach alone. We just do not have the capacity to process all involved information at once. Following that, the script counted how many of these triads are balanced or unbalanced according to the four configurations as proposed by Fritz Heider. These four signed subnetworks are also summarized in figure 20. The table includes also the percentage each triad contributed to the total number of triads in the network. The following paragraph will discuss this table in more detail.

6. MAGLIABECHI’S NETWORK AND THE STRUCTURAL BALANCE THEORY

If there is a universal tendency towards balance, it is reasonable to expect that unbalanced triads will become less frequent over time, while balanced triads will become more frequent. Unbalanced triads will engender unease among the nodes and, as a consequence, it will eventually move to a balanced state by changing the sign of a relationship. The changing of relationships follows entirely intuitive rules: an individual tends to be friends with a friend’s friend (+ + +), distrusts a friend’s enemy (- - +) and befriend an enemy’s enemy (- - -). These formations mean that the balance theory promotes thus the formation, but not necessarily conflict free, of stable social groups over time. Does the network of Magliabechi conforms to this tendency? Is Magliabechi to control the balance in his network? In order to answer these questions, the next paragraphs individually discuss the first three configurations in figure 20. In the third chapter of this study we have already focused on the last configuration (+ + +) in the context of triadic closure and the importance of introductions in the scholarly network.

750 Dr. Sebastian Ahnert deserves many thanks for helping me to design the algorithm to calculate the dynamics of balance in the network of Antonio Magliabechi.
6.1. TRIANGLE OF IMBALANCE (- - -)

Figure 20 considers the structural changes in the network of Magliabechi across seven successive five-year periods. From the analysis, it appears that the all-negative triads (- - -) are underrepresented to a much lesser degree than the other types of relationships. The reason for this is that the formation of an all-negative triad is very complex. In his letters, Magliabechi needs to express his dislike of two persons and, on top of that, he also needs to specify that these two persons dislike each other. In this respect, the four discovered triads acquire a greater importance for there is a slim chance to detect such a triad in hundreds of letters. Digital methods help us to highlight the finest details we otherwise might have overlooked. Although the all-negative triad does not contribute significantly to the overall network structure, their relative presence in the network, which remains stable over time, declines over time with 0.05 percent.

The all-negative triad is definitely a configuration that evokes tension. An example of such a triad involves the Florentine satirist Benedetto Menzini (1646-1704). In 1681, Menzini failed to obtain the chair of Greek and Rhetoric at the University of Pisa, which had remained vacant after the departure of Jacob Gronovius in 1674. He did not get hired partly because of the jealousy of other scholars, in particular Giovanni Andrea Moniglia and partly because of the insults he constantly used in his writings. Although Magliabechi detested Moniglia, he must have agreed with his decision to stop Menzini from obtaining a professorship. From the letters of Magliabechi to Jacob Gronovius it turns out that Menzini resented the fact that Magliabechi did not put in a good word for him by the Grand Duke. According

752 In his most important work, the Satire, Menzini assailed in harsh terms the hypocrisy prevailing in the Grand Duchy of Tuscany, making fun of several key figures at the court of Cosimo III, including, Moniglia, Magliabechi and Bassetti. Although the Satire was only published posthumously in 1718, the manuscripts enjoyed a wide circulation in the Florentine and Roman scholarly communities throughout the seventeenth century. The Satire was published after Menzini’s death in 1718 under the false imprint of Amsterdam.
753 Magliabechi to J. Gronovius, undated, LMU, Cod 4° Cod. Msc 778, f. 28, “Questo infame [Menzini] avrebbe voluto che a S.A.S. io avessi parlato di esso.”

![Table: Structural Balance and Antonio Magliabechi (1633-1714)](image-url)
to Magliabechi, Menzini was not worthy enough to occupy such an important position, especially because “per professione come bene V.S. Ill.ma sa, è un Pedante effettivo, e per Lettere un asino naturale.”\textsuperscript{754}

The mutual hostility between Magliabechi, Moniglia and Menzini gives rise to an all-negative triad (see figure 21).

The distrust Magliabechi showed towards Menzini brought further reverberations upon his network. On the one hand, he needed to make sure that his own correspondents did not become entangled in the tricks of Menzini, while on the other hand, he needed to safeguard his own equilibrium in his network. In the event that one of his correspondents makes contact with Menzini, a layer of tension would have been added to his network in the form of an unbalanced triad (figure 21, - - +). As a result, on the 10\textsuperscript{th} of December 1675, Magliabechi expressively urged Jacob Gronovius not to answer the letters of Menzini. In order to not get into trouble, he advised Gronovius to dissimulate and hide that he had received a letter from Menzini:

> “Adesso mi avveggo che quell’infame mi ha più volte domandato come doveva fare a scrivere a V.S. Ill.ma, ed a chi doveva indirizzare le Lettere. […] È ben necessario che V.S. Ill.ma non gli risponda, perché o in una maniera, o nell’altra, che V.S. Ill.ma gli scrivesse, sempre se ne servirebbe esso per male come può presupporsi. Acciò La supplico con la maggior caldezza che so, e che posso, a dissimulare, ed a fingere o di non ne saper nulla, o di credere che esso abbia scritto a V.S. Ill.ma.”\textsuperscript{755}

As shown by this example, moments of tension in the network forge dissimulation and secrecy, and the structural balance theory highlights and enriches these moments for us.

\textsuperscript{754}\textit{Ibidem}, “by profession, as Your Illustrious Lordship knows well, he is just a pedante (=someone who ostentatiously exhibits academix knowledge, just a schoolmaster), and he is a genuine ass in literature”.

\textsuperscript{755} Magliabechi to J. Gronovius, 10 December 1675, LMU, Cod 4° Cod. Msc 777, f. 166, “Now it happens to me that that fool has repeatedly asked me how he could write to your Illustrious Lordship, and to whom he could address his letters. It is very necessary that Your Illustrious Lordship does not answer him, because in one way or another, if Your Illustrious Lordship writes to him, he will always use it for something bad, as you might assume. Therefore, I beg you with much affection I have and can, to dissimulate, or pretend not to know anything, or to believe that, he had written to Your Illustrious Lordship”.
6.2. TRIANGLE OF BALANCE (- - +)

The second type of relationship is a triad with one positive edge and two negative edges (- - +). This is an example of a balanced triad in which two of the three are friends with a mutual enemy in the third. As stated before, relationships do eventually tend towards balance through a process whereby relationships change from positive to negative and vice versa. Figure 20 shows that the (- +) triads in the network of Magliabechi conform to the structural balance theory. The formation of balanced triads increases with 4.6% during the period 1672-1713.

A balanced triad (- +) can either evolve from a (- -) unbalanced triad or a (- + +) unbalanced triad. While the correspondence of Magliabechi does not provide any example of a reconciliation in an all-negative triad, the following example shows how Magliabechi seeks for balance in a (- + +) triad. In 1675, Magliabechi wrote a long letter to Jacob Gronovius, in which he set out his arguments as to why Gronovius should forward his letters to the classical scholar Abraham van Berkel (1639-1686). He used the following arguments to encourage Gronovius to forward his letters to Van Berkel:

“Io ho stimato bene lo scrivergli per tre capi. Il primo perché esso mi ha fatti altri favori pel passato, e pare la mia la maggiore asinità del Mondo, mentre che a tanta cortesia, ne anche lo ringrazio con un solo verso. Il secondo, perché ho con mio estremo contento veduto, che il detto signore Berckelio, parla nelle note con gran lode meritamente di V.S. Ill.ma. Il terzo capo che mi ha fatto scrivergli si è, il vedere la gran malignità che è, e qua, ed anche in buona parte costà, come V.S. Ill.ma avrà veduto dalle mie Lettere, onde non solo non mi par bene che ci tiriamo addosso eg’altri nemici, ma in oltre stimo necessario il farci più amici che possiamo, per far tanto maggiormente scoppiar d’invidia i maligni.”

756 Magliabechi to J. Gronovius, Florence, 26 March 1675, LMU, Cod 4° Cod. Msc 777, ff. 149-150, “I deemed necessary to write him [Van Berkel] for three reasons. Firstly, he has done me other favors in the past, and it is the most idiot thing that I...”
The first argument denotes one of the vital principles of the Republic of Letters: reciprocity. Although reciprocity was not always guaranteed in the Republic of Letters, it was a least expected that favors were returned. Failure to do so was associated with bad manners, resulting often in an unnecessary conflict between people. In Magliabechi’s own words, it would be a “maggiore asinità del mondo” not to respond to the letters of Van Berkel, who recently had also donated his recently published edition of Stephanus Byzantius, *De arribus et populis fragmenta*, to Magliabechi.

In 1674, Abraham van Berkel gave this edition to the merchant-scholar Daniel Couson (1648-1688) who was on his way to the Grand Duchy of Tuscany. The edition was not intended for Magliabechi but was meant to be a gift for Jacob Gronovius who was at the time professor at the University of Pisa. However, by the time Couson arrived in Florence, Gronovius had already left Pisa. Not knowing what to do with the book, Couson asked Van Berkel for further instructions and he was ordered to donate the book to Magliabechi instead. After having delivered the books to Magliabechi, Couson advised Magliabechi to thank Van Berkel for his gift. He did not have to say it twice: Magliabechi knew very well that gifts needed a return – one of the unwritten rules that kept the Republic of Letters together. On the 26th of March 1675, Magliabechi informed Couson that he would send his reply to Van Berkel to Jacob Gronovius:

> “Il signore Cousson mi prega a ringraziare il signore Berckelio. Stimo infinitamente i consigli di V.S.III.ma, e ricordandomi che già mi ordinò che io non iscriversi ad alcuno che non mi avesse ben praticato, mando la Lettera a V.S.III.ma, perché se ella non istima bene al dargliela, la stracci, già che mi rimetto liberamente in lei. Non so, se intenda la lingua Italiana, ma V.S.III.ma se stimerà bene il dargliela, potrò spiegargliela nella Latina.”

Cousson was certainly not pleased with Magliabechi’s decision to send the letter to Gronovius first, and not without reason. From the correspondence between him and Magliabechi we discover that Gronovius never forwarded Magliabechi’s letter to Van Berkel:

> “Ho ricevuto hieri una Lettera dal Sig. Berkelio, che riverisce V.S. Illustri ssima e si duole molto del Sig. Gronovio, che nega haver la lettera, che V.S. Illustressima si è degnata di scrivere al predetto Sig. Berkelio tutto sconsolato per vedersi privo de’ vostri favori tanto da se desiderati. Veda V.S. Illustressima che mala bestia sia l'invidia.”

have never thanked him with one single verse to this very kindness. Secondly, I have seen that sir Berkel, and I blush for it, has spoken with a lot of praise in his notes of Your Illustrious Lordship. The third reason why I want to write him, is because of the great malice that is here, and also to a large extent there, as Your Illustrious Lordship has seen from my letters, whereby I believe that it is not good that we pull ourselves other enemies, but I value that it is necessary that we make us as many friends we can, so that evil persons burst with envy even more.”


Abraham van Berkel, *Genuina Stephani Byzantini De arribus et populis fragmenta* (Lugduni in Batavis: apud Danielem a Gaesbeek, 1674).

Magliabechi to Gronovius, 26 March 1675, “Sir Cousson begs me that I need to thank sir Berkelio. I value the advice of Your Illustrious Lordship, and remembering that you commissioned me not to write to anyone who is not close to me, I send the letter to Your Illustrious Lordship, in case you consider that you do not want to give it to him, you can tear it apart. You already know that I completely refer to your decision. I do not know if he understands the Italian language, but if Your Illustrious Lordship considers that it is good to give it to him, you can explain it in Latin.”

D. Cousson to Magliabechi, 22 May 1675, BNCF, Magl. VIII 274, cc. 108-109, “Yesterday I have received a letter from sir Berckelio, who revers Your Illustrious Lordship and complains a lot about sir Gronovius, who denies to have the letter, which Your Illustrious Lordship deigned to write to sir Berkelio who is very devastated to be deprived from your, very desired, favors. You see, Your Illustrious Lordship, envy is a bad beast.”
So, Gronovius refused to forward Magliabechi’s letters to Van Berkel, impeding any form of communication between the two, and he continues to do so. Even four years later, on the 18th of May 1679, Cousson informs Magliabechi that Berkel deeply regrets that “Gronovio gl'impedisce la corrispondenza con V.S. Illustissima”.

To convince Gronovius that he had to forward his letters to Van Berkel, Magliabechi also argued that he had considered it to be “necessary to make as many friends we can so that evil men will burst with envy even more”. Here, Magliabechi deliberately asked Gronovius to put his hostile relationship with Van Berkel aside for a greater good. The more friends they had, argued Magliabechi, the better they could respond to the hostilities present in both the Dutch Republic and the Grand Duchy of Tuscany. It was all about the right balance between friendly and hostile fractions in the network.

From a later letter to Magliabechi, it appears that Jacob Gronovius was not on good terms with Van Berkel. According to Gronovius, Van Berkel only owe his renown and success to his father, Johann Friedrich Gronovius (1611-1671) and to the scholar Isaac Vossius (1618-1689). Instead of thanking them as they deserved, argued Gronovius, Van Berkel had made the mistake to dedicate the _De urbis et populis fragmenta_ to the French scholar Emery Bigot.

How can we explain this case in light of the balance theory? The case of Gronovius and Van Berkel shows what happened when someone tries to join a network in which there is existing friendship and hostility. Abraham van Berkel wants to join the network of Antonio Magliabechi, and establish either positive or negative relations with the existing nodes in that network. When we thinks in terms of structural balance, Van Berkel needs to do this in such a way that he does not become involved in any unbalanced triangle that disrupts the balance in the scholarly network. This means that it would be impossible for Van Berkel to join the network of Magliabechi without becoming involved in any unbalanced triangles caused of his feud with Gronovius. Figure 22 shows a schematic illustration of this case. It is impossible for Van Berkel to join the network of Magliabechi, thus creating a positive edge with him, without becoming involved in an unbalanced triad (+ - +).

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761 D. Cousson to Magliabechi, 18 May 1679, BNCF, Magl. VIII 274, c. 120, “Gronovius impedes the correspondence with Your Illustrious Lordship”.

762 See note 685.

763 Gronovius to Magliabechi, undated but after 1674, BNCF, Magl. VIII. 771. A synopsis of this letter can be found in _Lettere e carte Magliabechi. Regesto_, ed. M. Doni Garfagnini, 694.
Van Berkel’s book-gift puts Magliabechi thus in a difficult position with Gronovius if he decides to establish a positive connection with Van Berkel: in fact, you cannot be friends with your friend’s enemy. Not willing to jeopardize his relationships with Gronovius, Magliabechi asked for Gronovius’ permission before reaching out to Van Berkel. Gronovius decided not to give Van Berkel Magliabechi’s letter, and Magliabechi never attempted to write Van Berkel again in order to sustain his relationship with Gronovius, maintaining the overall balance in his network by ignoring a relationship with Van Berkel. So, while the (- +) triad is a natural, balanced outcome, it is not necessarily the preferable one.

6.3. TRIANGLE OF IMBALANCE (- + +)

As previously stated, the argument of structural balance is that unbalanced triangles are sources of stress and psychological dissonance. As a result, people strive to minimize them in their network, and hence they will be less abundant in social settings than balanced triads. In other words, because people strive for balance the total number of unbalanced triads should decrease over time. Yet, as shown by figure 20, the number of unbalanced triads in the network of Magliabechi gradually increases over time, which provides thus a counter-example to the definition of structural balance. This strongly suggest that Magliabechi was continuously busy to keep putting out fires as they came up, which is an argument that often comes up in his letters.

Which are the kind of situations that placed Magliabechi in a difficult situation? The (- + +) triad represents a situation in which one is on good terms with two people who are enemies with one another. As a consequence, he will be pressured to pick a side, which causes him stress in deciding, for example, to which friend to share private information or to which friends to give books. Moreover, he would experience stress because he wants to stay loyal to both sides, but he cannot publicly support one side over the other. Consequently, Magliabechi had to rely often on measures of secrecy in order to conceal his involvement with the foes of his friends.

For example, in 1698, the Utrecht scholar Ludolph Küster (1670-1716) desired to establish a correspondence with Magliabechi, sending the librarian several of his own publications. Magliabechi, however, did not answer Küster instantly, but first wrote a letter to Jacob Gronovius, telling him that he was “costretto a rispondergli, per non fare una malacreanza, e rendermi odioso”. It seems here that Magliabechi desired that Gronovius gave his blessing to initiate a correspondence with Küster, like he had tried to do with Van Berkel. In fact, as noted earlier, Gronovius, as a true gate-keeper, had commissioned Magliabechi not to write to anyone who was not close enough to him. Certainly, Gronovius did not want that his opponents benefitted from a fruitful exchange with his most important contact in Italy. It must not have been easy for Magliabechi to avoid contact with the opponents of Gronovius, who was known to be one of the most prolific and quarrelsome scholars in the seventeenth century that “render’d him odious to most Learned men”.

Gronovius, in fact, also came into conflict with Küster several times in the course of his career. He therefore did not accept Magliabechi’s correspondence with Küster, as is shown by the correspondence between the merchant Abraham Cousson, brother of Daniel, and Magliabechi. On the 11th of September 1699, Cousson wrote Magliabechi the following:

“Non so capire per qual cagione il detto signore non voglia che V.S. Illustrissima scriva al suddetto signore Neocoro. La lettera per il signore Neocoro ho fatto indirizzare con la dovuta confidenza e segretezza.”

Magliabechi became involved in two unbalanced triads with Küster, Cousson and Gronovius. This situation of tension as shown in figure 23 exerted pressure on Magliabechi who had to sneak around Gronovius’ back to reach his foes. He secretly sent his letters to Cousson who promised him to send his letters to Küster with “la dovuta confidenza e segretezza” so that Jacob would not find out that Magliabechi maintained contact with Küster. Interestingly, these examples show thus that secrecy and confidentiality prevail in unbalanced triads, in which moments of tensions figure prominently.

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765 Magliabechi to J. Gronovius, LMU, Cod 4° Cod. Msc 778, f. 6, “obliged to answer him, for not making me uncivilized and hated.”

766 See note 759.


768 A. Cousson to Magliabechi, BNCF, Magl. VIII 1356, c. 41, “I do not understand the reason why that Sir [Gronovius] dies not want that Your Illustrious Lordship writes to sir Neocoro [Küster] I have addressed the letter for sir Neocoro with the neccessary confidentiality and secrecy.”
A similar example regards the relationships between Magliabechi, Johannes Georgius Graevius and Jacob Gronovius. As shown by the previous chapters, the relationships between Magliabechi and Jacob Gronovius dates back to the years 1673, when the latter travelled to Florence as part of his *peregrinatio academica*. During his stay in Florence, Jacob passed on a letter from his colleague Johannes Georgius Graevius to Magliabechi. In this letter, Graevius asked for Magliabechi's help for the preparation of his edition of Cicero, commenting that he lacked books and manuscripts from Italy. Magliabechi replied Gronovius that he was more than happy to assist Graevius in his studies.

From that moment on, Graevius and Magliabechi started a regular correspondence, sending each other letters through the intermediation of Gronovius.

On the 12th of October 1681, Magliabechi asked the grand ducal secretary, Apollonio Bassetti, to take care of his letters to Graevius. Usually, wrote Magliabechi to Bassetti, he would have sent his letter through the intermediation of Jacob Gronovius, but a recent argument between the two philologists complicated the delivery of his letters:

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769 Magliabechi to J. Gronovius, 6 March 1674, LMU, Cod 4° Cod.Msc 777, ff. 147-148, Le rendo poi un milione di grazzie della Lettera che mi ha trasmessa del dottissimo signore Grevio, riconoscendo da V.S.Ill.ma interamente questo onore singolarissimo, da me in niun conto non meritato. Oltre a elegantissima, è anche piena di curiosissime notizie, onde son certo che la leggeranno con gusto grandissimo, anche questi serenissimi Padroni. In essa mi scrive, come vuole ogni ragione, con gran lode di V.S.Ill.ma, come ella vedrà, giacché in fine di questa le copierò quella parte nella quale mi parla di Lei. Da questo veggo, che oltre a dotto, e anche candido, e non invidioso come quell’altro. Mi accenna tra l’altre cose, di bramare ardentissimamente pel suo Cicerone, e più di tutti gli’altri, tre Libri, che gli mandrò, banché ve ne sieno due rarissime, avendogli tutti a tre nella mia piccola Libreria. In uno di esso però, stimo che assolutamente esso pigli errore, come V.S.Ill.ma vedrà dalla mia risposta. Banché brami quei tre sopra di ogni altra cosa, per quanto mi scrive, gienche mancano ancora alcuni altri, che pel medesimo suo Cicerone gli sarebbero necessari. Io di buona voglia glieli manderò, bramando sommamente di contribuire qualche pietruzza, a così nobile, e bella fabbrica”.

770 27 letters written by Graevius to Magliabechi from 1675 until 1699 are extent in the National Central Library of Florence (Magl. VIII 296 and Magl. S. IV. T. IX).The letters from Magliabechi to Graevius are to be found in the Royal National Library of the Netherlands (8 letters in KW 72 C 16, ff. 77-94) and the University Library of the Ludwig Maximilian University of Munich (3 letters in Cod 4° Cod.Msc 777, ff. 143-144, 168, 175).
The conflict between Graevius and Gronovius evidently caused discomfort by Magliabechi. On the one hand, he wanted to remain loyal to his trusted friend Gronovius who was his most important contact in the Dutch Republic. On the other hand, Graevius was a highly respected scholar, whose work continued to make a substantial contribution to the Republic of Letters. Now, Magliabechi was entwined in a conflict and felt pressured to pick a side. He could not remain friends with his friend’s enemy.

If Magliabechi wanted to remain friends with both Gronovius and Graevius he needed to change this initially unbalanced triad (- + +) into a balanced triad that consists of three positive relationships (+ + +). One way to do that is to lure Graevius and Gronovius into friendship. As such he would restore the balance in this particular triad (see figure 24). From the answer of Bassetti to Magliabechi, we learn that this is exactly the kind of strategy Magliabechi attempted to adopt. On the 9th of February 1682, Bassetti confirms the receipt of Magliabechi’s mail, acknowledging the delivery of a letter destined to Graevius. From this letter, we learn that the letter from Magliabechi to Graevius was indeed meant to solve the conflict between Graevius and Gronovius:

“Mi pare che fusse per il signore Grevio una lettera, che già mi fu da V.S. Ill.ma vivamente raccomandata per il recapito, e conteneva, se non erro, certo uffizio di buona legge per promuovere la buona intelligenza fra due letterati diffidenti.”

Magliabechi urged Bassetti “a non lasciar vedere ad alcuno” the letter to Graevius and he needed to make sure that he would address the letter “in Olanda a qualche Amico sicuro, che sia dato in popria mano del signore Grevio”. Again, the unbalanced triads in which Magliabechi found himself, demanded the utmost discretion.

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771 Magliabechi to Bassetti, Florence, 12 October 1681, ASF, MdP, Carteggi dei Segretari, 1526 (1681), “I am now obliged to forward you the attached letter, which I do with much care, to the very learned sir Graevius. I wanted to address the letter to Leiden to sir Gronovius, who securely gave the letters to Graevius, but now, as far I can tell, things have changed, and from friendship they have become, to my regret, enemies. [...] The infinite courtesy, in the first place, often expressed by me to Your Illustrious Lordship, gives me a reason to bring you this inconvenience and expenses, but the necessity willed myself to do so, not knowing to whom I can address my letters so that they safely arrive in the hands of sir Graevius.”

772 Bassetti to Magliabechi, Livorno, 9 February 1681 ab incarnazione, BNCF, Magl. VIII 425, f. 33, “I believe that there was a letter for sig. Graevius, whose delivery was already vividly recommended to me by Your Illustrious Lordship, and contained, if I am not mistaken, several pleas to promote the good intelligence between two wary scholars.”

773 Ibidem, “not showing to anyone”, “in Holland to a trusted friend, who will give the letter in the hands of sir Graevius”.

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Nevertheless, the conflict between Graevius and Gronovius had the result that Magliabechi never used the intermediation of Gronovius again to forward his letters to Graevius. In the following years, Magliabechi relied on the intermediation of Bassetti, who subsequently sent his letters to the Florentine merchant Giovacchino Guasconi. Guasconi then gave the letter to Graevius “per mezzo di amico in proprie mani”.

One negative relationship has thus serious consequences for the network of Magliabechi, who now had to rely on 3 intermediaries to reach Graevius. Naturally, the more intermediaries, the more risks the letter from Magliabechi to Graevius was subject to. The letter could easily get lost or intercepted, increasing the risk that Gronovius would find out about the link between Magliabechi and Graevius. In 1695, Magliabechi directly asked his correspondent Gisbert Cuper to take care of his letters to Graevius, “non sapendo a chi altro indirizzarla”, lowering the number of intermediaries between him and Graevius. These kinds of dynamics are visible and quantifiable in the structure of the network of Magliabechi. The following paragraph will explain in more detail how negative relationships impact the performance of the overall network.

### 6.4 Obstacles in the Network

Research based in the social network tradition claims that the social relationships of individuals – the edges – provide them with both opportunities and constraints in accessing valuable resources such as

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774 From November 1681 onwards, Guasconi repeatedly acknowledged the delivery of letters and books from the Grand Duchy of Tuscany to Graevius: letters from Guasconi to Bassetti, 7 November 1681, ASF, MdP, 4263 (XII), f. 653; 5 December 1681, ibidem, f. 656; 12 December 1681, ibidem, f. 657; 24 December 1681, ibidem, f. 658; 9 January 1681, f. 659; 16 January 1681, ibidem, f. 660.

775 Guasconi to Bassetti, Amsterdam, 5 December 1681, ASF, MdP, 4263 (XII), f. 637, “by means of a friend in his hands”.

776 Magliabechi to Cuper, Florence, 17 April 1695, KB, KW 72 D 10, f. 112, “not knowing to who else I can address the letter,”
trust, knowledge and power. Herein, opportunities in the network are mostly related to the presence of positive edges in the network, while constraints are often the result of negative edges. For example, people only convey confidential information to people they trust or people only introduce people they trust to their friends. The presence of a negative edge can thus be linked to a broad range of behavioral constraints that have a negative impact on the performance and confidentiality of the network as a whole.

Starting off from the simple assumption that people will not convey information to persons they dislike, or distrust and that they do not introduce enemies to their friends, for each time-frame of five years the negative links were isolated (2) and filtered out (3). Figure 25 reports the number of nodes and edges in the network that represent the period 1672-1677. In this period, the network is composed of 361 nodes and 1066 edges, of which 71 are negative (only 6.66% of the total number of edges). Network measures were ran over network (1) and network (3) to study the impact of the negative sign on the overall network performance, and hence determine how detrimental (or not) negative ties are.

![Figure 25](image)

**Fig. 25** Division of the whole signed “optimal” network (1) into two sub-networks with only negative (2) and only positive (3) edges. This network represents the period 1672-1677 and consists of 361 nodes and 1066 edges (1). After the removal of dyadic negative relationships the network (3) consists of 345 nodes and 995 edges. This means that only 6.66% of the network is composed of negative ties. Networks created with Gephi.

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777 Negative tie research is still a current domain in the social sciences. In 2019, a special issue of the journal *Social Networks* will be dedicated to the study of negative ties. Martin G. Everett and Thomas W. Valente, eds., *Negative and Signed Tie Networks: Special Issue of Social Networks*, Social Networks, https://www.journals.elsevier.com/social-networks.
The present approach builds upon the ideas of the following studies, which use link deletion for the analysis and measurements of social networks. Duncan J. Watts has made use of link deletion in the analysis of small worlds – the principle that most of us are linked by short chains of acquaintances. He suggested that optimal networks are characterized by short average distances between nodes and a high degree of clustering.\(^{778}\) According to him, an optimal network is a small-world network that maximizes bridging and bonding opportunities between the nodes of that network. Similarly, Thomas W. Valente and Kayo Fujimoto, used link deletion to introduce “a measure of bridging designed to measure the degree a node in a network occupies a strategic position such that changes in links to or from this node have maximal impact on the overall structure of the network”.\(^{779}\) In order to do so, they calculate the change in average path-length of the network when each link is removed. Adilson E. Motter et al. have removed links to demonstrate network vulnerability. Douglas R. White and Frank Harary removed the edges between the nodes to assess the overall cohesiveness in a network. The cohesiveness of a network is measured by the extent to which it is not disconnected by the removal of links.\(^{780}\)

Following Watts and Valente, low average path-length helps us to measure bridging and bonding in the network. Path lengths in the network are calculated by tracing a path from each node of the network to every other node, and counting the minimal number of nodes that must be traversed to reach the destination. For example, in a network with only positive edges, information can easily diffuse from \(a\) to \(c\) through the directed path \(a \rightarrow b \rightarrow c\) where \(a\) is connected to \(b\) who is further connected to \(c\). In this case, the path-length is two, since the shortest path between \(a\) and \(c\) must go through \(b\). By contrast, in a network that is also composed of negative relations, the flow of information does not follow this pattern. For instance, the same path is not possible if \(a\) has a hostile relation with \(b\). In this case, \(a\) needs to find another path to reach \(c\), which might be longer than necessary. Illustrative for these dynamics was the example of the previous paragraph. When Gronovius refused to forward Magliabechi’s letters to Graevius, Magliabechi struggled to reach Graevius. In fact, no less than three intermediaries were needed to forward his letter to the Utrecht professor. The negative edge between Gronovius and Graevius thus affected the length of the path that linked Magliabechi to Graevius.

The negative links in the network were deleted and the resultant changes in the network’s average path lengths were compared to the optimal network represented in figure 25. As shown by figure 26, the elimination of the negative links greatly decreased the average path length. The longer the path-length, the greater the amount it takes for information to flow between the nodes and the greater the probability of a failure to flow.


7. COMPLEXITY AND INTERCONNECTIVITY IN HISTORICAL NETWORKS

The following paragraph will discuss a more complex case, shown in figure 27, that generalizes the structural balance theory to a more interconnected and interdepended network. The stability of three mutually connected nodes is easy enough to evaluate, but the complexity increases as nodes are added to create larger graphs with many interdependent triads. The structural balance theory also helps us to inform and reason about more complicated models. More complex cases of interconnected triads also illustrate a connection “between local and global properties in the network”. This phenomenon – the interaction between micro- and macro-network structures, will be central in this paragraph. We will see, for example, that the change of one relationship will have major consequences upon the formation of the overall network.

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781 Sack, 90.
782 Easley and Kleinberg, cit. 107.
The majority of Magliabechi’s letters to Jacob Gronovius are related to a series of ongoing disputes that emerged between him and the Dutch philologist Nicolaas Heinsius during the 1670s. The disputes were centered around a conflict between Jacob Gronovius and the University of Pisa. A combination of personality clashes and power struggles within the University of Pisa was the reason why Gronovius was forced to resign from his chair in Greek. He had been forced to tender his resignation not only because of these academic intrigues but also because of the interference of the Roman Inquisition. The conflict caused serious concerns and disquiet by Gronovius’ compatriot Nicolaas Heinsius, who was afraid that the conflict would negatively affect the relationship between the Dutch Republic and the Grand Duchy of Tuscany, jeopardizing a long-standing rapport he had curated for almost three decades. Based on Heider’s balance theory, the following paragraphs provide an explanation for the behavior of Magliabechi and his correspondents during this conflict. However, first we offer some background information with a brief account of Jacob Gronovius and his stay in Italy.

In the third chapter of this study we have followed Jacob Gronovius’ travels through France, Spain and Italy to visit historic sites and to collate ancient manuscripts in the most prominent library collections in 1673. In Florence, Magliabechi made sure that Gronovius was granted an audience with

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Cosimo III. The Grand Duke’s interest in Jacob was such that he offered him, at the insistence of Magliabechi, a chair in Greek at the University of Pisa, which had remained vacant after the death of the Tuscan scholar Valerio Chimentelli in 1668.  

Gronovius gladly accepted the professorship in Pisa, much to the delight of Cosimo III, as shown by a letter that Cosimo wrote to Magliabechi, which is transcribed by Jacob in his travel diary:

“Jo [Cosimo III] mi posso assicurare, che non potrei in questo mondo avere cosa di maggiore sodisfazione quanto questa, di avere appresso di me, un virtuoso della sua condizione, ed oltre a questo di un naturale così Angelico.”

In the following weeks, preparations were made for Gronovius’ entrance in the university. He received an appropriate gown for lecturing, he was shown around the lecture hall and he received his first stipend of 266 scudi. On the 5th of March 1674, Gronovius reports in his diary that he had “de eerste lesse gedaen”.

Other sources inform us about Gronovius’ stay in the Grand Duchy of Tuscany. The most important source are the letters between Magliabechi and Gronovius, which give a detailed account of Gronovius’ experience at the University of Pisa. Magliabechi’s letters to Gronovius, more than 150 in total, confirm the impression that Magliabechi regarded Gronovius as a good and reliable friend, with whom he could confidently touch upon subjects of more concern to him than the borrowing of books or scholarly exchanges. As a result, these letters are intriguingly frank, full of sharp-tongued remarks about people and events in Florence. In addition, the correspondence between Magliabechi and Nicolaas Heinsius provide another source of information, which gives us a glimpse of Gronovius’ conflict that would gradually evolve within the walls of the University of Pisa.

From the very moment that Gronovius was appointed professor at the university of Pisa, Magliabechi informed Nicolaas Heinsius about Gronovius’ miserable situation. It appears that Gronovius had become victim of a vindictive campaign waged against him by those who were jealous of Cosimo’s favors towards him:

“Quasi tutti costoro, copertamente perseguitano terribilmente il Signor Gronovio benché apparentemente gli facciano cortesia. Ne’ pochi mesi che ’l detto Signor Gronovio è stato qua, ha benissimo conosciuto la malignità che qua regna”

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784 UBL, LTK 860, f. 2r. See also Magliabechi to N. Heinsius, 15 February 1674, UBL, BUR F 8, “Stimo che assolutamente V.S.Ill.ma abbia inteso, che capitò quà il Signor Iacopo Gronovio nel principio del mese di Ottobre, e mi portò una Lettera in sua raccomandazzione del Signor Giovanni Cappellano, amico anche di V.S. Ill.ma. Io l’ho servito in tutto quello che ho potuto, ed anche raccomandato caldamente a questi Serenissimi Padroni, onde il Serenissimo Gran Duca mio Signore, mi ha fatto grazia di dargli la Cattedra dell’Umanità di Pisa che aveva il Chimentelli, con provvisione di quattrocento nostre piastre l’anno. In oltre gli ha adeso donate cento piastre, e gli farà dare le stanze per abitare senza spendere in Palazzo Vecchio, con la biancheria”

785 Ibdem, f. 6r. “I am certain that I cannot have in this world more satisfaction than this, to have near me, a virtuous man of his condition, and besides that, of such an Angelic nature”.

786 Ibdem, f. 12v. “done the first lesson”.

787 Magliabechi to N. Heinsius, 19 June 1674, UBL, BUR F 8, “Almost all these men secretly pursue sir Gronovius in a terrible way, while they appear to be kind to him. In the few months sir Gronovius has been here, he has well witnessed the evilness that reigns here”.

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Figure 28 shows the dynamics of balance and imbalance in the network of Jacob Gronovius, showing that he was part of many unbalanced triads during his stay at the University of Pisa (1672-1677). Gradually, once Gronovius returned to the Dutch Republic, the number of unbalanced triads declined over time.

Who were responsible for the harassments against Gronovius? According to Magliabechi, the physician and poet Giovanni Andrea Moniglia was the fiercest persecutor of Gronovius. When Jacob Gronovius obtained his position at the University of Pisa in 1674, Moniglia was a well-established professor at the University of Pisa. On the 1st of January 1672, Magliabechi expressed for the first time his anger about Moniglia. Magliabechi warned Gronovius that Moniglia “è interamente ripieno di vizzi, di infamia, d’ignoranza” and will do anything to go ahead.

Figure 29 shows the role of balance in the network of Moniglia from 1672 until 1701. The first thing we notice is that the dynamics of balance in the network of Moniglia are in stark contrast to those in the network of Magliabechi in figure 20. While Magliabechi was increasingly involved in many unbalanced triads, Moniglia is mostly part of balanced triads. Interestingly, in the wake of the conflict with Gronovius and Magliabechi – in the years 1678-1683 – Moniglia managed to significantly increase the number of balanced triads in his relationships. During these years, the number of balanced triads increases from 68.42% to 80.65%. These dynamics strongly support the influential position of Moniglia, who teams up with others (- - +) to
undermine the position of Magliabechi and Gronovius. As we shall see, similar dynamics can be found in the networks of all the people responsible for the departure of Gronovius.

Magliabechi accused Moniglia of instigating the Florentine lawyer Ferrante Capponi (1611-1689) to plot against Gronovius. Moreover, according to Giovanni Targioni Tozzetti (1712-1783), prefect of the Magliabechian Library after the death of Magliabechi, Capponi did not accept that Gronovius had been given the chair in Pisa without his permission. Capponi belonged to a prestigious if not especially wealthy branch of the Capponi family. He studied law at the University of Pisa, and moved to Rome where he became jurisconsult and lawyer at the Roman Rota, the apostolic tribunal of the Catholic Church. In Rome, he worked under Cardinal Luigi Capponi (1583-1659), who helped him to secure ties with important jurists, officers and prelates. In 1651, Capponi returned to Florence and accumulated several high-profile offices at the court of Ferdinando II and under Cosimo III de' Medici. Cosimo III, for example, appointed him as his chief legal expert. Over the years, Capponi's influence became broad and significant: he did not only help direct Cosimo's political economy, but he also decided over the Grand Duchy's intellectual life, becoming, in 1664, auditor of the universities of Florence and Pisa. As the auditor of the universities of Florence and Pisa, he exerted an ever-increasing influence over university life. He "played a key role in the appointment of professors, receiving recommendations, reading texts by applicants and negotiating contracts. He could also recommend candidates for the chairs which were appointed by the rector. Moreover, all payments, including the salaries of professors, had to be approved by him".

The observations of Magliabechi in his letter to Gronovius concerning Capponi are consistently characterized by mistrust and aversion. Capponi is in Magliabechi's eyes a suspect person in which company one should be on one's guard, apparently because with his great influence he could easily manipulate people to take his side. For example, on the 15th of January 1675, Magliabechi informs Gronovius that Capponi had promised Jacopo Rilli a chair in law at the University of Florence in exchange that he would "dire il peggio che poteva" about Gronovius. This arrangement was detrimental not only for Gronovius, but also for the Florentine poet and intellectual Agostino Coltellini (1613-1693), who had desired the position for years:

"Adesso per benemerito dell'essersi il detto Rilli accordato con costoro a dire il peggio che poteva di V.S. Ill.ma, questo Ministro, perché non si abbia a scomodare ad andare a Pisa, gli'ha fatta avere la Cattedra di Legge di Firenze con grossa provvisione. Il povero Coltellini che quasi si muor come V.S. Ill.ma sa di fame, l'ha in vano durata a chiedere molti anni, e poi si è veduto passare avanti un ragazzo, che non ha merito d'alcuna sorta."

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788 Targioni Tozzetti, Clarorum Belgarni ad Ant. Magliabechium nonnullisque alios epistolae ex autographis in bibiloth. Magliabechiana; quae nunc Publica Florentinorum est, adversatis descriptae. Tomus Secundus (Florentiae: Ex Typographia ad Insigne Apollinis in Platea Magni Ducis, 1745), 4: “Ferrante Capponius Pisani Lycei moderator, qui Gronovio minus favebat, eo quod inconsulto Pisas advoatus fuerat”.


790 Jonathan Davies, Culture and Power: Tuscany and Its Universities 1537-1609 (Leiden: Brill publishers, 2009), cit. 83-85. About the role of the auditor at the University of Pisa, see also Romano P. Coppini, Breve storia dell’Università di Pisa (Pisa: Plus, 2009), 18.

791 Magliabechi to J. Gronovius, 15 January 1675, LMU, Cod 4° Cod. Msc 777, f. 139, “Now that Rilli has agreed with them to say the worst things he could about Your Illustrious Lordship, that Minister, so that he does not have to bother to come to Pisa, had given him a chair in law in Florence, highly paid. The poor Coltellini, who almost starves to death of hunger, as Your Illustrious Lordship knows, has asked for the position in vain for many years, and had then to see to it that a boy went ahead of him, who does not even have any sort of credit”.

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How is Capponi’s behavior perceived by Magliabechi? The following table (figure 30) reflects the moments of balance and imbalance in the relationships in the network of Capponi. Similarly to Moniglia, Capponi is involved in many balanced triads, which happen to increase right after the conflict with Gronovius. By manipulating people to join his side (- - +), Capponi is able to sustain many balanced triads, forming as such a strong and stable opposition against Magliabechi and Gronovius.

<table>
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<th>Year</th>
<th>Total closed triads</th>
<th>- -</th>
<th>%</th>
<th>- +</th>
<th>%</th>
<th>- +</th>
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<td>7.69</td>
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Fig. 30 Structural balance in the network of Ferrante Capponi

Also Henry Noris (1633-1704), theologian of Cosimo III, became part of the plot against Gronovius. Noris was an eminent Augustinian and theologian. Born in Verona in 1633, at the year of 15, he was sent to study with the Jesuits in Rimini and here he entered the Order of the Hermits of Saint Augustine. In Rimini, he caught the attention of Father Celestino Bruno, who recommended Noris to the Prior General of the Order, Father Fulgenzio Petrelli. It was the latter who sent him to Rome to study theology. In Rome, Noris dedicated his studies to the works of S. Augustine and he began to write his Histo\(\)ria Pelagiana. In 1673, when he taught theology at his order’s house in Padova, he completed and printed the work, which was revised and approved by the Papal Inquisition. Nevertheless, after the publication of the Histo\(\)ria Pelagiana, charges were made against him, accusing him to teach Jansenist theology. In particular, Noris had to face the attacks of the Jesuits, who wrote several publications against him. Despite these accusations, Pope Clement X named Noris one of the qualificators of the Holy Office. In 1674, on the recommendation of Magliabechi, Noris was appointed court theologian by Cosimo III. The Grand Duke also appointed him lecturer in Ecclesiastical and Sacred History at the University of Pisa, where he remained from 1674 until 1678.²⁹²

At the University of Pisa, Noris enjoyed the company of Jacob Gronovius, who had been appointed professor around the same time. On the 5th of March 1675, Noris informed Magliabechi about Gronovius’ first lecture at the University of Pisa, which did not exactly go as planned:

“This morning I did my first letter with complete attendance, and the scholars have been silent. But much to my chagrin,

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²⁹² Del Gratta, ‘I docenti e le cattedre dal 1543 al 1737’, 527.
²⁹³ Targioni Tozzetti, Clarorum Venetorum ad Ant. Magliabechium nonnullisque alios epistolae ex autographis in Biblioth. Magliabechiana, quae nunc publica Florentinorum et, adversatis description. Tomus primus. (Florence: Typographia ad Insigne Apollinis in Platea, 1745), 25, “This morning I did my first letter with complete attendance, and the scholars have been silent. But much to my chagrin,
That the Pisan students made fun of Gronovius' northern accent during the course of his classes was,
however, not something to worry about. More disturbing was the fact that Gronovius had been put in
an invidious situation by his fellow colleagues. Noris, however, reassured Magliabechi that he would do
anything to help Gronovius. If one reads Noris’ letter to Magliabechi, one gets the impression that at
least in the beginning, Noris was willing to help his Dutch colleague. However, Noris soon realized that
the opposition against Gronovius was too strong to resist. At that point, Noris decided to switch sides
and joined forces with the enemies of Gronovius. It was either him or me, must have thought Noris.

That Noris changed his mind, can be explained by the structural balance theory. In light of the
structural balance theory, there are two ways for Noris to deal with this conflict. First, Noris can decide
to protect Gronovius, which will make him an enemy of all the opponents of Gronovius. In this case,
each triad Noris is involved in contains exactly one positive edge (his relationships with Gronovius) while
all the other edges turn into negative. Alternatively, Noris could decide to side with Gronovius' opponents. In that case it would be impossible for Noris to remain friends with Gronovius without
becoming involved in conflicts expressed by any unbalanced triads in his network. Consequently, he
becomes an enemy of Gronovius as well. Again, these dynamics are reflected in figure 31. The number
of balanced triads (- - +) increases over time, while the number of unbalanced triads tend to decrease
over time.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total closed trials</th>
<th>- - -</th>
<th>%</th>
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<td>11</td>
<td>25,58%</td>
<td>7</td>
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Fig. 31 Structural balance in the network of Enrico Noris

The foes of Jacob Gronovius tend to stick together, and train others who will also adopt their
hostility against Gronovius. These equilibria are also driven by “cascades effects”, generally described by
the point at which a chain reaction across a network becomes inevitable. In particular, a cascade has
the potential to occur when people make decisions sequentially, with later people merely watching the
actions of earlier people and from these actions inferring something about what the earlier people
know. A cascade thus develops when people abandon their own information in favor of inferences

the same did not happen to sir Gronovius, who was laughed at five or six times because of his northern pronunciation. However, sir Ricciardi has acted in such a way that they would give up, and I believe that sir Gronovius is very mad because I have not seen him anymore after the course.”

Ibidem, 26, “Il signore Gronovio è entrato carico di grand’invidia come Ella sa. Non mancherò d’assistergli (giacché mangia meco) con tutti li più opportuni consigli per regolarlo in queste prime contrarietà”.


Easley and Kleinberg, cit. 425.
based on earlier people’s actions. The inherent interconnectedness of the network in Florence allowed opinions and sentiments to “cascade” across the scholarly network, reaching the whole community swiftly. It could be that initially someone saw no reason to be against Jacob Gronovius. But with more and more people acting against the Dutch scholar, he must have decided that there was a good reason to follow the crowd and to keep him at bay against the Dutch scholar. As a result, Gronovius would get more enemies over time. Consequently, Apollonio Bassetti, Carlo Dati, Lorenzo Bellini and Viale Felice eventually became part of the plot against Gronovius. On the 25th of September, for example, Magliabechi warned Nicolaas Heinsius that he should be careful to send him letters regarding Gronovius, because his letters will end up in the hands of Apollonio Bassetti “il quale è amicissimo, per non dire l'istessa cosa, di un Ministro grande [Capponi], il quale è stato il più fiero persecutore che abbia avuto il Signor Gronovio”.

The cascade effect explains also the reasons why Nicolaas Heinsius stayed loyal to Magliabechi’s and Gronovius’ enemies, something which will be discussed in the next paragraph.

7.2. TWO BATTLING FRACTIONS IN THE NETWORK

Up to now, the network of Magliabechi is balanced. According to the structural balance theory as proposed by Cartwright and Harary, the network is balanced if it can be divided into two, or multiple sets of mutual friends, with complete mutual antagonisms occurring between the sets. In other words, the network is balanced when it can be divided into two battling fractions. On the one hand, a group led by Moniglia and Capponi sought to strengthen their forces with others with a view to a fierce attack on Gronovius. In opposition to them there was a group led by Magliabechi who tried to defend Gronovius at all costs (see figure 27). It is thus important to notice here that balance is thus not always necessarily harmonious: a network is even said to be balanced when two implacably opposed groups that find it impossible to resolve the opposition between them.

At the beginning of the confrontation, the strength of the opposition did not worry Magliabechi so much, since he was backed by the Grand Duke and many friends who supported Gronovius’ stay in the Grand Duchy. For example, the erudite bibliographer Angelico Aprosio (1607-1680), Federico Nomi (1633-1705), rector of the University of Pisa, and Pietro Paolo Bosca, librarian of the Ambrosiana in Milan, supported Magliabechi in the defense of Gronovius: they “bestemmiano per così dire la malvagità di costoro” who tried to undermine the position of the Dutchman. On the 17th of April 1675, in fact, Magliabechi informed Nicolaas Heinsius that, although Gronovius is the subject of vicious harassments and wrong accusations, they certainly will lead to nothing:

“Ha V.S. Ill.ma dato nel segno, che le grazzie che fa S.A.S. al Signor Gronovio lo caricano quà d'invidia appresso molti che sono l'istessa malignità, benché io non creda che gli possino in maniera alcuna nuocere.”

Yet, to make sure that nothing bad happened to Gronovius, Magliabechi suggested Heinsius to put in a good word for Gronovius in his next letters to Cosimo III. A good recommendation would guarantee that the Grand Duke would not believe the rumors of Gronovius’ enemies. This would ensure that the

797 Ibidem, 426.
798 Magliabechi to N. Heinsius, 25 September 1674, UBL, BUR F 8, “who is a very good friend, not to say almost the same person, as the great minister, who is the fierest opponent that Gronovius has ever had.”
799 Magliabechi to J. Gronovius, Florence, 6 March 1675, LMU, Cod 4° Cod.Msc 778, f. 147, “they curse the evilness of those”.
800 Magliabechi to Heinsius, Florence, 17 April 1674, UBL, BUR F 7, “Your Illustrious Lordship hit the right spot, [by saying] that the favors Your Royal Highness made to sir Gronovius, make many evil men jealous, although I do not believe that they can harm him in any way”.

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Grand Duke would not change his mind about the goodness of Gronovius. However, the reaction that Magliabechi got from Heinsius was definitely not what he had expected. On the 1st of August 1674, Heinsius replied to Magliabechi that he did not even consider to speak up for Gronovius. As a matter of fact, he held Gronovius responsible for the persecutions. Rumor had it that Gronovius had repeatedly insulted the professors at the University of Pisa. If all this were to be true, stressed Heinsius, then Gronovius “should immediately tone down his attacks and insults against his own colleagues”.

On the 28th of August 1674, Magliabechi answered Heinsius not to believe this horrible rumor. It was started out of jealousy from Gronovius’ fiercest opponents. Magliabechi urged Heinsius to be careful in deciding what the truth was, since many of the opponents of Gronovius pretend to be his loyal correspondents, writing him “con qualche tratto di cortesia, crede ella che sieno Angeli, mentre alcuni sono veramente peggiori de’ diavoli.” According to Magliabechi, Gronovius never had spoken a bad word about someone, leading the “most innocent life imaginable, studying day and night in the Biblioteca Medicea Laurenziana to collate ancient manuscripts of Greek and Latin authors”. Nonetheless, he could not endure the hostile atmosphere of the University. From the first day he set foot in the University, he became victim of his own colleagues who strongly disagreed with Cosimo’s decision to offer him the prestigious chair in Greek literature:

“Non ostante però che abbia menato una vita così studiosa, ed innocente, non parlando non che altro sto per dire ad alcuno, non ha potuto sottrarsi dalla diabolica malignità, ed invidia, che qua regna, anche in alcuni, non so con quanta ragione, da V.S. Ill.ma lodati, I quali non potendo soffrire che S.A.S. lo vedesse di buon occhio, e ne facesse quella stima che merita la sua virtù, gli hanno fatto mille porcherie, e tesi un milione di lacci, per farlo o precipitare, o almeno cadere di grazia del Padron Serenissimo.”

To involve Heinsius in the conflict was a strong move by the opposition. It could unbalance the hard-to-resolve opposition between the two battling sides of the network and undermine the position of Magliabechi and Gronovius. Nevertheless, the opponents of Gronovius soon realized that their plot did not have any impact on Grand Duke Cosimo III, who did not change his mind regarding his decision to offer Gronovius a chair at the University of Pisa. The spreading of vicious rumors turned out to be ineffective, so they needed to find a different way to get rid of the Dutch scholar. They decided to involve the Roman inquisition in the Gronovius-affair. It was Padre Noris who wrote a letter to Cardinal Barberini (1597-1679) in Rome to express his discontent that a Protestant scholar was giving lectures at the University of Pisa. This is corroborated by a letter Magliabechi wrote to Jacob Gronovius:

“Il suddetto P.N. con quel Medico scellerato, e con altri maligni, invidiosi, e della grazia che V.S. Ill.ma godeva appresso di S.A.R., e della provvisione che aveva, si unirono, con quel ateo Ministro [Ferrante Capponi], per rovinarlo. Vedendo che le loro cabale contro di V.S. Ill.ma, con S.A. Reale, non operavano nulla, perché S.A. Reale l’aveva in una infinita stima, si rivolsero...”

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801 Heinsius to Magliabechi, 1 August 1674, in Targioni Tozzetti, Clarorum Belgarum ad Ant. Magliabechium nonnullisque alios epistolae ex autographis in biblioth. Magliabechiana; quae nunc Publica Florentinorum est, adversatis descriptae. Tomus Primus (Florentiae: Ex Typographia ad Insigne Apollinis in Platea Magni Ducas, 1745), 177.
802 Magliabechi to Heinsius, 28 August 1674, UBL, BUR F 7, “with so much courtesy that he may think that they are angels, while some of them are actually worse than the devil himself.”
803 Magliabechi to N. Heinsius, 28 August 1674, UBL, BUR F 8, “Despite the fact that he had lived such a scholarly and innocent life, without saying anything of what I have said before to anyone, he was unable to escape from the diabolic evilness and envy that reigns here, also in certain men honored (I do not know the reason why) by Your Illustrious Lordship. These men, who could not stand the fact that His Highness looked favorably on Gronovius, and valued his virtues as he deserved, have done him thousands of nasty things, and tightened millions of laces around him, to make him tumble down, or at least make him fall into disgrace by the Serene Patron.”
Magliabechi was aware of the insecure nature of his letters to Gronovius. He urged Gronovius to burn his letters after reading and intentionally concealed the names of his foes, as his correspondence could be read by prying eyes. Thus he used the acronym P.N to disguise the name of Padre Noris, Moniglia was the “evil physician” and Capponi “quel ateo Ministro”.

The complot to involve the Catholic Church in the Gronovius-affair turned out to be successful. The Grand Duke got blindsided by the number of letters he received from Rome, telling him that it was inappropriate that a Protestant scholar was giving lectures at a university that was supported by the Catholic church. Cosimo III, worried about the repercussions that the affair could have on the relationships between Florence and Rome, was pressured to give Gronovius an ultimatum: he changed his religion or else he was no longer able to support him:

“To give the Grand Duke the ultimate push, Noris also convinced him that not even in the Venetian Republic, the most liberal state in Italy, a protestant scholar was allowed to teach at the University:"

804 Magliabechi to J. Gronovius, undated, LMU, Cod 4° Cod. Msc 778, f. 18, “P.N [Padre Noris] with the evil physician [Moniglia], and with other evil persons, jealous of the Grand Duke's grace towards Your Illustrious Lordship, and of the commissions you got from him, joined forces together with that godless Minister [Capponi] to ruin him. Seeing that their uproar against Your Illustrious Lordship did not have any success upon His Royal Highness, because he had such a high appraisal of you, they addressed their letters to Rome, writing that it was anything but tolerable that, in a Catholic University, and especially in that of Pisa, leggesse un Protestante.”

805 Ibidem, “Here there arrived continuously letters from Rome to Your Royal Highness, and in particular from Cardinal Barberini, to whom P.N [Noris] had dedicated his first book, regarding this issue. Your Royal Highness remained strong much time, he resisted, but finally, having scruples I believe, he succumbed and said to me that if Your Illustrious Lordship was not willing to change religion, he would no longer able to support him. P.N., knowing that this evil affair was well-known, which teared him up more than a little, in order to abolish the memory of it, and showing instead that he had helped you, needed to spread that, in particular with the foreigners, whatever Your Illustrious Lordship has indicated to me that it was not true, although was true, and spread all over, that he was the reason for the departure of Your Illustrious Lordship”.

806 Magliabechi probably referred here to the natural philosopher and English writer Walter Charleton (1619-1707).

807 Magliabechi to J. Gronovius, undated, LMU, Cod 4° Cod. Msc 778, f. 18, “The major measure he undertook to bring Your Illustrious Lordship down was to tell the Grand Duke that the Venetian Republic, despite the fact that they are very liberal regarding Religion, never had permitted that a Protestant scholar could lecture at the University of Padova. That made quite an impression on the Grand Duke. Yet, just now the Venetian Republic has called sir Charleton from England and one believes that he will go there, from which becomes clear the exposed evilness of that Friar”. 
Gronovius refused to convert to Catholicism and was forced to resign from his chair at the University of Pisa. On the 15th of September 1674, only one year after his appointment, Magliabechi informed Heinsius that Gronovius needed to leave Pisa as soon as possible:

“Finalmente la malignità di costoro ha pienamente trionfato, poiché ieri si partì il Signor Gronovio, col Signor Rulleo, per ritornarsene costà in Olanda. Oltre all'avere con mille indegnità e porcheriuole, costretto il detto Signor Gronovio a chieder licenza, come da se stesso ha generosamente fatto, hanno anche operato che il Gran Duca Serenissimo, nel partirsi, non gli ha donato cosa alcuna, come stimo che infallibilmente avrebbe fatto, mentre che la malignità di costoro non si fosse opposta.”

Moreover, in a letter of the 24th of November 1674, Magliabechi informed Gronovius about what happened after his departure. It appears that the opponents of Gronovius threw a party to celebrate their victory:

“Qua V.S. Ill.ma riderebbe, poiché ognuno si vanta di essere stata cagione che ella si sia partita. Alcuni giorni sono fecero per l'allegrezza della sua partenza una Cena, come mi ha scritto uno amico, che essendo da loro stato invitato, vi andò solo per potermi riferire come ha fatto tutto quello che vi si disse, e vi si fece. Gjesù! Ella inorridirebbe a sentire l'empietà, e malignità, che vi furono dette, contro di V.S. Ill.ma, e contro di me. Que' medesimi che mi fingevano l'amico, come il Bellini, e simili, anno mutato interamente mantello, il che però non m'importa niente, poiché gli conosco bene, e so che non mi possono insegnar niente. Di nuovo la riverisco, e di nuovo la prego a degnarsi di stracciar subito questo foglio.”

News of this big celebration reached Magliabechi through one of his friends, whose name Magliabechi omitted in his letters to Gronovius, probably as a precaution. Through his insider’s account, he found out who his real friends were, most of whom presented themselves differently from who they actually were.

The departure of Gronovius was only the beginning of a series of arguments between Magliabechi and Heinsius. When Heinsius read Magliabechi’s letter from the 15th of September 1674, he was appalled to hear that the Grand Duke did not donate anything to Gronovius, which was normally the case. After reading Magliabechi’s letter, Heinsius was not shocked by the idea that Gronovius was bullied away from the University, but he was worried that Gronovius had brought disgrace to the Grand Duke. Hence, he was afraid that the Grand Duke would not treat the Dutch scholars with the same courtesy he had done in the past. The concern of Heinsius infuriated Magliabechi. “Che ha qua fatto il Signor Gronovio, che per suo conto Sua Altezza Serenissima non abbia a far carezze a’ Forestieri?”, he asked with anger in a
letter to Heinsius dated the 27th of November 1674.⁸¹¹ Heinsius now hears again, what Magliabechi wrote him before: even though Gronovius had led the most innocent life possible, he had become subject of dreadful persecutions in the Grand Duchy of Tuscany. In addition, Gronovius was certainly not the only one, explained Magliabechi, other well-known scholars as, amongst all, Giovanni Alfonso Borelli (1608-1679), Barthélemy d’Herbelot (1625-1695), John Price (1600-1676), Carlo Rinaldini (1615-1698) and “in conclusione tutti gli altri forestieri, si Oltramontani, come Italiani” met the same fate as Gronovius and were forced to leave Tuscany.⁸¹²

In defending Gronovius, Magliabechi knew very well that he had put his relationship with Heinsius at risk. As a matter of fact, he did not even expect that Heinsius would ever write him again. Yet, on the 6th of March 1675, Magliabechi informed Jacob Gronovius the following:

“Si ricorderà V.S. Ill.ma eh’io le avvisai, di avere scritta al signore Einsio una Lettera in difesa di V.S. Ill.ma, e con forme tali, che non istamava che esso fosse ne per rispondermi, ne mai più per iscrivermi. Esso però, doppo un silenzio di alcuni mesi, che scrive esser derivato da diversi affari, mi ha risposto una lunghissima, inconsideratissima, e pungentissima Lettera.”⁸¹³

What did Heinsius write in this “pungentissima Lettera”? In this letter, dated the 28th of February 1676, Heinsius entirely blamed Magliabechi for the conflict. According to Heinsius, Magliabechi had to settle down the conflict and sedate the immature nature of Gronovius. To use Heinsius’ own words: instead of pouring water on the fire, Magliabechi had poured oil on the fire.⁸¹⁴ And, if that wasn’t enough, he also despised Magliabechi for telling Gronovius that certain Florentine scholars, in particular Carlo Dati, had written lies about Magliabechi and Gronovius.⁸¹⁵ According to Heinsius, not a single letter he received contained any calumnies and accusations against them. To prove this, he even proposed Gronovius to take a look at the letters of Dati, which he had carefully stored in his private archive.⁸¹⁶

The letter from Heinsius has been commented upon at great length by Magliabechi in his next letters to Gronovius. As regarding to Dati’s letters in his private archive, Magliabechi is indeed certain that they will not contain any indication that Dati had written something offensive about them. According to Magliabechi “è uso comune nelle Lettare parlar con lode, e s

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⁸¹¹ Magliabechi to Heinsius, 27 November 1675, “What [the heck] has sir Gronovius done here that would make His Serene Highness not to care anymore about foreigners?”

⁸¹² Ibidem, “and ultimately, all the other foreigners, both oltramontani (those from over the Alps) and Italian”.

⁸¹³ Magliabechi to J. Gronovius, 6 March 1675, LMU, Cod 4º Cod. Msc 777, ff. 171-174, “As Your Illustrious Lordship remembers, I have notified you that I had written a letter to sir Heinsius in your defense, and in such a way that I believed that he would not answer me, or, better yet, not even write to me ever again. Yet, he, after a long silence of several months, resulting, as he writes, from various matters, has replied to me with a very long, very inconsiderate and very harsh letter.”

⁸¹⁴ Heinsius to Magliabechi, 28 February 1675, in Targioni Tozzetti, Clarorum Belgarum, 190 “(…) ut iuvenilis atque aliquanto concitatoris animi incendio affunderetur aquae nonnihil, Te sollicite rogabamus; nunc vero oleum effundi pro aqua videmus”.

⁸¹⁵ According to Heinsius, not a single letter he received contained any indications that Dati had written something offensive about Magliabechi.

⁸¹⁶ Magliabechi to J. Gronovius, 6 May 1675, LMU, Cod 4º Cod. Msc 777, ff. 171-174, “It is common use to praise someone in letters, and write things that can be seen by everyone, but one needs to see the [separate] pages that were inside these letters, which sir Heinsius must have immediately torn apart after reading them.”
not know anything about Heinsius’ offensive letters “per non propolare il segreto, e che non apparisse ch’io abbia violata la segretezza delle Lettere.” Did Magliabechi regret that he had written Heinsius a letter in defense of Gronovius? A letter from Magliabechi to Gronovius gives the answer:

"Esso non mi ha mai più scritto, ne assolutamente è più per iscrivermi, del che ne ho contento. Dissi questo al Padrone Serenissimo, il quale mi rispose, che io avevo fatto benissimo a rispondergli in quella maniera. E doppo mi soggiunse queste precise parole, che non altero ne meno un jota: Non solo avete fatto bene a rispondergli in quella maniera, ma in oltre io voglio ben grande al signore Gronovio, e gli gioverò dove potrò.”

To prove that he was speaking the truth, Magliabechi got the Grand Duke to write a letter to Jacob Gronovius in which he would confirm his benevolence towards him. A letter allegedly in the hand of Cosimo would remove all doubts and demonstrate equivocally that Gronovius did not jeopardize the relationships between the Dutch Republic and the Medici family. In may 1675, Magliabechi informed Gronovius about this plan. He urged Gronovius not to say a word about it before he would actually receive the letter. This would only complete matters and create unnecessary envy and resentment among the Dutch scholarly community. Once Gronovius received the letter, he could show it to everyone, especially Heinsius, who believed that he had left the Grand Duchy of Tuscany in disgrace.

7.3. HEINSIUS UNDER STRESS: THE VULNERABILITY OF THE NETWORK

As previously stated, unbalanced triads are socially unstable and vulnerable because, in the light of the structural balance theory, people are motivated to restore a position of balance in their network. People will do everything to correct troublesome relationships, even if this means that this change goes at the expense of others. Un unbalanced triad with the configuration (+ + -), for example, introduces some amount of stress or psychological dissonance into the relationships. Just to recap, this type of triangle corresponds to a person A who is friends with B and C, but B and C do not get along with each other. In this type of situation, the tension can be resolved by one of the acquaintances (B or C) to be broken. In this case, the edge would be removed altogether. These dynamics explain why Heinsius cuts off all contact with Magliabechi (see figure 27). Heinsius needed to re-stabilize the balance by eliminating an

818 Ibidem, “In alcuni luoghi della sua Lettera, il signore Einsio loda anche V.S.Ill.ma ed è per questo che la prego anche a finger sempre di non ne saper nulla, per non propolare il segreto, e che non apparisca ch’io abbia violata la segretezza delle Lettere. Questo foglio la supplico a non lo lasciar vedere ne anche al suo signore Fratello, ne al signore Grevio, che sono i maggiori Padrone, insieme con V.S.Ill.ma che io abbia costà.”

819 Ibidem, “He has never written to me anymore, and he certainly will not ever write me again, and I am glad about it. I said that to our Serene Patron [Cosimo III], who has answered me that I did the right thing to answer him in that manner. And subsequently he adds with these precise words, and I do not alter even a single letter: I did not only do the right thing to answer him in that manner, but I [Cosimo] do also care much about sir Gronovius, and I will help him wherever I can.”

820 Magliabechi to J. Gronovius, May 1675, “In oltre, mi soggiunse, il che mi ricolma di un estremo giubbilo ogni volta che me ne ricordo; che le vuol rispondere di sua propria mano. Da questo potrà V.S.Ill.ma chiarissimamente conoscere, che è verissimo quello che sempre le ho scritto, che S.A.S. non solo ha una stima grandissima pel gran merito di V.S.Ill.ma, ma che anche le conserva un affetto particolarissimo. Quando codesti invidiosi vedranno un onore così grande, stimo che sin per morire per la pena, e pel dolore. Che dirà il signore Einsio, che faceva tanto rumore per avere (se anche fu vero) veduto un verso critto di propria mano di S.A.S., al signore Magalotti, quando vedrà una Lettera intera scritta a V.S.Ill.ma. La prego però a non ne parlare costà, fino a tanto che non ha ricevuta la Lettera, per iscansare l’invidia, e non gli dare occasione che le facciano de’ cattivi ufizzi contro. Quando l’avrà avuta, allora la mostri a coloro che falsamente si persuadono che V.S.Ill.ma sia sia partita di qua in disgrazia del Padron Serenissimo, mentre che veramente, come cento volte le ho scritto, e adesso le replico, il Padron Serenissimo non solamente la stimo, ma anche l’ama. Prova più sicura della Lettera di S.A.S., e di sua propria mano, non ne potrà ne V.S.Ill.ma, ne altri, avere, e stimo che sia per iscriverle assolutamente, o questa sera, o al più lungo la seguente settimana.”
unsafe link in his network that caused him discomfort. Consequently, he could continue to correspond with the opponent of Magliabechi, Apollonio Bassetti, and not have to worry about the consequences of their relationship. Bassetti and Heinsius stayed in contact until the death of the latter in 1681.

A disagreement that involves two people can affect others that were not initially involved in the quarrel. Magliabechi and Heinsius had common contacts in the Dutch Republic, which significantly disturbed the balance of their network. In fact, how could Heinsius ever trust someone who is a friend of his adversary Magliabechi? To avoid this, Heinsius had to make sure that none of his own correspondents were correspondents of Magliabechi. The dynamics of imbalance between Heinsius’, Heinsius’ correspondents and Magliabechi are visible in the network in figure 27.

That Heinsius is significantly under a high amount of pressure is shown by figure 32. If we consider the structural change in the entire epistolary network of Heinsius, as shown by this table, it appears Heinsius is involved in many unbalanced triads (- + +) during the conflict with Magliabechi (1672-1677) that pressured him to change the relationships in his network. In supporting these findings, numerous examples from the correspondence of Magliabechi shed light on Heinsius’ efforts to secretly convene his friends away from Magliabechi to restore these unbalanced triads. Again, imbalance triggers secrecy in the network because they introduce an amount of tension between people.

<table>
<thead>
<tr>
<th>Year</th>
<th>Total closed triads</th>
<th>- - -</th>
<th>%</th>
<th>- - +</th>
<th>%</th>
<th>- + +</th>
<th>%</th>
<th>- + +</th>
<th>%</th>
<th>+ + +</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1672-1677</td>
<td>252</td>
<td>0</td>
<td>0.00%</td>
<td>15</td>
<td>5.95%</td>
<td>55</td>
<td>21.83%</td>
<td>182</td>
<td>72.22%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1678-1683</td>
<td>257</td>
<td>0</td>
<td>0.00%</td>
<td>17</td>
<td>6.61%</td>
<td>46</td>
<td>17.90%</td>
<td>182</td>
<td>70.82%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 32 Structural balance in the network of Nicolaas Heinsius**

For instance, on the 11th of December 1674, Magliabechi wrote a letter to Jacob Gronovius in which he complained about the behavior of the Heinsius. It appears that Heinsius avoided to introduce his friends travelling to Italy to Magliabechi:

"È stato qua il signore Ruysch alcuni pochi giorni, e adesso stimo che sia per essere arrivato a Roma. Il signore Einsio gli aveva dato Lettere pel S. Dati, e pel S. Panciatichi, ma di me ne anche gliene aveva scritta una sola parola, in una lunga Lettera, dove gli nominava dugento persone, o poco meno, che in Italia poteva cercar di vedere, e conoscere."  

As we can read from this letter, the Dutch burgomaster Conrad Ruysch arrived in Florence armed with several letters of recommendation to the most prominent men in Florence, including Carlo Dati (1619-1676) and Lorenzo Panciatichi (1635-1676), with whom Heinsius both maintained a regular correspondence. Besides that, Heinsius wrote a long letter to Ruysch in which he gave him advice as

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821 Magliabechi to J. Gronovius, Florence, 11 December 1674, LMU, Cod 4° Cod.Msc 778, f. 155, “Sir Ruysch has been here for a few days, and now I believe that he has arrived in Rome. Sir Heinsius had given him letters to sir Dati and sir Panciati, but about me he did not have even written one single word, in a long letter, in which he mentions two hundred persons, or a little less, Ruysch could look for and meet in Italy.”

822 80 letters written by Carlo Dati to Nicolaas Heinsius are preserved in the university library of Leiden: BPL 1920 (1647 to 1660); BUR F 7 (1652-1671; 1674) and HUG 45 (1660). 4 letters from Heinsius to Dati are extent in BPL 885 (1674) and BUR Q 14 (1673-1674) at the same university. Other letters can be found in Florence (BNCF, Lett. Aut. IV. 64). 4 letters from Panciatichi to Heinsius (1671-1676) are preserved at the Leiden University Library, BUR F 7, while 9 letters (1671-1676) from Heinsius are preserved in the National Library of Florence, Panc. 216.
to which persons he needed to meet during his travels to Italy, mentioning more than “dugento persone” worthy of a visit. In all these documents, Magliabechi pointed out, Heinsius did not ever made mention of him. Consequently, Magliabechi did not get involved with Ruysch, writing to Gronovius that Heinsius is “la cagione che io non vada mai dal detto signore”.

When Magliabechi confronted Heinsius with his behavior, asking him straight out why he was left out from all his recommendation letters, Heinsius answered that he did not barely have the time to compile any letter, blaming the uncle of Ruysch who had notified Ruysch’ arrival in Florence on such a short notice. Evidentially, Heinsius is making here an excuse, especially because other sources inform Magliabechi about the matter. On the 6th of May 1675, for example, Magliabechi writes to Gronovius that Heinsius did not only decline to introduce Ruysch to Magliabechi, but that he also wrote negatively about the librarian to his Florentine correspondents:

“Il fratello del signore Falconieri [Paolo Falconieri], il quale è qua in Corte, come V.S. Ill.ma sa, è stato a visitare il signore Ruyschio, in riguardo delle raccomandazzioni del signore Einsio. A me appena mi guarda in viso, il che tanto maggiormente mi fa credere, che il signore Einsio non abbia scritto benissimo a Monsignore suo Fratello, di V.S. Ill.ma, e di me.”

Likewise, Heinsius wrote negatively about Magliabechi to the Dutch merchant Daniel Cousson while he stayed in Florence. In 1675, Cousson travelled to the Grand Duchy of Tuscany where he stayed for two months before travelling on to the Levant by boat from Livorno.

In addition, Heinsius also tries to convince his colleague Johannes Georgius Graevius and his stepbrother Willem van der Goes (1611-1686) to sever their connections with Magliabechi:

“Da quel tempo in qua che stampò il Libro, ne anche mi ha più il signore Grevio scritto. Anche il signore Goes non mi scrive, oltre che nell’ultima Lettera. Può V.S. Ill.ma presupporsi, che appena ho tempo di respirare, non che possa rispondere a tutti coloro che mi scrivono, e che però tal cosa non mi da fastidio alcuno. Con tutto ciò si vede che costà il signore E.... cerca di farci il peggio che può segretamente. Per le viscere del signore Dio, e per tutte le Sante Leggi dell’amicizia supplico V.S. Ill.ma a dissimulare ancora ella seco, già che non ci mancherà di vendicarmi.”

823 Magliabechi to J. Gronovius, Florence, 13 August 1675, LMU, Cod 4° Cod. Msc 778, f. 180, “he is the reason why I never visited that Sir.”

824 Heinsius to Magliabechi, 28 February 1675, in Targioni Tozzetti, Clarorum Belgarum (…) Tomus Primus, 191: “Erant complura, de quibus in rem meam actum oportebat, quale illud, quod sine meis ad Te litteris Conradus Ruyschius venit, quodque in iis, quas ad ipsum illum dedaram, nulla Tui mentio occurrebat. Quippe cum ille in procinctu me ex Allobrogibus advenit, transitum illi brevem per Civitatem vestram nunc fore.”

825 Nicolaas Heinsius became acquainted with Ottavio Falconieri (1636-1675) during his travels in Italy, and maintained contact with him after he returned to the Dutch Republic. The letters between them are extent in the University Library of Leiden (BUR F 9, BPL 1920 and BUR Q 14 (49 letters from Ottavio (1660-1675) and 12 letters from Heinsius (1661-1674)). After the death of Ottavio, Heinsius continued to correspond with his brother, Paolo until 1679 (UBL, Bur Q 16, letters written by Paolo Falconieri to Heinsius from 1676 to 1679). Magliabechi to J. Gronovius, 6 May 1675, LMU, Cod 4° Cod. Msc 777, ff. 171-174, “the brother of sir Falconieri, who is here at the court, as Your Illustrious Lordship know, visited sir Ruysch on account of the recommendations made by Heinsius. He barely looks at me in the eyes, which makes me strongly believe that, sir Heinsius has not written something good about me and Your Illustrious Lordship to his brother.”

826 Magliabechi to J. Gronovius, 30 May 1675, LMU, Cod 4° Cod. Msc 778, ff. 169-171, “L’Einsio, e gl’altri che mi stimano un ignorantissimo come io sono, ne scrivono qua ad esso signore Cousson, che per qualche tempo mi ha praticato assai familiarmente, ed è in parte è informata della mia Vita, de’ miei studi, ecc, e sentiranno che io non sono un così cattivo uomo come che essi mi credono.”

827 Magliabechi to J. Gronovius, undated, LMU, Cod 4° Cod. Msc 777, f. 123, For some time now after he printed his book, Graevius has not even written me. Also sur Goes does not write to me, other than that last letter. Your Illustrious Lordship can assume that, I have barely time to breathe, not able to answer at everyone who writes me, for which it does not bother me. Anyway, one sees that sir Heinsius is trying to do there the worst things to us as possible in secret. In the bowels of the Lord,