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The Purpose and Types of Organizational Gossip

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The Purpose and Types of Organizational Gossip

Doctoral Dissertation

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1. Introduction[1]

Gossip is one of the most widespread human activities. People devote approximately 65 percent of their speaking time to gossip, regardless of age, gender, or culture (Dunbar, 1997, 2004; Foster, 2004). Gossip may play a key role in sustaining human cooperation (Dunbar, 2004) and affect reputation and social order. Although gossip is mainly related to cooperation and reputation, it is a much more complex social phenomenon due to multiple effects and causing many others. These related effects to gossip depend on the individual's motivation, relationships between the gossip's sender, the receiver, and its target, group dynamic, and social context of which they are part.

Gossip arises in small and cohesive groups (Ellwardt, 2011), usually involving three people: the sender, the receiver, and the gossip target. Senders gossip partly to contribute to their wellbeing, considering the costs like self-revelation or humiliation, and the benefits of these actions, such as gains in reputation. The current thesis aims to deconstruct and distinguish the mechanisms behind gossip in small groups, focusing on participants' relation to each other, reputation, cooperation, and workplace-related factors such as perceived salary equity, salary differences, and other contextual factors. Previous research mostly focuses on a one-dimensional explanation of gossip where one function, such as freerider exclusion or a single relationship configuration such as a balanced triad, could explain the occurrence of gossip. This dissertation aims to contribute to the understanding of gossip by identifying new mechanisms such as envy-driven and salary inequality-related gossip. The research concludes that gossip might be placed strategically through a negative sender-receiver tie or that a competitive work environment can foster it.

The analysis takes place through several chapters using a similar theoretical framework, carefully selecting the appropriate methodology throughout the multiple levels of analysis. Our unique and complex datasets are assumed to contribute significantly to explaining novel mechanisms behind gossip. On each level of our analysis, we aim to identify more complex explanations behind gossip. The dissertation addresses the following questions in connection with the underlying mechanisms: Are there other

[1] The current research is part of the EVILTONGUE project, financed by ERC (Takács, 2014). This project has received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement no 648693). One basic hypothesis about gossip that serves as a basis for the project is that gossip wrecks reputation but enhances cooperation (Feinberg *et al.*, 2014; Hess and Hagen, 2006; Nowak and Sigmund, 2005; Takács, 2014).

motivations of the sender for gossiping other than fostering cooperation or excluding free riders? Can envy drive gossip? Is gossip dependent on organizational context? How are the members of a triad reflected in the sender's speech? Is triadic balance the best and only set of relationships between the sender, receiver, and target that fosters gossip?

The dissertation relies on an interdisciplinary framework derived predominantly from social scientific theories such as social comparison and multiple research fields, including psychology, management studies, and economic theories. Since studying gossiping activity needs to take into account multiple participating individuals and the social context, the methodological approach of the current study relies heavily on network analysis, where employees apply networking and social control strategies to enhance their position and exclude free-riders via gossip (Ellwardt, Steglich, *et al.*, 2012; Hess and Hagen, 2006; Kurland and Pelled, 2000). In management studies, gossip was seen as useless and harmful, mostly because it is time-consuming (Gholipour *et al.*, 2011; Johnson and Indvik, 2003; Michelson and Suchitra Mouly, 2004), but we can safely assume that it is more complicated than that.

While most studies focus on one or two purposes of gossip (such as cooperation and excluding free riders, gossip, as an act of talking in an evaluative manner about a third person not present at the conversation), it can serve many other social purposes as well. As a multifaceted social phenomenon, an act of gossip emerges not to fulfill a single purpose only but to possibly fulfill multiple others at the same time (Giardini and Wittek, 2019). For example, cases where the sender reveals a secret about the target to the receiver of the gossip can simultaneously serve social bonding between the sender and the receiver and demolish the target's reputation. This example demonstrates how gossip may be a tool for reputation manipulation and fostering friendships.

From a causal perspective, gossip might differ not only by antecedents that lead to its formation, such as the sender's motivations but also in terms of social consequences that it entails. For instance, gossip might arise because the sender intends to demolish the sender's reputation but also due to the sender's envy toward the target's undeserved position. It is important to note that antecedents and consequences of gossip are not straightforward to distinguish, and it is not the focus of our research to demarcate this division. We, instead, consider them as social phenomena, both related to and affecting gossip.

To understand gossip as a phenomenon in a structured manner, the chapters in this thesis focus on different analysis levels. On the level of individuals, gossip statements might represent the speaker's motivations, thoughts, and the triadic relationship inherent to gossip is reflected in speech. Considering the level of dyads between the sender and the target, we propose that various types of gossip might arise due to the sender's different motivations, focusing on identifying the strategic use of gossip in particular. The motivation of the senders might depend on their relative social position compared to the target. On the triadic level, the relationship between the sender, the receiver, and the gossip target is associated with different gossip types. For example, if all three actors maintain a positive relationship, they will gossip differently from where the sender and receiver maintain hostility toward the target. As gossip is a phenomenon that makes the most sense in a small community where people know each other, norms and practices within that group are essential to consider. Organizational context is mainly reflected in the dyadic and the triadic level of gossip.

With a unique approach, methodology, and novel data sources, this dissertation aims to support understanding actors' behavior, such as employees, the purpose of the gossiping activity, and clarify the role and concept of gossip within small groups. We argue that there are multiple types of gossip triggered by different mechanisms in distinct settings. To decompose how gossip works, we consider the dyadic level between sender and target, the triadic level between a sender, a receiver, a target, and the group's level while also attempting to consider senders' thoughts and motivations thoroughly.

1.1 Concepts

1.1.1 Gossip

Gossip being one of the widespread human activities (Dunbar, 1997, 2004) has been a well-researched topic over the last decades, and many disciplines formulated theories around the phenomenon. Researchers have argued over its origin, function, definition, consequences, participating members and their qualities, the gossip's content, its effect on cooperation, among other areas. (Foster, 2004). Over the last years, the role of gossip in the workplace has also received considerable attention among scholars (Ellwardt, 2011; Kniffin and Wilson, 2010; Wittek and Wielers, 1998).

To define what gossip is, it is better to first list its characteristics according to the literature. Firstly, gossip is unplanned and spontaneous (Tholander, 2003), although this research considers gossiping as an intentional activity to enhance gossipers' wellbeing. Secondly, gossip is about a past event in which a third party has engaged (Tholander,

2003). Thirdly, gossip is evaluative (DiFonzo and Bordia, 2007; Kurland and Pelled, 2000; Tholander, 2003). Fourthly, gossip is confidential (Tholander, 2003). Fifthly, gossip concerns known people by the gossip sender and receiver who is absent, creating a gossip triad (Ellwardt, 2011; Kurland and Pelled, 2000; Mills, 2010; Tholander, 2003). According to Mills (2010), it also has some degree of velocity and is informal (within an organization). According to Szvetelszky (2002), gossip is a piece of locally interpreted, secure information about known or knowable people, and its most important feature is the ability to spread.

According to DiFonzo and Bordia (2007), gossip and rumor are often used interchangeably by laypersons and scholars. While their social functions are identical, gossip mostly occurs in privacy about a small group of individuals like friends or acquaintances, while the rumor is disseminated in public, and its subject is more of universal interest. The shared methods of information transmission can lead us to believe that gossip is a subset of rumor. However, gossip and rumor do not have the same motivations: gossip is mostly driven by personal desires and needs, while rumor is motivated by the urge to find meaning in life's uncertainties (Michelson and Mouly, 2000; Michelson and Suchitra Mouly, 2004).

The current study uses the following definition of gossip as a starting point where gossip is "informal and evaluative talk in an organization, usually among no more than a few individuals, about another member of that organization who is not present" (Kurland and Pelled, 2000, p. 429). The core of this definition is a talk about a third person known by the sender and the receiver. In the research, we rely on a survey dataset and a spontaneous, manually annotated speech corpus. In the former, questionnaire-based data source, we instructed our respondents to consider the shared information to be personal (as the opposite of formal information). We have also asked them to classify the information shared during gossip into one of the three categories: positive, negative, or neutral. During both of these data collections, we considered gossip as information about a fellow group member.

It is important to note that the evaluative or personal nature of gossip is not always present explicitly. Any statement made about a third party can be interpreted negatively or positively, making the statement evaluative within the social context. In our spontaneous speech data source, every statement about third persons was considered gossip as they were mostly implicitly evaluative. Since the sound recording data contained spontaneous speech coded by human annotators, we could not ask if the sender considered the

information shared to be evaluative. The manual annotators lacked the social context to decide the nature of the information. We, therefore, considered every information to be evaluative.

Gossip is considered a costly talk that risks self-revealing and usually requires a trusting relationship between the sender and the target. We implicitly assume that exchanged gossip occurs when the third person is not present and happens between a few people. Regarding the sound recording data of spontaneous conversations, we did not explicitly include this aspect among the human coders' annotation rules since it was mostly impossible to determine who was present at the time of the conversation.

In line with the considerations listed above, our definition of gossip is as follows. In chapters relying on survey data , we define gossip as personal and evaluative information exchanged about a colleague. In parts of this dissertation utilizing the spontaneous speech corpus, we consider gossip as talk about a third member of a group.

1.1.2 Reputation

Gossip can affect someone's reputation. Many researchers have demonstrated a strong relationship between cooperation and reputation, particularly the fact that many acts of cooperation in human society can be explained by reputational motives (Feinberg *et al.*, 2014; Nowak and Sigmund, 1998, 2005).

Reputation is a social construction (Berger and Luckmann, 1991), and personal characteristics do not directly and necessarily determine it. Although an individual's reputation is a subjective evaluation of a person, it is determined and harmonized by social interactions, including gossiping about third parties. Social order and the informal social hierarchy is determined by reputation and status (Davis, 1970; Davis and Leinhardt, 1967).

Other concepts related to reputation are equally important to consider since they may have similar effects on the holder of the reputation and others' behavior. In a workplace setting, employees' personal reputation has been associated with different career success levels such as job applicant desirability or increased promotions, but very little is known about how exactly this reputation is achieved (Laird *et al.*, 2012). Reputation is a concept related to status. The concept of salary does not equal status. However, it demonstrates one's status within a company similarly (Loch *et al.*, 2000). Having a high social status, reputation, and even salary within a workplace can induce unwanted gossip from the

coworkers that are party aiming to reduce the target's success, partly to reduce their own frustrations.

1.1.3 Cooperation

In the literature, cooperation is linked to gossip in two significant ways. Gossip allows people to keep track of each other in their social group and enhance cohesion, and it is also a tool used to exclude free-riders and increase group cohesion and cooperation. The leading theory of gossip's ethnographic significance was elaborated by Robin Dunbar (Dunbar, 1997, 1998, 2004). Dunbar and his colleagues aimed to uncover a connection between human evolution and language development that includes gossip. Language allows for information exchange and creates the ability to keep track of important happenings in the social group, seeking advice in hypothetical situations, underpinning society, controlling those who fail to obey formal and informal agreements, and self-advertising and spreading useful information to peers (Dunbar, 2004). Social topics gained importance, and reputation is highly dependent on what other members say. In this framework, gossip serves the purpose of excluding free riders and increasing the cooperation and cohesion of the group at the same time. Although soliciting advice and talking about free riders are happening during approximately five percent of the total time devoted to conversation (Rosnow and Gary, 1976). Gluckman's (1963) interpretation of gossip and group cohesion's relationship is similar to Dunbar's. He argues that gossip and scandal are universally important in human societies based on the comparison of many communities. Gossip and scandal can help a community to find a leader. However, at the same time, gossip creates boundaries between groups and excludes outsiders. Gossip and scandal can help achieve unification in a group, especially in a competitive situation involving multiple groups.

Many definitions of cooperation are used in disciplines such as economics, sociology, anthropology, psychology, or organization theory and management. Most of them focus on the interaction between individuals, organizations, or groups that result in psychological gains. Another approach is a more dynamic one that includes the willingness to continue cooperation**.** Cooperation is preconditioned by trust in others' goodwill and belief that others will also work to fulfill group goals (Smith *et al.*, 1995)

1.2 Characteristics of Gossip

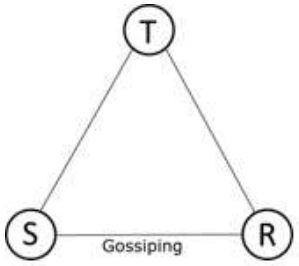
Our theoretical framework includes characteristics of gossip and the social structure in which it occurs. By making theoretical assumptions based on earlier researches as part of a framework, we can better understand gossip. The framework not only relies on existing literature but also serves as a basis for new interpretations.

1.2.1 Gossip is Triadic by Nature

According to Kurland and Pelled (2000), gossip is "informal and evaluative talk in an organization, usually among no more than a few individuals, about another member of that organization who is not present" (Kurland and Pelled, 2000, p. 429), indicating that gossip has a triadic character by nature. Gossip information is shared by a sender, whose motivations and actions we mostly analyze, and who usually is the gossiper. These individuals make the crucial decision of whether to cooperate with others or not. Gossip is received by the receiver, reciprocating the cooperative intent. The target is the "third" person, usually the object of gossip. In a gossip triad, individuals having one of these three roles can be distinguished, and the existing relationships and dynamics amongst them can be uncovered. Giardini and Wittek (2019) consider gossip a multifaceted social phenomenon, where the engagement of at least three types of actors is inherently relational and triadic: the sender conveys information of evaluative nature concerning an absent third party (the target of the gossip) to someone else (the receiver of the gossip).

1.2.2 Relations Within the Triad

Figure 1. The gossip triad



We assume that the gossip is determined by the parties' motivations and relations within the three actors in a gossip triad. Cooperation and gossip can be present in a triad at the same time. The following literature demonstrates carefully other's findings of how these concepts relate in a triadic setting.

Wittek and Wielers (1998) collected network data in six organizations in the Netherlands and Germany and six business school classes in the Netherlands. They concentrated on the effect of gossip on the relationship between the sender ("ego"), receiver ("alter"), and

the object or target of the gossip (“tertius”). They assumed that all three actors are willing to maximize their status, and personal gains motivate gossiping. They used gossip triads with three possible relationship configurations. A coalition triad emerges when the receiver and sender have a positive relationship, and they both have a negative relationship with the target. The constraint triad is when the sender and receiver have a relationship, but the sender is the only one who knows the target. A closure triad emerges when the sender, receiver, and target all have a positive relationship. The central hypothesis tests the coalition triad's existence, where the sender and receiver will exchange negative information about the target. The target’s status is lowered while the relationship between the sender and receiver is strengthened. The first rivaling hypothesis is the constraint hypothesis built on Burt’s structural holes theory (Burt, 2000). In the constraint triad, the sender will have more structural holes in the social network that will result in more gossiping, and that will lead to more personal gain (because of the novel information only the sender possesses). The second rivaling hypothesis is the closure hypothesis that operates with group formation's functional argument, where sharing information about someone they know will enhance their relationship. In this case, they do not exchange information because of its novelty. There was a positive effect in coalition triads, negative in constraint triad, and negative effect in the network closure triad. People tend to share information with friends about a third, known but not liked person (Wittek and Wielers, 1998), but if they all three have good relationships (cooperative relationship), they will not gossip about each other.

Negative gossip does not merely entail a negative tie between the sender and target, but it also means that gossip is a signal toward the receiver that generates trust. Exchanging discrete information about a third person fosters trust and friendship over time (Dunbar, 2004; Ellwardt, 2011).

Ellwardt et al. (2012), in a study using longitudinal network data from a childcare center’s employees, examined the relationship between friendship and gossip. They applied a social capital and evolutionary perspective with two-two hypotheses to explore the social mechanisms behind gossiping. The first social capital perspective driven hypothesis was the following: if “ego” (sender) nominates “alter” (receiver) as a friend, “alter” will reply with gossip after a while (dyadic level). The second social capital hypothesis was that if “ego” has a higher number of friendship choices, “ego”’s gossiping activity will increase (nodal level). The evolutionary perspective focused on the fact that friendship is a product of gossip and not vice versa, having the functions of tying the group, solving the free-

rider problem, advertising one's qualities, and signaling positions in a social group. The first evolutionary perspective driven hypothesis was if ego (sender) gossips, alter (receiver) will reciprocate with friendship (dyadic level). The second was if "ego's" gossiping activity increases, "ego's" popularity in the friendship network will also increase. The research supported an evolutionary perspective, but the last hypothesis occurred to have the opposite effect. The increased gossiping activity caused unpopularity (Ellwardt, Steglich, *et al.*, 2012).

Ellwardt et al. (2012) conducted their research in a Dutch childcare organization examining the generalized and interpersonal trust's effect on gossip about the manager. They found evidence to support the following hypothesis**:** friendly relationships and frequent contact with their manager will reduce employees' negative gossip about the manager. Negative gossip circulates about the manager among employees that are friends with each other. (Ellwardt, Steglich, *et al.*, 2012). Considering a triadic setting, the authors made similar conclusions. When we can observe a higher level of cooperation between the employee and the manager, the amount of negative gossip about the manager will reduce. Smith (2014) applied a cognitive psychological approach in his multi-agent modeling, where malicious gossip and evil acts were present in the network. Observers who do not gossip (in the model observers could refuse interaction) could detect evil targets. If the interactions were unconditional and could not refuse interaction, they could not detect the evil agents. Making an impression-based decision and/or engaging in gossip allowed the discrimination of evil targets from the group . Gossiping about the malicious targets (with the sender) allowed discrimination, therefore a rupture in cooperation with the evil targets (Smith, 2014).

Wittek et al. (2000) discuss organizational actors' differing ability to maintain voluntary cooperative relationships. Two key factors are distinguished: social network and strategies of exerting informal social control. The organizational actors are separated into two groups: controllers could respond to the targets' deviant behavior. Indirect sanctioning of targets (including the usage of gossip) is achieved through an informal network of individuals intended to reduce the target's social approval. Controllers and targets may have different levels of interdependence. The usage of informal control may cause the target to escape the relationship or get social approval and gains from other social relationships. By analyzing a panel database collected in a Dutch housing corporation, the researchers show that mutual interdependence in the social network plays a larger role in the maintenance of stable cooperation than power exerted by some actors

in the network. They also show that frequent gossiping is likely to hurt cooperative relationships regardless of the network's interdependent relationships. Gossip, in this case, appears to escalate conflict rather than resolving it, and the target tends to escape the situation rather than try to comply with the expectations. In a hierarchical relation, where subordinate social classes try to resist control, gossip can be utilized as a "weapon of the weak" to levy a symbolic, social sanction on members of the elite as an attempt to undermine their superior statuses. Since gossip is told in secrecy, the sender (author) may remain anonymous, while the information will have multiple retailers (Scott, 2008).

The listed researches point toward the fact that if the sender does not have a cooperative relationship with the target, then the sender will likely gossip about the target with a receiver with whom the sender has a positive or cooperative relationship. As Wittek and Wielers' (1998) work argues, gossip is more likely to form in the case of a coalition triad (where there is a cooperation between the sender and the receiver) (Figure 1). The role of gossip here can be to enforce trust and friendship between the sender and receiver. Sender and receiver can be motivated to gossip about the target by their intentions to socially exclude target by informally sanctioning target for the lack of cooperation and demolishing the target's reputation. Gossip is exchanged in cases where all three actors have positive or negative relationships, but it may happen with different motivations.

1.2.3 Gossip is Meaningful within Groups

As gossip is about people that senders and the receivers both know, it is more meaningful within groups. Small, cohesive groups where individuals are closely connected enhance gossip. A dense social network enhances information flow and lowers distrust (Ellwardt, 2011; Michelson and Mouly, 2000; Wert and Salovey, 2004). Gossip and cooperation both occur within close social communities. Gossip intends to punish free-riders and norm violators to enhance cooperation. Gossip can serve the senders' personal interests by maximizing their wellbeing. Still, gossip, just as cooperation remains a community action. Other concepts as status competition and social order can sense within larger groups. Members of a group are evaluating themselves based on peers from the group.

1.2.4 Individual Gains are Important Factors while Gossiping

The motives of the actors can be understood through individual gains within a gossip triad. We seek an answer for who gossip about whom and what the mechanisms are among the three gossip triad actors. The precise question is what leads the sender to gossip about the target, whether it is the presence or absence of a cooperation relationship or the differences between the sender's and target's reputation or wage. The different

mechanisms taking place between the three actors suggest that gossip can be initiated with different expectations of the sender fulfilling various purposes. We assume that the sender ponders whether to apply a gossiping or cooperative strategy based on their cost and benefits gained from the action.

Gossip is an efficient signal that can sanction free-riders, cheaters, and deviants (Coleman, 1994). Gossip is an individual action that's function is to contribute to senders' wellbeing. Gossip can be initiated to influence, enhance status and power within a group. It can be intended to harm others or lower others' social status (Gambetta, 2009; Gholipour *et al.*, 2011; Michelson and Suchitra Mouly, 2004; Rosnow and Gary, 1976). For the sender, sending gossip has costs like self-revealing and risks like humiliation, but may also have certain benefits such as an increase of own reputation (Ellwardt, 2011). In this framework, gossip is understood as information referring to a positive or negative reputation, but the cited study only incorporates gossip as negative information. By gossiping to the receiver, the sender can increase their own reputation by sharing confidential information and can enhance cooperation between them. Costs and benefits can be considered when gossiping about a target with a higher, lower, or equal reputation. Gossiping about a low reputation target has low costs because the receiver likely does not care or even dislikes the target. The benefits might be self-representation for the sender or norm enforcing between the sender and the receiver. Gossiping about a similar reputation target can benefit the sender when the sender tries to outcompete the target, while gossiping about a higher reputation target can result from envy (Dogan and Vecchio, 2001; Wert and Salovey, 2004). Gossip can also be done for stress reduction and wrecking the target's reputation. Gossiping about a high reputation target has more costs because it has a higher possibility of a backlash against the sender.

1.2.5 Gossip Can Have Multiple Outcomes

Gossip in a group or an organization can occur for several reasons and may have social and individual motivations leading to different outcomes. Some of the research findings focus on the group's level, while others concentrate on individual motives and consequences. In a group, gossip can have several social purposes such as supporting, identity building, resisting and regulating, maintaining group cohesion and group norms, contributing to the interpretation of events, managing emotions, and reducing anxiety in stressful situations (Michelson and Suchitra Mouly, 2004; Mills, 2010). Gossip is used for self-promotion purposes (Martinescu *et al.*, 2014). Gossip is not only intended for different reasons but achieves individual and macro-level consequences. In a workplace

setting, gossip is essential in the formation of organizational culture (Gholipour *et al.*, 2011). When informal ones accompany formal ties, a potential outcome is that the cooperativeness and productiveness will increase (Mehra *et al.*, 2006).

In contrast, others have shown that gossiping tends to hurt cooperative relationships regardless of the network context. Gossip, in this case, appears to escalate conflict rather than resolving it (Wittek *et al.*, 2000). Gossip can help share information more efficiently and inform managers about important issues (Gholipour *et al.*, 2011). For employees, gossiping may help with organizational socialization and reinforcing social bonds (Michelson and Suchitra Mouly, 2004; Mills, 2010). According to Rosnow and Gary (1976), the not necessarily exclusive motivations for gossip can be to inform, influence, and entertain (Rosnow and Gary, 1976). Influencing can be utilized for individuals' benefit as a social tool and enhance the group's power and status. Simultaneously, gossip can be anticipated to harm others, it can lower their social status (Gholipour *et al.*, 2011; Michelson and Suchitra Mouly, 2004).

Based on the earlier findings that are in line with Ellwart's findings (2011), considering that the senders are willing to maximize their benefits and minimize their costs, gossip can serve at least three purposes. First, gossip can be used to complete information about unknown processes within the organization (Mills, 2010). Second, the act of gossiping may be a tool of informal influence that can be related to both ensuring of cooperation by punishing free-riders/norm violators and spreading information about a third party (target) to harm their reputation. Third, the sender may use gossip as a signaling device. By sharing confidential information about a third party, they can foster trust relations with the receiver.

Members of a group evaluate themselves based on other members of the group. There is a ranking between the actors. Employees care about their wages and their wages compared to other co-workers' wages (Loch *et al.*, 2000).

Gossip can be explained by social comparison motives (Wert and Salovey, 2004). Comparison can be made based upon reputation, status, or salary differences between the sender and target. Upward comparison between a sender and a target can be understood through the concept of envy. Envy is the desire to have another person's possession (Dogan and Vecchio, 2001). Objects of envy can be transferables such as wealth, and non-transferables such as status (Elster, 1991). Frustration and envy may feed dislike and a form of relational aggression (Pál *et al.*, 2016), and a potential result of relational

aggression can be negative gossip (Crick *et al.*, 2001). In a contemporary workplace setting, relational aggression with the usage of gossip as socially aggressive behavior may be considered a subtle form of bullying (Crothers *et al.*, 2009).

Fairness can decrease negative feelings about payment and increase pay satisfaction (Hegtvedt and Killian, 1999). Gossip can be used to respond to perceived unfairness, resolve the frustration due to unfavorable social comparison with others, and improve the employee's own relative position (Dunbar, 2004; Wert & Salovey, 2004).

Status comparison can be made with similar others, making the comparison meaningful. In this case, gossip can happen for individual needs connected to self-esteem (Wert and Salovey, 2004). Competition is more intense with others similar in some respect (Gulati *et al.*, 2000). When a comparison is made with similar others, the purpose of gossip can be to make lessons about how to not behave in the group. This case arises when group norms are strong. Another case of social comparison is downward comparison. Downward comparison is different from an upward comparison in terms of its function and what motivates it. Downward comparison can be made for self-enhancement, the legitimization of own position, and social exclusion on a group level (Wert and Salovey, 2004).

1.2.6 Gossip is Contextual

Gossip, cooperation, and reputation are interrelated with many other factors that need to be measured simultaneously. Based on the characteristics described earlier, we can conclude that gossip can have multiple antecedents and consequences dependent on individual motivations and the social context.

In a workplace setting, all observed and unobserved factors are creating an organizational context. We assume that organizational context influences how gossip works within a particular organization. An organizational structure can encourage either cooperation or competition. Both options have potential advantages and disadvantages (Beersma *et al.*, 2003; Drago and Turnbull, 1991).

One precondition for cooperation in a workplace is task interdependence, which means more than one employee is often needed to solve a task. It is a multidimensional concept involving the tasks' scope, resources, criticality, and direction (Kiggundu, 1981). High task interdependence requires cooperation more than low task interdependence. Task interdependence has been shown to increase communication and norms of cooperation

and expectation for help (Bachrach *et al.*, 2006). It is an open question about whether task interdependence increases gossiping behavior as well or not.

Employees' behavior is embedded in and also influenced by interpersonal relations, factors contributing to job satisfaction, the context of behavior, and the overall work mood (Brief and Weiss, 2002; Johns, 2006). Financial incentives can also determine employees' behavior. It worth mentioning wage negotiations that can reduce differences between employees (Leibbrandt and List, 2014; Seidel *et al.*, 2000) and reward allocation (Dyer *et al.*, 1976).

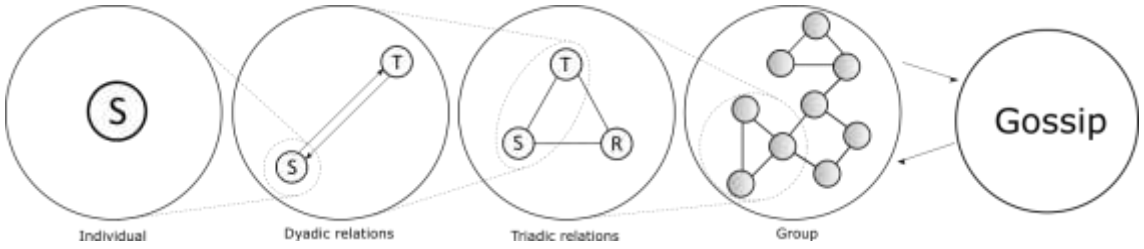
1.3 Research Directions

Table 1. Levels of analysis; used measures; and examined antecedents and consequences to gossip by chapter.

Levels of explanation	**Indicators for levels**	**Antecedents, consequences**	**Chapter**			
			Organizational Factors and Their Possible Relationship with Gossip	**Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations**	**Relational Elements of the Gossip Triad**	**Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches**
Between organizations	Differences in norms and practices	Different norms and organizational context, in general, encourage gossip with different motivations	X	X		
Within organizations	Norms as perceived fairness or group cohesion	Competitive or cooperative environment, perceived fairness	X	X		
Within triads	Nr. of coalition, closure, and unbalanced triads	Different triadic configurations leading to positive, negative, or neutral gossip			X	X
Dyadic level	Relationships of sender and target, sender's perception about target	Envy, friendship, misfit to the team, salary differences		X		X
Individual-level	Representation of sender, receiver, and target in sender's gossip related speech	The motivation of S as self-representation, or demolition of target's reputation				X

Gossip is one of the fundamentals of human behavior and has a rich literature in social sciences. Gossip is mostly related to cooperation, reputation, and free-rider exclusion, but purposes such as self-promotion or anxiety reduction have also been described sporadically. Using a unified theoretical framework, we argue that gossip is a more general tool used by the parties according to the social situation. The current research adds to the existing literature on several levels. Examining the individual's motivation for gossiping, we measure multiple motivations at once, looking at conditional usage in relation to the receiver, the target, and the organizational context. We argue that specific usages for gossip are overlooked as a more intentional, strategic usage. We examine the dyadic setting for gossiping and examine if there is gossip outside of a balanced gossip triad. A rich and detailed dataset of 9 workgroups allows us to compare the contextual nature of gossip usage. Table 1 demonstrates each chapter's analysis levels, including the involved antecedents, consequences for gossip, and the measures we used to draw our conclusions.

Figure 2. Gossip on different levels



1.3.1 Motivations of the Sender for Gossiping

An individual can be motivated to gossip to reduce their stress levels. Gossip can result from sender attributing their failure to external factors and protecting their self-esteem by blaming others. In most cases, however, an individual's motivation for gossip can be interpreted in relation to other social network members. Social comparison is one way how the individual defines their worth that can lead to gossip. Another reason is the desire to get a more favorable social network position and achieve a higher status. The sender's individual motives in relation to the receiver or the gossip target will be discussed in the next chapter.

1.3.2 Motivations Behind Gossip on a Dyadic Level

The current research uses multiple networks among employees, considering their characteristics. On a dyadic level, the sender can gossip in many situations with different expectations, giving gossip several purposes. The sender can gossip for several reasons with respect to the target's reputation. The sender can gossip due to the lack of cooperation with the target or cooperation

with the receiver. Another reason can be the social comparison that may be upward, downward, or with similar others (Wert and Salovey, 2004). When the target has a higher reputation, and the sender envies the target, the gossiping act may be an attempt from the senders to reduce their stress level. The sender can gossip about a target in a similar position to outcompete him, and he can gossip about a target with a lower position for social exclusion. We aim to clarify the situations in which gossip occurs, considering the sender's motivations and the relationship between the sender and the target.

The nature of gossip might differ when the relationship between the sender, receiver, and target changes. Wittek and Wielers (1998) demonstrated that gossip is more likely to be sent if the sender has a positive relationship with the receiver, and they both have a negative relationship with the target. In our research, we analyze triadic gossip data to determine how and what type of gossip spreads in a triad where the three actors have all positive or all negative relationships. We propose that gossip is contextual, meaning that different organizational norms and organizational practices lead to other gossip types. Gossip can be motivated by several factors. Motivated by several factors, gossip can fulfill different purposes. Different network structures and organizational context leads to different types of gossip as well.

In one research direction present in the chapter "Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations", we aim to investigate whether unfavorable relative comparisons about perceived salary and the potential envy and frustration resulting from these constitute a key mechanism that explains malicious gossip about others in organizations. Envy and frustration can feed dislike and relational aggression (Pál *et al.*, 2016). Negative gossip has been identified as one potential result of relational aggression (Crick *et al.*, 2001). Although gossip has a vast literature, it has been mostly associated with the lack of cooperation within a group, group cohesion, and reputational information (Dunbar, 1998; Hess and Hagen, 2006; Nowak and Sigmund, 2005), we assume that negative gossip can be a result of unfavorable comparisons regarding wages and promotional opportunities. We expect that if employees evaluate their financial position unfavorably compared to others, they will be more likely to gossip about colleagues about whom they are envious. This potentially can happen because gossip can be a result of social comparison and competition for resources. Gossip can be a way to reduce stress and a tool for undermining others. Gossip can be used as a more strategic tool.

1.3.3 Effects of the Triadic Setting on Gossip

The nature of gossip might differ when the relationship between the sender, receiver, and target changes. Wittek and Wielers (1998) proved that gossip is more likely to be sent if the sender has a positive relationship with the receiver, and they both have a negative relationship with the target.

In the chapter titled “Relational Elements of the Gossip Triad,” we analyze triadic gossip data to determine how and what type of gossip spreads in a triad where the three actors have all positive or negative relationships. Depending on targets’ relative reputation, wage, and other characteristics, the sender and receiver can socially exclude, outcompete, or demolish their reputation. We intend to untangle how gossip is used in various triadic settings, even in unbalanced triads. When all actors have positive relationships, gossip can be intended to reinforce norms and cohesion. When all actors have negative relationships, gossip can be interpreted as a purer strategic action. Our data allow us to distinguish between negative, positive, and neutral gossip.

In the chapter “Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches”, we use the individual’s perspective to reflect on the gossip participants' triadic representation in their speech. Using different parts of speech while gossiping and having a different linguistic representation of the three parties allows us to speculate on the sender’s motives.

1.3.4 Examining Gossip‘s Contextual Nature

The occurrence of gossips is not only dependent on the triadic setting between the three actors but also on the organizational context and organizational practices. Our data (collected in work organizations based primarily on surveys) helps us understand how organizational norms and perceptions of employees about the organization might shape how negative gossip is used. We recorded data in 9 workgroups from 6 workplaces. We measured factors as the perceived fairness of the division of goods, perceived competition, or perceived cohesion and cooperation. On top of a standardized questionnaire, we conducted interviews with company leaders to explore their organizational practices. Measuring financial incentives and perception of financials was an essential part of our attempt to reconstruct the organizational context. The chapter “Organizational Factors and Their Possible Relationship with Gossip” contains a thorough analysis of organizational differences between the groups. The chapters “Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations” and “Relational Elements of the Gossip Triad,” we ultimately look at the difference of gossip usage within the organizations to highlight that the social phenomenon of gossip may differ depending on the organizational context.

1.3.5 Summary of Hypotheses, Research Questions and their Measures by Chapter

Given the research directions established by the mechanisms' level, we summarized all the research questions and hypotheses in the current dissertation in Table 2.

Table 2: Hypotheses and research questions by chapters

Chapter	Hypothesis/Questions	Measure
3. Organizational Factors and Their Possible Relationship with Gossip[2]	RQ: What group norms are present in the examined organizations? 2. How are the norms related to gossip?	Perceived Cooperation within the group; Positive group values; Perceived Fairness; Perceived Wage; Promotion opportunities: Requested and received wage; Promotion opportunities: Expecting a promotion
	Dependent Variable	Gossip
4. Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations	H1a: Employees that did not get a raise last raise are more likely to gossip negatively.	Raise of the sender
	H1b: Employees that received a salary upgrade during the last raise are more likely to be the target of negative gossip.	Raise of the receiver
	H1c: Employees who did not receive a salary upgrade during the last raise are more likely to gossip negatively about those who did.	Raise interaction
	H2: If a colleague earns more money than the sender and is considered underserved (despised) by the employee, the employee will be more likely to spread negative gossip about them.	Target earns more money, and others despise
	H3a: Individuals will be more likely to gossip negatively about a target if they envy their financial position.	Envy of earnings: Wage reduction of the target
	H3b: Individuals will be more likely to gossip about a target if they consider the target to be an executive's pet.	Envy of treatment by executives: Executive's pet
	H4a: Controlling for other factors, negative gossip will be present more likely between employees at the same hierarchical level in the organization.	Leader interaction
	H4b: In our models with multiple effects, we expect that if the target is a leader and earns more money than the sender, then negative gossip will be less likely compared to the situation when the target is not a leader and earns more money.	Legitimate leader
	H5a: If an employee perceives cooperation problems with a colleague, this employee will be more likely to initiate negative gossip about that colleague.	Would not cooperate
	H5b: If an employee thinks that a colleague does not belong to the team, the employee will be more likely to gossip negatively about that colleague.	Misfit to the team

[2] The table summarizes the main research questions and hypotheses from the main chapters of the present thesis, where the primary research areas and analyses are delineated. The prior chapters, due to their mainly introductory and descriptive nature, are not included in this breakdown.

	H5c: If an employee appreciates a colleague, this employee will be less likely to gossip negatively about them.	Reputation
	Dependent Variable	Negative gossip
5. Relational Elements of the Gossip Triad	H1: The presence of a gossip triad increases the probability of another existing triad involving the same sender and receiver.	Gossip tie density
	H2: If the sender gossips with the receiver, the sender will reciprocate it with gossip	Gossip tie density
	H3: If the sender gossips with the receiver, the receiver is likely to reciprocate it with gossip about another target.	Gossip tie density
	H4: Gossip spreads, so it is likely that if the sender gossips with the receiver about the target, the receiver will spread the same gossip about the target in another triad to another receiver.	Gossip tie density
	H5: If S has a trust relationship with R, R will not gossip with T.	Gossip tie density
	H6: If S gossips about T with R, and then it is less likely that the sender gossips with T about R (about the same people) in another triad.	Gossip tie density
	RQ: Which triadic configurations lead to gossip?	Positive, Negative and Uninterested dyadic ties
	Dependent Variable	Positive, Negative, and Neutral Gossip
6. Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches	RQ1: Which parts of speech are more significantly present in gossip speeches than non-gossip speeches? What can we conclude about gossip from the usage of parts of speech?	Parts of speech
	RQ2: Which detailed parts of speech are more significantly present in gossip speeches than non-gossip speeches? How are the members of a triad represented in a gossip speech? In what combinations can we find the detailed parts of speech representing members of the triad? How are plural and singular personal pronouns used between gossip and non-gossip speeches?	Detailed parts of speech
	RQ3: What is the speaker's motivation for gossiping?	Interpretation of gossip-related texts

In the chapter “Organizational Factors and Their Possible Relationship with Gossip”, we aim to answer how the organizational norms and factors such as cooperativeness or fairness are related to gossip. We made a comparison between organizations’ norms and their relation to gossip as well.

In the chapter “Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations”, we hypothesized that gossip is driven by social comparison motives. We assumed that on a dyadic level can be driven by personal and financial envy as well as personal frustration due to the lack of promotional opportunities. We also compared separate workgroups to see whether gossip is driven by different motives, given their organizational norms and culture.

In the chapter “Relational Elements of the Gossip Triad,” we formulated a set of hypotheses driven by the literature regarding the dynamics between the three actors in a gossip triad. We assume that gossip is reciprocated, that sender and receiver are likely to have a trusting relationship, that gossip is likely to spread to another triad, and so on. We built up a dataset to see the relationship between the sender and the receiver, leading to gossip. The literature did not drive this part of the chapter. On the contrary, we aimed to discover gossip triads that are not solely based on the triadic balance theory. In the end, we were curious if different types of gossip triads are present in different organizations.

In chapter “Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches,” we examined how the primary and detailed parts of speech are present in gossip texts versus the non-gossip texts. Since the detailed parts of speech reflect the gossip triad members, we examined how the parties are represented in gossip texts versus non-gossip texts. The actors' representation in a gossip text allowed us to make assumptions about the sender’s motivations behind gossiping.

2. Data and Methods

The dissertation relies on two datasets obtained in the EVILTONGUE ERC project (Takács, 2014). The organizational data was recorded in 9 workgroups from 5 organizations. We analyze this dataset in the following chapters: "Organizational Factors and Their Possible Relationship with Gossip", "Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations" and "Relational Elements of the Gossip Triad". The corpus from transcribed and annotated audio recordings captured during a Hungarian game show was utilized in the chapter titled "Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches".

2.1 Organizational Data

The data collection phase of the organizational dataset aimed to select companies from the knowledge-intensive sector where the wages are considerably divergent since that is expected to intensify envy. We attempted to include companies with a higher chance of getting promoted and negotiating a fair wage, where the positions and wages are relatively fixed, and there is a lower chance to step ahead. The project members attempted to gather data from more workgroups within one company for the sake of comparison. In a workgroup, managers were also included as survey respondents. The ideal number of employees in such a workgroup is ideally around 20-50[3] individuals because a smaller number would not have been enough to conduct specific network analyses, and a much bigger workgroup would have made filling out network-type questions very time-consuming. It is worth mentioning that collecting data from organizations was difficult due to strict business and contracting policies and lack of time, meaning that sampling in the classical sense of the word would be not have been viable.

The organizational data is a result of multiple data sources. The primary data source is a survey for the employees. The employees of participating companies filled out an online questionnaire that consisted of questions aimed to uncover sociodemographic characteristics, norm and company-related opinions, promotional opportunities, map many different relationships between employees, identify participants in gossiping activities, and the respondents' perception of their peers (such as reputation or salary levels or cooperation). We conducted semi-structured interviews with HR specialists and managers to better understand the companies' market position, the internal organizational

[3] The number of employees of a workgroup in our dataset varies between 16 and 43.

practices, and the inter-employee dynamics. To find out where employees came from, these professionals also provided details of the recruitment process and assessment of workgroup performance. The respective HR departments provided additional demographic data as years spent at the company, salary levels[4], and positions. Please refer to Appendix 1.1 and 9.12 for the Data Protection protocols and Consent forms[5] signed by the participants.

The thematic blocks and most important survey measures are summarized in the chapter titled "Organizational Factors and Their Possible Relationship with Gossip". The chapter provides a thorough analysis and comparison of all the recorded data from the workgroups. This chapter helped us understand the organizations and put dynamics behind gossip into perspective.

2.1.1 Measurement of Gossip in the Organizational Data

In the organizational survey dataset, we defined gossip as the following: "Gossip is personal and evaluative information exchanged between sender and receiver about their colleague." The concept of gossip has a negative connotation and implies social desirability from the respondents; therefore, we avoid the use of the word gossip similarly to other research programs focusing on gossip. Building on the widely accepted definition of organizational gossip (Kurland and Pelled, 2000) but tailoring to the survey, we asked respondents whether they share evaluative information with colleagues about a third colleague who is not present.

Assuming that self-reported gossip is less likely than gossip reported by others, we asked receivers if they received evaluative information about a third colleague. We asked them both from whom they received and about whom they received it. At the final step, we asked the nature of the information, whether it was a positive, a negative, or a neutral piece of information. The way we operationalized gossip was heavily inspired by Ellwardt (Ellwardt, 2011). Questionnaire items can be found in Appendix 9.1. By using receiver reported gossip, we achieved sender-receiver network densities (Figure 12) between 4% and 18% for each of the signed gossip networks (positive, neutral, negative) and sender-target network densities (Figure 13) between 4 and 45%. For detailed statistics, see Appendix 9.2.

[4] We asked for and received the relative level of salaries and not the actual ones

[5] Data protection protocol and participant consent was prepared for ERC project 648693 (Takács, 2014) and reviewed by Hungarian National Authority for Data Protection and Freedom of Information

To be able to construct the gossip triad with multiple-choice questions that are dependent on each other, we developed our own questionnaire software. The implementation of the question looked like the following: “From whom did you receive personal information [selection from a list of all colleagues]” => “About who was the shared information [selection from a list of all colleagues]“ => “What type of information was it [positive, neutral, negative]”.

2.2 Audio Recording Data

In the chapter titled “Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches”, we used a novel spontaneous speech corpus in Hungarian consisting of approximately 550 hours of audio recordings. The complete corpus was manually transcribed and annotated. Gossip was one among many annotation tags used by the manual transcribers and annotators. The text similarity, annotation tags, timestamps, and names were quantified. We used cosine and Levenshtein similarity between these factors to assure the quality of the annotator’s work on a subset of 20 hours. We instructed the manual annotators to identify participants' statements about a third, non-present person about the third person’s deeds, personality, or other factors as gossip (Galántai *et al.*, 2018).

Each written transcription was processed using the Magyarlánc v3.0 software (Zsibrita *et al.*, 2013), executing lemmatization and Part-of-Speech (POS) tagging. Basic statistics and levels of POS tagging can be found in chapter “Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches”. The complete corpus was stored in Elasticsearch, a database enabling fast access and searchability of large amounts of text. The complete database contains over 460,000 lines of text. Please refer to chapter “Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches” for more information on the corpus, measuring gossip, and the annotation process.

In the spontaneous speech corpus, we used the following definition for gossip: “Gossip is about a third member of the group”. Human annotators got to decide what counts as a statement about a third party, but they did not attempt to determine whether a statement was evaluative, even if this is a core part of our theoretical framework. The reasoning behind gossip annotation in the speech corpus is that people do not need to use strong adjectives to be evaluative. A simple observation might be evaluative of the other. For example, if Martha is friends with Jasmin and Peter makes a note about it in their absence to a shared friend, it might affect Martha's representation. Judging the connotation of this statement might be challenging and might depend highly on the social context. If Jasmin

is considered a “cool” person by Peter, this might be a positive gossip. If Jasmin is considered an undesirable friend, this might be a negative statement about Martha. In most cases, statements like this carry social connotations that are very hard to annotate to an outsider. In the spontaneous speech corpus, all statements about third parties that are part of the group were considered gossip; therefore, they were considered implicitly evaluative.

Even though annotating gossip in a text might seem more subjective than receiver-reported gossip, the latter is judged and prefiltered by the receiver while the former includes all the actual statements given about a third party even though we assumed that all statements are evaluative.

2.2.1 Comparison and the Measurement of Gossip

Table 3 shows the gossip definition elements by Kurland and Pelled (2000) and our definition’s components from the two data collections.

Table 3: The definition of gossip in the two datasets

Definition by Kurland and Pelled (2000)	**Workgroups survey data**	**Sound recording data**
Informal	Personal	Implicit assumption
Evaluative	Explicitly	Implicitly
Concerns known people	About the group members	About the group members
The third person is absent	Implicit assumption	Implicit assumption

According to a widely accepted definition, gossip is “informal and evaluative talk in an organization, usually among no more than a few individuals, about another member of that organization who is not present.” As mentioned previously, the measurement of gossip is a challenging task. Since we asked a three-fold question to capture the agents of gossip, its personal nature (contrary to formal talk), and its evaluativeness (positive, negative, or neutral information content), we successfully able to capture the core of the concept. Since the question is already complicated, we assumed that the third person was absent at the gossip's occurrence to prevent further complexity. In the sound recording data, annotators could not tell clearly if a statement was evaluative. Technically it was

impossible to determine if the third person was present at the discussion or not. Contrary to the survey data collected from the workgroups, the setting was highly informal, and people mostly exchanged personal information. The definition of gossip in the sound recording data can be summarized as "gossip is about a third member of a group".

2.3 Gossip on Different Levels

In the introductory part, we have mentioned that the dissertation analyses the mechanisms behind gossip on different levels. For each chapter and each level, we selected the appropriate methodology and indicators (Table 4). In this subchapter, we briefly describe the methods used in each chapter. For a detailed description of the utilized methodologies, please refer to the respective chapters.

Table 4. Methods used by chapters and levels of analysis

Chapter	**Organizational Factors and Their Possible Relationship with Gossip**	**Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations**	**Relational Elements of the Gossip Triad**	**Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches**
Methods	Descriptive statistics, factor analysis, analysis of the interviews	ERGM, qualitative analysis of the organizations	Cluster analysis, CART, TRM, Basic Probabilities	Syntactic analysis
Indicators	Basic statistics of the employees, employee opinions, employee networks, basic characteristics of the organizations, correlations with gossip	Sender target relationship, comparison of the organizations	Triadic configurations that lead to gossip	Presentation of triadic actors in sender's statements
Analyzed Levels	Between organizations, within organizations	Between organizations, within organizations, dyadic level, Individual-level	Triadic level	Triadic, dyadic and individual level

2.3.1 Organizational Factors and Their Possible Relationship with Gossip

In the chapter titled “Organizational Factors and Their Possible Relationship with Gossip”, we discuss the organizational (survey) dataset's most important variables. Descriptive statistics are provided by the employees, their opinions, and observed social networks between and within organizations. The most indicative characteristics of the organizations based involved in the data collection were also described. Organizational characteristics and dynamics were explored with semi-structured interviews conducted with the management and HR personnel.

2.3.2 Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations

The organizational dataset enabled us to explain the emerging gossiping relations using social network analysis. Exponential Random Graph Models (ERGMs), a family of casual models utilizing different aspects of the existing structure to explain the presence (or lack of) network ties, were used to explain the emergence of negative gossip dyads between employees on an intra- and inter-organizational level while considering the level of the individual as well.

2.3.3 Relational Elements of the Gossip Triad

The chapter titled “Relational Elements of the Gossip Triad” aimed to uncover triadic configurations that lead to the emergence of positive, negative, or neutral gossip using numerous statistical methods. An analysis of basic probabilities was conducted to find gossip network settings that are more frequent than pure chance. As part of a partially data-driven approach to identify triadic configurations, an unsupervised learning method, hierarchical cluster analysis, is used to find hierarchical groupings of dyadic relationships that form subsets of items more like each other than to other segments. Multiclass classification trees, a supervised learning method in the Classification and regression trees (CART) model family, produce interpretable results through a recursive partitioning technique, where the feature space (dyadic ties) is split iteratively until the dependent variable can be reliably predicted (the presence of negative, neutral, and positive triad). Moreover, Triadic Relational Models (TRMs), random-effect logistic regression models, are used to validate the identified dyadic configurations that lead to the emergence of gossip. A TRM's estimation happens using Markov-chain Monte Carlo (MCMC) methods, where the random-effect error terms associated with the three roles in a gossip

triad (sender, receiver, and target) are not considered independent since an individual cannot fulfill all three roles at the same time.

2.3.4 Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches

Gossip-related utterances were analyzed in the chapter titled “Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches.” A novel text corpus derived from voice recordings covering eight participants of an entertainment program covering approx. Five hundred fifty hours are used to examine interpersonal relationships in everyday language as they appear in speeches containing gossip. The results of Part-of-Speech (POS) tagging, a long-recognized and frequently applied technique in linguistics assigning grammatical descriptors to individual words, are analyzed to uncover representations of interpersonal relationships in spoken language (such as the three participants in a gossip triad) used while gossiping and, as a reference, in other cases.

3. Organizational Factors and Their Possible Relationship with Gossip

The current chapter serves as an overview of the nine workgroups from six organizations from which we collected data. The chapter aims to provide a comprehensive but mainly exploratory view of the organizations that can later help with sample selection and hypothesis forming.

The chapter focuses on concepts that the employees formed an opinion around and represent overall organizational values like fairness, cooperation, or promotion opportunities. We examined these values through the questionnaire data, the network data, and the semi-structured interviews conducted with the organizations' management.

The chapter also summarizes the organizations' main characteristics as their external position on the market, internal policies, organizational values, and practices. These analyses allow us to form an image of the organizations. Factors were correlated with gossiping patterns to see what phenomena can have a relationship with gossip.

The data collected from workgroups happened through two main methods. One of these is a survey method[6] that includes basic statistical questions such as age or gender, opinion questions regarding organizational satisfaction, cooperation, and fairness[7]. The other method enabled us to uncover employee networks through questions where respondents had the opportunity to identify their colleagues.

The HR departments of the organizations provided us with associated data such as the position of the employee, position level, salary level, or entrance date of the employee. Network questions[8] included multiple interpersonal questions regarding cooperation, communication, or perception of others. We also conducted semi-structured interviews with the organization's leaders to be able to see the organization’s market position, policies, and practices regarding organizational dynamics and resource distribution. Interviews were also an excellent source of information to get an image of the organizational culture in general. We have described research design, data collection process, and cooperation with the organizations (mostly from the business world) in a

[6] The questionnaire can be found in Appendix 9.1.
[7] Read more on the measures in the chapter “Data and Methods”.
[8] For network questions, please refer to Table 35.

separate article (Pápay *et al.*, 2016). For more information on these steps and considerations, please refer to Appendix 1.1.

In order to be able to form a grounded image on the workgroups, we present the organizations from multiple angles in this chapter of the dissertation. These perspectives have guided our general focus and topics, where we aim to point out possible relations of the organizational norms to gossip patterns. The current, explorative chapter does not intentionally utilize multi-variate analysis, although its usage constitutes an integral part of future research directions. We focus on the descriptives and bivariate analysis of the survey items instead; the data analysis served as a basis, among others, for the organization selection in our "Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations" chapter.

The chapter starts with the employees' basic statistics, such as gender, age, and educational background. For further analysis, we checked the missing values and prepared the data using imputation techniques to analyze the questionnaire data. Option questions had been established through the literature[9] and relying on the RECENS research group's previous studies. Groups of opinion questions should cover the relevant social phenomena in this dissertation. To crosscheck whether these questionnaire items measure the same phenomena, we executed a factor analysis on them. Factor analysis only slightly modified our initial concepts to add or leave out certain items that do not fit the picture. The last part contains a correlation analysis of gossiping activity with demographic variables and concepts as fairness or cooperation.

3.1 Measures in the questionnaire

The network questions (Table 35) and the non-network (Table 36) questions used in the survey can be found in Appendix 9.1, containing references to the literature that inspired specific questionnaire items. Descriptive statistics about the network questions can be found in Appendix 9.2. For comparability and continuity, the Research Center for Educational and Network Studies (RECENS) group's school questionnaire has served as a basis for some of the employee survey questions.

In the survey, we measured the concept of cooperation with multiple network items, including by asking whom they trust in doing good work as a precondition for cooperation (Smith *et al.*, 1995). We aimed to triangulate cooperation between employees in a way that eliminates the obligatory, but otherwise unwanted cooperation and voluntary

[9] For more, please refer to the chapter "Data and Methods" and Appendix 9.1.

cooperation. Employees bargaining over help for their tasks (Drago and Turnbull, 1991) has also served as an indicator for a cooperative relationship.

We attempted to quantify and capture at least two types of reputational information regarding employees' perception of their peers in the survey: personal reputation ("I appreciate this person") and professional reputation ("I turn for his/her help when I want something done right") (Laird *et al.*, 2012). Other coworkers' perceptions are measured by the attention received from other coworkers, the perceived eligibility to the current position, and relationship with superiors, as seen by colleagues. We attempted to uncover these qualities from two perspectives simultaneously: the employee's own opinion and what the group thinks of the individual.

According to Dana Laird (2012), reputation is built by political skills that we measured by time spent networking with coworkers, communication efficiency, and the expressed interests toward them. Quality of interpersonal relations was captured by the level of friendship between coworkers regarding the level of knowledge about each other. During this research, we had a social network approach targeting everyone in the surveyed work groups.

Another block in the questionnaire measured employees' perception of their wages compared to the country's overall population, their profession, their company, and their department. We measured the level of specific knowledge of colleagues' wages and whether those amounts are smaller or higher than their own in the form of network questions. We asked employees to reveal their opinion on other coworkers' work performance and if they are fit for their position. Moreover, the companies' HR departments provided us data on the formal hierarchical position and its employees' actual and relative wage levels.

Job satisfaction was quantified by classical dimensions such as the inclination to quit the organization, the perception of work tasks, and satisfaction with supervisors, coworkers, payments, and the promotional system. Employees were also asked about what position and wage they received during the last wage negotiation and what their expectations were for the next one.

3.2 Basic Statistics of the Employees by Workgroup

Table 5 shows us insight into the simple demographic information of the workgroups. The percentage of female workers (75 %) was the highest in A104, a state-owned company focusing on writing and managing social projects. The next in line was at the

administrative/managerial workgroup of the “F106” developer company. The number of female workers is generally low in all development workgroups (code starting with F) and a brokerage company (P102). The mean age is between 30 and 40 in all groups. The group with the youngest employees was F101.

Table 5. Descriptive statistics of gender, age, and education by workgroup

	Gender				Age				Education		
Group	N	Female	Male	Female percentage	Min	Mean	Max	Standard deviation	Min	Median	Max
F101	19	5	14	26.32%	23	30.68	41.00	4.55	2.00	3.00	5.00
P102	22	1	21	4.55%	27	37.64	48.00	6.89	1.00	4.00	5.00
F103	29	1	28	3.45%	21	32.07	55.00	6.18	1.00	4.00	6.00
A104	24	18	6	75.00%	24	36.71	54.00	7.59	3.00	4.00	6.00
F105	18	6	12	33.33%	24	38.44	63.00	10.72	2.00	4.00	5.00
F106a	16	10	6	62.50%	23	38.63	55.00	8.92	2.00	4.00	6.00
F106b	29	5	24	17.24%	24	38.41	64.00	9.65	2.00	4.00	6.00
F106c	43	1	42	2.33%	27	37.91	54.00	7.18	2.00	4.00	5.00
F106d	25	1	24	4.00%	23	39.56	64.00	11.42	2.00	4.00	6.00

The highest standard deviation regarding the age can be found in F105, F106b, and F106d groups, where they also have relatively high maximum values for age as 63 and 64.

Regarding the employees' educational level, in most companies, the median value is four, which indicates a bachelor or comparable degree. The only exception is F101, where the median value is 3, meaning University or college diploma acquired in traditional training. The educational level’s mode is generally 4 (bachelor or equal degree) or 5 (Masters or equal degree). The lowest mode value (2, High School diploma) is at F101 and F103 development companies.

3.3 Preparing the Data for Analysis

We prepared an analysis of missing data (NA) among the questionnaire's non-network items, shown in Table 6. The mean NA rate ranges from 2% to 18%. The list of questions with the highest rates of missing values per workgroup is shown in Appendix 9.2.

Table 6. Missing non-network data by workgroup

Group	Min NA in percentage	Mean NA in percentage	Max NA in percentage[10]
F101	0%	2.03%	26.32%
P102	0%	5.18%	18.18%
F103	0%	18.21%	44.83%
A104	0%	0.51%	8.33%
F105	0%	2.92%	44.44%
F106a	0%	2.74%	43.75%
F106b	0%	16.82%	55.17%
F106c	0%	13.99%	44.19%
F106d	0%	16.63%	40.00%

In the following step, we imputed the missing data using an R package called mice (Buuren and Groothuis-Oudshoorn, 2011). The package uses as an imputation method Predictive Mean Matching, which is a semi-parametric approach. The imputation method works similarly to a regression where the fill-in value must be similar to a randomly selected donor value in a way that and the regression-predicted value for the missing value is the closest to the regression-predicted observed donor values ("How do I Perform Multiple Imputation Using Predictive Mean Matching in R? | R FAQ", n.d.). In the following step, we imputed the missing data using an R package called mice (Buuren and Groothuis-Oudshoorn, 2011), which is the R implementation of the Multivariate Imputation By Chained Equations (MICE) technique. MICE has many advantages for data imputation: each missing value in a dataset is estimated multiple times, resulting in imputations that take the uncertainty of their predictions into account and also provide accurate standard errors, imputed values with sufficient prediction certainties will remain consistent even between multiple imputation rounds, and the framework is highly flexible and can be utilized in a wide variety of settings and for different datasets. The main disadvantages of the method are less pronounced theoretical basis as some other imputation methods; a joint, multi-variate model could be more beneficial in cases where the to-be-imputed variables are continuous and normally distributed; MICE does not have a way to incorporate certain data-specific complex cases such as clustering during the

[10] The question „Has a good relationship with the management" is not considered in this column due to it being considered an outlier in terms of high percentage of missing values.

imputation process; the technique may not provide well-defined predictions in the case of longitudinal data and if sampling weights are involved (Azur *et al.*, 2011).

The non-network survey dataset variables have undergone imputation using the technique since these limitations of MICE are not expected to be pronounced for our analytic purposes due to data characteristics. We expect that the imputed variables enable better analysis and a more straightforward comparison of workgroups while moderating the varying prevalence of missing values. The method replaces missing values with predicted ones that consider a variety of other properties (including the workgroup membership itself) in conjunction with each other and represent the overall distribution of each variable. Moreover, there is evidence that using multiple imputation techniques to produce a dataset used for exploratory factor analysis (as we have done) produces comparably good performance as other popular methods for the lower prevalence of missing data. Its results are overall less sensitive to an increasing size of missing values. However, some new methods (including the one implemented by the R package mifa) may provide more reasonable estimations for factor analysis (Nassiri *et al.*, 2018). The future directions of our research include an evaluation of alternative imputation methods as well.

3.4 Values Based on the Interviews

3.4.1 F101

About the Company

F101 is a software development company with 19 employees, founded six years preceding our interview. Highly specialized in its respective field, the firm has a small market share in Hungary and some neighboring countries in the region. The company boasted a significant each year: it reported a doubling of its revenue compared to last year at the time of our contact.

The Company's Internal Structure, Practices, and Culture

There are two executives, several project and product managers, and a bit more than half of them are software developers. The executives have a close relationship with the employees. The project manager's position might swiftly change according to the current project landscape. The hierarchy is kept intentionally flat. Project managers coordinate the workflow, allocating everyone's time precisely in advance.

The executives declared goal is to foster a friendly and familial atmosphere within the company. They consciously avoid the terms of superior and subordinate. They all spend time together frequently outside the workplace. Teamwork is a pronounced corporate value. The team gets to select who will be their new colleague. They can all participate in the job interviews and express their opinion on the candidate later. There are many applicants to this company, but only a few are considered qualified to work there due to selective hiring practices.

3.4.2 P102

About the Company

P102 operates in the financial sector. We examined a workgroup from the company, which consists of brokers handling clients' money. P102 was founded a couple of years after the regime change in Hungary[11]. It is a slowly but continuously growing company with a significant market share in Hungary.

The Company's Internal Structure, Practices, and Culture

There is a very low turnover; most of the people had been employed there for 6-8 years. A degree is not a requirement for their work, many of them are college graduates, and some have specific vocational degrees. Employees are challenging to replace due to their constant client contact. Sales performance determines the employees' salary. There is a total of five leaders among the 22 employees.

There is no relationship between the employees outside of the workplace. The company has a practice where they distribute the clients in a centralized way, where the leaders have the last word. The employees are highly competitive and often envious of each other. Since the type of work is individual, there is not much need for cooperation.

3.4.3 F103

About the company

F103 is a workgroup operating inside a developer company, size around 100 employees in total, founded ten years before our research. The company is vastly growing each year and has a significant market share in their field. They boast well-known international companies among their clientele.

[11] In Hungary, the years 1989-1990 mark the end of the Communist rule and the beggining of a democratic system.

The Company's Internal Structure, Practices, and Culture

There are two levels within a workgroup: project leaders and software developers. The latter group is divided by the technologies with which the members are the most competent. The technical leaders are not appointed but are selected by the team based on their competence level. They often hire juniors since the personality and willingness to learn are more important for the company. They often organize team building events.

Teams frequently hang out together after work in the office or even outside of the office. Team spirit is an essential value within the group. They communicate in the company chat both formally and informally.

3.4.4 A104

About the Company

A104 is a relatively a workgroup in a newly founded (4 years at the time of our contact) institution in the public sector. They operate in the social sector, writing project proposals, and managing finances for other institutions in their field. The institution is under constant restructuring with changing tasks. The workgroup does not have much connection to the institution, and they operate isolated.

The Company's Internal Structure, Practices, and Culture

There is one leader in the company and smaller teams with 3-7 people. The team consists of administrative professionals and social workers. Because there is high work-related pressure on them, causing stress, the fluctuation is high. They only hire the best candidates while it is also easy to get fired or to quit due to the circumstances.

Two third of the team are women. They all have good relations, but they do not spend time together outside of the workplace, neither does the workplace organize events for them. The relationships can be considered formal.

3.4.5 F105

About the Company

F105 is a software development company founded after the regime change in Hungary. It has Hungarian owners. After ten years, they changed their profile to a more IT-focused one. Their revenue has grown around 500 percent in the last five years. Their clientele is international. They are in a monopolies position in their field; they do not have real competitors.

The Company's Internal Structure, Practices, and Culture

There are two leaders in this company. There are sales and marketing, administration finances, and the rest of them are developers. They offer daycare for the employees' children; there are a gym and a canteen. Everyone can take as many vacations as they need, and they do not abuse this system.

Most of the employees have good relationships; however, some employees are socially isolated from the group. They generally like working there; intentional departures are rare or virtually non-existent.

3.4.6 F106

About the Company

F106a, F106b, F106c, and F106d[12] are workgroups of a leading Hungarian IT company, listed amongst the country's most successful IT companies. F106a focuses on leadership, HR, administration, and sales, while the other three groups consist overwhelmingly of software developers. Their clients are Hungarian corporations.

The Company's Internal Structure, Practices, and Culture

We gathered data from four workgroups, each with a flat hierarchy. The fluctuation is considered average; most of those who quit mostly work at external partners and are not closely connected to the rest of the team.

They have strict working time. During the hiring process, the firm has implemented a thorough candidate screening method that includes interviews and technical tasks. Personal skills are considered equally important to technical skills. They have team events, but they often find it challenging to make people participate in them. They have numerous shared spaces like the kitchen or game rooms.

[12] Due to sparse networks and multiple missing values, we decided to remove F106d workgroup from further analyses such as chapter "Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations" and "Relational Elements of the Gossip Triad".

3.5 Values Based on the Questionnaire Items and Networks

The questionnaire items are based on the ERC project (Takács, 2014), referencing the existing literature[13].

To validate whether the questionnaire items are related to an underlying shared concept, we used factor analysis on all the non-network items with the "psych" R package (Revelle, 2018). The analysis only modified the item groups slightly and these modifications would be referenced later. The "fa" function of psych enables the application of five alternative algorithms, from which we utilized the factor analysis by minimizing residuals ("minres") technique. "Minres" provides an efficient method for the estimation of factor loadings to minimize the sum of squares of off-diagonal residuals (the off-diagonal correlation matrix) (Harman and Jones, 1966). We set the number of factors to 24 and used the "oblimin" GPArotation function, which is the default one for most factor analytic procedures in psych. The main factors were obtained from the results of earlier steps at a cutoff of 0.3.

3.5.1 Cooperation

Cooperation is essential in the workplace in order for employees to fulfill group goals. We measured the perceived cooperating in the workgroup using multiple items regarding how well the team works together or how cohesive the community is perceived. On a scale from 1 (strongly disagree) to 5 (strongly agree), values higher than 3 (neither agree nor disagree) are considered positive, and lower values are considered negative. The group values were measured by asking what makes someone popular within the group. They either answered Yes (1) or No (0) to items such as "team player," "friendly," or "good professional." Overall, the best performing groups were F106a, F106d, F103, F101, and F106c. The worst performing groups were A104 and P102.

The average and standard deviation of *perceived group cooperation* were derived as an aggregate of the following statements from the survey: "I get on well with my coworkers"; "My coworkers do their job well"; "We work well as a team"; "My coworkers and I form a cohesive community." These values were measured on a scale ranging from 1(strongly disagree) to 5 (strongly agree). The ANOVA test result for these items per workgroup indicates a statistically significant relationship ($p<0.0000$) with a between group variance of 2.2 and F equals 5.14. Please refer to Appendix 9.1 for more information on these questions.

[13] See Appendix 9.1.

Group values (average and standard deviation) were calculated from the answers given to the following question: "What do you think are the characteristics that make someone popular at your company?" The possible answers were the following: "good professional"; "friendly"; "team player"; "intelligent"; "has a positive attitude towards the job." These measures were binary (either 0, disagree, or 1, agree). The ANOVA test result shows $p<0.0000$, while between group variance is 0.53, and F is 16.49.

Table 7. Cooperation by workgroup

Group	Average Perceived Group Cooperation	Perceived Group Cooperation SD	Average of Group Values	Group Values SD
F101	4.14	0.44	0.81	0.16
P102	3.40	0.89	0.73	0.31
F103	4.32	0.61	0.92	0.20
A104	3.74	0.77	0.56	0.31
F105	3.88	0.39	0.93	0.12
F106a	4.42	0.53	0.99	0.05
F106b	4.01	0.54	0.94	0.12
F106c	4.12	0.78	1.00	0.00
F106d	4.23	0.57	0.96	0.13

The network density regarding positive networks (Appendix 9.2) tells us the same story. Network densities in the case of positive networks are less dense in the case of A104 and P102.

3.5.2 Wage

In our framework, the wage is considered a possible driving factor for envy related gossip. More importantly, the distribution of wages might affect interpersonal relationships. More conflicts are expected when a distribution is peaked and not flat. We received each employees' salary category from the HR departments that we recoded to a scale with equal length grades. The salary was measured on a scale starting at 1 (the lowest monthly salary in the group). Each 50000 HUF (or approx.. 156 Euro on 12th of January, 2019 exchange rate) increment represents a new level on this scale.

The standard deviation of wages (Table 8) was the highest in F103, A104, and F106a. The result of the ANOVA test shows a between-group variance of 24.32. F is 5.35 ($p<0.0000$).

Table 8. Wage differences by workgroup

Group	Mean	Median	SD
F101	2.95	3.00	1.27
P102	3.55	3.00	2.06
F103	4.55	5.00	3.01
A104	5.42	5.00	2.90
F105	1.72	1.50	0.96
F106a	4.00	3.50	2.66
F106b	4.14	5.00	2.25
F106c	4.60	5.00	1.40
F106d	4.40	5.00	1.71

3.5.3 Fairness

Gossip can be related to the negative feelings caused by unfairness. The perceived fairness within the company has higher values in all the F-prefixed or developer companies. The lowest perceived fairness was among P102 and A104 companies.

Table 9. Perceived fairness by workgroups

Group	Perceived Average Fairness	Perceived Fairness SD
F101	3.68	0.61
P102	2.71	1.19
F103	3.54	0.91
A104	2.35	0.86
F105	3.65	0.84
F106a	3.67	0.97
F106b	3.45	0.73
F106c	3.58	0.69
F106d	3.51	0.71

3.5.4 Current Situation and Promotion Opportunities

Promotion and salary raise opportunities reflect how rigid the organizational structure is and how easy or hard it is for employees to get ahead. When it is harder to receive a salary increase or a promotion, employees get demotivated easier.

Table 10 was aggregated from items that reflect how employees see their wages compared to other reference groups as average Hungarians or their own colleagues. The highest perceived salary was in P102, followed by F106b, while the lowest one in A104 and F101.

Table 10. Perceived wage by workgroup

Group	Perceived Average Salary	Perceived Salary SD
F101	2.39	0.80
P102	3.16	0.88
F103	2.83	0.61
A104	2.27	1.12
F105	2.26	0.75
F106a	2.75	1.05
F106b	3.01	0.75
F106c	2.94	0.73
F106d	2.90	0.63

Employees from P102, F106b, F106c, F106d, and F105 received a lower raise than requested. The promotion was expected at the highest rate in F103, F106d, and F106c. The lowest amount of expected promotions was at F101. Our ANOVA test shows that neither of these differences was significant between the organizations.

Table 11. Requested and received wage, expected promotion by workgroup

Group	Difference between requested and received salary increase in pct	SD of difference between requested and received salary increase in pct	Promotion is expected, Mean	Promotion is expected, SD
F101	2.89%	9.18%	0.05	0.23
P102	-3.23%	15.26%	0.09	0.29
F103	1.62%	12.03%	0.21	0.41
A104	1.04%	20.27%	0.13	0.34
F105	-0.67%	18.95%	0.11	0.32
F106a	1.56%	15.13%	0.13	0.34
F106b	-2.55%	6.86%	0.07	0.26
F106c	-2.16%	10.82%	0.19	0.39
F106d	-0.84%	11.34%	0.20	0.41

3.6 Possible Relations with Gossip

After carefully examining employee characteristics, opinions, and company values, we measured which one has a possible relationship with gossip.

Table 12, Table 13, and Table 14 show the Spearman rank correlation coefficients between different individual-level variables describing their subjective opinions and the

number of initiated sender-target ties. As mentioned earlier, we have collected sender-reported gossip during the organizational survey. Both the network-like and non-network items were captured in the employee survey.

The Spearman rank correlation coefficient considers the relationship between two variables representable by a monotonous function and, as opposed to the Pearson correlation coefficient, does not assume a linear relationship or that the measurement is on an interval scale, making it an appropriate method for ordinal variables as well (Hauke and Kossowski, 2011) In the case of binary variables, Spearman and Pearson coefficients are identical. We calculated the correlation coefficients and corresponding significance levels using the Hmisc R package (Harrell, 2019).

Table 12 demonstrates that if someone is a leader or a woman with a significant and positive relationship with all types of gossip. Employees with a high level of education tend to gossip more negatively in general.

Table 12. Gossip's relation with demographic variables

Items	Number of all sender-target ties[14]	Number of negative sender-target ties	Number of neutral sender-target ties	Number of positive sender-target ties
Is leader?	0.315***	0.303***	0.310***	0.298***
Gender	0.170**	0.227***	0.195***	0.124*
Highest level of education completed	0.076	0.141**	0.093	0.064

* p <= 0.1, ** <= 0.05, *** <= 0.01

Perceived group cooperation is positively correlated with positive sender-target gossip ties. When group values were perceived important by an employee, they were more prone to sending negative and positive gossip (Table 13).

Table 13. Gossip's relation to Perceived Cooperation and Group Values[15]

Aggregated Items	Number of all sender-target ties	Number of negative sender-target ties	Number of neutral sender-target ties	Number of positive sender-target ties
Perceived group cooperation	0.103	0.014	0.044	0.206***
Group values	0.081	0.126*	0.034	0.117*

[14] More aboutinformation on the occurring gossip types can be found in Appendix 9.2.
[15] For a description of the two aggregated items (perceived wage cooperation and group values), please refer to subchapter 3.5.1.

* p <= 0.1, ** <= 0.05, *** <= 0.01

Perceived fairness has a positive correlation with the number of sent sender-target gossip ties overall and the number of positive gossip ties. Perceived wage level differences are positively correlated with negative gossip.

Table 14. Gossip's relation to Fairness and Wage-related factors

Aggregated Items	Number of all sender-target ties	Number of negative sender-target ties	Number of neutral sender-target ties	Number of positive sender-target ties
Perceived fairness	0.125*	0.103	0.067	0.190***
Perceived wage	0.049	0.122*	-0.017	0.048
Difference between requested and received salary increase	0.008	-0.028	0.014	0.060
Net wage level	0.079	0.071	0.105	0.061

* p <= 0.1, ** <= 0.05, *** <= 0.01

3.6.1 Summary of the Workgroups

Workgroup F101 had high perceived cooperation and fairness. The company follows collaborative hiring practices while people have an informal, friendly relationship with each other and the leaders. The number of gossip ties sent demonstrated a positive correlation with the education level. People who received a higher wage increase than requested sent more positive gossip ties.

Workgroup P102 followed competitive wage distribution practices. They performed low on cooperative values and low in terms of perceived fairness, even though they make good money in comparison to other companies. The higher wage an employee makes, the more prone they were to gossip.

In F103, the perceived cooperation and group values were high. The wages are high, and even though the difference between the wages is high, the perceived fairness is also high. Leaders tended to gossip more positively and neutrally, while people with high net wages tended to gossip more negatively.

A104 is a workgroup where the reported working environment is stressful. The wage differences were huge, perceived fairness was low, and the perceived cooperation was also on the low side. All types of gossip were correlated with differences between requested and received salary increase. The less wage they were able to achieve compared to the requested one, the more they were likely to gossip.

In F105, there was a flat wage structure and perceived high fairness. Leaders were more likely to gossip, and people who valued group values were more likely to gossip negatively.

In workgroups F106a, F106b, F106c, and F106d from the same company had high perceived cooperation and fairness. In some cases, gender, group values, and net wage levels were correlated with sent gossip ties.

In conclusion, we can establish that the examined workgroups had considerable differences in their organizational culture and perceived values such as cooperation and fairness of distributing the goods or promotional opportunities. Perceived group values (where someone was made popular if followed group positive values) had a correlation with both negative and positive gossip, while perceived cooperation was only correlated with perceived cohesion. Perceived low fairness, in most cases, was associated with negative gossip. Demographic variables as someone's gender, leadership position, or education were associated with gossip in some workgroups and not others. Promotion opportunities and net wage levels only correlated with gossip in some of the companies.

In the chapter "Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations" we selected three organizations to see whether gossip is driven by different factors taking the organizational context into account. F101 was an obvious choice where the values for cooperation by the employees' perception are high, but also cooperation is fostered by the management. The perceived fairness is high, and the wage distribution is flat. On the other hand, both A104 and P102 are low in the perceived cooperativeness and fairness, operating outside the IT sector. We expect these organizations to demonstrate other mechanisms for gossip than the lack of cooperation or free-rider exclusion. P102 is a competitive place, while in A104, people are stressed and work under pressure. Another interesting distinguishable characteristic is that A104 is the workgroup with the most female employees, while P102 is the one with the most male employees.

4. Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations

4.1 Introduction

Employees are largely concerned about their formal and also their informal position in the organization. This concern shapes their social and organizational identity, the meaning they attach to their work but also affects self-esteem and overall self-concept. To satisfy this concern, employees continuously make social comparisons with other employees (Beersma *et al.*, 2003). Important dimensions of these comparisons are performance in formal tasks, benefits, and promotions received, treatment by the managers, and wages.

Objective inquiry to the elements of social comparison is hardly possible for a regular employee. Hence, individuals form and maintain perceptions about formal tasks, treatment by the managers, promotion received, wages, and others' benefits. This is done by keeping an informal track of individual tasks and benefits received. The mostly unconscious book-keeping of relative positions helps to evaluate individuals' own relative position in the organization. The resulting comparisons that might be factual or exaggerated could either be perceived as favorable or unfavorable. Favorable comparisons improve self-esteem and do not imply strategic behavior to correct for the situation. Unfavorable comparisons lower self-esteem and are painful if perceived differences are not in line with perceived effort, expertise, merit, and the amount of work conducted. Unfavorable comparisons with coworkers can induce multiple coping strategies as exiting the organization or undermining the others. Social undermining is often done through relational aggression, such as negative gossip about coworkers. In this study, we hypothesize that negative gossip is a consequence of unfavorable comparisons, perceived organizational injustice, and envy of other's positions.

4.2 Negative Gossip at the Workplace as a Result of Social Comparison

Unfavorable comparisons with a discrepancy between merits and positions are felt unjust. They cause psychological tension or distress, lack of comfort, and often imply envy and frustration. There are several psychological and social strategies to cope with such discrepancies and manage emotions and reduce anxiety (Michelson and Suchitra Mouly, 2004; Mills, 2010; Roberts *et al.*, 1999). Some strategies are behavioral responses that

have social consequences. Among them, some forms of action can be considered as strategical reactions to these stressful comparisons.

Unfavorable situations are relaxed by conscious decisions on loyalty (deference), exit, or voice (Hirschman, 1970). Loyalty could mean full adherence to perceived injustice and acceptance of the inferior relative position in the formal or informal hierarchy (Cook *et al.*, 1988; Della Fave, 1980; Labianca and Brass, 2006; Stolte, 1983). An unfavorable comparison often induces dislike and hate of those who have gained high formal or informal positions undeservedly (Labianca and Brass, 2006; Pál *et al.*, 2016). Dislike and hate do not fully resolve anxiety and stress but do not cause major social turmoil in the organization unless they are publicly revealed. Exit strategies such as searching for external career options are typically endorsed by unfavorable comparisons within the organization. Anticipation of exit is largely influenced by comparison mechanisms inherent in the informal social network (Kratzer and Takács, 2007). Among all, voicing concerns of injustice has the most severe consequences for the organization. They could materialize in complaints to the manager and colleagues.

Social undermining is a less transparent alternative strategy that directly attempts to undermine the target's relative position who is perceived to occupy an undeservedly high formal or informal position in the organization (Duffy *et al.*, 2002; Posthuma *et al.*, 2014). The perceived discrepancy is manifested in relational aggression towards the target person (Pál *et al.*, 2016) and, as such, might not be a truly different construct from bullying (Duffy *et al.*, 2002; Hershcovis, 2011). Social undermining is explicitly intended to lower or to ruin the reputation of the target and their abilities to establish and maintain positive relationships and work-related success (Duffy *et al.*, 2002; Hershcovis, 2011). If successful, the target's authority is questioned, and the legitimization of their position is underscored. As a result, the targets might find themselves in a difficult situation and might be forced to show more loyalty, affection, cooperation, or step down. In extreme cases, social undermining could even lead to social exclusion (Wert and Salovey, 2004).

Social undermining can take various forms, including the insult, deceit, making to feel incompetent, belittling, talking down the target, or spreading rumor and negative gossip about them (Duffy *et al.*, 2002; Hershcovis, 2011). Some of these forms occur in direct interpersonal interactions, while others are indirect. Negative gossip is talking bad about a third person behind their back (Crick *et al.*, 2001; Duffy *et al.*, 2002, 2012; Ellwardt, Labianca, *et al.*, 2012; Faris, 2012). In other words, it is informal communication that evaluates a third person who is not present negatively (Eder and Enke, 1991; Ellwardt,

2011; Kurland and Pelled, 2000). Negative gossip is a manipulation of the third person's (the target's) reputation and social relationships without their direct knowledge (Little *et al.*, 2003). Therefore, gossip has a triadic character by nature. We analyze the motivations of the sender in relation to the target. The receivers receive the gossip and might change their evaluation of the target person consequently.

Negative gossip directly lowers or ruins the reputation of the target in the eye of the receiver (Feinberg *et al.*, 2014; Wu *et al.*, 2016a); hence it can be a strategic tool to destroy the good standing of others (Van de Bunt *et al.*, 2005; Wittek and Wielers, 1998). If it is successful, the sender's relative position is improved compared to the target, and the perceived injustice is decreased. In this perspective, negative gossip is a political tool (Besnier, 2009). Moreover, negative gossip has been documented to have an immediate positive effect on the sender as it relaxes stress and causes relief (Feinberg *et al.*, 2012).

Within an organizational context, career opportunities, formal positions, workplace authority, and salary are important determinants of the organizational hierarchy and are the bases of interpersonal comparisons. We expect that the sender's unfavorable position within the company will trigger negative gossip, especially when the workplace conditions are fixed, and it is hard to achieve a better position. Negative gossip is expected to be aimed toward those colleagues who are perceived to be in a better position undeservedly. Although others' salary is usually not known precisely, a perceived higher wage, which is considered undeserved, is expected to trigger negative gossip. This is true, especially in the case when sender and target are on the same level of the hierarchy, and the comparison is more meaningful. Direct competitors whose reputation loss could directly benefit the sender are expected to be primary targets.

Competition for formal and informal positions is a major source of relational aggression (Faris and Ennett, 2012; Faris and Felmlee, 2014). In addition to formal positions, a target of competition and a determinant of relative position in the organizational hierarchy is salary. Employees not only care about their wages but also about their salaries compared to other coworkers' salaries (Loch *et al.*, 2000). Most organizations, however, do not reveal the salaries of employees publicly, which can be considered reasonable because employers may achieve perfect discrimination and higher profit with anonymity and bilateral agreements. To maintain information asymmetry, employers may even enforce secrecy of wages by acting as saviors of employee privacy. Job interviews are always private, and negotiations about the salary are discretional. In a similar vein, premia and bonuses are emphasized to be of private concerns.

Consequently, there is uncertainty among colleagues about the wages of others in an organization, and employees develop perceptions about others' wages as guidelines to evaluate their own relative position in the organization. Envy is based on these perceptions rather than on actual salary differences. In a competitive environment, we believe being excluded from salary upgrades, being discriminated against by the boss, and perceived wage differences could trigger envy and lead to the social undermining of the target through negative gossip.

While financial incentives are not revealed publicly, it is often clear who is receiving a salary raise. The lack of promotional incentives can cause frustration for employees. It is particularly frustrating if the employee has been excluded from a raise. Similarly, other resources could also be discretional in the organization. Executives have favorite employees who have more access to these resources than others. Frustration could follow from such relational disadvantages (Gaines and Jermier, 1983).

We postulate social comparison motives largely drive that who is gossiping about whom in an organization. Self-identification takes place through the lens of social comparison to relevant others. A frequent emotional consequence of unfavorable comparison is envy, which is a desire to achieve the target's position and possessions either by improving own or demolishing the target's position or possessions (Bedeian, 1995; Dogan and Vecchio, 2001). Envy is a relational concept between two actors that are, in our case, the sender and the target (Dogan and Vecchio, 2001). Experiencing envy is unpleasant; it, therefore, triggers cognitive mechanisms and actions to avoid it. A typical reaction is to devalue the person who possesses the envied attribute (Elster, 1991). Envy does not necessarily lead to gossip. Being envious might also lead to harmless tactics such as wage negotiation (Elster, 1991), learning, or working harder (Cohen-Charash and Larson, 2016; Floyd and Sterling, 2017). When opportunities are not scarce, employees tend to feel better and intend to keep up with the envied ones instead of undermining them (Gershman, 2014; Welsch and Kühling, 2015). In such circumstances, there is no reason to expect negative gossip to be driven by envy.

Envying a person could also materialize in direct offense of the target (Cohen-Charash and Larson, 2016). The direct intimidation approach is in line with gossip's function to influence status and power relations within the organization. Both intimidation and negative gossip can be utilized for individuals as a social tool to enhance their power and status within the group. This is more realistic when the sender is a direct competitor of the target. In terms of social comparison, if people envy those who are like them since

proactive strategies are more meaningful in these relationships (Welsch and Kühling, 2015). Previous research has underlined that formal positions, as well as informal status, is influenced by both the contribution of an individual and other, non-productive social behaviors such as deceit, manipulation, and negative gossip (Loch *et al.*, 2001, 2000; Lund *et al.*, 2007; Washington and Zajac, 2005).

The causal attribution theory argues that people are more likely to expect success and are more likely to attribute success to their own behavior than other factors. Simultaneously, they are more likely to attribute failure to external factors and not to their own behavior. The reason behind attribution might be to protect one's self-esteem.

The effect of attributing success to one's efforts is mediated through motivation. If a person had high motivation, it is more likely to self-attribute success. A competitive environment can act as a motivational factor and induce self-serving attribution (Zuckerman, 1979). The attributional model of motivation describes a complex relationship between feelings, thoughts, and acting. Interpersonal feelings related to attribution theory are feelings as anger or pity. One social consequence of attribution is peer acceptance or rejection (Graham, 1991). Attribution theory plays an important role in all workplace behaviors, which are reward-oriented and employee relationships as the leader-subordinate relationship (Martinko *et al.*, 2011).

If an unfavorable social comparison is made with a colleague, people will be more likely to attribute their failure to external factors and the colleague's success to luck or other undeserved characteristics. Anger toward the colleague and social rejection might be a natural reaction of an employee. Competitive environments might be more likely to foster attribution of others' success to undeserved factors.

We can conclude that people can express their norms, powerlessness, feelings of envy, and injustice by talking about others. This follows from the arguments above in two different ways. First, gossip could be a reflective strategy to perceived injustice that helps to relax relative deprivation internally, which typically happens unconsciously. Second, gossip could be a proactive and intentional strategy that aims to lessen relative deprivation by downgrading the target's public reputation (Gambetta, 2009; Gholipour *et al.*, 2011; Michelson and Suchitra Mouly, 2004; Rosnow and Gary, 1976). Typically, both elements are present to a certain extent in the same gossip event and jointly reduce discrepancy experienced by the individual (Dogan and Vecchio, 2001; Kisfalusi *et al.*, 2019; Roberts *et al.*, 1999; Wert and Salovey, 2004).

In this study, our central hypothesis is that negative gossip is often the consequence of unfavorable comparisons, perceived injustice, and envy within the organization. A large body of social psychological and sociological literature emphasized the importance of social comparisons and relative deprivation for individual beliefs, attitudes, and behavior (Merton, 1957; Shibutani, 1955; Stouffer *et al.*, 1949). Evaluation of other people that are not present is the comparison itself (Festinger, 1954; Wert and Salovey, 2004).

We anticipate that if employees, based on their wage perceptions, evaluate their position unfavorably compared to others and believe that this relative difference is undeserved, they will be more likely to gossip negatively about colleagues they envy. We investigate whether unfavorable relative comparisons about perceived wage and the potential envy and frustration resulting from these constitute a key mechanism that explains others' malicious gossip in organizations. As negative gossip can result from a wide range of factors, we investigate whether unfavorable social comparison or other mechanisms serve as appropriate explanations. Other potential explanatory mechanisms and factors, such as the mocking of targets with low reputation, punishment for free riding in cooperative tasks, and a perceived misfit of the target to the team, will be controlled for in the analysis.

4.2.1 Alternative explanations of negative gossip

One key function of gossip is social bonding between the sender and the receiver (Dunbar, 1998, 2004). For this function, it is important who is gossiping *with* whom. Instead, the current study focuses on the question of who is gossiping *about* whom, as we believe this question is more important from the organizational perspective that aims to prevent relational aggression, social undermining and aims to improve the cohesion of the group.

The second line of explanation for gossip is that gossip is an important tool to maintain group norms and enforce cooperation (Dunbar, 2004; Hess and Hagen, 2006; Nowak and Sigmund, 2005; Tholander, 2003; Wu *et al.*, 2016b). People gossip to transmit reputational information to punish or to exclude norm violators and free riders, as a form of informal sanction (Ellwardt *et al.*, 2012). An individual's reputational information is based on their past contribution to the group and helps future partner selection for cooperation (Hess and Hagen, 2006). The mechanism works the following way: individuals who fail to cooperate will be informally sanctioned by gossip. Their reputational information is transmitted via gossip so that other group members can avoid cooperation with them. It is possible that perceived cooperation problems are positively associated with negative gossip; according to this explanation, frustration and feelings of

injustice originate in the norm violations or free-riding by the target. Hence, negative gossip that punishes norm violators is desirable from the organizational perspective.

In addition to these main explanations, one should control for structural dependencies related to the internal relational logic of who could be the target of negative gossip. First, just as positive relations, malicious informal activities are often reciprocated (Kisfalusi *et al.*, 2019; Pál *et al.*, 2016). The reciprocation of negative gossip by the target towards the sender could have a direct reason for retaliation, could build up from frustration of the sender and the development of mutual negative sentiments, or could simply follow from the fact that these individuals are competitors for certain resources such as for promotion. Second, just as for popularity in friendship relations, negative gossip could spread, and a Matthew-effect could be observed according to which targets of negative gossip are likely to become the target of negative gossip also by other senders. This can arise from a network spread and a general perception of injustice or public condemnation of norm violations or free riding. Third, gossipmongers are more likely to gossip negatively about other persons as well. This could be explained by personality characteristics or by unequal communication skills and opportunities.

4.3 Hypotheses

4.3.1 Social comparison

In this study, we are able to make inferences on two grounds of social comparison: salary raise and perceived wage differences. Within the workplace, these factors are clearly at the center of attention. We will examine the effect of unfavorable social comparisons in these dimensions on negative gossip controlling for other factors.

It is naturally felt disadvantageous when the employee has been excluded from the last raise. Driven by frustration, envy, and attributing their own failure and coworkers' success to external factors, we hypothesize that employees who did not get a raise are more likely to gossip negatively about colleagues who did. This can be expressed by combining the effects of variables describing the salary raise of the sender, the raise of the target, and their interactions (Table 15). We expect gossip by the sender about the target to occur when the sender did not receive a raise, while the target did.

H1a (raise for the sender): Employees that did not get a raise last raise are more likely to gossip negatively.

H1b (raise for target): Employees that received a salary upgrade during the last raise are more likely to be the target of negative gossip.

H1c (raise interaction): Employees who did not receive a salary upgrade during the last raise are more likely to gossip negatively about those who did.

Table 15. Summary of hypotheses[16]

Variable	Sender	Target	Prediction on negative gossip (sender about target)
Raise for sender	+	-	+ (H1a)
Raise for target	+	+	+ (H1b)
Raise interaction	-	+	+++ (H1a+H1b+H1c)
Earnings undeservedly (earns more money and others despise)	< ⟶	despised	+ (H2)
Envy of earnings (wage reduction)	⟶		+ *(H3a)*
Envy of treatment by executives (executive's pet)	⟶		+ *(H3b)*
Hierarchical position (leader interaction)	=		+ (H4a)
Hierarchical position (legitimate leader)	< &	earnings <	- (H4b)
Cooperation problems (would not cooperate)	⟶		+ *(H5a)*
Misfit	⟶		+ *(H5b)*
Reputation	⟶		- *(H5c)*

Salient comparisons with others are made not only regarding salary upgrades but also about the gross salary itself. Frustration or envy can be the result of unfavorable perceived discrepancies in wages. Employees are likely to attribute a coworker's success to undeserved factors. A third person who earns more undeservedly will likely be the target

[16] Hypotheses based on network nominations between the sender and the target are written in italic. Network nominations between the sender and the target that enter the hypotheses are indicated with an arrow. H2 and H4b are formulated as interactions of two variables each: earnings and despise nominations (H2) and hierarchical position and earnings differences (H4b).
The variable names can be found in parantesis in case when they are different from the naming in this table.

of negative gossip that can be considered an attempt to reduce the frustration caused by the situation. The following hypotheses consider perceptions that employees hold about each other's wages.

H2 (earns more undeservedly): If a colleague earns more money than the sender and is considered undeserved (despised) by the employee, the employee will be more likely to spread negative gossip about him or her.

As discussed before, negative gossip can be fueled by envy, and it could be a form of a social undermining of more successful colleagues or direct competitors. We expect that when an employee feels the colleague's financial compensation unjustified, with an envious intention, they will spread negative gossip about the colleague.

H3a (envy of earnings): Individuals will be more likely to gossip negatively about targets if they envy these targets' financial position.

Perceived positive discrimination of the target by the boss can drive envy and trigger negative gossip. Those who are personally close to leaders can benefit from their social position. We hypothesize that if individuals consider somebody as an executive's pet, then they will be more likely to gossip negatively about that person.

H3b (envy of treatment by executives): Individuals will be more likely to gossip about a target if they consider the target to be an executive's pet.

Frustration could be the highest if it is arising from close competition. Attribution of own failure might be enhanced in a competitive environment. When the wage difference or differential treatment concerns two employees in a similar hierarchical position, the unfavorable treatment feels particularly painful. These situations are not uncommon since, in general, promotions create differences between employees at the same level of the organizational hierarchy. Employees might realize the strategic importance of gossip in competition, or, alternatively, they might end up in negative gossip due to the frustrating result of the competition.

H4a (hierarchical position): Controlling for other factors, negative gossip will be present more likely between employees who are at the same hierarchical level in the organization.

An unfavorable salary difference between the target and the sender does not necessarily lead to frustration, a perception of injustice, and, consequently, negative gossip. For instance, targets can earn more money due to their higher hierarchical position. A certain extent of salary difference in line with the organization's formal hierarchical structure is

generally considered legitimate. A legitimate difference is unlikely to trigger envy and negative gossip. Hence, when considering the origins of envy, we should not consider the perceived wage difference simply. We need to control for a salary difference instead that exists given the formal hierarchy.

H4b (hierarchical position: legitimate leader): In our models with multiple effects, we expect that if the target is a leader and earns more money than the sender, then negative gossip will be less likely compared to the situation when the target is not a leader and earns more money.

Seniority and work experience can create more frustration in the sender when paired with underappreciation by the company and a comparatively disadvantageous position to other, less senior colleagues. For this reason, we will control for the time of employment at the company in the analysis. Colleagues working for an organization for a longer period could be better informed but could also be less motivated, more frustrated if they were not promoted, and could gossip more likely. Given their stable position, they might also be more visible objects of negative gossip, but due to their stable job position, they could also be more secured from being the target of negative gossip.

4.3.2 Alternative motives behind negative gossip

According to an alternative explanation, gossip is an informal sanctioning tool that is used by members of the organization to sustain organizational norms, to enforce cooperation, and punish free-riders (Dunbar, 2004; Ellwardt, Steglich, *et al.*, 2012; Hess and Hagen, 2006; Nowak and Sigmund, 2005; Tholander, 2003; Wu *et al.*, 2016b). Hence, negative gossip is beneficial for the organization's functioning as it could contribute to the establishment of cooperation.

The organizational context is full of task interdependencies between the employees. When direct punishment is difficult or not possible, gossip is a cheap informal tool to deter colleagues from free-riding (Ellwardt, Labianca, *et al.*, 2012; Sommerfeld *et al.*, 2007). This explanation presumes that the organization functions as a team in which employees are aware of tasks and have some but not full information about individual contributions to these tasks. They exchange information with and about each other and update their reputational beliefs accordingly. Negative gossip brings the consequences of a reputation loss and a potential social exclusion of the target (Feinberg *et al.*, 2014). By connecting the observation or the perception of cooperation problems with gossip acts,

we hypothesize that if senders perceive cooperation problems with the target, they will initiate negative gossip more likely about that target.

H5a (cooperation problems): If an employee perceives cooperation problems with a colleague, then this employee will be more likely to initiate negative gossip about that colleague.

Another more direct measurement of how employees evaluate the performance, the skills, and the contributions of each other is given by their vision of who is fitting and who is not fitting in their team. We have used such a direct measurement in our organizational survey and can link answers directly to negative gossip.

H5b (misfit): If an employee thinks that a colleague does not belong to the team, the employee will be more likely to gossip negatively about that colleague.

Gossip is influencing reputations, but reputations also influence the likelihood of gossip. An employee is not likely to initiate a gossip about a colleague whom they appreciate or respect. Hence, we expect a positive reinforcement loop and a lack of negative gossip about well-reputed targets.

H5c (reputation): If an employee appreciates a colleague, this employee will be less likely to gossip negatively about the colleague.

Due to the lack of context-specific expectations, we do not formulate hypotheses about expected differences between organizations in advance. Still, given organizations are different in several dimensions, our results could also be conditional on certain contextual factors.

4.3.3 Structural effects

Our analysis takes account of the non-independence of observations in the organization. Particularly for gossip and reputation, the embeddedness of relations in the social network structure is not negligible. We control for structural dependencies in the network by using exponential random graph models (Lusher *et al.*, 2013). Our analysis accounts for structural constraints in the network and includes structural effects.

The most elementary dyadic structural effect we control for is reciprocity between the sender and the target. As in social networks in general, gossip ties are also reciprocal, although the extent of reciprocity is not as strong as in the case of friendship (Kisfalusi *et al.*, 2019). Most arguments we discussed underline some level of symmetry: if the sender

gossips negatively about the target, the target also has such motivations. Hence, we predict a positive and significant reciprocity parameter for our models.

A second effect we account for is popularity in terms of being the object of negative gossip. We presume a cascade or a Matthew effect, according to which targets who are subjects of negative gossip are more likely to be subjects of negative gossip also in other informal discussions. This is underlined by organizational network research: negative gossip tends to concentrate on a small number of scapegoats (Ellwardt *et al.*, 2012). Such scapegoating could result from independent observations of norm violations by the target, could be emerging from their undesired personal characteristics, or could also be the result of social influence among colleagues (Burt, 1999).

A third structural effect we account for is a tendency that some people tend to gossip more likely than others. Gossipmongers are generally acknowledged in any social group; they are relatively few, typically well-known, and usually treated with caution (Mills, 2010). We assume that if an employee gossips negatively about a target, they will be more likely to gossip about another target as well.

Due to the lack of context-specific expectations, provisionally, we do not formulate hypotheses about expected differences between organizations. Still, given organizations are different in several dimensions, our hypotheses could also be conditional on certain contextual factors.

4.4 Workplaces

We selected organizations for our study in Hungary. As the first step, we attempted to contact the CEOs of the companies first. After their agreement and negotiations with the HR managers, we asked employees to participate in a survey of approx. 45 minutes. For studying social networks, a high participation rate (over 80%) is a crucial requirement; therefore, some of our attempts failed.

We report data and analysis from three organizations we first acquired access to in 2016 and 2017. The three organizations are different with respect to norms and organizational culture, making it possible for us to investigate the universality of explanations. We handle the organizations as case studies and report the results of the same analyses conducted separately for them. As noted in subchapter 3.6.1, we restrict our attention to the following three organizations for the current analysis: the workgroup F101 had a flat wage distribution, high perceived fairness, and high perceived cooperation that was also fostered by the management; employees of A104 consist of mostly female members,

exhibited stress and feeling under pressure in their work, and demonstrated low perceived cooperativeness and fairness; P102 is a competitive workgroup of mostly males with also low levels of cooperativeness and fairness as perceived by its members. The latter two groups operate outside IT. For more information on these work groups, please refer to subchapter 3.4.

We searched for organizations with 20-30 employees, which we consider an adequate size for a social network study because colleagues likely know each other. A smaller size would not make certain social network analyses meaningful, and filling in a full-rooster questionnaire with numerous network questions would be time-consuming in larger organizations. We searched for organizations with the required size or were well-bounded organizational units in larger companies with the required size.

We conducted the same survey in each organization. We asked employees about their wage perceptions, reputational concerns, cooperative intentions, social relations to others, and gossip. Our survey has been supplemented with qualitative interviews about the organization with the managers and HR specialists. These interviews allowed us to get insight into the dynamics inside the organization.

4.5 Methodology

4.5.1 Measures

4.5.1.1 Key variables

Our dependent variable is a network item. The concept of gossip has a negative connotation and implies a social desirability bias on respondents. Therefore, similarly to other research programs, we avoided the use of the word "gossip." Also, in contrast to the perspective that is used elsewhere (Kisfalusi *et al.*, 2019), we did not rely on nominations by the sender but on the memories of the receiver. We asked respondents whether their peers shared negative evaluative information about a third colleague who was not present. This measurement strategy follows work on organizational gossip (Ellwardt, 2011; Kurland and Pelled, 2000) and has been chosen because senders might have considered negative gossip they spread as more confidential than receivers. We asked respondents to indicate from whom they received information and about which colleague. After that, we asked them about the nature of the information, where they could have selected negative, neutral, or positive. This question was repeated because respondents were able to reconstruct multiple gossip triads in which they were receivers. Based on respondents' replies, we have reconstructed sender-target negative gossip nominations.

The operationalization of key independent variables and networks are summarized in Table 16. While selecting dyadic variables based on theory, we considered that the networks should be relatively uncorrelated. In subchapter 5.2.1.1, we can see that the items presented in Table 15. are not directly related to each other. The highest Jaccard index between the two explanatory networks is 18%. More about Jaccard indexes can be seen in Appendix 9.3.

Salary raise (H1) was asked from the employees and entered the analysis as a dichotomous variable. Hence, all tests of H1 are based on self-response. When testing H1, we implicitly assumed that employees are aware of who has been rewarded with a salary rise and who was not.

Table 16. Description of key variables

Abbreviation	Hypothesis	Actual question/statement/source of the data	Explanation	Type
years at company of sender	Control	Question: In which year did you start working at this company?	The higher the year, the later the employee started to work at the company	Continuous variable, sender effect
years at company of receiver	Control	Question: In which year did you start working at this company?	The higher the year, the later the employee started to work at the company	Continuous variable, receiver effect
years at company difference	Control	Question: In which year did you start working at this company?	The higher the year, the later the employee started to work at the company	Continuous variable, difference between sender's and receiver's years at company
raise of sender	H1a	Question: In percentages, how much did your net salary increase the last time you received a raise?	If the respondent received a raise, then the value of the variable is 1, if not, then 0	Binary variable, sender effect
raise of receiver	H1b	Question: In percentages, how much did your net salary increase the last time you received a raise?	If the respondent received a raise, then the value of the variable is 1, if not, then 0	Binary variable, receiver effect
raise interaction	H1c	Question: In percentages, how much did your net salary increase the last time you received a raise?	If the respondent received a raise, then the value of the variable is 1, if not, then 0	Binary variable, interaction effect
earns more money	Control	Statement: He earns more or much more money than I do	Control network	Dyadic
earns more money and others despise	H2	Statement: He earns more or much more money than I do AND Statement: Others despise him/her	Explanatory network	Dyadic, interaction effect
wage reduction	H3a	Question: Imagine that you are the CEO who executes a cost reduction. Mark that employee whose wage you would reduce.[17]	Explanatory network	Dyadic
executive's pet	H3b	Statement: (He/she is) the executive's pet	Explanatory network	Dyadic
leader interaction	H4a	Data from the HR department: Employee is leader or not leader	Leaders expected to gossip about leaders and non-leaders about non-leaders	Binary variable, interaction effect
legitimate leader	H4b	Combination of: Data from the HR department (Employee is leader) AND Statement (He earns more or much more money than I do)	Explanatory network of: 'He earns more money than I do', only if target is a leader	Dyadic
would not cooperate	H5a	Question: Who would you not wish to cooperate with at all?	Explanatory network	Dyadic
misfit	H5b	Statement: He/She does not belong to the team	Explanatory network	Dyadic
reputation	H5c	Statement: I appreciate this person.	Explanatory network	Dyadic

[17] An indirect way to measure envy through perceiving undeserved wage as we assume that employees would not admit to envy

In contrast, network items were used to test H2. Respondents were asked to mark those colleagues who earn more money and, in another item, those individuals that colleagues despise. The interaction of these items and the main effects of these network nominations were included in the analysis as dyadic covariates. We hypothesize that a higher wage of the target can induce discrepancy and frustration when perceived as undeserved.

H3 expressed hypotheses related to dimensions of envy. In general, it is difficult to measure envy, and its survey measurement concerning the position of another employee could particularly be sensitive. Therefore, we avoided the term "envy" in our survey items and did not ask employees directly whether they envy others' earnings. Instead, we asked them to position themselves in the place of the CEO. We asked the following question: "*Imagine that you are the CEO who executes a cost reduction. Mark employees whose wage you would reduce."* This network item implicitly includes a relativizing element. For hypothesis H3b, we measured envy regarding personal position by asking respondents of whom they consider being the executive's pet. Hence, this has also been included as a dyadic covariate in the analysis.

The organizational units in our study are small and quite flat. Therefore, we distinguished only two levels of hierarchy: the level of managers (leaders) and the level of other employees. We expect that leaders will compare themselves more to leaders than to non-leaders (H4). Moreover, we argued that it is more likely that a non-leader employee will be envious of another non-leader's salary because they are at the same level of the organizational hierarchy.

To test H5, respondents were directly asked who they would not wish to collaborate with at all (H5a); who they think does not belong to the team (H5b); and whom they appreciate. We entered these dyadic covariates as explanatory variables in the models explaining gossiping about that person.

4.5.1.2 Control variables

We used years spent at the company as a control variable. We used the years spent at the company by the sender and the target as predictors of negative gossip. We also included their interaction. We presumed that a difference in years spent at the company could be important for negative gossip from one about the other.

Although we consider gender a possible explanatory variable, we did not use it as a control since P102 only had one female employee. We run additional models with other control variables, such as organizational commitment, perception of fairness, and job

satisfaction. None of them added important insights to the analyses reported. Also, to supplement H2 that included “earns more or much more money” as a dyadic co-variate, we attempted to add the network item “earns the same amount of money” among the explanatory variables, but these models did not work. Moreover, we also executed further models that controlled for the time of last promotion in the organization. Employees who have not been promoted for a long time could have been expected to be more frustrated and gossip negatively more likely. We have not found any support for this argument.

4.5.2 Statistical methodology

Most of our concepts are relational terms, making it straightforward to apply social network analysis and control for the non-independence of observations within the team. Social network methods allow us to analyze employees in their social environment and explore mechanisms present within the organizational team's bounded context.

We conducted Exponential Random Graph Models (ERGMs) for each team individually to test which factors are significant predictors of negative gossip. Exponential random graph models (ERGMs) are a class of statistical models applied for network data (Lusher *et al.*, 2013). They provide a model for the existing network structure by considering existing and possible ties in the structure. A model is built by considering local patterns of ties in the graph, such as reciprocated ties, triangles, and others, to explain observed ties' emergence. In addition to sender and receiver effects, interactions between them, and dyadic covariates, our chosen structural parameters were those of theoretical interest, namely reciprocity, In2Star (popularity), and Out2Star (gossipmonger) effects. ERGM models are estimated using Monte Carlo methods (Lusher *et al.*, 2013). We used the PNet software developed by researchers at the University of Melbourne, Australia (Wang *et al.*, 2006).

4.5.3 Executed models

We tested the hypotheses by estimating four kinds of models. The first models only contained non-perception variables; these concerned hypotheses H1 (raise) and H4 (leadership). Also, they included the fundamental structural parameters and incumbent seniority (years at the company) for the sender, receiver, and their similarity. These variables were also included in the other models. The second model is extended to test the main hypotheses concerning salary perceptions (present in H2 and H4b). The third models contain a joint test of all hypotheses derived from our main arguments (H1, H2, H3, and H4). The last models also include H5 that is based on alternative explanations of negative gossip.

4.6 Results

4.6.1 Norms and perceptions within the selected workgroups

First, we present descriptive statistics that illustrate general opinions from the employees regarding the three organizations and the organizational norms therein. To measure organizational norms, we relied on existing literature and survey items about job satisfaction to identify relevant questions capturing each norm. The survey items listed together are meant to capture one organizational norm.

Employees from A104 and P102 generally do not agree that wages, benefits, opportunities, and the acknowledgment of employees are divided fairly (Table 17). All fairness items were inspired by Churcill Jr. et al.'s job satisfaction survey (1974, p. 6), capturing wage, opportunity, and acknowledgment dimensions of fairness. The results are in line with our experiences from the interviews. Employees from A104 are exposed to extreme pressure, and workers of P102 constantly compete for clients. It seems plausible that they perceive their workplace as "less fair."

Table 17. Perceived fairness/equity within the company.

		I believe the wages and benefits are divided fairly	I believe the opportunities to advance one's skills and career are divided fairly	I believe the employees are acknowledged fairly
A104	Mean	-0.63	-0.75	-0.83
	SD	*1.01*	*0.99*	*0.96*
P102	Mean	-0.38	-0.24	-0.43
	SD	*1.12*	*1.37*	*1.29*
F101	Mean	0.39	0.83	0.74
	SD	*0.70*	*0.71*	0.87

Note: Measured on a five-grade scale from -2 being "Strongly disagree," through 0 being "Cannot decide" to 2 being "Strongly agree."

For the perceived cooperation or competition within the company, we asked the employees which one they think makes the company more effective or successful. All mean opinions were positive regarding whether cooperation generally helps (Table 18). The competition is slightly more valued in P102 as they constantly must demonstrate their

competence by succeeding with their clients. Each month, their income is based on their performance, while clients need to be divided among them. Employees from A104 think the least that competition between employees would help the company.

Table 18. Employee opinions about cooperation vs. competition.

		The company can be the most successful if its employees cooperate effectively	The company can be the most effective if its employees share a healthy sense of competition between each other
A104	Mean	1.29	-0.29
	SD	*0.75*	*1.27*
P102	Mean	1.43	0.71
	SD	*0.75*	*0.90*
F101	Mean	1.68	0.32
	SD	*0.48*	*0.95*

Notes: Measured on a five-grade scale from -2 being „Strongly disagree," through 0 being „Cannot decide" to 2 being „Strongly agree."

The items from Table 19 were intended to measure how coworkers work together, form a team, and perceive the workgroup as a cohesive community. Based on these three questions, employees from F101 seem to have the most cohesive group: employees from F101 gave the highest ratings for each question, followed by the employees of A104. Employees from P102, on average, do not agree that they form a cohesive community.

Table 19. Sense of community within the organizations studied.

		My coworkers do their job well	We work well as a team	My coworkers and I form a cohesive community
A104	Mean	0.79	0.75	0.38
	SD	*0.72*	*0.94*	*0.97*
P102	Mean	0.29	0.10	-0.29
	SD	*0.96*	*1.14*	*1.31*
F101	Mean	1.00	1.21	1.00
	SD	*0.67*	*0.54*	*0.58*

Notes: Measured on a five-grade scale from -2 being "Strongly disagree," through 0 being "Cannot decide" to 2 being "Strongly agree."

Descriptives indicate that employees of F101 have a sense of being a community (Völker *et al.*, 2006). Employees from A104 also perceive their group as a good and cohesive team, but they are not satisfied with the way resources are divided. P102 has a different climate as employees perceive it as more competitive, less fair, and without a sense of community at work. As the wages are dependent on productivity, we speculate that envy and financial incentives are probably more important driving factors of behavior in P102 than in the other organizations.

4.6.2 Social network characteristics

Table 20 demonstrates the density of the dependent (negative gossip) and the explanatory networks in the organizations studied. All of these networks are sparser than friendship but have a sufficient number of nominations to be analyzed.

Table 20. Network densities

Network	A104(N=24)	P102(N=22)	F101(N=19)
Negative gossip about target	0.16	0.17	0.07
Imagine that you are the CEO who executes a cost reduction. Mark that employee whose wage you would reduce.	0.07	0.09	0.05
He/she earns more or much more money than I do.	0.14	0.18	0.08
Executive's pet.	0.04	0.11	0.10
I would not cooperate with him/her.	0.04	0.06	0.02
I appreciate this person.	0.14	0.18	0.39
He/she does not belong to the team.	0.02	0.05	0.02

4.6.3 Explanatory models

Detailed results of the four kinds of models for each organization are displayed in Table 21 - 24. If a model converged, we conducted a goodness-of-fit test. The detailed, goodness-of-fit statistics are included in Appendix 9.4. We tested the hypotheses by estimating four kinds of models.

The first models only contained non-perception variables that concerned hypotheses H1 (raise) and H4 (leadership). Also, they included the fundamental structural parameters and incumbent seniority (years at the company) for the sender, receiver, and their similarity. These variables were also entered in the other models.

The second model is extended to test the main hypotheses concerning salary perceptions (present in H2 and H4b). The third models contain a joint test of all hypotheses derived from our main arguments (H1, H2, H3, and H4). The last models also include H5 that is based on alternative explanations of negative gossip.

Table 21: First family of models without subjective variables

		A104 (N=24)				P102 (N=22)				F101 (N=19)			
	Effects	P	Stderr	t-ratio		P	Stderr	t-ratio		P	Stderr	t-ratio	
S	Reciprocity	1.70	0.42	0.04	*	1.62	0.47	-0.04	*	3.02	0.93	-0.08	*
S	In2Star	0.23	0.02	0.03	*	0.30	0.02	0.01	*	0.29	0.13	-0.04	*
S	Out2Star	0.12	0.05	0.08	*	0.10	0.10	-0.03		0.39	0.05	0.03	*
	years at company of sender	-0.40	0.13	-0.07	*	-0.17	0.06	0.04	*	0.20	0.12	0.01	
	years at company of receiver	-0.09	0.09	0.02		0.02	0.02	0.00		-0.32	0.15	0.01	*
	years at company difference	-0.27	0.11	0.04	*	-0.05	0.04	0.05		-0.10	0.13	-0.02	
H1a	raise of sender	-0.15	0.31	-0.07		0.29	0.26	-0.05		0.58	0.76	0.07	
H1b	raise of receiver	-0.01	0.25	0.01		0.89	0.39	-0.02	*	0.18	0.82	-0.03	
H1c	raise interaction	0.14	0.51	-0.01		-1.64	0.88	-0.06		-0.41	1.00	0.01	
H4a	leader interaction	0.63	0.31	-0.03	*	-0.36	0.58	-0.03		-0.57	0.98	-0.01	

Table 22: Second family of models with wage perceptions

		A104 (N=24)				P102 (N=22)				F101 (N=19)			
	Effects	P	Stderr	t-ratio		P	Stderr	t-ratio		P	Stderr	t-ratio	
S	ReciprocityA	1.73	0.43	0.04	*	1.62	0.47	-0.06	*	2.92	0.89	0.03	*
S	In2StarA	0.23	0.02	0.07	*	0.29	0.02	-0.03	*	0.29	0.12	-0.04	*
S	Out2StarA	0.12	0.05	-0.02	*	0.10	0.10	-0.04		0.40	0.04	-0.02	*
	years at company of sender	-0.38	0.13	0.03	*	-0.16	0.06	0.01	*	0.20	0.12	0.03	
	years at company of receiver	-0.12	0.10	0.03		0.01	0.02	0.08		-0.32	0.15	0.02	*
	years at company difference	-0.29	0.11	-0.01	*	-0.04	0.04	0.05		-0.10	0.13	0.03	
H1a	raise of sender	0.78	0.39	0.03		0.21	0.68	-0.02		-0.42	0.97	-0.05	
H1b	raise of receiver	0.01	0.32	-0.03		0.89	0.41	0.03	*	0.61	0.74	-0.02	
H1c	raise interaction	0.09	0.26	0.02		0.25	0.28	0.02		0.27	0.88	-0.01	
	earns more money	0.17	0.36	0.04		0.27	0.22	-0.06		-0.58	1.18	-0.03	
H2	earns more and others despise	2.49	0.91	-0.01	*	-0.43	1.15	0.06		1.87	1.64	0.00	
H4a	leader interaction	0.08	0.51	0.01		-1.56	0.88	0.04		-0.53	1.04	-0.02	
H4b	legitimate leader	-0.61	1.27	0.07		-6.39	18.40	-0.06		-2.53	13.12	-0.08	

Table 23: Third family of models, including envy

		A104 (N=24)				P102 (N=22)				F101 (N=19)			
	Effects	P	Stderr	t-ratio		P	Stderr	t-ratio		P	Stderr	t-ratio	
S	ReciprocityA	1.77	0.40	0.01	*	1.63	0.45	0.00	*	3.01	0.93	0.05	*
S	In2StarA	0.23	0.02	-0.05	*	0.29	0.02	-0.01	*	0.30	0.13	-0.03	*
S	Out2StarA	0.12	0.05	-0.03	*	0.11	0.10	0.05		0.40	0.06	0.01	*
	years at company of sender	-0.35	0.13	-0.03	*	-0.14	0.06	-0.06	*	0.26	0.14	0.01	
	years at company of receiver	-0.07	0.10	-0.05		-0.01	0.03	-0.03		-0.30	0.16	0.07	
	years at company difference	-0.23	0.12	-0.01		-0.05	0.05	0.05		0.00	0.15	-0.05	
H1a	raise of sender	0.76	0.38	-0.05	*	-0.13	0.71	0.07		-0.43	1.05	0.05	
H1b	raise of receiver	-0.01	0.32	-0.05		0.95	0.43	-0.07	*	0.47	0.82	0.01	
H1c	raise interaction	0.02	0.27	-0.07		0.38	0.28	-0.04		0.16	0.91	0.04	
	earns more money	0.09	0.38	0.05		-0.02	0.26	0.05		-0.93	1.23	-0.08	
H2	earns more and others despise	2.14	0.97	0.04	*	-0.62	1.15	0.00		2.63	1.70	-0.06	
H3a	wage reduction	0.36	0.40	-0.03		0.98	0.36	0.00	*	1.98	0.65	0.01	*
H3b	executive's pet	1.22	0.54	-0.01	*	0.48	0.34	0.10		0.61	0.84	0.04	
H4a	leader interaction	0.04	0.53	-0.07		-1.72	0.89	-0.04		-0.53	1.07	0.04	
H4b	legitimate leader	-0.62	1.21	-0.03		-6.29	11.31	-0.09		-3.70	18.69	-0.06	

Table 24: Fourth family of models with alternative accounts of negative gossip

		A104 (N=24)				P102 (N=22)				F101 (N=19)			
	Effects	P	Stderr	t-ratio		P	Stderr	t-ratio		P	Stderr	t-ratio	
S	ReciprocityA	1.77	0.41	-0.03	*	1.66	0.46	-0.01	*	3.25	0.99	-0.04	*
S	In2StarA	0.23	0.02	0.04	*	0.30	0.02	-0.03	*	0.33	0.14	0.02	*
S	Out2StarA	0.13	0.06	-0.03	*	0.11	0.10	0.03		0.46	0.08	0.02	*
	years at company of sender	-0.36	0.14	0.04	*	-0.15	0.07	0.02	*	0.20	0.15	0.03	
	years at company of receiver	-0.08	0.11	0.01		-0.01	0.03	0.02		-0.36	0.18	-0.03	
	years at company difference	-0.26	0.12	-0.04	*	-0.04	0.05	-0.04		0.04	0.17	0.02	
H1a	raise of sender	0.71	0.43	-0.08		0.03	0.73	0.02		0.11	1.06	0.03	
H1b	raise of receiver	0.02	0.33	0.05		1.00	0.44	0.02	*	-0.34	0.98	-0.07	
H1c	raise interaction	-0.02	0.28	-0.01		0.44	0.31	-0.06		0.32	0.96	-0.04	
	earns more money	-0.12	0.43	-0.01		0.06	0.29	0.00		-0.68	1.34	0.00	
H2	earns more and others despise	2.33	1.09	-0.01	*	-0.77	1.21	0.00		1.00	2.36	-0.06	
H3a	wage reduction	0.37	0.42	0.02		0.90	0.41	0.04	*	0.95	0.98	-0.06	
H3b	executive's pet	1.52	0.59	-0.02	*	0.68	0.38	0.02		0.20	1.03	0.01	
H4a	leader interaction	0.11	0.55	-0.01		-1.71	0.88	-0.05		0.05	1.22	-0.08	
H4b	legitimate leader	-0.10	1.26	-0.08		-6.41	22.56	-0.05		-4.56	32.12	-0.03	
H5a	would not cooperate	-2.57	1.41	-0.05		-0.47	0.66	0.00		-4.48	1.68	-0.05	*
H5b	not belongs to the team	-1.75	0.83	-0.04	*	0.49	0.58	-0.02		-1.21	1.24	-0.06	
H5c	appreciation	-0.77	0.42	-0.03		-0.48	0.35	0.03		-0.02	0.64	0.04	

Two structural effects were significant in all organizations in all models. Reciprocity seems to be a universal pattern of negative gossip. When an employee gossips negatively about a colleague, that colleague is likely to do the same about the employee. There is also a universal tendency that when somebody was nominated as a target of negative gossip, this person was likely to get further negative gossip nominations from other colleagues. Also, a significant Out2Star effect was present in A104 and F103, but not in P102, which indicates that an employee who gossips negatively about one target is more likely to initiate negative gossip about other targets as well.

In all models, we entered seniority (years spent at the company) as a control variable for the sender, the receiver, and their interactions (difference). The more time an employee spent at the company, the less likely it is to send negative gossip about others in A104 and P102. This effect is significant in all models concerning these organizations, but not in F101. F101 is characterized by less negative gossip about those who spent more time

at the company. Furthermore, in A104, an incumbent seniority difference is also significantly related negatively with negative gossip. Hence, employees are more likely to gossip about those that spent approximately the same time at the organization. Time spent at a company does not seem like a source of frustration in itself.

Results concerning our main hypotheses are all context-dependent. Hypotheses 1 concerned salary raise. The expectation was that a raise of the target, and especially an unfavorable comparison with the target, would induce negative gossip from an employee. This expectation has gained support only in one organization. In P102, the salary raise of an employee triggered negative gossip about that person. This effect was significant in all models.

Hypothesis 2 stated that if a colleague earns more money than the respondent and the respondent perceived the colleague's position as undeserved (despised), they would be more likely to spread negative gossip about this colleague. To test this hypothesis, we included the interaction term, and the main effects for the dyadic variables "earns more money" and "colleagues despise her" in the models. The main effects were never significant. The interaction term "earns more and others despise" characterizes the effect beyond the main effects. We find a confirmation of our hypothesis in A104. The effect size indicates that employees gossip a lot negatively about those who earn more money and are despised in this organization.

Hypotheses 3 concerned envy about earnings and privileged connections to the executive. According to H3a, we expected employees to be more likely to gossip negatively about their colleagues if they envied their financial position. Our test relied on a direct dyadic measurement of a hypothetical salary cut for the target. This hypothesis has been supported in P102 and F101, although in the latter case, the significance disappeared when we entered a variable concerning dyadic cooperation problems in the model. This could be explained as employees have observed difficulties of cooperation with those colleagues for whom they also would have considered salary cuts justified. We did not find support for H3a in A104, probably because of the relative inflexibility of the wage scheme in the organization. In A104, envy was fueled more by unfair advantages from relations to the manager. In this organization, we received support for H3b: those considered the executive's pets were more likely to be the target of negative gossip by respondents who formed these perceptions.

Hypotheses 4 concerned the role of leadership in gossip. In H4a, we expected that negative gossip would be more likely between employees at the same hierarchical level due to hierarchical competition and appropriate social comparisons. We did not find support for this hypothesis in P102 and F101, and in A104 negative gossip was more likely to be spread by a sender who was on the same level of hierarchy as the target, though this effect was significant only in the first and simplest model. When further variables were entered, the significance also disappeared in A104. In H4b, we expected a legitimate difference in the hierarchy would not trigger envy and negative gossip. However, our results do not support that if a colleague is a leader and earns more money than the respondent, then negative gossip would be less likely compared to the situation in which the colleague is not a leader and earns more money.

Hypothesis 5 was based on alternative explanations of negative gossip. We entered explanatory variables concerning this hypothesis in the last and most elaborated models. It is worth mentioning that these models had the best model fit. Gossip might be used as an informal sanction against those who fail to cooperate or do not follow the group's norms. If a respondent experienced problems regarding cooperation with a colleague, we expected that they would gossip negatively about this colleague more likely (H5a). We found support for this hypothesis in F101. Surprisingly, even the parameters' signs are in the opposite direction in the other two organizations studied. We expected that another possible source of negative gossip is a perception that the target does not fit into the team (H5b). This effect was found positive and significant in A104. Our last hypothesis H5c that if the respondent appreciates a colleague, they will be less likely to gossip negatively about that colleague who has not received support in any of the organizations. Hence, social appreciation does not prevent anyone from being selected as a target of negative gossip.

All results should be interpreted cautiously. We have tested several hypotheses at once, which means that all effects should be considered given the other variables entered in the analyses. We summarize these results in Table 25. As the right column indicates, most of our findings are dependent on the organizational context. Regarding perceptions that senders hold about the target, we see different patterns for each organization. Financial envy was associated with negative gossip in P102, the broker company, while perceived cooperation problems were significant in F101. In A104, negative gossip was associated with envy of the other’s social advantages and with social exclusion from the team. The

universal effects are structural. They are good predictors for the formation of negative gossip in each organization.

Table 25. Summary of results

Hypotheses		Effect	A104 (N=24)	P102 (N=22)	F101 (N=19)	Context-specific?
Structural effects		ReciprocityA	++++	++++	++++	universal
		In2StarA	++++	++++	++++	universal
		Out2StarA	++++		++++	contextual
Salary raise	*H1a*	Raise of sender	§§+§			rejected
	H1b	Raise of receiver		++++		contextual
	H1c	Raise interaction				rejected
Earns undeserved	*H2*	Earns more & despised	+++			contextual
Envy	*H3a*	Envy of earnings (wage reduction)		++	+§	contextual
	H3b	Envy of treatment by executives (executive's pet)	++			contextual
Hierarchical position		Leader interaction				rejected
	H4a		+§§§			
	H4b	Legitimate leader				rejected
Alternative accounts	*H5a*	Cooperation problems (would not cooperate)			+	contextual
	H5b	Misfit	+			contextual
	H5c	Reputation				rejected

Notes: Significant parameter signs from Models displayed in Table 21 (1st character), Table 22 (2nd character), Table 23 (3rd character), Table 24 (4th character). Notation: + significant positive, § lost significance, - significant negative.

4.7 Conclusion and discussion

Recognizing its relevance to key organizational outcomes, gossip at the workplace has received considerable attention among scholars (Ellwardt, 2011; Kniffin and Wilson, 2010; Wittek and Wielers, 1998). This study addressed negative gossip and discussed its importance for organizational research considering gossip embedded in the social network. Our major aim was to investigate the relevance of envy and unfavorable social comparisons for negative gossip and contrasted these explanations with alternative concerns, such as negative gossip about those who are obstacles to organizational effectiveness. We derived hypotheses from theoretical considerations, gathered data, and tested our hypotheses using exponential random graph models in three organizations in Hungary.

Negative gossip can originate from a social comparison with another employee (the target). When the comparison is unfavorable for the sender, *envy* could arise. Envy is a desire to have a relative improvement or a takeover of the target's position and possessions (Bedeian, 1995; Dogan and Vecchio, 2001). Negative gossip is one way of coping with the unpleasant emotional state of envy. Negative gossip releases frustration of the unfavorable social comparison, but it might also be an undermining tool (Gershman, 2014). Social undermining could later result in the informal or formal restructuring of the organizational hierarchy or social exclusion. Therefore, negative gossip might be a tool to outcompete targets in a competitive setting by reducing their reputation (Pál, 2016; Pál *et al.*, 2016).

The current study investigated the determinants of negative gossip driven by employees' perceived wage equity, wage differences, competition, and negative gossip usage as a potential undermining tool. We distinguished and focused on envy on others' financial situations and special treatments of others received from the management. As the latter's measurement, we asked employees of whom they considered as pets of the executive in the organization. We argued that an unjustified difference in salaries and the boss's exceptional treatment could create envy. We assumed that negative gossip might be initiated as a form of relational aggression that might be used for undermining and outcompeting the target because of social comparison and envy.

We found that negative gossip is prevalent in all organizations investigated. We have not found overwhelming evidence to support all our hypotheses based on envy. We have not found support that people would gossip negatively about employees who are in a similar hierarchical position. We did find support for some hypotheses related to social

comparison processes and envy in some organizations. In organizations A104 and P102, some envy aspects were important and were strong determinants of negative gossip. Employees tended to gossip more about those who received a wage that was perceived undeserved or when they perceived somebody as the executive's pet, receiving an unfair social advantage. This was not the case, however, in organization F101.

In contrast, in the third organization, F101, negative gossip has also been used as an informal sanction in case of cooperation problems. This is a well-described function of gossip that brings clear benefits to organizational functioning. According to this perspective, negative gossip is a sanctioning tool against free riders and those who violate organizational norms (Ellwardt *et al.*, 2012; Tholander, 2003). Negative gossip leads to reputation loss and the social exclusion of free riders and norm violators. Many researchers have demonstrated a strong relationship between cooperation and reputation, especially the fact that many cooperation acts in human society can be explained by reputational motives (Feinberg *et al.*, 2014; Nowak and Sigmund, 1998, 2005). One basic assumption about gossip is that gossip wrecks reputation but enhances cooperation on a group level (Feinberg *et al.*, 2014; Hess and Hagen, 2006; Nowak and Sigmund, 2005).

Among the control variables that we entered in the analyses, it seems that incumbent seniority is important. Employees who are for longer at a company tend not to gossip negatively in organizations A104 and P102, presumably due to their different motivational and promotional perspectives. As a robustness test, we further explored the impact of additional control variables and interaction variables between our main effects. Such interactions were: makes more money and does not belong to the team; makes more money and is not suitable for the job; makes more money, and I would reduce their wage; earns more money and is the executive's pet. If converged, these models did not add anything significant to the explanation for negative gossip than those reported in the tables.

Overall, our results indicate that negative gossip could be motivated by different main factors depending on the contextual environment. Gossip could be used for informal sanction purposes in some contexts, but it can be a strategical tool against colleagues fueled by envy in others. Differences between the organizations hold importance with respect to the interpretation of the results. Gossip related to financial factors was the most prevalent in P102. It is a broker company where the perceived fairness of the division of goods was the lowest and where the competition was the most valued. The team was perceived as a non-cohesive community, and we did not find evidence that gossip was

used as an informal sanction against non-cooperative employees or who did not fit into the team. Employees of P102 were in constant competition for clients, and the company had a centralized system of distributing them. This mechanism might be a factor why envy and negative gossip were related to financial incentives.

Financial motives were less central in A104. Perceived fairness was also low, but group cohesion was perceived positively, which might be a possible explanation for our results that highlighted the importance of envy's social dimension. Those who were considered the executive's pet and those who were perceived not fitting into the team have received more negative gossip nominations. Presumably, a negative status competition was also a driving motive for negative gossiping.

We see a different pattern of results in F101. Cooperation and cohesion were perceived as very high in the organization. At this company, envy does not seem to be the determinant of negative gossip. Instead, the only significant effect associated with gossip was the perceived cooperation problem between the sender and target. Hence, negative gossip serves to sanction free riders. F101 is a good example of how this form of informal communication could sustain organizational efficiency. The possible reason how the informal and formal functioning could be so integral in this company is that employees can interview all their future colleagues and influence their selection.

While the deepness of the investigation of negative workplace gossip is a unique value of our study, our investigation naturally has its limitations. We cannot have a clear causal explanation as our data is cross-sectional. Another limitation is the focus on negative gossip only. Gossip is not necessarily negative. When it is positive, it could also be used to enhance group norms and cooperation as it rewards cooperators with reputation and offers role models to follow. Gossip could also function to maintain group boundaries and cohesion in a larger organization, and hence its reasons could lie in relations with other teams (Festinger, 1954; Wert and Salovey, 2004). Although we can argue that organizational factors such as organizational culture, organizational practices, and perceptions about the organizations can influence individuals' well-being, behavior, and relationships with other colleagues, there is no way to determine their role using our data. It is also not possible to investigate the content of negative gossip more closely, how exactly it emerged, and how extensive it was in informal communication, as we must rely on survey responses by the employees.

Despite the limitations, the case studies presented in the paper help us understand how organizational norms and perceptions of employees about the organization might shape how negative gossip is used and how negative gossip is interrelated with organizational norms and efficiency. This area of research has the potential to provide new insights concerning informal communication at the workplace and discover its relation to enhance cooperation and reduce frustration among employees.

5. Relational Elements of the Gossip Triad

Gossip is inherently relational and triadic (Giardini and Wittek, 2019). This chapter focuses on a peculiar triad: the gossip triad that forms during the flow of evaluative information between the sender and the receiver about the absent target. Positive, neutral, and negative dyadic ties between the three actors are obtained from a workgroup survey dataset and analyzed using various statistical methods to produce complex configurations that may explain gossip triads' emergence. The obtained configurations are validated and interpreted from the perspective of their correspondence to ones predicted by the relevant scientific literature.

Rival theories explain the high frequency of gossip interactions in human communication, emphasizing its different functions for the group and the implications for the characteristics of the gossip triad. The social bonding hypothesis stresses that gossip replaces grooming between the sender and the receiver, and the target's role in this is less important (Dunbar, 1998). This hypothesis suggests that the sender and the receiver maintain a good relationship in the gossip triad. In an alternative theoretical view, gossip has the function to enforce social norms; it is relational aggression against norm violators and hence aims at demolishing the target's reputation. This implies that the sender has a negative tie to the target, and this negative relationship is more likely to occur between the receiver and the target, partly due to malicious gossip that has already taken place.

This study's basic assumption is that gossip can have several social functions, and these functions are reflected in the relationship between the three participating actors. Reputation destruction is most likely to happen if the sender and receiver have a negative relationship with the target while exchanging sensible information about the target requires a positive bond between the sender and target. Norm enforcing can be assumed to happen when all three actors have positive relationships. If they all have positive relations, they might have a better chance of affecting each other's behavior in favor of the group, the reason being that negative gossip seems to escalate conflict and not resolve it (Wittek *et al.*, 2000). Therefore, a negative relationship toward the target would not be successful in enforcing norms on them. Positive gossip indicates a positive relationship between the actors, while gossip can be neutral, simply serving the purpose of gaining information about the social surroundings.

From structural balance theory (Heider, 1946) and triadic balance (Cartwright and Harary, 1956), we have preliminary expectations about how a configuration of relationships between the sender, receiver, and target should look like in order to be stable and possibly result in gossip. We call the set of relationships between the sender, target, and receiver a triadic configuration. This study aims to establish triadic configurations that are more likely than random to result in gossip, and we also consider and measure what type of gossip they result in. These triadic configuration types and the types of gossip they foster allow us to relate them to the gossip's possible social functions.

In the study, we impose no theoretically pre-defined data selection for positive, neutral, and negative dyadic configurations between the sender, the receiver, and the gossip target. Presumably, this leads us to not only find the stable, expected triadic configurations such as the coalition or closure triad (Wittek and Wielers, 1998) but a broader set of triadic configurations that are interrelated with different gossip types. Applying such an approach also poses challenges to get interpretable results at the end. In some places of a network, gossip is more likely to be present than in others. We also tested and interpreted what relationships, in general, are more likely to lead to gossip in correspondence with the predictions of relevant scientific literature as well.

Our database is built in our workgroup data (see the chapter titled “Data and Methods”), where the unit of analysis is a triad of actors. Gossip is present in some triads of actors and is not present in others. The database of 8 workgroups and 200 employees with receiver-reported 460 negative, 679 neutral, and 696 positive gossip triads (1801 triads in total) makes it possible to examine the relationships between the sender, receiver, and target. We analyze which set of relationships between the three actors is more likely to lead to gossip than others, while the more likely ones can be related to different types of gossip. The goal is to form hypotheses over why certain gossip types occur under the relationship configuration of the three actors and to understand what their motivation could be behind gossiping. For the sake of comparison, we included both gossip triads with and without revealed gossip in the dataset. We call them existing gossip triads and non-existing gossip triads.

To analyze non-traditional triadic network data, we consider several methods as classification methods taking the probability of the existing triads versus the non-existing triads into account and the triadic relation model (TRM). After finding the configurations that are more likely to lead to gossip than others, we also test them to ensure their stability.

Structural balance theory gives us a framework to understand relationships within a triad of actors. Heider's original balance theory is broadly formulated and included attitudes toward people, ideas, and objects. His theory is based on individual psychological motivations. He assumes that people feel comfortable to agree with people they like and uncomfortable to disagree with them. If people dislike someone, they feel more comfortable to disagree with them. He stated that a balanced state exists when there are three positive relations, or two negative and a positive tie in the triad (Heider, 1946). Heider's theory had been first used in graph theory by Cartwright and Harary, called structural balance theory (Krackhardt and Handcock, 2007). According to structural balance theory, if P (one person) and O (another person) have a positive relationship with each other in order for the s-digraph to be balanced, they both have to either like X (an impersonal entity) or dislike it (Cartwright and Harary, 1956). These theories become a basis for several papers that are built mostly on Heider's theory. There were two major additions to this theory. The first is that sometimes only positive ties are present; therefore, balance theory was re-thought on all positive ties, examining transitive triads at the end. The second major addition was the claim that structures tend toward balance and seldom exist in a balanced state (Krackhardt and Handcock, 2007).

Heider's theory had been repeatedly formalized and tested (Hummon and Doreian, 2003; Khanafiah and Situngkir, 2004; Krackhardt and Handcock, 2007; Wellens and Thistlethwaite, 1971). Most empirical works on triads and dyads have produced inconsistent findings (Hummon and Doreian, 2003). In social network analysis, the structural balance theory is often used to check stable and unstable triads, where unstable triads have one or three negative ties, and stable ones have two or zero negative ties (Qian and Adali, 2013; Szell *et al.*, 2010).

Structural balance theory can be applied to gossip triads as well. A triad is stable when all parties have positive relationships with each other, or when the sender and receiver have a positive relationship, and they both have a negative relationship with the target. In these stable triads, gossip is more likely to spread. Wittek and Wielers (1998) in their study tested the effect of gossip on the relationship between the receiver (alter), the sender (ego), and the target of the gossip (tertius) using data from six organizations from the Netherlands and Germany. They tested the existence of gossip triads with three possible relationship configurations. A coalition triad is where alter and ego have a positive relationship, and both have a negative relation with tertius. A constraint triad is where ego and alter have a relationship, but only ego knows tertius and alter does not. A closure

triad is where all three actors have a positive relationship with each other. They found that gossip is more likely to spread in coalition triads and less likely to spread in both constraint and closure triads. Actors tended to share information with friends about a third person they both knew and disliked (Wittek and Wielers, 1998). Righi and Takács (2014), in a simulation, proved that triadic closure and triadic balance are enhancing cooperation (Righi and Takács, 2014). Wittek et al. (2000) described that one way for organizational actors to maintain voluntary cooperation relationships is through informal social control. Indirect sanctioning of targets via gossip is intended to reduce the target's social approval.

When someone gossips about a target, it is more likely to hurt their cooperative relationship regardless of the network context, escalating conflict rather than resolving it (Wittek *et al.*, 2000). Ellwardt et al. (2012) found out that negative gossip about managers is being shared among employees who are friends. Frequent contact and a friendly relationship with the manager reduces negative gossip among employees about the managers. (Ellwardt, Wittek, *et al.*, 2012). Ellwardt et al. (2012) found on longitudinal data of childcare center's employees that if the sender gossip with the receiver on a dyadic level, the receiver will reciprocate it with friendship (Ellwardt *et al.*, 2012). Ellwardt (2011) tested how coalition and closure triads are likely to breed gossip and what type of gossip they are likely to create. Results shown that coalition triad was breeding negative gossip and closure triad positive gossip.

The assumption with regards to the stability of the triad can help with spreading gossip in two cases. When the sender and receiver have a positive relationship and they both have a negative relationship with the target, called a coalition triad, or when all three actors have positive relationships, called the closure triad. In this study, we measure what types of triadic configurations of gossip are more likely to spread than random.

An important limitation of our measurement and analysis of the gossip triads is that gossip triads are not necessarily triads in reality. There can be multiple targets in a gossip situation as well as multiple receivers. These targets and receivers would not be independent of each other. We made the abstraction to treat each group of gossiper actors as a triad. This helps analyze gossip easier as well as it is easier to connect the research to the existing literature and methodology.

Our study aims to test relationship configurations to see where and how gossip is more likely to spread than random. Depending on the sender's motivation and on the gossip was meant to fulfill, we expect to see a broader set of configurations related to gossip, or

if the sender strategically tries to undermine the target by demolishing the target‘s reputation.

5.1 Hypotheses and Research Questions

The research focuses on finding which relationships within a triad are the configurations that are more likely to lead to gossip than random. Considering network effects outside of a certain triad is an important step to see the whole picture. Using our knowledge based on the literature, we first tested some basic hypotheses regarding how different relationships in the network should affect each other’s formation, considering network effects are a great addition to the approach where we only take triads separately.

5.1.1 Basic Hypotheses

Deriving from the existing literature mainly about triadic balance theory (Cartwright and Harary, 1956), we assume that triad formation should be more probable in certain parts of the network and less probable in others. Before diving into which triadic configurations are more likely to lead to gossip, we discussed conditions that should make a triad formation more probable than random defined by existing relationships between the sender, receiver, and target. Whether certain relationships are more likely to form between our actors, we will compare the number of the existing triads (and dyads) and their configurations to the number of non-existing but probable triads.

When the sender (S) gossips with the receiver (R), they presumably have a trusting relationship. In case there is an existing tie between sender and receiver (S->R), forming a gossip triad about the target (T), it should be more probable that another gossip triad about another target arises, making sender and receiver gossiping partners.

> H1.: The presence of a gossip triad increases the probability of another existing triad involving the same sender and receiver.

The reciprocity effect can be found in most network models, especially in our case, when S->R have a trusting or friendship relationship, we can expect reciprocity.

> H2.: If the sender gossips with the receiver, the sender will reciprocate it with gossip

Information is a great asset. We assume that senders revealing themselves and sharing information about a specific target will be reciprocated by the receiver sharing information about a different target to return the favor.

H3.: If the sender gossips with the receiver, the receiver is likely to reciprocate it with gossip about another target.

The following hypothesis considers that gossip is likely to spread (Szekfű and Szvetelszky, 2005). We assume that a receiver of gossip from a first triad will participate in another triad, speaking about the target with another receiver.

H4.: Gossip spreads, so it is likely that if the sender gossips with the receiver about the target, the receiver will spread the same gossip about the target in another triad to another receiver.

According to our previous knowledge, a triad formation should occur less frequently than random in some scenarios. Assuming triadic balance within the actors, if the sender and receiver have a positive relationship, the receiver should not gossip with the target.

H5.: If S has a trust relationship with R, R will not gossip with T.

We assume that the sender will not have the same positive relationship with both T and R.

H6.: If S gossips about T with R, and then it is less likely that, in another triad, the sender gossips with T about R (about the same people).

5.1.2 Exploring Triadic Configurations

Previous studies built on triadic balance theory to find balanced triads in their data, such as coalition or closure triads (Wittek and Wielers, 1998). Closure and coalition triads are also likely to lead to different types of gossip (Ellwardt, 2011). Triadic configurations are related to the social function that gossip was meant to fulfill, operating with different gossip types. Next to the social bonding and free-rider excluding functions, we assume that gossip has many others that are being reflected in the triadic configuration and the gossip type. As mentioned in the introduction, gossip can have a strategic use, where it is used to influence status and power within a group, or it is aimed to lower someone's social status (Gambetta, 2009; Gholipour *et al.*, 2011; Michelson and Suchitra Mouly, 2004; Rosnow and Gary, 1976). In other cases, gossip is used to reduce stress in an uncertain situation (Waddington and Fletcher, 2005).

In this study, our aim is not to rely on theoretically predefined data selection for the triadic relationships but take a partially data-driven approach, where various statistical methods are utilized to identify complex configurations of positive, neutral, and negative dyadic ties that may lead to gossip triads. We anticipate this to enable discovering the expected,

stable triadic configurations and a wider set of configurations interrelated with positive, neutral, and negative gossip. These configurations of dyadic ties are then validated and interpreted in their correspondence to relevant scientific literature predictions.

5.2 Methodology

First, we test our basic hypothesis using a dataset of 1801 existing gossip triads from the 153348 possible ones, recorded in 8 workgroups among 200 employees. Around 1 percent of all possible triads formed gossip triads.

To test our basic hypothesis, we needed a significance test. A tie in our networks can have sign one (1) if it exists and sign zero (0) when the tie does not exist. For significance testing our hypotheses, we used a binomial test, originating from the Bernoulli probability test. Bernoulli trial can have two outcomes: success and failure. A trial is examining a random item from multiple items where the item could be possibly accepted or faulted (Forbes *et al.*, 2011). The p-values of our basic hypotheses are obtained from binomial tests.

5.2.1 Creating the dataset

A triad is between sender (S), receiver (R), and a target (T) where S gossips about T with R. This study takes a descriptive account of receiver-reported gossip triads[18] in 8 workgroups[19] with a total of 200 employees and attempts to decide which theoretical views are supported with empirical data.

In subchapter 3.4, we described each workgroup separately using their interviews, data about the wages, and opinion items collected using the questionnaire. We found out that both the perceived fairness and cooperation are the lowest in organizations A104 and P102 and high in all six organizations. As feedback to the dissertation's organizational context matter hypothesis, the discussion part of the chapter contains remarks regarding organizational differences in triadic configurations among the organizations.

[18] The online questionnaire was formulated in the following way:From who you received information [selection from a list of all colleagues] => Whom it was the information about [selection from a list of all colleagues] => What type of information was it [positive, neutral, negative].
Inspiration for the exact question was from (Ellwardt, 2011, p. 110) that looked like the following:

- Which of your coworkers has GIVEN YOU personal information of another coworker in the past three months?
- About whom?
- What kind of information?

[19] Due to the sparsity and large number of missing values, data collected from the work group F106d is not included in the dataset used for the current analysis. The following work groups are included in the database: F101, P102, F103, A104, F105, F106a, F106b, F106c.

In our research, we recorded three types of gossip: positive, negative, and neutral. There are 460 negative, 679 neutral and 696 positive gossip triads in our database, giving a total of 1801 triads. To explain, what causes a triad formation, we do not only need the existing gossip triads but all the potential ones, where no gossip was formed. We reference them as non-existent or non-gossip triads.

There are other 153348 possible triads, calculated by permutations of actors by the organization. The number of respondents and the number of k-permutations (without repetition) by workgroup is indicated in Table 26. The number of possible triads was calculated with the following formula:

$$N_{possible\ triads} = N_{respondents} * \left(N_{respondents} - 1\right) * (N_{respondents} - 2)$$

The sum of the k-permutations gives the number of all possible gossip triads (153348).

Table 26: Number of unique respondents and the total number of possible triads by workgroup

Workgroup	**Number of unique respondents**	**Number of possible triads (k-permutations without repetition)**
F101	19	5814
A104	24	12144
P102	22	9240
F103	29	21924
F105	18	4896
F106a	16	3360
F106b	29	21924
F106c	43	74046

As a first step, we created a database complete with all the gossip and non-gossip triads, and all the possible directed edges between the actors can be: S->R, R->S, S->T, T->S, R->T, T->R.

Structurally, the applied dataset is stored in a long format closely resembling Ellwardt's (2011, p. 130) three-way data format, where the unique identifier of all participants of a

possible gossip is indicated with the nature of the gossip (positive, neutral, or negative). In the dataset used for these analyses, the fact that a particular triad did not lead to gossip is also indicated as an extension to Ellwardt's format.

Table 27: The structure of the triads with the nature of gossip[20]

Sender's unique identifier	**Receiver's unique identifier**	**Target's unique identifier**	**Nature of gossip**
1A0401	1A0402	1A0403	0
1A0401	1A0402	1A0404	-1
1A0401	1A0402	1A0405	x
1A0401	1A0402	1A0406	x
1A0401	1A0402	1A0407	1

As demonstrated in Table 27, a row of the dataset contains whether a particular combination of the sender, receiver, and target were involved in an observed gossiping triad (the column "Gossip" has a value of "x" if that did not occur) and if so, then of what nature was the gossip information (-1 negative, 0 neutral, or 1 positive). For example, the first row indicates that the sender (unique identifier: 1A0401) shared gossiping information of neutral nature (0) with a receiver (1A0402) about a third party (1A0403). The third row, however, indicates a possible but unmaterialized gossip triad (gossip is indicated as nonexistent with the letter "x") between sender "1A0401", receiver "1A0402", and target "1A0405".

The dyad-level explanatory variables are included as separate binary columns for each possible dyad (one for each of the possible six dyadic ties). We formed three composite networks: "positive," "negative," and "uninterested" that were created were created using Vörös and Snijders's method (2017), which is described in the next subchapter.

Table 27 gives an example of including the dyadic ties as binary columns in the triadic dataset. For each possible sender, receiver, and target triad, the presence of a "Positive" network tie between a dyad of the participants is indicated by a 0-1 variable. To account for all possible ties between actors participating in gossip, a total of 6 "Positive" network dyadic columns are added. The triadic variables are included as single binary columns in

[20] The data displayed is for demonstration purposes only and does not contain actual data from the survey dataset.

the data. This data structure has proven to fulfill the input dataset's purpose for the various statistical methods listed in the next subchapters due to the simplicity to extend with arbitrary new variables and clear separation of each (actual and possible) triads.

Table 28: Inclusion of dyadic variables in the gossip triad dataset

Sender (S)	**Receiver (R)**	**Target (T)**	**Nature of gossip**	**Positive tie S->R**	**Positive tie S->T**		**Positive tie T->S**
1A0401	1A0402	1A0403	0	1	0	…	0
1A0401	1A0402	1A0404	-1	0	1	…	0
1A0401	1A0402	1A0405	x	0	0	…	1
1A0401	1A0402	1A0406	x	0	0	…	0

We aim to explain the formation of a triad that accounts for all observed as well unmaterialized gossip triads, the nature of shared gossip, and 18 dyadic ties of “positive,” “Negative,” and “Uninterested” networks. In the following chapters, we describe how we created the composite networks that serve as explanatory variables for the formation of gossip triads.

5.2.1.1 Measuring Network Similarity

The organizational research questionnaire included 34 networks after aggregating the items that are degrees of the same phenomena. We tested several hypotheses against each other to see which factors cause negative gossip between the sender and target. To select explanatory networks in a manner that we make sure that they do measure different phenomena, checking the network similarities is a necessary step.

Explanatory networks have interrelations between them. To capture their latent dimensions, we executed dimension reduction steps and formed composite networks as the new explanatory networks for gossip. These steps are also useful in the description of the organizations.

The following subchapter describes dimension reduction steps that were applied and the theory behind them.

Multiplexity and the collection of multiplex networks have great importance and a long tradition in network studies. Although studies often use simple measures as friendship

networks to capture affectionate relationships, while friendship can mean a lot of different things to subjects. Vörös and Snijders (2017) propose to measure a large number of social relations obtaining valid measures for each specific item. However, the more important thing is to present the latent dimensions to these relationships by exploring their interrelations. To tackle the challenges of too many networks, they propose dimension reduction to achieve composite networks. In sociometry, the behavioral patterns are usually observed through factor analysis as a dimension reduction technique. In those studies, dyadic level perceptions are aggregated into individual degrees. To establish network similarities, the authors established similarity on the level of the network dyads, where the network dimensions were referred to as network items. The classification of multiplex networks and the aggregation of information was based on their similarities of network items on a dyadic level. The method aimed to find similar networks within groups and find structures that are similar across groups. Their study's main method is hierarchical cluster analysis, where a tie that exists in at least “t” of the networks will be present in the composite network. The term “t” can have different thresholds. In their research, Vörös and Snijders (2017) have worked with a high school class dataset from the Research Center for Educational and Network Studies (RECENS). Their research resulted in three well-interpretable composite networks: positive network, social role attribution network, and negative network. Social attribution composite network contained network items that are social roles as helping others, being trustworthy, looking up to someone, or being organized. Positive attributions contained items like being kind, clever, or funny (Vörös and Snijders, 2017).

The goal of our dimension reductions is to keep all our networks as possible explanatory variables to gossip triad formation but reduce the redundancy between them and increase the validity of the measures. We used Vörös and Snijder’s (2017) dimension reduction method as a guideline for defining composite network formation. The following part describes the steps we took and the decisions we made during the dimension reduction. The source code used for the analysis can be found on Github (Pápay, 2017). During the analysis, we relied heavily on igraph (Csardi and Nepusz, 2006).

Calculating Network Similarities

Jaccard index is an ideal measure for network similarity. Jaccard index uses the network's matrix form and compares what percentage of the edges in two networks overlap. For each organization, we calculated the Jaccard index of the network pair for each pair of the recorded networks. We arranged these pairs of indexes into Jaccard matrices for each

organization. For all the eight workgroups[21], we created (34*34 wide) Jaccard matrixes with their 34 networks[22].

Consistency of Network Similarities

Kendall's coefficient of concordance or Kendall W (Gamer *et al.*, 2017) was used to measure the consistency of network similarities across all our groups. Kendall W is calculated by rank ordering the network similarity matrixes by rows. We got a number from 0 to 1 of how consistently similar one network with the other networks across each analyzed group is for each network.

Networks that are not consistently similar to others across organizations were removed from our analysis iteratively since we could not use networks in our composite networks that behave differently across organizations. Where after removing each network, we checked the Kendall W measures again. In total, we removed the following eight networks, resulting in 25 networks: "He/She is the executive's pet"; "Who do you think shares negative information about you?"; "I want to be better than him/her"; "He/she earns more money than I do"; "He/she earns less money than I do"; "He/she earns the same amount of money than I do"; "I do not know how much he/she earns"; "I know how much he/she earns"; "Our threshold to remove the networks was that they are not-similar across organizations" (Kendall W is lower than 0.5) After the selection, our lowest Kendall W number was 0.656.

Many of the removed questions are related to salary. Being the executive's pet is related to envy. These items might not behave similarly across groups but might have good explanatory power on a contextual analysis.

Calculating Average Jaccard and Distance Matrix for Clustering

After establishing the 25 networks, we calculated an average Jaccard matrix by simply aggregating the 8 matrices and dividing them by 8. The visualized average Jaccard matrix together with the minimum and the maximum Jaccard matrices can be found in Appendix 9.2.

[21] There were originally 9 workgroups, but we decided to not analyze one of them due to too many missing values and too sparse networks

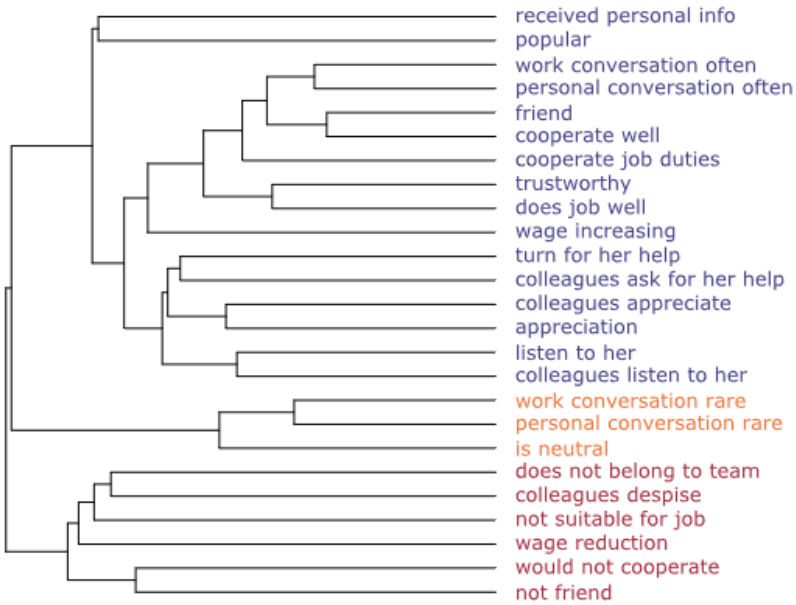
[22] Some of the networks are aggregated network items. For example, if a person liked or consireded the other a good friend, we created an aggregated network called "friend" from these two items with a similar meaning. For aggregated network items, please refer to Table 35.

From our average Jaccard matrix, we created a distance matrix to prepare it for the clustering of the network items, calculating the dissimilarity between them. A distance matrix was calculated by one minus the average Jaccard matrix.

Clustering of the Networks

Using the "hclust" (R Core Team, 2013) function of R's core, we executed hierarchical clustering on the distance matrix. Three main clusters are well distinguishable, as demonstrated in Appendix 9.3. A positive network, marked with blue, a neutral network, marked with orange, and a negative one, marked with red. The positive cluster includes many network items. On lower levels of the cluster tree, we can see some distinction between those positive networks that are socially attributed roles such as "colleagues ask for her/his help," "colleagues listen to him/her," "colleagues appreciate her," and positive items that represent a positive relationship between the respondent and the nominated person. These are networks as "friend", "we cooperate well", or "I trust him/her". If we chose to select our clusters on a lower level, we would have too many clusters that are hard to interpret. Instead, we went with positive, negative, and neutral ones.

Figure 3. Clustered network dendrogram



Defining the Composite Networks

Our final composite networks are built up by summing the adjacency matrices by the defined clusters. We defined a threshold for how many edges in the aggregated networks represent one tie in our composite networks after aggregating networks. Clusters with more network items require a higher threshold, and clusters with fewer network items require a lower one.

For selecting threshold for the number of ties in each cluster, Vörös and Snijders state that „there is no universal recipe for choosing a combination threshold, and it is up to the researcher to decide on its appropriate value" (2017, p. 105).

Table 29: Network densities of the composite networks by the number of ties selected, where 1 is the maximum density, where all ties exist

Organization	**Uninterested cluster nr. of ties**		**Negative cluster nr. of ties**		**Positive cluster nr. of ties**		
Number of ties	**1**	**2**	**1**	**2**	**5**	**6**	**7**
A104	**0.42**	0.21	**0.17**	0.05	0.41	**0.33**	0.26
F101	**0.32**	0.14	**0.10**	0.05	0.64	**0.56**	0.48
F103	**0.33**	0.19	**0.05**	0.02	0.53	**0.48**	0.43
F105	**0.41**	0.15	**0.15**	0.07	0.54	**0.47**	0.42
F106a	**0.37**	0.21	**0.22**	0.04	0.59	**0.54**	0.45
F106b	**0.53**	0.36	**0.06**	0.03	0.22	**0.18**	0.13
F106c	**0.35**	0.23	**0.01**	0.01	0.14	**0.12**	0.10
P102	**0.33**	0.12	**0.23**	0.10	0.40	**0.28**	0.23
Mean	**0.38**	0.20	**0.13**	0.04	0.43	**0.37**	0.31
Median	**0.36**	0.20	**0.12**	0.05	0.47	**0.40**	0.34
Std	**0.07**	0.08	**0.08**	0.03	0.18	**0.17**	0.15

In this research, selecting the number of ties for each cluster was an iterative process. The densities of the composite networks were considered. For the negative cluster, the networks became very sparse if we were to raise the network tie threshold to 2 (Table 29), the average network density would have been 4%. Therefore we chose one as the number of ties since the mean density was 13%, the minimum was 1%, and the maximum was 23%. Since these composite networks were later used as explanatory variables, we wanted to have dense networks, but where the density does not surpass 50%, which would mean that most ties exist. For the uninterested and the positive clusters, we selected the number of ties that lead to 38% and 37% average density and 36% and 40% median

density. Selecting two ties for the uninterested cluster would have led to a 20% average network density across the organizations instead.

As the last step, we created our composite networks as dyadic, directed networks by using our density rule with the help of the established threshold.

Table 30. Networks in the three clusters

1st, "**positive**" cluster	2nd, **"negative"** cluster	3rd, **"uninterested"** cluster
At least six directed edges between two actors	At least one directed edge between two actors	At least one directed edge between two actors
appreciation colleagues_appreciate colleagues_ask_for_her_help colleagues_listen_to_her cooperate_job_duties cooperate_well does_job_well friend listen_to_her personal_conversation_often popular received_personal_info trustworthy turn_for_her_help wage_increasing work_conversation_often	belong_to_team colleagues_despise not_friend not_suitable_for_job wage_reduction would_not_cooperate	is_neutral personal_conversation_rare work_conversation_rare

By executing the earlier steps, we have created three composite networks in total:

- 1st, „**positive**" cluster: 16 networks, At least six directed edges between two actors
- 2nd, **„negative"** cluster: 6 networks, At least one directed edge between two actors
- 3rd, **„uninterested"** cluster: 3 networks, At least one directed edge between two actors

As mentioned previously, the dimensionality reduction technique that resulted in the positive, negative, and uninterested network clusters prevents the redundancy of a wide range of individual networks (multiplexity), preserve their explanatory power, and improve these measures' validity. These three, well-interpretable composite networks will be used as variables contributing to gossip triads' formation in the chapter titled "Relational Elements of the Gossip Triad."

5.2.2 Establishing Triadic Configurations

This chapter details the methodology used to identify which configurations of dyadic ties lead to the emergence of gossip triads. Hierarchical clustering, an unsupervised learning method, and classification trees, a supervised learning model, was one of the methods used to identify configurations of dyadic ties. The weakness of these classification methods is that it does not consider that the units of analysis (in this case, triads) are a part of a network carrying interdependencies. The configurations found were tested, comparing the occurrence in the configurations within gossip triads and non-gossip triads. Results are also tested using a random-effects logistic regression model that can be considered a Triadic Relation Model (TRM) (Card *et al.*, 2010). TRM may be well-suited to consider network dependencies involving triadic and dyadic ties; therefore, it could legitimately validate our configurations.

5.2.2.1 Hierarchical Clustering

One of the main methods to identify the configurations of dyadic ties that may explain gossip triads' emergence was hierarchical clustering.

A group of unsupervised learning methods, cluster analysis, or data segmentation aims to identify subsets (clusters) of observations so that elements in a cluster are more like each other than items in another cluster. The hierarchical clustering algorithms implement the grouping of observations hierarchically based on a measure of dissimilarity between these units without requiring the user to specify the number of resulting clusters. At the highest level of the resulting hierarchy, there is only a single cluster encompassing all items in a dataset, while the lowest level is the level of the unit. The analyst can choose between different levels of clustering in between to produce a grouping fit for the analytic purposes (Friedman *et al.*, 2001).

Using hierarchical clustering, we can tell clusters apart using our dataset with all the possible, existing, and non-existing triads and their dyadic relationships. In each cluster, we can tell how many of the units are existing gossip triads and how many of them are non-existing gossip triads. Existing gossip triads in each cluster can be present more likely than random or less likely than random, indicating which clusters include triadic configurations that likely to formed gossip triads. Although the results of hierarchical clustering are quite straightforward to interpret, the exact configurations of dyadic ties cannot be directly observed since each cluster has a mixture of those with varying rates.

The hierarchical clustering of dyadic edges was executed using the "hclust" function of the stats R package (R Core Team, 2013). The dissimilarity of units was calculated as Euclidean distances, and the complete linkage method was chosen. The resulting tree was cut into 13 groups in total to enable interpretability with a good fit. Please refer to Appendix 9.8 to get an overview of these derived clusters' statistics and how the occurrence of different types of gossip triads was distributed between them.

A weakness of interpreting clusters is that the average "value" of a dyadic tie can be a fraction between 1 (existing tie) and 0 (non-existent tie), meaning that in that cluster, some of the dyadic ties exist between two actors and some of them do not, but one outcome is more frequent than the other. The same logic applies to gossip triads. Some gossip triads contain negative gossip (signified by -1), some are neutral (0), and others contain positive gossip (1). By calculating their average, we will only tell which one of these types were predominant in a cluster. As a result, we can draw conclusions such as: in a triad, where the relationships are mostly positive within the actors, the gossip is predominantly positive. These ratios also enable us to calculate their deviations from the full sample values, providing statistical significance. These levels of significance (calculated using the "prop.test" function in the "stats" R package) are used to evaluate the ratios of different types of gossip in the resulting clusters and derive configurations.

The configurations derived using hierarchical clustering and their relation to gossip types are presented in detail in subchapter 5.3.2.

5.2.2.2 Decision Trees

Besides the hierarchical clustering technique, a supervised learning model, Classification and regression trees (CART), was also utilized to identify meaningful configurations of dyadic network ties explaining gossip triads.

Classification and regression trees (CART) are conceptually simple but effective models. This method aims to divide the feature space of included predictors into a set of rectangles through recursive partitioning. In a systematic and ordered way, each predictor is split into two (binary partitioning) intervals based on some information criteria (Friedman *et al.*, 2001). For the current analysis, a supervised learning method, multiclass classification trees are used. In these models, independent variables indicate the presence of certain dyadic ties, and the dependent variable consists of the following categories: the absence of a negative, neutral, or positive gossip triad.

One of the main advantages of these models is interpretability. The partitioning decisions and eventual outcomes (predictions) are straightforward to interpret and represent as a single tree. Moreover, the ordered relationship between the variables also uncovers potentially important interactions (Friedman *et al.*, 2001). In the current analysis, it provides a way to tell which set of relations between the individuals (network edges) leads to the formation of a gossip triad. Also, the depth of the tree (limiting the number of splits and resulting leaves) is automatically determined as a model tuning parameter; thus, the number of interactions between the dyadic relationships does not need to be predetermined. Moreover, this supervised learning method makes it simple to calculate predictive performance measures.

We aimed to keep the resulting tree intentionally small during the model building process by limiting its maximum depth, ensuring that the resulting ruleset remains moderate-sized. We assume that a smaller classification model allows for an approximate accuracy while explaining the phenomenon (emergence of gossip triads); maintains generalizability; and enables straightforward interpretability. Larger, more complex models could have provided a better predictive performance level, but likely at the cost of losing interpretability and providing weaker generalizability due to considering highly dataset-specific details. In machine learning, this is referred to as the accuracy-simplicity trade-off. In the case of decision trees, the researcher's goal is to find the smallest simplified tree that explains the investigated concept generally well and remains straightforward to interpret while trading some accuracy for the desired simplicity in the process (Bohanec and Bratko, 1994).

CART models are not frequently used in social sciences. The input data can heavily impact the results of these models. In our analysis, an imbalanced class distribution of the dependent variable (the presence and type of a gossip triad) is present since a gossip triad did not form in a large majority (99%) of the possible cases. In the case of decision trees, a relatively balanced distribution of the categories tends to lead to better results. However, the exact drop in classification performance is hard to quantify due to other possibly important factors such as sample size or separability. In case of a very frequent prevalent class and considerably smaller other category or categories, a tree-based model estimation may stop the partitioning process before identifying all the required splits necessary to distinguish infrequent class(es) (Sun *et al.*, 2009).

We have decided to follow a data level approach to handle the issue of imbalanced class distribution: resampling the data. Among the research solutions for handling imbalanced

datasets for classification purposes, resampling the data space is one of the most straightforwardly applicable and frequently utilized techniques adapted for virtually all classification learning systems. However, this data level method could be heavily constrained by the unknown optimal distribution of classes in the data and the fact that the criteria used to derive the resampled subset of the data remain uncertain. These constraints may risk losing information if the most frequent class is undersampled and overfitting while upsampling the less prevalent class or classes. Moreover, the resampling technique may be more difficult to generalize to multi-class classification problems due to the fact that classes are binary in most use cases and that the area of imbalanced multi-class distribution remains somewhat under-researched (Sun *et al.*, 2009).

The "rpart" package for the R programming language was used to build the classification tree (Therneau and Atkinson, 2018). To simplify the process of model training with rpart, the popular caret package for the R programming language (Kuhn, 2008) was used. The multi-class classification model's training was executed using 4-fold cross-validation aiming for the best multiclass AUC (area under the curve, a frequently used measure to evaluate classification models). To preserve a straightforward interpretation of the resulting model, the tree's size was restricted to be maximum of five. Various sampling methods were evaluated to handle the imbalanced class distribution of the dataset (without any sampling, oversampling, undersampling, as well as SMOTE (Chawla *et al.*, 2002) enabled by the parameter controls in caret through the "trainControl" object) with undersampling providing the best evaluation metric (AUC). The sample used for the analysis contained all existing triads and an equally sized random sample of non-existing triads.

The data sample was split into a training (70%) and testing (30%) set. The latter subsample was used to evaluate the performance of the model. The model's accuracy was 65% on the testing set, while the multiclass AUC was 0.7286, as measured on the testing set. The model was pruned at the complexity parameter providing the best performance (0.01). Considering the accuracy-simplicity trade-off while evaluating various models, a tree demonstrated in Appendix 9.6 is assumed to provide the most generalizable and interpretable explanation of the emergence of gossip triads with different information content.

The triadic configurations identified with CART and their relation to gossip types are presented in detail in subchapter 5.3.2.

5.2.2.3 Testing Configurations, Interpretation of the Model Outputs

By comparing the appearance of dyadic ties in the possible triad dataset and the existing triad dataset, we can tell which one is more likely to form than random. Appendix 9.5 presents the hierarchical cluster results, and Appendix 9.6 demonstrates the results of the decision tree.

In the hierarchical cluster case, we checked which clusters have members that are significantly more likely to be connected to gossip triads than random (Appendix 9.9). We checked the average values of individual ties within these significant clusters. Whether a tie was higher than 0.5, we considered it as an existing relationship. A triadic configuration from the hierarchical cluster was built considering each significant cluster and each tie within the cluster that was larger than 0.5.

In the case of the decision tree (for interpretation, please refer to Appendix 9.7), an outcome category (leaf node) can be positive, negative, neutral gossip, or non-gossip triad. Each leaf node predicts its category based on the rules observed above. The rules establish how dyadic relations within the actors should be for them to lead to the specific outcome category. The difference between the results of the hierarchical cluster and the decision tree that in the case of a decision tree, we can have as a rule that a dyadic relationship (for example, the sender has a negative relationship with the receiver) is not true. While hierarchical cluster only shows which dyadic relationships are present in a certain cluster, CART also shows us which dyadic relationships are certainly not present in a configuration. In the case of hierarchical clustering, the complete (dis)similarity matrix of distances between each observation in the dataset is calculated using Euclidean distances (Friedman *et al.*, 2001). These distances combine various binary (dyadic) features in our dataset into floating point distances, making it difficult to decipher a clear ruleset from the clustering method. Moreover, various combinations of the binary features could result in a close or, in some cases, identical (dis)similarity measure. These aspects prevent a direct characterization of missing ties in the case of hierarchical clustering results as opposed to a CART model's output, where Gini index-based splits provide a detailed ruleset for our binary variables (determining the existence or lack of dyadic ties).

The number of ties that had the value over 0.5 from the hierarchical clusters and the number of rules from the decision tree that lead to a leaf node or outcome category can vary. A configuration can have established one tie (that can signify a positive, a negative, or a neutral/distant relationship) among three actors in two directions (3 types of

relationship * 3 dyadic relationships * 2 directions). Our used models can establish configurations considering between 1 and 18 ties.

5.2.2.4 Triadic Relation Model

Card et al.'s (2010) adaptation of the Social Relations Model (SRM) (Kenny and La Voie, 1984) to triadic data describing three-person configurations is referred to as the Triadic Relations Model (TRM). In the fully Bayesian modeling approach for triadic data of Swartz et al. (2015), the dependent variable is triadic ties, where dyadic configurations of N individuals (N*N two-dimensional adjacency matrices) are also observed by each of these entities ("judges"), creating n*n*n configurations represented by a three-dimensional matrix. In the case of gossip triad, senders spreading gossip about targets (S->T dyads) are observed by the receivers (R->S->T). All individuals can fulfill all three roles but cannot occupy two or three positions at the same time (cannot gossip or share gossip about self). The presence of an R-S-T tie (a binary variable: 0 - does not exist, 1 - exists) can be estimated using a random-effect logistic regression model. The included random effect terms are not independent since everyone could fulfill all three roles in a triad, but not at the same time. Inference happens using Markov-chain Monte Carlo (MCMC) methods.

Although these models are extendable with nodal, dyadic, and triadic effects, the current chapter's focus (to unearth triadic configurations leading to the emergence of gossip triads) would necessitate the inclusion of a potentially large number of effects along with their interactions. Individuals in a gossip triad could concurrently form different kinds of directed ties (positive, uninterested, and negative relationships), and these edge configurations may significantly predict a triadic setting. The number of possible directed dyads in a triad is 6. Since we have three explanatory networks (positive, uninterested, and negative relationships), the total count of the main effects is 18. Their two-way interactions amount to 153, the number of 2-combinations from the set of main effects without replacement (barring quadratic terms). There are 816 three-way, 3060 4-way, 8568 5-way, and 18.564 6-way interactions. In total, possible explanatory variables amount to 31.179 effects. Although this number may be reduced using feature selection techniques (such as Chi-squared statistics of the relationship between each variable and the target), the resulting feature set may still be too large for the purposes of a logistic regression model estimated using the Just Another Gibbs Sampler (JAGS) software (Plummer and others, 2003), not to mention long computation times and time-consuming process of model selection.

In the current analysis, simplified TRM models are used to test the configurations uncovered by hierarchical clustering and classification trees. These models contain the individual random effects of Swartz et al. (2015), but the interaction terms are not included similarly to Ellwardt's model (2011). The MCMC-based simulation is executed using the Just Another Gibbs Sampler (JAGS) software (Plummer and others, 2003), which is a faster and platform-independent alternative to WinBUGS (Lunn *et al.*, 2000) that is frequently used to estimate similar models in the literature. Identically configured models were estimated for each group in our sample separately.

The following formulation can represent the simplified TRM model used for evaluating the identified configurations:

$$logit(y_{srt}) = \alpha + \beta_1 * config_{srt}^{C5} + \beta_2 * config_{srt}^{C10} + \cdots + \gamma_s + \gamma_r + \gamma_t + \varepsilon_{srt}$$

where "y" indicates the probability of a triadic gossip tie's emergence between sender ("s"), receiver ("r"), and target ("t"), the "$config$" explanatory variables indicate a triadic network tie (a binary variable) for each identified triadic configuration. The coefficients of these configurations are displayed as the numbered "β" terms. The variable "α" represents the technical term or intercept, while the "γ" variables indicate the ability of each participant ("s", "r", "t") to send and receive ties in the network, referred to as "expansiveness" by Swartz et al. (2015, p. 595). The error term "ε" is some combination of each participant's correlated error terms in the gossip triad, which arises from the fact that an individual can fulfill only one of the sender, receiver, and target roles and not two or three of them at the same time. As mentioned earlier, the interaction effects and perception bias parameters of Swartz et al. (2015)'s full model specification were not included in our simplified models due to the exhaustive computational needs and long runtimes of the full model that rendered the estimation of these models unrealistic. Separate simplified TRM models were estimated for each workgroup. The input dataset for the TRM estimation was structurally identical to the dataset demonstrated in Table 27.

The JAGS model adaptation and sampling were made using the rjags R package (Plummer, 2018). Each model was configured to have 2000 adaptation (the model initialization was successful in all cases), 1000 burn-in, and 2000 saved sampling steps in a single MCMC chain. The coefficient of each configuration was assumed to follow a normal distribution.

5.3 Results

5.3.1 Basic Hypotheses

Testing which triadic configurations lead to gossip more frequently is the focus of the paper. Triadic configurations are examined as separate units, mainly not considering the network structure around them. Since some parts of the network relationships are more likely to lead to gossip than others, we created basic hypotheses to test our assumptions regarding the relationship of ties and gossip formation.

5.3.1.1 Events That Should Be More Likely Than Random

There are existing gossip 1801 triads from the 153348 possible ones. One percent of the possible triads formed into gossip triads.

The first hypothesis assumed that a triad's presence increases the probability of another existing triad involving the same sender and receiver. The number of the existing S->R pairs is 457. If an S->R pair creates any gossip triad, they will form, on average, four triads out of 29 possible ones, representing 14% of the triads. Amongst the 1801 existing triads, there are 451 unique S->R pairs. In our dataset, there are 5330 possible S->R dyads, capable of forming 153348 triads, which means that they could theoretically participate in 29 triads. Every existing unique S->R pair gossips about four targets on average (participating in 4 triads) out of the possible 29. 29/4 is approximately 14 percent. Fourteen percent is more than the existing triads divided by the probable triads (1801/153348), which is approximately 1 percent.

$$\frac{\left(\frac{|t^e|}{|D^e_{sr}|}\right)}{\left(\frac{|T^p_{srt}|}{|D^p_{sr}|}\right)} \approx \frac{4}{\left(\frac{153348}{5330}\right)} \approx 0.139$$

$$\frac{|T^e_{srt}|}{|T^p_{srt}|} = \frac{1801}{153348} \approx 0.01$$

where pipe ("|") characters are cardinality operators, "t" represents target network nodes, "D" are dyads, and "T" indicates triads. The superscript "e" demonstrates existing, while the superscript "p" represents possible entities. The subscript lists the involved gossip participants (senders "s", receivers "r", and targets "t") while preserving the direction of the network tie (for example, "sr" represents S→R directed edge).

The number of possible S->R pairs in our dataset is 5330, each capable of creating 29 triads on average, but only 0.01 of them is existing as gossip triads. This means that H1 can be supported ($p < .001$).

The second hypothesis was about reciprocity, where we assumed that if the sender gossips with the receiver, the sender will reciprocate it with gossip.

There are a total of 451 S->R pairs, of which 68 R->S pairs exist as well. 451/68 is 15 percent of the existing S->R dyads are reciprocated. There are 451 pairs from our possible dyads, where an S->R relationship exists, creating a 0.084 chance for a dyad to be formed. To be able to tell how what is the chance of an S->R dyad to be reciprocated as R->S within the set of probable triads, we calculate the square of existing dyads/possible dyads (451/5330)^2), which gives is 0.71 percent chance that an R->S dyad randomly forms in a case of an existing S->R dyad. Based on our calculations, H2 can be supported as well ($p < .00001$).

$$\frac{|D^e_{rs}|}{|D^e_{sr}|} = \frac{68}{451} \approx 0.15$$

$$\left(\frac{|D^e_{sr}|}{|D^e|}\right)^2 \approx 0.0071$$

where pipe ("|") characters are cardinality operators, "D" represents dyads, and the superscript "e" demonstrates existing dyadic ties. The subscript lists the involved gossip participants (senders "s", receivers "r", and targets "t") in the order of existing relationship (for example, "sr" represents S→R directed edge).

The third hypothesis assumes that if the sender gossips with the receiver, the receiver will likely reciprocate it with gossip about another target.

The chance that S and R speak about a specific target is 1 in 29, which is calculated by dividing the total number of probable triads by the number of the possible S->R pairs. 1 out of 29 is 0.035. As indicated earlier, since they participate on average in 4 triads, there is a 14 percent chance (0.035*4) that gossip will be reciprocated about the same triad and 86 percent of speaking about a different target.

$$\frac{|D^p_{sr}|}{|T^p_{srt}|} * \frac{|t^e|}{|D^e_{sr}|} \approx \frac{5330}{153348} * 4 = 0.14$$

On the set of the existing dyads, there are 68 reciprocated S->R pairs, of which 49 contain the same target. That means that they are talking about the same target in 72.06 % of the

cases and another target in 27.94 % of the cases. Reciprocating gossip about another target is more likely than random ($p < .0000001$). In our dataset, we see that, in reality, the sender and receiver speak about the same targets, and in rare cases, share one information about a new target. This entails that H3 cannot be supported.

The fourth hypothesis considered that gossip is likely to spread. The assumption was that it is likely that if the sender gossips with the receiver about the target, the receiver will spread the same gossip about the target in another triad to another sender.

There are 911 R->T pairs forming two triads on average (1801 existing dyads divided by 911). There are 153348 possible triads, of which 5330 possible R->T pairs. The chance of R->T pair being equal to an S->T pair in another triad is 5330/153348=0.035. Since there are two triads formed by each R->T pairs, there is a 0.07 theoretical chance that R->T from the second triad is equal to S->T from the first one. If the receiver gossips about the target to an average of 2 senders (forming the same number of triads), theoretically there is 0.07 chance of telling the gossip about to the original sender, and there is 0.93 receiver of the first gossip will tell the gossip about the target to a receiver different than the sender of the first gossip.

Looking at the existing triads, in 459 cases, the first target is the same as the second target ($t_1=t_2$), the first receiver is the same as the second sender ($r_1=s_2$). In 41 cases, the receiver from the second triad is different from the sender in the first triad ($r_2<>s_1$), meaning that the receiver from the second triad spreads gossip to a new actor. Nine percent (41/459) is the chance that if $r_2=s_1$ and $t_1=t_2$, then s_1 will differ from r_2.

Thus, if the sender gossips about the target, the receiver gossips about the same target, 0.91 of the cases receiver gossips with a different sender, and 0.09 of the cases, the receiver will gossip with the same sender about the same target. Overall, it is more likely that the receiver will gossip about the same target about whom they heard gossip earlier, meaning that H4 can be considered true ($p < .05$).

5.3.1.2 Events That Should Be Less Likely Than Random

Assuming triadic balance within the actors, our *fifth hypothesis* is as follows: if the sender has a trust relationship with the receiver, the receiver will not gossip with the target. Since we operate here with gossip triads, trust relationship will be characterized by a sender-receiver (S->R) gossip tie.

Possible triads divided by existing R->T dyads give 29 (153348/5330), meaning that they could form 29 triads together. Given our data density, they form an expected two triads

(1801 existing triads divided by 911 R->T pairs). 2 existing triads out of 29 means that the receiver will have a trusting relationship with the sender in 6.9 percent of our cases.

$$\frac{\left(\frac{|T^e_{srt}|}{|D^e_{rt}|}\right)}{\left(\frac{|T^p_{srt}|}{|D^e_{sr}|}\right)} = \frac{\left(\frac{1801}{911}\right)}{\left(\frac{153348}{5330}\right)} \approx \frac{2}{29} \approx 0.069$$

As calculated earlier, S->R and R->T pair exist at the same time in 377 cases, giving 41 percent of the total R->T dyads (377/911). Therefore, H5 cannot be supported. When the sender has a trusting relationship with the target, it is six times more likely than random that the receiver will gossip with the target ($p < .000001$).

Our *sixth hypothesis* assumes that if the sender gossips about the target with the receiver, and then it is less likely that in another triad gossips with the target about the receiver (or about the same people).

Looking at the dataset with the existing triads, the sender will gossip with the target of the previous gossip about the receiver of the previous gossip in 0.209 of the cases. If there are two triads, s_1 should be similar to s_2, and t_1 should be equal to r_2. Sender participates in a total of 12.86 triads (calculated by dividing the number of existing triads with the number of individual senders, 1801/140). The chance that the sender is the same in two triads and R->T equals T->R is $(1/12.86)^2$ because 12.86 in only one case will the sender have a triad with a specific R->T. If the T->R tie exists in another triad, we calculate the square of that chance, obtaining 0.006. In other words, there is a 0.006 chance that the R->T pair will be the same as T->R in the case of the same sender.

$$\frac{1}{\left(\frac{|T^e_{srt}|}{|t^e|}\right)^2} = \frac{1}{\left(\frac{1801}{140}\right)^2} \approx \frac{1}{12.86^2} \approx 0.006$$

In our existing triads sample, there are 190 cases of 911 (number of existing R->T pairs) that fulfill this condition, meaning that 20 percent of the cases meet this condition ($s_1=s_2$, $t_1=r_2$, $r_1=t_2$). As we can see, H6 cannot be supported either since the chance of the described configuration to form is more likely than random ($p = .000001$).

In the first method, we checked each configuration's basic frequencies within the Possible Triad Dataset and the Existing Triad Dataset. For results by organizations, please refer to Appendix 9.9). We found that all of the established configurations are more likely to be

present within the existing gossip triads (Ratio on the Existing Triad Dataset) than in the whole dataset (Ratio on the Possible Triad Dataset).

5.3.2 Configurations and Their Relation to Gossip Types

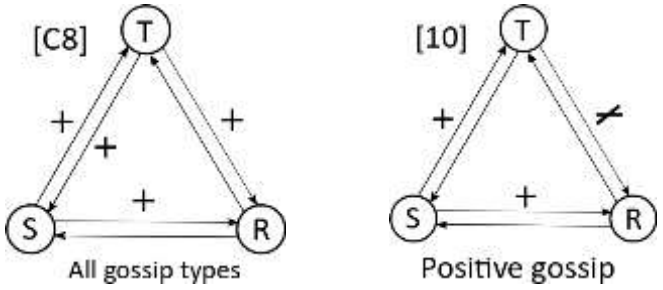
We applied the CART method and hierarchical clustering to establish what configurations of relationships between the sender, receiver, and target are more likely to lead to gossip than random. We categorized our configurations using the literature on stable triads. Detailed results of the configurations can be found in Appendix 9.9. Configurations resulting from the hierarchical clustering are marked with a "C." All the numbered configurations without a "C" result from the decision tree (see Appendix 9.6). The numbering from the Decision Tree configurations is from the number of the leaf nodes (see Appendix 9.7) on the tree.

As detailed in subchapter 5.2.2.4, we also tested the triadic configurations obtained using CART and hierarchical clustering with the help of simplified Triadic Relation Models (TRMs). Configurations were included as explanatory variables in the models that were estimated by each organization separately. Almost all of these configurations' coefficients were statistically significant and positive in nearly all organizations, indicating that the presence of these triadic configurations contributes to the emergence of gossip triads. For the detailed model output, please refer to Appendix 9.10.

5.3.2.1 Closure Triad

Using Wittek and Wieler's terminology, a closure triad is when all three actors have a positive relationship. C8 and 10 configurations represent 6 and 25 percent of the total population and fit the criteria for closure triads (Table 31). When all three actors have a positive relationship (T->R relationship in the case of 10 is non-negative) they tend to share all types of gossip and positive gossip (Figure 4). These "friendly" triads can serve a norm enforcing role for gossip. A negative tie toward the target seems to escalate rather than solve a conflict (Wittek *et al.*, 2000). Since they are all close to each other and not in distant relationships, we assume that they have a deep conversation rather than small talk about others.

Figure 4. Closure Triad Configurations

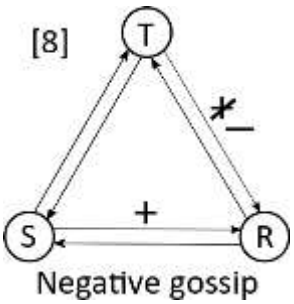


The character "T" represents the target; the letter "S" indicates the sender, while "R" denotes the receiver of gossip. The symbols on the directed ties between them are as follows: + means positive relationship, - means negative relationship, and 0 means uninterested relationship. These relationship types are a result of our network composition (see subchapter 2.4.1). If a sign is crossed out, that means the lack of the relationship. Lack of relationships is only present in configurations that are results of the decision tree. Each sign refers to the dyadic relationship that is closer to. At the bottom of each triangle, there is the type of gossip that arises in the respective triadic configuration.

5.3.2.2 Coalition triad

The coalition triad is also present in our results. Configuration 8 from the decision tree represents 8 percent of that sample (Table 31). In this case, the sender has a positive relationship with the receiver, and the target has a negative and non-positive relationship with the Receiver (Figure 5). This leads to negative gossip. This can be aimed at excluding a free rider or demolishing target's reputation while also enforcing the bond between the sender and receiver.

Figure 5. Coalition Triad Configuration

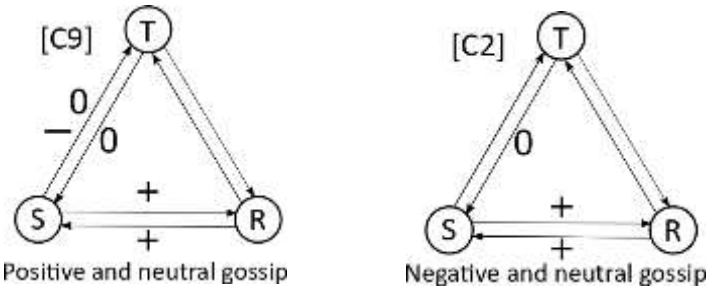


5.3.2.2.1 Distant Coalition Triad

Around ten percent of our hierarchical cluster members belong to a coalition triad where S and R have a positive relationship, and they have a distant or neutral relationship with Target (Table 31, Figure 6). The sender's goal can be the same as in the coalition triad, where the sender and receiver are enforcing a bond and are trying to influence the target's reputation. With the difference of they do not know target closely enough but might have

impressions about the target (Configuration C9). The goal of the Distant Coalition Triad can be to gather social information about the target that helps to decide a future relationship with her.

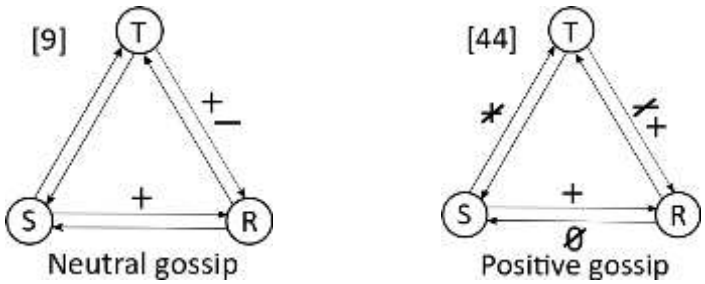
Figure 6. Distant coalition configurations



5.3.2.3 Convincing or Unstable Triads

Many triads are not balanced but tend toward a balanced state (Krackhardt and Handcock, 2007). In this case, the sender and receiver have a positive relationship, but their relationship with the target is inconsistent. In the case of configuration 9, the T->R (target nominates receiver) relationship is both positive and negative (Figure 7). In the case of configuration 44, the T->R relationship is positive, but S has a non-positive relationship with Target. We assume that dyadic relationships are symmetric, and the T->R relationship will have similar values as R->T. These triads can be interpreted as the sender and the receiver trying to settle on what relationship they should have with the target. It could also be that one of these actors is trying to win over the other about a future relationship.

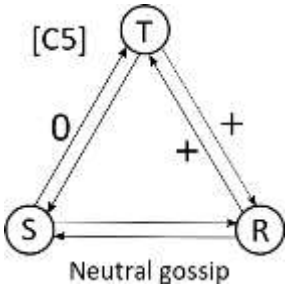
Figure 7. Convincing or unstable triad configurations



5.3.2.4 Information Seeking Triads

Around 15 percent of the cluster members belong to C5 (Table 31), which seems like a specific case of an unstable triad. The target and receiver have a positive relationship, while the sender has a distant relationship with the target (Figure 8). It seems that the sender seeks information about the target from the receiver by gossiping neutrally.

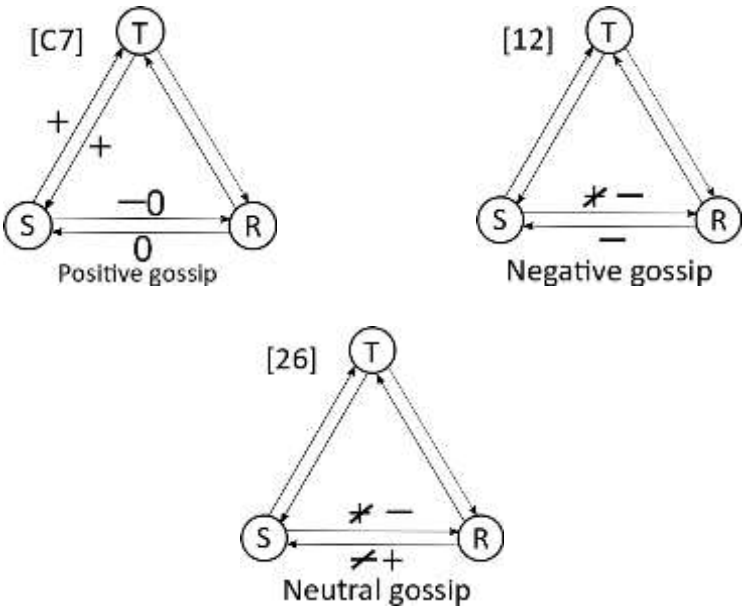
Figure 8. Information seeking configuration



5.3.2.5 Negative Triads

Our most interesting findings are the so-called negative triads, where the sender and the receiver have an overall negative or conflicting relationship with each other (configurations C7, 12, and 26 from Table 31, Figure 9). Gossip is being an activity that is costly and requires trust among the gossiping parties. This type of triad should be unlikely to lead to gossip. The existence of negative triads that are more likely to cause gossip than random is proof that the sender can gossip with people with whom the sender has a negative relationship. The sender might want to change the receiver's mind about the target, regardless of their hostile relationship. Negative triads can be a breeding ground for strategic gossip, where the sender tries to influence the receiver's perspective on target. In the case of C7, sender even gossips with receiver regardless that they have an "uninterested" or distant relationship.

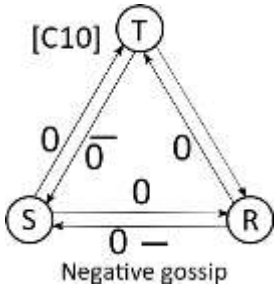
Figure 9. Negative triad configurations



5.3.2.5.1 Distant Negative Triad

A distant negative triad is a form of a negative triad, where the Sender and Receiver have a negative relationship, but all three actors have distant or uninterested relationships (Figure 10). Not only the Sender has a distant relationship with the Receiver, but neither of them knows Target well. The sender is trying to influence the Receiver's relationship with Target by spreading negative gossip about her. Both negative and distant negative triads might lead to gossip simply because employees are trying to reduce stress.

Figure 10. Distant negative triad configurations



5.3.3 Triadic Configurations

We used Hierarchical Clustering and Decision Three classification methods in order to find Triadic configurations. These methods provide us with easily interpretable results, although they do not consider interdependencies within a network. After establishing the triadic configurations where gossip is more likely to occur, two methods are used to test these given configurations.

In the first method, we checked each configuration's basic frequencies within the Possible Triad Dataset and the Existing Triad Dataset (Table 31). Configurations marked with C are the result of the Hierarchical Clustering, and all the configurations without a C are the results of the Decision Tree.

Table 31. Number and ratio of triads on the possible and existing triad dataset by configuration

	Nr. Of Triads on the Possible Triad Dataset	The ratio on the Possible Triad Dataset	Nr. Of Triads on the Existing Triad Dataset	The ratio on the Existing Triad Dataset
config C2	8000	5.15%	230	12.77%
config C5	8000	5.15%	133	7.38%
config C7	451	0.29%	22	1.22%
config C8	5344	3.44%	437	24.26%
config C9	459	0.30%	24	1.33%
config C10	152	0.10%	2	0.11%
config 8	2845	1.83%	277	15.38%
config 9	787	0.51%	83	4.61%
config 10	13763	8.86%	727	40.37%
config 44	6075	3.91%	216	11.99%
config 12	1550	1.00%	94	5.22%
config 26	2442	1.57%	85	4.72%

We found that all the established configurations are more likely to be present within the existing gossip triads (Ratio of the Existing Triad Dataset) than in the whole dataset (Ratio on the Possible Triad Dataset).

As a second step, we tested our configurations with the Triadic Relation Model (TRM). Configurations in the TRM were tested by each organization (see Appendix 9.10). Almost all configurations were significant in almost all the organizations. There was a total of 4 configurations found in 2 organizations where the configurations were not. It is safe to say that most found configurations are overall significantly present in gossip triads and that our configurations generated by the Hierarchical Cluster and the Decision Tree are correct.

5.4 Conclusion

We gathered a unique dataset of 8 workgroups, recording many relationships of their members with each other. We created composite networks of their relations, so we have a positive, a negative, and a distant/uninterested tie between them. These directed relationships and the configuration of them served as explanatory variables for the formation of gossip triads. A triad could be either existing, in the case when gossip was formed or non-existent between each possible three actors when there was no gossip

present. In the first part of the research, we evaluated basic hypotheses regarding network structure that we assume contribute to gossip's formation. Second, we utilize multiple statistical methods to determine which combinations of these dyadic relationships (referred to as configurations) were more likely to lead to gossip than non-gossip triads. We used hierarchical clustering and decision tree models to establish the configurations; these were tested using the configurations' frequency within existing ad non-existent gossip triads and Triadic Relational Model. All our found configurations were more likely to lead to gossip than random.

While analyzing the co-occurrence of dyadic ties of positive, neutral, and negative nature, we mostly found triads that could be predicted by literature such as the Coalition triad, Closure triad, and Unstable or Convincing triads that are likely to form into one of the stable configurations. The first basic hypothesis proved that a triad's presence increases the probability of another existing triad involving the same sender and receiver, meaning that the sender and receiver have a friendly relationship as in the coalition and the closure triad. According to our second basic hypothesis, the receiver reciprocates gossip to the sender. These findings are in line with the presumption that gossip has a social bonding function. In a coalition triad, where the sender and receiver have a negative relationship with the target, the reason behind gossiping might be free rider exclusion, demolishing the target's reputation, and increasing own reputation. Having a friendly relationship between sender and target, the costs of self-revealing are low. In case of a closure triad where all three actors have a positive relationship, they can use gossip to enforce norms or raise the target's reputation. We found distant coalition triads, where they speak about a target they barely know. The sender might try to gain social information about the target. In our results, we found that a number of triadic configurations that lead to gossip contain distant relationships.

Burt's constraint triad (Burt, 2000) is when only the sender knows the target and a piece of gossip is valuable added information to the receiver. Wittek and Wielers (Wittek and Wielers, 1998) did not find this gossip triad type prevalent in their data. New information is similarly not valued in our findings. According to our third basic hypothesis, when the receiver reciprocates gossip to the sender, they are not likely to speak about another or new target, but they rather reciprocate gossip about the same group of people. The fourth basic hypothesis proved that gossip is likely to spread and receiver gossips with a different partner about the same target.

As a new triadic configuration that makes the gossip more likely to arise, we found the negative triads where the sender and receiver had a negative relationship, and they still gossiped about Target. Gossip is a risky act, where self-revealing and the risk of humiliation are associated costs (Ellwardt, 2011). Gossip can lead to personal gains as raising the sender's reputation or changing the target's. In the case of a negative relationship between the sender and receiver, the sender risks self-revealing and humiliation by expecting a higher gain in either their or the target's reputation change. Our fifth and sixth basic hypotheses were supporting imbalances in the gossip triad. We found that if the sender has a trust relationship with the receiver, the receiver will gossip with the target. Furthermore, if the sender gossips with the receiver about the target, the sender can also gossip with the target later. We assume that such imbalances can have multiple explanations. On the one hand, it is explained by strategic actions taken by the sender for reputational purposes. The sender, receiver, and target might be positively gossiping about each other, or they might use gossip as an information-seeking strategy.

In our results, we found that many triadic configurations that lead to gossip contain distant relationships. One reason for this type of gossip next to the information-seeking purpose might also be strategic use for gossip.

5.5 Discussion about the Organizational Context

The organizational context was not examined within the scope of this chapter. However, aligning with the dissertation's general topics, we can see (Appendix 9.9 and 9.10) that there were clear differences between the organizations in the occurring configurations that lead to gossip. We had two organizations (P102 and A104) where the perceived fairness and cooperation were the lowest (see chapter 3), while all in the other organizations, the perceived fairness, and cooperation were high. P102 also had a competitive practice for distributing clients with a direct causal effect on their salaries.

In these two organizations, but also F106a, the triadic configurations that lead to negative gossip are overrepresented. P102 was a workplace with low required cooperation and competitive practices among the employees. Configuration 12 is a negative triad that we associated with strategic use, leading to negative gossip being overrepresented in both A104 and P102. Workgroups that were software development teams (prefixed with "F") that generally have high cooperation tended to have more coalition, closure, and even convincing triads. Whether the gossip's connotation was positive, negative, or neutral also varies from organization to organization in line with the general inter-organizational

relations and employee perceptions. Teams with more positive work cultures have more positive, while more negative work cultures have more negative gossip.

Different configurations of dyadic relationships within a triad of actors might lead to gossip. Gossip can be generated among friends targeted to form and maintain positive relationships. Their intention might be to enforce group norms, gain social information, or sender might want to alter their own and target's reputation.

As the organizational context is a sum of employee perceptions, relations, organizational norms, and environmental factors, it is hard to connect organizational context with gossip types and gossip triad configurations. Our examined workgroups demonstrate different network structure regarding the prominent gossip triads, the nature of the actors' intentions is very likely to be affected by the organizational context.

6. Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches

6.1 Introduction

Most human conversations contain topics that can be categorized as gossip (Fitzsimons and Kay, 2004). Many social functions had been attributed to gossip as social action. Social norms and reputational information are transmitted by gossip, making gossip the core of human interactions (Dunbar, 2004). The senders of gossip can use it to enhance their own reputation or to destroy the target's. The sender can also gossip to enforce a social bond with the receiver or enhance group norms (Michelson and Suchitra Mouly, 2004; Mills, 2010; Wittek and Wielers, 1998).

The current framework examines gossip as an act of speech that is a part of the used language. Language had been identified to be related to many socio-phycological processes as stereotypes, intergroup evaluation, and expectations, interpersonal rapport, and self-identity (Fitzsimons and Kay, 2004, p. 547). Language can be linked to interpersonal relationships through a set of syntactic and pragmatic codes (Ellis and Hamilton, 1985). Variations in language can be used as instruments to represent relationships between people. Language and cognition have a bidirectional relationship where language both creates and conveys perceptions on interpersonal relationships. Individuals can strategically choose structural linguistic cues tailored to the social context and depending on the speaker's motivation (Fitzsimons and Kay, 2004, p. 548). Gossip explicitly is a type of speech, which is supposed to represent and influence interpersonal relationships.

The current chapter is an exploratory one that examines the representation of interpersonal relationships in the language used in gossip speeches. Our dataset is a unique, spontaneous language corpus, a transcription of everyday conversations between a Hungarian game show's participants. We assume that the selection of words is related to virtual social networks, and they can be intentionally selected to utilize gossip for different social functions such as group cohesion, free-rider exclusion, or individual gain. We examine which parts of speech are present in gossip speeches compared to non-gossip speeches, how are the members of a gossip triad (sender, receiver, and target) represented in the participants' speech, and how this varies from participant to participant. From the

structure of speeches, we can get a better idea about containing gossip that might have been the speaker's motivation for gossiping.

According to Besnier (1989), gossip as a conversational strategy can be intended as a group cohesive and a self-serving act. Information withholding can serve as a manipulative strategy for involving the recipient in the gossiping process, making them producers of gossip, and reinforcing the sender's status (Besnier, 1989). Besides the entertainment and sociability functions, gossip as a discourse can be used to mock the third party and offer comparative competition of the sender toward the target. Senders often express envy, degrade others' success, or increase their self-esteem (Ferreira, 2014).

Language can have an impact on the perception of interpersonal relationships (Fitzsimons and Kay, 2004). In social network terms, gossip is triadic by nature, where the gossip's sender shares evaluative information with the receiver about the target of the gossip (Kurland and Pelled, 2000). Based on Dunbar's (1993) claim, the language is a bonding tool related to increased group sizes where social information is being exchanged. Building upon Dunbar's theory Conein (2011) establishes a language-based explanation for social networks where language creates not only social ties but networks. By talking, the speaking parties build and maintain a relationship among themselves. Repeated communication between two parties as a shared action leads directly to the existence of a conversational group. Vocal grooming can extend the social group further than a dyad.

Mentioning third parties in a conversation, often by gossiping, enables the speakers to gain social information about them without interacting with them or observing their actions. Conein (2011) references this type of social tie as a virtual social tie. Social networks are being generated both in action and virtually when they are represented in the language. The information obtained about the third party can influence the future relationship of the speaking parties. A virtual tie can become an actualized tie, and virtual ties cannot be detached from reality. In the end, most social ties are a result of meshing actualized and virtual ties (Conein, 2011). The social network is represented in language usage, and language affects how relationships are perceived simultaneously.

6.2 Elements of Language and Their Social Meaning

6.2.1 Part-of-Speech (POS)

A long-recognized and heavily utilized linguistics method, Part-of-Speech (POS) tagging is the automated assignment of descriptors to individual words (tokens) of an input text. The most valid criteria to identify parts of speech are grammatical rather than semantic

nature. Besides identifying main word classes (such as nouns, verbs, or articles), POS tagger computer programs also tend to provide inflectional and lexico-semantic information (such as distinguishing between common and proper nouns) (Voutilainen, 2003). Besides wide application in information technology and linguistics (Voutilainen, 2003), social science literature also has a number of examples of Natural Language Processing (NLP), where POS tagging is used. Reyes et al. (Reyes *et al.*, 2012) relied in part on the output of a POS tagger to measure sentence complexity and morphosyntactic ambiguity to identify the presence of humorous and ironic content on social media. Xu et al. (2012) relied in part on the presence of POS tags for labeling roles in the context of bullying on social media, namely associating each person-mention in the analyzed corpus with a bullying role. Verécze (2014) used software based on the Magyarlánc toolkit to categorize the authors of Hungarian real estate advertisements by focusing on the text's social meaning. Verécze's decision tree-based model relied on the results of POS tagging (the number of verbs, third-person pronouns, etc.) as well to tell whether a real estate agent has written an ad or not.

6.2.2 Usage of Pronouns in Representing Existing Relationships

Identifying pronouns are an important result of POS tagging that can be directly related to interpersonal relationships in the language. Other parts of speech, such as nouns and adverbs, can also be related to the nature of speech (Ellis and Hamilton, 1985).

Referring to ’we’ instead of ’she and I’ can be perceived as a closer relationship (Fitzsimons and Kay, 2004). According to Vedula & Parthasarathy (2017), who analyzed social media interactions of people suffering from depression, self-centered pronoun usage (e.g., using “me,” “mine,” “I,” “myself”) can be related to depression (Hargitai *et al.*, 2007; Vedula and Parthasarathy, 2017). First-person singular pronouns may not only be related to depression but interpersonal distress in general and a more intrusive style for interpersonal relationships. Referring to self can be related to competitiveness where parties brag about themselves. This was described in the case of 7-13 years old males by Goodwin (1980), who examined the discourses of children living in close communities.

The usage of first-person plural pronouns is associated with lower interpersonal distress (Zimmermann *et al.*, 2013). The usage of plural pronouns by couples signifies cognitive interdependence between the parties (Agnew *et al.*, 1998). Usage of plural pronouns as “we” or “us” versus “they” and “them” can signify the perception of ingroup and outgroup boundaries (Fitzsimons and Kay, 2004).

Third-person pronouns can be a form of negotiation, where the two participants dispute with the help of a mediating third. Goodwin (1980) described the frequent use of 'he-said-she-said' in the case of 7-13-year-old girls who were noncompetitive as opposed to the group of boys also examined. Third parties acting as investigators can help set a further conflict between the speaking parties. Third parties are usually involved in the first stage, where the accusations are made against each other. The speaker can either request information about the third party from the hearer or inform the hearer about something they do not know. These types of 'he-said-she-said' sentences not only have a particular syntactic structure, but they also create social order between the participants (Goodwin, 1980). Pronouns can be cultural tools for social influencing when used to alter the hearer's attitude (Haddad, 2013).

Besides personal pronouns, other parts of speech and the combination of these parts can also describe human relationships. Ellis and Hamilton (1985) linked the types of interpersonal relationships with language, especially with its syntactic and pragmatic codes. Their research examined couples' language usage. A traditional relationship is where the parties have interdependence and complementary interactions. Independent relationships are more symmetrical and have less clearly defined roles. Independent relationship types use a more personal reference in the form of personal pronouns to self or unusual adjectives and nouns. This type of relationship could be considered to have the more complex language usage of the two. Adverbs and nouns were connected to a more elaborative linguistic style (Ellis and Hamilton, 1985).

6.3 Research Questions

The current study is a quantitative text analysis of sentences that were part of gossip speeches. Using parts of speech obtained by POS tagging, we can see the representation of the three parties of a triad in the language while gossiping. As a baseline for comparison, we consider the scenario:

- Are the analyzed sentences appearing in gossip speech different in their structure than those that are not gossip speeches?

We assume that gossip is a speech about third parties. First, we examined what is the structure of a sentence in a gossip speech. The assumption is that gossip speeches contain more personal pronouns and verbs than non-gossip speeches. Gossip being a private and secretive talk (Michelson and Mouly, 2000), we assume that it is less explicit than speeches that do not contain gossip.

RQ1.: Which parts of speech are more significantly present in gossip speeches than non-gossip speeches? What can we conclude about gossip from the usage of parts of speech?

In our framework, we would like to see how the gossip triad members are represented in a gossip speech. Our detailed parts of speech contain information about the person and the number of persons mentioned. Gossip should mostly be about a third person but also serves as a bonding tool; therefore, we assume that the receiver should also be represented.

RQ2.: Which detailed parts of speech are more significantly present in gossip speeches than non-gossip speeches? How are the members of a triad represented in a gossip speech? In what combinations can we find the detailed parts of speech representing members of the triad? How are plural and singular personal pronouns used between gossip and non-gossip speeches?

Representation of actors within gossip speeches can be good indicators of the speaker's intentions or motivations. As the third research question, we semantically analyzed gossip statements based on their structure.

RQ3.: What is the speaker's motivation for gossiping?

6.4 The corpus and annotation of the gossip

Our analysis relies on a corpus, which is a large, annotated text collection of spontaneous, informal conversations transcribed from approximately 1000 hours of raw audio recordings (Galántai *et al.*, 2018). An entertainment company provided us the audio data for scientific research under compliance with a full secrecy closure. Part of an entertainment program, the voices of 8 participants, speaking in Hungarian, were recorded in a closed environment for eight days, covering their entire awake times. These individuals had no contact with the outside world except for the organizers of the entertainment program. Everyone was issued a personal micro port, ensuring professionally recorded, high-quality audio recordings and direct access to the different individuals' perspectives.

The material has undergone multiple cleaning and filtering steps to remove long periods of silence and parts that did not contain any human voice (using Voice Activity Detection). The cleaned and filtered audio covered a total of 550 hours. Human annotators transcribed timestamped utterances in a format that, amongst other things, enables the identification of each speaker, the presence of non-verbal vocalizations (such as laughter

or singing), and vocal expressions (like gossip). The quality of the transcriptions has been ensured using both manual and automated methods of quality assurance.

An example row from the database can be seen below. The names of participants have been anonymized, with only the first letter preserved.

> *"(Grace) (t?). Most még azért hatan vannak. (Daniel) Az is elég sok. (Kyle) Annyit tudok."*
>
> *[(Grace) (t?). There are still six of them. (Daniel) That is quite a few. (Kyle)That is all I know.]*

These utterances were recorded on a Thursday during lunchtime and lasted approximately 10 seconds. Annotation tags (participant names) before each sentence enable the researchers to distinguish between speakers. The manual transcriber considered these 10 seconds as an instance of simultaneous speech; therefore, these three utterances were recorded on the same line. The transcriber also noted the presence of inaudible speeches from afar (the "(t?)" tag). As mentioned, each transcriber-provided document also underwent lemmatization, and a lemmatized form was recorded for every line:

> *"(Grace) (t?) most még azért hat van (Daniel) az is elég sok (Kyle) annyi tud"*[23]

The documents provided by the transcribers were subject to both automated checks of quantitative nature and qualitative, random-sampling-based steps for quality assurance purposes. Multiple annotators were also tasked with transcribing the same audio segment in order to establish the quality of their work: the similarity of these texts, annotation tags, names, and timestamps was quantified. Reference annotators were also selected for this type of analysis. The main methods of quantifying text and annotation tag similarity were cosine similarity and Levenshtein distance. Annotators were provided frequent feedback from multiple dimensions using the results of automated and manual quality assurance steps. Approximately 20 hours of the complete corpus were used for these purposes.

The human transcribers of the corpus were instructed to provide annotation tags to each recorded utterance. The complex coding process was supported by f4, a professional software enabling timestamped transcriptions and the quick addition of standard symbols between parentheses (annotation tags). The manual annotators were provided a detailed

[23] Hungarian language is an agglutinative language. A lemma of a word is much different from the actual word. This however is hard to demonstrate in the english translation.

codebook and trained to identify numerous non-verbal (such as lowered voice, laughter, crying, coughing, and throat clearing) and verbal expressions (like gossip).

6.4.1 Presence of Gossip in the Sound Recording Data

Since we are dealing with sound recording and could not directly ask people about what they consider gossip. We could not make a clear decision about the evaulativeness of a speech about a third person because of the lack of context; therefore, we assumed that every statement is some sort of evaluation of the third party. In this research, we simply defined gossip as the following: "gossip is about a third member of a group."

The annotation tag indicating the presence of gossip ("(p)") was added by the human annotators when a discussion about a third party who was not present when the conversation took place. A third party could only be a fellow player and not someone from outside of the group. Since each utterance was associated with the speaker, the sender of gossip was straightforward to find. Other speakers participating in a discussion were considered to be the receivers of gossip. Human annotators were instructed to indicate the presence of individuals that were part of the conversation but chose not to say anything. The target(s) of the gossip, if amongst the current or former participants of the entertainment program, also needed to be identified using specialized tags containing the character "p" and the target's initial (such as "(p-G)" indicating gossip about a female participant nicknamed Grace). Besides the cases of mentioning the deeds, personality, and other factors of a third individual, annotators were also asked to include the "(p)" tag if a speaker made a statement about themselves in relation to a third participant. The annotators did not have to decide if a statement was evaluative, but all statements counted as gossip.

6.4.2 POS-tagging

For exploring our rich dataset, we found a quantitative approach the most appropriate. We executed a morphologic and then a semantic analysis on gossip statements made by the sender in order to understand the relationship among the three actors of the triad. We focused on the sender's motivations for gossiping. As a tool, we used Magyarlanc (translates to „Hungarian chain") (Zsibrita *et al.*, 2013), a linguistic analyzer developed for syntactic analysis of Hungarian language. We used it for POS-tagging, morphological analysis, and dependency parsing. We were able to identify linguistic structures through parts of speech, marking the actors and their relationships.

The Magyarlanc software was developed by researchers of the Natural Language Processing Group of the University of Szeged to serve as a toolkit for the linguistic preprocessing of Hungarian texts. The computer program is capable of text segmentation, morphological analysis, POS-tagging, and dependency parsing. The POS-tagging feature of Magyarlanc achieved an accuracy of 96.33% (Zsibrita *et al.*, 2013).

Large tagged text corpora (such as the British National Corpus or the Szeged Corpus) are frequent data for linguistic studies (Voutilainen, 2003). To obtain such a data source for our analysis, the complete HunTongue corpus was preprocessed using the "morphparse" mode of Magyarlanc 3.0, executing lemmatization, segmentation, and POS-tagging.

Due to the fact that the Hungarian language is agglutinative, words are rich in meaning. For example, personal pronouns often contain information about the object of speech and the speaker's relationship with them simultaneously.

6.4.3 Selection of the Data

Each participant had a micro port, and multiple participants were present when a gossip statement was made; therefore, a participant's gossip statements might be present in the database multiple times. To eliminate the bias of over-representing certain gossip statements, we only analyzed those gossip statements recorded by each micro port said by the person wearing the particular micro port.

There were a total number of 84072 gossip statements in the corpus. By selecting only those where the micro port wearer matches the speaker, there are 34367 of gossip statements. One gossip tag refers to one object or target of the gossip. One gossip statement can have multiple gossip tags when the speaker talks about multiple people.

6.5 Results

In our full corpus, there were 34367 sentences tagged with gossip by our transcribers, and 155767 were non-related to gossip, indicating an 18 percent gossip to non-gossip ratio. In each player's speeches, there is a gossip sentence/overall sentence ratio between 12% and 24% (Table 32).

As gossip was defined as speaking about one of their fellow players (subchapter 2.2), this means that the number of social topics speaking about people outside of their group might be much higher (Galántai *et al.*, 2018).

Table 32. Total number of gossip and non-gossip sentences, gossip ratio by player

Player[24]	Total number of Gossip Sentences	Total number of Sentences	Gossip Ratio[25]
Andrew	3735	25521	0.15
Daniel	4401	28060	0.16
Grace	5784	36327	0.16
Kyle	4369	26327	0.17
Miranda	355	2939	0.12
Sean	8592	36219	0.24
Victoria	6634	31979	0.21
Zach	497	2762	0.18

6.5.1 The Occurrence of Main Parts of Speech in Gossip and Non-gossip Related Speeches

Our first research question is to see how participants' speeches are structured when they gossip and when they do not. Gossip and non-gossip related statements show a very similar pattern when it comes to the ratio of main parts of speech (Table 33), although they are significantly different from each other.

Comparing the occurrence of parts of speech in gossip and non-gossip texts have been executed using t-tests of the frequencies of these items in these two groups per unique sentence. Since the number of unique sentences was very large, relying on the test statistic and p-values at a chosen significance level may not indicate something of practical significance since, at large sample sizes, even small differences may be considered

[24] The names of the individual players have been anonymized
[25] The gossip-sentence ratio variance by player was 0.036

significant. In quantitative analysis, relying on statistically significant, but practically negligible effects derived from sizable datasets is referred to as the large sample size fallacy. A remedy to these possibly false interpretations is calculating and reporting effect sizes and increasing the level of significance at which identified differences could be considered statistically significant (Lantz, 2013). To demonstrate the effect sizes as well, Cohen's d is also reported besides the t-statistic and its p-value. The t-test has been executed using the "t.test" function in R's stats package (R Core Team, 2013), while the effect size (Cohen's d) was estimated using the "effsize" package (Torchiano, 2020).

Table 33. Parts of speech in gossip and non-gossip statements

	Ratio in non-gossip statements	Ratio in gossip statements	Standard deviation of ratios	T-test statistic and p-value (in parentheses)	Cohen's d effect size estimate
Verb	0.21	0.20	0.01	52.54 ($0.01*10^{-199}$)	0.30
Noun	0.13	0.11	0.02	29.11 ($1.09*10^{-184}$)	0.176
Pronoun	0.13	0.16	0.02	57.40 ($0.01*10^{-199}$)	0.34
Adverb	0.21	0.21	0.00	49.87 ($0.01*10^{-199}$)	0.29
Conjunction	0.10	0.14	0.03	56.55 ($0.01*10^{-199}$)	0.38
Interjection	0.04	0.02	0.02	-17.62 ($2.59*10^{-69}$)	-0.10
Determiners	0.07	0.07	0.00	44.76 ($0.01*10^{-199}$)	0.29
Subordinating Conjunction	0.04	0.07	0.02	65.33 ($0.01*10^{-199}$)	0.48
Adjective	0.06	0.05	0.01	23.95 ($5.43*10^{-126}$)	0.15
Name	0.02	0.02	0.00	41.25 ($2.2*10^{-16}$)	0.30

The result of a T-test indicates that there is a significant (p=0.022) difference between gossip and non-gossip statements in terms of parts of speeches

Parts that are more common in gossip texts are pronouns, conjunctions, and subordinating conjunctions. The Cohen's d (0.34-0.48) values for these items also demonstrate a medium effect size, the largest among the listed main parts of speech. Pronouns most probably are present with a higher ratio because while gossiping, speakers often reference other persons than they speak more often about themselves. At the same time, names are used in roughly the same amount. Since gossip is a more secretive talk, we assume that a piece of gossip refers less explicitly to persons. The usage of conjunctions and subordinate conjunctions is an indicator of formulating longer and more complex sentences while gossiping (Ellis and Hamilton, 1985).

Nouns and adverbs are slightly more frequent in speeches that do not contain gossip, indicating that non-gossip speeches are more elaborated, but these parts are associated with smaller effect sizes (0.176-0.29). Interjections are used more in non-gossip conversations, and this category has a small, negative effect size (-0.1). Interjections are parts of speech that express emotions directly as "ouch," "psst," or "haha." While gossiping, we expect people to be more focused and use less distractive language as interjections are.

Overall, gossip seems like a less explicit, more private, and secretive talk (Michelson and Mouly, 2000), where complex sentences are made and references to persons without overusing their name.

6.5.2 Most Common Combinations of Detailed Parts of Speech in Gossip-related Statements

While gossip has a triadic nature, not all actors are represented equally in gossip speeches. Since gossip is about a third person, we assume that gossip texts mostly include the gossip's target. Gossip might be intended to boost the sender's and ruin the target's reputation. The senders might not only mention themselves but could involve the receiver in their speeches as a form of influence. Mentioning the receiver might be an act of reinforcing the social bond between the sender and receiver. Different representations of parties in gossip related sentences indicate different measures, acts, and relationships. These representations might be related to the underlying social motivation of the sender.

Gossip is rarely explicitly evaluative. We initially tested what our participants mostly use adjectives, and we established that adjectives within gossip statements are seldom referring to targets of gossip, but events, situations, etc. The sender hardly ever evaluated targets by using an adjective; therefore, we decided not to evaluate adjectives' usage.

As so-called detailed parts of speech, we measured verbs and pronouns with the information about them being in the first, second, or third person, being singular or plural. We examined the occurrence and combinations of these detailed parts of speech in gossip-related sentences (see Table 34) as the smallest interpretable unit of speech. These parts of speech are most relevant to representing the gossip triad actors, thereby demonstrating the sender's underlying motivations to us. The results about the most common occurrences and combinations were tested against the ones in non-gossip sentences. Comparing all the existing combinations together in gossip and non-gossip speeches show us that they are overall not significantly different from each other (the result of the t-test shows a p-value of 0.059) and the effect sizes (calculated using Cohen's d) measured per detailed parts are overwhelmingly small and medium in some cases. There are still differences between individual single and combined occurrences of certain parts of speech that allow us to compare linguistic patterns between gossip speech and a non-gossip speech. Semantic analysis of these statements made by the sender provides a way to interpret the sender's motivation.

Table 34: Combinations of Detailed Parts of Speech in Gossip-related and Non-gossip-related Sentences

vb_s1	vb_s2	vb_s3	vb_p1	vb_p2	vb_p3	ppron_s1	ppron_s2	ppron_s3	ppron_p1	ppron_p2	ppron_p3	propn_s3	propn_p3	Nr. of Sentence in Gossip	Ratio of Sentence on Gossip	Nr. of Sentence in Non-gossip	Ratio of Sentence on Non-gossip	T-test statistic and p-value (in parantheses)	Cohen's d effect size estimate
0	0	0	0	0	0	0	0	0	0	0	0	0	0	7875	0.229	56859	0.365	-54.19 ($0.01*10^{-199}$)	-0.30
0	0	1	0	0	0	0	0	0	0	0	0	0	0	4289	0.125	20612	0.132	6.27 ($3.64*10^{-10}$)	0.04
1	0	0	0	0	0	0	0	0	0	0	0	0	0	2398	0.070	13776	0.088	-8.9 ($5.55*10^{-19}$)	-0.05
0	1	0	0	0	0	0	0	0	0	0	0	0	0	1168	0.034	11519	0.074	-32.74 ($2.85*10^{-233}$)	-0.16
0	0	0	0	0	0	0	0	0	0	0	0	0	0	1126	0.033	6545	0.042	-54.19 ($0.01*10^{-199}$)	-0.30
1	0	1	0	0	0	0	0	0	0	0	0	0	0	1053	0.031	3173	0.020	15.99 ($2.34*10^{-57}$)	0.11
0	0	1	0	0	0	0	0	0	0	0	0	0	0	1019	0.030	1360	0.009	6.27 ($3.64*10^{-10}$)	0.04
1	0	0	0	0	0	1	0	0	0	0	0	0	0	945	0.027	4003	0.026	4.84 ($1.32*10^{-6}$)	0.03
0	0	1	0	0	0	0	0	1	0	0	0	0	0	817	0.024	1678	0.011	18.21 ($8.34*10^{-74}$)	0.14
1	0	1	0	0	0	1	0	0	0	0	0	0	0	682	0.020	1231	0.008	20.38 ($7.08*10^{-92}$)	0.17
0	0	1	0	0	0	1	0	0	0	0	0	0	0	635	0.018	1769	0.011	13.24 ($6.39*10^{-40}$)	0.10
0	0	0	1	0	0	0	0	0	0	0	0	0	0	516	0.015	2988	0.019	-3.88 (0.0001)	-0.02
0	0	0	0	0	0	1	0	0	0	0	0	0	0	459	0.013	2587	0.017	-2.65 (0.008)	-0.02
0	0	0	0	0	1	0	0	0	0	0	0	0	0	445	0.013	2464	0.016	-3.26 (0.001)	-0.02
1	0	1	0	0	0	0	0	1	0	0	0	0	0	430	0.013	446	0.003	18.81 ($1.32*10^{-78}$)	0.18
1	0	1	0	0	0	1	0	1	0	0	0	0	0	403	0.012	225	0.001	20.98 ($3.49*10^{-97}$)	0.22
1	0	0	0	0	0	0	0	1	0	0	0	0	0	401	0.012	741	0.005	12.24 ($2.29*10^{-34}$)	0.10
0	1	1	0	0	0	0	0	0	0	0	0	0	0	317	0.009	1813	0.012	-0.86 (0.389)	-0.01
1	0	1	0	0	0	0	0	0	0	0	0	0	0	314	0.009	240	0.002	15.99 ($2.34*10^{-57}$)	0.11
1	0	0	0	0	0	0	0	0	0	0	0	0	0	277	0.008	595	0.004	-8.9 ($5.55*10^{-19}$)	-0.05

vb – verb

ppron – personal pronoun

s – singular

p – plural

nr– person (1 – first person, 2 – second person, 3 – third person)

1 – occured, 0 – not presen

6.5.2.1 When there are no verbs or personal pronouns

The most frequent form of gossip related sentences was when the sender did not use verbs or personal pronouns at all. 23 percent of gossip statements and 36.5 percent of non-gossip statements fall into this category. Therefore, this type of sentence is more characteristic of non-gossip sentences, which is also demonstrated by the negative Cohen's d effect size of -0.3. These utterances, in most cases, expressed agreement with another participant's statement. In other cases, these statements contain swearing or making small comments to someone else's statements. Agreement between the sender and receiver of the gossip can be considered as social bonding between the two.

Amúgy igen teljesen jogos
[Yes, absolutely legitimate, by the way]

Tehát hogy ez csúnya dolog
[So that's ugly]

Az gáz
[That's akward]

The other, rarely occurring case for not using verbs or personal pronouns is when they use adjectives to describe a third person or characterize a situation. In this situation, they mostly talk about the target of the gossip, characterizing the target directly.

Hát kétszínű sunyi ember
[Well, (he is)[26] *a two-faced, sneaky man.]*

De hülye
[How stupid (is he)]

In most cases, we have seen, gossip can be classified as an act of demolishing reputation. As established earlier, people use less explicit and more secretive language while gossiping. Gossip can be used to demolish reputation without using a personal pronoun or even a verb to describe the target.

6.5.2.2 Referring to the third person

The second most common combination in detailed parts of speech for a gossip statement is when the sender uses a third person, singular verb. This type is slightly more

[26] Hungarian being an agglutinative language, references to a third person are present as suffixes and not as personal pronouns. Words in brackets are words that do not appear in the Hungarian version, just were added for the English translation.

characteristic of non-gossip sentences. In 12.5 percent of the gossip sentences and 13.2 percent of non-gossip sentences use only a singular verb from the examined parts of speech, but the effect size (0.04) can be considered small in this case. A verb generally indicates some action.

Igaza van.
[(He) is right.]

Tényleg azt mondta
[(He) truly said that]

In this case, the gossip mostly is about the target's actions and opinions.

In 2.4 percent of gossip sentences and 1.1 percent of non-gossip sentences, speakers use the third person singular verbs combined with third-person singular pronouns. This combination of parts of speech is more characteristic of gossip sentences. These two detailed parts of speech amount to 21 percent in gossip sentences, while 13.7 percent in non-gossip ones.

Valamikor bealudt ő is.
[One time he overslept too.]

Aztán akkor ő se jön vissza.
[He will not come back]

A smaller part of statements containing third party verbs refers to a situation as part of the storytelling.

Hülyén jött ki.
[That played out stupidly]

Az gáz lenne.
[That would be akward]

6.5.2.3 Referring to the first person

In 7 percent of gossip statements and 8.8 percent of non-gossip statements, people used only a first-person singular verb from the examined parts of speech. This difference is associated with a small effect size of -0.05.

We found that the senders speak about themselves while gossiping about the target frequently.

Remélem

[(I) hope so]

Viccelek

[(I am) joking]

Meg hát nyilván félek

[Obviously (I am) scared]

Participants used first-person personal pronouns and first-person verbs in singular together in 2.6 percent of gossip sentences and 2.7 percent of non-gossip sentences. The correlation in the usage of both is higher in the case of gossip-statements (34 %) than in non-gossip ones (27.8 %).

Én is ezt mondom

[That is what I say]

Én ezt nem ko nem tartom korrektnek

[I don't feel that this is fair]

Hát én ezt annyira nem szeretem

[I don't like this so much]

While gossiping, speaking about themselves makes gossip more of Goffman's presentation of self (1978) or as a mechanism of reputation building. From our examples, we can see that this form is mostly used when the participants express opinions explicitly.

6.5.2.4 Referring to the second person

In our analysis, second person singular verbs were used alone in 3.4 percent of the gossip sentences and 7.4 percent of the non-gossip ones. While in our analysis, this case was not so common, in most cases, second-person verbs are used to grab the receiver's attention.

Hallod

[(Do you) hear]

Ugye csak viccelsz ugye

[(I hope that you) are joking]

When mentioning the receiver during gossiping, the sender's underlying motivation might be to flatter the receiver or introduce the small talk. In some other cases, the sender gives advice to the receiver.

Akkor is kemény legyél

[(You) should be tough anyways]

Semmit semmit ne vegyél fel

[Don't take anything personally]

Engedd el

[Let it go]

6.5.2.5 Most Common Dyadic Representations

When there are references to more than one person in a sentence, we have a direct representation of a dyadic relationship between members of the gossip triad. Our dataset's most common dyadic representation is when a singular first-person verb occurs together with a singular third-person verb. This combination occurs in 3.1 percent of gossip related sentences and 2 percent of non-gossip related sentences. Overall, the correlation between these two detailed parts of speech is negligible but more characteristic to gossip sentences.

*Hát hozza, less*rom*

*[Then bring it, (I) don't give a cr*p]*

Akkor azt hiszi hogy idegesíteni akarom

[(He/she) thinks that (I) want to stress (him/her) out]

This form is more explicitly evaluative of the target since the senders express a more direct contact with the target by involving themselves in the sentence. This often can express confrontation between the two. In other cases, the usage of first-person and third-person singular verbs are cases when the senders refer to their relation to an event or object.

Nagyon szeretném hogyha ez most egy hét múlva lenne

[I would like it to be in two weeks]

Many other forms of word combinations are present involving the first and the third person as the most commonly represented dyadic relationship. These combinations of the first and third persons, generally referring to sender and target, are overall the most common in gossip-related sentences (Table 34).

Less pronounced, we see representations of receiver and target in the same sentence. The participants used second-person single pronouns combined with singular third-person verbs in 0.9 percent of the gossip related sentences and 1.2 percent of non-gossip related

sentences. These two parts of speech are co-occurring in a negligible amount of their occurrence.

Ki nyerte szerinted ezt a playback párbajt?
[Who do you (think) won this playback battle?]

És felkelt és akkor mondja hogy te milyen bunkó (vagy).
[And (she) woke up and told that you (are) jerk]

De miért haragudna rád?
[Why would (she) be mad at you?]

Ja, rád van kattanva.
[Yep, (he/she) is into you.]

In gossip related sentences, this combination of parts of speech the speaker tries to project on the receiver's and target's relationship. Either the speakers take an interest in their relationship or give a piece of gossip about what the target did to/told about the receiver. We consider this a form of influence that the sender exercises over the receiver.

In 0.7 percent of gossip sentences and 0.9 percent of non-gossip sentences, the first and second-person singular verbs occur together.

Tudod ilyen félálomban kelek föl
[(You) know that (I) wake up when (I) am half-asleep.]

Nem gondolod hogy én egy ilyenbe részt veszek.
[(You) can't think that I participate in this.]

Én tudod hogy őszinte vagyok
[(You) know that I am honest.]

Mostly senders build on the existing relationship between them and the receivers, referring to their previous knowledge or experience with the receiver. This assumes an existing bond between the two, where this combination of parts of speech can build further trust between the two.

Nem imádom azt hogy dohányzol.
[(I) do not adore that (you) are smoking]

In very few cases, the sender gives direct advice to the receiver.

6.5.2.6 Plural forms

Plural forms of a verb or personal pronoun are very rarely used in our dataset. Plural forms should indicate a sense of community between the actors. In 1.5 percent of gossip sentences and 1.9 percent of non-gossip sentences, participants used only first-person plural verbs to represent the actors of a triad in their speech.

Dehát ezt már megbeszéltük sokszor.
[But (we) discussed this many times.]

Én azt gondolom hogy csajok vagyunk.
[I think (we) are girls.]

Mutassuk meg!
[Let's show (it/that)!]

Plural verbs mostly reflect on the relationship of sender and receiver, or sender and other parties, demonstrating a sense of community.

The second most common case of plural forms is when participants use third-person plural verbs, occuring in 1.3 percent of the gossip related and 1.6 percent of the non-gossip related sentences.

Kicsit még húzzák az idegeimet.
[(They) are pushing my buttons a litle.]

Utálni fognak.
[(They) will hate me.]

These cases demonstrate a clear separation between "them" and "me" as the sender.

6.6 Conclusion

In this chapter, we conducted exploratory research on the representation of interpersonal relationships in the language used in gossip speeches. Working on a unique, spontaneous Hungarian language corpus, we assumed that the selection of words is a tool used by the senders of gossip and is related to the virtual social network around them (Conein, 2011). Starting from the gossip's sender perspective, representing actors from a gossip triad (sender, receiver, and target) could fulfill different social functions of the gossip. POS tagging (Zsibrita *et al.*, 2013) our corpus allowed us to analyze the grammatical structure of parts of speech used in gossip-related sentences in comparison to a non-gossip related one.

As our first research question, we concluded that there are significant differences in the structure of gossip and non-gossip sentences. Gossip uses more complex sentences and uses pronouns more often but names the same amount. Nouns and adverbs were in speeches that are not gossip indicating that non-gossip speeches appear to be more elaborated (Ellis and Hamilton, 1985). Interjections were less likely to be used in gossip-related sentences. Gossip appears to be a less explicit, more secretive and more complex language. This finding is in line with the assumption that gossip has a cost related to it and is more likely to occur between trusting parties.

Our second research question was thatw hich detailed parts of speech are more significantly present in gossip speeches than non-gossip speeches?; and How are the members of a triad represented in a gossip speech? We measured the occurrence and combination of detailed parts of speech as pronouns and verbs. Regarding the overall distribution of sentence structures, there were no significant differences between gossip related and non-gossip related sentences. However, there were differences in the level of each type of sentence. The most frequent sentence in the case of both gossip and non-gossip sentences were the cases when participants did not use any verb or personal pronoun. In the case of gossip, they were mostly speaking about the target in an implicit way.

In the third research question we were looking to see sender's motivation behind the gossip statements. Semantically speaking, gossip was used mostly for describing the target's actions and characteristics that we consider to have reputation influencing. The other frequent sentence structure was when participants were using third party verbs to describe or tell stories about the target. Even if this might be used in the case of gossip as a tool for indirect evaluation of the target, the sentence structure was more characteristic of non-gossip sentences. Referring to the third person using both pronouns and verbs in the same sentence was more characteristic of gossip-related sentences. The reason behind this could be that gossip is more likely about a third person and the sender emphasizes it with the double reference to the target.

After speaking about the target, senders referred to themselves the most often. Similar to the third person sentences, speaking about themselves using verbs in the first person is more common in non-gossip related sentences, but speaking about themselves using both verbs and pronouns us more characteristic to gossip sentences. Self-reference makes gossip a possible tool for Goffman's presentation of self or as a mechanism of reputation building (Goffman, 1978). Sender's often express their opinion in these types of

sentences, laying down the foundations of the expected norms. Referring to the second person alone is not commonly used in gossip sentences and the usage is half the amount as in the non-gossip sentences. Referring to the second person alone or together with the first person is usually perceived as a social bonding tool.

These combinations of the first and third person, generally referring to sender and target is overall the most common in gossip related sentences. Usually, this structure is more explicitly evaluative of the target, when the senders involve themselves in the situation with the target, sometimes even going as far as a direct confrontation between the two. Assuming that the sender and receiver have a positive relationship, the receiver is more expected to form an opinion or to pick sides from the story.

A less common dyadic representation is when the 2nd and the 3rd person are represented. this structure is less likely to appear in gossip than in non-gossip related sentences. In these cases, the sender either gives advice to the receiver about the target or gives a piece of gossip about her. Although this represents a minority of gossip sentences, when used, this representation might be intended to influence the receiver's and target's relationship in a more direct manner.

Plural pronouns or verbs generally express a sense of community. In our dataset, they are present at a very low amount. Plural verbs alone are used in 1.5 percent of gossip and 1.9 percent of non-gossip related sentences.

6.7 Discussion and Further Directions

Gossip is a complex social phenomenon that can be analyzed on many levels. Gossip happens on the level of an individual, on a level of dyads of individuals and in social networks. We like to think of these units as physically existing structures, however, gossip as a form social scoring system happens inside the heads of individuals. Social network ties are real and virtual at the same time (Conein, 2011) where the experiences and thoughts of individuals shape social relations together with the social influence they receive from others. In this chapter, we examined linguistic representations of social ties and possible social motives as consequences of the sender's thought processes. In our research we have taken a quantitative approach, examining the grammatical structures of gossip texts in comparison with non-gossip texts. We did a semantical analysis of these structures that contained representations of parties to be able to explain the sender's possible motives for gossiping.

As a methodological limitation and a future research direction, the scope of the quantitative comparison of parts of speech occurrences in gossip and non-gossip sentences could be extended. This includes the utilization of methods to minimize the dependency of the sub-samples used, which stems from the fact that each word has been assigned a part-of-speech (POS) tag, and these words occur embedded in sentences that in turn are embedded in broader stories and contexts uttered by multiple individuals. This multi-level and multi-faceted relation between the individual words or tokens used in our analyses may also imply the independence assumption of the used bi-variate statistical tests.

Many others could complement our way of approaching the social phenomenon. Considering grammatical structures of individual sentences does not give us the context in what an individual sentence was made. As both limitations and future directions of this research, we can list several contextual factors to be further examined. The literal context or the broader semantical context is very important to consider, although it is relatively hard to analyze at this scale. The second important contextual factor is the existing relationship between the parties. For this research, we did not consider the individual relationships between the actors. We intended to make a more generalizable description of gossip and the represented social ties in it and did not consider this factor. However, relationships have a huge impact on the motivations behind gossiping or social bonding with the receiver. The third major contextual factor is the individual traits and strategies of participants. For instance, we have seen that some participants used much more gossip than received, participants that happened to be more successful in the gameshow. Individuals can apply gossip more strategically where the actors of gossip can be represented differently than in the case of a less strategic sender. The fourth factor that is worth mentioning is time. Relationships change over time, and acts of gossip can shape or reshape relations and perceptions of each other, possibly leading to an ultimate change in gossiping behavior.

7. Conclusion and Discussion

This dissertation's premise is that gossip is a complex phenomenon where we aimed to deconstruct the mechanisms behind it. Gossip is a cause and a result of several social phenomena and the social setting in which it occurs. We analyzed the social settings and the related effects by their level. On the inter-organizational level, we compared organizations to see the difference between factors that lead to gossip. Organizational factors were measured and associated with the type of gossip with which they correlated. We assumed that gossip occurs within small groups, and that is contextual. Organizational factors resulted in changing dynamics in the formation of gossip, where each group had its own specifics. Since gossip is a network phenomenon, and as it has a triadic nature, a gossip triad with a sender, a receiver, and a target is an important level to consider. Combinations of relationships within the triad were taken into account as causes for gossip formation. We measured gossip on a dyadic level (between sender and target, between the sender and receiver). Finally, we assumed that individual gains and losses are important driving factors for gossip. We analyzed the individual level, where the sender's motivation was considered the driving factor for gossip. Each level of analysis was examined with the appropriate methodology.

The other important presumption of the dissertation was that depending on the context, gossip can be intended and can fulfill different purposes while at the same time, might be triggered by multiple phenomena. The most common framework in which gossip is interpreted as a cooperation device, intended to exclude free riders by harming their reputation. Regarding mechanisms, the dissertation addressed the following questions: Are there other motivations of the sender for gossiping than fostering cooperation, excluding free-riders? Can envy drive gossip? Is gossip dependent on organizational context? How are the members of a triad reflected in the sender's speech? Is triadic balance the best and only set of relationships between the sender, the receiver, and the target that fosters gossip? Our unique and complex datasets played a significant part in being able to explain novel mechanisms behind gossip.

The most important results of the dissertation are the following: Gossip is not always explicit in our language, but the most common type when the sender indirectly references the target without using their name, pronoun, or even a verb is highly dependent on the context to be interpretable. Senders often gossip by referring to themselves rather than

the target as a self-representation tool and reputation building. Gossip is not solely used for enforcing social bonds between the sender and receiver or excluding the free-riders. Envying a colleague's undeservedly high wage of privileged position by the boss can lead to negative gossip. Based on the literature, gossip was likely to spread in balanced triads, where the sender and the receiver have a positive relationship, and both have a negative relationship with the target or in a situation where all three actors have a positive relationship. We found that this balance is being violated between the three actors. The sender is likely to gossip about the receiver with the target, and also, the receiver is likely to gossip with the target. Not only that gossip flows in unexpected directions, but we also found that if the receiver has a negative relationship with the sender, the sender will still spread gossip. One other important finding is that gossip is triggered by different factors across organizations, such as a competitive environment that can enhance negative, envy driven gossip.

As our first chapter, we compared the organizations and their dynamics with respect to the measured gossiping activity. We used basic statistics to analyze a survey. We also relied on interviews to establish that the analyzed workgroups had major differences in their organizational culture, perceived values as cooperation, and perceived fairness of distribution of the goods or promotional opportunities. The measured intra-organizational perceptions and the observed characteristics as distribution of wages or leadership positions varied vastly. Finally, we analyzed the interviews conducted with management and HR personnel.

In conclusion, we established that perceived positive group values were positively correlated with negative and positive gossip. We assume that the group of people with strong, positive norms was more likely to gossip positively about each other as a social bonding activity and negatively about the norm's violators. Similarly, perceived group cohesion was correlated with positive gossip. Perceived low fairness in most cases was associated with negative gossip, as unfairness tends to create frustration in people. Other factors we examined as gender, education level, leadership position, promotion opportunities, or net wage level was only correlated with gossip in some organizations but not others.

In our chapter titled "Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations", we compared dynamics in three organizations while explaining negative sender-target gossip ties from the sender's perspective using exponential random graph modeling (ERGM). Results have shown that the perception of

an undeservedly high wage and, similarly, to being privileged by the boss can lead to malicious gossip. Gossip was frequently used as an informal sanction tool when colleagues are not considered appropriate for their job. Differences in the results between organizations highlight that the organizational context might largely alter the senders and targets of negative gossip.

In a unique dataset of 8 workgroups, we employed multiple statistical methods to establish the set of relationships (configurations of relationship) within a gossip triad that are likely to lead to gossip. We used Hierarchical Clustering and Decision Tree models to establish these relationship configurations, and we tested their validity with the frequency of the configurations within gossip triads and a Triadic Relational Model.

During our analysis, we mostly found triads that could be predicted by the existing literature. Coalition triad, Closure triads, and Unstable or Convincing triads are likely to result in gossip. In a coalition triad, where the sender and receiver have a negative relationship with the target, the motivation for gossip might be reputation demolition and free-rider exclusion. In a closure triad, all three actors have a positive relationship. They might use gossip to enforce norms and to raise reputation. In these configurations, gossip mostly serves two purposes. Social bonding between sender and receiver and reputation building of target, sender, or reputation demolishing of the sender. In a convincing triad, a configuration of relationships is likely to change, where the reason might be that one party convinces another to change their opinion. As an unexpected result, we found that negative triads, or where sender and receiver have a negative relationship, are also more likely to lead to gossip. Since the sender carries the risk of self-revealing, we assume that the sender's expected future gain is higher than the suffered risk. We generally label this as a strategical behavior from the sender aiming to undermine the target. The other explanation for this behavior is an information-seeking strategy carried out by the sender. Many of our triadic configurations contained distant relationships where information seeking might be key to understanding the motivations behind gossip.

Using a spontaneous Hungarian language corpus, we assumed that the selection of words in the language is the senders' tool, attempting to influence the virtual social network. Representing the sender, receiver, and target in the speech can be explained by the sender's motives. We used POS tagging on our corpus to analyze the grammatical structure of parts of speech used in gossip related sentences. First, we found significant differences in the structure of gossip and non-gossip sentences. In gossip, participants

used more complex, less explicit, and more secretive language. This finding makes sense in the light of gossip occurring between trusting parties.

Examining detailed parts of speech signifying the three members of a gossip triad, we found out that the most frequent sentence structure is where the speaker does not use a verb or a pronoun. The second most frequent case is when participants use third party verbs. In both cases, gossip was used to evaluate the target indirectly. Self-reference was also commonly used by the sender as a tool for presentation of self or as a mechanism of reputation building. Referring to the second person alone was not commonly used in gossip sentences, and if they were, we attributed it to the social bonding function of gossip. The most common structure where the sender referenced two persons were the combination of the first and third persons. Usually, this structure was more explicitly evaluative of the target since the sendesr directly involved themselves in the sentence. A less common dyadic representation was the one with reference to the 2nd and the 3rd person. Even though we have seen this case in only a few of the gossip related sentences, this representation of target and sender was intended to influence the receiver's perspective and ultimately a relationship with and target in a more explicit way.

The dissertation intended to answer not only why gossip happens but how it happens. While intentions and social purposes are hard to measure directly, the multilevel analysis, triangulation of methods, and hypothesizing about probable causes can get us closer to understand gossip. Gossip happens in small groups where negative gossip is a tool to exclude free-riders and enforce norms. Positive group values at an organizational level were correlated with both positive and negative gossip, as groups with strong positive norms were more prone to gossip positively and negatively. On the level of the triads, we have seen that the most prominent triadic configurations are the balanced triads. The supposed mechanisms behind gossip are similar to what we have seen on an organizational level. The coalition triad is aimed toward a third, not liked party to exclude her, and the closure triad is to enforce norms. Social bonding between the sender and receiver is also prevalent in gossip triads and dyads. The reputational building or demolishing nature of gossip van be traced by many of our findings, just as many findings can be explained by reputational motives as well as others. Free rider exclusion is one common and obvious type of it, but we have found more subtle ones as on the individual level, the sender used frequent self-reference to enhance their position. In other observed cases, the sender speaks about the target in a variety of scenarios. In some cases, the senders make subtle references, in other cases, more direct ones, and sometimes they

directly insert themselves in the situation with the target to affect both of their reputations. Besides these commonly existing social purposes for gossip, we found that organizations with perceived low fairness and high competitiveness can drive negative gossip among employees. On the level of the sender-target dyad, the organizational context appears as a social comparison between the employee, when if someone is liked by the boss or makes more money undeservedly become the target of negative gossip. In a situation like this, the sender might use gossip out of envy or frustration, but gossip can be interpreted as a strategic tool intended to level the playing field. Although any intentionally used piece of gossip that builds and demolishes reputation can be considered a strategic use, the level of intentionality is hard to diagnose. Structural analysis of triadic configurations that lead to gossip shown us that the sender can gossip even when it has a negative relationship with the receiver, indicating that they might be willing to go the extra mile to influence someone's reputation. From our spontaneous speech analysis, we have seen that the senders sometimes involve receiver and target in their speech, which might also be considered a more direct form of exercised influence. Other probable driving factors for gossip as information seeking were also found. In many cases, people were gossiping about others that they did not know well. To form norms, gather reputational information about one's future cooperative behavior, this step is crucial.

Throughout the analyses, we used many abstractions in order to deconstruct the mechanisms behind gossip. Reality is often more complicated than the abstractions with which research can work. In most of the chapters, we used receiver reported gossip recorded with a survey. By avoiding the word "gossip" and self-revealing from the sender's part, we managed to capture dense gossip networks within workgroups. This method is prone to the perception and memory error of the receiver. In one of our chapters, we used human identified and coded gossip on spontaneous speech. While this method does not depend on our actors' memory, it is prone to be biased by our coders' judgments. Both methods are close appropriations for gossip, but neither can capture it a hundred percent accurately. Another abstraction we made is that gossip happens in triads. There can be multiple parties present and can gossip about multiple targets at the same time. Having cross-sectional data allows us to assume correlations but not necessarily causations between phenomena. We were assuming that gossip and the related concepts are causes and effects of each other simultaneously, sometimes even working in a circulatory manner. As a more focused approach, we assumed the sender's motivations as driving factors for gossip just as organizational contexts. However, motivations and intended consequences from the sender are very important to understand gossip; they are

hard to measure and prove directly. Working with a common theoretical framework on multiple analysis levels and selecting the appropriate methodology on each level of analysis helped us make statements about the observed phenomena more securely. Our methods were mostly of quantitative nature to get the big picture of our large and rich datasets. The qualitative approaches, such as the semi-conducted interviews in the case of the organizational data or the semantical analysis in the case of the textual data of spontaneous conversations, were crucial for our explanations.

Finally, gossip is not driven by one factor or another and does not have one effect or the other. Gossip is related to a combination of multiple phenomena at the same time. For example, the sender and receiver might build up a social bond while demolishing the target's reputation. The sender might use self-representation techniques to build up their reputation. If the sender is in an unfavorable position compared to the target, envy might motivate their actions. Using our multilevel analysis, we were able to establish that certain effects are not only more prominent than others but also less dependent on the context. As free-rider exclusion or social bonding was a common theme, envy-driven gossip, and strategically used negative gossip, just as information seeking gossip might be more dependent on the social setting in which they occurred.

The dissertation took a step toward distinguishing these related concepts to gossip in accordance to their social setting. Gossip as a concept is a very widely and actively researched phenomenon so as it should be, as gossip is a key activity of all humans. We have a good idea of why people gossip in general. We also have ideas about when people gossip. Although we did not measure who is more prone to gossip in this dissertation, that is also an important piece of the puzzle. The combinations of why, where, who, and under what conditions people gossip can still give us some important lessons to learn.

From this dissertation, there are some takeaways for companies that are considering policies around gossip. Although gossip is a universal human behavior, its function and usage highly vary. Some gossip is used for social bonding and norm enforcing; therefore, it can be considered beneficial. Some gossip is used to reduce stress caused by unfair treatment, some other for undermining others. It is important to distinguish between the types of gossip and not try to ban gossip altogether but rather understand the root causes first. The root cause is not always coming from the individual employee can often be caused by the unfair reward structure or unfavorable group norms.

8. Limitations and Future Directions

The generalizability of our conducted research is limited. The organizational data is recorded in knowledge-intensive sector companies exclusively located in the Hungarian capital, Budapest. The gameshow participants are preselected people by others for entertainment purposes. As a basis for our analysis, we used Hungarian language text and grammar. None of the samples used were balanced by any demographic variables.

Future directions of this set of researches are partly motivated by the need to eliminate the existing limitations other than mentioned earlier. The other part of the future directions is phenomena that we can research on our existing datasets but are not included in the current dissertation. Thirdly, we might have to consider adding new data to shed light on certain observed phenomena in some cases.

The most lucrative addition to the research would be to include longitudinal data, which could help thoroughly distinguish causes and effects. We would be able to tell if indeed some effects are becoming later causes for new gossip. One of the discoveries of the dissertation was that organizational context could cause differently motivated and intended gossip. However, the organizational context is hard to operationalize, and, in our research, it was mostly used as a basis for case-by-case comparisons. Controlling for organizational context as perceived fairness, wage structure, perceived group values, leadership structure, group size, and many more while understanding how they affect gossip would greatly add to the literature. Taking many measures into account also makes the usage of multivariate analysis methods viable, particularly for quantifying organizational factors and their possible relationship to gossip (chapter 3). While the scope of the chapter titled “Organizational Factors and Their Possible Relationship with Gossip” was intentionally explorative and descriptive, the sample size of the survey items from the multiple workgroups enables the usage of multivariate modeling techniques, including the usage of Partial Least Squares (PLS) Structural Equation Modeling (SEM). This path modeling method is frequently applied in social sciences and provides a systematic and flexible method of limiting data requirements, the complexity of the model, and specifying relationships between the explanatory variables (Henseler *et al.*, 2016).

During our research, we had limited use for triadic and dyadic relations and social comparisons. Although we measured most network aspects of the dyadic relationships in

the chapter “Relational Elements of the Gossip Triad”, we did not consider the differences of the parties in terms of social position. In the chapter “Is it all about the Money? Gossip Induced by Unfavorable Comparisons in Organizations”, we captured the parties' relative positions better on a dyadic level. In the chapter “Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches”, the nature and history of relationships were not considered within the research scope. However, it would be a great addition to understand the motivations behind their gossip.

Individual characteristics were not considered within our scope. The chapter “Organizational Factors and Their Possible Relationship with Gossip” demonstrated that some characteristics such as gender, leadership position, and education are positively correlated with the inclination to gossip. These characteristics later might be used as control variables or solely in relation to individual motivations. Considering the psychological factors of the individual is supposedly interrelated with motivations and strategies. Psychological characteristics should be added to the research “Grammatical and Semantic Analysis of Triadic Relationships in Gossip Speeches” as they would clarify our assumptions about individual motivations behind gossip.

9. Appendix

9.1 Questionnaire

Table 35. Original Network Questions, their translation and variable names

Question nr.	Kérdés	Question	Variable Name	Aggregated Network Name
7	**Az oszlopokban állításokat olvashat, a sorok a kollégái nevét tartalmazzák. Kérjük, jelölje meg azokat a cellákat, melyek tartalmát igaznak véli. Például ha az első sorban lévő kollégájával tud jól együttműködni, akkor jelölje meg az első sorban az első oszlopot.**	**The rows below contain statements, while the columns contain the names of your coworkers. Please mark the cells whose content you claim to be true. For example, if you usually cooperate with the coworker named in the first column, mark that column.**		
	Ki az akivel jól együtt tud működni munkahelyi feladatok megoldásában?	Who can you cooperate well with in solving workplace tasks?	cooperate_well	
	Munkaköri feladataiból adódóan kivel kell együttműködnie?	Who do you have to cooperate with due to your job duties?	cooperate_job_duties	
	Ki az, akivel egyáltalán nem működne együtt?	Who would you not wish to cooperate with at all?	would_not_cooperate	
8	**Kérjük, jelölje meg, hogy az elmúlt három hónapban milyen gyakran folytatott SZEMÉLYES BESZÉLGETÉST kollégájával? Jelölje a megfelelő oszlopot!**	**Please indicate how often you conducted PERSONAL CONVERSATIONS with your coworkers in the past 3 months by marking the corresponding column.**[27]		

[27] Inspiration from: (Ellwardt, 2011, p. 110)

	Soha	Never	personal_conversation_never	personal_conversation_rare
	Ritkábban, mint havonta	Less often than once a month	personal_conversation_less_than_once_a_month	
	Körülbelül havonta	About once a month	personal_conversation_once_a_month	
	Körülbelül hetente egyszer	About once a week	personal_conversation_once_a_week	personal_conversation_often
	Hetente többször	Several times a week	personal_conversation_several_times_a_week	
	Nyolc, vagy több alkalommal hetente	On eight or more occasions a week[27]	personal_conversation_eight_a_week	
9	**Kérjük, jelölje meg, hogy az elmúlt három hónapban milyen gyakran folytatott beszélgetést MUNKAHELYI FELADATAIVAL KAPCSOLATBAN kollégájával? Jelölje a megfelelő oszlopot!**	**Please indicate how often you conducted WORK-RELATED CONVERSATIONS with your coworkers in the past 3 months by marking the corresponding column.**		
	Soha	Never	work_conversation_never	work_conversation_rare
	Ritkábban, mint havonta	Less often than once a month	work_conversation_never	
	Körülbelül havonta	About once a month	work_conversation_once_a_month	
	Körülbelül hetente egyszer	About once a week	work_conversation_once_a_week	work_conversation_often
	Hetente többször	Several times a week	work_conversation_several_times_a_week	

	Nyolc, vagy több alkalommal hetente	On eight or more occasions a week	work_conversation_eight_a_week	
10	**Kérjük, mondja meg, hogy mennyire kedveli kollégáit! Jelölje meg a megfelelő oszlopot!**	**Please tell us how much you like or dislike your coworkers by marking the corresponding column.**[28]		
	Semmiképp nem barátkoznék vele	I would definitely not be friend him/her	would_not_befriend	not_friend
	Nem kedvelem	I do not like him/her	do_notlike	
	Közömbös, semleges	He/she is neutral to me	is_neutral	
	Kedvelem	I like him/her	like	friend
	Jó barátom	He/she is a good friend of mine	good_friend	
11	**Melyik kollégáitól KAPOTT személyes információt egy harmadik kollégájukról az elmúlt három hónapban?**	**Which of your coworkers has GIVEN YOU personal information of another coworker in the past three months?**[29]	received_personal_info	
	Kiről?	About whom?		
	Milyen tartalmú információt?	What kind of information?		
	Ön szerint KI SZOKOTT ÖNRŐL negatív információt megosztani?	**WHO do you think shares negative information ABOUT YOU?**	shares_negative_info	
21	**Az oszlopokban állításokat olvashat, a sorok a kollégái nevét tartalmazzák. Kérjük, jelölje meg azokat a cellákat, melyek tartalmát igaznak véli.**	**The rows below contain statements, while the columns contain the names of your coworkers.**		

[28] School questionnaire
[29] Inspiration from: (Ellwardt, 2011, p. 108)

		Please mark the cells whose content you claim to be true.		
	Ezt a személyt nagyra értékelem	I appreciate this person.[30]	appreciation	
	Hallgatok a szavára	I listen to him/her	listen_to_her	
	Népszerű	He/She is popular	popular	
	Az ügyvezetők kedvence	He/She is the executive's pet	executive_pet	
	Ha valamit jól akarok csinálni, az ő segítségét kérem	I turn for his/her help, when I want something done right[31]	turn_for_her_help	
	Meg lehet bízni benne	He/She is trustworthy	trustworthy	
	Jól végzi a munkáját	He/she does his/her job well	does_job_well	
	Jobb akarok lenni nála	I want to be better than him/her[32]	want_to_be_better_than_her	
	Nem való ebbe a munkakörbe	He/she is not suitable for his/her job	not_suitable_for_job	
	Nem való ebbe a csapatba	He/She does not belong to the team	belong_to_team	
22	**Ön szerint mit gondolnak a kollégái egymásról? Kérjük, jelölje meg. Saját magát is megjelölheti**	**What do you think your coworkers think of each other? Please indicate below. You can include yourself among the answers.** [33]		
	A kollégák nagyra értékelik Őt.	Colleagues appreciate this person	colleagues_appreciate	
	A kollégák Hozzá fordulnak, ha azt szeretnék, hogy valami jól el legyen végezve.	Colleagues ask for his/her help, when they want something done right	colleagues_ask_for_her_help	

[30] Inspiration from: School questionnaire, (Laird *et al.*, 2012)
[31] Inspiration from: (Laird *et al.*, 2012)
[32] Inspiration from: School questionnaire
[33] All of the options were taken from RECENS school questionnaire

	A kollégák lenézik Őt.	Colleagues despise him/her	colleagues_despise	
	A kollégák hallgatnak a szavára.	Colleagues listen to him/her	colleagues_listen_to_her	
30	**Az oszlopokban állításokat olvashat, a sorok a kollégái nevét tartalmazzák. Kérjük, jelölje meg azokat a cellákat, melyek tartalmát igaznak véli.**	**The rows below contain statements, while the columns contain the names of your coworkers. Please mark the cells whose content you claim to be true.**		
	Biztosan tudom, hogy mennyit keres	I know for certain how much he/she earns	earning_known	wage_known
	Nagyjából tudom, hogy mennyit keres	I approximately know how much he/she earns	earning_apr_known	
	Csak tippelni tudok, hogy mennyit keres	I can only guess how much he/she earns	earning_guess	wage_unknown
	Fogalmam sincs, hogy mennyit keres	I have no idea how much he/she earns	earning_unknown	
	Sokkal kevesebbet, mint én	He/she earns much less money than I do	makes_much_less	wage_less
	Kevesebbet, mint én	He/she earns less money than I do	makes_less	
	Nagyjából ugyanannyit, mint én	He/she earns the same amount of money than I do	makes_the_same	
	Többet, mint én	He/she earns more money than I do	makes_more	wage_more
	Sokkal többet, mint én	He/she earns much more money than I do	makes_much_more	
31	**Képzelje el, hogy ön az ügyvezető és a cég költségcsökkentést hajt végre. Jelölje meg azt a dolgozót, akiknek csökkentené a fizetését.**	**Imagine that you are the CEO who executes a cost reduction. Mark that employee whose wage you would reduce.**	wage_reduction	
32	**Képzelje el, hogy ön az ügyvezető és a cég extraprofitra tett szert, melyet béremelés formájában szétosztana a dolgozók között. Jelölje meg azt a dolgozót, akinek növelné a fizetését.**	**magine you are the CEO and your company has made some extra profit, which he/she distributes among the employees. Mark that employee whose wage you would increase.**	wage_increasing	

Table 36. Other (non-network) questions, their translations and corresponding variable names

Question nr.	Kérdés	Opció	Question	Options	Variable Name
1	**Születési év**		**Birth year**		birth_year
2	**Neme nő?**		**Gender**		gender
3	**Irányítószám**		**Postal code**		postalcode
4	**Település neve**		**Where (in which settlement) do you live?**		location
5	**Elképzelt helyzetek 1. Képzelje el, hogy párba állítjuk egy kollégájával. Azt, hogy melyik kollégájával, azt nem tudhatja. Ön dönti el, hogy mennyi pénzt ajándékozzunk Önnek és mennyit a Kollégájának. Kérjük, válassza ki A, B és C közül, amelyiket a legjobban szeretné.**	a. Ön kap 1350 forintot és a Kollégája 100 forintot.; b. Ön kap 1350 forintot és a Kollégája 700 forintot.; c. Ön kap 1300 forintot és a Kollégája 1350 forintot	**Imaginary situations 1. Imagine that you have been paired with one of your colleagues. You cannot know, with which colleague. You decide how much money each of you get as a gift. Please select the preferred answer from A, B and C.**	a. You get 1350 HUF and your coworker gets 100 HUF.; b. You get 1350 HUF and your coworker gets 700 HUF.; c. You get 1300 HUF and your coworker gets 1350 HUF.	imagined_situation_coworker
6	**Elképzelt helyzetek 2. A következő kérdés hasonló az előzőhöz, de NEM a KOLLÉGÁJÁRA, hanem egy számára ismeretlen személyre**	a. Ön kap 1350 forintot és az Ismeretlen 100 forintot.;	**Imaginary situations 2. This question is similar to the previous one; however, the other participant is NOT YOUR COWORKER but someone you do not**	a. You get 1350 HUF and the unknown person gets 100 HUF.;	imagined_situation_unknown

	vonatkozik, aki egy másik cégnél dolgozik. Őt „Ismeretlen”-nek fogjuk hívni. Ön dönti el, hogy mennyi pénzt ajándékozzunk Önnek és mennyit az Ismeretlennek. Kérjük, válassza ki A, B és C közül, amelyiket a legjobban szeretné.	b. Ön kap 1350 forintot és az Ismeretlen 700 forintot.; c. Ön kap 1300 forintot és az Ismeretlen 1350 forintot	**know, and working for another company. We shall call them “unknown person”. You decide how much money each of you get as a gift. Please choose your preferred option from the ones below (a., b., c.).**	b. You get 1350 HUF and the unknown person gets 700 HUF.; c. You get 1300 HUF and the unknown person gets 1350 HUF.	
12	**Mennyire ért egyet az alábbi munkájával kapcsolatos kijelentésekkel? Kérjük, jelölje be.**		**Please indicate how strongly you agree with the following statements about your job**		
	A munkám sikerélményt ad	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	My work gives me a sense of achievement[34]	1- strongly disagree; 5- strongly agree	agree_work_gives_sense_of_achievement
	A munkám során megvalósíthatom saját kezdeményezéseimet	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I can fulfill my own initiatives during my work[34]34 above	1- strongly disagree; 5- strongly agree	agree_work_fulfill_initiative
	Befolyással vagyok a saját munkám kimenetelére	1- Egyáltalán nem értek egyet; 5-	I can influence the outcome of my work[34]	1- strongly disagree; 5- strongly agree	agree_work_influence_outcome

[34] Inspiration from: (Van Wanrooy *et al.*, 2013, p. 33)

		Teljesen egyetértek			
	Elégedett vagyok a képzéssel, amit munkahelyemen kapok	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I am satisfied with the training I get[34]	1- strongly disagree; 5- strongly agree	agree_work_satisfied_training
	A munkám során fejleszthetem a képességeimet	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I have the opportunity to advance my skills during my work[34]	1- strongly disagree; 5- strongly agree	agree_work_advance_skills
	Megfelelő mennyiségű fizetést kapok	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I am paid adequately[34]	1- strongly disagree; 5- strongly agree	agree_work_adequate_pay
	Elégedett vagyok a munkahelyi biztonságommal	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I am satisfied with workplace security[34]	1- strongly disagree; 5- strongly agree	agree_work_security
	Elégedett vagyok a munkámmal	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I am satisfied with my job	1- strongly disagree; 5- strongly agree	agree_satisfied_work

13	**Mennyire ért egyet az alábbi munkájával kapcsolatos kijelentésekkel? Kérjük, jelölje be.**		**Please indicate how strongly you agree with the following statements about your job**		
	A cégem megfelelő fejlődési és előrelépési lehetőségeket biztosít számomra	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The company provides adequate opportunities for me to advance my skills and career.[35]	1- strongly disagree; 5- strongly agree	agree_job_adequate_advancement
	A cégem megfelelő béremelési juttatási rendszert biztosít számomra	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The company provides an adequate raise system.[35]	1- strongly disagree; 5- strongly agree	agree_job_adequate_raise
	A cégem megfelelő elismerést biztosít számomra	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The company gives me adequate acknowledgement.[35]	1- strongly disagree; 5- strongly agree	agree_job_adequate_aknowledgement
14	**Összességében mennyire elégedett a munkájával?**	1 - Egyáltalán nem; 10 - Teljes mértékben	**Overall, how satisfied are you with your job?**[36]	1 - not at all; 10 - fully	overall_job_satisfaction
15	**Mennyire ért egyet az alábbi, kollégáival kapcsolatos**		**Please indicate how strongly you agree with the following statements about your coworkers.**		

[35] Inspiration from: (Roberts and Chonko, 1993, p. 682)
[36] Inspiration from: (EVS, 2011) 8

	kijelentésekkel? Kérjük, jelölje meg.				
	Jól kijövök a kollégáimmal	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I get on well with my coworkers	1- strongly disagree; 5- strongly agree	agree_colleagues_get_on
	A kollégáim jól végzik a feladatukat	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	My coworkers do their job well	1- strongly disagree; 5- strongly agree	agree_colleagues_do_their_job_well
	Jól tudunk együtt csapatban dolgozni	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	We work well as a team	1- strongly disagree; 5- strongly agree	agree_colleagues_teamwork
	A kollégáimmal egy összetartó közösséget alkotunk	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	My coworkers and I form a cohesive community	1- strongly disagree; 5- strongly agree	agree_colleagues_cohesive_community
16	**Mennyire ért egyet az alábbi, projektmenedzserekkel kapcsolatos állításokkal? Kérjük, jelölje meg.**		**Please indicate how strongly you agree with the following statements about project managers.**		

	A projektmenedzserek tekintettel vannak rám	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The project managers take my needs into account[37]	1- strongly disagree; 5- strongly agree	agree_pm_takes_my_needs_into_account
	A projektmenedzserek mindig adnak a véleményemre	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The project managers value my opinion[37]	1- strongly disagree; 5- strongly agree	agree_pm_values_opinion
	A projektmenedzserek tisztában vannak a munkavégzéshez szükséges igényeinkkel	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The project managers are aware of our workplace requirements[37]	1- strongly disagree; 5- strongly agree	agree_pm_aware_of_requirements
	A projektmenedzserek teljes mértékben szabad kezet adnak a munkám során	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The project managers give me complete freedom to do my job[37]	1- strongly disagree; 5- strongly agree	agree_pm_gives_freedom
	A projektmenedzserek pontosan megtervezik és számon kérik a feladataim	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The project managers plan and supervise my tasks precisely[37]	1- strongly disagree; 5- strongly agree	agree_pm_plan_tasks

[37] Inspiration from: (Churchill Jr *et al.*, 1974, p. 6)

17	**Mennyire ért egyet az alábbi céggel kapcsolatos kijelentésekkel? Kérjük, jelölje be.**		**Please indicate how strongly you agree with the following statements about your company.**		
	Úgy gondolom, hogy a cégen belül igazságosan oszlanak meg a bérek és juttatások	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I believe that in the company the wages and benefits are divided fairly[37]	1- strongly disagree; 5- strongly agree	agree_fair_payment
	Úgy gondolom, hogy a cégen belül igazságosan oszlanak meg az előrelépési és fejlődési lehetőségek	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I believe that in the company the opportunities to advance one's skills and career are divided fairly[37]	1- strongly disagree; 5- strongly agree	agree_fair_advamcement
	Úgy gondolom, hogy a cégen belül igazságosan elismerik a munkavállalókat	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I believe that in the company the employees are acknowledged fairly[37]	1- strongly disagree; 5- strongly agree	agree_fair_aknowledgement
	A cég akkor tud jól teljesíteni, ha a munkavállalók sikeresen együttműködnek	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The company can be the most successful if its employees cooperate effectively	1- strongly disagree; 5- strongly agree	agree_company_employee_successfull_cooperation
	A cég akkor tud jól teljesíteni, ha a munkavállalók között egészséges verseny alakul ki	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The company can be the most effective if its employees share a healthy sense of competition between each other	1- strongly disagree; 5- strongly agree	agree_company_employee_healthy_competition

	A cégen belül jó a hangulat	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	The atmosphere of the company is positive	1- strongly disagree; 5- strongly agree	agree_company_positive_atmosphere
18	**Mennyire ért egyet az alábbi állításokkal? Kérjük, jelölje be.**		**Please indicate how strongly you agree with the following statements.**		
	Rengeteg időt és energiát fordítok a munkahelyemen a másokkal való kapcsolatépítésre.	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I spend a lot of time and energy on building relationships within the workplace[38]	1- strongly disagree; 5- strongly agree	agree_time_build_relationships
	Képes vagyok a kollégáimmal könnyen és hatékonyan kommunikálni.	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I communicate easily and effectively with my coworkers[38]	1- strongly disagree; 5- strongly agree	agree_communicate_eggective_coworkers
	Próbálok valódi érdeklődést mutatni a kollégáim iránt.	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I try to be genuinely interested in my coworkers[38]	1- strongly disagree; 5- strongly agree	agree_genuinely_interested_coworkers
23	**Mit gondol, mely tulajdonságoktól lesz valaki népszerű a cégnél?**		**What do you think are the characteristics that make someone popular at your company?**		
	Jó szakember		Good professional		popular_good_professional

[38] Inspiration from: (Laird *et al.*, 2012, p. 26)

	Barátságos		Friendly		popular_friendly
	Csapatjátékos		Team player		popular_teamplayer
	Intelligens		Intelligent		popular_intelligent
	Jóban van a menedzsmenttel		Has a good relationship with the management		popular_good_relation_with_pm
	Pozitív a munkához való hozzáállása		Has a positive attitude towards the job		popular_positive_attitude
24	**Kérjük, jelölje meg, hogy mennyire ért egyet az alábbi állításokkal!**		**Please indicate how strongly you agree with the following statements.**		
	Úgy gondolom, hogy jelentősen többet keresek, mint az átlag magyar állampolgár.	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I believe I earn significantly more than the average Hungarian.	1- strongly disagree; 5- strongly agree	agree_earn_more_hung_cityzens
	Úgy gondolom, hogy jelentősen többet keresek, mint a szakmámon belül dolgozók általában.	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I believe I earn significantly more than the average person in this field.	1- strongly disagree; 5- strongly agree	agree_earn_more_than_others_in_my_field
	Úgy gondolom, hogy jelentősen többet keresek, mint egy átlagos dolgozó a cégemen belül.	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I believe I earn significantly more than an average employee of this company.	1- strongly disagree; 5- strongly agree	agree_earn_more_average_employee_at_company
	Úgy gondolom, hogy jelentősen többet keresek, mint egy átlagos	1- Egyáltalán nem értek egyet; 5-	I believe I earn significantly more than an average employee in my department.	1- strongly disagree; 5- strongly agree	agree_earn_more_average_employee_at_department

	dolgozó a cégemmél ugyanebben a munkakörben.	Teljesen egyetértek			
25	**Hány százaléknyi fizetésemelést kért a legutóbbi béralkunál/béremelésnél?**		**In percentages, how much raise did you requested the last time you received a raise?**		raise_requested_percentage
26	**Hány százalékkal emelkedett a nettó fizetése a legutóbbi béralkunál/béremelésnél?**		**In percentages, how much did your net salary increase the last time you received a raise?**		raise_got_percentage
27	**Hány százalékos emelésre számít a következő béralkunál/béremelésnél?**		**In percentage, how much raise do you expect from the next raise?**		raise_expect_percentage
28	**Számít-e a közeljövőben előléptetésre?**	Igen; Nem	**Are you expecting a promotion in the near future?**	Yes; No	expecting_promotion
29	**Ha igen, milyen pozícióra számít?**		**If yes, what position do you expect?**		expectig_position
33	**Melyik évben kezdett el dolgozni a jelenlegi munkakörében?**		**Which year did you start working at this position?**		year_at_position
34	**Melyik évben kezdett el dolgozni a cégnél?**		**Which year did you start working at this company?**		year_at_company
36	**Hányadik pozíciója ez ugyanennél a cégnél?**		**How many positions have you held at this company, including this one**		number_of_position
37	**Melyik a legmagasabb befejezett iskolai végzettsége?**	1.Érettségivel nem rendelkezik, 2.Érettségi bizonyítvány,	**What is your highest level of education completed?**	1.Did not graduate from High School, 2. High School Diploma	sch_completed

		3.Hagyományos képzésben megszerzett egyetemi vagy főiskolai oklevél, 4.Alapképzési egyetemi vagy főiskolai oklevél, 5.Mesterszintű egyetemi vagy főiskolai oklevél, 6.Doktori fokozat		3. University or college diploma acquired in traditional training 4. Bachelors or equal degree 5. Masters or equal degree 6.PhD or Advanced	
38	**Mi az eredeti szakképesítése?**		**What is your original qualification?**		sch_qualification
39	**Kérjük, jelölje meg, hogy mennyire ért egyet az alábbi, céggel kapcsolatos állításokkal!**		**Please indicate how strongly you agree with the following statements about your company.**		
	Szeretek a cégről beszélni a munkahelyemen kívüli embereknek	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I enjoy discussing my organization with people outside.[39]	1- strongly disagree; 5- strongly agree	agree_company_discuss_others
	Nem kötődöm érzelmileg a céghez	1- Egyáltalán nem értek egyet; 5-	I don't feel 'emotionally attached' to this organization[39]	1- strongly disagree; 5- strongly agree	agree_company_no_emotional_attachment

[39] Inspiration from: (Dixit and Bhati, 2012, p. 42) - they took it from (Meyer and Allen, 1984, p. 4)

		Teljesen egyetértek			
	Boldoggá tenne, ha a karrierem hátralevő részét ennél a cégnél tölthetném	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I would be very happy to spend the rest of my career with this organization.[39]	1- strongly disagree; 5- strongly agree	agree_company_rest_of_carreer_at_company
	Ha egy másik cégtől kapnék egy jobb ajánlatot, akkor sem hagynám el a jelenlegi munkahelyem	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	"If I got another offer for a better job elsewhere I would not feel it was right to leave my the organization[39]	1- strongly disagree; 5- strongly agree	agree_company_stay_if_got_better_offer
	Váltogatni a munkahelyeket egyáltalán nem etikátlan	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	Jumping from organization to organization does not seem at all unethical to me[39]	1- strongly disagree; 5- strongly agree	agree_company_jumping_organization_not_unethical
	Úgy tanítottak, hogy legyek lojális a cégemhez	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I was taught to believe in the value of remaining loyal to one organization[39]	1- strongly disagree; 5- strongly agree	agree_company_i_taught_loyalty
	Bűntudatom lenne, ha kilépnék a cégtől	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I would feel guilty if I left my organization now.[39]	1- strongly disagree; 5- strongly agree	agree_company_guilt_leaving

	Most nem lépnék ki a cégtől, mert kötelezettségeim vannak vele szemben	1- Egyáltalán nem értek egyet; 5- Teljesen egyetértek	I would not leave my organization right now because I have a sense of obligation to the organization[39]	1- strongly disagree; 5- strongly agree	agree_company_stay_obligation

9.2 Variables with most missing values by work group

F101		P102		F103	
Variable Name	**Ratio of missing values (%)**	**Variable Name**	**Ratio of missing values (%)**	**Variable Name**	**Ratio of missing values (%)**
raise_requested_percentage	26.3	raise_requested_percentage	18.2	popular_good_relation_with_pm	86.2
raise_got_percentage	21.1	raise_expect_percentage	18.2	popular_intelligent	44.8
raise_expect_percentage	15.8	raise_got_percentage	13.6	popular_positive_attitude	44.8
expecting_promotion	10.5	birth_year	9.1	popular_teamplayer	37.9
agree_fair_advamcement	5.3	agree_company_i_taught_loyalty	9.1	popular_good_professional	37.9
agree_fair_payment	5.3	agree_earn_more_average_employee_at_department	9.1	raise_requested_percentage	34.5
agree_company_i_taught_loyalty	5.3	agree_earn_more_hung_cityzens	9.1	agree_fair_advamcement	31.0
agree_company_stay_if_got_better_offer	5.3	postalcode	4.5	agree_fair_aknowledgement	31.0
agree_work_influence_outcome	5.3	sch_completed	4.5	agree_company_employee_healthy_competition	31.0
agree_work_satisfied_training	5.3	agree_company_discuss_others	4.5	agree_company_employee_successfull_cooperation	31.0

A104		F105		F106a	
Variable Name	**Ratio of missing values (%)**	**Variable Name**	**Ratio of missing values (%)**	**Variable Name**	**Ratio of missing values (%)**
agree_work_satisfied_training	8.3	popular_good_relation_with_pm	94.4	popular_good_relation_with_pm	93.8

agree_fair_advamcement	4.2	raise_requested_percentage	44.4	popular_intelligent	43.8
agree_fair_aknowledgement	4.2	popular_intelligent	44.4	raise_got_percentage	31.3
agree_company_rest_of_carreer_at_company	4.2	raise_expect_percentage	33.3	raise_requested_percentage	31.3
agree_company_employee_healthy_competition	4.2	popular_good_professional	27.8	popular_friendly	31.3
agree_pm_plan_tasks	4.2	raise_got_percentage	22.2	raise_expect_percentage	25.0
		popular_friendly	22.2	expecting_promotion	18.8
		popular_teamplayer	22.2	popular_positive_attitude	18.8
		agree_fair_payment	16.7	popular_teamplayer	12.5
		popular_positive_attitude	16.7	agree_fair_advamcement	6.3

F106b		**F106c**		**F106d**	
Variable Name	**Ratio of missing values (%)**	**Variable Name**	**Ratio of missing values (%)**	**Variable Name**	**Ratio of missing values (%)**
popular_good_relation_with_pm	89.7	popular_good_relation_with_pm	88.4	popular_good_relation_with_pm	72.0
popular_friendly	55.2	popular_intelligent	44.2	popular_positive_attitude	40.0
popular_intelligent	44.8	popular_positive_attitude	39.5	popular_friendly	32.0
popular_positive_attitude	44.8	raise_requested_percentage	37.2	popular_teamplayer	32.0
popular_teamplayer	27.6	raise_got_percentage	34.9	popular_intelligent	32.0
agree_fair_payment	24.1	popular_friendly	30.2	raise_got_percentage	28.0
raise_requested_percentage	24.1	popular_teamplayer	30.2	popular_good_professional	28.0
raise_expect_percentage	24.1	popular_good_professional	30.2	agree_fair_advamcement	24.0
popular_good_professional	24.1	agree_fair_advamcement	25.6	raise_requested_percentage	24.0
agree_fair_advamcement	20.7	agree_fair_payment	25.6	postalcode	20.0

9.3 Network Descriptive Statistics

Figure 11. Network densities by workgroup

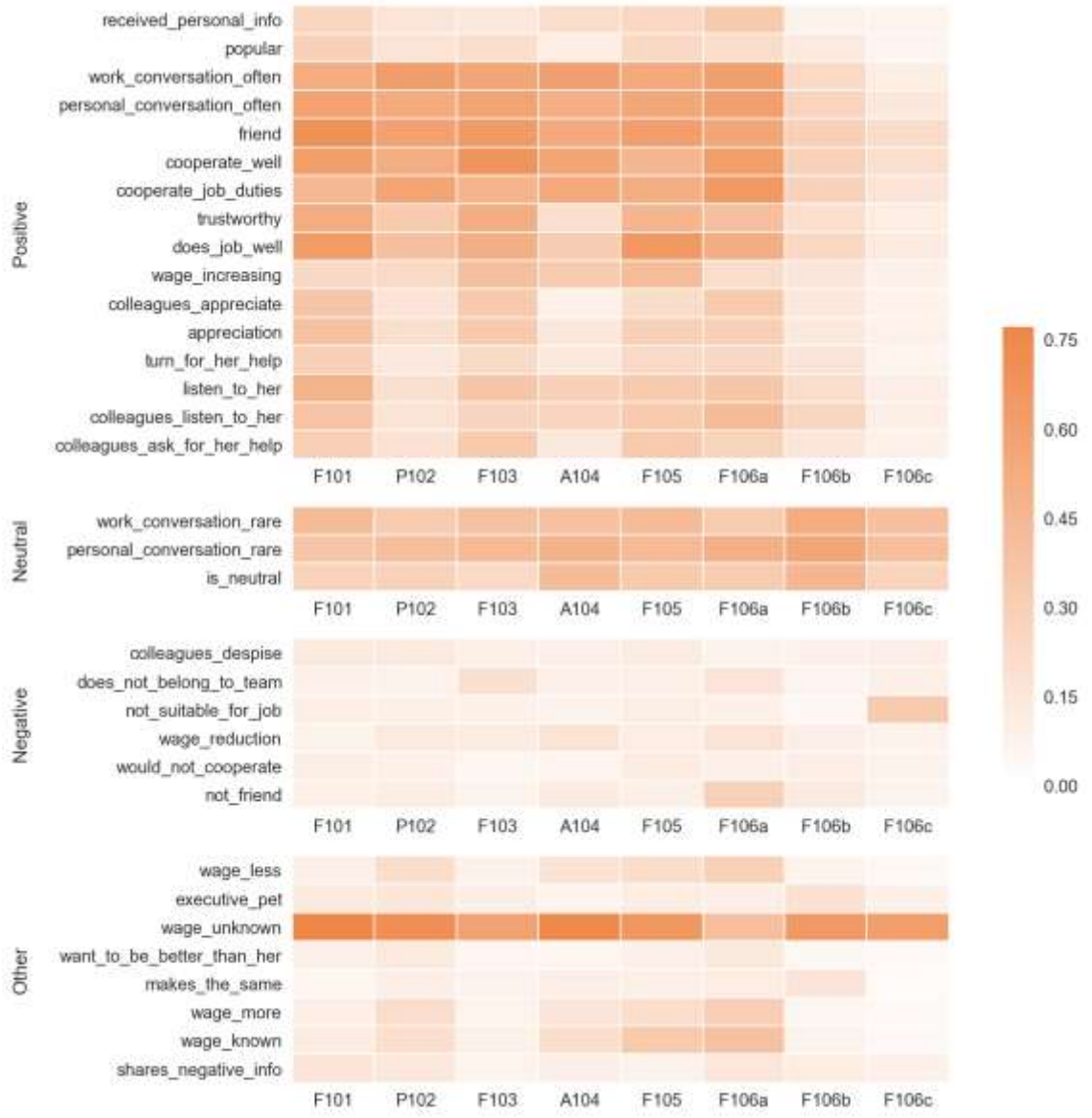


Figure 12. Densities of the sender-receiver network by workgroup

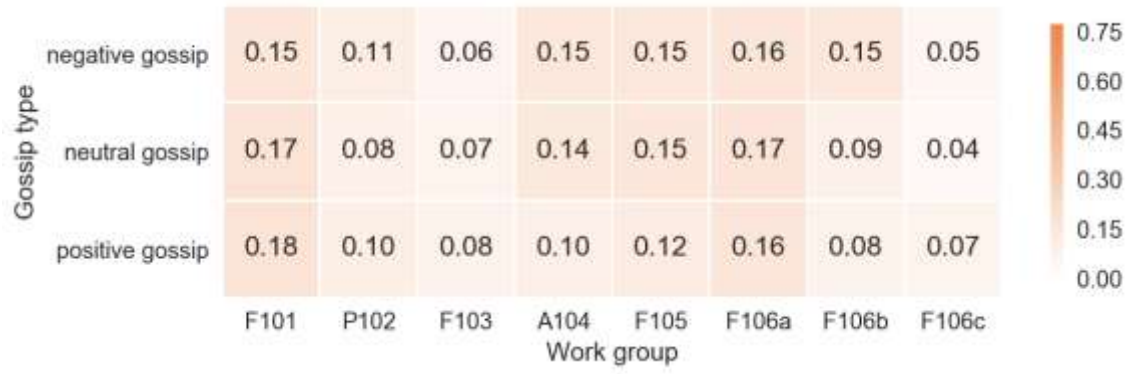


Figure 13. Densities of the sender-target network by workgroup

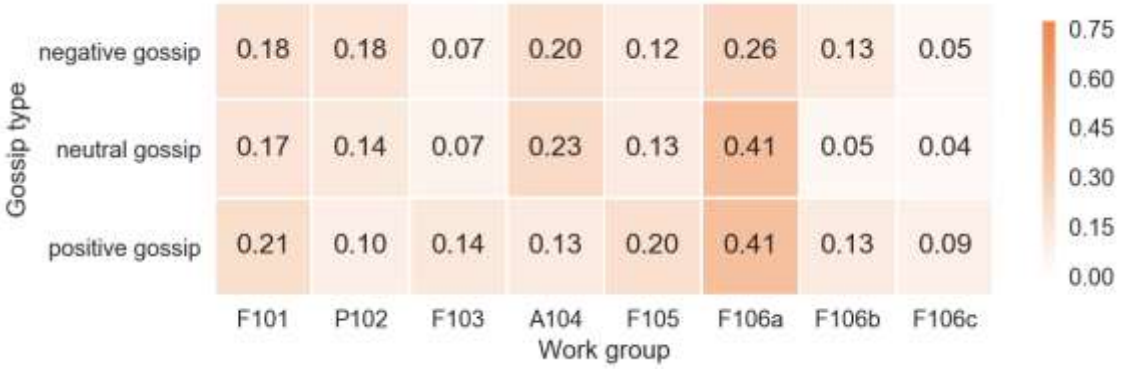


Figure 14. Jaccard min F106c

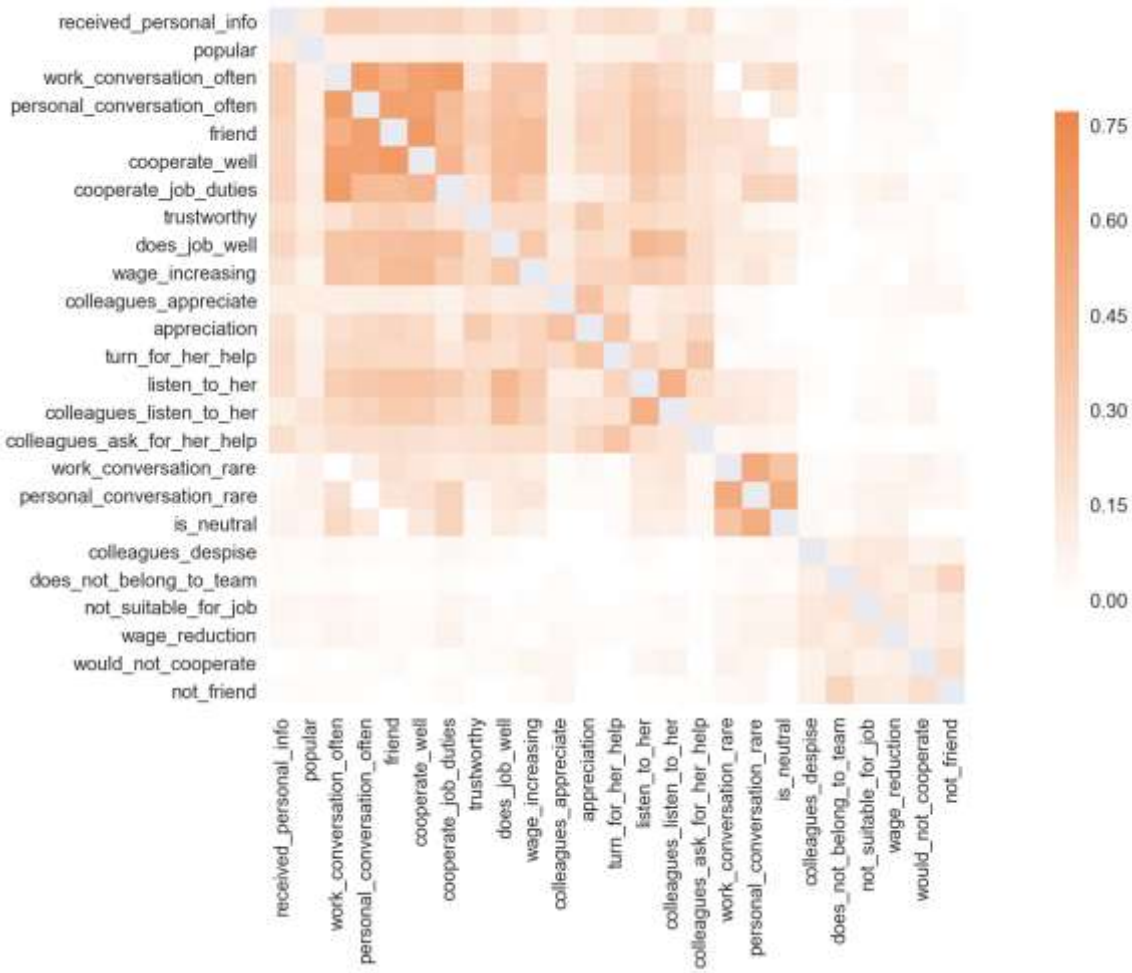


Figure 15. Jaccard average F106c

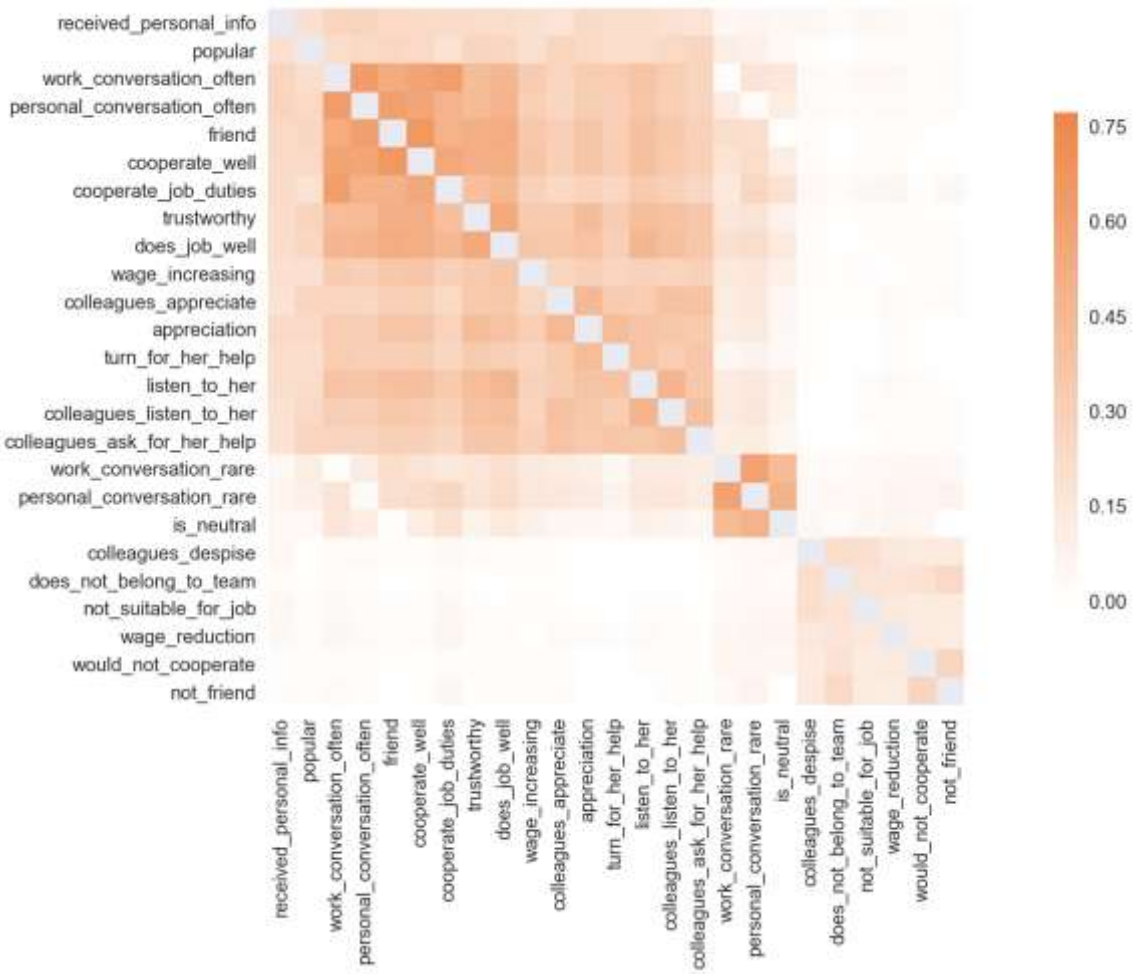
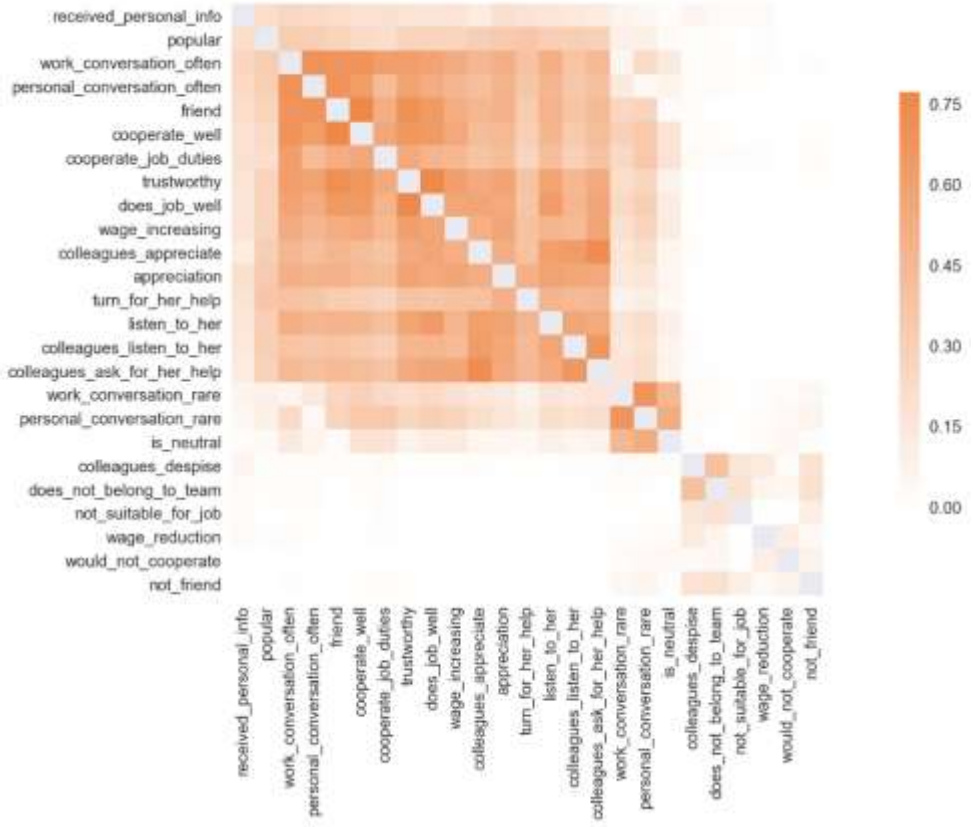


Figure 16. Jaccard max F106c



9.4 Exponential Random Graph Model (ERGM) goodness of fit statistics

9.4.1 First family of models

	A104					P102					F101				
Statistics	Observed	Mean	StdDev	t-ratio		Observed	Mean	StdDev	t-ratio		Observed	Mean	StdDev	t-ratio	
ArcA	91	91	0	NaN		80	80	0	NaN		23	23	0	NaN	
ReciprocityA	23	22.58	3.096	0.136		16	16.339	3.342	-0.101		3	3.027	1.591	-0.017	
In2StarA	302	298.205	51.658	0.073		345	344.911	60.243	0.001		21	20.113	13.03	0.068	
Out2StarA	223	220.806	26.169	0.084		152	153.201	18.777	-0.064		45	48.23	42.129	-0.077	
In3StarA	807	982.138	426.212	-0.411		1564	1518.017	486.541	0.095		12	21.812	39.205	-0.25	
Out3StarA	367	447.252	163.382	-0.491		203	222.766	95.342	-0.207		70	156.875	229.553	-0.378	
TwoPathA	487	468.101	51.972	0.364		396	358.209	50.47	0.749		35	27.983	12.568	0.558	
Transitive-TriadA	198	148.652	24.508	2.014	#	132	125.948	17.66	0.343		11	4.928	2.869	2.117	#
Cyclic-TriadA	59	43.274	9.301	1.691		37	27.662	7.946	1.175		1	0.514	0.838	0.58	
T1A	10	6.116	3.306	1.175		4	2.961	2.245	0.463		0	0.023	0.15	-0.153	
T2A	84	56.578	22.076	1.242		41	31.768	15.77	0.585		1	0.373	1.072	0.585	
T3A	122	86.196	24.518	1.46		69	52.851	18.929	0.853		2	0.822	1.538	0.766	
T4A	69	48.472	12.721	1.614		40	38.91	10.725	0.102		2	0.738	1.014	1.245	
T5A	61	43.4	11.935	1.475		32	27.075	8.547	0.576		1	0.828	1.097	0.157	
T6A	89	85.55	30.641	0.113		53	51.766	24.921	0.05		2	2.019	2.695	-0.007	
T7A	331	311.339	71.098	0.277		271	254.621	61.829	0.265		8	9.857	8.815	-0.211	
T8A	259	255.707	60.185	0.055		159	150.469	52.585	0.162		20	15.419	13.377	0.342	
SinkA	0	1.009	1.008	-1.001		0	0.268	0.516	-0.519		4	5.712	3.554	-0.482	
SourceA	5	2.216	1.397	1.993		7	3.316	1.567	2.351	#	2	3.248	2.212	-0.564	
IsolateA	2	0.397	0.619	2.589	#	0	0.117	0.357	-0.328		7	2.893	1.607	2.555	#
AinSA	121.2032	111.9602	4.205	2.198	#	106.8008	102.0106	4.842	0.989		16.125	13.3075	4.943	0.57	
AoutSA	110.9453	106.1233	3.555	1.357		86.6641	86.2904	2.612	0.143		23.0625	18.8938	6.804	0.613	
AinSA2	121.2032	111.9602	4.205	2.198	#	106.8008	102.0106	4.842	0.989		16.125	13.3075	4.943	0.57	
AoutSA2	110.9453	106.1233	3.555	1.357		86.6641	86.2904	2.612	0.143		23.0625	18.8938	6.804	0.613	

AinAoutSA	50.2264	56.9073	3.127	-2.136	#	46.2539	48.45	3.593	-0.611	12.6875	10.7482	2.908	0.667	
ATA-T	108.2344	95.8322	10.46	1.186		88.4375	82.8924	9.054	0.612	10	4.5699	2.584	2.102	#
ATA-C	97.9375	86.6091	13.25	0.855		75.625	59.2606	14.016	1.168	3	1.4938	2.373	0.635	
ATA-D	106.375	90.2298	10.053	1.606		71.9609	68.5013	7.69	0.45	10.5	4.6719	2.591	2.249	#
ATA-U	114.6875	100.7931	11.828	1.175		99	93.9325	9.89	0.512	6.9688	4.5493	2.527	0.957	
ATA-TD	214.6094	186.062	19.688	1.45		160.3984	151.3937	14.844	0.607	20.5	9.2418	5.138	2.191	#
ATA-TU	222.9219	196.6253	21.7	1.212		187.4375	176.8249	18.363	0.578	16.9688	9.1191	5.064	1.55	
ATA-DU	221.0625	191.0229	19.768	1.52		170.9609	162.4338	14.452	0.59	17.4688	9.2212	5.056	1.631	
ATA-TDU	329.2969	286.8551	29.982	1.416		259.3984	245.3262	22.967	0.613	27.4688	13.7911	7.605	1.799	
A2PA-T	327.2813	359.4469	44.075	-0.73		308.75	282.8258	43.782	0.592	30.5	27.1873	12.47	0.266	
A2PA-D	140.3125	162.9427	24.137	-0.938		101.6367	107.2502	20.161	-0.278	36.75	47.2904	42.327	-0.249	
A2PA-U	211.5938	229.8205	42.664	-0.427		276.25	264.9124	38.161	0.297	15.9688	19.1804	12.76	-0.252	
A2PA-TD	467.5938	522.3896	60.423	-0.907		410.3867	390.076	59.23	0.343	67.25	74.4777	44.038	-0.164	
A2PA-TU	538.875	589.2674	75.894	-0.664		585	547.7383	56.931	0.655	46.4688	46.3677	18.159	0.006	
A2PA-DU	351.9063	392.7633	42.64	-0.958		377.8867	372.1626	31.454	0.182	52.7188	66.4709	35.933	-0.383	
A2PA-TDU	679.1875	752.2102	82.967	-0.88		686.6367	654.9884	62.922	0.503	83.2188	93.6581	38.082	-0.274	
leader interaction	14	14.011	3.644	-0.003		2	1.952	1.888	0.025	1	1.059	1.216	-0.049	
raise of sender	33	33.353	5.17	-0.068		24	23.923	3.218	0.024	17	17.135	3.02	-0.045	
raise of receiver	35	35.658	7.842	-0.084		18	18.174	6.609	-0.026	13	13.044	2.589	-0.017	
raise of interaction	12	12.332	4.816	-0.069		2	2.007	2.02	-0.003	9	9.11	2.997	-0.037	
years at company of sender	183310	183310.66	13.308	-0.05		160654	160652.624	29.151	0.047	46316	46316.97	20.799	-0.047	
years at company of receiver	183322	183321.222	15.437	0.05		160692	160685.954	64.332	0.094	46266	46266.878	18.12	-0.048	
years at company difference	110	109.81	13.9	0.014		308	311.714	30.044	-0.124	70	69.772	12.348	0.018	
stddev_indegreeA	5.497	5.4516	0.409	0.111		6.0553	6.036	0.474	0.041	1.9003	1.8409	0.352	0.169	
skew_indegreeA	-1.0033	-0.7538	0.31	-0.805		-0.2219	-0.3239	0.251	0.406	-0.9415	-0.7644	0.577	-0.307	
stddev_outdegreeA	4.832	4.8065	0.235	0.109		4.2762	4.2846	0.205	-0.041	2.5055	2.4395	0.828	0.08	
skew_outdegreeA	-1.2921	-1.0977	0.156	-1.244		-1.1795	-1.1281	0.103	-0.501	0.0956	0.1439	1.329	-0.036	
clusteringA_tm	0.4066	0.3179	0.042	2.108	#	0.3333	0.3562	0.059	-0.388	0.3143	0.2199	0.19	0.496	
clusteringA_cm	0.3634	0.2759	0.044	1.978		0.2803	0.2283	0.045	1.149	0.0857	0.0466	0.073	0.536	

clusteringA_ti	0.3278	0.2534	0.045	1.637	0.1913	0.1859	0.03	0.18	0.2619	0.1729	0.141	0.633
clusteringA_to	0.4439	0.3391	0.057	1.827	0.4342	0.4167	0.076	0.232	0.1222	0.0883	0.084	0.402
	Mahalanobis distance = 323 Maximum qasi-autocorrelation in absolute value = ∞				Mahalanobis distance = 373 Maximum qasi-autocorrelation in absolute value = ∞				Mahalanobis distance = 2083 Maximum qasi-autocorrelation in absolute value = ∞			

9.4.2 Second family of models

	A104					P102					F101				
Statistics	Observed	Mean	StdDev	t-ratio		Observed	Mean	StdDev	t-ratio		Observed	Mean	StdDev	t-ratio	
ArcA	91	91	0	NaN		80	80	0	NaN		23	23	0	NaN	
ReciprocityA	23	22.745	3.094	0.082		16	16.33	3.415	-0.097		3	3.04	1.601	-0.025	
In2StarA	302	300.193	48.499	0.037		345	341.936	61.819	0.05		21	21.811	14.113	-0.057	
Out2StarA	223	223.911	25.782	-0.035		152	153.87	19.331	-0.097		45	43.108	38.393	0.049	
In3StarA	807	996.757	414.068	-0.458		1564	1494.49	487.866	0.142		12	26.232	47.384	-0.3	
Out3StarA	367	460.998	163.201	-0.576		203	224.05	95.882	-0.22		70	128.066	207.377	-0.28	
TwoPathA	487	470.052	50.326	0.337		396	359.387	52.987	0.691		35	28.521	13.182	0.492	
Transitive-TriadA	198	150.967	24.185	1.945		132	125.68	18.583	0.34		11	5.002	2.891	2.075	#
Cyclic-TriadA	59	43.946	9.35	1.61		37	27.657	8.17	1.144		1	0.569	0.888	0.485	
T1A	10	6.231	3.395	1.11		4	2.893	2.248	0.493		0	0.025	0.156	-0.16	
T2A	84	57.705	22.407	1.174		41	31.353	16.078	0.6		1	0.404	1.139	0.523	
T3A	122	87.823	24.675	1.385		69	52.554	19.51	0.843		2	0.893	1.652	0.67	
T4A	69	49.109	12.58	1.581		40	38.779	11.216	0.109		2	0.75	1.043	1.199	
T5A	61	44.345	11.97	1.391		32	26.752	8.881	0.591		1	0.872	1.141	0.112	
T6A	89	87.347	30.143	0.055		53	51.581	25.676	0.055		2	2.154	3.121	-0.049	
T7A	331	314.745	68.224	0.238		271	254.934	65.673	0.245		8	10.292	9.376	-0.244	
T8A	259	259.798	59.241	-0.013		159	150.137	54.202	0.164		20	15.558	14.473	0.307	
SinkA	0	1.019	0.989	-1.03		0	0.315	0.596	-0.528		4	5.338	3.271	-0.409	
SourceA	5	2.213	1.318	2.114	#	7	3.309	1.648	2.239	#	2	3.46	2.229	-0.655	
IsolateA	2	0.495	0.675	2.229	#	0	0.135	0.353	-0.382		7	3.055	1.513	2.608	#
AinSA	121.2032	112.2629	4.003	2.233	#	106.8008	101.9032	5.125	0.956		16.125	13.9639	4.809	0.449	

AoutSA	110.9453	106.5429	3.508	1.255		86.6641	86.5014	2.779	0.059	23.0625	18.2033	6.369	0.763	
AinSA2	121.2032	112.2629	4.003	2.233	#	106.8008	101.9032	5.125	0.956	16.125	13.9639	4.809	0.449	
AoutSA2	110.9453	106.5429	3.508	1.255		86.6641	86.5014	2.779	0.059	23.0625	18.2033	6.369	0.763	
AinAoutSA	50.2264	56.6898	2.958	-2.185	#	46.2539	48.443	3.688	-0.594	12.6875	10.877	2.87	0.631	
ATA-T	108.2344	96.7448	9.959	1.154		88.4375	82.8988	9.466	0.585	10	4.6459	2.596	2.062	#
ATA-C	97.9375	87.3704	12.991	0.813		75.625	59.4717	14.325	1.128	3	1.6505	2.515	0.537	
ATA-D	106.375	91.4722	10.057	1.482		71.9609	68.4369	7.766	0.454	10.5	4.7326	2.612	2.208	#
ATA-U	114.6875	101.6002	11.088	1.18		99	93.5049	10.59	0.519	6.9688	4.6286	2.546	0.919	
ATA-TD	214.6094	188.217	19.228	1.373		160.3984	151.3358	15.231	0.595	20.5	9.3785	5.172	2.15	#
ATA-TU	222.9219	198.345	20.453	1.202		187.4375	176.4038	19.534	0.565	16.9688	9.2744	5.097	1.51	
ATA-DU	221.0625	193.0724	19.096	1.466		170.9609	161.9419	15.15	0.595	17.4688	9.3612	5.097	1.591	
ATA-TDU	329.2969	289.8172	28.8	1.371		259.3984	244.8407	24.104	0.604	27.4688	14.007	7.659	1.758	
A2PA-T	327.2813	359.8298	43.872	-0.742		308.75	283.9879	45.405	0.545	30.5	27.7086	13.134	0.213	
A2PA-D	140.3125	164.2911	23.14	-1.036		101.6367	107.744	20.648	-0.296	36.75	42.1261	38.549	-0.139	
A2PA-U	211.5938	230.5013	41.213	-0.459		276.25	262.5299	38.96	0.352	15.9688	20.8459	13.925	-0.35	
A2PA-TD	467.5938	524.1209	59.906	-0.944		410.3867	391.7319	60.735	0.307	67.25	69.8347	42.387	-0.061	
A2PA-TU	538.875	590.3311	74.639	-0.689		585	546.5178	60.009	0.641	46.4688	48.5544	19.17	-0.109	
A2PA-DU	351.9063	394.7924	42.388	-1.012		377.8867	370.274	31.938	0.238	52.7188	62.972	32.764	-0.313	
A2PA-TDU	679.1875	754.6222	82.448	-0.915		686.6367	654.2618	65.605	0.493	83.2188	90.6805	37.218	-0.2	
leader interaction	14	13.769	3.395	0.068		2	2.159	1.707	-0.093	1	1.135	1.301	-0.104	
raise of sender	33	33.317	5.156	-0.061		24	24.053	3.211	-0.017	17	16.866	3.009	0.045	
raise of receiver	35	35.989	7.67	-0.129		18	18.557	6.351	-0.088	13	13.057	2.665	-0.021	
raise of interaction	12	12.41	4.83	-0.085		2	2.152	2.021	-0.075	9	8.925	3.035	0.025	
years at company of sender	183310	183309.713	12.808	0.022		160654	160652.843	29.403	0.039	46316	46314.321	17.604	0.095	
years at company of receiver	183322	183321.818	16.045	0.011		160692	160689.104	63.569	0.046	46266	46265.319	17.789	0.038	
years at company difference	110	110.489	14.44	-0.034		308	308.207	26.367	-0.008	70	68.762	12.739	0.097	
earns more money	20	19.975	3.343	0.007		21	21.66	5.147	-0.128	2	2.037	1.324	-0.028	
legitimate leader	3	2.96	1.027	0.039		0	0.003	0.055	-0.055	0	0.006	0.077	-0.078	
earns more and others despise	6	5.958	1.208	0.035		1	1.024	1.098	-0.022	1	0.981	0.888	0.021	

stddev_indegreeA	5.497	5.4693	0.383	0.072	6.0553	6.0114	0.487	0.09	1.9003	1.8888	0.366	0.031
skew_indegreeA	-1.0033	-0.7416	0.311	-0.841	-0.2219	-0.3334	0.25	0.445	-0.9415	-0.6962	0.635	-0.386
stddev_outdegreeA	4.832	4.8347	0.23	-0.012	4.2762	4.2918	0.211	-0.074	2.5055	2.3426	0.761	0.214
skew_outdegreeA	-1.2921	-1.0943	0.157	-1.259	-1.1795	-1.1322	0.099	-0.477	0.0956	-0.0032	1.24	0.08
clusteringA_tm	0.4066	0.3217	0.043	1.963	0.3333	0.3545	0.06	-0.352	0.3143	0.2105	0.164	0.631
clusteringA_cm	0.3634	0.2792	0.046	1.834	0.2803	0.2272	0.046	1.168	0.0857	0.0511	0.076	0.453
clusteringA_ti	0.3278	0.2555	0.046	1.573	0.1913	0.187	0.03	0.144	0.2619	0.1563	0.126	0.837
clusteringA_to	0.4439	0.3393	0.054	1.922	0.4342	0.4143	0.079	0.254	0.1222	0.096	0.085	0.31
	Mahalanobis distance = 1183 Maximum qasi-autocorrelation in absolute value = ∞				Mahalanobis distance = -41 Maximum qasi-autocorrelation in absolute value = ∞				Mahalanobis distance = 3393 Maximum qasi-autocorrelation in absolute value = ∞			

9.4.3 Third family of models

	A104				P102				F101			
Statistics	Observed	Mean	StdDev	t-ratio	Observed	Mean	StdDev	t-ratio	Observed	Mean	StdDev	t-ratio
ArcA	91	91	0	NaN	80	80	0	NaN	23	23	0	NaN
ReciprocityA	23	22.722	2.967	0.094	16	15.882	3.132	0.038	3	2.993	1.586	0.004
In2StarA	302	302.647	49.63	-0.013	345	334.513	61.337	0.171	21	21.989	13.499	-0.073
Out2StarA	223	223.76	24.454	-0.031	152	152.111	16.68	-0.007	45	45.54	31.089	-0.017
In3StarA	807	995.33	414.713	-0.454	1564	1421.208	484.575	0.295	12	26.371	45.494	-0.316
Out3StarA	367	449.744	144.865	-0.571	203	210.242	75.315	-0.096	70	123.074	158.135	-0.336
TwoPathA	487	467.226	49.063	0.403	396	347.189	47.181	1.035	35	30.782	15.97	0.264
Transitive-TriadA	198	152.913	25.934	1.739	132	123.109	18.76	0.474	11	5.459	3.082	1.798
Cyclic-TriadA	59	43.716	9.853	1.551	37	26.471	7.822	1.346	1	0.606	0.905	0.435
T1A	10	6.153	3.458	1.113	4	2.576	2.011	0.708	0	0.019	0.137	-0.139
T2A	84	57.177	23.006	1.166	41	28.689	14.553	0.846	1	0.393	1.039	0.584
T3A	122	87.306	25.682	1.351	69	49.261	18.082	1.092	2	0.937	1.607	0.662
T4A	69	49.554	13.248	1.468	40	36.802	11.074	0.289	2	0.709	1.009	1.279

T5A	61	44.308	12.513	1.334		32	25.643	8.068	0.788		1	1.036	1.235	-0.029	
T6A	89	84.711	28.195	0.152		53	45.829	21.239	0.338		2	2.539	3.861	-0.14	
T7A	331	311.857	67.813	0.282		271	237.869	60.576	0.547		8	10.018	9.106	-0.222	
T8A	259	255.326	55.144	0.067		159	141.052	45.048	0.398		20	19.222	17.967	0.043	
SinkA	0	1.017	0.957	-1.062		0	0.361	0.63	-0.573		4	5.662	2.742	-0.606	
SourceA	5	2.331	1.369	1.95		7	3.353	1.673	2.179	#	2	3.323	2.144	-0.617	
IsolateA	2	0.583	0.719	1.971		0	0.173	0.409	-0.423		7	3.221	1.461	2.587	#
AinSA	121.2032	112.9362	4.122	2.005	#	106.8008	101.901	4.994	0.981		16.125	14.0459	4.376	0.475	
AoutSA	110.9453	106.8747	3.593	1.133		86.6641	86.6724	2.792	-0.003		23.0625	19.4005	5.459	0.671	
AinSA2	121.2032	112.9362	4.122	2.005	#	106.8008	101.901	4.994	0.981		16.125	14.0459	4.376	0.475	
AoutSA2	110.9453	106.8747	3.593	1.133		86.6641	86.6724	2.792	-0.003		23.0625	19.4005	5.459	0.671	
AinAoutSA	50.2264	56.1713	3.034	-1.96		46.2539	48.5844	3.656	-0.637		12.6875	10.1638	2.611	0.966	
ATA-T	108.2344	97.134	10.637	1.044		88.4375	81.3467	9.528	0.744		10	4.984	2.709	1.852	
ATA-C	97.9375	86.6378	13.615	0.83		75.625	57.2473	13.917	1.321		3	1.738	2.51	0.503	
ATA-D	106.375	91.2527	10.562	1.432		71.9609	67.3569	7.467	0.617		10.5	5.1394	2.784	1.925	
ATA-U	114.6875	102.2451	11.878	1.047		99	91.9884	10.903	0.643		6.9688	4.8895	2.575	0.807	
ATA-TD	214.6094	188.3867	20.404	1.285		160.3984	148.7035	15.155	0.772		20.5	10.1234	5.453	1.903	
ATA-TU	222.9219	199.3791	21.994	1.07		187.4375	173.335	19.907	0.708		16.9688	9.8735	5.208	1.362	
ATA-DU	221.0625	193.4979	20.555	1.341		170.9609	159.3452	15.546	0.747		17.4688	10.0289	5.274	1.411	
ATA-TDU	329.2969	290.6318	30.932	1.25		259.3984	240.6919	24.54	0.762		27.4688	15.0129	7.934	1.57	
A2PA-T	327.2813	354.6066	41.591	-0.657		308.75	273.2366	40.001	0.888		30.5	29.9192	15.974	0.036	
A2PA-D	140.3125	161.9684	21.692	-0.998		101.6367	105.8263	18.144	-0.231		36.75	44.2408	31.255	-0.24	
A2PA-U	211.5938	230.1026	41.559	-0.445		276.25	256.5992	40.32	0.487		15.9688	20.7455	13.33	-0.358	
A2PA-TD	467.5938	516.5749	55.269	-0.886		410.3867	379.0629	51.836	0.604		67.25	74.16	40.263	-0.172	
A2PA-TU	538.875	584.7092	73.748	-0.621		585	529.8358	59.096	0.933		46.4688	50.6647	19.349	-0.217	
A2PA-DU	351.9063	392.071	41.418	-0.97		377.8867	362.4255	32.353	0.478		52.7188	64.9864	26.19	-0.468	
A2PA-TDU	679.1875	746.6775	79.255	-0.852		686.6367	635.6621	60.588	0.841		83.2188	94.9056	35.66	-0.328	
leader interaction	14	13.829	3.348	0.051		2	1.994	1.565	0.004		1	0.956	1.127	0.039	
raise of sender	33	32.991	4.79	0.002		24	24.094	3.213	-0.029		17	16.853	2.891	0.051	

raise of receiver	35	34.88	7.163	0.017	18	18.297	6.242	-0.048	13	12.941	2.667	0.022
raise of interaction	12	11.971	4.374	0.007	2	2.052	1.911	-0.027	9	8.88	2.887	0.042
years at company of sender	183310	183310.034	11.838	-0.003	160654	160653.815	27.803	0.007	46316	46315.428	10.71	0.053
years at company of receiver	183322	183323.208	14.257	-0.085	160692	160697.967	58.592	-0.102	46266	46265.292	16.863	0.042
years at company difference	110	109.048	12.494	0.076	308	306.61	23.311	0.06	70	70.52	14.108	-0.037
wage reduction	16	15.79	2.651	0.079	15	14.978	3.369	0.007	5	5.057	1.912	-0.03
earns more money	20	19.997	3.257	0.001	21	21.127	5.381	-0.024	2	1.976	1.234	0.019
executive's pet	12	12.07	1.977	-0.035	14	14.049	3.253	-0.015	2	1.912	1.428	0.062
legitimate leader	3	3.009	1.046	-0.009	0	0.01	0.109	-0.092	0	0	0	NaN
earns more and others despise	6	6.019	1.189	-0.016	1	1.112	1.196	-0.094	1	0.99	0.858	0.012
stddev_indegreeA	5.497	5.4883	0.39	0.022	6.0553	5.952	0.491	0.21	1.9003	1.8977	0.346	0.007
skew_indegreeA	-1.0033	-0.7617	0.304	-0.795	-0.2219	-0.3833	0.269	0.6	-0.9415	-0.679	0.632	-0.416
stddev_outdegreeA	4.832	4.8339	0.219	-0.009	4.2762	4.2735	0.184	0.015	2.5055	2.4347	0.64	0.111
skew_outdegreeA	-1.2921	-1.1154	0.137	-1.293	-1.1795	-1.1543	0.082	-0.308	0.0956	0.2174	1.117	-0.109
clusteringA_tm	0.4066	0.3273	0.045	1.765	0.3333	0.358	0.056	-0.438	0.3143	0.2124	0.147	0.695
clusteringA_cm	0.3634	0.279	0.049	1.734	0.2803	0.225	0.047	1.182	0.0857	0.0531	0.078	0.418
clusteringA_ti	0.3278	0.2564	0.047	1.524	0.1913	0.1872	0.03	0.14	0.2619	0.1588	0.118	0.874
clusteringA_to	0.4439	0.3435	0.057	1.754	0.4342	0.4096	0.078	0.317	0.1222	0.0877	0.078	0.445
	Mahalanobis distance = -133 Maximum qasi-autocorrelation in absolute value = ∞				Mahalanobis distance = 183 Maximum qasi-autocorrelation in absolute value = ∞				Mahalanobis distance = -5033 Maximum qasi-autocorrelation in absolute value = ∞			

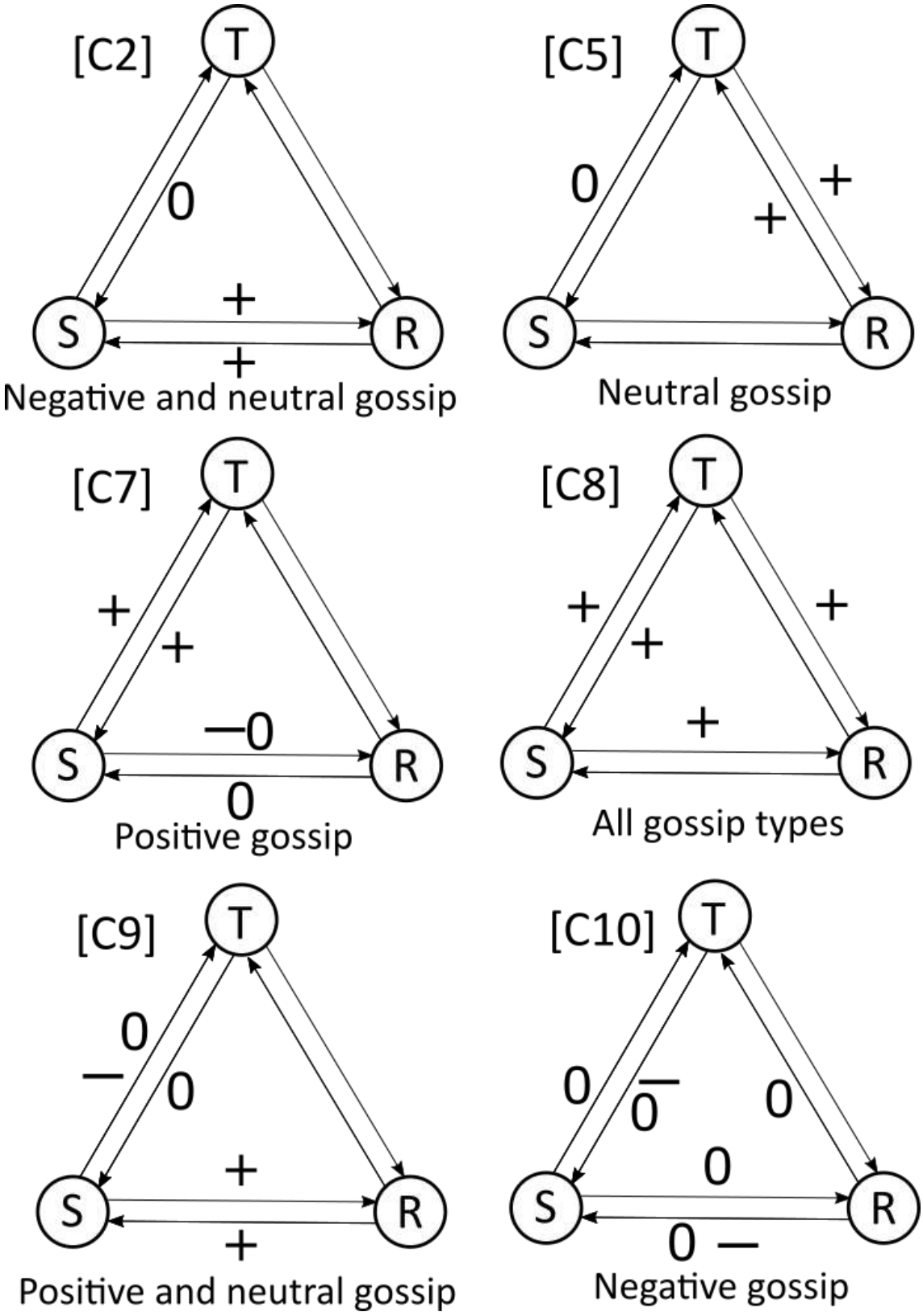
9.4.4 Fourth family of models

	A104					P102					F101				
Statistics	Observed	Mean	StdDev	t-ratio		Observed	Mean	StdDev	t-ratio		Observed	Mean	StdDev	t-ratio	
ArcA	91	91	0	NaN		80	80	0	NaN		23	23	0	NaN	
ReciprocityA	23	23.024	2.921	-0.008		16	15.874	3.324	0.038		3	3.023	1.567	-0.015	
In2StarA	302	299.846	47.367	0.045		345	356.117	59.818	-0.186		21	20.587	11.444	0.036	
Out2StarA	223	223.859	24.513	-0.035		152	150.983	16.683	0.061		45	47.255	30.84	-0.073	
In3StarA	807	949.028	394.756	-0.36		1564	1595.981	476.057	-0.067		12	20.824	33.802	-0.261	
Out3StarA	367	447.527	148.73	-0.541		203	207.685	78.007	-0.06		70	121.124	163.364	-0.313	
TwoPathA	487	466.979	46.879	0.427		396	352.61	50.195	0.864		35	28.3	12.664	0.529	
Transitive-TriadA	198	154.996	26.071	1.649		132	129.449	17.698	0.144		11	6.187	3.677	1.309	
Cyclic-TriadA	59	44.378	9.591	1.525		37	27.439	8.204	1.165		1	0.697	0.998	0.304	
T1A	10	6.426	3.531	1.012		4	2.876	2.274	0.494		0	0.037	0.194	-0.191	
T2A	84	59.105	23.245	1.071		41	31.217	15.832	0.618		1	0.585	1.385	0.3	
T3A	122	89.379	25.458	1.281		69	52.285	19.221	0.87		2	1.2	1.933	0.414	
T4A	69	50.969	13.16	1.37		40	39.624	11.182	0.034		2	0.828	1.148	1.021	
T5A	61	45.344	12.58	1.245		32	27.071	8.376	0.588		1	1.338	1.593	-0.212	
T6A	89	85.045	27.549	0.144		53	48.066	22.626	0.218		2	2.25	3.112	-0.08	
T7A	331	312.808	64.006	0.284		271	248.808	61.614	0.36		8	9.142	8.165	-0.14	
T8A	259	256.453	54.87	0.046		159	143.049	48.34	0.33		20	17.658	13.476	0.174	
SinkA	0	1.038	1.01	-1.027		0	0.277	0.518	-0.535		4	5.854	2.895	-0.64	
SourceA	5	2.575	1.427	1.699		7	3.57	1.705	2.012	#	2	2.907	1.902	-0.477	
IsolateA	2	0.523	0.711	2.077	#	0	0.17	0.401	-0.424		7	3.757	1.534	2.114	#
AinSA	121.2032	113.5835	4.272	1.784		106.8008	103.0518	5.108	0.734		16.125	13.8774	4.19	0.536	
AoutSA	110.9453	106.9482	3.43	1.165		86.6641	86.3342	2.552	0.129		23.0625	20.7475	5.283	0.438	
AinSA2	121.2032	113.5835	4.272	1.784		106.8008	103.0518	5.108	0.734		16.125	13.8774	4.19	0.536	
AoutSA2	110.9453	106.9482	3.43	1.165		86.6641	86.3342	2.552	0.129		23.0625	20.7475	5.283	0.438	
AinAoutSA	50.2264	55.691	2.993	-1.826		46.2539	47.8177	3.671	-0.426		12.6875	10.362	2.835	0.82	
ATA-T	108.2344	97.8918	10.429	0.992		88.4375	84.1389	9.087	0.473		10	5.6689	3.24	1.337	

ATA-C	97.9375	87.6136	12.927	0.799	75.625	58.4924	14.326	1.196	3	2.0114	2.785	0.355
ATA-D	106.375	92.3218	10.102	1.391	71.9609	68.3866	7.349	0.486	10.5	5.8041	3.38	1.389
ATA-U	114.6875	102.5088	11.664	1.044	99	95.7661	9.88	0.327	6.9688	5.1817	2.757	0.648
ATA-TD	214.6094	190.2136	19.659	1.241	160.3984	152.5255	14.358	0.548	20.5	11.473	6.589	1.37
ATA-TU	222.9219	200.4007	21.587	1.043	187.4375	179.905	18.411	0.409	16.9688	10.8506	5.869	1.043
ATA-DU	221.0625	194.8306	19.746	1.328	170.9609	164.1527	14.029	0.485	17.4688	10.9858	5.985	1.083
ATA-TDU	329.2969	292.7225	29.926	1.222	259.3984	248.2916	22.533	0.493	27.4688	16.6547	9.173	1.179
A2PA-T	327.2813	351.6804	40.603	-0.601	308.75	276.197	42.731	0.762	30.5	27.3145	12.473	0.255
A2PA-D	140.3125	160.9274	22.407	-0.92	101.6367	103.3635	18.592	-0.093	36.75	45.0028	30.866	-0.267
A2PA-U	211.5938	227.2974	39.72	-0.395	276.25	270.1795	37.221	0.163	15.9688	18.6395	11.305	-0.236
A2PA-TD	467.5938	512.6078	55.521	-0.811	410.3867	379.5605	56.496	0.546	67.25	72.3173	34.591	-0.146
A2PA-TU	538.875	578.9777	70.398	-0.57	585	546.3764	54.597	0.707	46.4688	45.954	15.997	0.032
A2PA-DU	351.9063	388.2248	40.258	-0.902	377.8867	373.543	30.147	0.144	52.7188	63.6423	25.652	-0.426
A2PA-TDU	679.1875	739.9051	77.012	-0.788	686.6367	649.74	59.367	0.622	83.2188	90.9568	29.57	-0.262
leader interaction	14	13.921	3.276	0.024	2	1.942	1.625	0.036	1	0.96	1.171	0.034
raise of sender	33	32.979	4.363	0.005	24	24.014	3.094	-0.005	17	17.133	2.925	-0.045
raise of receiver	35	34.811	6.383	0.03	18	17.355	5.886	0.11	13	13.074	2.293	-0.032
raise of interaction	12	12.071	3.93	-0.018	2	1.908	1.807	0.051	9	9.12	2.648	-0.045
years at company of sender	183310	183308.928	11.663	0.092	160654	160655.387	26.655	-0.052	46316	46315.756	9.723	0.025
years at company of receiver	183322	183320.993	14.484	0.07	160692	160690.715	59.794	0.021	46266	46266.195	14.243	-0.014
years at company difference	110	110.983	12.916	-0.076	308	307.186	25.365	0.032	70	69.703	12.778	0.023
wage reduction	16	15.842	2.646	0.06	15	15.157	3.204	-0.049	5	5.096	1.326	-0.072
earns more money	20	19.884	2.969	0.039	21	20.991	4.443	0.002	2	2.085	1.136	-0.075
executive's pet	12	11.85	2.058	0.073	14	13.806	3.308	0.059	2	1.932	1.254	0.054
appreciation	10	9.923	2.877	0.027	11	10.923	3.437	0.022	6	5.952	2.366	0.02
would not cooperate	3	2.962	0.9	0.042	4	3.821	1.885	0.095	5	4.967	0.802	0.041
legitimate leader	3	3.017	1.044	-0.016	0	0.004	0.063	-0.063	0	0.001	0.032	-0.032
not belongs to the team	8	8.018	1.459	-0.012	7	7.118	2.006	-0.059	6	6.035	1.191	-0.029
earns more and others despise	6	5.931	1.196	0.058	1	0.899	1.084	0.093	1	1.043	0.649	-0.066

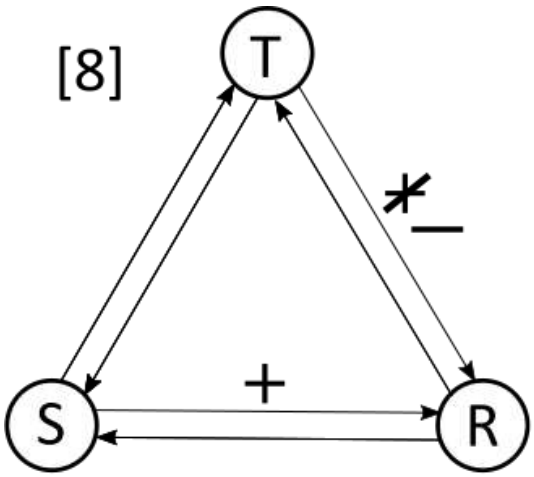
stddev_indegreeA	5.497	5.4672	0.373	0.08	6.0553	6.1243	0.467	-0.148	1.9003	1.8629	0.308	0.121
skew_indegreeA	-1.0033	-0.8107	0.296	-0.65	-0.2219	-0.2977	0.237	0.32	-0.9415	-0.7719	0.546	-0.311
stddev_outdegreeA	4.832	4.8348	0.218	-0.013	4.2762	4.2609	0.184	0.083	2.5055	2.4815	0.609	0.04
skew_outdegreeA	-1.2921	-1.1223	0.136	-1.248	-1.1795	-1.1489	0.083	-0.368	0.0956	0.1915	1.001	-0.096
clusteringA_tm	0.4066	0.332	0.046	1.611	0.3333	0.3723	0.061	-0.636	0.3143	0.2496	0.168	0.385
clusteringA_cm	0.3634	0.2836	0.048	1.68	0.2803	0.2294	0.047	1.092	0.0857	0.0609	0.082	0.304
clusteringA_ti	0.3278	0.262	0.047	1.404	0.1913	0.1847	0.028	0.233	0.2619	0.1888	0.142	0.514
clusteringA_to	0.4439	0.3482	0.059	1.633	0.4342	0.4339	0.077	0.005	0.1222	0.0865	0.066	0.541
	Mahalanobis distance = -1153 Maximum qasi-autocorrelation in absolute value = ∞				Mahalanobis distance = 273 Maximum qasi-autocorrelation in absolute value = ∞				Mahalanobis distance = -793 Maximum qasi-autocorrelation in absolute value = ∞			

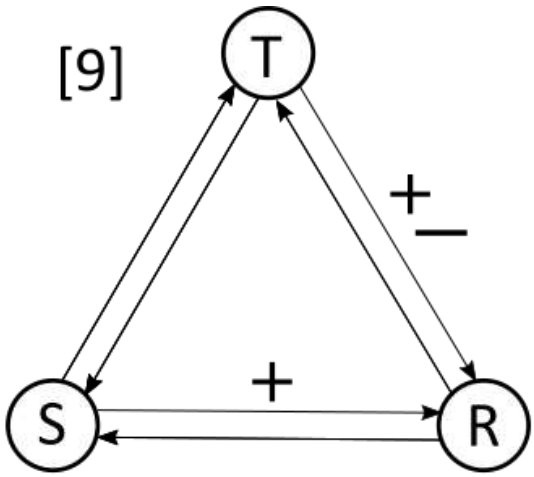
9.5 Triad Configurations Identified Using Hierarchical Clustering

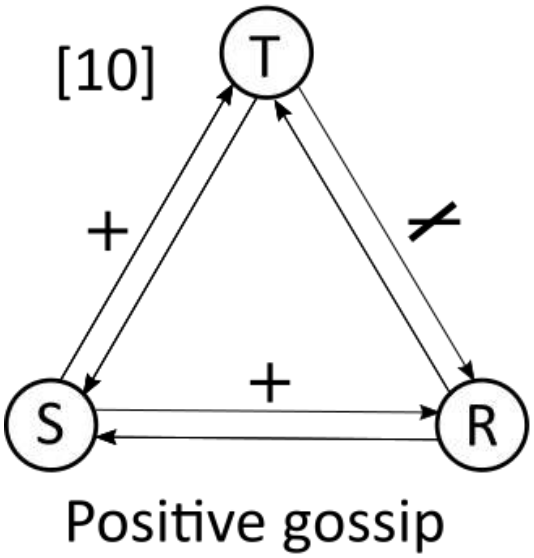


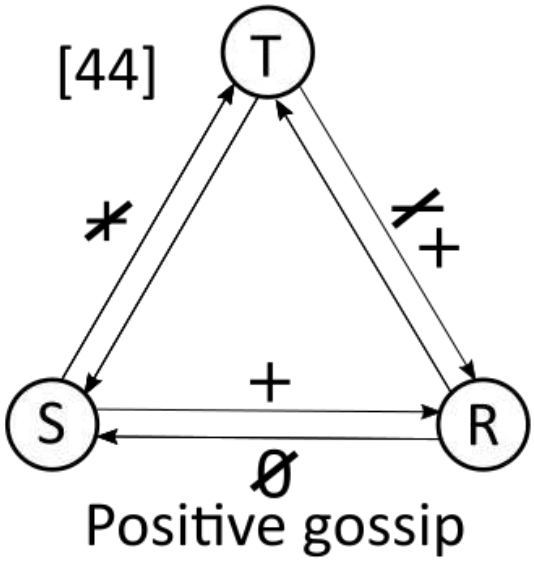
+ means positive relationship, - means negative relationship and 0 means a distant relationship. These relationship types are a result of our network composition (see subchapter **Error! Reference source not found.**). If a sign is crossed out that means the lack of the relationship. Lack of relationships are only present in configurations that are results of the decision tree. Each sign refers to the dyadic relationship that is closer to. At the bottom of each triangle, there is the type of gossip that arises in the respective triadic configuration.

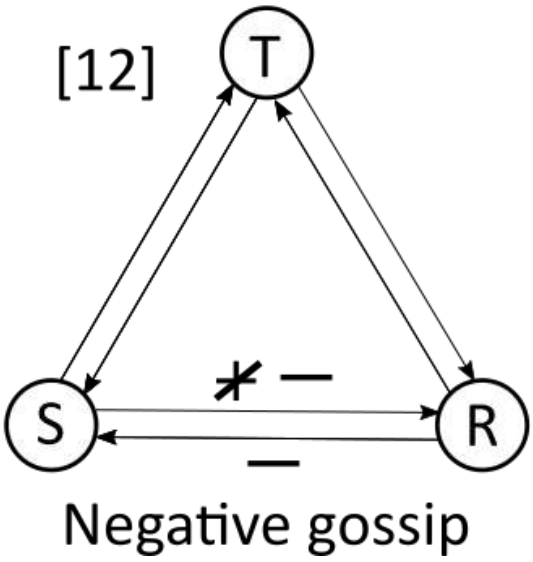
9.6 Triad Configurations Identified by Decision Tree

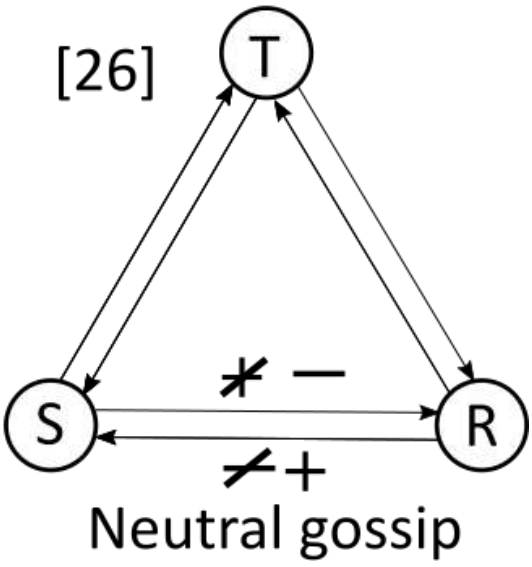




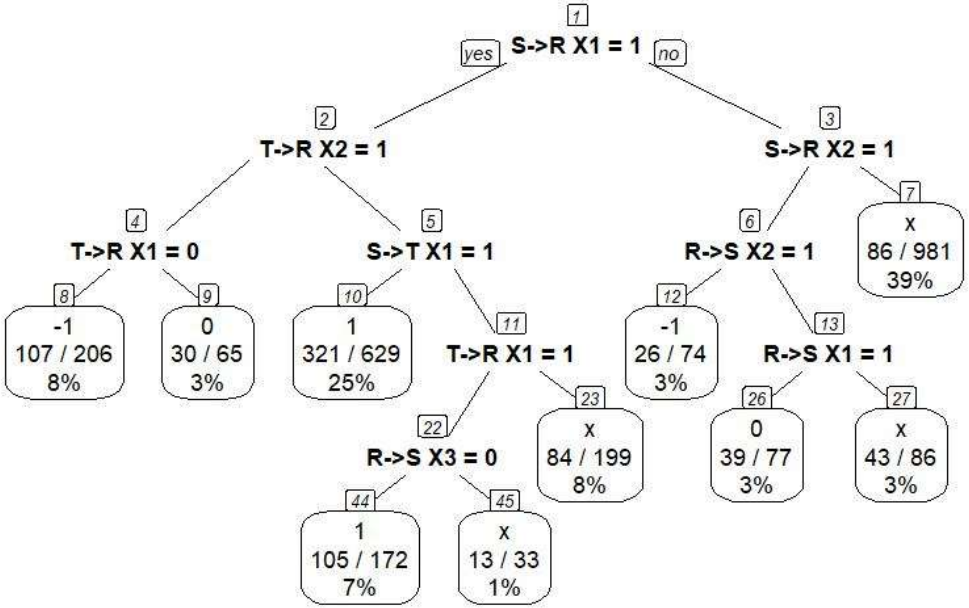








9.7 Decision Tree Identifying Triadic Configurations



X1 = positive, X2 = negative, X3 = neutral dyadic tie

The decision tree estimates branches by splitting the features at nodes (presence of a dyadic tie) until arriving at a terminal node where no further splits can be made and the model can predict the dependent variable (the presence of negative, neutral, positive, or no gossip). At every node, the value of an independent variable is observed, and a splitting criterion is identified. For instance, in the case of node #2, the presence of a negative target -> receiver tie is either present (branch continues left) or not (branch continues right). A terminal node, such as node #7, is reached if there was no positive sender -> receiver (node #1), and no negative sender -> receiver (node #3) tie. Node #7 predicts the lack of a gossip triad ("x") showing the probability per class of observations in the node (86 / 981) and the percentage of observations (39%). As described in subchapter 5.2.2.2, our aim was to find a small, easy-to-interpret model to explain the emergence of various types of gossip triads, trading accuracy for the simplicity and generalizability of our findings (accuracy-simplicity trade-off).

9.8 Statistics of Hierarchical Clusters Used to Derive Triadic Configurations

Hierarchical cluster	Number of gossip triads			Number of non-gossip triads	Ratio of negative triads	Ratio of neutral triads	Ratio of positive triads	Ratio of gossip triads	Ratio of negative gossip is larger than random probability	Ratio of neutral gossip is larger than random probability	Ratio of positive gossip is larger than random probability
	Negative	Neutral	Positive								
1	29	93	58	18990	0.002	0.005	0.003	0.009	No	not sign.	No
2	131	171	83	15179	0.009	0.011	0.005	0.025	not sign.	Yes	Yes
3	56	76	73	15353	0.004	0.005	0.005	0.013	not sign.	not sign.	not sign.
4	37	56	88	29666	0.001	0.002	0.003	0.006	No	No	No
5	56	120	174	22509	0.002	0.005	0.008	0.016	No	Yes	not sign.
6	35	27	2	22054	0.002	0.001	0.000	0.003	No	No	No
7	17	10	10	1865	0.009	0.005	0.005	0.020	not sign.	not sign.	Yes
8	40	84	168	8165	0.005	0.010	0.021	0.036	Yes	Yes	Yes
9	11	13	4	890	0.012	0.015	0.004	0.031	not sign.	Yes	Yes
10	18	8	6	3743	0.005	0.002	0.002	0.009	Yes	No	not sign.
11	16	4	4	5846	0.003	0.001	0.001	0.004	No	No	not sign.
12	5	2	3	6933	0.001	0.000	0.000	0.001	No	No	No
13	9	4	0	354	0.025	0.011	0.000	0.037	not sign.	not sign.	No

The table demonstrates various statistics relating to the estimated hierarchical clusters at a horizontal cut of 13 clusters. The number of gossip triads (displayed separately for the negative, neutral, and positive cluster triads) indicates how many times a triad with such information shared occurred in the specific cluster. Besides the count of triads without observable gossip (from the all possible triads dataset), the ratio of these three types of gossip triad in the various groups is also listed and compared to what we should expect from their random occurrence. In the last 3 columns, “Yes” refers to a ratio of a type of gossip that emerged significantly more frequently in the particular cluster compared to what we could expect based on their frequency measured in the whole dataset, “No” indicates that the ratio did not occur more frequently than random, while “not sign.” denotes cases where the difference between these ratios was not statistically significant.

9.9 Triad Configuration Statistics by Organization

Configuration	Type	F101		P102		F103		A104		F105		F106a		F106b		F106c	
		Nr.	More likely than amongst all triads[40]	Nr.	More likely than amongst all triads	Nr.	More likely than amongst all triads	Nr.	More likely than amongst all triads	Nr.	More likely than amongst all triads	Nr.	More likely than amongst all triads	Nr.	More likely than amongst all triads	Nr.	More likely than amongst all triads
Configuration C8	All	78	1	27	0	62	0	60	0	67	1	90	1	7	0	46	1
Configuration C10	Negative	0	0	1	1	0	0	0	0	0	0	1	1	0	0	0	0
Configuration 8	Negative	37	1	40	1	25	0	78	1	27	1	49	1	5	0	16	0
Configuration 12	Negative	0	0	55	1	0	0	25	1	0	0	14	0	0	0	0	0
Configuration C2	Negative and neutral	26	1	13	0	25	0	49	0	21	1	74	1	6	0	16	0
Configuration C5	Neutral	13	0	12	0	6	0	14	0	3	0	70	1	4	0	11	0
Configuration 9	Neutral	10	1	6	0	7	0	9	0	1	0	47	1	0	0	3	0
Configuration 26	Neutral	8	0	1	0	0	0	13	0	1	0	28	1	27	1	7	0
Configuration C7	Positive	2	0	0	0	2	0	0	0	0	0	17	1	0	0	1	0
Configuration 10	Positive	95	1	44	0	143	1	141	0	104	1	104	0	18	0	79	1
Configuration 44	Positive	27	1	19	0	41	1	26	0	6	0	62	1	4	0	31	1
Configuration C9	Positive and neutral	2	0	1	0	1	0	5	0	0	0	15	1	0	0	0	0

[40] 1 stands for „yes" and 0 for "no"

9.10 Triadic Relations Model (TRM) Coefficients by Organization

Coefficients	F101		P102		F103		A104		F105		F106a		F106b		F106c	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
config 10	4.81***	0.45	3.76***	0.49	5.97***	0.40	4.53***	0.46	4.76***	0.44	6.51***	0.42	3.89***	0.47	3.05***	0.51
config 12	2.21***	0.62	3.57***	0.48	1.47***	0.67	3.27***	0.51	2.36***	0.55	4.81***	0.48	2.66***	0.52	0.01	1.02
config 26	3.20***	0.54	2.97***	0.53	2.83***	0.53	3.06***	0.51	3.36***	0.51	5.16***	0.46	3.04***	0.54	2.52***	0.55
config 44	3.89***	0.48	3.29***	0.49	5.43***	0.40	3.14***	0.52	3.02***	0.53	5.48***	0.43	2.49***	0.58	2.57***	0.56
config 8	3.45***	0.50	3.62***	0.50	3.26***	0.51	3.66***	0.47	3.69***	0.49	6.13***	0.42	2.61***	0.54	1.67***	0.67
config 9	2.74***	0.57	2.23***	0.59	3.35***	0.52	2.36***	0.59	1.54***	0.69	5.07***	0.48	1.30***	0.70	0.74***	0.77
config C10	-0.02	1.03	1.14***	0.71	1.32***	0.73	1.21***	0.72	1.37***	0.69	2.33***	0.66	0.25***	0.90	0.15***	0.90
config C2	3.44***	0.49	2.68***	0.57	3.61***	0.50	3.15***	0.51	3.26***	0.53	6.07***	0.42	3.37***	0.49	3.63***	0.47
config C5	3.76***	0.50	2.92***	0.54	3.83***	0.47	3.46***	0.52	3.61***	0.48	6.26***	0.39	3.44***	0.49	3.65***	0.46
config C7	1.83***	0.63	1.61***	0.65	1.40***	0.68	1.77***	0.68	1.43***	0.73	4.36***	0.46	0.95***	0.77	0.03	1.00
config C8	1.63***	0.67	1.00***	0.76	1.23***	0.69	1.04***	0.77	1.65***	0.71	2.40***	0.61	0.85***	0.75	0.78***	0.77
config C9	0.23***	0.94	0.31***	0.90	0.18***	0.94	0.31***	0.90	0.38***	0.89	0.69***	0.82	0.07***	0.96	0.00	1.01
intercept	0.95***	0.24	1.78***	0.15	1.64***	0.22	1.75***	0.13	1.10***	0.28	-1.93***	0.32	-0.89***	0.29	2.93***	0.07

The coefficients are assumed to follow a normal distribution. The mean and standard deviations of these distributions are indicated. Significance levels were derived from Student's t-tests. Positive coefficients (means) indicate that a particular configuration increases the likelihood of the emergence of gossip in the respective triad.

9.11 Data Protection Protocol

Subproject "Gossip in Organizations"

In this subproject, we execute **new organizational data collection**, involving workgroups of business and governmental organizations with approximatively 30 employees. For newly collected organizational survey data, the following procedure on **data collection, storage, and protection** will be applied.

Due to the high refusing rate, the **selection of organizations** is based on accessibility. We only select organizations where the leaders and HR leaders beforehand gave permission to the research and allowed us to execute the data collection at the office of the company, during working hours. In case selecting one workgroup of many as the subject of the research, the selection of the workgroup is done with the help of the HR leader.

Bilateral cooperation agreements between the participant business or governmental organizations and the chief director of the HAS Social Science Center, as the representative of HAS SSC 'Lendület' RECENS will be signed. The cooperation agreement contains the personal and organizational data protection protocols considered during the research. Our research does not intend to collect company-sensitive data, information on patents, know-how, and trade secrets. Once obtained by coincidence, such information will be destroyed. Participating organizations (their names and specific profiles) will be masked in the data files and in all publications.

We will define the group of respondents and group boundaries very clearly at the beginning. The list of participants will be prepared either by the researchers or by the representative of the organization as agreed upon during the consultations with the specific organization. For the research, we will reach out to every employee of the company. If an employee agrees to the terms written in the participation consent and info sheet, we will ask them to fill out the survey on our tablets or on their PC.

The agreement for cooperation with partner organizations is executed in two steps. Firstly, employees are contacted to provide oral consent for their name to be included in the electronic questionnaire. The programming of the questionnaire happens afterwards. Secondly, written approval from the employees is collected prior to entering the questionnaire. The survey can only be entered and filled out by

employees who provided their written consent, although the names of employees that gave consent during the first stage are included in the questionnaire as checkable options in relevant questions. Prior to filling the survey, every employee is assigned a unique code, which is used to enter the website and is solely shared with the corresponding employee. These unique codes are then stored in the database in the backend of the website. It's important to note that information mapping employee names to their IDs is securely stored only in frontend and discarded after the duration of the survey. Since names are not stored in the database, the survey participants can use their own uniquely assigned code to request deletion after filling out the questionnaire.

The participation consent and info sheet informs the employees about the scientific nature of the research, the data protection protocol, the relevant laws (12. § of Act CXII of 2011 on Informational Self-Determination and Freedom of Information of Hungary), the responsible researcher and the source of funding.

We do not involve those employees in our research, who did not give consent to it. Any participant will be able to **withdraw from participation at any moment** during the study period without any kind of justification. Until the identity of the given participant and recorded data can be linked, the participant can also request the deletion of this data. After the data is anonymized, such a link cannot be made, and therefore the data loses its "personal" character and does not need protection anymore (12. § of Act CXII of 2011 on Informational Self-Determination and Freedom of Information of Hungary).

Data will be collected online. The survey software runs on a secure online server. Access to filling in the survey is only given to the respondents. To secure anonymity for respondents, the software takes in a list automatically with each respondent's name and his/her unique code. The respondents access the survey using their unique identification code, but the name list also allows them to see colleges by their name in network questions. The database that is created contains the code numbers only. No names are saved as there is no need to enter names. For organizational data with multiple waves, codes linked to identities will be saved in separate electronic data files and will be deleted after the completion of the study. Code numbers enable us to link data files from different waves. After the file with

code numbers is deleted, neither the researchers nor any other person will be able to make a direct correspondence between the data and the participants. Collected data that does not allow the identification of respondents will be analyzed on PCs of the researchers.

After the data collection, survey participants cannot be identified. **Sensitive information such as precise birth date, the name of the mother will not be collected. Names of the employees will not be stored.** Personal data is not included in the organizational reports since only aggregated information is provided in these documents. Examples of such data include the demonstration of the relationship between working in a particular organizational unit, or between dissatisfaction and central position in the organization. Individuals cannot be identified in publications either since statistical models are executed on data from complete organizational units and only highly aggregated results are demonstrated in these documents.

After the statistical analysis of the recorded data, we prepare a **report for the leader of the company and the HR leader**. The reports contain simple descriptive statistics aggregated on the organizational unit's level, comparison (to other values recorded in other organizations) and some practical advice. These reports allow us to handle essential information to organizational leaders without identifying or making possible to identify the respondents.

9.12 Consent Form

Dear Sir/Madam,

The MTA TK ”Lendület” Research Centre for Educational and Network Studies (RECENS) is conducting a survey research with the title “Organisational Communication, Cooperation and Reputation”, supported by the European Research Council (ERC/648693). Researchers on the field are Boróka Pápay (scientific research assistant, e-mail: papay.boroka@tk.mta.hu) and Eliza Bodor-Eranus (research fellow, e-mail:eliza.eranus@tk.mta.hu). The research is supported by the European Research Council (ERC) in the framework of the European Union’s Horizon 2020 research and innovation program (ERC_CoG_2014_648693, Principal Investigator: Károly Takács).

The aim of the research program is to investigate how informal communication at the workplace influences cooperation and hereby organizational operation and its efficiency. In the framework of the research program, we carry out fieldwork at more organizations in the country; at your organization among others. You can find all the information about the research and the participating researchers on the website recens.tk.mta.hu.

We ensure participants that the handling of all collected data will be strictly confidential: Under no circumstances will any data be disclosed to the employer or a third party. Only employees giving voluntary written consent in advance will fill out the questionnaire. Employees giving consent can also decide not to answer specific questions.

Our research team takes the responsibility that no personal data about the respondents are collected except their name that is indispensable in order to create a database about the structure of informal communication. When the database is prepared after registering all responses, the data is anonymized and names are deleted. Withdrawal of consent is possible until the moment of anonymization, after that the re-identification of participants is not possible.

We will store all data in a strictly anonymized form so that the possibility of re-identification of participants is excluded. Collected data will be anonymized and handled on the aggregate level, which means that the re-identification of respondents will be possible neither on the individual nor at the organizational level. Collected answers will be handled and stored according to the data protection law (Act CXII of 2011 on

information self-determination and freedom of information 12. §). Data collected during the research will only be used for scientific research purposes. Under no circumstances will any data be disclosed to a third person for marketing reasons.

On our website, http://recens.tk.mta.hu, you can find detailed information about the study and the data management and data protection procedure. For further information about the study or the data protection procedure, you can request oral information from the contact person (Eliza Bodor-Eranus, telephone: +XXXXXXX).

We would highly appreciate your contribution to the project, and we are looking forward to seeing you among the participants of our research!

If you have any questions, please contact our colleague on-site (…….)

Thank you for your cooperation!

Statement

I hereby agree to take part in the online survey research "Organisational Communication, Cooperation and Reputation" conducted by the MTA TK "Lendület" Research Centre for Educational and Network Studies (RECENS), supported by the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (ERC/648693, Principal Investigator: Károly Takács). I have received detailed information about the aims of the research, its procedure, the voluntary nature of participation, and the terms of data protection. By filling out the questionnaire I agree that my data will be used for scientific research purposes in an anonymized way, as a part of the database in the framework of the research program.

☐ I agree

References

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