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Evolution of students' friendship networks: Examining the influence of group size*

Abstract: The main aim of this study was to examine the effect of the network size on formation and evolution of students' friendship relations. Data was collected from two groups of sociology freshmen: a group from the University of Belgrade, which represents a larger group, and a group from the University of Novi Sad, which represents a smaller group. The data was collected in three periods of one academic year. We analyzed the structural features of students' networks and constructed a stochastic model of network evolution in order to explore how friendships form and change during one year. The results showed that structural features of the larger and the smaller group differ in each stage of friendship formation. At the beginning of group forming, small world structure was noticeable in the larger group, although full small world structure was not confirmed in both groups. Furthermore, transitivity of triads had effect on the evolution of the larger network, while balance or structural equivalence had effect on the evolution of the smaller network. Results of the structural analysis are in line with findings of the network evolution model and together they provide an insight into how friendship evolves in groups of different sizes.

Keywords: social networks, students' friendship network, network evolution, group size

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Evolution of students' friendship networks: Examining the influence of group size

Research of interpersonal relationships, including friendships as their aspect, started developing rapidly within social network analysis in the second half of 20th century. After defining the concept of strong and weak ties (Granovetter 1973; Granovetter 1983; Milgram 1967; Travers and Milgram 1969) and providing a more precise definition of the small world model (Watts 1999; Watts and Strogatz 1998), friendship networks have been linked to strong ties and precisely defined small groups. Strong ties constitute a base of interpersonal trust and represent stable and constant relationships, while weak ties represent acquaintances or recently acquainted persons, who often act as distributers of new information to an individual they are connected to. Both tie types are present in most social networks, and when it comes to friendship relationships, strong ties usually connect a small subgroup of network actors – a clique (small group of close friends), while some individuals belonging to different cliques are mutually connected via weak ties, thus enabling complete connectedness of the entire network. This is the basic argument of the small world hypothesis, and in the context of the friendship networks we can restate it as: friendship network consists of several groups of close friends and these groups are weakly connected by acquaintance relations formed by members of different cliques.

Examining the development and changes of friendship over time is related to methodology used in data collection and analysis. Namely, only by using a longitudinal method one can provide a better insight into forming and changing of friendship relationships. At the beginning of friendship formation, Van Duijin, Zeggelink, Huisman, Stokman, and Wasseur (Van Duijin et al. 2003) see friendship networks as relatively closed small groups, with clearly developed boundaries, in which the majority of actors meet for the first time. This approach is theoretically grounded in the standpoint that the process of building friendships is a series of tentative moves of one person towards the other, where a favourable response in one stage leads to another stage while an unfavourable response results in withdrawal of the offer. Relying on sequentiality in the process of forming friendships, Hallinan (Hallinan 1978; Hallinan 1979) formed a friendship model that consists of four elements: first, a person's desire to have some other person as a friend; second, making moves to establish friendship; third, recognising the desire for friendship with the person to whom the offer was made; and fourth, reciprocating the offer, i.e. making interaction. This is why Hallinan claimed that the information about a friendship dyad and the nature of structural changes in the dyad are essential for understanding the process of friendship.

On the other hand, Hallinan's model of friendship was criticised by Runger and Wasserman (Runger and Wasserman 1979; Runger and Wasserman 1980),

who claimed that Hallinan failed to define a statistical model which incorporates the structural parameters that would properly assess and evaluate affirmative behaviour. In their view, reciprocity model is of special importance for dyadic interaction, because it includes parameters aimed at measuring the probability of dyadic change in reciprocal arcs. This is in contrast with Hallinan's approach aimed at measuring the probability of friendship stability.

Unlike the mentioned approaches which focus on the time sequence of steps in making friendships, there are many studies which stress the importance of identifying the factors that may be preconditions for meeting people. Newcomb (Newcomb 1961) thus identified four such preconditions: proximity, reciprocity, similarity, and complementarity. Weiss (Weiss 1988) expanded the factors that do or do not lead to friendship, clarifying that friendship can be explained by the following determinants: exclusivity, the probability of sadness caused by ending the relationship, the persistence of the limits within which relationships are formed, as well as the existence of rivalry and loyalty in some relations. Although friendship is an individual choice, it is impossible to exclude the impact of a broader social and economic background on creating new friendships and developing the existing ones. In addition to the initial factors, Johnson (Johnson 1989) identifies other predictors that are important for making friends: similar values, interests and background, closeness of residence, working together and physical appearance, while Allan (Allan 1998) points out that friendship is also affected by a specific social context in which it is developed. All of these predictors can be analysed by studying friendship networks.

Some of the aspects of the social context in which friendship develops can be regarded as general or structural properties of friendship networks. The number of actors which constitute the network (network size) and the number of ties which connect these actors are the most general properties of the network. Structural properties give us the most detailed insight into the nature of ties between the actors. Important structural properties include: density (ratio of the measured number of ties in relation with the theoretical maximum), connectivity (existence of an indirect connection between any two ties), the shortest path (the smallest possible "degree of separation" – an indirect path from one actor to another), transitivity (probability of establishing relationship between two people who are connected with the same third person), centrality (the number of ties a specific person has in relation to the theoretical maximum), betweenness (the number of the shortest paths which pass through an individual actor) (for more details see Wasserman and Faust 1994).

Several studies have shown that network size influences the processes of building and retaining friendships, i.e. that in a larger network actors fail to remember friends' names (Brewer and Webster 2000), the level of intimacy and interaction decreases (Roberts et al. 2009), and actors report longer "time since

last contact" (Roberts and Dunbar 2011). These findings suggest that the intensity of relationships decreases with the increase of the network size. However, these studies are based on personal (egocentric, see McCarty 2002) network approach in which the research focus is on interrelationship between the individuals that ego (an individual whose personal network is examined) can maintain in his/her personal network. This means that the objects of inquiry are multiple personal networks (obtained from individual questionnaires which contain questions about personal friendship networks of different, non-connected individuals). Studying multiple personal networks at once means analyzing data based on disjointed sets of individuals, and thus prevents the researchers from gaining an insight into the overall features (general or structural) of the entirety of social relationship between the participants in the study, and thus fails to reveal the influence of the size of the entire group (social network) on friendship formation processes within the group. In this study, we adopt the complete i.e. sociocentric network approach to study the evolution of friendship relations in two groups of different sizes. This means we will analyze the complete social network which consists of limited, predetermined group of actors (student group) and which has no focal actors (egos). By adapting sociocentric approach, we can receive a "bird's eye" perspective of network structure, which enables us to analyze the entirety of the relations between individuals inside the group and examine their structural properties.

Present study

The aim of this study is to determine whether there are differences in evolution of friendship networks in two groups of same-class students due to different sizes of the groups. Students' network is beneficial for analysing the general patterns of network formation because all participants start out in a new environment and thus jointly create a new social network, as compared to a situation in which a stable social network already exists and only some new individuals enter. Based on previous research, we suppose that friendship networks of different sizes have different structural properties and evolve in a different way. Bearing this in mind, we conducted two types of analysis: an exploratory analysis of structural properties of two networks, as well as the stochastic model of network evolution. By analysing the structural properties, we will determine how the major structural features of the entire networks change over time ("bird's eye" perspective), while we will use stochastic models of network evolution to gain an insight into network changes from the perspective of the actors themselves. Studying network evolution provides an insight into the importance of factors which guide actor's decision to build/terminate network connection with other

actors. Factors included in our study include various forms of homophily (towards gender, age, smoking or preferred activities) and structural effects, such as transitivity and network balance. In this way, we will obtain a complete picture of the networks' evolution, which means that we can analyse the impact of the network size on structural features of the networks and the process of network evolution. In addition, we compared the structural parameters of the network with the processes at the individual level that lead to network changes and we analysed their relationship depending on the size of the network.

Method

Participants and procedure

The sample included two groups of the first-year students of undergraduate studies in sociology. The larger group of students is from the University of Belgrade (n = 100) while the smaller one is from the University of Novi Sad (n = 55). In the study, we used longitudinal data collected during one school year. The respondents completed the questionnaires at three times: once in October, at the very beginning of the academic year, the second time in February, after the end of the first semester, and the third time in June, at the end of the second semester. The final sample included only those students that had completed all three questionnaires because our model required a constant number of actors through all stages of network evolution. All the questionnaires were completed by 58 students (41 females) from the Belgrade group (58% of the total number of students) and 35 students (26 females) from the Novi Sad group (63.4% of the total number of students).

Instrument

The survey consisted of two parts. The first part measured three types of variables. (1) Proximity variables: elective courses and smoker/non-smoker. These variables affect the frequency of interaction between students, and they are a precondition for developing a friendly relationship. The more classes students attend together, the more opportunities they have to get to know each other better. Other studies have pointed to the importance of these variables (Van Dujin et al. 2003), but it should be keptin mind that, in the case of our research groups, elective courses make up for about 20% of the total courses, so their importance is smaller compared to groups examined in the previous studies. The variable smoker/non-smoker also affects the frequency of interaction, since smokers tend to spend together their breaks during classes (DeLay et al. 2013; Mercken 2010). (2) Visible variables: gender and age. These variables are used

to verify the existence of homophilic friendship in relation to visible characteristics of students.[4] (3) Invisible variables: students' activities and interests. These variables are used to verify homophilic friendship in relation to preferences for the same activities that students perform together with friends. The list of activities included daily activities such as going out to lunch or to the cinema, as well as student activism (volunteering in student organisations, participation in extracurricular activities), and helping their colleagues solve personal problems or problems related to their studies. Following previous research (Van Dujin et al. 2003), the list of activities was changed during the research, and only those activities which represent different aspects of students' social life and which have the highest variability in a previous stage of the survey were transmitted to the following stage. In this way, we isolated only those activities about which students have different views.

The second part of the survey was used directly for construction of friendship networks. We used Van de Bunt's (Van de Bunt 1999) approach for measuring friendship. Students were asked to evaluate their relationship with other colleagues using a scale of six degrees: (1) the best friend, (2) a friend (3) friendly relationship, (4) neutral, (5) a dissonant relationship (6) we do not know each other. Students wrote one of these numbers next to the names of each of their fellow students. In the first stage of the testing for both groups, the scores ranging from 1 to 3 do not exceed 20%, while the score 1 (the best friend) occurs only in 3% percent of the responses in both groups. Accordingly, we conclude that, as expected, a very small number of students knew each other before the beginning of the studies. We believe that with this number of students and the duration of the survey we cannot properly analyse the subtleties of changes in the relations between students (such as a transition from a friendly relation to

[4] The reason for the narrow choice of variables of "visible similarity" is provided by the findings of the study conducted by Van Dujin and his colleagues (Van Dujin et al. 2003). They have included more socio-demographic variables (such as ethnicity and religion) in their questionnaire, but none of them proved significant in the analysis. These results are in line with the main conclusion of the study, which states that the influence of visible similarity (e.g. race, ethnicity, gender etc.) is weaker than the influence of the proximity variables (network effects), which govern the opportunity for meeting and interaction between students. After all, "when two individuals never meet, they will never become friends, however similar they may be" (Van Dujin et al. 2003, 157). In our samples, we collected the data about age and gender, but we left out the age out of the analysis as there were almost no variations (almost all of the students were of the same age). As the results will show, gender was not found significant in any stage of the network evolution. None of the other socio-demographic variables were found significant in Van Dujin's study, which was performed in a very diverse and international academic environment of the University of Groningen, and therefore we didn't include such variables in a much more demographically homogeneous environment of Serbian universities.

friendship). Therefore, it was decided to analyse the evolution of friendships in relation to the existence of *at least* friendly relations, which was codified as the existence of network relations between the two students. In addition, we have decided to construct a network of two-way relations, which means that in order to have a network relation, both respondents have to rank the relationship with each other with the score lower than 3. In this way, we can make a more realistic assessment of the actual relationship, by eliminating the error of one-sided estimates of friendship.

Results

Social networks

Structural networks were analyzed using RSEINA software (Ripley et al. 2014) on data collected in the second part of the survey (friendship evaluation). In Figure 1 we can see the development of the smaller group network through three testing periods. In the first stage, at the beginning of the academic year, we have a network that is not fully connected and there are three isolated nodes. As early as in the second phase, after the end of the first semester, there is full network connectivity and its transformation into a fully connected network. Visually, it is noticeable that the network density increases in each stage, and that there is a more densely connected core.

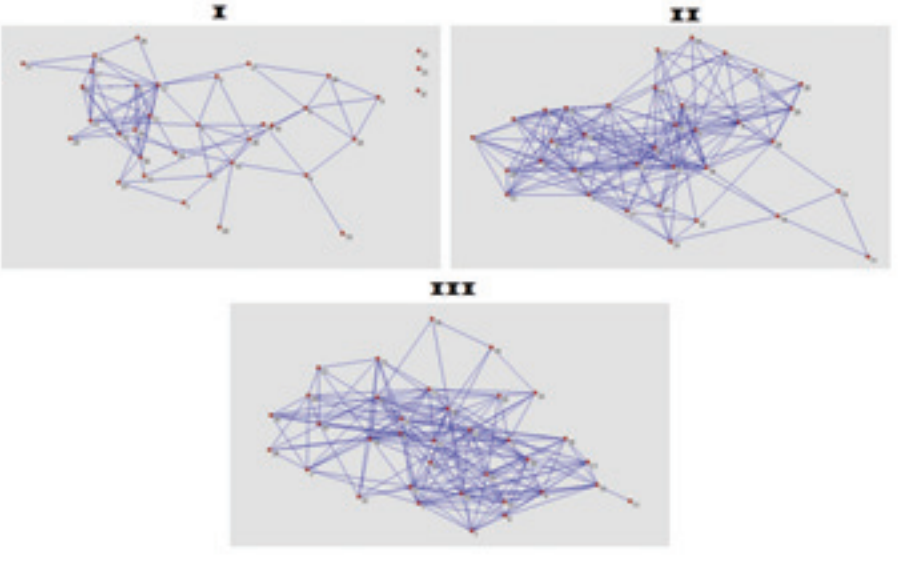

Figure 1. Three stages of the smaller group network evolution (I – beginning of the academic year, II – after the end of the first semester, III – the end of the second semester).

Figure 2 represents the evolution of the larger group network. It shows different characteristics compared to the smaller group network. In the first stage, we also have a discontinuous network that consists of four components, only one of which is an isolated node. In the second stage, these components are inter connected and there is a fully connected network. In the third stage, we cannot visually discern what used to be separated components and we have a network of much higher density, compared to the smaller group network.

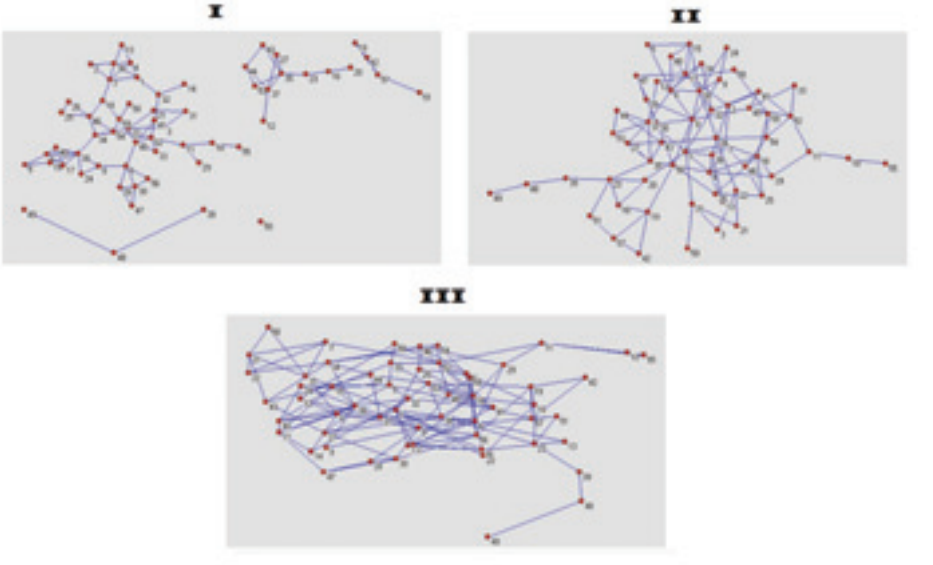

Figure 2. Three stages of the larger group network evolution (I – beginning of the academic year, II – after the end of the first semester, III – the end of the second semester).

Exploratory structural analysis

Exploratory structural network analysis is done by comparing the basic structural characteristics of our networks with theoretical structures. In our research, we will use the model of the small world (Watts 1999; Watts and Strogatz 1988). Formally, the structure of the small world is recognised in networks that have a high level of clustering coefficient (which indicates the existence of cliques) and smaller average path length, which indicates the existence of rewiring within the network, i.e. the connections that connect the sub-units of the network itself. In particular, these network variables are compared to the same variables of the random graph for the networks (Newman et al. 2002) and then, on the basis of the comparison, we can make conclusions about the existence of the small world

structure in a given network. This procedure was used in our study for all stages of the network evolution.

In the case of the smaller network, the existence of the small world structure cannot be precisely determined. The clustering coefficients (Table 1), although being higher than in the case of the random graph, are still not an order of magnitude larger, which is, with approximately the same path length, the main precise indicator of the small world structure. The difference between the clustering coefficients is decreased over time, which is a sufficient indicator for us to conclude that the structure of the small world fails to form in the case of a smaller group. This is due to a small number of actors, so it is not possible to form a sufficient number of clearly isolated clusters that would be connected to one another through weak ties to form the small world structure. The low initial tendency towards forming cliques decreases over time, as more and more freshmen form friendship dyads, relatively independently from the existing structure of relations.

Table 1
Comparison of structural features of the smaller network and the corresponding random graph

Smaller network			Erdos-Renyi Random graph		
Period	Avg. Clustering Coefficient	Avg. Path Length	Period	Avg. Clustering Coefficient	Avg. Path Length
1	0.466	2.490	1	0.192	2.374
2	0.552	1.871	2	0.311	1.706
3	0.454	1.808	3	0.305	1.719

In the case of the larger group of freshmen (Table 2), grouping into clusters – or cliques – was noticeable in the beginning, as the time did not allow all the actors to interact. As the time passes, the existing cliques disintegrate, becoming integrated into wider (sparsely) connected groupings which constitute a fully connected network. In this case, the presence of the small world structure is the most visible in the first stage of the network evolution, and we can see that in the later stages this structure is lost, which is indicated by the reduction of the clustering coefficient. However, it can be concluded that the size of the group, as the major determinant of the probability of interaction between any pair of actors, influences the formation of the small world structure: in a larger network the existence of the small world structure becomes more pronounced in the beginning, only to gradually fade away over time, while in smaller networks these structures fail to form.

Table 2
Comparison of structural features of the larger network and the corresponding random graph

Larger network			Erdos-Renyi Random graph		
Period	Avg. Clustering Coefficient	Avg. Path Length	Period	Avg. Clustering Coefficient	Avg. Path Length
1	0.427	3.984	1	0.020	3.822
2	0.302	3.541	2	0.038	3.108
3	0.312	3.069	3	0.117	2.778

Stochastic model of network evolution

A stochastic model of network evolution is based on decisions of individual actors. By applying this method, we can determine which factors influence the decision of an individual to create or terminate a network connection with another individual. In our particular case – since we are dealing with two-way networks – when it comes to creating network connections, it is understood that the decision to create a network connection is made by both sides (which may not be the case when it comes to terminating network connections).

Before applying the model, we analysed the transitions of the relationships during the three stages of the study. There is a very low rate of relationship terminations in the smaller network (Table 3), because we processed an incomplete data set in the research, i.e. a certain number of students were not included in the research. Consequently, the visibility of terminations of friendship relations is decreased. In Table 3 we can see that the largest number of potential network relationships (0→0) is never realised. However, in every period, there were certain changes in connections, while these changes were more intense in the initial period of network evolution. As we could see in Table 3, establishing friendship relationships was more frequent during the transition from the first period to the second (1→2), while during the transition from the second to the third period (2→3) establishing new friendships was in decrease.

Table 3
Transitions of network ties over time for the smaller network

Period	0→0	0→1	1→0	1→1
1→2	369	146	41	39
2→3	393	17	16	169

Note: 0 means that there are no mutual friendly relations while 1 represents the opposite case.

As we can see in Table 4, in the larger network there was even a lower number of terminations of friendship ties, which can also be attributed to the fact that the survey did not include all the freshmen. In contrast to the smaller network, a constant increase of new relationships was detected, which is a consequence of

the size of the network. Therefore, the frequency of establishing the new friendship relationship between two periods is constant. The size of the network leads to lower density of connectedness compared to the smaller network, so the fact that there are more possibilities for actors' interaction leads to formation of new ties, and this trend does not decrease over time (as long as the density is low).

Table 4

Transitions of network ties over time for the larger network

Period	0→0	0→1	1→0	1→1
1→2	1599	28	0	84
2→3	1569	30	4	108

Note: 0 means that there are no mutual friendly relations while 1 represents the opposite case.

The transition of network relation scan be explained through stochastic models of network evolution. Following the previous research (Van De Bunt et al. 1999; Van Dujin et al. 2003), we opted for a model that contains three groups of variables: (1) Control variables, which are represented by the rate parameters, i.e. the average level of changes in network relationships between any two periods, (2) Network effects, i.e. actors' preferences towards creating network relationships with others in relation to their position in the network structure, and (3) Covariates, i.e. qualitative independent variables collected by the used survey (proximity, visible and invisible variables).

A number of models with different network effects and covariates were constructed and tested for both networks. However, for each network, there was a model in which all three groups of variables have statistically significant impact on formation of network connections (Table 5 and 6).

Table 5

Results of stochastic evolution model for the smaller network

	Effect	Estimate	*SE*	Convergence
Control variables	Rate parameter period 1	16.546	3.568	
	Rate parameter period 2	1.076	0.200	
Network effects	Density Balance	0.094	0.098	0.034
		0.092**	0.011	-0.072
Covariates	Same activity (Talking about problems)	0.206**	0.100	-0.058

** $p<.001$

The results for the smaller network are shown in Table 5. A lack of a remarkably high number of clusters in this network indicates low levels of transitivity. Transitivity leads to closing of triads and formation of clusters, which was not the case here. On the other hand, the effect of structural balance (Davis 1963; Mizruchi 1993; in network terms it can be also referred to as "structural equivalence", Steglich et al. 2010, 355) tells us that the actors form relationships with those who are connected to the rest of the group in a similar way. This does

not lead to formation of weakly connected cliques, but large groupings, which may not be densely connected. The fact that the only activity which proved to be significant is very intimate and delicate (talking about problems) can explain the durability of two-way ties and relatively small changes of the network from the second to the third period.

Table 6
Results of stochastic evolution model for the larger network

	Effect	Estimate	*SE*	Convergence
Control Variables	Rate parameter period 1	0.491	0.093	
	Rate parameter period 2	0.615	0.108	
Network Effects	Density	-0.840*	0.282	-0.023
	Transitive triads	0.705*	0.194	-0.076
Covariates	Same activity (Talking about problems)	0.332*	0.281	0.046

*p<.005

The results for the larger network are shown in Table 6. The effect of triadic transitivity explains why in the beginning the network had the small world structure, i.e. increased clustering coefficient. However, the density of the network is still low, preventing the formation of the stable small world structure, so the triads become embedded into a wider loosely connected structure, and the clustering coefficient is decreased over time. This is clearly a consequence of the size of the network since the model did not indicate the existence of other effects that influence the evolution of the network. With regard to the qualitative variables, the greatest influence was still the activity of conversation and mutual support in problem-solving, but its influence was not considerably higher than its standard error.

Discussion

The results show that there are differences in several network features between groups of different sizes. First, in the larger group network, the small world structure was formed in the initial period. This means that at the beginning of forming a friendship network, there is not a single clear core, but rather several groups of students which are connected later, as time passes. In the smaller group network, unlike the larger group network, there are no indications of the small-world structure. At the beginning of the network formation in the smaller group, there is no evidence of separation by several groups, but rather there is one core of the network. In the last stage of the study all members of the both groups are connected, e.g. there is one core of the network. This result is in accordance with the results of the exploratory structural analysis. Namely, the indicators of the small world structure are a large clustering coefficient and

small path length. The results of the exploratory structural analysis showed that path lengths in both groups are small, but clustering coefficients are not large as could be expected in the case of the small world network.

Second, there are different structural effects in the evolution of the networks. In the larger group network, transitivity of triads had the effect on network evolution, while in the smaller group network it was balance or structural equivalence. These results are also in accordance with the results of structural analysis. The structure of the larger network exhibits more clustering, which means more cliques of friends are formed. Transitivity represents the mechanism which leads to cluster formation by bringing "friends of friends" together. We may call transitivity a "short range" effect, because new friendships are formed in the "neighbourhood" of the existing friendships, which is expected for large networks because there is a decreased probability that individuals will meet each other and have enough time to form a lasting relationship.

However, in the smaller network this is not a problem and individuals frequently interact with each other. Our structural analysis for the smaller network confirmed a lower level of clustering, which indicates a denser, interconnected network without strictly bordered subgroups. Therefore, network evolution is not guided by the mechanism of transitivity, and instead, we detected the mechanism of structural balance. Structural balance guides individuals to form relationships with individuals who are connected to the rest of the network in a similar way that they are (Davis 1963). This mechanism requires that every individual has the chance to interact with the majority of others, which means it is suitable for small networks.

These findings confirm the results of previous research (Roberts et al. 2009; Robert and Dunbar, 2011) related to the constraints that network size puts on the process of relationship formation. In large networks we have lower density, which means that actors cannot maintain a number of friendships proportional to the size of the network. Size also influences the frequency of interactions between any two individuals in the network, making interactions in large networks more localized due to the transitivity effect.

What is similar in both networks is the effect of students' activities done together. A special quality of the process of forming friendships among freshmen is reflected in isolation of the variable "conversation about intimate problems and problems related to the studies" in relation to other defined activities (such as going to the cinema or out to dinner, etc.). Social support and intimacy are the most typical characteristics of friendships (Ueno and Adams 2006), which could be expected for students' friendship even more than for friendships of young adults in general. Compared to young adults, college students probably have larger, more homogeneous, denser, and more intimate friendship networks (Blieszner and Adams, 1992). Because of greater amount of time that college

students spend with peers and probable homogeneity and density of their networks, one would expect their friendship networks to be relatively intimate. Also, sharing the same problems which are mostly related to students' obligations and tasks contributes to greater need for mutual social support. The results showed that this quality of students' friendships is independent of group size.

Furthermore, we have emphasized the importance of combining structural analysis with stochastic modeling of individual's behavior for a complete understanding of the way interpersonal relationships evolve in small groups. Modeling individual decisions enables us to identify which effects on the micro level produce specific structural features on the macro level of the entire group. Following the recent "analytical turn" in sociological theory (Demeulenaere 2011; Hedström 2009), we think that expanding the scope our research to different groups (of different sizes) will lead to a more precise insight into the nature of these effects and their potential value as theoretical mechanisms, which can be used for constructing a formal theory of friendship evolution.

There are some limitations of this study. Although gender has not shown significant effects on friendship network, the same-gender dyads or triads are not explored in this study. Previous studies showed that women's dyads differ from men's and that women prefer dyads while men prefer larger, all-male cliques (David-Barrett et al. 2015). Because there is a small number of males in this study, differentiation of the same-gender and the opposite gender relationships is not justifiable. In future research, these structural components should be included.

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Evolucija studentskih mreža prijateljstva: istraživanje uticaja veličine grupe

Glavni cilj ovog istraživanja jeste razmatranje uticaja veličine mreže na formiranje i evoluciju mreža prijateljstva kod studenata. Podaci su prikupljani od studenata prve godine Sociologije na Univerzitetu u Beogradu (veća grupa) i Univerziteta u Novom Sadu (manja grupa). Podaci su prikupljeni u tri različita trenutka tokom trajanja jedne akademske godine (na početku prvog semestra, na početku drugog semestra i na kraju drugog semestra). Rad analizira strukturalne odlike socijalnih mreža, na osnovu kojih je konstruisan stohastički model mrežne evolucije. Na osnovu ovih konstruisanih modela rad nastoji da rekonstruiše kako se prijateljstva formiraju i menjaju tokom jedne akademske godine na primeru studenata sociologije prve godine studija na dva univerziteta u Srbiji. Rezultati istraživanja pokazali su da se strukturalne odlike veće i manje mreže razlikuju u svakom stadijumu procesa formiranja prijateljstva. Na početku formiranja grupe, odlike strukture malog sveta primećene su u većoj

grupi, iako potpuna struktura ovog tipa nije prisutna ni u jednoj mreži. Pored toga, efekat tranzitivnosti trijada primećen je u evoluciji veće mreže, dok je efekat strukturalne ravnoteže imao uticaj na evoluciju manje mreže. Rezultati strukturalne analize su saglasni sa rezultatima modela mrežne evolucije i uzeti zajedno oni pružaju detaljan uvid u proces evolucije prijateljstva u grupama različitih veličina.

Ključne reči: socijalne mreže, mreže prijateljstva, mrežna evolucija, veličina grupe

Évolution des réseaux d'amitié étudiants: recherche sur l'influence de la taille du groupe

Le principal objectif de cette recherche est d'étudier l'influence de la taille d'un réseau sur la formation et l'évolution d'un réseau d'amitié chez les étudiants. Les données ont été rassemblées auprès des étudiants de première année de sociologie de l'Université de Belgrade (groupe plus nombreux) et de l'Université de Novi Sad (groupe moins nombreux). Les données ont été rassemblées à trois moments différents au cours d'une année académique (au début du premier semestre, au début et à la fin du second semestre). Le travail analyse les caractéristiques structurales des réseaux sociaux, sur la base desquels le modèle stochastique de l'évolution du réseau a été contstruit. À partir de ces modèles construits le travail tente de reconstruire comment les amitiés se forment et évoluent au cours d'une année académique sur l'exemple des étudiants de sociologie de première année dans les deux universités en Serbie. Les résultats de la recherche ont montré que les caractéristiques structurales du plus grand réseau et celles du plus petit diffèrent à chaque stade du processus de la formation des amitiés. Au début de la formation du groupe, les caractéristiques de la structure du petit monde ont été remarquées dans le groupe plus nombreux, même si la structure entière de ce type n'est présente dans aucun des groupes. En outre, l'effet de transitivité des triades a été remarqué dans l'évolution du plus grand réseau, alors que l'effet de l'équilibre structural a exercé son influence sur l'évolution du plus petit réseau. Les résultats de l'analyse structurale sont en accord avec les résultats du modèle de l'évolution du réseau et pris ensemble, ils offrent un bilan détaillé du processus de l'évolution de l'amitié dans des groupes de taille différente.

Mots clés: réseaux sociaux, réseaux d'amitié, évolution du réseau, taille du réseau

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