

Propensity to make social connections and structural social capital of SNS users

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Abstract. The present study aims to investigate the relationship between structural social capital of social networking site (SNS) users and their propensity to make social connections. We focus on Vkontakte SNS as the most popular one in Russia and obtain both network data on ego-networks characteristics and self-reported data on the motivation to make connections from 363 respondents. The results support the idea that the growth of personal networks is driven by the own motivation of users along with the effect of preferential attachment is observed. In addition, users with different level of motivation to connect with others turned out to demonstrate different patterns of online friending behavior: less motivated users form more tight and dense ego-networks in comparison with highly socially-oriented users. In contrast, highly motivated users possess more loose and centralized networks, which may reflect the tendency of ego-network having a star-structure.

Keywords: Social capital, Propensity to make connections, ego-networks, Social network analysis, Social Networking Site (SNS)

1. Introduction

The advent of Social networking sites (SNSs) has brought about a revolution in the daily communication process. The extant body of studies has evidenced how users' engagement with SNSs leads to several advantages in terms of social capital [1].

The stream of research on online social capital may be categorized based on the conceptualization of social capital it proposes. The present study relies on the structural understanding of social capital, which takes individuals' social network structure as an approximation of the social capital suggesting that social benefits derive from the composition of social ties in the personal networks [2]. Using Putnam's distinction on bonding and bridging social capital [3], the previous studies showed that different characteristics of individuals' personal online social networks are associated with both types of social capital. Brooks et al. conceptualized bridging social capital based on the number of clusters (social groups) within an individual's online network and bonding social capital as the density of social ties within the network [4]. In addition to this, the topology of a personal online social network is associated with higher socioeconomic status and more diverse economic resources [4]. In addition, the extent of the already-gained amount of social resources of a person also matters for the online social capital growth: users with a higher number of social connections ("online friends") in SNS have a stronger ability to make new ones [5]. However, it remains unclear, how the propensity of a user to initiate and maintain social ties is related to the individual structural social capital. In this research, we aim to bridge the gap in understanding the mechanism of accruing online social ties in SNS: whether the online social capital is a result of users' own intentional activity to build the social landscape rather than a byproduct of the already gained amount of social resources. In particular, we examine the relationship between the propensity to make social connections and the structure of personal social networks (so-called "ego-networks") on SNSs. In the online context, the ego-network is a reflection of existing social ties between a user ("ego") and its online friends. First, we analyze how the growth of users' online social networks in SNS is related to their motivation to establish social connections. Second, we investigate how users differ in the structural characteristic of ego-networks depending on their level of motivation to establish social ties.

To the best of our knowledge, no research to date has explored the dynamic and structure of personal social networks in the proposed context.

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2. Data and method

The study focuses on SNS users from a typical Russian city (Vologda), which are registered on the most popular and largest Russian-speaking SNS - Vkontakte.ru (VK). It provides functionality similar to Facebook: users may create a personal account, form a network of online friends, or exchange messages in private and public. In addition to this, users may use the personal pages in VK as a channel for broadcasting different information, e.g. offer different services, selling goods etc.

The data from 363 respondents in correspondence with the demographic distribution of Vologda city were collected during the online survey (Fall 2017). The online application¹ which contained the questionnaire was integrated into Vkontakte as a standard public available application. The preview page provides information about the research project, the consent form and the terms of using the app. During the online survey, the self-reported data on the motivation the make social connections, the usage of Vkontakte and demographics were obtained. In addition, the application downloaded automatically the online data about the VK friends after getting users' agreement to share with this information. In order to assess the shift in the number of online friends 1 year apart, the two waves of downloading data on users' online friends were performed (Fall 2017-2018).

2.1. Measures

Motivation to make social connections

The scale of propensity to make connections with others (PCO scale) introduced by Totterdell et al. was used to measure the motivation of individuals to establish social ties [6]. Previously the scale was tested in the organizational context: it was shown that propensity to make connections is related to such positive social capital outcomes as social support received, work attainment and well-being [6] as well as job satisfaction [7]. In the context of the research, only two dimensions were of interest: the intention to have social connections (e.g., "I like being able to connect people") and the self-reported evaluation of its current amount (e.g., "I often put people in touch with the right person when they need something"). According to the research of Totterdell these two dimensions can form one scale. Cronbach's alpha of the adapted scale exceeded the 0.7 threshold (Cronbach's $\alpha=0.8$, $M=1.8$, $SD=0.96$), which is suggested as the appropriate value for exploratory research [8].

Structural online social capital

First, we assessed the *shift in the size of personal networks*. It was calculated as a delta in the number of user's online friends between two time periods (1 year apart).

Second, the information on users' online friendship ties was used for building the ego-networks (mapping the social ties within users personal network) and calculating *different metrics* like density, number of isolates, mean distance, transitivity, modularity and several types of network centralization (by degree, by closeness and by eigenvector) [9].

Demographics and control variables

Participants were asked a series of questions about the demographics: age, sex, and education. 56% of respondents were female, with an average age of 32.5 (min=14, max=83, median=31, $SD=12.97$). About one-third of participants reported "unfinished high-education" level of education (30.7%), 9.9% of respondents were university graduates. We also controlled for the professional usage of VK by asking respondents to evaluate the extent that they used their account for selling goods and services, developing online communities for commercial goals or promoting themselves (Likert-type scale). In addition, we measured the intensity of VK use by asking respondents: 1) "During the last few weeks how much time a day did you spend on average surfing Vkontakte?" (time of online session) and 2) "How quickly do you get to know that your friend wrote you a message in Vkontakte?" (frequency of usage).

¹ DigiFriends app: https://vk.com/app6067290_-53622302

3. Procedure and results

First, to test our main hypothesis that motivation to make connection contributes to the growth of the individual's social network, we ran a series of nested Ordinary Least Squares (OLS) regressions. In addition, we consider the actual number of friends in order to control for effects of preexisting online ties on the growth of users' ego-networks. As our goal was to predict the *growth* of the personal network, the users with negative shifting in the network size (i.e. users who have excluded some friends from the network during the observed period) were removed from the sample. The final sample consisted of data on ego-networks from 274 respondents who have demonstrated the positive or zero shift in the number of online friends. Second, we explore how people with various levels of motivation may differ in the ego-network structure. We divided our sample into two groups by the mean value of propensity to make social connections. In result, we received the group with a high level (N=185) and the group with a low level of propensity to make connections with others (N=168). Only three ego-network parameter variables were successfully transformed into normally distributed ones by means of log-transformation: density, the number of isolates, and transitivity. Thus, the non-paired non-parametric Wilcoxon signed-rank test was used for assessing the difference in means values of different network parameters between two groups.

Descriptive statistics

Descriptive analysis showed that respondents are highly engaged in Vkontakte: two-thirds of them spend at least an hour or more per day in Vkontakte. 20% of respondents pointed out that they have an instant notification on their devices about new messages received.

3.1 Predicting the social network growth

In the regression model (Model 1) predicting the shift in the size of personal networks, the control variables accounted for 6% of the variance, with professional usage of SNS ($\beta = 0.18$, $p < .001$) and time of the online session ($\beta = -0.15$, $p = .016$). It means that professional users tend to expand their personal networks more heavily than regular ones. The length of an online session associates negatively with the increase in online friends. Other demographic variables: sex, education level, and occupation type remained non-significant (as well as the frequency of SNS use) and were excluded from the model.

On the next step, the variable on the propensity to make connections was added to the model (Model 2), which increased the model fit (Adj. $R^2 = .151$). Motivation to make connections significantly predicts the shift in the number of friends ($\beta = 0.46$, $p < .001$), supporting the idea on the role of motivation in the formation of social ties. Additionally, it reduces the effect of professional usage of SNS and time of the online session.

Finally, the actual number of friends (log-transformed value) was included in the model in order to control to what extent the shift in the network size is explained by the current number of friends ("preferential attachment effect") (Model 3). Addition of a logged number of friends in the model ($\beta = 0.53$, $p < .001$) increased the quality of the model (Adj. $R^2 = .344$) while propensity to make connections was still significant ($\beta = 0.06$). Thus, we observe that people who already possess great number of friends are more prone to expand their social circle. At the same time, the growth of the personal network is explained by the own motivation of an individual to make social connections as well. The essential results are presented in Table 1.

Table 1. OLS Regression predicting friendship shift in the personal networks of SNS users

	Model 1			Model 2			Model 3		
	<i>B</i>	<i>std. Beta</i>	<i>p</i>	<i>B</i>	<i>std. Beta</i>	<i>p</i>	<i>B</i>	<i>std. Beta</i>	<i>p</i>
(Intercept)	2.80		<.001	1.89		<.001	-0.41		.358
Professional use	0.18	0.55	<.001	0.09	0.27	.088	0.07	0.21	.154
Time of online session	-0.15	-0.45	.016	-0.11	-0.32	.069	-0.06	-0.18	.267
Propensity to make connections				0.46	0.87	<.001	0.28	0.54	<.001
Log. friends							0.54	1.12	<.001
Observations	274			274			274		
R ² / adj. R ²	.114 / .059			.204 / .151			.347 / .301		
Only significant variables are presented at the table.									

3.2 Motivation to establish social ties and ego-networks structure

It was explored how users with various level of propensity to make connections differ in the ego-network structure. The comparison of the means values showed that there is a significant difference between groups in some network parameters.

The users with high level of motivation to connect with others possess significantly less dense networks ($Z=-3.6$, $p<0.001$) with greater number of isolates in there ($Z=4.4$, $p<0.001$). The ego-networks of highly motivated users are more centralized (by degree ($Z=3.3$, p -value = $p<0.001$), by eigenvector ($Z=3.49$, p -value = $p<0.001$) and by closeness ($Z=2.49$, $p<0.001$)) relatively to users with low level of motivation to establish social ties. In addition, the former have significantly more friends ($Z=5.4$, $p<0.001$) with greater value of mean distance between them ($Z= 3.6$, $p<0.001$). The difference between groups in transitivity values was non-significant ($Z=-1.07$, p -value = 0.283). The results of the comparison are presented in Table 2.

Table 2. The results of Wilcoxon signed-rank test, the comparison of users with high and low level of propensity to make connections

Group	Number of friends	Density	Isolates	Mean distance	Transitivity	Centrality (degree)	Centrality (closeness)	Centrality (eigenvector)
Low	112	0.074	10.5	1.926	0.284	0.934	0.969	0.848
High	200	0.056	17.0	1.944	0.246	0.949	0.976	0.878

4. Discussion

The aim of the study was to investigate the role of motivation to connect with others in the online social capital formation of SNS users.

First, the results support the idea that the growth of the ego-network in the SNS is affected not only by the current number of social connections in SNS but also by users' own motivation to have more social ties. Thus, the number of online contacts in a social network is a reflection of general users' ambitions in social terms. It allows considering social networking sites and users' digital traces as a valuable source of data which in fact relate to the identity of SNS users. Second, users with various levels of "social" motivation turned out to differ in ego-network structure. Users less inclined to social activity form more dense and tight ego-networks in comparison with socially oriented people. In contrast, highly motivated users possess more loose and centralized networks, which may reflect the tendency of ego-network having a star-structure.

These results may indicate different patterns of managing the online social environment. According to certain indicators like geodesic distance and centralization of networks, it could be concluded that less motivated users reproduce small-world type networks (i.e., highly connected networks). At the same time, the networks of the highly motivated users consist of “heterogeneous” contacts with connection being mediated by the ego, as evidenced by the greater values of networks’ centralizations, the average geodesic distance and the number of isolates.

These findings could be expressed in terms of “strong” and “weak” ties. The denser networks of less-motivated users could be treated as “strong” oriented ties, while loose networks of highly motivated ones as weak oriented ties. Thus, if the ego-network structure is associated with the users' intentional social activity, we can suppose that different people tend to pursue the various types of online social capital. Highly motivated develop bridging social capital which is associated with the weak ties while low-motivated ones are oriented to the bonding social capital which is associated with the strong ties.

The limitation of this study is that we obtained only publicly available data on online friends, parts of which were unreachable due to privacy restrictions applied by a user. In addition, since we analyzed data from one of the most popular SNS in Russia, the ability of ego-networks gained from only one particular SNS to reflect the entire social circle of individuals may be limited. Finally, our study is not free from the typical sampling issues inherent for online studies: first, we are unable to reach individuals who do not have Internet access; second, studying the online population may address by default only those who already have a high motivation to connect with others. Finally, the construct of motivation to connect with others was assessed by means of the self-reported method.

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6. References

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