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**Privacy-protective strategies on Vkontakte Social Networking Site and its
role in the formation of individual social capital**

Thesis Summary for the purpose of obtaining academic degree PhD in
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The processes of digitalization, virtualization, and networking in contemporary society significantly increase the importance of interpersonal computer-mediated communication for the development and maintenance of social connections. Recent meta-analytic studies summarizing findings from the past fifteen years of research show that increased use of social media is associated with positive effects on the development of individual social capital (Williams, 2019; Ahmad et al., 2022¹).

The main forms of participation and maintaining relationships on social networking sites are active communication and sharing personal information with others (Liu et al., 2016²). At the same time, communication in the digital environment is fundamentally different from other forms of communication, especially in terms of control possibilities and safety of information dissemination. All this makes it important for individuals not only to have the skills to use new communication technologies, but also to develop various strategies to control and maintain privacy boundaries in the online environment.

The empirical data accumulated to date allow us to draw conclusions mainly regarding the factors that determine the "openness" of individuals in online communication. The role of restrictions is less discussed in the studies, impoverishing the concept of privacy, as implying also the acts of "closeness", avoiding contact with other people. Filling this empirical gap seems particularly important because privacy management strategies impose restrictions on individual communication and can affect users' ability to accumulate and develop connections online. Especially vulnerable to this may be "weak" connections, the accumulation

¹ Williams, J. R. (2019) The use of online social networking sites to nurture and cultivate bonding social capital: A systematic review of the literature from 1997 to 2018, *New Media & Society*, 21(11-12), pp. 2710-2729.

Ahmad et al. (2022) Bridging social capital through the use of social networking sites: A systematic literature review, *Journal of Human Behavior in the Social Environment*. pp. 1-17.

² Liu D. et al. (2016) A meta-analysis of social networking online and social capital, *Review of General Psychology*, 20(4), pp.369-391.

and maintenance of which in the online environment is related to the degree of "manifestation" of the individual in this space (Liu et al., 2016).

The current study examines how the activity of users of social networking sites to maintain online social relationships and regulate privacy is related to the development of their social connections, described in terms of individual social capital. The first part of the study will examine online privacy maintenance strategies and identify key factors that explain their adoption by users. The second part of the study clarifies the nature of the relationship between privacy regulation, social networking activities, and individuals' social capital.

The current work seeks to answer the question on the relationship between the actions of individuals in online space to their "offline" reality. This task involves considering the formation of social capital that takes place in the scope of the communication within some real social groups. In the online environment such conceptualization of social capital is difficult both due to the limited access to such kind of data and due to the uncertainty in determining the meaningful boundaries of social groups and communities online. In the existing studies this issue is usually studied either within fragmented personal online "communities" (ego-networks) (Brooks et al., 2014³), or in the context of small social groups like a student campus (Ellison et al., 2007)⁴.

Previous research shows that social capital is rooted in geographically close environments, such as a neighborhood, a village, or a city (Craven & Wellman, 1963; Hampton & Wellman, 2003⁵). In this connection, the current study proposes a methodological apparatus that allows studying online social connections and the social capital of individuals localized within a particular geographical community - the city of residence. As a research case of the study the online "population" of an

³ Brooks B. et al. (2014) Assessing structural correlates to social capital in Facebook ego networks, *Social Networks*, 38, pp.1-15.

⁴ Ellison N. B. et al. (2007) The benefits of Facebook "friends:" Social capital and college students' use of online social network sites, *Journal of computer-mediated communication*, 12(4), pp. 1143-1168.

⁵ Craven, P., & Wellman, B. (1973). The network city. *Sociological inquiry*, 43(3-4), pp. 57-88.

Hampton, K., & Wellman, B. (2003) Neighboring in Netville: How the Internet supports community and social capital in a wired suburb, *City & Community*, 2(4), pp. 277-311.

typical by the number of relevant parameters Russian city Vologda will be considered.

State-of-the-art in online communication, social capital and privacy research

The understanding of various aspects of digitalization, the phenomena of interpersonal interaction of individuals in a virtual environment and the development of methodological approaches to their study are actively developing in the studies of Russian scientists I.F. Devyatko, D.A. Alexandrov, A.M. Klimova, A.G. Asmolov, G.A. Asmolov, G.U. Soldatova, T.A. Nestik, E.I. Rasskazova, Y.G. Rykov, L.A. Vidyasova, Y.A. Kabanov, I.B. Smirnov, O.Y. Koltsova, L.V. Mararitsa, I.A. Klimov, R.V. Leushkin, A.A. Shirokanova, E.R. Agadullina, O.N. Arestova, A.E. Vojskunsky, L.N. Babanin, I.A. Bobkova, Z.S. Zavyalova, D. A. Ustyuzhanina, D. E. Dobrinskaya, A. V. Chugunova, and others.

The problems of individual social capital in modern studies are touched upon in sociological and socio-psychological way in the studies of such authors as V.V. Radaev, V. Stepanenko, P.N. Shikhirev. L.V. Strelnikova, A. Tatarko, N.M. Lebedeva, T.A. Guzhavina, Y.M. Roshchina, E.D. Kuflina, L.A. Belyaeva, O.V. Volchenko, A.M. Almakaeva, L.G. Pochebut, A.L. Svetsitsky, L.V. Mararitsa, T.V. Kazantseva etc.

Pioneering work on the role of social media focused on the general question of the impact of the frequency and intensity of their use on the social capital of Facebook users (Ellison et al. 2007; Steinfield et al. 2008; Huang, 2010). Further, researchers have searched for mechanisms of social capital accumulation in the online environment, among which the following have been considered: motives for using social media (Ellison et al., 2011; Quinn, 2016; Guo et al, 2014; Chen&Li, 2017), specific behavioral practices for maintaining online relationships (Ellison et al., 2014; Vanden Abeele et al., 2018), initiating relationships and seeking social information about others (Ellison et al., 2011), and disclosing information about oneself (Rykov et al., 2020; Chen & Li, 2017; Vitak, 2012; Stutzman et al., 2012; Luo&Hancock, 2019).

Existing research on online social capital has focused on examining connections within personal social networks maintained by users on specific sites, mainly Facebook (Burke et al., 2011; Brandtzæg, 2012; Vanden Abeele et al., 2018; Brooks et al., 2014; Shen et al., 2014). Most of these studies operationalize social capital in terms of a resource-based approach using survey methodology and only a few studies focus on structural social capital (Brooks et al., 2014; Vanden Abeele et al., 2018; Venkatanathan et al., 2012). Studies of online social capital in the context of an offline geographically localized community also prove to be few, such as those of university campus (Ellison et al., 2007; Steinfield et al., 2008; Ellison et al., 2011; Ellison et al., 2014) or "general" (offline) social capital (Brandtzæg, 2012; Ellison et al., 2014). Despite the fact that classical studies have shown that social capital is a result of investments in social relations, which also often turn out to be spatially close, to date no studies focus on the role of online communication on the formation of social connections at the macro level, for example, within a particular city.

The personality traits are also considered to be important for communication and, consequently, for social capital. Much attention is paid to testing the "the social compensation hypothesis" and the "reproduction of social success" hypothesis (Zywica, J., & Danowski, 2008; Ruppel&McKinley, 2015; Toma, 2022). Among the factors considered, those closely related to communication are primarily represented: self-esteem (Joinston et al., 2009; Ellison et al., 2007; Zywica, J., & Danowski, 2008; Ruppel&McKinley, 2015), social anxiety (Ruppel&McKinley, 2015; Toma, 2022), narcissism (Wnag et al., 2012), extraversion (Zywica, J., & Danowski, 2008; Chen, 2014), and other traits in the Big 5 integral personality trait questionnaire (Wang et al., 2012).

Empirical research on online privacy is widely represented in the works of N. Allison, F. Stutzman, J. Vitak, C. Steinfield, R. Gray, K. Lampe, N. Kraemer, R. Gross, A. Acquisti, T. Dienlin, F. Masur, S. Trepte, L. Reinicke, J. Meyer, H. Krasnova, L. Baruh, B. Debatin, E.S. Pronkina, E.O. Trufanova, I.V. Sapon, L.V. Chesnokova, A.A. Shapovalenko, V.V. Zotov, G.U. Soldatova, etc. The concepts

of the psychological space and the sovereignty related to the concept of privacy are developed in the works of S.K. Nartova-Bochaver, A.L. Zhuravlev, A.B. Kupreichenko, T.D. Martsinkovskaya, D.V. Olshansky, and others.

Online privacy research has examined the role of factors such as privacy attitudes (Gerber et al., 2018; Dienlin&Trepte, 2015; Gross & Acquisti, 2005; Nosko et al., 2010; Tufekci, 2008), perceived privacy risks (Dienlin & Trepte, 2015; Heirman et al., 2013), digital literacy, privacy violation experience (Christofides et al., 2012; Trepte et al., 2014; Sinyavskaya, 2022), the expected benefits of self-disclosure (Dienlin&Metzger, 2016; Trepte et al., 2017, 2019, 2020), network audiences (Binder et al., 2009; Ellison et al., 2011, 2014; Vitak, 2012). In addition, various strategies for maintaining online privacy are discussed, including the use of privacy settings (Stutzman et al., 2012; Debatin et al., 2009), limiting self-disclosure (Baruh, 2017), or self-censorship (Hogan, 2010; Das&Kramer, 2013; Warner&Wang, 2019).

There are few studies combining the factors of communicative use of social media, privacy management, and social capital (Ellison et al., 2011; Stutzman et al., 2012; Gohen& Aharony, 2017). All the studies found focus on users' perceptions of their social capital and use survey methodology. In addition, studies on the relationship between social networking site use, online privacy, and social capital are predominantly presented in the context of studying Facebook social network users and with the exception of (Trepte et al., 2017; Li et al., 2017; Ur&Wang, 2013) focus on users in Western countries.

The research *object* of the study is the users of the social network V Kontakte from the city of Vologda. The study focuses on the users of social networking site V Kontakte reside in Russian city Vologda. Specifically, the structure of social connections of users, modeled as a set of friendships connections within the online population of this typical Russian city. In addition, the focus is on users' attitudes and behavior towards maintaining online connections and privacy.

The *research aims* of the research are the following:

a) to establish the factors that determine the behavior of users in the social networking site Vkontakte in relation to privacy protection

b) to examine the joint impact of factors such as the propensity to make social connections and maintain online privacy on indicators of social capital of Vkontakte users

Research Objectives

The first part of the study intends to model different strategies for users' online privacy maintenance behavior through various factors.

Objective 1: To establish the relationship between users' online privacy maintenance behaviors, their privacy attitudes, their desire to make social connections, their experience with online privacy violations, and their privacy management skills.

The second part of the study intends to solve the following tasks within the framework of a single model:

Objective 2: Establish the relationship between the propensity to make social connections, maintaining relationships online, and users' social capital;

Objective 3: To establish the relationship between privacy attitudes and behaviors and users' social capital;

Objective 4: To establish the relationship between different dimensions of social capital (perceived and structural social capital).

Hypotheses:

1. The greater the concern about privacy risks, the higher the probability of privacy regulation

2. The higher the propensity to make social connections, the lower the likelihood of privacy regulation

3. The higher the digital literacy, the higher the probability of privacy regulation

4. Having privacy violation experience increases the likelihood of privacy regulation

5. Greater propensity to make social connections is associated with greater of social capital both directly (a) and indirectly (b) through respective relationship maintenance behavior

6. The relationship between privacy concerns and social capital is mediated by privacy protective behavior and the effect of the latter varies by the type of social capital: more concerned users tend to regulate privacy more, which is negatively related to the development of (a) weak ties (bridging social capital) and positively to the development of (b) strong ties (bonding social capital).

Theoretical and methodological framework of the study

The theoretical ground for the study and conceptualization of social capital is based on the classical works of P. Bourdieu, J. Coleman, H. White, M. Granovetter, N. Lin, R. Burt, R. Putnam, B. Wellman, which were adapted in the Russian context in the works of V.V. Radaev, V. Stepanenko, L.V. Strelnikova A. Tatarko, N.M. Lebedeva, T.A. Guzhavina, J.M. Roshina, E.D. Kuflina, L.A. Belyaeva, O.V. Volchenko, A.M. Almakaeva, D. Maltseva, A.Kim and others.

The methodological basis for studying the social structure of urban community was the approach and methods for analyzing social networks, based on the method of sociometry by J. Moreno, and further developed by L. Freeman, S. Wasserman, S. Borgatti, M. Everett, M. Newman, A. Barabashi, N. Kristakis, D. Watts. The methodological apparatus for analyzing the structure of social networks is developed in the works of L. Freeman, S. Wasserman, K. Faust, S. Borgatti, M. Everett, F. Bonacic, etc.

The conceptual and theoretical basis for the study of the impact of the Internet and social media is based on the works of M. Castells, J. Van Dijk, B. Wellman, G. Rainey, M. McLuhan, Z. Papaharissi, N. Ellison, d. boyd, A. Marwick, S. Trepte, L. Reinicke.

The conceptualization of the classical theories of privacy by I. Altman, A. Westin and their implementation in the online context is based on the works of

such researchers as S. Petronio, H. Nissenbaum, N. Ellison, S. Trepte, L. Reinicke, F. Mazur, T. Dienlin, J. Walver, S. Margulies, B. Debatin, M. Taddiken, B. Hogan, J. Vitak.

The empirical part of the work was carried out with the method of social network analysis (SNA), structural equation modeling (SEM), as well as linear and logistic regression methods. Analysis was made on the data collected in the framework of the project of the Social and Cognitive Informatics Laboratory at HSE University (SCILA). Three collections of data were formed in the study. The first one includes information about all friendship connections between users of the social network Vkontakte from the city of Vologda (dataset 1, N=196 630) which were available for downloading through the open API. The second collection includes data from a representative sample (from dataset 1) regarding various socio-psychological characteristics, which was complemented by data from Vkontakte profile and data about social connections within a personal network (full ego network) (dataset 2, N=369). The third collection includes a second wave of measurement of the characteristics of users' personal network from dataset 2, taken one year later (dataset 3, N=353).

The contribution of the study

1. For the first time the connection between online activity and social capital was studied using data from the Russian social networking site Vkontakte, which opens a new direction in empirical research of social capital and online privacy.
2. The study expands the understanding of individual online privacy strategies and the factors that influence their choice and application. First, factors belonging to competing theories of privacy were explored. Second, the range of strategies considered in previous studies was expanded: for the first time, measures of online communication regulation were examined along with informational privacy. Third, privacy protective behavior was assessed using observable data from digital user traces, overcoming the limitations of self-reported data from previous studies.

3. The study tested, for the first time, a comprehensive model of social capital that simultaneously accounts for two potentially divergent vectors of online behavior of individuals: the desire to develop social connections and to maintain privacy.
4. For the first time in the context of online research indicators of structural social capital of individuals were measured on the macro level as characteristics of the individual position in the social structure within city network. This approach makes possible to assess social capital formed within the boundaries of natural spatial community and correlated with access to resources rooted in real relationships outside the online space. In addition, the study allowed to correlate the indicators of online activity of individuals with the metrics of local social capital at the level of ego-networks, as well as with its global indicators at the level of the city.
5. The study contributes to the theory of social capital by comparing and exploring the relationship between two different approaches to the conceptualization of social capital - resource and structural.

Main results

1. Users who are more concerned about privacy risks, have longer experience with Vk social networking site, and have more advanced privacy management skills are more likely to engage in privacy management.
2. Users who are more intended developing social connections are characterized by higher rates of activity to maintain relationships with the online environment and higher rates of both perceived and structural social capital.
3. Greater concern about privacy risks is positively associated with greater measures of perceived and structural social capital. No relationship is found between privacy protective behavior and measures of social capital.
4. Greater perception of bonding social capital is associated with lower indicators of centrality in the network of urban connections and greater indicators of local network embeddedness (transitivity).

The presentation of the results on the scientific conferences

The results of the work were presented at the following scientific events:

1. ICA Regional Conference 2022, Computational Communication Research in Central and Eastern Europe, Helsinki, Finland, June 27-29, 2022
2. XXIII Yasin (April) International Academic Conference on Economic and Social Development, Moscow, Russia, April 5-22, 2022
3. St. Petersburg Conference on Inequality and Diversity (IDC HSE), Saint-Petersburg, Russia, November 11-13, 2021
4. 23rd international conference on human-computer interaction, Washington DC, USA, July 24-29, 2021
5. 13th ACM Web Science Conference 2021, University of Southampton, June 21–25, 2021
6. Networks in the Global World V, Saint-Petersburg, Russia, July 2020.
7. St. Petersburg Conference on Inequality and Diversity (IDC HSE), Saint-Petersburg, Russia, November 5-7, 2020
8. 11th conference of the media psychology division, Chemnitz, Germany, September 4-6, 2019
9. 24th Annual CyberPsychology, CyberTherapy & Social Networking Conference, Norfolk, USA, June 26-28, 2019.
10. 23rd Annual CyberPsychology, CyberTherapy & Social Networking Conference, Gatineau, Canada, June 26-28, 2018
11. Networks in the global World conference IV, St.-Petersburg, July 4-6, 2018.
12. Social Informatics 2018 conference, Higher School of Economics, St.-Petersburg, September 25-28, 2018.
13. 22nd Annual CyberPsychology, CyberTherapy & Social Networking Conference, Wolverhampton, UK, Jun. 26-28, 2017

Based on the results of the dissertation, the following articles were prepared and published:

1. Sinyavskaya Y.E. (2022) Online Social Media Communication: The Effect of Having Privacy Violation Experience on Online Behavior. *Sotsial'naya psikhologiya i obshchestvo. Social Psychology and Society*. Vol. 13. No. 1, pp. 33—50. (In Russ.)
2. Rykov Y., Koltsova O., Sinyavskaya Y. (2020) Effects of user behaviors on accumulation of social capital in an online social network. *PLOS One*. Vol. 15. No. 4. pp. 1-17. (In Eng.)

3. Sinyavskaya Y., Porshnev A. (2020) Friend network expansion and reduction: investigating the role of structural and psychological factors. Lecture Notes in Networks and Systems. Cham: Springer. pp. 17-33. (In Eng.)
4. Sinyavskaya Y., Porshnev A. (2019) Propensity to make social connections and structural social capital of SNS users. Annual Review of CyberTherapy and Telemedicine. Vol. 17. P. 33-37. (In Eng.)
5. Sinyavskaya Y., Koltsova O. (2017) Self-disclosure online and offline: the Effect of Age. Annual Review of CyberTherapy and Telemedicine. 2017. Vol.15. P.88-91. (In Eng.)

Theoretical and practical significance of the work

The results contribute to the theory of social capital by clarifying the relationship between different dimensions of social capital. The study proposes a methodological approach to the study of online social capital within a localized offline community, which can be borrowed by other studies. The study identifies a number of behavioral practices that point to the mechanisms of accumulation of social capital in the online space and demonstrate the general role of online activity as a factor in user differentiation. The practical importance of these findings is based on the fact that social capital is an important component of the overall well-being of an individual's success in society. The results of the study contribute to the theory of privacy. The study examined a number of competing approaches to explaining privacy behavior (“paradox” of privacy, experience-behavior gap, privacy calculus, knowledge gap). It has been shown that the implementation of online privacy protection is driven more by individuals' skill than by previous experience, a propensity to connect, or privacy concerns. The results describe popular and unpopular strategies for protecting privacy on social networking sites and can be used as the basis for privacy policy and the development of preventive measures in relation to increasing the digital literacy of users.

Author's contribution

The present work systematizes the results of the Digital Friends project, developed by the team of the Laboratory of Social and Cognitive Informatics

(SKILA HSE) in the period of 2017-2021. The role of the author Y.E. Sinyavskaya consisted in developing the idea and design of the research, collecting survey and digital, data analysis (analysis 1) and preparation of both collective and individual publications. This study also includes some contribution of the SCILA Lab colleagues. The city network data were collected and mathematically processed (calculation of network metrics) by Y.G. Rykov. The first version of data analysis (analysis 2) was performed by the author using a series of linear regression models. The final edition of analysis 2 included in the current version were performed by means of structural equation modeling method, which was curated by the international SCILA supervisor Reinhold Kliegl.

Structure of the work

The dissertation includes an introduction, two chapters, a conclusion, a bibliography consisting of 207 sources, and a list of supplement materials. Overall volume of the work is 154 pages.