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Research paper

How does peer cheating influence on individual cheating behavior?

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Abstract

Using the data gathered by online survey of the third-year students of the Faculty of Economics at HSE, we estimate an econometric model to measure the influence of peer cheating on individual cheating behavior. This research concentrates on two different types of networks: friends and students individual works and consults with while studying. Additionally, we consider that students can be influenced by their peers through cognitive abilities and use GPA to estimate the magnitudes of peer performance on individual academic achievements through this channel and two networks. Empirical results show that individual's violations of academic aspects of the honor code are driven by cheating in formal and informal groups the student involved in. Therefore, student's cheating is dependent on the opportunistic behavior of friends and colleges with whom students consult. Building graphs for both types of relationships also illustrates this peer effect. In addition, we have not found the connection of peer academic performance with cheating results – that reveals the variety of friendships with diverse academic outcomes and undesirable behavior among students with different GPA.

Introduction

Peer effects are meaningful in academic performance. A representative student is influenced by coursemates through discussions and general interactions and can be affected by their attitudes toward studying process. On the one hand, peers can have a positive impact on each other. Individuals may teach peers specific knowledge that they possess or general insights of how to have a great outcome in an educational setting. Students can also be motivated simply by co-working.[1] On the other hand, peer effects can cause socially undesirable behaviors. Bayer P., Hjalmarsson R. and Pozen D. established strong evidence of peer effects for burglary, petty larceny, felony and misdemeanor drug offenses, aggravated assault and felony sex offenses.[2] Also, it was found that peers can negatively influence academic performance of individual. Kremer M. and Levy D. showed that students who lived with drinking roommates had significantly lower grades compared to those assigned to nondrinking roommates.[3]

In addition, studying the influence of social interactions on students' academic achievements can be crucial for university as administration can enhance positive externalities from peer effects and diminish negative ones by establishing different types of honor codes, doing manipulations on the stage of forming groups for study and facilitating communication among students.

[1] Griffith A. L., Rask K. N. Peer effects in higher education: A look at heterogeneous impacts //Economics of Education Review. – 2014. – T. 39. – p. 66.

[2] Bayer P., Hjalmarsson R., Pozen D. Building criminal capital behind bars: Peer effects in juvenile corrections //The Quarterly Journal of Economics. – 2009. – T. 124. – №. 1. – p.1.

[3] Kremer M., Levy D. M. Peer effects and alcohol use among college students. – National Bureau of Economic Research, 2003. – №. 9876. p.35.

For instance, significant classmates' influence on each other was found in the Russian and Brazilian Universities (HSE and Unicamp). Researchers estimated peer effects as similarity in student attributes and established strong positive impact of peers on academic performance of individual[4]. However, it seems intriguing to find analogical significance of peer effects on cheating behavior for students in HSE. Therefore, there is an attempt to analyze it in this research evaluating peer effects using the results of surveys.

This research is going to answer the question: "How does peer cheating influence on individual cheating behavior?". It is hard to survey the students on the matter of academic dishonesty therefore the actual rate of cheating can never be known with certainty. Our aims are to analyze cheating and motives to it, build an empirical model to find connections between individual's and friends cheating behavior and individual's and study peers' academic dishonesty, also draw graphs to illustrate findings.

Literature review

Peer effects are meaningful in academic performance of students. From discussions with friends or studymates students socialize and teach each other, so they are affected by peer's personality and attitudes towards learning in different channels. The economics literature conjectures three drivers of correlation between outcomes of peers.[5] Exogenous (or contextual) effect demonstrates the impact of preliminary characteristics of peers on individual's behavior. Endogenous effect is based on influence of simultaneous peer behavior on one's actions. Correlated effects show how shared characteristics influence on self-selection and imply that individuals in one reference group tend to behave identically because they have alike personal traits or live in similar institutional environment.[6]

Many papers are concentrated on endogenous effects, because they are the best to reflect the networks influence. Lam C. et al. try to analyze endogenous and correlated peer effects on exam scores. Authors demonstrate that friendship and study group are endogenously formed networks, which have significant and positive influence on individuals[7]. Moreover, in this paper authors claim that peers affect each other through personal traits and mental abilities. Based on these findings we try to analyze endogenous peer effects of academic performance on cheating, suggesting this hypothesis:

[4] Poldin O. et al. Estimation of Peer Effects with Predicted Social Ties: Evidence from Two Universities in Brazil and Russia //Higher School of Economics Research Paper No. WP BRP. – 2015. – T. 30. – p. 17.
[5] Manski C. F. Identification of endogenous social effects: The reflection problem //The review of economic studies. – 1993. – T. 60. – №. 3. – p. 532.
[6] Manski C. F. Identification of endogenous social effects: The reflection problem //The review of economic studies. – 1993. – T. 60. – №. 3. – p. 532.
[7] Lam C. et al. Estimating Various Kinds of Peer Effects on Academic Performance (Draft) //Department of Economics, University of Chicago. – 2012 – p. 43.

Hypothesis 1: Academic dishonesty will be indirectly related to co-workers' and friends' academic performance.

McCabe D.L. and Trevino L.K. found the number of characteristics of contextual components that have an impact on academic offences too. First of all, faculty support of academic integrity policies. Researchers established that academic honesty directly connected to student perceptions of the degree of faculty maintaining honor codes. McCabe D.L. and Trevino L.K. indicated that most institutions have honor codes that define expectations and characteristics of cheating behavior thus students have less opportunities to hide the actual motives of cheating and rationalize it. Moreover, faculty that supports academic integrity policies, involves students in detecting academic offences and determining guilt. In addition, honor code may suppose some privileges, such as home tasks without oral defense, and students may be prone to academic honesty because they are motivated to preserve them.[8]

Second factor is severity of sanctions. The higher the risk of punishment the lower the share of students that will cheat, especially within females. If penalties are quiet serious cheater has less to gain and more to lose, so the potential output of academic dishonesty is less attractive.[9]

Third factor is disapproval of cheating. Students who face strong disapproval of academic dishonesty from their peers potentially less violate the rules of honor code.[10] This research concentrates on two different types of networks: friends and students individual works and consults with while studying. Therefore, we will separately measure the influence of friends cheating approval and co-workers cheating approval on individual dishonesty. We suppose, that friends have tighter relationships and broader channels of affecting each other.

Hypothesis 2: Academic dishonesty will be directly associated with co-workers' and friends' level of cheating.

Besides, there are several other factors that can influence on academic offences. Donald L. McCabe and Linda K. Trevino suppose that student's outcome is separable into an individual component and a peer-effect component.[11] Therefore, they investigate a number of characteristics of students that can be predispositions to dishonesty.

First of the individual characteristics influence on cheating behavior is locus of control – expectancies of people regarding the outcomes of their actions and decisions. People with strong

[8] McCabe D. L., Trevino L. K. Academic dishonesty: Honor codes and other contextual influences //The journal of higher education. – 1993. – Т. 64. – №. 5. – p. 536.
[9] McCabe D. L., Trevino L. K. Individual and contextual influences on academic dishonesty: A multicampus investigation //Research in higher education. – 1997. – Т. 38. – №. 3. – p.384.
[10] Bonjean C. M., McGee R. Scholastic dishonesty among undergraduates in differing systems of social control //Sociology of Education. – 1965. – p. 134.
[11] McCabe D. L., Trevino L. K. Individual and contextual influences on academic dishonesty: A multicampus investigation //Research in higher education. – 1997. – Т. 38. – №. 3. – p.379

internal locus of control think that they are responsible for the results of their choices, individuals with strong external locus of control tend to find exogeneous explanations for outcomes of their activities. Karabenick S. A., and Thomas K. S. established that people with internal locus of control are more prone to plagiarism when the task requires some specific skills whereas people with strong external locus of control cheat more in situations when the chance presumably influence on performance result.[12] A theoretical rationale for the difference is that the internal individual may rationally resort to cheating as a means of maintaining control over unpredictable situation, thereby saving efficiency, while external person may consider cheating as a means of transferring control from the environment to individual.[13]

Second factor is grade-point average. Research papers that investigates influence of academic outcomes on cheating behavior found strong negative correlation between high GPA and academic dishonesty.[14] An explanation for an outcome is that the risk of students with relatively low academic achievements is justified as potential beneficials may outweigh the potential consequences of deviation.[15]

Hypothesis 3: Academic honesty will be directly related to academic individual achievement.

Third individual factor that have an impact on academic dishonesty is age. Research papers consistently established that cheating inversely related to maturity of students: younger undergraduates were more prone to plagiarism than older students of their degree.[16]

Forth factor – gender. McCabe D. L. and Trevino L. K. noted in a review of the research literature that the results of examining gender influence on cheating were inconsistent.[17] Underwood J. and Szabo A. investigated cheating of students in the process of online education and found strong interrelationship between gender, Internet experience of students and their age. Cheating within males prevailed, but also within active users of the Internet therefore the share of women who had considerate Internet experience was more tended to academic dishonesty.[18] Leming J.S. established different results: in his research of college undergraduates, females cheated more than males. The author supposed that the findings may be explained by low risk conditions, while theoretical rationale

[12] Karabenick S. A., Srull T. K. Effects of personality and situational variation in locus of control on cheating: Determinants of the "congruence effect" 1 //Journal of personality. – 1978. – Т. 46. – №. 1. –p.72-75.
[13] Leming J. S. Cheating behavior, subject variables, and components of the internal-external scale under high and low risk conditions //The Journal of Educational Research. – 1980. – Т. 74. – №. 2. – p. 86.
[14] McCabe D. L., Trevino L. K. Individual and contextual influences on academic dishonesty: A multicampus investigation //Research in higher education. – 1997. – Т. 38. – №. 3. – p.382.
[15] Leming J. S. Cheating behavior, subject variables, and components of the internal-external scale under high and low risk conditions //The Journal of Educational Research. – 1980. – Т. 74. – №. 2. – p. 86.
[16] McCabe D. L., Trevino L. K. Individual and contextual influences on academic dishonesty: A multicampus investigation //Research in higher education. – 1997. – Т. 38. – №. 3. – p.381.
[17] McCabe D. L., Trevino L. K. Individual and contextual influences on academic dishonesty: A multicampus investigation //Research in higher education. – 1997. – Т. 38. – №. 3. – p.380.
[18] Underwood J., Szabo A. Academic offences and e-learning: individual propensities in cheating //British Journal of Educational Technology. – 2003. – Т. 34. – №. 4. – p. 467.

of opposite result is high sensitivity of women to the risk of punishment and men indifference to such threats in high risk condition.[19] We suppose that students of HSE face obvious sanctions against cheating.

Hypothesis 4: Males are more likely to individual's violations of academic aspects of the honor code.

Fifth factor is parents' education. The significance of variable is driven by the assumption that well-educated parents can motivate their children to achieve significant academic results since the childhood and to be higher committed to further education.[20]

Additionally, the relation between individual academic cheating and peer cheating behavior is quantitively established. Scott E. Carrell, Frederick V. Malmstrom and James E. West using the data gathered from United States military service academies, measured how peer cheating effects individual cheating behavior. On the basis of 2060 mail surveys authors established that nearly 0.33 to 0.47 new college students cheated driven by one additional student who had cheated in high school. Nearly 0.61 to 0.75 new college students cheated driven by one additional college cheater. These results imply, in equilibrium, that social multiplier for academic cheating equals almost three.[21]

Therefore, in economic literature the role of peer effect on the level of cheating is irrefutable. However, only a small number of papers shows the influence of social networks in Russia. Poldin et al analyze the peer effect on academic performance of students in two countries (Brazil and Russia). Interestingly, authors find that in HSE students' achievements are positively influenced by friends and studymates with the same characteristics, such as the same gender, region of origin [22]. In this research we will analyze the peer effect of HSE students on the level of cheating, suggesting hypotheses mentioned above.

Empirical part

Data

In our research we attempted to recognize friendships (informal relationships) and study relations between peers (formal relationships). To reduce potential error connected with misreporting, respondents were not directly asked about the issue of cheating. Dataset involved in this research is constructed from the online survey that was conducted on the third-year students of the Faculty of Economics in October 2020. Respondents were asked to write the names of their close friends

[19] Leming J. S. Cheating behavior, subject variables, and components of the internal-external scale under high and low risk conditions //The Journal of Educational Research. – 1980. – Т. 74. – №. 2. – p. 86.
[20] McCabe D. L., Trevino L. K. Individual and contextual influences on academic dishonesty: A multicampus investigation //Research in higher education. – 1997. – Т. 38. – №. 3. – p.382.
[21] Carrell S. E., Malmstrom F. V., West J. E. Peer effects in academic cheating //Journal of human resources. – 2008. – Т. 43. – №. 1. – С. 173.
[22] Poldin O. et al. Estimation of Peer Effects with Predicted Social Ties: Evidence from Two Universities in Brazil and Russia //Higher School of Economics Research Paper No. WP BRP. – 2015. – Т. 30. – p. 17.

(minimum 4 people not necessarily from their study group) and students respondents work and consult with while studying (minimum 4 people not necessarily from their study group).

Also, we used the data that was gathered in May of 2020, which includes names and grades for Data Science homework[23]. The main detail in this homework was the recognition of plagiarism by Yandex Contest in scale from 0 to 6, where 0 – not cheating homework, 6 – fully cheating homework. In our data we recorder this data as $cheat$. Unfortunately, there is no opportunity to recognize exact plagiarism because all works were downloaded in antiplagiarism program together and demonstrated final scale of cheating. But we assume that each student cheated with his friends or study peers, which we have known from conducting surveys. Moreover, we used open information about student's number of the group (12 groups were in surveys), sex (we used dummy variable, where 1 - female, 0 – male), and GPA in official HSE website[24]. And we recorded this data as gpa, sex. After that we estimated average level of cheating and GPA among informal and formal relationships for each student. These received variables we recorded as $cheat\_informal, cheat\_formal, gpa\_informal, gpa\_formal$.

Final dataset consisted information about 163 students (out of 369 on the course) or approximately 44% of the third-year students of the Faculty of Economic. As mentioned above, for each student we collected his or her formal and informal relationships, the level of cheating, GPA, sex, number of the group. Descriptive statistics you can find in Table 1.

Table 1: Summary

Statistic	N	Mean	St. Dev.	Min	Pctl(25)	Pctl(75)	Max
gpa	163	7.264	1.231	4.410	6.365	8.150	9.890
cheat	163	1.706	1.515	0	1	3	6
sex	163	0.423	0.496	0	0	1	1
cheat_formal	163	1.390	0.706	0.250	0.845	1.750	4.000
cheat_informal	163	1.446	0.876	0.000	0.800	2.000	4.333
gpa_formal	163	7.556	0.817	5.260	7.000	8.148	9.143
gpa_informal	163	7.187	0.922	4.677	6.470	7.867	9.397

Model

To analyze peer effect on the level of cheating (or academic dishonesty) we use OLS regression, where the level of cheating ($cheat$) is dependent variable, $cheat\_informal, cheat\_formal, gpa\_informal, gpa\_formal, gpa, sex$ – are independent variables, and the number of the group is control variable.

[23] Data Science assessments and rankings in program "Economics" in 2020. URL: https://docs.google.com/spreadsheets/d/13YDDmS561QSkQukWqHnPn_3-aRkniD2trb_KhvsxMRA/edit#gid=0 (visited on 04.12.2020).
[24] Students' ratings in Bachelor program "Economics" in 2020. URL: https://www.hse.ru/ba/economics/ratings?from=412769365&course=3 (visited on 04.12.2020).

To verify hypotheses, we use 2 models for formal and informal relationships:

$$cheat = \alpha + \beta_1\, cheat\_formal + \beta_2\, gpa\_formal + \beta_3\, gpa + \beta_4\, sex + \beta_5\, group + \varepsilon$$

$$cheat = \alpha' + \beta_1'\, cheat\_informal + \beta_2'\, gpa\_informal + \beta_3'\, gpa + \beta_4'\, sex + \beta_5'\, group + \varepsilon$$

Lam C. et al. used the same model to estimate peer effect on academic performance, in which they showed the role of each coefficient, especially what type of peer effect is demonstrated[25]. Analogically with this paper, we classify our coefficients: β_1, β_1' are "Contextual effects", which are how one's average peer's level of cheating affect the one's level of cheating; β_2, β_2' are 'Endogenous effects", which are how one's average peer's GPA affect one's the level of cheating, β_3, β_3' are "Own effects of GPA", which are how GPA affect the level of cheating, β_4, β_4' are "Own effects of sex", which are how sex affect the level of cheating, β_5, β_5' are "Correlated effects", which are unobservable factors which affect students in the same group.

Based on literature review above, we suppose 4 hypotheses, where the hypothesis 2 is the most interesting for us, because it demonstrates the endogenous peer effect, which are the purest to estimate the influence of social networks on the level of cheating. Therefore, we focus on this effect and use the correspond independent variables in all regressions.

Results

Tables 2–3 present results of our analysis. Table 2 shows the results for the influence by formal relationships (peers with whom students consulted). Table 3 shows the results for the influence by informal relationships (friendships).

Table 2: Formal social network

	Dependent variable:				
	cheat				
	(1)	(2)	(3)	(4)	(5)
cheat_formal	0.435^{***} (0.071)	0.393^{***} (0.077)	0.392^{***} (0.077)	0.386^{***} (0.075)	0.394^{***} (0.085)
gpa_formal		−0.110 (0.077)	−0.111 (0.077)	0.014 (0.084)	−0.009 (0.104)
sex			0.036 (0.144)	0.068 (0.140)	0.048 (0.143)
gpa				-0.260^{***} (0.079)	-0.281^{***} (0.083)
group_control					YES
Constant	0.000 (0.071)	0.000 (0.071)	−0.015 (0.093)	−0.029 (0.091)	0.011 (0.248)
Observations	163	163	163	163	163
R^2	0.189	0.200	0.200	0.251	0.302
Adjusted R^2	0.184	0.190	0.185	0.232	0.225
Note:					*p<0.1; **p<0.05; ***p<0.01

[25] Lam C. et al. Estimating Various Kinds of Peer Effects on Academic Performance (Draft) //Department of Economics, University of Chicago. – 2012 – p. 9.

Table 3: Informal social network

	Dependent variable:				
	cheat				
	(1)	(2)	(3)	(4)	(5)
cheat_informal	0.372^{***} (0.073)	0.332^{***} (0.079)	0.331^{***} (0.080)	0.326^{***} (0.077)	0.303^{***} (0.083)
gpa_informal		−0.101 (0.079)	−0.102 (0.080)	−0.007 (0.081)	−0.047 (0.090)
sex			0.017 (0.149)	0.059 (0.143)	0.047 (0.146)
gpa				-0.283^{***} (0.075)	-0.309^{***} (0.080)
group_control					YES
Constant	0.000 (0.073)	0.000 (0.073)	−0.007 (0.097)	−0.025 (0.093)	0.015 (0.245)
Observations	163	163	163	163	163
R^2	0.138	0.147	0.147	0.217	0.269
Adjusted R^2	0.133	0.136	0.131	0.197	0.189
Note:					*p<0.1; **p<0.05; ***p<0.01

Firstly, we find the significant positive endogenous peer effect for both types of relationships. It means that the level of cheating among friends and colleges with whom students consulted affect the individual level of cheating significantly, that proves our hypothesis 2. Moreover, this influence by social networks can be observed in figures 1 and 2 in appendix, in which the color of node is the level of cheating and lines are the relationships between students.

Secondly, we do not find the "contextual effects" in regressions. It can be explained by three factors. The first factor is that in HSE students are communicative and have formal and informal relationships independently from the GPA. The second factor is that students with high GPA and less GPA attempted to cheat. Thus, the level of cheating is independent from the average GPA among friends and studymates. The result can be connected with the fact that co-working in HSE is widespread and often doing assignments together enhance the effectiveness of all students: peers with high GPA improve the quality of their works together, while peers with low GPA have more chances to cope with larger number of tasks in assignment. Finally, we have not enough students with less GPA, who may have more motives to plagiarism, so this absence of data also can explain absence of this peer effect.

However, we find significant negative "Own effect of GPA", so smarter students are more honest and less cheated, while students with less GPA are prone to plagiarism, which proves our hypothesis 3. Summarizing with absence of "contextual effect" we suggest that students with high GPA are more independent and conscious, while students with less GPA have incentives to opportunistic behavior.

Lastly, we do not find the "Own effect of sex", which demonstrates balanced incentives to plagiarism for males and females. This finding does not confirm the hypothesis 4, which can be explained by the fact that in HSE there are identical conditions and risks to cheating for all students independently from the gender.

Conclusion

Studying peer effects on academic achievements of students is highly beneficial as after identifying positive externalities from peer abilities universities can utilize them to enhance the productivity of learning process. Moreover, understanding of influencing of peer effects on studying process will help to minimize academical dishonesty and undesirable behaviors.

This research analyzes and compares peer effects especially influence of peer cheating on individual cheating behavior for two different types of networks: friends and students individual works and consults with while studying. We assume that these peer groups have the most significant influence on individuals' educational process. Using the data gathered by online survey of the third-year students of the Faculty of Economics at HSE, we estimate an econometric model and build graphs to measure the influence of peer cheating on individual cheating behavior and find positive endogenous peer effects for both types of relationships. We establish that students in HSE are not influenced by their peers through grade-point average as the variable is insignificant for both types of networks in estimating the individual's violations of academic aspects of the honor code. Empirical evidence shows that contextual peer effects are not observed but the result can be explained by the specific of the dataset which consists mostly of students with high GPA and the fact that people form relationships considering various factors.

We realize the educational experience for students at the Faculty of Economics can differ from other Faculties and especially universities, which draws into question the generalizability of our results. We consider that students at HSE are highly motivated and the faculty supports academic integrity policies and define expectations and characteristics of cheating behavior thus students have less opportunities to hide the actual motives of cheating and rationalize it.

Future study can be enhanced by the expansion of database with including more data on students with different academic achievements. Moreover, the econometric model can be extended to consider multiple individual characteristic such as parents' education and locus of control.

To conclude, academic cheating is directly influence on individual cheating behavior and this effect is observed for both friendships and co-working networks.

References

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3) Carrell S. E., Malmstrom F. V., West J. E. Peer effects in academic cheating //Journal of human resources. – 2008. – Т. 43. – №. 1. – p. 173-207.

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5) Karabenick S. A., Srull T. K. Effects of personality and situational variation in locus of control on cheating: Determinants of the “congruence effect” 1 //Journal of personality. – 1978. – T. 46. – №. 1. – p. 72-95.

6) Kremer M., Levy D. M. Peer effects and alcohol use among college students. – National Bureau of Economic Research, 2003. – №. 9876. p.1-50.

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14) Data Science assessments and rankings in program “Economics” in 2020. URL: https://docs.google.com/spreadsheets/d/13YDDmS561QSkQukWqHnPn_3-aRkniD2trb_KhvsxMRA/edit#gid=0 (visited on 04.12.2020).

15) Students’ ratings in Bachelor program “Economics” in 2020. URL: https://www.hse.ru/ba/economics/ratings?from=412769365&course=3 (visited on 04.12.2020).

Appendix

Figure 1: Formal social network

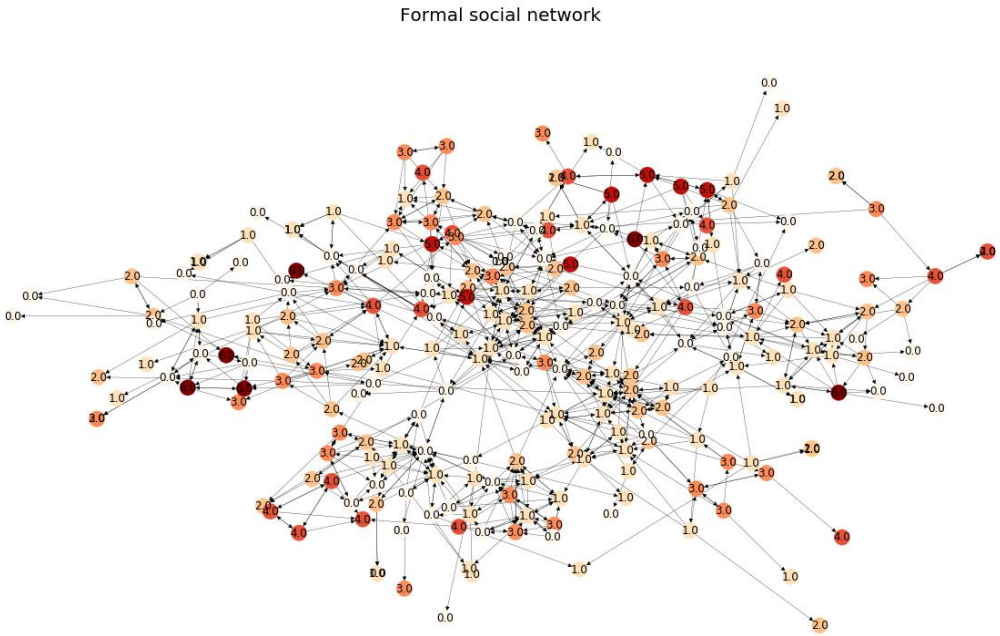

Figure 2: Informal social network