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Georgia Leads in Prosociality: Comparison to Cross-Cultural Economic Experiment[1]

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Recent experimental economic research highlights the importance of Altruism and prosociality in many economic relations. Our experiment replicates the cross-cultural public goods game experiment conducted in 16 different countries by (Herrmann, Thöni, and Gächter 2008). We find that the mean contributions in standard public goods experiment with voluntary contribution in Tbilisi participant pool appears the highest compared to 16 experiment participant pool of different countries. Moreover, our experimental results show surprisingly flat pattern of mean contributions, indicating on strong evidence of altruism and prosociality. Individual level experimental data tentatively suggests, the repeated game incentives and considerable portion of altruism seems to reinforce each other and motivate subjects' genuine generosity reputation building, as it is a distinct and esteemed character of Georgian culture. In our view, our results of strong evidence of altruism contributes to the cross-cultural economic research of human cooperation.

Keywords: *Prosociality, altruism, culture, human cooperation, public goods experiment.*

JEL Codes: *D60, D64, D69*

Introduction

In Economic theory it is well known fact that voluntary provision of public goods will lead to an inefficient undersupply (Samuelson 1954) and free riding incentives emerges as a main obstacle. Economic theory explains this by viewing

1 This work was supported by Shota Rustaveli National Science Foundation (SRNSF), grant PHDF-19-321, "Prosocial Behavior in Economics and Influence of State Institutions: Case of Georgia".

contributions to a public good as strategies in a non-cooperative game. Based on standard assumptions of self-interest and rationality, the Nash equilibrium of games involving cooperation decisions is inefficient. Since, one can receive a benefit of public good without contributing towards the cost of its production, there exists a tension between individual and collective interest, which is typical for many cooperation problems in economics.

Indeed, many important social and economic problems of humankind involve a large-scale cooperation of individuals in situations in which collective welfare is jeopardized by individual self-interest. In economic literature, the "tragedy of the commons" is probably the best-known example. Collective welfare is threatened by individual greed in such diverse areas like environmental protection, tax compliance, fighting corruption, labor contract, the voluntary provision of public goods, donations to charities, collusion between firms and so on. While the logic of self-interest is straightforward, the experimental research data seem to be at odds with the free rider hypothesis that is derived under the joint assumptions of rationality and selfishness. Humans often manage to avoid the "tragedy of the commons" and achieve high levels of prosociality. Thus, understanding prosocial behavior of cooperation is an important challenge not only in economics, but also across all social sciences.

The fact that people take part in collective actions and care about collective welfare, suggests that the strict self-interest hypothesis is inconsistent with the degree of voluntary cooperation we observe in real life. Besides, the main finding from a large body of experiments that have been conducted in a variety of settings in the last three decades is that there is much more cooperation contrary to the predictions of standard economic theory (Ledyard 1995, Fehr and Fischbacher 2003). However, the experiments also show that voluntary cooperation is fragile in the sense that in repeatedly played public goods games (PGG) cooperation declines over time under the influence of free riders.

Recent experiments have also shown that cross-cultural differences in cooperation exist among societies with the wide range of cultural and economic backgrounds (Herrmann, Thöni, and Gächter 2008) (henceforth HTG). Our experiment adds Georgia to the cross-cultural study of HTG and replicates their experiment design of public goods game experiment. This article presents attempt to measure with the help of controlled laboratory experiment human prosociality in Georgia. The main goal of our experiment was to see whether and at what level cooperation stabilized in case of Georgia and compare it to the results of HTG.

1. Experiment Design

Laboratory experiments are probably the best tool for studying prosociality empirically. The reason is that in the field many factors are operative at the same time. The laboratory allows for a degree of control that is often not feasible in the field. The experiment design of seminal study by E. Fehr and S. Gächter has become the standard by which to study cooperation in a public goods environment (Fehr and Gächter 2000). Since, we were interested in whether people behave differently under the exact same circumstances, we applied the exact same public goods experiment design that did HTG.

1.1. Participants

In order to hold participant pool comparability with HTG and minimize sociodemographic variability, we conducted experiment with university students who were similar in age. The experiment was conducted in Autumn 2020 in Tbilisi, Georgia and included observations made on 57 subjects. Participants were recruited via various Facebook groups of university students. The participants were registered online on experiment sessions via Google Forms posted on these Facebook groups page and advertised on our special Facebook page. We prevented repeated participation by excluding duplicate IDs and IP addresses. In total 3 experiment sessions were conducted. In the standard Public Goods Game (PGG) with 10 periods the experiment lasted between 10 and 20 min and participants earned on average 13.7 GEL (4.2 USD at that time).[1] After finalizing experiment, the participants were paid immediately by internet banking transfer, as soon as participant provided electronically signed payment document. The average age of participants in the sample was 24.6 years, and 58.4% were female. The participants were from various majors, namely: 21% of participants were students from Economics, 17.8% of Business Administration, Social Sciences 8.4%, Law 8.8%, other majors 22% and non-students 22%. About 58% of students were from Ivane Javakhishvili Tbilisi State University and remaining students were from various universities, mainly from capital Tbilisi, some of them were from Batumi and Gori city universities.

1 According to the official statistics of Georgia average hourly salary in QII 2020 was 8.5 GEL (about 2.6 USD), source: https://www.geostat.ge/ka/modules/categories/39/khelfasebi

1.2. Method

Our work parallels and replicates the experimental setting used by E. Fehr and S. Gächter and cross-cultural seminal study of HTG. HTG conducted standard PGG experiment in 16 different participant pools with various cultural and economic backgrounds. Their study show that prosocial cooperators is indeed widespread in many participant pools. However, a large variation and heterogeneity of prosociality remains between these cultures. Here we focus only on measurement of prosociality in case of Georgia and comparing it to these 16 different country participant pools. We adjust group size and endowed token amount to the parameters of HTG. Next, we kept the group composition constant across all periods and was made public knowledge as we wanted to measure the cooperative behavior development under strategic settings. When play a repeated game that opens up the possibility for reputation formation opportunities due to repeated strategic interaction.

1.3. Payoff Mechanism

The experiment is based on voluntary contributions mechanism PGG with linear payoffs. In each period each of the n subjects in a group receives an endowment of γ tokens. A subject can either keep these tokens for herself or invest g_i tokens ($0 \leq g_i \leq \gamma$) into a project. The decisions about g_i are made simultaneously. The monetary payoff for each subject i in the group is given by

$$\pi_i^1 = \gamma - g_i + \alpha \sum_{j=1}^{n} g_i,\ 0 < \boldsymbol{\alpha} < 1 < n\boldsymbol{\alpha}$$

In each period, where α is the marginal per capita return from a contribution to the public good. The total payoff from the no-punishment condition is the sum of the period payoffs, as given in (1), over all ten periods. Note that (1) implies that full free-riding ($g_i = 0$) is a dominant strategy in the stage game. This follows from

$$\frac{\partial \pi_i^1}{\partial g_i} = -1 + \alpha < 0$$

However, the aggregate payoff is $\max \sum_{i=1}^{n} \pi_i^1$ if each group member fully cooperates ($g_i = \gamma$) because

$$\partial \sum_{i=1}^{n} \frac{\pi_i^1}{\partial g_i} = -1 + n\alpha > 0$$

1.4 Parameters and Information Conditions

The study was conducted in native Georgian language using the LIONESS software platform for interactive online experiments (Arechar, Gächter, and Molleman 2018). The experiment took place anonymously, participants were not informed about the identity of their group members. In all treatment conditions the endowment is given by $\gamma\gamma$ = 20, groups are of size $n\,n$ = 4, the marginal per capita return (MPCR) that a participant obtained from their contributions was fixed at $\alpha\alpha$ = 0.375. Each of the four group members earned 0.375 tokens for each token invested in the project, regardless of whether he or she contributed any. The resulting number of points was than divided equally between the four participants in the group, irrespective of how much each person contributed. Because the cost of contributing one token in the project was exactly one token whereas the return on that token was only 0.375 tokens, keeping all one's own tokens was always in any participant's material self-interest, irrespective of how much the group members contributed. Yet, if each group member retained all of his or her tokens, there were no earnings to be shared; on the other hand, each member would earn 0.375 × 80 = 30 tokens if each of them invested their entire 20 token endowment. Thus, contributions benefited the group as a whole, but the individual always earned the most by not contributing.

Players made their contribution decisions simultaneously and once the decisions were made, they were informed about their group members' contributions. To ensure that participants did not have varying expectations of the length of the game, the total number of rounds was made public knowledge. Once participants entered experiment, they were taken to an introductory page where general instructions were explained in detail. To maximize data quality, we required game comprehension prior to playing the PGG: after reading the instructions, participants could not advance to the game until they correctly answered all control questions (they were allowed an unlimited number of attempts).

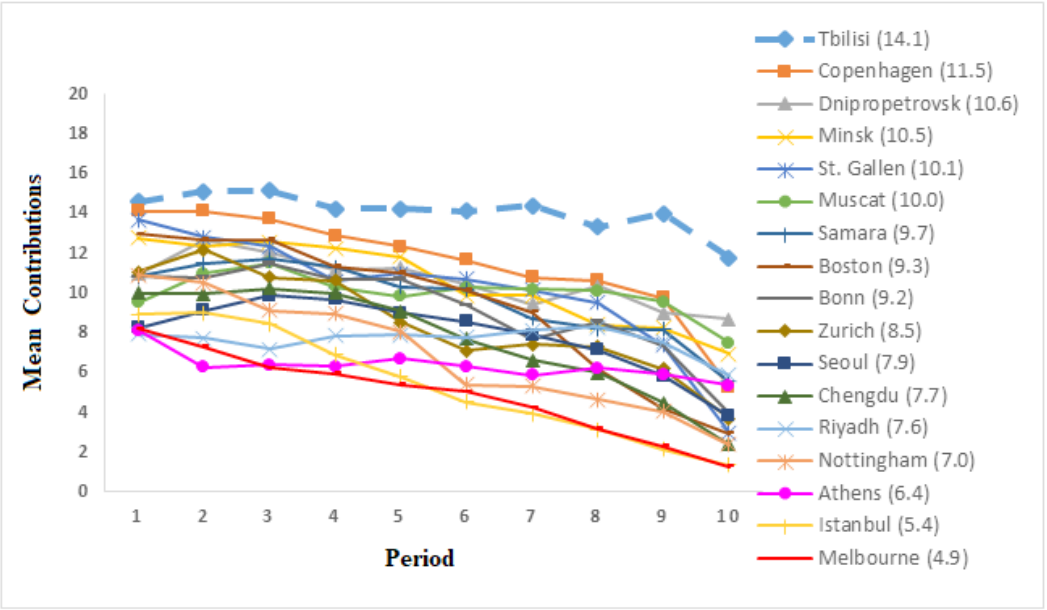
2. Results

Quite unexpectedly, the mean contributions overall exhibit surprisingly flat pattern and voluntary contributions across all rounds remain quite high, well above 50%. The mean contributions averaged 14.1 tokens. However, as it is typical for this kind of public goods experiments, in the last period it experiences a pronounced endgame effect by sharp drop (two-tailed paired t-test, differences between period 1 and period 10, t = 2.06, p = 0.042). In the last period, 22% percent

of the subjects contributed zero. This indicates that, the Nash equilibrium retains substantial drawing power.

Average contributions

Figure 1



Source: *own experiment data and HTG experiment data - https://datadryad.org/stash/dataset/doi:10.5061/dryad.87301*

In comparison to the average contributions of 16 participant pools of the experiment conducted by HTG, the average contributions of our experiment in Tbilisi remains at the top level of contributions, while all others mean contributions end up under 50%. The right side of Figure 1 provides list of 16 participant pool indicating in parenthesis the average contribution of 10 periods. The average contributions of PGG experiment conducted in Tbilisi is significantly higher to the average contributions of Copenhagen experiment, which was the highest compared to the 16 country results (two-tailed paired t-test, $t = 2.85$, $p = 0.0156$).

Why average contributions in Tbilisi participant pool are significantly higher than average contributions documented in 16 participant pool? We take a closer look to the data of HTG experiment and examined share of free riders and altruist in experiments with "Top 3" and "Bottom 3" average contributions, and compared to the results of Tbilisi experiment. The interaction of the free riders and altruist bares a crucial importance in recent theoretical and empirical

research of behavioral economics (Fehr and Fischbacher 2003). In experimental research these two types of behavior is well defined (Fischbacher, Gächter, and Fehr 2001). Namely, "Free-riders" are those who contribute nothing in all periods in PGG. The "Altruists" are those who contribute full endowment in all periods regardless what other group members do. In Table 1 shows these results.

Share of Free Riding and Altruistic Behavior

	Country	City	Altruist Behavior, %	Free Riding, %
	Georgia	Tbilisi	17.5%	0%
Top 3	Denmak	Copenhagen	3%	6%
	Ukraine	Dnipropetvk	5%	2
	Belarus	Minsk	6%	0%
Bottom 3	Australa	Melbourne	0%	13%
	Turkey	Istanbul	2%	13%
	Greece	Athens	0%	7%

In participant pool of Tbilisi experiment, we can observe a zero free riding and considerable share of Altruist behavior relative to Top 3 participant pool results. Table 1 reveals that in Top 3 participant pool, the share of free riding behavior is larger than in Bottom 3, which is logical.

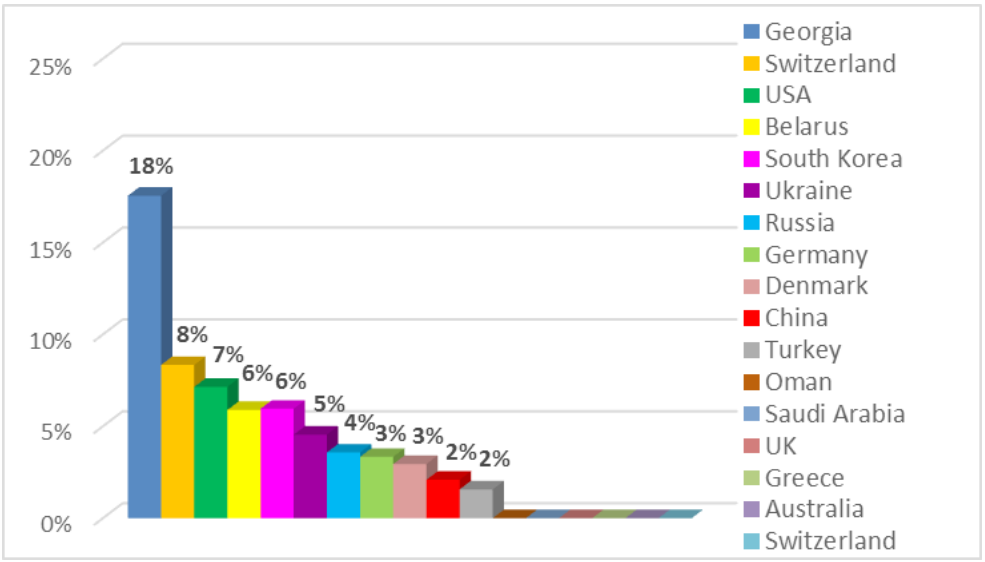
Since, altruist behavior was distinctively higher in participant pool of Tbilisi experiment, we compared it to all 16 participant pool of the experiment of HTG. Figure 2 presents an interesting fact, the share of altruist behavior of Tbilisi experiment participant pool is considerably higher compared to other 16 experiment participant pool of HTG study.

Next, we were interested how total contributions of all subjects were distributed across all 10 periods of Tbilisi experiment. We classify the contributions into four category: (1) zero (2) full contribution (3) contribution equal or more than 50% of endowment and (4) contribution less than 50% of endowment. Figure 3 depicts this distribution results.

Over all 10 periods, 47% of total contributions were equal to full endowment (i.e. 20 tokens) and 29% of contributions were above 50% of endowment. Thus, in total 76% of contributions made were equal or more than 50% of endowment, which clearly is classified as generous acts.

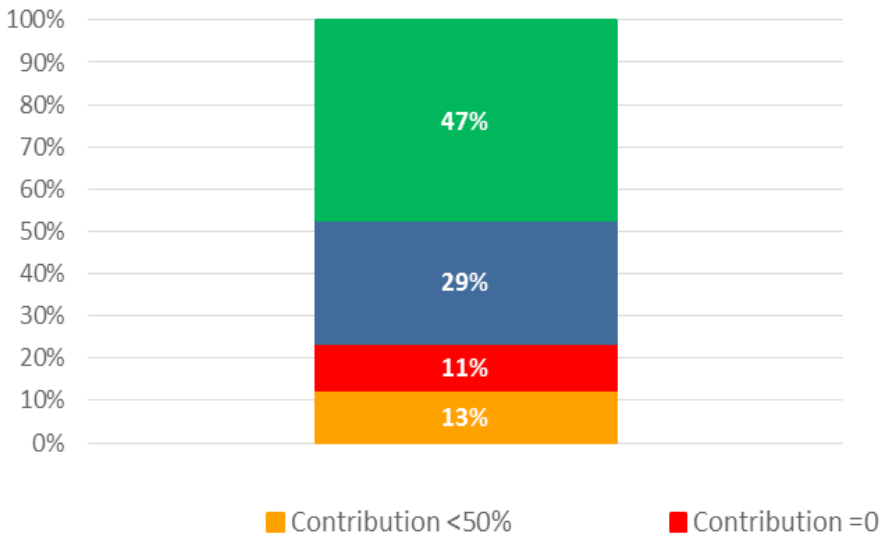
Share of Altruists

Figure 2



Distribution of Total Contributions of All Subject over Four Category

Figure 3



In the experimental research it is well documented that large portion of subjects are 40-60% conditional cooperators i.e. those who contribute only if other group members contribute and stop contributing if other group members do not contribute (Fehr and Fischbacher 2003, Fischbacher, Gächter, and Fehr 2001). Based on this logic, as more dominates altruistic behavior the individuals' interaction, the grater is stimulus for conditional cooperators to line-up their behavior to altruistic one. However, it is well observed from many PGG experiments that even small number of free riders can easily undermine cooperation. Our results tentatively suggest that considerable portion of altruistic behavior to gather with reputation formation possibility in repeated interactions, seems to be the driving force of generous and high contributions.

Conclusion

Our experiment results highlight the importance of human altruism in long-term economic relations. Indeed, society with significant part of altruists would serve a fertile ground for development of more efficient economic interactions, although it remains vulnerable to free riding. The mean contributions in standard public goods experiment with voluntary contribution in Tbilisi participant pool appears the highest compared to 16 experiment participant pool of different countries. More interestingly, mean contributions exhibit surprisingly flat pattern, indicating on strong evidence of altruism. Indeed, altruistic behavior appeared considerably higher in the Tbilisi experiment participant pool compared to 16 experiment participant pool of different countries. As our individual level experimental data tentatively suggests, the repeated game incentives and considerable portion of altruism seems to reinforce each other and motivate subjects' genuine generosity reputation building, as it is a distinct and esteemed character of Georgian culture. In our view, our results of strong evidence of altruism and prosociality contributes to the cross-cultural research of human cooperation.

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საქართველო ლიდერობს პროსოციალურობით: შედარება კულტურათშორის ეკონომიკურ ექსპერიმენტთან

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თეორიულ ეკონომიკაში საყოველთაოდ ცნობილია, რომ საზოგადოებრივი დოვლათის ნებაყოფლობითი მიწოდების პირობებში, მისი წარმოქმნა ხდება დაბალეფექტიანად და არასაკმარისად (Samuelson 1954), რა დროსაც ოპორტუნისტული ეკონომიკური ქცევა გვევლინება მთავარ ხელისშემშლელ ფაქტორად. სტანდარტულ თეორიულ ეკონომიკაში, ეგოიზმისა და რაციონალურობის დაშვებაზე დაფუძნებული ნეშის წონასწორობა მიგვითითებს საზოგადოებისათვის არაეფექტიან შედეგზე. საზოგადოებრივი დოვლათის ნებაყოფლობითი წარმოქმნის პირობებში, ეკონომიკურ აგენტს შეუძლია მისით სარგებლობა, მაშინაც კი, თუ მას არ გაუღია წვლილი მის მიწოდებაში. ამდენად, ჩნდება სტიმული, რომ ერთმა ინდივიდმა ყოველგვარი პირადი წვლილის გაღების გარეშე, სხვების ხარჯზე ისარგებლოს საზოგადოებრივი დოვლათით. ამრიგად, არსებობს დაპირისპირება პირად ინტერესსა და საზოგადოებრივ ინტერესს შორის, რაც დამახასიათებელია მრავალი სხვადასხვა სახის ეკონომიკური ურთიერთობისა და სიტუაციისათვის.

ფაქტია ისიც, რომ ადამიანები არ ხელმძღვანელობენ მხოლოდ ეგოისტური ანგარიშიანობით, ისინი მონაწილეობენ კოლექტიურ ქმედებებში, ერთად ზრუნავენ გარემოს დაცვაზე, ეწევიან ქველმოქმედებას და ა.შ., რასაც ყოველ ცხოვრებაში ხშირად ვხედავთ. გარდა ამისა, ბოლო სამი ათწლეულის განმავლობაში ჩატარებულმა ეკონომიკურმა ექსპერიმენტებმა ნათლად დაგვაყა-

ხა, ჩომ ადამიანები გაციცებით მეტად თანამშრომლობენ და პროსოციალურად იქცევიან, ვიდრე ამას სტანდარტული თეორიული ეკონომიკა პროგნოზირებს (Ledyard 1995, Fehr and Fischbacher 2003). გარდა ამისა, ექსპერიმენტებმა ასევე ანახა, ჩომ ნებაყოფლობითი თანამშრომლობა მყიფეა იმ გაგებით, ჩომ საზოგადოებრივი დოვლათის ექსპერიმენტის განმეორებითი ინტერაქციის პირობებში, ოპორტუნისტული ქცევის გავლენით, თანამშრომლობა დროთა განმავლობაში კლებულობს და მიისწრაფვის ნეშის ნულოვანი კონტრიბუციების წონასწორობის წერტილისკენ.

ამასთანავე, ბოლოდროინდელ ეკონომიკურ ექსპერიმენტებში ნათლად გამოჩნდა თანამშრომლობის კულტურათაშორისი განსხვავებები (Herrmann, Thöni, and Gächter 2008, შემდგომში HTG). შედარების მიზნით ჩვენი ექსპერიმენტი ამატებს საქართველოს HTG-ის ექსპერიმენტულ კვლევას და ადგენს საზოგადოებრივი საქონლის თამაშის ანალოგიურ ექსპერიმენტულ დიზაინს. ჩვენი ექსპერიმენტის მთავარი მიზანი იყო დაბორატორიული ექსპერიმენტის საშუალებით შეგვეფასებინა საქართველოში პროსოციალურობის, ანუ თანამშრომლობითი ქცევის დონე და შეგვედარებინა ის HTG-ის მიერ სხვადასხვა ქვეყნაში ჩატარებულ ანალოგიური ექსპერიმენტული კვლევის შედეგებთან.

თბილისში ჩატარებულ ეკონომიკურ ექსპერიმენტში საშუალო შენატანების ოდენობა აღმოჩნდა ყველაზე მაღალი HTG-ის მიერ 16 სხვადასხვა ქვეყნაში ჩატარებულ ანალოგიურ ექსპერიმენტების შედეგებთან შედარებით. უფრო მეტიც, ჩვენს ექსპერიმენტში ოპორტუნისტული ქცევის არარსებობასთან ერთად, აღტრუისტული ქცევის წილი აღმოჩნდა გაციცებით დიდი, ვიდრე ყველა სხვა 16 ექსპერიმენტის ანალოგიურ მონაცემებთან შედარებით. გარდა ამისა, განსაკუთრებით საყურადღებოა, ჩომ ჩვენს ექსპერიმენტში საშუალო კონტრიბუციების დონე გასაკვირად სტაბილურ მაღალ დონეზე ნარჩუნდება და ჩრება 50%-ის ზემოთ.

ჩვენი ექსპერიმენტის შედეგები ნათლად წარმოაჩენს აღტრუისტული ქცევის არსებით წილს და მის მნიშვნელობაზე საერთო შედეგებზე. ჩვენი დაკვირვებით, მეტწილად ის განაპირობებს საშუალო შენატანების მაღალი დონის შენარჩუნებას. ექსპერიმენტის მონაცემებზე დაყრდნობით შეგვიძლია ვივარაუდოთ, ჩომ ერთი და იმავე ინდივიდთა ჯგუფში, ინტერაქციების განმეორებითი სტრატეგიული ხასიათი და აღტრუიზმის მაღალი წილი, ერთობლივად არენს ინდივიდებისათვის გულუხვი ინდივიდის რეპუტაციის შექმნის სტიმულს, რაც გამორჩეულად ახასიათებს ქართულ კულტურას. ჩვენი აზრით, ჩვენს ექსპერიმენტს, აღტრუისტული ქცევის მნიშვნელობის წარმოჩინებით, თავისი მცირედი წვლილი შეაქვს კულტურათაშორის ექსპერიმენტულ ეკონომიკურ კვლევებში.

საკვანძო სიტყვები: *პროსოციალურობა, აღტრუიზმი, კულტურა, ადამიანთა თანამშრომლობა, საზოგადოებრივი საქონლის ექსპერიმენტი.*

JEL Codes: *D60, D64, D69*