



# Experimental Assessment of Cheating Prevalence in the Czech Republic as an Example of a Post-Communist Country

Julie Novakova<sup>a</sup>, Petr Houdek<sup>a,b,c</sup>, Jan Jolič<sup>b</sup>, and Jaroslav Flegr<sup>a</sup>

<sup>a</sup>Department of Philosophy and History of Science, Faculty of Science, Charles University, Prague, Czech Republic; <sup>b</sup>Department of Economics, Faculty of Social and Economic Studies, J. E. Purkyne University, Usti nad Labem, Czech Republic; <sup>c</sup>Department of Management, Faculty of Business Administration, University of Economics, Prague, Czech Republic

## ABSTRACT

Dishonest behavior presents a serious problem in many countries' institutions and was found to be relatively widespread in post-communist countries. We focus on the prevalence of cheating in a sample from such country, the Czech Republic, and individual characteristics influencing dishonest behavior. We used a die rolling task where participants can cheat on their reward to determine whether anonymity conditions increase the frequency of cheating. Participants playing alone did not cheat significantly more than the control group throwing dice publicly. We did not find that gender, cognitive abilities, risk and social preferences robustly predicted the rate of cheating.

## ARTICLE HISTORY

Received 22 February 2017  
Accepted 26 July 2017

## Introduction


Even a quarter of a century after the Iron Curtain's fall, its effects are manifest in the post-Soviet block. People in post-communist countries have been found to be less trusting (Bjørnskov 2007; Hjöllund, Paldam, and Svendsen 2001), prone to cheating (Ariely et al. 2015; Hrabak, Vujaklija, and Vodopivec et al. 2004) and corruption (Furtado, Marcén, and Sevilla 2013). However, the results are too few insofar, although it is a widely held belief that corruption and cheating are flourishing in the post-communist block.

A number of studies showed that cultural behavioral patterns tend to be transmitted through several generations even after the external conditions had changed, for example, by moving to another, often culturally very different, country or by a political shift in one's own country (Furtado, Marcén, and Sevilla 2013; Algan and Cahuc 2010; Giuliano 2007). Social learning in general plays a substantial role in dishonesty, be it in the context of a country, or, for example, a college community (Lanza-Kaduce & Klug 1986). Tolerance toward cheating, the notion that one needs to cheat in order to achieve their goals and perception of widespread cheating, may facilitate the propensity to cheat and form a "cheating culture" (essentially the effect of the "fraud triangle," as described in Houdek 2017a), although the impact of moral philosophy and economic ideology is not straightforward (Crittenden, Hanna, and Peterson 2009). Even tendencies toward academic cheating may differ across countries and suggest possible sociopolitical background (Chudzicka-Czupala et al. 2016).

Hjöllund, Paldam, and Svendsen (2001) have shown that the effects of dictatorship can be long-lasting and that the transition from communism to democracies' levels of social capital can take several decades. Also, communist and totalitarian countries tended to be more corrupt according to Transparency International data in 2004 (Hodess and Wolkers 2004). On the other hand, it is not

**CONTACT** Julie Novakova  [julie.novakova@natur.cuni.cz](mailto:julie.novakova@natur.cuni.cz)

Color versions of one or more of the figures in the article can be found online at [www.tandfonline.com/udbh](http://www.tandfonline.com/udbh).

 Supplemental data for this article can be access on the [publisher's website](#).

clear to what extent corruption norms relate to generalized dishonesty. Mann et al. have recently found that corruption levels are a good predictor of dishonesty predictions, but not the actual dishonest behavior (Mann, Garcia-Rada, and Hornuf et al. 2016).

Ariely et al. (2015) tested rates of cheating in a dice rolling task for people with East German or West German family background. They found increased levels of cheating in subjects of East German background. Similarly, Barr and Serra (2010) demonstrated that students from countries with high corruption levels (such as the post-communist block) studying in the UK were significantly more willing to bribe in an experimental corruption game, although this tendency had been mitigated by the time spent in the UK. Fisman and Miguel (2007) studied parking violation among world diplomats based in NYC and found that violating the rules and not paying off the parking tickets correlated strongly with the diplomat's home country corruption measures. The "antisocial" behavior shifted when the city implemented measures sanctioning unpaid parking tickets by removing the diplomatic license. Henrich, Boyd, and Bowles et al. (2001) showed in their renowned cross-cultural work that acceptance of selfish behavior differs vastly between countries. However, some studies, such as Pascual-Ezama, Fosgaard, and Cardenas et al. (2015) or Mann, Garcia-Rada, and Hornuf et al. (2016), do not show any significant difference in cheating in experimental games for participants from different countries.

Cheating appears not to be the only antisocial behavioral pattern associated with post-communist states. Antisocial punishment has also been shown to differ significantly across societies, with much higher abundance in less stable, high-corruption, low civic cooperation norms-possessing countries (Herrmann, Thöni, and Simon 2008). Punishment as a moderator of cooperation is especially noneffective in low-trust, often post-communist states such as Russia, Ukraine, or Belarus (Balliet and Van Lange 2013).

The Czech Republic has peacefully transitioned to democracy in November 1989 (by the so-called "Velvet Revolution") – roughly a year before East Germany. We wanted to explore whether the rates of cheating are comparable and also tested whether young people who did not experience the communist regime or experienced it only as preschool children still exhibit the low-trust, dishonest tendencies typical for communist and post-communist countries – as the family background characterization (not necessarily upbringing in East Germany) in Ariely et al. (2015) and several cultural transmission studies (Furtado, Marcén, and Sevilla 2013; Algan and Cahuc 2010; Giuliano 2007) would suggest. A model by Hauk and Saez-Marti (2002) shows the mechanics of cultural transmission of corruption, which suggests close dependence of corruption on education in family and expectations about ethics and policies in society (which depends greatly on the political climate in a country). According to Transparency International's survey (2016), the country now ranks 37th in the Corruption Perceptions Index (the higher the country ranks, the lower are the perceived corruption rates; for a comparison, Germany ranks 10th). In addition, antisocial punishment has been previously detected in Czech population (Kuběna, Houdek, and Lindová et al. 2014).

In the present study, we tested the following hypotheses: (1) Czech students cheat in a die rolling task more than West Germans, comparably to East Germans. (2) Students cheat less when their behavior is watched by assistants than when this possibility is ruled out. Anonymity had been previously shown to increase selfishness (for a review, see Camerer 2003:62–63). (3) Positive correlation exists between one's cheating and expectations on how much the others would cheat.

In the exploratory part of the study, we searched for factors that could influence the level of cheating, such as one's gender (Barfort et al. 2015; Friesen and Gangadharan 2012; Muehlheusser, Roider, and Wallmeier 2015; Mustaine and Tewksbury 2005; Tibbetts 1997), prosocial tendencies, cognitive and memory abilities (Ponti and Rodriguez-Lara 2015), future discounting, willingness to risk (Rigby, Burton, and Balcombe et al. 2015), and personality characteristics (McTernan, Love, and Rettinger 2014) measured by the Big Five system. This part of the work was conceived as an observational study for this investigation and also with respect to a separate study aimed at the conditions influencing cooperative behavior.

Studying rates of dishonest behavior and its predictors can have important policy implications and can tell us more about the patterns of cultural transmission and factors influencing cheating, essential in turn for “nudges” (influencing choice architecture) or other psychological–behavioral interventions (Houdek 2017b).

## **Sample and methods**

### ***Sample***

The study was conducted using a sample of 148 Czech students of a large Czech university located in the North Bohemia province. It is among the economically poorest regions of the Czech Republic with high unemployment rates.

The study was approved by the ethics committee of the University of J. E. Purkyne in Usti nad Labem. All participants have given their written informed consent.

The participants were invited to join the study through the university’s social networks and leaflets on the noticeboards. In total, 81 (54.7%) were female, 67 (45.3%) male. Their age ranged from 19 to 28 (mean 22, median 22). All participants behaved accordingly to the experimental protocol, and therefore none was excluded from the sample.

### ***Course of the experiment***

The experiment has been conducted in five sessions over two runs, in May and November 2014, respectively. The subjects were randomly assigned into sessions and groups and given individual numbers through which they would log into the experimental interface. Each time, there were 17–20 participants in one room, along with experimenters prepared to answer questions regarding the course of the experiment and to solve the potential problems, should any arise. In the experimental group in the room with large partitions between the computer stations, two experimenters sat in the front, unable to see the participants unless they had raised their hand. In the control group, the subjects sat by computer stations in an open space, watched by four experimenters for the whole time.

After having sat at the available computer stations and read the experimental instructions (listed in the Supplementary Material in an English translation from the Czech original), the subjects were asked if they understood everything before commencing the experiment. They first played five experimental games for the assessment of their social preferences, and then participated in a die rolling experiment in which they had the opportunity to cheat, a questionnaire focused on their health and personal characteristics, especially related to altruistic, cooperative, and fair-perceived behavior, a hypothetical task of future discounting, and a risk-taking experiment for their rewards. All of the experimental instructions can be found in the Supplementary Material. Due to the size of the sample, the sequence of the tasks had not been randomized, but previous studies such as Blanco, Engelmann, and Normann (2011) suggest that it does not play a marked role in the subjects’ decisions.

At the end of the experiment, the subjects received their earnings from the experimental games, die rolling and risk-taking parts of the experiment. The sum was distributed in total; it was therefore impossible to tell how much they had earned in which respective part of the study.

They were also asked to fill in a post-experimental questionnaire (asking whether they had any ideas or complaints for the experimenters consider, what they thought had been the purpose of the experimental tasks, and finally, if and how much the other participants had cheated according to them, as Innes and Mitra (2009) had shown that expectations about others’ behavior can influence one’s own decisions).

## Methods

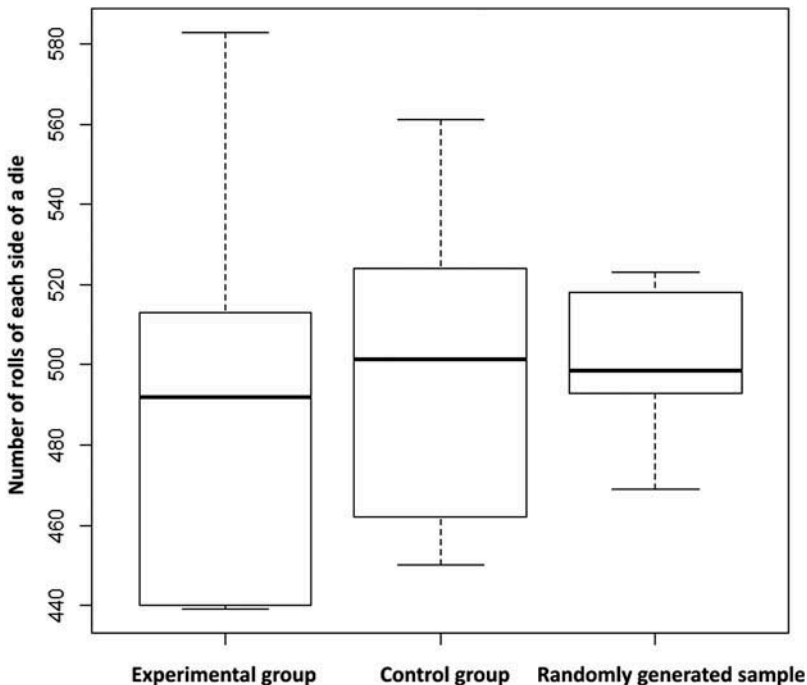
Dice rolling has been used to measure the propensity to cheat, for example, in Ariely et al. (2015), Fischbacher & Föllmi-Heusi (2013), Hanna and Wang (2013), and Ruffle & Tobol (2015). In our experiments, the subjects were asked to roll a fair hexagonal die 40 times and record each number of points. The subjects could cheat by writing down a different (higher) number than they had actually rolled in each of the 40 die rolls (with expected mean of  $3.5 = (1 + 2 + 3 + 4 + 5 + 6)/6$ ). Their reward depended on the overall outcome of the die rolling. For each point, participants got five tokens, representing 0.5 CZK, that is, they could earn roughly  $3.5 \times 40 \times 0.5 = 70$  CZK  $\approx 3$  USD in this task.

In the control group, they could potentially see each other's numbers as the computers by which they sat were stationed by octagonal tables. Moreover, four experimenters were thoroughly observing the room.

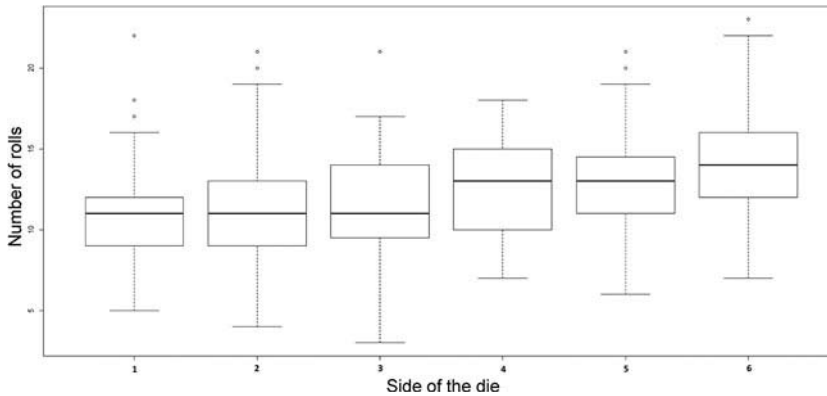
Participants in the experimental group sat by computer stations divided by partitions high and wide enough to give the subjects complete privacy. The two present experimenters could not see anyone's work stations and were only present to greet the subjects, explain the instructions, and remain there in case of any questions or technical problems.

Photos of mock control group and mock experimental group sessions are included in the Supplementary Material (Images 1 and 2).

All subjects recorded the points scored in each roll in a computer interface, through which they also played the games and answered the questionnaire. Each had received a randomly allocated number through which they could log in into the interface. We also measured the response time for each roll.



**Figure 1.** The variances in the number of rolls of each side of a die between the control group, experimental group, and a randomly generated sample of the same size. In the randomly generated sample, each side was rolled approximately the same number of times, whereas in both groups of subjects the number of rolls of a different number of points differed more. The rectangles show the first to third quantile, with the line inside indicating the median, and the whiskers show minimum and maximum.



**Figure 2.** The number of rolls (in a given round and group) for each side of the die. The rectangles show the first to third quartile, with the line inside indicating the median, the whiskers show the inner fence, and the empty circles indicate suspected outliers.

A battery of tests consisting of experimental games [Dictator Game (Forsythe et al. 1994), Ultimatum Game (Güth, Schmittberger, and Schwarze 1982), Trust Game (Berg, Dickhaut, and Kevin 1995), Three-Player Ultimatum Game (analogous to Knez and Camerer (1995), Güth & van Damme (1998), and Kagel and Wolfe (2001)) and Reversed Dictator Game (analogous to the “taking games” in Cox, Sadiraj, and Sadiraj (2002), Bardsley (2005), and List (2007))] was used to assess the subjects’ social preferences. The games’ instructions can be seen in the Supplementary Material. Each of the games was played with 400 tokens at stake, representing 40 CZK. The subjects were paired fully anonymously and each time randomly with a different player.

Meili’s picture memory test was used for testing the subjects’ short-term memory. The classic Cognitive Reflection Test with one added question (“In the finish of a race, you outrun the second runner. In which place do you finish?”) was used for assessing the subjects’ cognitive abilities as these were shown to be closely linked to honesty in a task similar to ours (Ruffle and Tobol 2016), although another similar study by Hanna and Wang (2013) did not find any connection of abilities and (dis)honest behavior.

The questionnaire included hypothetical temporal discounting tasks, mini-Big Five psychological questionnaire [characteristics from wherein, namely agreeableness and neuroticism, were found to be negatively connected by cheating in (Hanna and Wang 2013)], and questions regarding one’s prosocial/antisocial behavioral patterns and socioeconomic status. In the risk-taking experiment, the subjects were asked to either earn nothing above their reward so far or earn additional 40 CZK with a 50% probability or lose an amount climbing from 4 to 80 CZK with an equal probability. A willingness to take risks can be connected to dishonesty, as Rigby, Burton, and Balcombe et al. (2015) had shown. The participants received monetary compensation based on the above-mentioned tasks.

The statistical analysis was conducted using the open-source R software ([www.r-project.org](http://www.r-project.org)) and IBM SPSS Statistics 20 (IBM Corporation, New York, USA) (for the mixed linear model).

## Results

### *Rates of cheating*

A one-sided Wilcoxon test (chosen because of the non-normal distribution of the data) showed no difference in mean points scored by the experimental and control group ( $W = 2856.5$ ,  $p = .273$ ). The Cohen’s  $D$  effect size was small, with a value of 0.14. The control group rolled on average 3.62 points in each roll, whereas the experimental group rolled 3.66 on average.

When compared to a same-size randomly generated sample of the same number of rolls with equal probabilities of each number of points, the frequencies of rolls of different sides of a die differed significantly ( $\chi^2 = 18.41$ ,  $df = 10$ ,  $p = .048$ ), suggesting the presence of some cheating. However, they did not differ significantly between the experimental and control group ( $\chi^2 = 3.96$ ,  $df = 5$ ,  $p = .556$ ).

The frequencies of rolls of each side of the die differed significantly (Kruskal–Wallis  $\chi^2 = 50.82$ ,  $df = 5$ ,  $p < .0001$ ). **Figure 1** illustrates the frequencies of rolling the respective sides of a die.

The possibility of an autocorrelation between rounds and trends during the course of the experiment, signifying a possible gradual development of cheating behavior, was tested by dividing the set in quarters and testing if they differ in the points scored by the subjects. An analysis of variance model (usable due to the lack of notable differences in the distribution of the parts of the data) showed no significant difference in points scored between the phases of the experiment ( $df = 3$ ,  $\text{sum}^2 = 114$ ,  $\text{mean}^2 = 37.9$ ,  $F = 0.06$ ,  $p = .981$ ). When the round of the experiment was filtered out, the effect of the points on each side of the die on the reported frequencies of their rolls remained very strong ( $p < .0001$ ), indicating that the rate of cheating did not evolve in time.

We also investigated the possibility of a correlation between the time taken for each roll and typing the number of points into the interface, and the reported number of points. No overall trend was observed. The two-sided Spearman correlation was significant for rolls 10 ( $p = .036$ ,  $\rho = 0.17$ ), 11 ( $p = .040$ ,  $\rho = 0.17$ ), 12 ( $p = .004$ ,  $\rho = 0.24$ ), 19 ( $p = .015$ ,  $\rho = 0.20$ ), and 21 ( $p = .003$ ,  $\rho = 0.24$ ); however, in only 5 rolls out of 40 it can be attributable to accident and shows no relationship of the self-reported number of points and the time the respective roll of the die took.

### Factors tested for influencing cheating

We had let the subjects play several experimental games, complete an extended Cognitive Reflection Test, and fill in a short questionnaire including questions about their family income level, mini-Big Five psychological questionnaire, and hypothetical financial decisions for assessing their temporal discounting and real reward gamble for assessing their risk preferences (**Table 1**).

In a mixed linear model, subjects' group, gender, cognitive reflection, temporal discounting, family income, Big Five personality traits (openness to experience, conscientiousness, extraversion,

**Table 1.** Mixed linear model including the subjects' group, gender, cognitive reflection, temporal discounting, family income, Big Five personality traits, risk-taking, and behavior in the experimental games, with the total number of rolled points as the dependent variable.

Source	Numerator <i>df</i>	<i>F</i>	Significance
Intercept	1	494.228	.000
Cognitive reflection	4	0.931	.445
Experimental/control group	1	0.082	.775
Gender	1	2.131	.144
Family income level	4	1.661	.156
Given in Dictator Game	1	0.000	.993
Taken in Reversed DG	1	1.435	.231
Sent in Ultimatum Game	1	3.052	.081
Sent in three-player UG	1	1.444	.230
Sent in Trust Game	1	0.261	.610
Returned in Trust Game	1	0.278	.598
Big Five 1	1	0.463	.496
Big Five 2	1	0.545	.460
Big Five 3	1	0.113	.737
Big Five 4	1	0.671	.413
Big Five 5	1	0.185	.667
Meili memory results	1	0.633	.426
Risk-taking results	1	0.467	.494
Temporal discounting	1	0.062	.804

No significant effects of the tested variables were shown by the data.

agreeableness, and neuroticism), risk-taking results, and behavior in the experimental games did not have any significant effect on the points scored by a subject. However, that is not surprising given the low overall amount of cheating (Figure 2).

### External validity test

We tested the external validity of die rolling results as an indicator of dishonesty across several dishonesty-related questions in the questionnaire: (1) If a shopkeeper gave you back more money than supposed to, would you remind him/her? (2) Do you ever purchase bus or train tickets for a shorter distance than you really travel? (3) A friend had lent you money but forgot about it. Do you remind him/her? (4) Do you use cheat sheets or copy answers during school exams? (5) If you found a wallet with approximately 2000 CZK inside, would you hand it in to the police or take the money and toss away the wallet? (6) You see a thief in a shop. Do you report him/her? (7) Do you lie in questionnaires like this one?

Several of the questions were yes–no, several multiple response. To obtain a measure of a participant's overall tendency to cheat, we standardized them to binary variables where 0 always meant dishonest behavior and 1 honest. The values were then added into one aggregate variable signifying the overall obtained measure of dishonesty. The higher value (possible range from 0 to 7), the higher honest behavior, and vice versa. The average “honesty value” was 4.82, the median value was 5.

A one-sided Spearman correlation with the value of rolled points found no significant correlation between those two possible measures of dishonest behavior ( $p = .343$ ,  $\rho = -0.034$ ).

### Post-experimental questionnaire assessment

In the post-experimental questionnaire, the participants have been asked the following questions regarding the die rolling task: What do you think was the purpose of the die rolling experiment? On the other side of the paper: Do you think that the other participants cheated in the die rolling experiment? If you think that they did, how many points “extra” would you think they added (answers available in deciles)?

Forty-seven percent participants guessed the purpose of the task. 50.3% of participants thought that others had cheated, whereas 49.7% did not think so. A one-sided Wilcoxon test of the amount won in the die rolling (assuming those who considered others cheating would themselves cheat more, as previous studies had shown) showed a marginal effect ( $t = 1.373$ ,  $df = 141.789$ ,  $p = .086$ ) of a small size (Cohen's  $D = 0.23$ ). The who reported “yes” had rolled 146.96 points on average, whereas those answering “no” had rolled 144.24 points.

Only half of the subjects answered the additional question (logically, as it was intended only for those who answered “yes” in the previous one). On average, they expected others to add 21–30% points to their values. The Kruskal–Wallis rank-sum test showed no significant differences between the number of points rolled by each of the selected deciles ( $\chi^2 = 7.454$ ,  $df = 9$ ,  $p = .59$ ).

### Discussion

Even though the subjects had ample opportunity to cheat, we found cheating to be decidedly low in overall and there was no significant difference between the control and experimental group. The comparison with randomly generated sequences suggests that some cheating had occurred, but the difference between both groups was negligible. The results were surprising for students had been previously found to exhibit greater readiness to cheat (Mann, Garcia-Rada, and Hornuf et al. 2016; Rigby, Burton, and Balcombe et al. 2015), as had post-communist countries' populations (Ariely et al. 2015; Hrabak, Vujaklija, and Vodopivec et al. 2004). Young people were also more dishonest in Gabor and Barker's (1989) field “lost letter” experiment.

Especially contrary to a methodologically similar (albeit not identical) approach in Ariely et al. (2015), we have found very low levels of cheating in a die rolling task in a population of post-communist country citizens. The difference in the number of rolls of each side of the die and the significant difference between the actual data and a randomly generated non-biased sample suggests that the subjects had in fact cheated and reported higher numbers of points more often. Nevertheless, the overall rates of cheating had been low and did not differ significantly between the experimental and control group. In Ariely et al.'s (2015) experiment, East Germans rolled 3.83 points on average and West Germans 3.68 points, whereas in our study, the experimental group rolled 3.66 and the control group 3.62 points – both outgroups therefore seemed to cheat even less than the West Germans in Ariely et al. (2015). Their design allowed for cheating in two dimensions (the side of die and the number of dots), which may explain a part of the difference; however, we consider the approach used in our study to be more robust and likely to show basic prevalence of cheating propensity.

The time it took to report the number of points, and the rolled number itself showed no overall relationship. None of the tested predictors of cheating had a significant effect on the number of scored points. However, as the levels of cheating remained very low and the sample was not very large, this is not surprising. Most subjects seemed to cheat very little if at all. The middle half of the subjects scored between 137.5 and 152.5 points. Compared to the expected score of 140, it suggests existent but low levels of cheating across the sample. For the experimental group, the 25% quantile was at 138 and the 75% quantile at 153; for the control group, these were 137 and 150.5, respectively. Consistently with the findings of Innes and Mitra (2009), those who had expected others to behave dishonestly also showed a higher proportion of cheating, although the effect was only marginal (nonsignificant). The external validity test does not show any correlation with the die rolling results, but it is impossible to make a conclusion upon it with certainty using our sample with very low levels of cheating.

We consider it fruitful to study more populations of post-communist countries in near future as it could shed more light on the differences between the regime's impact on people's values and ethical behavior in the respective countries. Germany, studied by Ariely et al. (2015), had been divided after WWII, strongly traumatized by the war past and division, symbolized most blatantly by the Berlin Wall. However, that remains just a pure speculation, and the Czech Republic has its own historic traumas including the Soviet intervention in 1968 and the subsequent "normalization" era in the 1970s (Sobell 1987). Nevertheless, studying the post-communist block's populations by this simple die rolling task could be helpful in painting a more tangible picture of (dis)honesty and (mis)trust in countries that had suffered under the communist regime and often possess problems related to criminality, corruption, weak institutions, and low generalized trust nowadays. These issues are closely interlinked (Bjørnskov 2007). Studying a greater number of countries would help us assess the extent of the effects of communist past and the effects of the ways of transition to democracy and capitalism. In addition, studying their moral foundations [such as in Silver and Abell (2016)] may provide greater insight into the involved processes. Finally, using a wider range of possible payoffs may help us distinguish groups such as "corruptible individuals," "small sinners," or "brazen liars," and thus paint a more detailed picture of the triggers of dishonest behavior under different social conditions (Hilbig and Thielmann 2017).

The potential limitations of this study include using a student sample, which may not reflect the full variability of behavior in the population (Henrich, Heine, and Norenzayan 2010), and furthermore consists of younger people with little or no direct experience with the previous communist regime. On the other hand, we specifically wanted to explore whether the effects of living in a post-communist country would affect young people's levels of cheating and found it to have no notable impact. Potentially, the participants could also perceive experimenter's demand not to cheat despite the lure [as summarized in Zizzo (2010)]. That, however, does not explain the difference from samples in other similar studies where cheating had been more prevalent (Ariely et al. 2015; Fischbacher & Föllmi-Heusi 2013; Hanna and Wang 2013; Ruffle and Tobol 2016). Moreover, the



post-experimental questionnaire indicates that about half of the subjects expected cheating to be present and leading to about 21–30% extra points. That is striking in contrast with the actual results.

Finally, it could be possible that the expected reward in dice rolling task of roughly 70 CZK was not appealing enough to elicit cheating (which could have led to max. 120 CZK). The value of incentives may influence one's behavior in cooperation or honesty-related tasks (Novakova and Flegr 2013). On the other hand, that is, Mazar, Amir, and Ariely (2008) reported that people are generally more prone to engage in dishonest activities if the stakes are low as it does not impede their positive view of self. It is also possible that different tasks than dice rolling, despite its wide successful use, could be more suitable for studying subtle variations in dishonest behavior. More studies of varying designs focusing on (not exclusively) post-communist countries would also bring light onto this question.

Due to the low power of the study and low cheating rates, we were unable to determine factors mediating the tendency to cheat; therefore, our results of their null influence are not fully conclusive and potential mediators of cheating would require a follow-up study with a larger subject sample.

Despite the possible criticism of an “artificial” experimental approach, such studies are relevant for real-world dishonesty assessment, as experimentally tested mediators of cheating had been shown earlier to have a practical impact on dishonest behavior (Hanna and Wang 2013; Ruffle and Tobol 2016). Falk and Heckman (2009) discussed the contribution of laboratory experiments in social sciences and stress the importance of controlled variation in lab, known degrees of conditions, the ability to answer very specific questions, allow replicability, and provide insights relevant also outside the lab. That of course extends to dice rolling experiments too, which had been used for answering a whole spectrum of questions ranging from tendencies of cheaters to enter public service (Hanna and Wang 2013) to comparisons of entrance scores of soldiers and their propensity to cheat (Ruffle and Tobol 2016). However, like in all experiments, it's important to have a well-defined methodology, for experimental work is very sensitive to setting up the initial conditions for answering the right questions. In some experiments, it's hard to say whether the control group really is a good control and not just a different experimental group (see Cohn, Fehr, and Maréchal (2014), and Vranka and Houdek (2015)).

Dishonesty-related laboratory experiments bear a great importance for policy. The cultural transmission of corruption combined with a self-selection of dishonest individuals into public service in high-corruption countries paints a rather gloomy picture of future prospects of developing and post-communist countries. Nevertheless, the studies also show that policies matter, and moreover, in low-corruption countries, dishonest people tend *not* to go into the state sector (Barfort et al. 2015).

## Conclusion

Although some previous studies had shown increased rates of various dishonest and cheating behavior in post-communist countries, our results suggest that the situation is not as simple as that. We found very low levels of cheating in the sample of Czech students. We also did not detect any significant difference between cheating in the control and experimental group (playing separately from others in their boxes and therefore having higher incentives to cheat). Nor did we find any stable significant effect of supposed explanatory variables such as gender, cognitive reflection, temporal discounting, risking, and prosocial behavior in experimental games. We consider it useful to obtain experimental data for populations of more post-communist countries, leading to the possibility of a meta-study in the ideal case, to help uncover the effects of a country's recent political past on the (dis)honesty social norms prevalent in its population.

## Acknowledgment

We thank Ludmila Nesporova and Nikola Novakova for their help with inviting participants and overseeing the experiments.

## Notes on contributors

**JULIE NOVAKOVA** is a PhD candidate of Theoretical and Evolutionary Biology at Faculty of Science, Charles University in Prague, Czech Republic. She has also collaborated with the J. E. Purkyně University and CEBEX. In addition, she works as a writer and translator.

**PETR HOUDEK** is an assistant professor at University of Economics in Prague, Czech Republic, and at J. E. Purkyně University, Ústí nad Labem, Czech Republic. He is also a PhD candidate of Theoretical and Evolutionary Biology at Charles University in Prague. Petr serves as a research director at Center for Behavioral Experiments (CEBEX), a Prague-based nonprofit think-tank. His primary research interests include behavioral economics, social psychology, and management sciences.

**JAN JOLIČ** is a data analyst in the banking industry and a programmer. He collaborated with the J. E. Purkyně University in Ústí nad Labem, Czech Republic, and CEBEX.

**JAROSLAV FLEGR** is a full professor at Faculty of Science, Charles University in Prague, Czech Republic, and a researcher at the National Institute for Mental Health, Klecany, Czech Republic. His primary research interests are evolutionary biology, parasitology, and evolutionary psychology.

## References

- Algan, Yann and Pierre Cahuc. 2010. "Inherited Trust and Growth." *The American Economic Review* 100(5):2060–92. doi:10.1257/aer.100.5.2060
- Ariely, Dan, Ximena Garcia-Rada, Lars Hornuf, and Heather Mann. 2015. "The (True) Legacy of Two Really Existing Economic Systems." Munich Discussion Paper. Retrieved <https://ssrn.com/abstract=2457000> or <http://dx.doi.org/10.2139/ssrn.2457000>
- Balliet, Daniel and Paul AM Van Lange. 2013. "Trust, Punishment, and Cooperation across 18 Societies A Meta-Analysis." *Perspectives on Psychological Science* 8(4):363–79. doi:10.1177/1745691613488533
- Bardsley, Nicholas. 2005. "Altruism or Artefact? A Note on Dictator Game Giving." Working paper no. 2005-10.
- Barfort, Sebastian, Nikolaj A. Harmon, Frederik G. Hjorth, and Asmus Leth Olsen. 2015. "Dishonesty and Selection into Public Service in Denmark: Who Runs the World's Least Corrupt Public Sector?" Discussion paper no. 15-12. Retrieved <https://ssrn.com/abstract=2664983> or <http://dx.doi.org/10.2139/ssrn.2664983>
- Barr, Abigail and Danila Serra. 2010. "Corruption and Culture: An Experimental Analysis." *Journal of Public Economics* 94(11):862–69. doi:10.1016/j.jpubeco.2010.07.006
- Berg, Joyce, John Dickhaut, and McCabe, Kevin. 1995. "Trust, Reciprocity, and Social History." *Games and Economic Behavior* 10(1):122–42. doi:10.1006/game.1995.1027
- Bjørnskov, Christian. 2007. "Determinants of Generalized Trust: A Cross-Country Comparison." *Public Choice* 130(1–2):1–21. doi:10.1007/s11127-006-9069-1
- Blanco, Mariana, Dirk Engelmann, and Hans Theo Normann. 2011. "A Within-Subject Analysis of Other-Regarding Preferences." *Games and Economic Behavior* 72(2):321–38. doi:10.1016/j.geb.2010.09.008
- Camerer, Colin. 2003. *Behavioral Game Theory: Experiments in Strategic Interaction*. Princeton, NJ: Princeton University Press.
- Chudzicka-Czupała, Agata, Damian Grabowski, Abby L. Mello, Joana Kuntz, Daniela Victoria Zaharia, Nadiya Hapon, Anna Lupina-Wegener and Deniz Börü. 2016. "Application of the Theory of Planned Behavior in Academic Cheating Research—Cross-Cultural Comparison." *Ethics & Behavior* 26(8):638–59. doi:10.1080/10508422.2015.1112745
- Cohn, Alain, Ernst Fehr, and Michel André Maréchal. 2014. "Business Culture and Dishonesty in the Banking Industry." *Nature* 516(7529):86–89.
- Cox, James C., Klarita Sadiraj, and Vjollca Sadiraj. 2002. "Trust, Fear, Reciprocity, and Altruism." University of Arizona working paper, Unknown publisher.
- Crittenden, Victoria L., Richard C. Hanna, and Robert A. Peterson. 2009. "The Cheating Culture: A Global Societal Phenomenon." *Business Horizons* 52(4):337–46. doi:10.1016/j.bushor.2009.02.004
- Falk, Armin and James J. Heckman. 2009. "Lab Experiments are a Major Source of Knowledge in the Social Sciences." *Science* 326(5952):535–38. doi:10.1126/science.1168244

- Fischbacher, Urs and Franziska Föllmi-Heusi. 2013. "Lies in Disguise: An Experimental Study on Cheating." *Journal of the European Economic Association* 11(3):525–47. doi:10.1111/jeea.12014
- Fisman, Raymond and Edward Miguel. 2007. "Corruption, Norms, and Legal Enforcement: Evidence from Diplomatic Parking Tickets." *Journal of Political Economy* 115(6):1020–48. doi:10.1086/527495
- Forsythe, Robert, Joel L. Horowitz, N. Eugene Savin, and Martin Sefton. 1994. "Fairness in Simple Bargaining Experiments." *Games and Economic Behavior* 6(3):347–69. doi:10.1006/game.1994.1021
- Friesen, Lana and Lata Gangadharan. 2012. "Individual Level Evidence of Dishonesty and the Gender Effect." *Economics Letters* 117(3):624–26. doi:10.1016/j.econlet.2012.08.005
- Furtado, Delia, Miriam Marcén, and Almudena Sevilla. 2013. "Does Culture Affect Divorce? Evidence from European Immigrants in the United States." *Demography* 50(3):1013–38. doi:10.1007/s13524-012-0180-2
- Gabor, Thomas and Tonia Barker. 1989. "Probing the Public's Honesty: A Field Experiment Using the "Lost Letter" Technique." *Deviant Behavior* 10(4):387–99. doi:10.1080/01639625.1989.9967824
- Giuliano, Paola. 2007. "Living Arrangements in Western Europe: Does Cultural Origin Matter?" *Journal of the European Economic Association* 5(5):927–52. doi:10.1162/JEEA.2007.5.5.927
- Güth, Werner and Van Damme. Eric. 1998. "Information, Strategic Behavior, and Fairness in Ultimatum Bargaining: An Experimental Study." *Journal of Mathematical Psychology* 42(2–3):227–47. doi:10.1006/jmps.1998.1212
- Güth, Werner, Rolf Schmittberger, and Bernd Schwarze. 1982. "An Experimental Analysis of Ultimatum Bargaining." *Journal of Economic Behavior & Organization* 3(4):367–88. doi:10.1016/0167-2681(82)90011-7
- Hanna, Rema and Shing-Yi Wang. 2017. "Dishonesty and Selection into Public Service: Evidence from India." *American Economic Journal: Economic Policy*. 9(3):262–90. doi:10.1257/pol.20150029
- Hauk, Esther and Maria Saez-Marti. 2002. "On the Cultural Transmission of Corruption." *Journal of Economic Theory* 107(2):311–35. doi:10.1006/jeth.2001.2956
- Henrich, Joseph, Robert Boyd, Samuel Bowles, Samuel Camerer, Colin Fehr, Ernst Fehr, Herbert Gintis and Richard McElreath. 2001. "In Search of Homo Economicus: Behavioral Experiments in 15 Small-Scale Societies." *The American Economic Review* 91(2):73–78. doi:10.1257/aer.91.2.73
- Henrich, Joseph, Stephen J. Heine, and Ara Norenzayan. 2010. "The Weirdest People in the World?" *Behavioral and Brain Sciences* 33(2–3):61–83. doi:10.1017/S0140525X0999152X
- Herrmann, Benedikt, Christian Thöni, and Gächter. Simon. 2008. "Antisocial Punishment Across Societies." *Science* 319(5868):1362–67. doi:10.1126/science.1153808
- Hilbig, Benjamin E. and Isabel Thielmann. 2017. "Does Everyone Have a Price? On the Role of Payoff Magnitude for Ethical Decision Making." *Cognition* 163:15–25. doi:10.1016/j.cognition.2017.02.011
- Hjöllund, Lene, Martin Paldam, and Gert Tinggaard Svendsen. 2001. "Social Capital in Russia and Denmark: A Comparative Study." Department of Economics, Faculty of Business Administration, Aarhus School of Business; working paper.
- Hodess, Robin and Marie Wolkers. 2004. *Report of the Transparency International Global Corruption Barometer 2004*. Berlin: TI 9.
- Houdek, Petr. 2017a. "Professional Identity and Dishonest Behavior." *Society* 54(3):253–60. doi:10.1007/s12115-017-0132-y
- Houdek, Petr. 2017b. "Is Behavioral Ethics Ready for Giving Business and Policy Advice?" *Journal of Management Inquiry* 1–9. doi:10.1177/1056492617712894
- Hrabak, Maja, Ana Vujaklija, Ivana Vodopivec, Darko Hren, Matko Marušić and Ana Marušić. 2004. "Academic Misconduct among Medical Students in a Post-Communist Country." *Medical Education* 38(3):276–85. doi:10.1111/j.1365-2923.2004.01766.x
- Innes, Robert and Arnab Mitra. 2009. "Is Dishonesty Contagious? An Experiment." Working paper, available at SSRN. <https://ssrn.com/abstract=1426002> or <http://dx.doi.org/10.2139/ssrn.1426002>
- International, Transparency. "Corruption Perceptions Index 2015." Retrieved November 12, 2016 (<https://www.transparency.org/cpi2015/>).
- Kagel, John H. and Katherine Willey Wolfe. 2001. "Tests of Fairness Models Based on Equity Considerations in a Three-Person Ultimatum Game." *Experimental Economics* 4(3):203–19. doi:10.1023/A:1013290819565
- Knez, Marc J. and Colin F. Camerer. 1995. "Outside Options and Social Comparison in Three-Player Ultimatum Game Experiments." *Games and Economic Behavior* 10(1):65–94. doi:10.1006/game.1995.1025
- Kuběna, Aleš Antonín, Petr Houdek, Jitka Lindová; et al. 2014. "Justine Effect: Punishment of the Unduly Self-Sacrificing Cooperative Individuals." *PLoS One* 9(3):e92336. doi:10.1371/journal.pone.0092336
- Lanza-Kaduce, Lonn and Mary Klug. 1986. "Learning to Cheat: The Interaction of Moral-Development and Social Learning Theories." *Deviant Behavior* 7(3):243–59. doi:10.1080/01639625.1986.9967710
- List, John A. 2007. "On the Interpretation of Giving in Dictator Games." *Journal of Political Economy* 115(3):482–93. doi:10.1086/519249
- Mann, Heather, Ximena Garcia-Rada, Lars Hornuf, Juan Tafurt and Dan Ariely. 2016. "Cut from the Same Cloth: Similarly Dishonest Individuals across Countries." *Journal of Cross-Cultural Psychology* 47(6):858–74. doi:10.1177/0022022116648211

- Mazar, Nina, On Amir, and Dan Ariely. 2008. "The Dishonesty of Honest People: A Theory of Self-Concept Maintenance." *Journal of Marketing Research* 45(6):633–44. doi:10.1509/jmkr.45.6.633
- McTernan, Melissa, Patrick Love, and David Rettinger. 2014. "The Influence of Personality on the Decision to Cheat." *Ethics & Behavior* 24(1):53–72. doi:10.1080/10508422.2013.819783
- Muehlheusser, Gerd, Andreas Roeder, and Niklas Wallmeier. 2015. "Gender Differences in Honesty: Groups versus Individuals." *Economics Letters* 128:25–29. doi:10.1016/j.econlet.2014.12.019
- Mustaine, Elizabeth Ehrhardt and Richard Tewksbury. 2005. "Southern College Students' Cheating Behaviors: An Examination of Problem Behavior Correlates." *Deviant Behavior* 26(5):439–61. doi:10.1080/016396290950659
- Novakova, Julie and Jaroslav Flegr. 2013. "How Much Is Our Fairness Worth? The Effect of Raising Stakes on Offers by Proposers and Minimum Acceptable Offers in Dictator and Ultimatum Games." *PloS One* 8(4):e60966. doi:10.1371/journal.pone.0060966
- Pascual-Ezama, David, Toke R.Fosgaard, Juan Camilo Cardenas, Praveen Kujal, Robert Veszteg, Beatriz Gil-Gómez de Liaño, Brian Gunia, et al. 2015. "Context-Dependent Cheating: Experimental Evidence from 16 Countries." *Journal of Economic Behavior & Organization* 116:379–86. doi:10.1016/j.jebo.2015.04.020
- Ponti, Giovanni and Ismael Rodriguez-Lara. 2015. "Social Preferences and Cognitive Reflection: Evidence from a Dictator Game Experiment." *Frontiers in Behavioral Neuroscience* 9:146. doi:10.3389/fnbeh.2015.00146
- Rigby, Dan, Michael Burton, Kelvin Balcombe Ian Bateman and Abay Mulatu 2015. "Contract Cheating & the Market in Essays." *Journal of Economic Behavior & Organization* 111:23–37. doi:10.1016/j.jebo.2014.12.019
- Ruffle, Bradley J. and Yossef Tobol. 2017. "Clever Enough to Tell the Truth." *Experimental Economics* 20(1):130–55. doi:10.1007/s10683-016-9479-y
- Silver, Eric and Leslie Abell. 2016. "Beyond Harm and Fairness: A Study of Deviance and Morality." *Deviant Behavior* 37(5):496–508. doi:10.1080/01639625.2015.1060746
- Sobell, Vlad. 1987. "Czechoslovakia: The Legacy of Normalization." *East European Politics & Societies* 2(1):35–68. doi:10.1177/0888325488002001002
- Tibbetts, Stephen G. 1997. "Gender Differences in Students' Rational Decisions to Cheat." *Deviant Behavior* 18(4):393–414. doi:10.1080/01639625.1997.9968068
- Vranka, Marek A. and Petr Houdek. 2015. "Many Faces of Bankers' Identity: How (Not) to Study Dishonesty." *Frontiers in Psychology* 6:302. doi:10.3389/fpsyg.2015.00302
- Zizzo, Daniel John. 2010. "Experimenter Demand Effects in Economic Experiments." *Experimental Economics* 13(1):75–98. doi:10.1007/s10683-009-9230-z