Tolerance of Cheating: An Analysis Across Countries

Jan R. Magnus, Victor M. Polterovich, Dmitri L. Danilov, and Alexei V. Savvateev

Abstract: Cheating is a serious problem in many countries. The cheater gets higher marks than deserved, thus reducing the efficiency of a country's educational system. In this study, the authors did not ask if and how often the student had cheated, but rather what the student's opinion was about a cheating situation. They investigated whether attitudes differ among students in Russia, the Netherlands, Israel, and the United States and conclude that attitudes toward cheating differ considerably between these countries. They offer various explanations of this phenomenon. In addition, they find that the student's attitude toward cheating depends on the student's educational level (high school, undergraduate, postgraduate). Finally, they show that the data from the sample can be aggregated in a natural and elegant way, and they suggest a tolerance-of-cheating index for each country.

Key words: cheating, international, students, tolerance
JEL codes: A13, A20, K42

Cheating is a serious problem in many countries. The cheater is a free rider and therefore gets higher marks than he or she deserves. The efficiency of the country's educational system is reduced, because cheating distorts competition, diminishes the student's incentive to study, and leads to inaccurate evaluation of the student's abilities. More information about the phenomenon of cheating is needed, if only to design appropriate deterrence mechanisms.

Several previous authors have studied the frequency and reasons for cheating. Bunn, Caudill, and Gropper (1992) interviewed U.S. economics undergraduates and concluded that many students cheat, that the brighter the student, the less likely it is that he or she has cheated, and that there is a higher probability attached to having cheated once if the student believes others to be cheating.

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Whereas Bunn et al. covered only the cheating-once case, Mixon (1996) was interested in habitual cheating. His main conclusion was that the determinants of habitual cheating are much the same as those that relate to having cheated once. Both Bunn, Caudill, and Gropper (1992) and Mixon (1996) stressed the analogy between cheating and crime (especially theft).

Kerkvliet (1994), also using U.S. data, concluded that about one-third of students had cheated on at least one occasion. Nowell and Laufer (1997) found that nontenure track faculty, large classes, poor performance in the class, and being employed all lead to more cheating. Kadane (1999) assessed whether data over 11 examinations supported an accusation of copying multiple-choice answers. Finally, Kerkvliet and Sigmund (1999) explored the determinants of source-specific cheating behavior, including student characteristics and deterrent measures. They concluded that large alcohol consumption and low grade point average (GPA) increase the probability of cheating. Interestingly, they found that the further along a student was in his or her academic career, the more likely he or she was to cheat. The most striking result was the difference in student cheating between students who were taught by teaching assistants and those taught by faculty; students taught by teaching assistants were 32 percent more likely to cheat than students taught by faculty.

Our study was different from those cited in several respects. We did not ask if and how often the student had cheated but rather what the student's opinion was about a cheating situation. Thus, we tried to analyze the student's attitude toward cheating. All previous studies—with the exception of Davis, Noble, Zak, and Dreyer (1994)—have been devoted to only one country. In contrast, we attempted to compare attitudes across countries. The results of our survey and subsequent statistical analysis for the United States, the Netherlands, Israel, and Russia showed that attitudes toward cheating differed considerably across those countries. We offer three possible explanations of this phenomenon: cultural factors, design of the educational system, and the possible occurrence of multiple equilibria.

In addition, we found that the student's attitude toward cheating depended on the student's educational level (high school, undergraduate, postgraduate). Finally, we show that the data from the sample can be aggregated in a natural and elegant way, and we suggest a tolerance-of-cheating index for each country.

EXPERIMENTAL DESIGN AND SUMMARY OF THE DATA

In 1997, we conducted a small survey in four countries at three different levels of education. Our design was very simple. We asked each respondent to consider the following situation: Student *C* reports to the departmental office that student *A*, while taking an exam, copied answers from student *B*'s paper with the consent of student *B*. The questionnaire then asked the respondent to characterize his or her attitude toward each of *A*, *B*, and *C* on a 5-point scale: *strongly negative* (–2), *negative* (–1), *neutral* (0), *positive* (+1), or *strongly positive* (+2). Thus, each respondent in our sample provided three answers. Of course, all answers were anonymous. Because the questions were simple and quick to answer, the response rate was close to 100 percent.

Our sample contained 885 students from four countries: 92 high school students, 554 university undergraduates (mostly from economics departments), and 239 economics postgraduates. The majority of the interviewed students was from Russia, 322 from Moscow, and 184 from provincial Russia (Ekaterinburg, Pervouralsk, Voronezh, and Novosibirsk). In the United States, we interviewed 112 students, in the Netherlands, 247. We also had a small sample from Israel consisting of one class of 20 undergraduates.

We kept the students from Moscow and provincial Russia separate because there was no *a priori* reason to believe that the behavior in the capital and the province would be the same. For the purposes of our study, we considered provincial Russia as a fifth country. (We checked that the responses from the students in the cities outside Moscow were sufficiently homogeneous to be aggregated.) We thus considered five countries (Moscow, provincial Russia, Israel, the Netherlands, the United States) and three educational levels (high school, undergraduate, postgraduate). For each of the 15 possible combinations of five countries and three educational levels, we could calculate the average attitude toward students *A*, *B*, and *C* in our sample. Because three cells were empty, we provide 12 sets of cell averages and all totals, together with the number of observations (*N*) in each cell in Table 1.

TABLE 1
Data Summary Statistics

Country		High school	Undergraduate	Postgraduate	Total
Russia	*A*	–0.18	–0.02	–0.43	–0.24
(Moscow)	*B*	0.78	0.85	0.19	0.52
	C	–1.88	–1.78	–1.76	–1.78
	N	40	124	158	322
Russia	*A*	–0.45	–0.08	0.00	–0.14
(Province)	*B*	0.33	0.65	0.43	0.58
	C	–1.27	–1.72	–1.57	–1.64
	N	33	144	7	184
Israel	*A*	—	–0.50	—	–0.50
	B	—	0.25	—	0.25
	C	—	–1.15	—	–1.15
	N	0	20	0	20
Netherlands	*A*	–0.16	–0.78	–1.37	–0.83
	B	0.63	–0.06	–0.32	–0.05
	C	–1.53	–1.52	–0.51	–1.36
	N	19	187	41	247
United States	*A*	—	–1.27	–1.55	–1.35
	B	—	–0.87	–0.88	–0.88
	C	—	–0.34	–0.03	–0.25
	N	0	79	33	112
Total	*A*	–0.27	–0.48	–0.73	–0.53
	B	0.59	0.22	–0.04	0.19
	C	–1.59	–1.45	–1.30	–1.42
	N	92	554	239	885

Note: A is the student who cheated; *B* is the student who allowed *A* to copy his or her answers; *C* is the student who reported the cheating; and *N* is the number of observations.

Even without model or statistical analysis, these data summaries provided two preliminary conclusions. First, all Russian students hated informers ($C = -1.73$, on average). The Russian saying: "First whip to the informer" appeared to prevail. Students from Israel and the Netherlands were not keen on informers either, but in the United States, students seemed to have a different attitude ($C = -0.25$). Second, in each country, except provincial Russia, high school students were less tolerant of the informer *C* than undergraduate students who, in turn, were less tolerant than postgraduates. One would, therefore, expect that the higher the level of education, the less tolerant students were of *A*, the person who cheated. This was indeed the case in the United States and the Netherlands but not in Russia. Hence, we needed to allow for the possibility that the dependence on educational level is different in Russia than in the other countries.

DIFFERENCES IN ATTITUDES TOWARD CHEATING

We had five countries in our sample, and we used five dummy variables, $x_1, \ldots, x_5$, one for each country. For example, $x_1 = 1$, if the respondent came from Moscow and zero otherwise. In addition, we had three educational levels, so we added two (not three) further dummy variables, x_6 and x_7. The dummy $x_6 = 1$, if the respondent was an undergraduate and zero otherwise, and $x_7 = 1$, if the respondent was a postgraduate and zero otherwise. Adding another dummy for high school students would have led to an identification problem. To the seven main effects dummies, we added one interaction dummy x_8, which took the value 1, if the student was a high school student from provincial Russia. This dummy allowed for the possibly different dependence on educational level in Russia than in other countries.

Each respondent i ($i = 1, \ldots N$) produced three answers, his or her attitude to *A, B,* and *C,* respectively. We let y_i denote the answer to the first question (*A*) on a 5-point scale (–2, –1, 0, 1, 2). Because we had five ordered categories, we formulated a simple ordered-response model to analyze the data (see Maddaia 1983, section 2.13): In the ordered-response model, we defined a latent variable y^* such that

$$y_i^* = x_i'\beta + \varepsilon_i, \qquad i = 1, \ldots, N,$$

where x_i was an 8×1 vector of the dummy variables defined above, and β was an 8×1 vector of parameters to be estimated. The errors ε_i were assumed independent and identically distributed as $N(0, \sigma^2)$.[2] We did not observe y^*, but rather y, which took on five discrete values according to the following rule:

$$y_i = \begin{cases} -2 & \text{if } y_i^* \le \tau_0 \\ -1 & \text{if } \tau_0 < y_i^* \le \tau_1 \\ 0 & \text{if } \tau_1 < y_i^* \le \tau_2 \\ 1 & \text{if } \tau_2 < y_i^* \le \tau_3 \\ 2 & \text{if } y_i^* > \tau_3, \end{cases}$$

where τ_1, τ_2, and τ_3 denote the threshold parameters. For purposes of identification and without loss of generality, we set $\tau_0 = 0$. Even then, only the ratios τ_i/σ and β/σ were identified. We followed the usual convention and normalized σ to equal 1. We then estimated the three equations separately by maximum likelihood. The resulting estimates and standard errors of the 11 parameters (8 βs and 3 τs) are presented in Table 2.

The estimated coefficients of an ordered probit model must be interpreted with care. The value of $\hat{\beta}_k$ denoted the effect of a change in the *k*th dummy variable on the expectation of the latent variable y^*, and hence indirectly on the expectation of the observed *y*. For example, we saw that the higher the level of education, the more negative the student was toward *A* and *B*, and the more positive toward *C*. Also, Russian students were most positive (and U.S. students most negative) toward *A* and *B, w*hereas the attitude toward *C* was precisely the opposite, as compared to students in other countries.

A formal statistical analysis showed the following: First the significance of the 11 coefficients jointly was enormous: $\chi^2(11)$ was above any reasonable level of rejection. Second, if we tried to pool data for Moscow and provincial Russia, while deleting the cross term x_8, that is, if we tested the joint hypothesis $\beta_1 = \beta_2$, $\beta_8 = 0$, then this was firmly rejected (*p* value is .002). However, if we kept the cross-term, then Moscow and provincial Russia *could* be pooled ($p = .12$). We used this fact later in estimating a model with corruption (Table 5). Third, we

TABLE 2
Parameter Estimates

	A[1]	*B*[1]	*C*[1]
Russia (Moscow)	2.0361	2.8854	–1.3136
	(0.1616)	(0.1722)	(0.2043)
Russia (Province)	2.0673	2.8563	–0.9319
	(0.1943)	(0.2009)	(0.2352)
Israel	1.4095	2.3523	–0.0955
	(0.2944)	(0.2978)	(0.3234)
Netherlands	1.0181	2.0223	–0.4955
	(0.1637)	(0.1729)	(0.2075)
United States	0.3318	1.0690	0.5258
	(0.1907)	(0.1881)	(0.2325)
Undergraduate	–0.1735	–0.3409	0.1615
	(0.1587)	(0.1554)	(0.2103)
Postgraduate	–0.7483	–0.8379	0.5607
	(0.1642)	(0.1601)	(0.2146)
Russia (Provincial) × high school	–0.7888	–0.7332	0.7330
	(0.2664)	(0.2591)	(0.3122)
τ_1	1.0668	0.9082	0.7816
	(0.0593)	(0.0752)	(0.0547)
τ_2	2.9780	2.5007	1.3666
	(0.0935)	(0.0935)	(0.0797)
τ_3	3.4733	3.3087	1.7724
	(0.1156)	(0.1030)	(0.1013)
$\chi^2(11)$	6,188	15,474	2,323

Note: Standard errors are in parentheses. See note to Table 1 for definitions of *A*, *B*, and *C*.

could test parameter restrictions *across* equations. These tests showed that students of the same educational level in different countries had very different attitudes toward *A, B,* and *C*. However, students within one country appeared to have the same attitude toward *A* and *B,* independent of their educational level ($p = .45$ for undergraduates and .70 for postgraduates). Students within one country obviously did not have the same attitude toward *A* and *C*; if anything they had the opposite attitude. If we tested $A = -2C$ (and similarly $B = -2C$) across educational levels, then we could not reject this hypothesis. This suggested that aggregation over educational levels may be possible, and that possibly a tolerance-of-cheating index might be constructed. We return to this issue later.

TENTATIVE EXPLANATIONS

Cultural Effects

First, collective and individualistic values differ between countries. In the United States and Russia, two cultural differences appear to relate directly to cheating. First, in the United States, in contrast to Russia, competition among students is seen as an important intrinsic value of the educational system, a value that affects interaction between students. Thus, cheating is condemned because it is considered an unfair instrument of competition. Second, the attitude to the law and to officials differ between the two countries. In the former USSR, the judicial system served as an instrument of the party, and a common view was that officials are enemies. This attitude existed toward policemen, civil servants, train conductors, and also toward teachers, and may explain the strong negative attitude toward informers among Russian students. It seems plausible that the same cultural factors influence other behavior such as tax evasion or corruption. If so, one may expect that cheating and corruption are closely correlated, and this would be of interest because perceived corruption is much more difficult to measure than perceived cheating.

Design of the Educational System

One can argue against the cultural explanation by saying that many students in the United States, the Netherlands, and Israel are actually foreigners who come from many different cultures. Russian students in the United States probably do not cheat.[3] Thus, the difference in tolerance of cheating might not depend on culture (or not only on culture) but on the design of the educational system: the grading system, selection procedures, severity of punishment, number of students in classes, existence of study groups,[4] existence of code of honor, and so forth.[5]

Even if one could prove that young Russians do not cheat when studying in the United States, this would not refute a cultural theory. To understand why, one may use a game-theory approach that is widely applied in the theory of corruption (Tanzi 1997) and other types of deviant behavior. The approach follows Becker's (1968) economic analysis of the rationality of crime (relying on expected costs and benefits), where cheating is considered as a rational act where the

student balances expected utility of higher grades against expected costs (severity of punishment, probability of getting caught, prevailing attitude toward cheating). If many students in a collective have negative attitudes toward cheating, then it is difficult to get help in cheating, and the probability is high that somebody will inform the teacher. Moreover, a cheater and his or her assistants, if detected, will get no sympathy from classmates, but informers are not condemned. Hence, the cost of cheating and assisting cheating is high, whereas the cost of informing about cheating is low.

Coordination Effect

Cheating and the attitude toward cheating are interconnected and self-supporting. The larger the number of students in a collective that is cheating and tolerant toward cheating, the more often they cheat, the more tolerant they are, and the less costly it is for every student to cheat and to be tolerant toward cheating. This is the so-called *coordination effect*: the more consistently a norm is observed in society, the greater the costs incurred by an individual deviating from it. The coordination effect causes multiplicity of equilibria in socioeconomic systems (Arthur 1988; North 1997). Prevalence of cheating can be considered as a stable inefficient equilibrium, a lock-in or institutional trap (Polterovich 2000).

This analysis can be converted into a formal model with cheating and free-of-cheating equilibria. Cultural and organizational factors, as well as the history of the system, define which of two equilibria prevails. If the system is free of cheating, then the cheating costs are high, and a newcomer may find it more beneficial to observe the prevalent norm even if he or she is inclined to cheat. The influence of the educational level on cheating and on the attitude toward cheating is ambiguous. On the one hand, learning effects (development of cheating techniques), linkage effects (interdependence of cheating and friendship relations), and cultural inertia (formation of cheating as a habit) decrease cheating costs over time and fix cheating as a norm of behavior. On the other hand, the higher the educational level, the more severe the punishment for cheating, and the larger possible losses of accumulated investment in education: by being expelled, a final-year student devalues a substantial part of the payments and efforts that have been invested in his or her education.

If cheating prevails and cheating costs are low, then the norm-fixation process is most important for the earlier stages of the education. For the advanced stages and for a low cheating equilibrium, the threat of losing accumulated investment seems to dominate. This can serve as a tentative explanation of nonmonotonic dependence of the attitude to cheating in Russia in contrast to other countries (Table 1).

TOLERANCE-OF-CHEATING INDEX

Comparisons of cheating behavior across countries may *inter alia* lead to practical conclusions about the effectiveness of different deterrent mechanisms. However, the comparisons and analysis would be simpler if we could characterize the

cheating phenomenon by only a few indicators, preferably one. This would also allow comparison with other social science indices, like those of corruption, economic freedom, liberalization, and quality of institutions. Attitude toward cheating is a complex phenomenon that involves attitudes toward cheaters, those who facilitate cheating, and informers. Our data were three-dimensional, because we had three answers from each respondent. The question is whether we can aggregate the answers, *A*, *B*, and *C* and construct a one-dimensional tolerance-of-cheating index (TCI). The obvious first guess about TCI would be based on ($A + B - C$), because a person who is extremely negative on cheating would have $A = -2$, $B = -2$, and $C = 2$ and would thus obtain a score of –6, whereas the opposite, very tolerant, person would have a score of +6. We argue that of all linear combinations of *A*, *B*, and *C*, this particular choice was the optimal one.

From the data, we computed the following correlation matrix of the answers to *A*, *B*, and *C*:

$$R = \begin{pmatrix} 1.00 & .60 & -.41 \\ .60 & 1.00 & -.48 \\ -.41 & -.48 & 1.00 \end{pmatrix}.$$

The largest eigenvalue of *R* is 2.0004, and the associated eigenvector, called the first principal component of *R* (see Anderson 1984), is $\upsilon = (0.5858, 0.6101, -0.5336)$. The correlation between υ and the hypothesized vector (1, 1, –1) was astonishingly high, namely 0.9985. We concluded, therefore, that the weighting (1, 1, –1) was the best linear combination in the sense that it explained most of the variation in the data.

Instead of ($A + B - C$), we defined a linear function as

$$\text{TCI} = 5 - 5(A + B - C)/6.$$

Thus defined, the TCI is a number between 0 and 10, and the higher the number, the *lower* was the tolerance to cheating. This is more intuitive and more in line with other indices (such as the corruption index discussed later), because cheating (like corruption) is "bad," and hence a high TCI is "good." Given our definition of the TCI, we can calculate the "empirical" TCI directly from the cell averages in Table 1. These summary statistics are presented in Table 3.

TABLE 3
Tolerance-to-Cheating Index, Obtained from Data Cell Averages

Country	High school	Undergraduate	Postgraduate
Russia (Moscow)	2.94	2.82	3.73
Russia (Province)	4.04	3.09	3.33
Israel	—	4.25	—
Netherlands	3.33	4.43	5.98
United States	—	6.50	7.00

We confronted these empirical TCIs with the predicted values from our ordered probit model (Table 4). Comparison of Tables 3 and 4 shows that our model provided a reasonable, although by no means perfect, approximation to the data. The standard errors in Table 4 are relatively small, showing a fair amount of accuracy. The two preliminary conclusions mentioned earlier were confirmed: first, Russian students were most tolerant of cheating, then Israeli and Dutch students were, whereas students from the United States definitely did not like cheaters; second, high school students were more tolerant of cheating than undergraduates were, who in turn were more tolerant than postgraduates, with the exception of high school students in provincial Russia.

CHEATING AND CORRUPTION

We applied the TCI concept to test the idea—mentioned earlier—that a link existed between cheating and corruption, because both depend on similar cultural factors. A widely used indicator of perceived corruption is the so-called Transparency International Corruption Perception Index, annually updated for more than 50 countries by Transparency International.[6] The rankings in 1997 for the four countries in our study were Russia 2.27, United States 7.61, Israel 7.97, and Netherlands 9.03.

We re-estimated our model using the 1997 corruption index instead of the five country dummies, together with three educational levels and the dummy for high school students in provincial Russia. Because the rankings of countries using the

TABLE 4
Tolerance-to-Cheating Index Predictions

Country	High school	Undergraduate	Postgraduate
Russia (Moscow)	2.61 (0.30)	2.92 (0.28)	3.74 (0.33)
Russia (Province)	3.98 (0.41)	3.08 (0.29)	3.92 (0.37)
Israel	3.91 (0.51)	4.28 (0.50)	5.28 (0.61)
Netherlands	4.07 (0.39)	4.45 (0.38)	5.47 (0.48)
United States	5.84 (0.55)	6.30 (0.51)	7.45 (0.54)

Note: Standard errors are in parentheses.

TABLE 5
Tolerance-to-Cheating Index Predictions, Corruption Model

Country	High school	Undergraduate	Postgraduate
Russia (Moscow)	2.53 (0.49)	3.07 (0.47)	3.92 (0.58)
Russia (Province)	4.00 (0.72)	3.07 (0.47)	3.92 (0.58)
Israel	4.02 (0.66)	4.69 (0.67)	5.79 (0.83)
Netherlands	4.34 (0.71)	5.04 (0.72)	6.19 (0.87)
United States	3.92 (0.64)	4.57 (0.65)	5.66 (0.81)

Note: Standard errors are in parentheses.

corruption index and using the TCI index were different, one should not expect a very good fit. Nevertheless the fit was reasonable. The TCI predictions (Table 5) were comparable but certainly not the same as those in Table 4. The results did not appear to contradict the cultural theory of cheating.

CONCLUSIONS

To what extent does the attitude to social behavior patterns vary among countries? This question is important in understanding institutional development and reform design. However, not much research is devoted to this topic.[7] We have tried to contribute to this literature by comparing the attitude of students toward cheating in four countries.

Our study shows that students have a different attitude toward cheating depending on where they live and that a student's opinion also depends on his or her level of education. We discussed several possible explanations of the results. Our questionnaire characterized the attitude toward cheating by a three-dimensional vector of attitudes toward cheaters, assistants, and informers. However, we show that a scalar indicator (the TCI) is sufficient to capture the essence of tolerance of cheating. The index can be used, for example, to compare deterrence mechanisms used in different countries.

Another hypothesis that was partially checked asserts a link between cheating and corruption from common cultural roots. More work is needed to check this and related hypotheses.

NOTES

1. It would be of interest to replace the education dummies by a one-dimensional measure of education, say years of schooling. This would be smoother and more informative, but the required data were not available to us. Similarly, one could attempt to replace country dummies by relevant descriptive statistics for the countries concerned, for example, per capita gross domestic product (GDP) or the unemployment ratio. We did not do this, although we made one small attempt in this direction by considering a corruption index.
2. We ignored the fact that the errors may not have been independent between answers: If a respondent had a very negative view on cheating, he or she would be negative on *A* and *B* (the cheaters), but positive on *C* (the informer). To account for this dependence would have required estimation of a *multivariate* ordered probit model. Such an approach was beyond our purpose in this article. The possible dependence did not affect the consistency of our estimates, although it did affect their efficiency. However, estimates from a multivariate regression model showed that the differences are very small.
3. This supposition was supported by interviewing a number of Russian students who were currently studying for a Ph.D. in the United States. Of course, the statement needs further proof.
4. In the former USSR, every student used to belong to a permanent group of about 30 students. This group stayed together for several years, taking the same academic program with only small variations. Today, most Russian universities still use this system. Solidarity between students in the group is high, and someone who informs officials about cheating is strongly condemned by the group.
5. See also Davis, Noble, Zak, and Dreyer (1994), who compare United States and Australian students in terms of their learning-oriented and grade-oriented behavior.
6. The index is available on the Web site www.transparency.de; also see Bardhan (1997). The higher the corruption index, the lower is the corruption level.
7. An exception is Shiller, Boycko, and Korobov (1991) who compared Moscow and New York inhabitants in their attitudes toward a free market. Differences were found to be not very significant.

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