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Propensities to engage in and punish corrupt behavior: Experimental evidence from Australia, India, Indonesia and Singapore ☆

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ABSTRACT

This paper examines cultural differences in individual decision-making in a corruption game. We define culture as an individual's accumulated experience, shaped by the social, institutional, and economic aspects of the environment in which the individual lives. Based on experiments run in Australia (Melbourne), India (Delhi), Indonesia (Jakarta) and Singapore, we find that there is a greater variation in the propensities to punish corrupt behavior than in the propensities to engage in corrupt behavior across cultures. Consistent with the existing corruption indices, the subjects in India exhibit a higher tolerance of corruption than the subjects in Australia. However, the subjects in Singapore have a higher tolerance and the subjects in Indonesia have much lower tolerance of corruption than expected. We conjecture that this is due to the nature of the recent institutional changes in these two countries. We also vary our experimental design to examine the impact of the perceived cost of bribery and find that the results are culture-specific.

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1. Introduction

Given the large negative impact corruption has on economic growth, much stands to be gained from understanding its causes and the ways in which it can be reduced (Bardhan, 1997; Mauro, 1995).[1,2] The aim of this paper is to contribute to our understanding of corruption by comparing individual decision-making in a corruption experiment across four different cultures.[3] Individuals' attitudes towards corruption are shaped by their everyday experiences of corruption, which are determined by the social, institutional (political

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[1] See Rose-Ackerman (2006) for a comprehensive survey of the literature on corruption, Treisman (2000) for an assessment of the explanatory power of various theories of the causes of corruption, and Glaeser and Goldin (2004) for a discussion of the historical factors that may have helped reduce corruption in the United States.

[2] Transparency International finds that of the 133 countries evaluated for its 2003 Corruption Perception Index (CPI), 70% scores less than 5 out of a clean score of 10. Among the developing countries, 90% scores less than 5. See http://www.transparency.org/surveys/index.html#cpi. The CPI ranks countries in terms of the degree to which corruption is perceived to exist among politicians and public officials. It reflects the views of analysts and business people around the world, including experts living in the countries evaluated.

[3] The fact that countries with similar degrees of development may have significantly different levels of corruption suggests that corruption may at least partially be a cultural phenomenon. For instance, Finland with a 2002 per capita GDP of 26,495 USD is ranked 1st in the 2003 edition of the CPI while Italy with a 2002 per capita GDP of 25,568 USD is ranked 35th. Portugal with a 2002 per capita GDP of 18,434 USD is ranked 25th while Greece with a 2002 per capita GDP of 18,439 USD is ranked 50th.

and legal), and economic backgrounds of the countries in which they live. We refer to all the elements that shape individuals' attitudes as culture. We examine whether higher levels of exposure to corruption in daily life promote a tolerance of corruption that is reflected in norms of behavior. A corrupt environment may make it easier to justify one's own corrupt behavior. Hence, corruption may gain more acceptance as it becomes more widespread and this may contribute to its further spread (Dey, 1989).

Several papers in the theoretical literature on corruption focus on the cultural transmission of corruption (e.g., Andvig and Moene, 1990; Hauk and Saez-Marti, 2002; Lui, 1986; Sah, 1988; Tirole, 1996). However, empirical investigations of the impact of culture on corruption are harder to find. While existing studies rely on data that are aggregated at the country level (see, for example, Treisman, 2000; Paldam, 2002), experimental methodology provides us with a unique opportunity to explore how *individual* behavior differs across cultures.

The set of actions that fall under the rubric of "corrupt acts" is large. We interpret corruption as a situation where two people can act to increase their own payoff at the expense of a third person, the victim. The transaction that takes place between the two people is illegal, so the victim is allowed to punish them. However, such punishment is costly to the victim. Our experimental design differentiates between the incentive to engage in a corrupt act from which one reaps benefits and the willingness to incur a cost to punish a corrupt act which decreases one's payoff. This distinction enables us to examine whether individuals' behavior differs depending on whether they directly benefit from a corrupt act. The ability to examine punishment behavior is important because as suggested by Fehr and Gachter (2000, 2002) and Bowles and Gintis (2002), such "altruistic" punishment by *homo reciprocans,* humans who are willing to punish norm violators even when such punishment is costly to the punishers, may be the primary driving force behind sustaining cooperative norms in a variety of social settings.

We explore whether, in environments characterized by lower levels of corruption, there is both a lower propensity to engage in corrupt behavior and a higher propensity to punish corrupt behavior. Our experiments were conducted in four countries: Australia (Melbourne), India (Delhi), Indonesia (Jakarta), and Singapore. According to Transparency International's Corruption Perception Index (CPI), Australia and Singapore are consistently ranked among the least corrupt in the world (with scores of 8.8 and 9.4 out of 10, respectively), and India and Indonesia are consistently ranked among the most corrupt (with scores of 2.8 and 1.9, respectively).[4]

In addition to examining cultural differences in behavior, we varied our experimental treatment to examine whether the propensities to engage in and punish corrupt behavior vary with the cost of corruption. We conducted one treatment with a welfare-enhancing bribe, where the total payoff gains from the bribe exceed the total payoff loss, and another treatment with a welfare-reducing bribe, where the reverse is true.

The rest of the paper is organized as follows. Section 2 describes the related experimental literature. Section 3 explains the experimental design and procedure. Section 4 states the research questions that motivate the analysis presented in Section 5. Section 6 discusses the implications of our results and concludes by suggesting avenues for future research.

2. Previous experimental literature on corruption

The experimental literature examining corruption is limited.[5] Abbink, Irlenbusch and Renner (2002) model corruption as a variant of the two-person trust and reciprocation game, where the participants play the role of a briber or a public official. They find that social welfare considerations have no impact on the level of bribery. However, the introduction of a threat of high penalties when discovered significantly reduces corruption. Abbink (2000) uses a similar design and finds that varying the relative salaries received by those who engage in corruption does not affect its prevalence. Using nursing students in Ethiopia as subjects, Barr, Lindelow and Serneels (2004) find that corruption in the form of embezzlement of public resources is less likely to take place when service providers have higher incomes, and when the risk of being caught is high. Frank and Schulze (2000) show that economics students are significantly more corrupt than others, due to a process of self-selection rather than indoctrination.

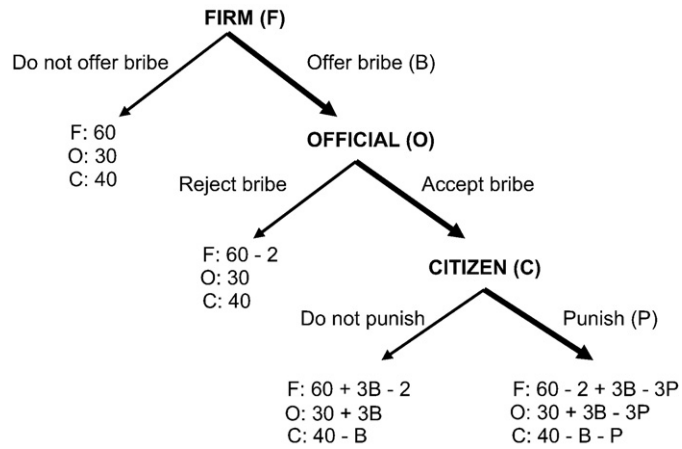

Fig. 1. The welfare-enhancing bribe game (Treatment WE).

Bertrand et al. (2007) and Olken (2007) analyze corruption using field experiments. Bertrand et al. (2007) study the allocation of driving licenses in India, and find that corruption does not merely reflect transfers from citizens to bureaucrats, but it distorts allocation. Using data from over 600 Indonesian village road projects, Olken (2007) finds that government audits are more effective in reducing corruption than local-level monitoring.

Our paper differs from the literature in two main ways. First, to the best of our knowledge, it is the first to focus on behavioral differences across cultures in a corruption experiment. It thus contributes to a growing experimental literature on cross-cultural comparisons of behavior in other types of experiments.[6] Second, while previous studies have modeled punishment as an exogenous lottery, punishment is endogenous in our paper and takes place if the victim decides to incur the cost associated with punishment. We are thus able to examine both the incentives to engage in corruption and the incentives to punish corrupt behavior. Understanding punishment behavior is important since societal control of corruption often relies on an individual bringing the act to the attention of enforcement officers.[7] A further advantage of our study is that it benefits from the increased power associated with a large sample of 569 observations, involving 1707 participants.

[4] We cannot definitively link the behavior in our games to the level of corruption in each country. To do so would require experiments to be conducted in a large number of locations. However, such a link seems intuitively plausible and, hence, we have used the CPI in selecting the countries for our study.

[5] See Abbink (2006) for a comprehensive survey.

[6] See, for example, Carpenter and Cardenas (2004), Croson and Buchan (1999), Ockenfels and Weimann (1999), Roth et al. (1991) and Henrich et al. (2004).

[7] In recent years, there has been a growing interest in studying the impact of sanctions (formal or informal) on individual behavior and social norms. See, for example, Fehr and Gachter (2000, 2002), Bowles and Gintis (2002), Fehr, Fischbacher and Gachter (2002), Casari and Plott (2003), Masclet et al. (2003), Carpenter and Matthews (2004), and Fehr and Fischbacher (2004).

3. Experimental methodology

3.1. Design

We designed a three-person, sequential-move game that focuses on a common bribery problem. Fig. 1 contains an extensive-form representation, where all the payoffs are denoted in experimental dollars. The first player acts as a firm which has the option of initiating a corrupt act by offering a bribe to a government official in order to increase its own payoff at the expense of society. The firm can offer a bribe by choosing an amount $B \in [4,8]$. It costs the firm two experimental dollars to offer a bribe and the firm incurs this cost regardless of whether the bribe is accepted. If a bribe is offered, the second player, called the official, can either accept or reject the bribe. If the official accepts (which implies favorable treatment of the firm), the payoffs of the firm and the official increase by $3B$ while the payoff of the citizen decreases by B.[8]

The third player, called the citizen, moves last after observing the choices made by the firm and the official. If a bribe has been offered and accepted, the citizen is given a chance to punish the firm and the official for the corrupt transaction by choosing an amount $P \in [2,12]$ in punishment.[9] Punishment is costly to the citizen and reduces the citizen's payoff by the amount of the punishment, P.[10] However, it imposes a monetary sanction on the firm and official by reducing their payoffs by $3P$. Hence, the net benefit to the firm and the official from the corrupt transaction is $3B-2-3P$ and $3B-3P$, respectively.

We have chosen to conduct a one-shot game because in a one-shot game the punishment has no economic benefit to the citizen and so the decision to punish is not affected by the anticipation of possible future economic gains. Hence, with a one-shot game, a comparison of the citizens' willingness to punish corrupt acts across different cultures reveals the differences in the tolerance levels. Citizens who choose to punish in a one-shot game would have a greater incentive to punish in a multi-period game since by doing so, they can deter corruption and decrease the harm they suffer. The one-shot nature of the game also helps us avoid the issues associated with repeated games, such as signaling, reputation formation and serial correlation in decisions. Each subject participated in the experiment only once and played only one role. They were grouped anonymously in the experiment to avoid conscious or unconscious signaling.

We deliberately chose to use emotive terms such as "bribe" and "punishment" in the instructions. This deviates from the standard practice of using neutral language in economics experiments. However, we used loaded language since our aim was to simulate a real-life corrupt transaction. As indicated in Harrison and List (2004), "it is not the case that abstract, context-free experiments provide more general findings if the context itself is relevant to the performance of subjects (p. 1022)."[11]

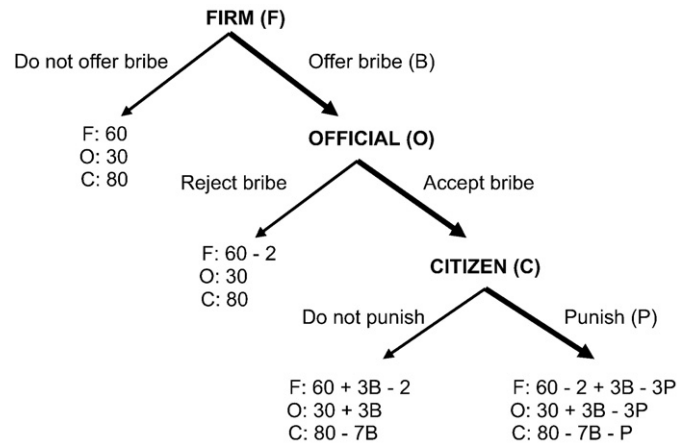

Fig. 2. The welfare-reducing bribe game (Treatment WR).

3.2. Treatments

We conducted the following two treatments. In the first treatment, the bribe is *welfare-enhancing* (WE), in that the total payoff gains to the firm and the official exceed the payoff loss to the citizen. In the second treatment, the bribe is *welfare-reducing* (WR) and the combined gains to the firm and the official are less than the payoff loss to the citizen. Specifically, in Treatment WE, each dollar offered as a bribe, if accepted, reduces the payoff to the citizen by $1 whereas in Treatment WR, it reduces the payoff to the citizen by $7. Figs. 1 and 2 describe the associated payoffs to the three players in Treatments WE and WR, respectively.

The distinction between welfare-enhancing and welfare-reducing corruption is frequently made in the literature (see, for example, Ali and Isse, 2003; Kaufmann and Wei, 1999; Bardhan, 1997; Nas et al., 1986; Lui, 1986). As an example, consider the scenario where a firm would like to import certain goods, but it needs to obtain a license to do so. In order to acquire the license more quickly than might otherwise be the case, the firm has to bribe a government official. Here, although undoubtedly corrupt, the immediate social cost of this action is possibly not high. In contrast, consider the case where the same firm bribes its way out of complying with environmental regulations and dumps toxic waste into the groundwater. Our goal in running the two treatments is to explore whether the tendency to engage in and punish corrupt behavior is different in the latter case, where the cost of bribery is potentially far greater.

A change in the cost of bribery may have the following effects on subject behavior. When the bribe is welfare-reducing, the subjects may think that it is less justified. In addition, as the harm imposed on the citizen increases, the citizen may choose to punish due to feelings of negative reciprocity. Both of these effects would result in lower bribe amounts and higher punishment amounts being chosen when the bribe is welfare-reducing. Alternatively, if the harm imposed on the citizen is sufficiently large, the citizen may not want to punish since this decreases his/her payoff by even more. As a result, punishment may occur less frequently, and if the firms and officials anticipate this, they may act more corruptly. Thus, whether we

[8] The payoff increase that the firm experiences may represent, for example, the benefit from avoiding a regulation. The official's payoff also increases by $3B$ even though the amount of bribe paid by the firm is B. This is due to a difference in the marginal utility of income. Since the income earned in the public service is likely to be lower than that earned in private firms, the same amount of money can be assumed to have a lower marginal utility value to the firm than to the official. Abbink, Irlenbusch and Renner (2002) make a similar assumption in their paper. As in their paper, this multiplier also has the additional advantage of helping us prevent negative total payoffs.

[9] These values were chosen to guarantee two things. First, we wanted to ensure that no one obtained a negative payoff. Second, we wanted to make sure that the payoffs were not unduly inequitable. Often, if the payoffs are excessively unequal, it leads to confounding changes in behavior.

[10] The cost of punishment can be interpreted as the effort the citizen has to put in to file a police report or pursue legal action. Alternatively, it can be interpreted as the amount of tax s/he is willing to pay in order to have such a legal enforcement scheme against bribery.

[11] Cooper and Kagel (2003) consider the role of loaded language in signaling games and suggest that the use of a meaningful context might better capture behavior in field settings than the use of neutral language. Abbink and Henning-Schmidt (2006), however, find that the use of words like "bribe" does not make a difference in the corruption game that they study.

Table 1
Experimental design.

	Efficiency-enhancing (Treatment WE)	Efficiency-reducing (Treatment WR)
Australia ($N=609$)	$N=363$	$N=246$
	Games = 121	Games = 82
India ($N=360$)	$N=180$	$N=180$
	Games = 60	Games = 60
Indonesia ($N=360$)	$N=180$	$N=180$
	Games = 60	Games = 60
Singapore ($N=378$)	$N=195$	$N=183$
	Games = 65	Games = 61
Total ($N=1707$)	$N=918$	$N=789$
	Games = 306	Games = 263

observe higher levels of bribery and punishment in Treatment WR than in Treatment WE depends on the relative magnitude of these effects and cannot be stated a priori.[12]

3.3. Procedure

The experiments were run at the University of Melbourne, the Delhi School of Economics, the University of Indonesia, and the National University of Singapore using third year undergraduate or postgraduate students.[13] We recruited students from a variety of fields of study. In order to minimize the experimenter effects, one of the authors (the same one) was present in all the countries where we ran the experiment.[14] All the sessions were run as non-computerized experiments. Across all four locations, a total of 1707 subjects participated once and only once as a firm, an official, or a citizen.

Each experiment lasted about an hour. At the beginning of each session subjects were asked to come to a large lecture theatre. Each session consisted of at least 30 subjects, who, on entering the room, were randomly designated as either firms, officials or citizens. The subjects participating in the experiment under the same role (as firms, officials or citizens) were asked to sit together and in one section of the lecture theatre away from the subjects representing the other two roles. The subjects were matched anonymously with each other, so individual subjects were unaware of which three specific subjects constituted a particular firm-official-citizen trio.

At the beginning of each session, each subject received a copy of the game's instructions, which were then read out loud to them. They were also given examples explaining how the payoffs would be calculated for specific bribe and punishment amounts. Then, the subjects playing the role of a firm were asked to decide whether or not to offer a bribe. If they chose to offer a bribe, they also had to choose an amount. The record sheets with the bribe amounts were then collected and distributed by the experimenter to the corresponding officials. After the officials made their decisions, the corresponding citizens were informed about whether a bribe was offered and whether it was accepted. The game ended after the citizens decided whether to punish by choosing a punishment amount. The decisions made by all of the subjects were entered into a spreadsheet which

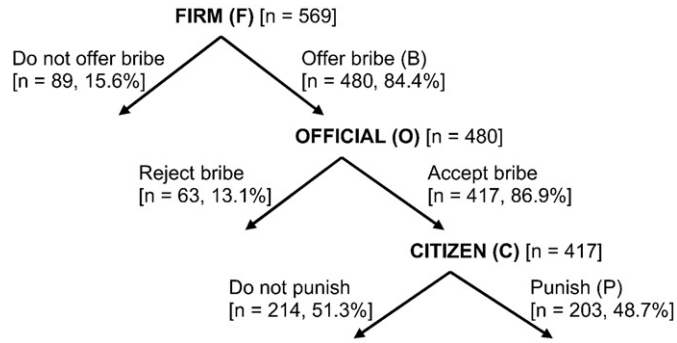

Fig. 3. Overview of the results.

generated their payoffs. The subjects were paid at the end of each session after the payoffs were converted into cash using an appropriate conversion rate, taking into consideration purchasing power parity across the countries where the experiment was conducted.[15] Since the equilibrium payoffs were highly asymmetric across the different player types (firm, official, and citizen), we used different conversion rates for the different types.[16] These conversion rates were public information.

All the subjects filled out a demographic survey, which asked them questions regarding their age, gender, field of study, work experience, income, ethnicity, exposure to corruption, and time spent in other countries. Those in the role of the citizen were also asked to explain the motivation for their decisions.[17]

In addition to the 569 observations that we examine in the paper, we also collected data using neutral language in the instructions. We eschewed words such as "bribe" or "punishment" and replaced them with words such as "transfer" and "forego money to reduce others' payoff."[18]

4. Research questions

In the subgame perfect equilibrium of the game outlined in Section 3.1, a payoff-maximizing citizen does not punish. Knowing this, the official accepts the bribe and the firm offers the bribe. Moreover, the firm offers the maximum amount of bribe it can since its payoff is increasing in the amount it offers.

There is ample evidence in the experimental literature that punishment takes place even in one-shot games. Moreover, since we used context-specific instructions, we expected behavior to differ

[12] We also conducted a low-punishment treatment, where the range of the punishment in Treatment WE was restricted to $P\in[2,8]$. Our goal in designing this treatment was to observe whether a less effective punishment system increases the incentives to engage in corrupt behavior and decreases the incentives to punish corrupt behavior. We found this to be the case. The results are available from the authors on request. This finding is consistent with Abbink, Irlenbusch and Renner (2002), and Barr, Lindelow and Serneels (2004), who find that in a game with exogenous punishment, corruption is lower when the risk of penalty is higher.

[13] All four universities are comparable in the sense that they are ranked among the best in their respective countries. Furthermore, they attract students from all over the country. For example, in our Indian sample, only 36% of the subjects were born in Delhi.

[14] Roth et al. (1991), and Cardenas and Carpenter (2005) discuss the methodological issues arising in multi-site experiments.

[15] The conversion rate in each country was based on 1) the standard hourly wage paid for a student research assistant in each country, and 2) a typical basket of goods bought by students in each country. This is similar to the procedure used by other researchers who have conducted cross-cultural studies (e.g., Carpenter and Cardenas, 2004; Cardenas and Carpenter, 2005).

[16] The treatments described in Section 3.2 are welfare-enhancing and welfare-reducing both before and after taking into account the relevant conversion rates. In Australia, the conversion rates were 3 experimental currency = 1 real currency for the firms, 2 experimental currency = 1 real currency for the officials, and 1.5 experimental currency = 1 real currency for the citizens. Each subject made on average AU$20. This amount is approximately equivalent to US$15. In India subjects were paid an average of US$12.5, in Singapore US$13, and in Indonesia US$9. Davis and Holt (1993) recommend that average payments in experiments should be high enough to compensate all participants for the opportunity cost of their time (pp. 24-26). Having different conversion rates for the different player types helped us achieve this outcome. Moreover, recruiting subjects for experiments can be very difficult if payoffs are not within the range announced for all subjects.

[17] The instruction, record and survey sheets are available from the authors upon request.

[18] The neutral-language sessions were conducted in Australia. A total of 231 students at the University of Melbourne participated in these sessions, which resulted in 77 neutral-language observations.

Table 2
Differences in means (*t*-tests) — cultural and treatment effects.

	India	Singapore	Australia	Indonesia	*p*-values (cultural effects)					
					Aust/ India	India/ Sing	India/ Indon	Aust/ Sing	Aust/ Indon	Indon/ Sing
A. Both treatments pooled										
% of firms bribing (%)	92.50	84.92	82.26	79.17	0.01 ⌂	0.06 #	0.00 ⌂	0.53	0.49	0.24
Bribe amount (if>0)	7.64	7.61	7.61	7.41	0.81	0.78	0.08 #	0.93	0.07 #	0.15
% of officials accepting (%)	92.79	92.52	84.43	77.89	0.04 *	0.94	0.00 ⌂	0.05 *	0.19	0.00 ⌂
% of citizens punishing (%)	28.16	50.50	53.19	66.22	0.00 ⌂	0.00 ⌂	0.00 ⌂	0.68	0.07 #	0.04 *
Punishment amount (if>0)	5.00	7.16	6.61	6.38	0.05 *	0.01 ⌂	0.15	0.46	0.77	0.38
B. Treatment WE										
% of firms bribing (%)	91.67	86.15	78.51	80.00	0.03 *	0.33	0.07 #	0.21	0.82	0.36
Bribe amount (if>0)	7.54	7.63	7.65	7.50	0.46	0.65	0.82	0.83	0.30	0.48
% of officials accepting (%)	92.73	89.29	81.05	77.08	0.05 *	0.53	0.02 *	0.18	0.58	0.10 #
% of citizens punishing (%)	35.29	44.00	62.34	72.97	0.00 ⌂	0.38	0.00 ⌂	0.04 *	0.27	0.01 ⌂
Punishment amount (if>0)	4.89	7.23	5.98	5.59	0.28	0.05 *	0.57	0.21	0.69	0.19
C. Treatment WR										
% of firms bribing (%)	93.33	83.61	87.80	78.33	0.28	0.10 #	0.02 *	0.48	0.13	0.46
Bribe amount (if>0)	7.73	7.59	7.57	7.32	0.21	0.34	0.02 *	0.90	0.16	0.19
% of officials accepting (%)	92.86	96.08	88.89	78.72	0.45	0.47	0.04 *	0.15	0.13	0.01 ⌂
% of citizens punishing (%)	21.15	57.14	42.19	59.46	0.02 *	0.00 ⌂	0.00 ⌂	0.12	0.10 #	0.83
Punishment amount (if>0)	5.18	7.11	7.74	7.36	0.06 #	0.17	0.15	0.58	0.76	0.84
p-values (treatment effects)										
% firms bribing	0.73	0.69	0.09 #	0.82						
Bribe Amount (if>0)	0.24	0.83	0.49	0.40						
% officials accepting	0.98	0.19	0.17	0.85						
% citizens punishing	0.11	0.19	0.02 *	0.22						
Punishment Amount (if>0)	0.80	0.92	0.06 #	0.18						

⌂, * and # denote statistical significance at the 1%, 5% and 10% levels, respectively.

from the theoretical prediction. Hence, we designed our experiment with the following research questions in mind:

(i) Do subjects in countries with higher levels of corruption offer and accept bribes more frequently, and punish bribery less frequently than subjects in countries with lower levels of corruption?
(ii) Does increasing the cost of bribery on the victim have an impact on the propensity to engage in and punish corrupt behavior?

5. Results

5.1. Overview of the results

Table 1 summarizes the data we collected. Fig. 3 provides a broad overview of our findings, pooling across locations and treatments. Overall 1707 subjects participated in 569 plays of the game across all treatments since three players (a firm, an official and a citizen) are required to generate one play of the game. As can be seen from Fig. 3, in 480 out of 569 (84.4%) plays of the game a bribe was offered by the firm. The average amount offered by those who chose to bribe was \$7.58 (in a range of \$4 to \$8). 417 out of 480 (86.9%) officials who received a bribe chose to accept it. Both the firms' and officials' behavior is more or less in accordance with the theoretical predictions. However, the citizens' behavior deviates sharply from the theoretical prediction. 203 out of 417 (48.7%) citizens who were harmed by the bribe chose to incur a pecuniary cost in order to punish the firm and official.[19]

In the next two subsections, we present our findings in detail. We first report the results on the cultural effects in Section 5.2, and then compare the two treatments in Section 5.3.

[19] In the neutral-language game in Australia, behavior was closer to the subgame perfect equilibrium outcome. A bribe was offered in 97% of the cases (compared to 82.3% in the loaded-language game) and accepted in 95% of the cases (compared to 84.4% in the loaded-language game). 37% of the citizens in the neutral-language game who were in a position to punish did so (compared to 53.2% in the loaded-language game).

5.2. Comparing behavior in Australia, India, Indonesia and Singapore

5.2.1. Tests of differences of means

Table 2 compares the behavior across the Australian, Indian, Indonesian and Singaporean subjects and reports *p*-values of *t*-tests of differences in means.[20] Panel A tells a clear story. The point estimates for the firm, official and citizen subjects indicate a consistent ranking of the countries in terms of their tolerance of corruption. The Indian subjects were the most likely to offer bribes, the most likely to accept bribes, and the least likely to punish corruption. The second and third most tolerant were the Singaporean and Australian subjects while the Indonesian subjects displayed the lowest tolerance of corruption.

The magnitude of the differences across countries is quite large. For example, 92.50% of the subjects offered bribes in India versus 79.17% in Indonesia. For officials, 92.79% of the subjects accepted bribes in India, compared to 77.89% in Indonesia. The citizen subjects punished corrupt behavior only 28.16% of the time in India versus 66.22% in Indonesia.

The bribery rate in India is statistically significantly higher than the bribery rates in the other countries. However, the bribery rates in Australia, Indonesia and Singapore are not significantly different from each other. For the acceptance rates, there is no statistically significant difference between India and Singapore at the higher end (92.79% and 92.52%), and between Australia and Indonesia at the lower end (84.43% and 77.89%). However, both India and Singapore are statistically significantly different from Australia and Indonesia.

The highest cross-country variation is observed in punishment behavior, where the Australian and Singaporean punishment rates are insignificantly different from each other, but they are significantly higher than the punishment rate in India and significantly lower than that in Indonesia. The larger variation in punishment rates is also borne out by a comparison of the coefficient of variation of the country means by subject type. The coefficients of variation for offering and

[20] We also conducted non-parametric rank sum tests of differences in distribution. The results were very similar to the reported *t*-tests.

Table 3
Multivariate regression results — cultural effects.

Australia vs. India vs. Indonesia vs. Singapore, All treatments, pooled regression (Australia and Treatment WE are the reference dummies.)										
	Bribe (0/1)		Bribe amount		Accept (0/1)		Punish (0/1)		Punishment amount	
	1	2	3	4	5	6	7	8	9	10
	M. effect§	*p*-value	Coeff	*p*-value	M. effect§	*p*-value	M. Effect§	*p*-value	Coeff	*p*-value
Treatment — WR	0.019	0.54	−0.030	0.71	0.045	0.14	−0.096	0.06#	1.000	0.08#
India	0.150	0.00 ⌂	−0.011	0.95	0.074	0.05*	−0.205	0.00 ⌂	−1.920	0.04*
Indonesia	0.051	0.33	−0.211	0.24	−0.058	0.16	0.138	0.06#	−0.429	0.56
Singapore	0.096	0.06#	−0.008	0.96	0.073	0.05*	−0.036	0.59	0.363	0.62
Male	0.063	0.04*	0.069	0.39	0.012	0.70	−0.090	0.08#	0.950	0.10#
Econ major							−0.120	0.03*	0.359	0.60
% life out of Australia	0.126	0.05#	−0.013	0.95						
Bribe amount					0.002	0.91	−0.020	0.50	0.422	0.21
Const			7.60	0.00 ⌂					2.650	0.31
Tests										
India = Indon		0.00 ⌂		0.07#		0.00 ⌂		0.00 ⌂		0.12
India = Sing		0.09#		0.87		0.99		0.02*		0.02*
Indon = Sing		0.19		0.10#		0.00 ⌂		0.03*		0.33
R-squared	0.038		0.01		0.044		0.069		0.063	
N	569		480		480		417		203	

§ We report marginal effects for the probits.
⌂, * and # denote statistical significance at the 1%, 5% and 10% levels, respectively.

accepting bribes are 0.07 and 0.08, respectively, while it is 0.32 for punishing corruption.

The amounts bribed or punished conditional on bribing and punishing, respectively, do not vary much across countries. Once a player decides to bribe, bribing $8 is a dominant strategy and most of the firm subjects (369 out of 480, 77%) followed this strategy. The Indian subjects on average chose significantly lower punishment amounts ($5.00) than the subjects in Singapore ($7.16) and Australia ($6.61).

5.2.2. Regression results

Table 3 presents the results from regression analysis. We estimated binary probit models for the bribe, acceptance, and punishment rates, and ordinary least square models for the bribe and punishment amounts.[21] In addition, Table 3 presents the results of pairwise tests of significant differences across countries.

The regression results control for several aspects of the subjects' backgrounds and also for the treatment effect (discussed in detail in Section 5.3). In general, the demographic variables were not strong predictors of behavior. In some of the specifications, gender and whether the subject was an economics major were significant. Specifically, men were 6.3 percentage points more likely to offer a bribe and 9 percentage points less likely to punish corrupt behavior ($p=0.04$ and $p=0.08$, respectively). Subjects who studied economics were on average 12 percentage points less likely to punish bribery ($p=0.03$).[22] Since many of the Australian subjects were foreign students, we also constructed a variable for the percentage of each subject's life which was spent outside of Australia. This variable was significant only in the bribery regressions.[23]

The regression results are largely consistent with the results of the *t*-tests. The Indian subjects are on average 15 percentage points more likely to bribe than the Australian subjects ($p=0.00$), 9.9 percentage points more likely to bribe than Indonesians ($p=0.00$), and 5.4 percentage points more likely than Singaporeans ($p=0.09$). Unlike in the *t*-tests, once we control for other variables, the Singaporean subjects are 9.6 percentage points more likely to bribe than the Australian subjects ($p=0.06$).[24]

For the acceptance rates, the regressions show, as before, that there is no significant difference between India and Singapore, and between Australia and Indonesia. The acceptance rates in India and Singapore remain significantly higher than the acceptance rates in Australia ($p=0.05$ in both cases) and in Indonesia ($p=0.00$ in both cases).

Table 3 shows that Indian subjects are 20.5 percentage points less likely to punish than the Australian subjects ($p=0.00$). The punishment behavior in Indonesia also differs from that in Australia, but suggests a *lower* tolerance of corruption (as in Table 2) with subjects being on average 13.8 percentage points more likely to punish than in Australia ($p=0.06$). Punishment behavior in Singapore is insignificantly different from that in Australia, but it is significantly higher than in India (16.9 percentage points higher, $p=0.02$) and significantly lower than in Indonesia (17.4 percentage points lower, $p=0.03$). The largest difference is found between the punishment behavior of the Indian and Indonesian subjects. The Indonesian subjects are 34.3 percentage points more likely to punish than the Indian subjects ($p=0.00$).

In summary, comparing behavior in the four locations, we find that, as expected, the Indian subjects are more tolerant of corruption than the Australian subjects. The Indonesian subjects, however, display a much lower tolerance of corruption than expected given the high level of corruption that exists in their country. In contrast, the Singaporean subjects appear to be more tolerant of corruption than expected. There is greater cross-country variation in the willingness to punish corruption than in the willingness to engage in it.

Culture can be regarded as having two components — one that represents those customs and values that ethnic and religious groups transmit relatively unchanged from generation to generation, and another that reflects the values embedded in the current institutions of the society in which the individual lives.[25] Although it is difficult to differentiate between these two influences, our data allow us to explore this issue by controlling for ethnicity. Almost all the Singaporean sample is ethnic Chinese. Indonesia has a Chinese minority and in our Indonesian sample 11.4% are ethnic Chinese.

[21] We also estimated ordered probit models for positive bribe amounts. The results were similar to the reported ones.

[22] This result is consistent with Frank and Schulze (2000).

[23] This variable and whether a subject majored in economics are only included in the regressions in which they were significant in Table 3.

[24] It is controlling for the foreign students in the Australian subject pool that makes the difference between Australia and Singapore statistically significant.

[25] The first of these two components is how culture is defined in Guiso, Sapienza and Zingales (2006). See Bisin and Verdier (2001) for a model where both family and society play a role in the transmission of preferences.

Table 4
Multivariate regression results — controlling for Chinese ethnicity.

	Bribe (0/1)		Accept (0/1)		Punish (0/1)	
	M. effect♣	p-value	M. effect♣	p-value	M. effect♣	p-value
Treatment WR	0.018	0.55	0.046	0.13	−0.103	0.04 *
India	0.150	0.00 ⌂	0.074	0.05 *	−0.200	0.00 ⌂
Indonesia	0.047	0.39	−0.069	0.11	0.105	0.17
Chinese Indonesian	0.048	0.60	0.081	0.32	0.283	0.14
Singapore	0.096	0.06 #	0.073	0.05 *	−0.038	0.57
Male	0.065	0.03 *	0.010	0.75	−0.098	0.06 #
Econ Major					−0.134	0.02 *
Bribe amount			0.001	0.95	−0.021	0.47
% life out of Australia	0.126	0.05 *				
Test						
Indonesian + Chinese Indonesian = Singapore		0.95		0.78		0.03 *
R-squared	0.039		0.047		0.073	
N	569		480		417	

♣ We report marginal effects for the probits.
⌂, * and # denote statistical significance at the 1%, 5% and 10% levels, respectively.

Table 4 presents regression results controlling for Chinese ethnicity in Indonesia and tests whether the behavior of the Chinese subjects in Indonesia differ from the behavior of the ethnic Indonesian or the Singaporean subjects. We find no significant difference between the behavior of the Chinese-Indonesians and other Indonesians (i.e., the coefficient on the Chinese-Indonesian dummy is insignificant in all three regressions). The large standard errors on the Chinese-Indonesian coefficients in the bribery and acceptance regressions imply that we are unable to reject the hypothesis that the behavior of the Singaporean and Chinese-Indonesian subjects are the same.[26] However, the punishment behavior of the Chinese-Indonesian subjects is significantly different from that of their Singaporean counterparts. Table 4 shows that the Chinese Indonesian subjects were on average 42.6 percentage points more likely to punish than the Singaporean subjects ($p = 0.03$).[27] These results tentatively imply that subjects' punishment behavior is affected by the values embedded in the institutions of the society in which they live rather than their ethnic background.[28]

5.2.3. Evidence from the survey responses

To gain further insight into whether the subjects' reasons for punishing differ across the four locations, we examined the citizens' open-ended responses to the post-experimental survey question about their punishment decisions. Table 5 shows our categorization of the reasons for punishing into the following four groups: moral responsibility, reduction of corruption, fairness, and negative reciprocity. Reasons for not punishing were categorized into three groups depending on whether the subject is profit maximizing, believes that it is difficult to change the system, and/or thinks that the bribe may be necessary. These categories were not mutually exclusive because often subjects gave multiple reasons for their behavior.

The reasons given reflect both the current levels of corruption in the respective countries and the extent of concern over the problem. In general, across all four countries, subjects predominantly gave reasons explicitly related to corruption in explaining their decisions to punish or not, which suggests that behavior was driven by the subjects' attitudes towards and experience of corruption.[29] In countries with higher rates of punishment, the proportions of subjects who gave moral responsibility or reduction of corruption as their reasons for punishment were higher. For example, of the citizen subjects who got a chance to punish, a greater proportion of those in Indonesia stated that punishing is a moral responsibility (39.2% in Indonesia versus 12.6% in India, 20.2% in Singapore, and 35.5% in Australia), or is a way to reduce corruption (20.3% in Indonesia versus 12.6% in India, 8.1% in Singapore, and 14.9% in Australia).

Table 5
Survey Responses — Reasons for Punishing/Not Punishing (as a percentage of those who had a chance to punish).

	Location				
	Overall	Australia	India	Indonesia	Singapore
A. Reasons for punishing					
Moral responsibility	26.9%	35.5%	12.6%	39.2%	20.2%
Reduce corruption	13.7%	14.9%	12.6%	20.3%	8.1%
Fairness	11.8%	10.6%	1.9%	23.0%	15.2%
Negative reciprocity	12.7%	9.9%	7.8%	21.6%	15.2%
B. Reasons for not punishing					
Profit maximizing	45.1%	42.6%	58.3%	27.0%	48.5%
Difficult to change the system or ineffective punishment system	10.1%	5.7%	12.6%	16.2%	9.1%
Bribe may be for a good purpose or may be necessary	3.6%	2.8%	7.8%	4.1%	0.0%
N	417	141	103	74	99

Although the majority of those who chose not to punish did so to maximize their payoffs, fewer subjects in Indonesia cited payoff maximization as their reason (27% in Indonesia as compared to 58.3% in India, 48.5% in Singapore and 42.6% in Australia). Many more of those in India and Indonesia stated that they did not punish because it is difficult to change the system (12.6% in India and 16.2% in Indonesia as compared to 5.7% in Australia and 8.1% in Singapore) or a bribe may be necessary (7.8% in India and 4.1% in Indonesia as compared to 2.8% in Australia and 0.0% in Singapore). This suggests a relatively higher acceptance of corruption as a part of life in these two countries.

5.3. Treatment WE versus Treatment WR

We now address whether behavior differs when the bribe is perceived as being harmful, i.e., when the payoff loss to the citizen exceeds the total payoff gain to the firm and the official. The bottom panel of Table 2 presents *p*-values from *t*-tests of differences in behavior across the two treatments. It shows no significant differences in the propensities to engage in and punish corrupt behavior across the two treatments in India, Indonesia and Singapore. This may be because the two effects we discuss in Section 3.2 exactly offset each other. However, there are substantial differences between subject behaviors in the two treatments in Australia. In Treatment WR, the frequency with which a bribe was offered was significantly higher (87.8% versus 78.51%, $p = 0.09$). The frequency with which the bribe was accepted was also higher (88.89% versus 81.05%) although the difference was not statistically significant. However, there was a significantly lower propensity to punish (42.19% versus 62.34%, $p = 0.02$). These differences suggest that on average, the larger harm imposed on the citizen by the bribery discouraged some citizens from choosing to punish, and the firms and officials who anticipated this behavior offered and accepted bribes more frequently. Interestingly though, while fewer citizens punished in Treatment WR, those who

[26] This is not surprising in the case of the bribery decision since Table 3 also shows that there is no statistically significant difference between Indonesia and Singapore.
[27] $0.105 + 0.283 - (-0.038) = 0.426$.
[28] These results are further borne out by results from unreported regressions which control for a number of different Indonesian ethnic groups, and Indian and Malay ethnicity in Singapore. In each case, the subjects acted in accordance with their country's participants rather than their ethnic group.
[29] The difference between the punishment rates in the neutral-language sessions (37%) and the loaded-language sessions (53%) further illustrates that the subjects' decisions were informed by their attitudes to real life corruption.

did punish punished by considerably larger amounts ($7.74 versus $5.98, $p = 0.06$).[30]

In summary, considering the impact of the cost of bribery on subject behavior, we find that the results are culture-specific. The difference in behavior between the Australian subjects and those in the other three countries could be because subjects in India, Indonesia and Singapore have more immediate experiences of the negative impact of corruption and are, therefore, relatively more willing to condemn it in Treatment WR even though the citizens' payoffs are very low.

6. Discussion

We have analyzed the propensity to engage in and to punish corrupt behavior in the context of a three-person sequential-move game in four different cultures. We find significant cross-cultural variation in behavior, particularly in the propensity to punish corrupt transactions. This finding suggests that people may be more ready to sanction behavior socially regarded as immoral when they see it in others or when they are victimized by it.[31]

Our results from India and Australia suggest that greater exposure to corruption in daily life may build a greater tolerance of corruption, with the Indian subjects showing a greater propensity to engage in and a lower propensity to punish corrupt behavior. However, the results from Singapore and particularly Indonesia do not support this argument. Indonesia is consistently ranked as having high levels of corruption, yet our subjects displayed a relatively low tolerance for corrupt behavior. In contrast, Singapore is a relatively low corruption country, but the Singaporean subjects in our experiments showed a relatively high willingness to engage in corruption and reluctance to punish it.

The results imply that cultural variation in attitudes towards corruption could be more complex than we originally hypothesized. Although we are not able to identify the causes of these results with certainty, we conjecture that the relatively high tolerance of corruption in Singapore and the relatively low tolerance of corruption in Indonesia reflect the recent institutional histories of these two countries. Corruption in Indonesia has traditionally been more centralized (controlled largely by the Suharto family, the military leaders, and the ethnic Chinese-run conglomerates) while corruption in India is more fragmented (Bardhan, 1997, p. 1325). The introduction of democracy in 1998 and the increased press freedom have resulted in this highly visible and identifiable type of corruption that exists in Indonesia receiving a lot of negative media attention — more than in the past and more than in India.[32,33] There have been several attempts (some successful) to prosecute high profile cronies of the previous government who were engaged in corruption to the scale of billions of dollars and the current president was elected largely on an anti-corruption platform. Although there is no doubt that corruption remains high in Indonesia, our results suggest that these institutional changes may have resulted in an increase in aversion to corruption in Indonesian society.[34] This finding is also supported by the findings of a recent Transparency International survey, which assesses people's attitudes to corruption. The results indicate that, among the 45 countries surveyed, Indonesians were the most optimistic about corruption falling in their country in the next 3 years.[35]

The relatively high propensity to engage in and a low propensity to punish corrupt behavior in Singapore suggest that attitudes towards corruption may take a long time to change. Half a century ago the level of corruption in Singapore was comparable to that in India and Indonesia. It has successfully eradicated corruption, but this has been achieved by the imposition of strict and heavily-enforced anti-corruption legislation.[36] A possible explanation for our results is that although the strict top-down approach in Singapore for the last few decades has made Singaporeans less tolerant of corruption (e.g., vis-à-vis Indians), the attitudinal change that accompanies such an approach occurs only slowly.[37]

Our paper is a first attempt to study an extremely complex phenomenon. One possible response to our findings is that the cross-cultural variation in our results merely reflects the differing propensities to punish across cultures, rather than the attitudes to corruption. While this is an issue worthy of additional research, for a number of reasons we believe that our results reflect attitudes to corruption rather than punishment per se. First, as discussed in Section 5.2, a large majority of the subjects specifically referred to the level of corruption in their country and it being a blight on their society when explaining their punishment decision. Second, our results are consistent with a number of other data sources. As mentioned above, Transparency International finds Indonesia to be one of the most optimistic countries in regard to lowering corruption in the future. India is found to be one of the most pessimistic. The World Values Survey finds that more Singaporeans say that accepting a bribe could be justified under certain circumstances (than in the other countries in our study).[38] Third, evidence from other experimental work on Indonesia using the ultimatum game has not found that Indonesians have a higher inherent propensity to punish than other cultures (Cameron, 1999). Fourth, punishment rates in our subject pool are much higher in the loaded-language treatment than in the neutral-language treatment.

The results from Indonesia and Singapore suggest that it would be worthwhile to do further research to more fully understand the role institutional change plays in changing attitudes to corruption. One way to do this is to investigate how attitudes change over time in a

[30] The coefficients on the Treatment WR dummy in Table 3 captures the average treatment effect across the four countries. Only the coefficients in the punishment regressions are significant. The different treatment effects in Australia detected by the *t*-tests suggest that it may be appropriate to interact the treatment variable with an Australian dummy variable. Doing so resulted in a less well-fitted model for the bribery and acceptance decisions and did not affect the qualitative results in the punishment regressions.

[31] This is in line with the arguments made in previous studies that the extent to which individuals care about other-regarding preferences like fairness or morality may depend on whether they are predators or potential victims (Bolton and Ockenfels, 2000; Fehr and Schmidt, 1999).

[32] That corruption receives more attention in Indonesia than in India is borne out by the percentage of newspaper articles that are devoted to the topic. In the time period April to June 2004, approximately 2% of the total number of articles in *Times of India* relate to domestic corruption. In Indonesia, nearly 9% of the articles in *The Jakarta Post* discussed corruption issues during this same time period.

[33] India is of course a functioning democracy with a free press, but the relatively smaller scale of high-level corruption in India has not galvanized society to forcefully oppose corruption. Further, corruption was not a major issue at the time when democracy was introduced in India. In contrast, corruption was one of the major causes of the downfall of President Suharto and the advent of democracy in Indonesia.

[34] Our conjecture is supported by Ferraz and Finan (2005) and Brunetti and Weder (2003). Based on the results of Brazil's recent anti-corruption program, Ferraz and Finan (2005) show that the media can enable voters to hold corrupt politicians accountable by reducing informational asymmetries. In a study that involves a large cross-section of countries, Brunetti and Weder (2003) find evidence of a significant negative relationship between press freedom and corruption. Gentzkow, Glaeser and Goldin (2004) also discuss how the rise of the informative press may have been one of the reasons why corruption declined in the US.

[35] See http://unpan1.un.org/intradoc/groups/public/documents/APCITY/UNPAN016537.pdf. Indians were found to be among the most pessimistic. There is evidence that the optimism in Indonesia is justified given the recent activities of the Corruption Eradication Commission in this country (The Economist, 2008).

[36] The strict top down approach of the Singaporean government may of course reflect the population's high propensity for corruption.

[37] That attitudes take time to change was acknowledged by one of the most successful anti-corruption bodies, the Independent Commission Against Corruption (ICAC), formed in Hong Kong in 1974. Its declared goals were: "To change people's behavior so that they will not engage in corrupt behavior initially for fear of detection (deterrence), later because they cannot (prevention), and yet later because they do not wish to (attitude change)." The ICAC's success has made Hong Kong an example of how promoting ethical values against corruption can work.

[38] See http://www.worldvaluessurvey.org/.

given location. Further experimental research with different subject pools would also be valuable.[39] Finally, research on a wider range of countries with differing levels of corruption would enable a more definitive examination of the relationship between the existing levels of corruption and individuals' attitudes in these countries.

In general, the differences between our results and what one would expect to observe in these countries based on the existing corruption indices suggest that experiments can be used as an alternative methodology to elicit attitudes to corruption. Corruption is difficult to measure because it is illegal. The most frequently used measures, such as the Transparency International's CPI, measure people's perceptions of corruption on the basis of survey responses. Given that there is often a disconnect between people's self-reported preferences and actual behavior, we believe that experiments can serve as a powerful alternative tool for measuring attitudes towards corruption. Moreover, perception indices such as the CPI provide a measure of perceptions of corruption in the recent past.[40] Policy makers value more forward-looking measures, which assess individuals' propensity to support anti-corruption policies in the future. Our study suggests experimental methodology can provide such information.

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[39] Using different subject pools to examine cultural differences in attitudes towards corruption can help us understand different aspects of the corruption problem. Alatas et al. (2009) takes a step in this direction by comparing the behaviour of students and public servants in Indonesia.

[40] See "Digging for Dirt," *The Economist*, March 18, 2006. Several people have raised concerns about the reliability of these measures and there exists a small recent literature that attempts to measure corruption more objectively. See Svensson (2003), Hsieh and Moretti (2005) and Olken (2006).