An experimental study of kin and ethnic favoritism*

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Abstract

Experimental studies of favoritism and corruption typically examine such behavior among strangers, but ethnic and kinship ties have long been viewed as potential catalysts for favoritism, and hence corruption. In this paper, we provide evidence from lab experiments on the effect of kinship and ethnic ties on favoritism. We report behavior in a game where the first mover chooses whether to offer a transfer payment and the second mover chooses to reject or accept it, and upon acceptance, whether to incur a cost to provide a benefit to the first mover at the expense of third party. In three countries, we recruit kin, co-ethnics and strangers to the lab and systematically vary the relationship(s) between the players of the game to observe how kin and ethnic ties influence the willingness of the first- and second-mover to benefit one another at the expense of a third party. We see kin favoritism in all societies, but we find some evidence that the degree of ethnic favoritism, and favoritism towards other in-group members (friends) varies. We provide evidence this may be related to kinship patterns, since favoritism is more common in societies with more in-marriage and denser kin networks.

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> "Now it appears, that in the original frame of our mind, the strongest attention is confin'd to ourselves; our next is extended to our relations and acquaintances; and 'tis only the weakest which reaches to strangers and indifferent persons. This partiality, then, and unequal affection, must not only have an influence on our behaviour and conduct in society, but even on our ideas of vice and virtue..."
>
> (David Hume, 1740, *A Treatise of Human Nature*, Section 3.2.2.)

1 Introduction

A common assumption in the literature on corruption is that it arises from peoples' preference to favor members of their own group at the expense of outsiders. In a prominent literature within economics, the group has been defined as those who share an ethnic identification; see e.g. Mauro (1995) who argues that in societies with substantial ethnic heterogeneity (aka fractionalization), corruption occurs on the basis of shared ethnicity. While early evidence supported an association between ethnic fractionalization and corruption in cross-country analyses (e.g. Alesina *et al.*, 2003), more recent work has cast doubt on the robustness of this association and encouraged skepticism (see Chuah *et al.*, 2013, and the references therein). Moreover, while the argument has some intuitive appeal, it is natural to ask why individuals should be assumed to favor co-ethnics. *Cultural* affinities provide a potential signal of shared interests and can be a source of increased trust and cooperation, but in practice shared ethnicity does not necessarily imply shared values (Desmet *et al.*, 2017). Thus shared ethnicity may provide a relatively weak basis for favoritism. Nevertheless there exist clear theoretical reasons to suspect that individuals will be prone to favoritism with another group: their kin.

The adage "blood is thicker than water" succinctly summarizes the intuitive knowledge that people are prone to favor their kin. Biological theory due to Hamilton (1964a,b) provides a compelling theory of why this should be true, across societies (and across species). The idea is that genetic relatedness between individuals provides the incentive for favoritism. The argument relies on the biological notions of inclusive fitness and kin selection, which imply that genetic relatives, who share genes with an interest in propagating themselves to the next generation, may have incentive to incur costs to help one another. A model of kin selection implies that increases in *relatedness* can encourage corruption and favoritism. Since the relatedness of two randomly chosen co-ethnics is quite low, the model also implies that shared ethnicity *per se* is insufficient to foster corruption, potentially helping to explain the ambiguous findings noted above. While this theoretical framework may be unfamiliar to economists (and other social scientists), "the biologically based approach shares strengths in common with the best of economic theory; it is parsimonious, counter-intuitive, and falsifiable" (Cox and Fafchamps, 2007, p. 3759). Thus we designed experiments to improve our understanding of the role of kin and ethnic favoritism in corruption in sample of 1251 subjects from 3 countries.

We report three studies that provide experimental tests of kin and ethnic favoritism in a variant of a widely studied, one-shot game meant to model petty corruption and bribery. In this game, the first mover chooses whether to offer a transfer payment (a bribe) to the second mover and the second mover chooses to accept or reject it. If he accepts the bribe, the second mover also decides whether to incur a cost to provide a (corrupt) benefit to the first mover, at the expense of a passive third player. We recruit subjects to the lab to play this game with kin, co-ethnics and strangers, and we use the data to test for kin and ethnic favoritism.

In the subgame perfect Nash equilibrium (SPE) of the game, the second-mover should always accept a transfer and should never incur the cost of reciprocation; as a result, the first-mover should never offer the transfer. Thus, under standard assumptions about preferences, we would expect to see neither transfers nor reciprocation. However, if individuals have a general tendency to favor member of an in-group, we would expect to see favoritism among both kin and co-ethnics. By contrast, in section 3, we show that kin selection theory predicts that the incentive for the second mover to reciprocate, and hence for the first mover to offer the transfer, is increasing in their relatedness. Since co-ethnics are not closely related, favoritism among them should rarely occur in equilibrium, but for sufficiently related pairs (e.g. among siblings), favoritism is an SPE.

In Study 1, subjects in Vancouver, Canada and Urmia, Iran played the three-player game with one unrelated person and one co-ethnic (or sibling, in the Kin treatment). Three possible assignments of roles to two co-ethnics (kin) create three treatments through which we explore the effect of co-ethnicity (kinship) on transfers by first movers and reciprocal favoritism by second movers. By standard measures, the two countries are both quite ethnically fractionalized (EF Index = 0.71 and 0.67, respectively Alesina *et al.*, 2003), which could provide fertile soil for norms of ethnic favoritism to thrive. We find evidence of corruption in both countries, and consistent with kin selection theory, increased relatedness of first and second movers is associated with higher levels of favoritism. Kin favoritism is extremely common in both countries, but, despite their similar degrees of ethnic fractionalization, we see evidence of ethnic favoritism (relative to treatment of strangers) only in Iran.

These findings suggest that we should consider other factors that differ across countries when interpreting the results. Canada is a developed country, renowned for its multicultural society, with among the lowest corruption perception indices in the world.[1] On the other hand, Iran is a developing country with a high corruption perception index and is in a region prone to ethnic conflicts. Existing evidence from Barr and Serra (2010) and Salmon and Serra (2017) suggests that laboratory measures of corruption are correlated with corruption in the origin country of immigrants, which could help to explain higher favoritism among Iranian co-ethnics if Iranian institutions shape social norms and subjects bring these norms with them into the lab. To test the robustness of our findings and to ask whether broader differences in norms can account for observed cross-country differences in behavior, we then conducted Study 2.

In Study 2, we ran two additional treatments that probe the boundaries of our findings: 1) a "High Cost" treatment that increases the cost of corruption (to the second-mover, such that he/she is worse off accepting and reciprocating than simply rejecting the bribe), and 2) a "Friend" treatment in which the first- and second mover are related by friendship (and not as kin). The High Cost treatment allows us to test the relative strength of favoritism across and within countries, and the Friend treatment allows us to test to what extent in-group favoritism extends outside the kin group. We see that, even with High Costs, Iranian kin are willing to help

[1]See http://www.transparency.org/research/cpi/overview.

one another at the expense of a stranger; the same is true with friends, but not when all three players are strangers. In Canada, friends favor one another at the expense of a stranger when the cost of corruption is low, but under High Costs, we see lower rates of corruption among friends in Canada than in Iran. This provides additional evidence that norms of in-group favoritism vary across the countries and raises the question why this might be the case.

As noted above, one explanation in the literature is that this is a spillover from institutional differences - weak institutions encourage corruption. This is consistent with our data, but it raises a fundamental question about why institutional quality varies. A growing literature suggests that kinship and marriage patterns may be a fundamental determinant of institutional quality (Greif, 2006; Greif and Tabellini, 2015; Woodley and Bell, 2013; Schulz, 2016; Moscona *et al.*, 2017a,b; Enke, 2017). Canada and Iran differ substantially on these dimensions. Despite having relatively similar measures of "family ties" (Alesina and Giuliano, 2011), Iranian households are more likely to include extended family, and marriages among kin are far more common (Bittles and Black, 2015). Recent work has connected these kinship patterns directly to corruption. Akbari *et al.* (2018) report evidence that societies with a larger share of close-knit family groups (as measured by the rate of marriage among cousins) also exhibit more corruption. There are two complementary reasons why this might be the case. First, in-marriage within families creates a denser web of kinship ties, binding families and local groups closer together and favoring the development of norms for cooperation within the group. Second, such marriage practices directly increase relatedness within the kin group, since the offspring of kin are substantially more related than the offspring of two randomly chosen people. Thus the incentive for corrupt favoritism is increased in a model of kin selection.

Since both institutional quality and marriage practices vary across Iran and Canada, these countries are not an ideal setting for testing this hypothesis. Thus, we conduct Study 3 in Ecuador, holding formal country-level institutions constant, and comparing two villages with divergent traditional marriage practices. Importantly, like Canada and Iran, Ecuador is ethnically fractionalized (EF Index = 0.66, according to Alesina *et al.*, 2003).[2] Before conducting the experiments in the villages, we first replicated the Stranger and Kin treatments using a student population in Quito, Ecuador. As before we find strong evidence of kin favoritism, consistent with the relatedness hypothesis. We then chose two rural villages from cultural groups that differ in whether they permit marriage between cousins, and there we conducted the experiment with the first- and second-movers related as Kin, non-Kin co-residents and Strangers; we also tested the strength of favoritism towards non-kin co-residents with a High Cost treatment.

If in-marriage practices increase incentives for favoritism, then we would expect to see more favoritism where those practices are permitted. The evidence is consistent with this hypothesis but is not decisive. As in our other settings, we see high degrees of kin favoritism in both villages. With non-kin co-residents of the villages, we see similar behavior when costs are low, but in the High Cost treatment, favoritism remains constant where cousin marriage is allowed and declines where it is not permitted. This provides additional (weak) support for the hypothesis that norms favoring in-group members are more common in societies with in-marriage practices.

Our studies are by no means the last word on the sources of corruption, but we provide a number of insights into the causes of corruption. First, across all three studies we see extremely strong evidence that kin are willing to favor one another at the expense of strangers, highlighting kin ties as an important channel of favoritism and corruption. Second, all of our data are consistent with theory from biology that predicts incentives to help are increasing in individuals' relatedness. This suggests that considering biological arguments about the source of preferences may provide a useful complement to economic theory. Third, we provide additional evidence that laboratory measures of corruption are related to the corruption level of the country of origin of the subjects, consistent with Barr and Serra (2010) and Salmon and Serra (2017). Fourth, while our evidence is not conclusive, we find some support for recent claims that kinship patterns may help explain variation in social norms (related to favoritism and corruption) and institutional quality. Moreover, our experimental approach provides a useful measurement strategy

[2] While family ties data for Ecuador are not available in Alesina and Giuliano (2011), interpolation from neighboring countries, such as Peru, suggests that Ecuador would also be similar to Canada and Iran on this dimension.

for asking such questions, and our design in Study 3 suggests a way to improve on cross-country evidence by conducting an analysis that holds country-level factors fixed. Finally, since ethnic fractionalization is similar in all societies in which we conducted experiments, evidence that corruption among co-ethnics varies across them should at least be seen as not supporting the hypothesis that such fractionalization is the only (or primary) cause of variation in corruption.

2 Related experiments

Methodologically, our study intersects with two line of research in the experimental economics. The first is experimental studies on bribery. By adding negative externality and risk of penalty to a simple two-player trust game, Abbink *et al.* (2002) introduces the first bribery game. In a neutral-language repeated experiment with fixed players, they show that bribers and officials reciprocate each other with higher bribes and corrupt efforts respectively, and negative externality (on all other subjects) has no significant effect on the cooperation level. Abbink (2004) finds a lower frequencies of bribery and corruption when pairs are re-matched after each round to show the effect of staff rotation policy on level of corruption.

In a one–shot loaded–language bribery experiment, Cameron *et al.* (2009) focus on behavioral differences across cultures (India, Indonesia, Singapore and Australia). They modify the bribery game by adding a third player whose payoff decreases as a result of the briber and official's cooperation in which case he/she can punish them. Their results show that consistent with the existing corruption indices, the subjects in India exhibit a higher tolerance of corruption than the subjects in Australia. In a similar one shot bribery game, Alatas *et al.* (2009) compare the behavior of Indonesian public servants with Indonesian students when exposed to corruption. They find that public servants are less likely to engage in bribery and more likely to punish. Based on the experiment survey, this is due to public servant's work experiences and real life encounters. Alatas *et al.* (2009) show that while women in Australia are less tolerant of corruption than men in Australia, no significant gender differences are seen in India, Indonesia, and Singapore.

Barr and Serra (2010) conduct a bribery experiment among international students and find that the more corrupt a student's home country is, the more he/she engages in the corrupt act. They also find that propensity to engage in the corrupt act decreases with an increase in years spent in UK. In a similar experiment, Salmon and Serra (2017) conducts a bribery experiment with children of immigrants in the US. They find that the possibility of social judgment, induced by visibility of corrupt cooperation by the victim and other players, reduces corruption only among individuals who identify culturally with countries characterized by low levels of corruption. Armantier and Boly (2013) investigate the external validity of corruption experiments by running a lab experiment Canada, and a lab and a field experiment in Burkina Faso. They design an experiment in which a candidate can offer a bribe to a grader to get a better grade. Their findings show that the direction and the magnitude of the results are statistically indistinguishable in all three environments.

The second line of research in experimental studies which is closely related to ours is in–group favoritism. Running a trust game among students, Glaeser *et al.* (2000) find that national and racial differences between partners strongly predict a tendency to cheat one another. Using two distinct native tribes from Papua New Guinea, Bernhard *et al.* (2006) ran an experiment where player A plays a dictator game with player B, player C is then informed about player A's action and can invest to punish player A. Results support an egalitarian norm within and across the tribes. However, the violation of the egalitarian norm by player A is much more heavily punished where B and C belong to the same tribe. Abbink and Harris (2012) runs a multi–recipient dictator game experiment in Thailand. A player divides a large sum of money among him/herself, and three groups of players: supporters of two political parties and a politically neutral group. The results provide clear evidence for both in-group favoritism and out-group discrimination.

Falk and Zehnder (2013) conducted a trust experiment with almost 1000 subjects from 12 residential districts of Zurich. Among other findings, they show that first movers invest more if the second mover comes from their own district. In a feild experiment by Chuah *et al.* (2013), subjects of different religions—Hindu and Muslim in Mumbai—played a trust game with the same and different religion. Results show that relative to the baseline where the ethnic and religious affiliations of co-players are unknown, (1) subjects cooperate more with others who share religious identity; (2) there is no evidence that they cooperate less with others who do not share religious identity. On contrary, Johansson-Stenman *et al.* (2009) found no significant effect of the social distance between Hindus and Muslims of rural Bangladesh in the trust experiment in terms of the proportions sent or returned. However, their survey show that both Hindus and Muslims trust others of their own religion more. In a meta-analysis of 77 experimental studies on out-group discrimination with different games, Lane (2016) found that out-group discrimination is bigger when identity is artificially induced in the lab rather than among ethnic, religious and national groups when there is scope only for taste-based discrimination.

Our study also contributes to the literature on the consequences of family ties. Banfield (1958), Fukuyama (1995), and Yamagishi *et al.* (1998) suggest that intense family ties prevent trust from developing beyond the confines of the family Banfield (1958); Yamagishi *et al.* (1998). Combining experimental data from trust game and panel survey data, both sampled from British population, Ermisch and Gambetta (2010) provide evidence on that people with strong family ties have a lower level of trust in strangers. They measure family ties by number of times an individual meets his/her parents living elsewhere. Alesina and Giuliano (2011) show an inverse relationship between of family ties with civic engagement, political participation, and generalized trust. They measure the strength of family ties by looking at three variables from the World Value Survey which capture beliefs regarding the importance of the family in the respondent's life, the duties and responsibilities of parents and children, and the love and respect for one's own parents. By providing an experimental study where norms of trust and harm among participants with family ties are compared against those of strangers and with ethnic ties, we contribute to this literature.

[TO BE EXPANDED]

3 Theory and hypotheses

Corruption can be defined as “abuse of public office for private gain” (World Bank, 1997, p. 8). *Public office* can be abused in hiring for governmental positions, manipulating government procurement or facilitating/limiting access to basic goods or services in places like hospitals, schools, police departments, etc. *Private gain* is often realized through *bribery*, with gifts, money, or similar benefits offered in exchange for official actions. However, enforceable contracts for such exchanges are impossible because corruption is typically illegal. Therefore, *bribery* necessitates implicit contracts which rely on trust and cooperation.

3.1 A basic model of bribery

Seen from a game-theoretic perspective, bribery is a social dilemma much like a trust game (see e.g. Berg *et al.*, 1995; Fehr and Fischbacher, 2003) where (i) a sequential exchange takes place in the absence of enforceable contracts, (ii) both players are better off exchanging their goods or favors, and (iii) there is also a strong temptation to cheat, e.g. by accepting the bribe and failing to reciprocate. However, as noted by Abbink *et al.* (2002), the trust game lacks two essential components of bribery: the possibility of negative externalities and the risk of penalty.

Figure 1a shows our bribery game inspired by Abbink *et al.* (2002). Player 1 represents a private agent and player 2 represents a public official. Player 1 may offer a bribe (t) to player 2 in the hope that player 2 will misuse his office to benefit her (B). If player 1 offers a bribe, she also incurs a small cost (c) of initiating the relationship with the official. The private agent’s benefit from the official’s corrupt effort, B is high enough that $B > t + c$.

The official, player 2, has the option of accepting t but making no effort or making a corrupt effort and incurring a cost (e). The effort cost is low enough that $e < t$. If the official chooses to make the corrupt effort, there is a small probability (ϵ) of getting caught, where both private agent and official end up with zero payoffs. If the official is not caught, the negative externality of the official’s corrupt effort on citizens, who have no move in the game, is X_i, which is displayed below the payoff vectors whenever it occurs. Assuming $\sum X_i \geq B$, the game also captures another characteristic of corruption; it is inefficient.

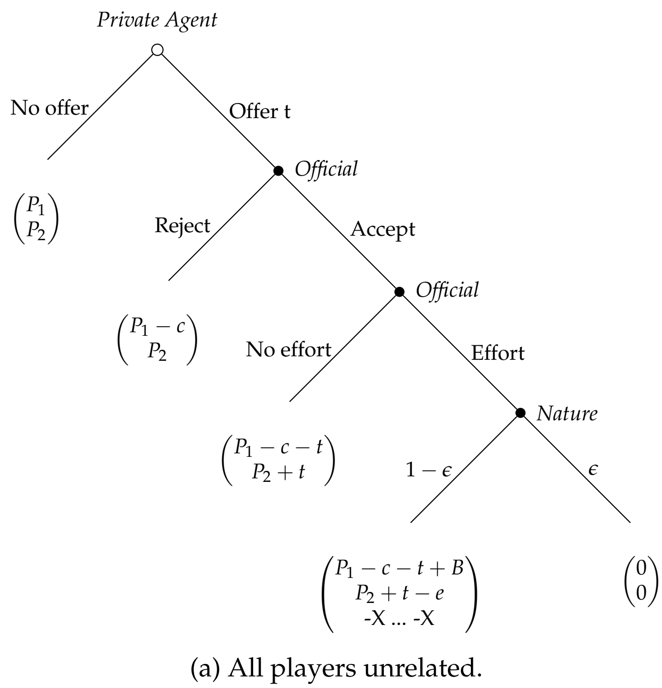

Figure 1: **A bribery game between strangers and relatives, highlighting the implications of inclusive fitness.**

In the unique subgame perfect equilibrium of the one-shot game, the official accepts the offer but makes no effort, and the private agent chooses not to offer a bribe to the official. However, from field observations and experimental studies, we know that "corruption exists, bribes are paid, and favors are reciprocated" (Lambsdorff, 2012, p. 280). One possible source of observed corruption is nepotism, and its antecedent biological or kin altruism.[3]

3.2 Inclusive fitness, kin altruism, and corruption

Sequential social dilemmas such as the bribery game allow agents to engage in altruistic behavior: one party may incur a cost in order to provide a larger benefit to another (in this case at a cost

[3] Of course we do not claim it is the only source - repeat interaction, reciprocity and threats may also facilitate corruption, even among non-kin. The purpose of the one-shot game described here is merely to provide a simple framework in which to highlight the role of kinship as another important potential causal factor.

to third parties). In general, costly, altruistic behaviors like self-sacrifice, non-reciprocal help and subordination of private interests for the good of the group are all commonly observed among kin. Costly altruism seems to contradict both models of individual self-interest and Darwinian natural selection, because behaving altruistically is disadvantageous for the altruist, by definition. Intuitively, individuals that incur costs in order to provide fitness benefits to others will have lower fitness than free-riders, and hence, *prima facie*, should have their numbers dwindle. However, Hamilton (1964a)'s *kin selection* theory provides a simple and empirically successful argument explaining how such altruistic behavior could evolve under natural selection.

Hamilton solved the problem by focusing on selection at the level of the *gene* rather than the *individual*. We can imagine "a gene which causes its bearer to behave altruistically towards other organisms, e.g. by sharing food with them" (Okasha, 2013). We expect the altruist gene to be eliminated because it is disadvantageous for the altruist. But what if altruists share food only with those with whom they also share genes? Since there is a certain probability that the recipients of the food will also carry copies of that gene, the altruistic gene can in principle spread by natural selection. Thus altruistic behavior may increase the number of copies of the altruistic gene in the next generation, and thus "the incidence of the altruistic behavior itself" (*Ibid*.).

Hamilton demonstrated that an altruistic gene will be favored by natural selection and will spread in the population when a certain condition, known as *Hamilton's rule*, is satisfied. According to Hamilton's rule, a *donor* provides an altruistic act if $rB > C$, where C is the cost of the altruistic act to the donor, B is the benefit of the act to the *recipient*, and r is the coefficient of relatedness between the donor and the recipient. This rule is based upon expected costs and benefits in terms of *inclusive fitness* which represents one's own fitness[4] plus the weighted sum of relatives' fitness, where the weights are the coefficients of relatedness. Then from a *gene's eye view* an individual benefits not only through personal reproduction, but also by helping the reproduction of others who share some of their genes (Okasha, 2013; Cox and Fafchamps, 2007).

Therefore, if we assume that all people have some propensity toward kin altruism, all else

[4]Fitness should be thought of as reproductive success, e.g. as the expected number of progeny.

equal, more closely related individuals have stronger incentives to behave altruistically towards one another. There is a lot of supporting evidence for this claim in other contexts: kinship patterns correlate with within-household violence, allocation of food, provision of childcare, and safeguards against infanticide, as well as migrant workers' remittances to their families, willingness to murder political rivals and form stable alliances, taking sides in disputes, emotional and material support within social networks, cooperation under catastrophic circumstances, membership in cooperative labor units, organ donation rates, etc. (see e.g. Cox and Fafchamps, 2007; Madsen *et al.*, 2007; Bowles and Posel, 2005; Fellner and Marshall, 1981).

The relatedness of two individuals can be approximated by the *coefficient of relatedness*, that is, the expected fraction of identical by descent genes that are shared between two individuals in a *randomly mating population*. The value of the relatedness coefficient for identical twins is 1, for full siblings and fraternal twins 1/2, for parents and offspring 1/2, for grandparents and grandchildren 1/4, for first cousins 1/8, and so-on to a randomly chosen pair who have a relatedness coefficient of 0 (Okasha, 2013).[5] "J. B. S. Haldane once remarked, it would make sense to dive into a river to save two drowning siblings or eight drowning cousins" (Siegfried, 2006, p. 85). See Appendix A for further detail.

Co-ethnics are also more related (in expectation) than strangers (Harpending, 2002; Cavalli-Sforza *et al.*, 1994). However, empirical estimates suggest that relatedness of people from the same ethnic group is typically not far above zero, so that co-ethnics are unlikely to be sufficiently related for kin selection to substantially influence behavior. For example, according to Cavalli-Sforza *et al.* (1994), the genetic distance between English and French populations is FST = 0.0024. Therefore, in a world consisting of both English and French populations, two random English (or French) people have a relatedness of only r = 0.0048 (in between the relatedness of 3rd and 4th cousins under random mating) (see Harpending, 2002, for the logic and calculations).

[5] In reality, even in a random mating population, a parent might share more than half of her genes with her offspring; "half those genes are surely identical because they came from the parent, while gene sharing with the other half of the child's genome is just what is shared with any random member of the population." Hence, a more precise way to think of relatedness is to "think of gene sharing in excess of random gene sharing" (Harpending, 2002, p. 142), and the coefficient of relatedness is more properly defined as $r = (Q - \overline{Q})/(1 - \overline{Q})$, where Q is the relatedness of the two individuals, while $\overline{Q}$ is the average relatedness in the population (Nowak *et al.*, 2010, p. 1059).

Bribery game with inclusive fitness

Suppose the payoffs in the bribery game are in units of *biological reproductive fitness*.[6] According to inclusive fitness theory, if players in the bribery game are related, their payoffs should include not only the fitness effects on themselves but also on the other parties involved.

In particular the benefits and costs to others enter into in the players' payoffs weighted by the coefficient r, of relatedness between them. Let r_{po} represent the relatedness of the private agent and the official. Also, let $r_{pc} = 0$ be the sum of relatedness of the private agent to citizens, and let $r_{oc} = 0$ be the sum of relatedness of the official to citizens. Then, the payoffs to the bribery game are modified as shown in Figure 1b.

In the bribery game with genetically related players, the subgame perfect equilibrium can be characterized as follows, by backward induction:

(I) If accepting the offer, the official honors the trust of the private agent and makes a corrupt effort on her behalf with a unique equilibrium strategy if: $(1-\epsilon) > \frac{P_2+(1-r_{po})t-r_{po}c}{P_2+(1-r_{po})t-r_{po}c+r_{po}B-e}$ and he accepts the offer if: $(1-\epsilon) > \frac{P_2}{P_2+(1-r_{po})t-r_{po}c+r_{po}B-e}$.

(II) Assume that both aforementioned conditions hold so that the official accepts the offer and exerts the corrupt effort as his unique equilibrium strategy. The private agent foresees the optimal strategy of the official; therefore she places trust and offers t in a unique equilibrium strategy if: $(1-\epsilon) > \frac{P_1}{P_1-c-(1-r_{po})t-r_{po}e+B}$.

Implication 1: All else equal, the official is more likely to accept a bribe and make a corrupt effort as r_{po} increases.

Implication 2: All else equal, the private agent is more likely to offer a bribe as r_{po} increases.

Note that while our example sets r_{oc} and r_{pc} equal to 0, if we allow r_{oc} to vary, the official is less likely to accept a bribe and make a corrupt effort as r_{oc} increases, and similarly, if we allow r_{pc} to vary, the private agent is less likely to offer a bribe as r_{pc} increases.

[6]Of course, the analogy is imprecise in the sense that corruption is not transacted in units of fitness. However, in many cases, corruption influences the allocation of large quantities of resources (monetary and otherwise), which are correlated with reproductive success. In an extreme case, if a corrupt act results in one individual living to reproduce and another dying before reproduction, the effects are direct in fitness terms.

The analysis so far highlights the role of relatedness in shaping the incentives for favoritism. In-group favoritism among co-ethnics was Mauro's (1995) motivating example for using ethnic fractionalization as an instrumental variable for corruption: "bureaucrats may favor members of their same group"(*Ibid.*, p.693). However, empirical estimates suggest that relatedness among co-ethnics (relative to neighboring groups) is often not far above zero (Cavalli-Sforza *et al.*, 1994), which helps explain the weak association between ethnic fractionalization *per se* and corruption. Our focus is instead on favoritistic cooperation driven by relatedness among family members.

4 Experiment design and procedure

4.1 Study 1 - Vancouver and Urmia

We ran experiments in Canada and Iran, two countries with similar levels of ethnic fractionalization (EF Index = 0.71 and 0.67, respectively, Alesina *et al.*, 2003), but different levels of economic and political development. Subjects play a one-shot, three-person game, in which Person A may offer a transfer to Person B, who can choose whether to accept and whether to incur a cost, thereby helping A and harming Person C. In each triplet, there are two "related" people (either co-ethnics or kin) and one unrelated person. By varying assignment of people to roles (e.g. A related to B vs. A related to C), we can test how favoritism varies within-country across different relationships (as e.g. implied by Hamilton's theory), and by comparing across (similarly ethnically fractionalized) countries we can test for residual country-level differences in behavior.

We conducted the experiments with students in two large, ethnically heterogeneous cities: Vancouver, Canada and Urmia, Iran.[7] Vancouver is the largest city in the province of British Columbia and has seen a large influx of people from East and South Asia in the last 30 years. Today, the two most common ethnic backgrounds are English and Chinese. Urmia is the capital of West Azerbaijan Province in Iran, and the city has been home to numerous ethnic groups

[7]Our experiments in Iran were conducted in collaboration with the Moaser Research Center which possesses a permit from the Ministry of Science, Research and Technology to conduct research in Economics and Management. The center took full responsibility for planning, ethical review and official approvals to run experiments in Iran.

during its long history. Today, Azeri Turks and Kurds are the two main ethnic groups in the city.

The game. Subjects participated in the one-shot bribery game shown in Figure 2, which is a simplified version of the game described in Section 3. Unlike above, there is no risk of punishment. We remove this possibility to eliminate a source of noise, as the impact of punishment has been investigated in previous experimental studies (e.g. Abbink *et al.*, 2002). For simplicity, we also assume that only one citizen suffers the negative externality.

We chose our parameters so that A choosing "Transfer" and B choosing "Accept/Right" do not occur in the subgame perfect Nash equilibrium with unrelated, payoff-maximizing agents. Our design also ensures that the payoffs resulting from this outcome are both inequitable and inefficient relative to the status quo, so that the outcome cannot be rationalized by egalitarian or social welfare preferences. However, if A and B are sufficiently related, such favoritism can occur in equilibrium (via Hamilton's rule).

More broadly, if we observe cooperation between A and B (at the expense of C), this must be driven by factors other than selfish payoff maximization, (pro)social preferences or concerns for efficiency. Our preferred interpretation is that such behavior reflects background social norms related to favoritism and corruption, consistent with . Moreover, if bribery and corruption rates are higher in Iran than in Canada, this would provide evidence of normative differences that are at least correlated with observed higher levels of sub-ethnic fractionalization in Iran.

We applied non-normative language in the experiment using words like "Transfer/Not-transfer", "Reject/Accept", "Right/Left", "payoff added/deducted".[8] In order to make full use of our limited sample, we elicited Person B's strategies using the strategy method, so that we know what he/she would have chosen, had Person A offered the transfer.

Payoffs were shown in Experimental Currency Units, and our conversion rates were designed to assure that the stakes were purchasing power-equivalent across the societies. We used local pizza prices as our measure of students' purchasing power since both cities have many

[8]While Abbink and Hennig-Schmidt (2006) and Barr and Serra (2009) find no effect of framing in laboratory corruption games, their experiments were run with a single sample. To avoid risk of culture-specific framing effects, we erred on the side of caution.

pizza shops, and pizza is popular among students. The price of a medium pizza in Vancouver including tax is around 15 CAD and in Urmia around 15000 Tomans at the time of running experiments (2015). In Vancouver, we paid $7 for arriving on time and converted ECU at a rate of 10 ECU = $1. In Urmia, we paid 7000 Tomans for arriving on time and paid 10 ECU = 1000 Tomans. At the conclusion of the experiment a subset of subjects completed a post-experiment questionnaire (see Appendix B.3).

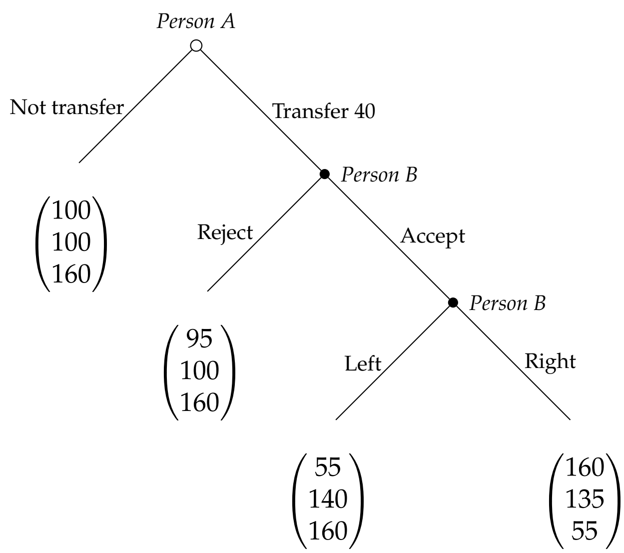

Figure 2: **Bribery game in the experiment.** Each terminal node shows the payoffs for Person A, Person B and Person C, from top to bottom.

Design and treatments

We employ a one-shot, between-subject design. Our treatments vary 1) whether the related pair of subjects in each triplet are related by kinship (K) or co-ethnicity (C), and 2) the assignment of subjects to roles. This generates the following treatments, where S refers to the Stranger:

KKS/CCS. Persons A and B are kin/co-ethnics. A(B) knows that B(A) is kin/co-ethnic and also knows that B(A) knows that A(B) is kin/co-ethnic. No information regarding the ethnicity of Person C is given to A or B, and C has no information about the ethnicity of the other players or their being related by kin or co-ethnicity.

KSK/CSC. Persons A and C are kin/co-ethnics. A(C) knows that C(A) is kin/co-ethnic and also knows that C(A) knows that A(C) is kin/co-ethnic. No information regarding the ethnicity of Person B is given to A or C, and B has no information about the ethnicity of the other players or their being related by kin or co-ethnicity.

SKK/SCC. Person B and C are kin/co-ethnics. B(C) knows that C(B) is kin/co-ethnic and also knows that C(B) knows that B(C) is kin/co-ethnic. No information regarding the ethnicity of Person A is given to B or C, and A has no information about the ethnicity of the other players or their being related by kin or co-ethnicity.

We randomly assigned one of the three treatments at the kin/ethnic level to each triple of subjects. Subjects were matched in triplets with their kin/co-ethnic based on their self-reported kinship/ethnic origin in a pre-experiment questionnaire (see Appendix B.2). Pre-experiment questionnaires were collected from subjects online or in paper, prior to the experiment. In the questionnaire, in addition to ethnic origin, we collected demographic information such as age group, gender, degree, and field of study to avoid highlighting the aim of our research. Before subjects learn their roles and information about subjects in the other roles, we mentioned that "you might observe some background information from the pre-experiment questionnaire about participants in the other roles." Also, we always included age-group information for other players in addition to ethnic origin information. We chose 18-30 as the age group to present in the experiment because it covered all the subjects in our sample; therefore, age information was the same for all treatments. We were hoping that these cautions along with the between-subject design would minimize any possible experimenter effect.[9] The instructions and more detailed procedures of the experiment are presented in Appendix B, including sample pages showing how we exchanged information between subjects in the three-player game.

[9]When we began our experiments in Vancouver, to present ethnic origin information, we used the word "ethnic origin" on the information page. Later, we dropped this word for the rest of the experiments in Vancouver and all the experiments in Iran, considering that it might affect subjects' choices due to the salience of "ethnicity". However, the results of experiments in Vancouver indicate that using the word "ethnic origin" had no effect on behavior.

Subject pool. For the co-ethnic treatments, our subjects in Vancouver were 180 Canadian-born undergraduate students with English or Chinese origins from the University of British Columbia and Simon Fraser University, both located in the Vancouver area. The subjects in the ethnic treatment in Urmia, Iran consisted of 180 Iranian-born undergraduate students with Azeri or Kurdish origins, taking courses at Urmia University during summer 2015. From each city, we collected data from 20 triplets in each of the three ethnic-level treatments (CCS, CSC, SCC).

For the kin treatments, we collected data on all three matching schemes in Urmia and only one matching scheme in Canada (KKS) since recruiting subjects for the Kin treatment in Canada was extremely difficult. For these treatments, we asked students whether their sibling would like to participate in the experiment, and if they answered with "Yes", we also asked the occupation and age group of their sibling. Then we invited those pairs of siblings who both were 18-30 years old and students. For each pair of siblings, another randomly chosen student was invited to participate in the three-person game. In Urmia 180 subjects (60 sibling pairs + 60 others) participated in the three kin level treatments (KKS, KSK, SKK), with 20 triplets per treatment. In Vancouver, 39 subjects (13 sibling pairs + 13 others) participated in the KKS treatment.

Hypotheses. One direct implication of the theory in Section 3 is that the frequency of offering a transfer by Person A and the frequency of accepting and making the costly effort by Person B are positive functions of their relatedness to one another and negative functions of their relatedness to Person C. Hypotheses (1a) and (1b) follows from the fact that kin are more related than co-ethnics and that co-ethnics are more related (in expectation) than strangers.

Hypothesis (1a): Pr(Transfer) is (weakly) increasing in relatedness of A to B and (weakly) decreasing in relatedness of A to C.
Hypothesis (1b): Pr(Accept/Right) is (weakly) increasing in relatedness of A to B and (weakly) decreasing in relatedness of B to C.

Since Iran and Canada are similarly ethnic fractionalized, we would expect similar behavior across countries, if such fractionalization is a primary determinant of favoritism.

Hypothesis (2): Pr(Transfer) & Pr(Accept/Right) among non-kin (strangers and co–ethnics) A and B are similar in Iran and Canada.

However, since Iran and Canada clearly differ on other important dimensions (e.g. level of development, corruption perceptions, historical ethnic tensions), there may be other reasons to expect cross-country differences. Our design will allow us to test for (and find) such differences, and then in Studies 2 and 3, we will try to better understand the sources of observed differences.

Study 1 findings

First we report within-country comparisons testing for the effects of relatedness on behavior, and then we report between-country comparisons. The experimental results from our primary treatments are presented in Table 1. Each entry in the table shows the fraction of subjects A and B choosing to transfer and to reciprocate, by treatment and matching scheme. Let μ_k be the relative frequency of choosing "Transfer" by A in matching scheme k, with $k \in \{KKS, KSK, SKK\}$ in the Kin treatment and $k \in \{CCS, CSC, SCC\}$ in the Co-ethnic treatment. Similarly, let ν_k be the relative frequency of choosing "Accept-Right" under matching scheme k.

	Iran				**Canada**			
	Kin		Co-Ethnic		Kin		Co-Ethnic	
	Transfer	*Accept/R*	*Transfer*	*Accept/R*	*Transfer*	*Accept/R*	*Transfer*	*Accept/R*
A & B related	18/20	19/20	17/20	16/20	13/13	12/13	7/20	9/20
A & C related	1/20	7/20	10/20	10/20	NA	NA	6/20	7/20
B & C related	8/20	1/20	14/20	9/20	NA	NA	9/20	6/20

Table 1: **Relative frequency of favoritism by treatment in Urmia, Iran and Vancouver, Canada**.

Thus, hypothesis (1a) has the following implication: $\mu_{KKS} \geq \mu_{CCS} \geq \mu_{SKK/SCC} \geq \mu_{CSC} \geq \mu_{KSK}$. Using the data from Iran, a Cochran-Armitage test rejects the null hypothesis of equal relative frequency across the treatments in favor of the ordered alternative (technically, the alternative is that the ordering is weak, with at least one relationship strict, $Z = 5.85$, p-value < 0.001). With our Canadian data, we can only test a portion of the hypothesis, namely $\mu_{KKS} \geq \mu_{CCS} \geq \mu_{SCC} \geq \mu_{CSC}$, but again a Cochran-Armitage test rejects the null hypothesis ($Z = 3.19$, p-value $= 0.001$).

Similarly, hypothesis (1b) implies that $\nu_{KKS} \geq \nu_{CCS} \geq \nu_{KSK/CSC} \geq \nu_{SCC} \geq \nu_{SKK}$. Using Iranian data, a Cochran-Armitage test rejects the null hypothesis of equal relative frequency in favor of the ordered alternative (Z = 6.08, p-value < 0.001). Again, with the Canadian data, we can only test a portion of the hypothesis, namely $\nu_{KKS} \geq \nu_{CCS} \geq \nu_{CSC} \geq \nu_{SCC}$, and a Cochran-Armitage test rejects the null hypothesis (Z = 3.28, p-value = 0.001).

Finding 1: In both countries, the data are consistent with the relatedness hypothesis (1a and 1b).

Cross-country comparisons. Table 1 reveals evidence of kin favoritism in both countries. We focus on the top row of the table since we have data in the kin treatment only in the KKS cell in Canada. Pooling over the decisions of Persons A and B in the KKS treatment, subjects took 25/26 (96%) corrupt actions in Canada and 37/40 (93%) corrupt actions in Iran; the degree of kin favoritism is virtually indistinguishable across countries (two-tailed proportions test, $\chi^2 = 0.006$, p-value = 0.94).

However, we see some differences in the degree of ethnic favoritism. Again pooling over the decisions of Persons A and B, and focusing on the CCS treatment, we see subjects chose actions consistent with favoritism in 16/40 (40%) cases in Canada and 33/40 (83%) in Iran. A two-tailed proportions test confirms that these differences are statistically significant ($\chi^2 = 13.5$, p-value < 0.001). Using rows 2 and 3 of the table, we can also test for differences in the willingness to *harm*, rather than help, a co-ethnic by comparing transfer rates when A and C are co-ethnics and reciprocation rates when B and C are co-ethnics. Here we see 12/40 (30%) such actions taken in Canada and 19/40 (45%) such actions taken in Iran; the difference is not significant (two-tailed proportions test, $\chi^2 = 1.90$, p-value = 0.17). Thus, we see that Iranian subjects are substantially more willing to help and no more willing to harm co-ethnics than are Canadian subjects.

Using the other cells of Table 1, we can also test for differences in Transfer and Accept/R choices among strangers. In particular, the decision of Person A to offer a transfer in the SCC/SKK treatments was made knowing nothing about the counterpart, as was the decision of Person B to accept and reciprocate in CSC/KSK. These decisions thus capture the rate at which people will cooperate with a stranger at the expense of another stranger. Pooling over the decisions of A and B, we see 16/40 (40%) such actions in Canada and 39/80 (49%) in Iran, and thus we have no evidence of significant differences in behavior when interacting with strangers (two-tailed proportions test, $\chi^2 = 0.51$, p-value = 0.48).

Finding 2: Iranian subjects exhibit somewhat more ethnic favoritism than Canadians, though both countries show similar levels of kin favoritism and similar behavior toward strangers.

While kin favoritism is common in both countries, we see evidence of differences between the countries regarding favoritism among co-ethnics, and it raises the question as to why we observe these differences and how robust this finding is. We thus designed Study 2 to address these questions.

4.2 Study 2 - Vancouver and Tehran

To try to improve our understanding of cross-country variation in behavior, Study 2 was conducted in Vancouver, Canada and Tehran, Iran. As noted above, Canada is a highly developed, multicultural society with low levels of corruption; while Iran is a developing country with a higher corruption and has a history of ethnic conflict. Previous experiments (Barr and Serra, 2010; Salmon and Serra, 2017) have shown that laboratory measures of corruption are correlated with corruption in the origin country of immigrants. This may help explain the fact that we observe higher favoritism among Iranian subjects. That is, if growing up and being exposed to Iranian and Canadian culture/institutions has led subjects from each country to internalize different social norms and attitudes towards favoritism, and if subjects bring these norms with them into the lab, then we might expect to see more favoritism among Iranian subjects.

Since ethnic tensions also plausibly vary across the two societies (and such tensions also potentially shape norms of behavior among co-ethnics), this suggests that we need a treatment that can disentangle ethnic favoritism driven by ethnic tensions from broader differences in norms of in-group favoritism. To this end, we chose to look at a different sort of in-group: friends. Thus we developed an FFS treatment, in which first- and second-movers in the game were recruited to the lab as pairs of non-kin friends and were matched with a third-party who was a stranger to both.

Hypothesis (3a): If country-level behavioral differences among co-ethnics are driven by differing degrees of ethnic tension, we expect no differences among Friends.

Hypothesis (3b): If country-level behavioral differences among co-ethnics are driven by broad differences in norms of favoritism, we would expect more favoritism among Friends in Iran.

At the same time to better understand the robustness of norms of favoritism within-country, we introduced a "High Cost" treatment in which we increase the cost of reciprocating by player 2 to eliminate the mutual gains from cooperation (such that player 2 is worse off by reciprocating than if player 1 had not offered the transfer). In the game tree, this amounts to changing the payoffs to A and B after Transfer→Accept→Right to 160 and 90, respectively. By varying the cost of helping, we can test the strength of particular norms of favoritism within and across countries as the cost to the second-mover varies.

Hypothesis (4): Favoritism is (weakly) lower in the High Cost treatment.

In total we collected data on an additional 90 subjects in Canada (10 triplets in the FFS treatment and 20 triplets in the FFS_High treatments) and on 180 additional subjects in Tehran, Iran (12 triplets each in the SSS, SSS_High, FFS_High, KKS_High and KKS_High_Cousins treatments). We conducted the SSS treatments to check for baseline differences in behavior among strangers between Tehran and Urmia, and we included the KKS_High and KKS_High_Cousins treatments as additional tests of the strength of kin favoritism in Iran.[10] We did not conduct a full factorial experiment due to difficulties recruiting subjects and to economize on resources. In particular, recruitment for additional KKS_High or KKS_High_Cousins treatments in Canada was infeasible given our student samples, and in Iran, we screened out treatments in which we had extremely

[10]According to kin selection theory, favoritism should be *weakly* lower among cousins than among siblings according to kin selection arguments, so the Cousins treatment provides us with an opportunity to further test this hypothesis.

strong priors regarding the results (e.g. we did not conduct the Low Cost FFS treatment in Iran, which we had no reason to think would differ from the High Cost FFS treatment). The new experiments are described in more detail in appendix B.4.

Study 2 Findings

Data from Study 2, along with relevant comparison data from Study 1 are reported in Table 2. In the FFS treatment, conducted only in Canada, we observe actions consistent with favoritism in 19/20 (95%) decisions, indicating that such acts in these small stakes decisions are just as likely among friends as among kin and substantially more so than among co-ethnics (two-tailed proportions tests, $\chi^2 = 0.00$, p-value = 1 and $\chi^2 = 14.4$, p-value < 0.001, comparing FFS to KKS and CCS, respectively). In almost all societies, norms of favoritism exist among friends, and these may constitute an instance in which the biological machinery for kin altruism is co-opted to support cooperation among non-genetic-relatives.[11,12] The adage that "blood is thicker than water" may nevertheless apply to our game, and thus we turn to High Cost variants of the treatment where player A and B are related as friends in both countries.[13]

In Canada, high effort cost significantly decreases the frequency of favoritism among friends relative to the experiment with low effort cost among either kin or friends. Pooling over the decisions of A and B in Canada, the frequency of favoritism is 22/40 (55%) in the High Cost FFS treatment versus 19/20 (95%) in the Low Cost FFS treatment and 25/26 (96%) in the Low Cost KKS treatment (two-tailed proportions tests, $\chi^2 = 8.1$, p-value $= 0.004$, and $\chi^2 = 11.1$, p-value = 0.001, comparing High Cost FFS to Low Cost FFS and Low Cost KKS, respectively).

However in Iran, the frequency of favoritism among friends in our high effort cost treatment

[11] But there is evidence that friends are more closely related than random individuals; see Christakis and Fowler (2014).

[12] This co-optation is reflected in the use of kinship words, e.g. 'brother' and 'sister', to refer to close friends.

[13] As noted above, the followup experiments in Iran were conducted in Tehran instead of Urmia. One reason to do this was to see if our basic results were unique to Urmia or generalized to the larger and more cosmopolitan city of Tehran. We ran a low cost SSS treatment in Tehran and the frequency of bribery (8/12) and corruption (5/12) were not significantly different from the SKK and SCC treatments conducted in Urmia (22/40 and 17/40, p-values > 0.7, two-tailed proportions tests). In addition, as seen in Table 2, experiments with siblings and cousins in the treatment with high effort cost in Tehran rules out the possibility of weak kin and relative ties in Tehran relative to Urmia.

	Kin (low cost)		Friend (low cost)		Stranger (low cost)[a]	
	Transfer	*Accept/R*	*Transfer*	*Accept/R*	*Transfer*	*Accept/R*
Canada	13/13	12/13	9/10	10/10	9/20	7/20
Iran	18/20	19/20	NA	NA	30/52	22/52

	Kin (high cost)[b]		Friend (high cost)		Stranger (high cost)	
	Transfer	*Accept/R*	*Transfer*	*Accept/R*	*Transfer*	*Accept/R*
Canada	NA	NA	13/20	9/20	NA	NA
Iran	24/24	22/24	11/12	10/12	1/12	1/12

[a] Includes 40 pairs from Urmia in the SKK and SCC treatments.

[b] Includes 12 sibling and 12 cousin pairs.

Table 2: **Summary of relative frequency of favoritism when A & B are related**.

is not distinguishable from that observed among kin, in either the Low or High cost treatment. Pooling over the decisions of A and B in Iran, the frequency of favoritism in the High Cost FFS is 21/24 (88%) versus 37/40 (93%) in the Low Cost KKS and 46/48 (96%) in the High Cost KKS, which includes both siblings and cousins since they were indistinguishable (two-tailed proportions tests, $\chi^2 = 0.05$, p-value = 0.82 and $\chi^2 = 0.67$, p-value = 0.41, comparing High Cost FFS to Low Cost KKS and High Cost KKS, respectively).

In fact, when we compare the High Cost FFS treatment across countries, we see a significantly higher rate of favoritism in Iran than in Canada among friends (two-tailed proportion test, $\chi^2 = 5.79$, p-value = 0.016). In sum, in our High Cost treatment, our Iranian subjects are equally willing to engage in favoritism on behalf of kin and friends, but in Canada, the High Cost treatment significantly decreases the willingness to benefit friends, as compared to kin.

Finding 3: Iranian subjects exhibit more favoritism toward friends than Canadian subjects.
Finding 4: In Canada, favoritism towards friends decreases with the cost of reciprocation.

One limitation of our initial design is that the effect of kinship could not be separated easily from that of familiarity. Kin, especially those of similar ages who are willing to attend a laboratory experiment together, are likely to have a good relationship built on reciprocity and generosity that might be reflected in their willingness to cooperate with one another (at a third party's expense). The Friend treatment allows us to highlight an important aspect of our interpretation of the findings: that differences in behavior reflect differences in norms of local favoritism, which may be driven by background differences in cultural norms and attitudes towards in-group members. The presence of normative differences across societies then raises the question of where such normative differences might arise. Study 3 is designed to address one possible explanation.

4.3 Study 3 - Quito, Chapintsa and Guangaje, Ecuador

As noted above, our evidence of normative differences across societies is consistent with previous evidence that subjects from societies with more corruption are more prone to exhibit favoritism in laboratory settings (Barr and Serra, 2009). Thus, one plausible interpretation of these findings is that norms reflect a spillover from the institutional environment in which subjects are raised; weak/corrupt institutions encourage norms of favoritism. The data are consistent with this account, but it raises a fundamental question about why institutional quality varies.

A recent literature in economics has begun to connect historical (and contemporary) variation in family structure, kinship, and marriage patterns to institutional quality (Greif, 2006; Greif and Tabellini, 2015; Woodley and Bell, 2013; Schulz, 2016; Moscona *et al.*, 2017a,b; Enke, 2017). While strong kin ties among immediate family are virtually universal, societies differ widely in terms of kin relations beyond immediate family. Some societies are structured around tight–knit extended families and strong kin–based institutions such as tribes and clans, while others lack such kin–based groups. Canada and Iran differ substantially on these dimensions. Despite having relatively similar measures of "family ties" (Alesina and Giuliano, 2011), Iranian households are more likely to include extended family, and marriages among kin are far more common (32% in Iran vs. 1.5% in Canada, Bittles and Black, 2015).

One recent paper has connected these kinship patterns directly to corruption, providing evidence that societies with a larger share of close-knit family groups (as measured by the rate of marriage among cousins) also exhibit lower institutional quality (Spearman's $\rho = -0.56$, p-value < 0.001, N = 67, Akbari *et al.*, 2018). There are two complementary reasons why this might be the case. First, in-marriage within families creates a denser web of kinship ties, binding families and local groups closer together and favoring the development of norms for cooperation within the group (at the expense of norms for cooperation outside the group). Second, such marriage practices directly increase relatedness within the kin group, since the offspring of kin are substantially more related than the offspring of two randomly chosen people. Thus the incentive for favoritism is increased in a model of kin selection (see Appendix A for details).

Since both institutional quality and marriage practices vary across Iran and Canada, these countries are not an ideal setting for testing this hypothesis. Thus, we conduct Study 3 in Ecuador, holding formal country-level institutions constant, and comparing two villages with divergent traditional marriage practices. Importantly, like Canada and Iran, Ecuador is ethnically fractionalized (EF Index = 0.66, according to Alesina *et al.*, 2003).[14] Before conducting the experiments in the villages, we first replicated the Stranger and Kin treatments using a student population in Quito, Ecuador to further assess the robustness of the relatedness hypothesis. We then chose two rural villages from cultural groups that differ in whether they permit marriage between cousins, and there we conducted the experiment with the first- and second-movers related as Kin, non-Kin co-residents and Strangers; we also tested the strength of favoritism towards non-kin co-residents with a High Cost treatment.

In Quito, we expect to see evidence of kin favoritism relative to treatment of strangers. In our rural settings, the villages of Guangaje and Chapintsa, we expect the degree of in-group favoritism to be related to the density of kin networks and marriage practices. Chapintsa residents live in the lowland jungle and are from the Shuar culture, which has a tradition of first cousin marriage; while, Guangaje residents live in the highlands and are from the Kichwa culture, which does not. To the extent that marriage practices shape norms of in-group favoritism as described above, we expect to see more favoritism in Chapintsa.

Hypothesis (5a): If norms are shaped by marriage and kinship practices, favoritism will be higher in Chapintsa than Guangaje.

[14]While family ties data for Ecuador are not available in Alesina and Giuliano (2011), interpolation from neighboring countries, such as Peru, suggests that Ecuador would also be similar to Canada and Iran on this dimension.

Hypothesis (5b): Favoritism will (weakly) decrease in the High Cost treatment.

In total we collected data on an additional 402 subjects in Ecuador (31 triplets in the KKS treatments, 31 in the SSS, and 36 each in the CCS and CCS_High_Cost treatments). Given limited resources, we focused our data collection efforts on the CCS and CCS_High_Cost treatments, since those treatments provide the test of our primary hypothesis. Since at our field sites we were forced to make some minor but notable adjustments in protocol and recruitment practices, in what follows we eschew cross-country comparisons with the data from Chapintsa and Guangaje. In Appendix B.5 we provide additional details on the local context and the conduct of the experiments.

Study 3 findings

Data from the KKS, CCS, and SSS treatments of Study 3 are reported in Table 3. First note that we find support for the relatedness hypothesis in Quito and both villages. Pooling over the decisions of A and B, in Quito, 19/22 (86%) of subjects in KKS exhibited favoritism, vs. only 9/22 (41%) in the SSS treatment (two-tailed proportions test, χ^2 = 8.0, p-value = 0.005).[15] In Chapintsa, the rate was 19/20 (95%) in the KKS treatment, 18/36 (50%) in the CCS treatment and 10/20 (50%) in the SSS treatment, and in Guangaje, the rate was 20/20 (100%) in KKS, 18/36 (50%) in CCS, and 9/20 (45%) in SSS. In both villages we reject the null hypothesis of equal rates of favoritism across treatments in favor of the ordered alternative that KKS $\geq$ CCS $\geq$ SSS, with at least one strict (Cochran-Armitage tests, Z = 2.93 and 3.58, p-values = 0.003 and 0.0003, respectively).

Since we are able to replicate support for the relatedness hypothesis in Ecuador, we now test our primary hypothesis. Data from the CCS_High treatments of Study 3 are reported alongside the data from the CCS treatments in Table 4. In the CCS treatment, we see no evidence of differences across villages, with subjects exhibiting favoritism in 18/36 (50%) actions in both cases.

[15] Since the Quito experiments were conducted with a student subject pool under laboratory conditions, we compare these to Study 1; behavior in the KKS and SSS treatments in Quito are statistically indistinguishable from behavior in Vancouver and Urmia (two-tailed χ^2 = 1.58 and 1.47, p-values = 0.480 and 0.454, respectively).

	Kin		Co-villagers		Strangers	
	Transfer	*Accept/R*	*Transfer*	*Accept/R*	*Transfer*	*Accept/R*
Quito	11/11	8/11	NA	NA	4/11	5/11
Chapintsa	9/10	10/10	8/18	10/18	8/10	2/10
Guangaje	10/10	10/10	13/18	5/18	7/10	2/10

Table 3: **Summary of relative frequency of favoritism when A & B are related, Ecuador**.

However, in the CCS_High treatment, we see favoritism in 19/36 (53%) actions in Chapintsa, but only 11/36 (31%) actions in Guangaje (two-tailed proportions test, $\chi^2 = 2.8$, p-value = 0.094). Thus, consistent with the kinship hypothesis we see a decline in favoritism only in Guangaje, which does not have a tradition of cousin marriage.

	Co-villagers (Low Cost)		Co-villagers (High Cost)	
	Transfer	*Accept/R*	*Transfer*	*Accept/R*
Chapintsa	8/18	10/18	11/18	8/18
Guangaje	13/18	5/18	10/18	1/18

Table 4: **Summary of relative frequency of favoritism when A & B are related by Cost, Ecuador**.

Finding 5: We see some evidence of lower in-group favoritism in Guangaje than in Chapintsa, in the High Cost treatment.

While the evidence is by no means overwhelming, we find additional support for the hypothesis that societies with denser kin networks (as proxied by their having a tradition of cousin marriage) exhibit more favoritism. In light of this and the strong evidence for the relatedness hypothesis, we believe additional research is warranted on the role of kinship and marriage practices in shaping social norms related to treatment of in- and out-group members.

5 Conclusion and discussion

We argue that kin favoritism is an overlooked and potentially important mechanism through which corruption may emerge. We report 3 experimental studies that probe the relationship between kinship, ethnic ties and favoritism in Canada, Iran and Ecuador. We find evidence of kin favoritism in all three countries, and we show that our data are consistent with the relatedness hypothesis, whereby favoritism is increasing in the relatedness of two individuals. Comparing Canada to Iran, we find evidence of increased favoritism among co-ethnics in the latter. A second study also finds increased favoritism among friends in Iran, which suggests the presence of broader normative differences across the two countries with respect to the treatment of in-group members. Study 3 tests the hypothesis that variation in marriage practices may account for such normative differences. Comparing two Ecuadorian societies that vary in their traditional marriage practices, we find (weak) evidence that favoritism is higher where in-marriage practices are permitted, and thus kin networks are denser.

Our findings lead us to five basic conclusions. First, across all three studies we see extremely strong evidence that kin are willing to favor one another at the expense of strangers, highlighting kin ties as an important channel of favoritism and corruption. Second, all of our data are consistent with theory from biology that predicts incentives to help are increasing in individuals' relatedness. This suggests that considering biological arguments about the source of preferences may provide a useful complement to economic theory. Third, we provide additional evidence that laboratory measures of corruption are related to the corruption level of the country of origin of the subjects, consistent with Barr and Serra (2010) and Salmon and Serra (2017). Fourth, while our evidence is not conclusive, we find some support for recent claims that kinship patterns may help explain variation in social norms (related to favoritism and corruption) and institutional quality. Moreover, our experimental approach provides a useful measurement strategy for asking such questions, and our design in Study 3 suggests a way to improve on cross-country evidence by conducting an analysis that holds country-level factors fixed. Finally, since ethnic fractionalization is similar in all societies in which we conducted experiments, evidence that corruption among co-ethnics varies across them should at least be seen as not supporting the hypothesis that such fractionalization is the only (or primary) cause of variation in corruption.

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Appendices to Akbari, Bahrami-Rad and Kimbrough (2018)

A Quantitative description of genetic relatedness and distance

First let us explain some vocabulary. A "locus" is a place on a chromosome where an "allele" resides. A locus is not a tangible object, it is a map describing where to find an allele, which is the piece of DNA in that location. Some books use gene as a synonym for an allele. An individual has two alleles at a particular locus, one from the mother and the other from the father. Alleles are identical by descent if they share a common ancestor allele in a relatively short time in the past, say, the past 10 generations (Gillespie, 2004, p. 6-8). Identity by descent is used as the basis of a quantitative description of relatedness. One simple measure is the "coefficient of kinship notated as f_{xy} which is the probability that two alleles, one from individual X and one from individual Y, are identical by descent. This coefficient can be written as

$$f_{xy} = \frac{1}{4}p_1 + \frac{1}{2}p_2$$

where p_1 and p_2 are, respectively, the probabilities of sharing one and two identical by descent alleles (p_0 is the probability of sharing 0 identical by descent alleles). The intuition is that there are two mutually exclusive ways that two chosen alleles from X and Y might be identical by descent; they share exactly one allele or exactly two alleles. The term $\frac{1}{4}p_1$ in the equation above is the probability that X and Y share exactly one identical by descent allele times the conditional probability that these two alleles are chosen from X and Y. The term $\frac{1}{2}p_2$ is the probability that X and Y share exactly two identical by descent allele times the conditional probability that two identical alleles are chosen from X and Y.

Relationship	p_0	p_1	p_2
Identical twin (IT)	0	0	1
Parent-offspring (PO)	0	1	0
Full sibs (FS)	1/4	1/2	1/4
First cousins (FC)	3/4	1/4	0

Table A1: **Identity by descent.**

It follows that $f_{PO} = 1/4$, $f_{FS} = 1/4$ and $f_{FC} = 1/16$. The "coefficient of relatedness", r, is one-half of the mean number of shared alleles ($p_1 + 2p_2$), $r = \frac{1}{2}r_1 + r_2$ therefore, $f_{xy} = \frac{1}{2}r$ and $r_{PO} = 1/2$, $r_{FS} = 1/2$ and $r_{FC} = 1/8$ (Gillespie, 2004, p. 121-123).

It follows that f_{xy} is defined over the the range of [0, 0.5]. It is important that the coefficient of kinship not be confused with the coefficient of relatedness, r. In a random mating population, the relationship between the two coefficients is simple: the coefficient of relatedness is just twice the coefficient of kinship, therefore in the range of [0, 1]. The coefficient of relatedness could be interpreted as the expected fraction of alleles that are shared identical by descent between two individuals (Harpending, 2002). Table A2 summarizes coefficients of relatedness for kin relationships.

A.1 Ethnicity and relatedness

Genomic methods allow us to measure relatedness between and within populations. The genetic distance of two populations can be measured by F_{ST} known as the *coancestor coefficient*: "the probability that two alleles at a given locus selected at random from two populations will be different, [...] F_{ST} is strongly related to how long two populations have been isolated from each other. When two populations split apart, their genes can start to change as a result either of random genetic drift or natural selection" (Spolaore

Relationship to you	Relatedness coefficient
identical twin	1
fraternal twin, parent, child, sibling	1/2
grandparent, grandchild, aunt, uncle, niece, nephew	1/4
great-grandparent, great-grandchild, great-aunt, great-uncle, great-niece, great-nephew, first-cousin	1/8
second-cousin	1/32
n^{th} cousin	$1/2^{2n+1}$
a perfect stranger	0

Table A2: **Expected relatedness of individuals under random mating.**

and Wacziarg, 2009, p. 481). As shown by Harpending (2002), for large populations, genetic distance between two populations implies genetic similarity within those populations. Therefore, F_{ST} also measures the coefficient of kinship between members of the same population; for a random mating population, F_{ST} is simply half of the coefficient of relatedness, r.[1]

Between some ethnic groups, empirical estimates suggest that relatedness is not far above zero, so that co-ethnics are unlikely to be sufficiently related for kin selection to substantially influence behavior. For example according to Cavalli-Sforza *et al.* (1994), the genetic distance between English and French populations is $F_{ST} = 0.0024$. Therefore, in a world consisting of only English people, the kinship of any randomly chosen pair is zero, but in a world consisting of both English and French populations, two random English (or French) people have a relatedness of only $r = 0.0048$ (in between the relatedness of 3rd and 4th cousins under random mating). Perhaps surprisingly, this is about how closely groups of friends are related to one another. Christakis and Fowler (2014) find that friends' genotypes tend to be positively correlated, and the increase in similarity relative to strangers is at the level of fourth cousins. The authors were aware that some of the similarity in genotypes can be explained by "a simple preference for ethnically similar others" or "distant relatives" (*Ibid.*, p. 10797). Therefore, they applied strict controls for such factors in their study. This suggests that there might be "some sort of kin detection system in humans [...] such that, for each individual encountered, an unspecified system may compute and update a continuous measure of kinship that corresponds to the genetic relatedness of the self to the other individual" (*Ibid.*, p. 10800).

A.2 Relatedness and in-marriage

The expected coefficients of relatedness computed from Table A1 are valid only under the assumption of random mating. With consanguineous marriages, actual relatedness will exceed expected relatedness. For example, two offspring from a first-cousin marriage (drawn from a previously randomly mating population) have a relatedness higher than 1/2 ($r = 1/2 + 1/2 \times 1/8 = 0.5625$): with probability 1/2 they inherit a gene from the same parent at each locus, and with probability 1/2 they each inherent a gene from a different parent, in which case the probability of gene sharing is just the relatedness between their parents, 1/8. Individuals born of consanguineous union have segments of their genomes that are *homozygous* as a result of inheriting identical-by-descent genomic segments through both parents. The extra term in the relatedness of offspring of a first-cousin marriage (i.e. $1/2 \times 1/8$) represents the *expected excess homozygosity* in the genome of the offspring of a union between first cousins. The extra term is ($1/2 \times 1/32$) for offspring of second-cousins; ($1/2 \times 1/4$) for offspring of double-first cousins; and ($1/2 \times$

[1] An individual's coefficient of kinship with someone randomly chosen from his own population is F_{ST} while his kinship with someone from the other population is $-F_{ST}$. "Negative relatedness implies that two individuals share fewer genes than average" (Gardner and Stuart, 2006, p. R663).

1/2) for the offspring of sibling or parent-offspring (incestuous) unions. Therefore, “offspring of second cousins are expected to have children with 1/64 of their genome homozygous; offspring of first cousins, 1/16; offspring of double-first cousins, 1/8; and offspring of incestuous union, 1/4” (Woods *et al.*, 2006, p. 889).

Hamilton (1975) explores the consequences of extreme inbreeding, developing a model of endogamous colonies where the relatedness of all colony members can rise to the level of siblings under random mating (1/2). In such a world,

> “siblings, parents, and offspring will still be the individual’s closest relatives. Owing to inbreeding, their relatedness will be above the value of 1/2 that applies under random mating. Thus an individual should be more altruistic than usual to his immediate kin. But other neighbors who are not immediate kin are now also closely related, and it is this reduced contrast between neighbors and close kin that will give what is probably the most striking effect: we expect less nepotistic discrimination and more genuine communism of behavior. At the boundary of the local group, however, there is a sharp drop in relatedness, [...] this drop may be such as to promote active hostility between neighboring groups” (Hamilton, 1975, p. 340).

Empirically, persistent inbreeding has raised the relatedness of siblings as high as 7/10 in some samples (compared to 1/2 in a randomly mating population), and the average sibling relatedness among three persistently inbreeding groups was 6/10 (Woods *et al.*, 2006). Note that cousins in such a society share almost 75% more genes than expected in a randomly mating population; their relatedness is ($0.6 \times 0.6 \times 0.6 = 0.216$), compared to ($0.5 \times 0.5 \times 0.5 = 0.125$) in a randomly mating population.

If this pattern repeats across generations, local relatedness only grows. Woods *et al.* (2006) found that in individuals with a recessive disease whose parents were first cousins and drawn from two populations with a long history of consanguinity (Pakistani and Arab) and a third population with a shorter history of consanguinity (Irish traveler), on average, 11% of their genomes were homozygous, ranging between 5% and 20% (consider that the expected homozygousity for offspring of first-cousins is 6.25% and for offspring of incestuous unions is 25%). This implies “that prolonged parental inbreeding has led to a background level of homozygosity increased $\sim$ 5% over and above that predicted by simple models of consanguineous marriage between first-cousins.” If we consider 11% as the extra term in the relatedness of the offspring of first-cousins, we will obtain $r = 0.61$, i.e. in a population with a long history of consanguinity which continues to practice first-cousin unions, we can expect the relatedness 0.61 for siblings and parent/child, instead of expected 0.5 relatedness in a randomly mating population. For the same consanguineous population, the relatedness of cousins will be ($0.61 \times 0.61 \times 0.61 = 0.227$), instead of ($0.5 \times 0.5 \times 0.5 = 0.125$) in a randomly mating population. To update Haldane’s famous line, in such a population, one would jump into a river to save only 4.40 drowning cousins, where the threshold was 8 under random mating.

The expected percentage of excess homozygosity arising from consanguineous mating is known as the *inbreeding coefficient of the individual with respect to the local sub-population*, or F_{IS}. For example, for the offspring of first cousins, F_{IS} is 1/16. Inbreeding coefficient (F_{IS}) of an individual is equal to kinship coefficient of the individual’s parents; as seen before, coefficient of kinship of the first cousin parents is also $f_{FC} = 1/16$. In fact, inbreeding coefficient F_{IS} measures homozygosity in individual genomes excess to the expected frequency under random mating in the *sub-population*. Therefore, inbreeding coefficient F_{IS} can be calculated as $1 - \frac{H_{obs,i}}{H_{exp,i}}$, where $H_{obs,i}$ is the observed heterozygosity of an individual, and $H_{exp,i}$ is expected heterozygosity within the sub-population which is equal to $H_{obs,p}$; the average of observed heterozygosity of individuals within the sub-population.

Ethnic fractionalization indices are generally taken as exogenous in cross–country regressions based on the fact that ethnic composition of countries is sufficiently stable over time (Alesina *et al.*, 2003). The same is true about the variation in the tightness of kin networks. For example by 1500 AD, most of tribes and clans disappeared in Europe as a results of Catholic Church's marriage policies. Particularly, the Church prohibited cousin marriages starting in 6th century and expanding it to sixth cousins at times. Cousin marriage bans are accompanied by prohibitions on marriage with affinal kin, (e.g. a dead brother's widow), to spiritual kin (e.g. godchildren) and to fictional kin (e.g. adoptees), producing a vast range of people, often resident in the same region, that were forbidden to marry (Goody, 1983), and to find eligible partners, people had to migrate (Cavalli-Sforza *et al.*, 2004). This made it impossible to avoid dismantling kin–based groups such as large extended families, tribes and clans (Greif, 2006).

A.3 Other sources of increased relatedness

Consanguineous mating is not the only way of producing excess homozygosity. If a sub-population is genetically isolated and thus "cryptically" inbred with respect to the total population, there will be excess average homozygosity in individual genomes of the sub-population compared to the expected frequency under random mating across the *total population*. This expected increase in homozygosity arising from genetic isolation of the sub-population is called F_{ST}; *the average inbreeding coefficient of sub-populations relative to the total population*. Pairwise F_{ST} measures population differentiation, producing higher values when two populations have large between-population differences but small within-population differences. Inbreeding coefficient F_{ST} can be calculated as $1 - \frac{H_{obs,p}}{H_{exp}}$, where $H_{obs,p}$ is the mean of observed heterozygosity within the sub-population, and H_{exp} is expected heterozygosity in the total population.

Thus, if the alleles in an individual are identical by descent in excess of the expected frequency in the total population, and due to population inbreeding, further inbreeding by consanguineous marriages can not increase homozygosity in those alleles. The "inbreeding coefficient" or F_{hbd} captures both F_{IS} and F_{ST}, and measures the inbreeding of an individual relative to the total population. The inbreeding coefficient F_{hbd} can be calculated as $1 - \frac{H_{obs,i}}{H_{exp}}$, where $H_{obs,i}$ is the observed heterozygosity of an individual, and H_{exp} is expected heterozygosity within the sub-population.

B Experiment materials and procedures

B.1 Experiment instructions

You are now participating in a decision making experiment. At the end of the experiment, you will be paid in cash based on your decisions. Please read the instructions carefully so you understand clearly how your payoff is determined. Please do not talk to other participants. If you have any questions, raise your hand and the experimenter will answer them privately.

This experiment consists of **only** one round where you will make a decision in a **three-person scenario**. You will be assigned one of three possible roles in this scenario: **A**, **B** and **C**. Your role will be determined randomly.

In addition to your $7 show up payment, you will earn Experimental Currency Units (ECU) during the experiment based on your decision. 10 ECU is worth $1. At the end of the experiment, we will convert your earnings to from ECU to dollars.

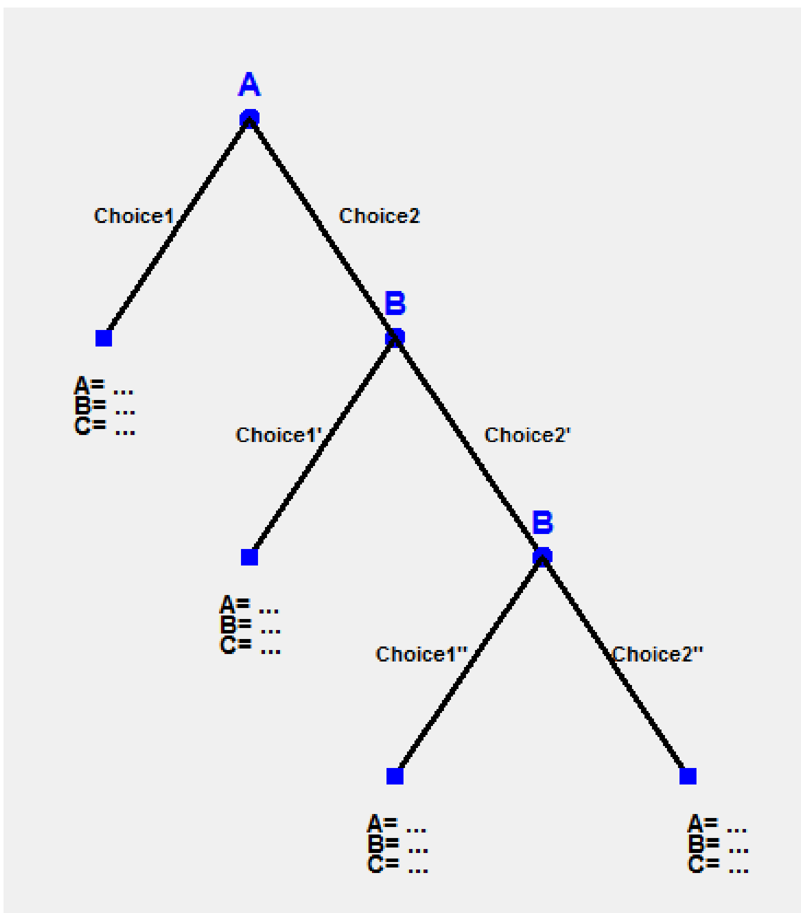


Figure 1

You will see a graph similar to Figure 1 during the experiment. The graph will help you to see the possible outcomes of the three-person scenario based on your and other participants' decisions.

Little blue circles show which person is making a choice.

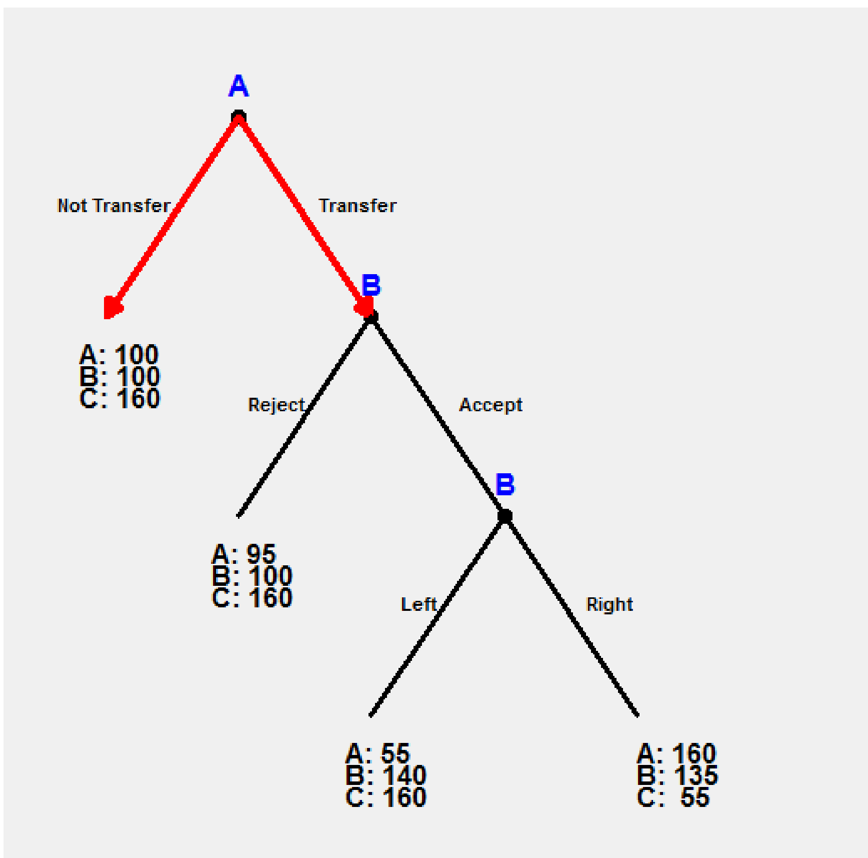
Two black lines exiting from each circle show the choices available to the person choosing. For example, the top circle and its lines show that **Person A** can choose **Choice 1** or **Choice 2**.

Little blue squares show all possible outcomes of the scenario and the payoffs for each person are shown by
A= ...
B= ...
C= ...

Payoffs are determined based on the decisions of **Person A** and **Person B**. As you can see **Person C** has no decision to make.

The scenario:

You will participate in a three-player scenario. This scenario is shown in the figure. Participants in the roles of **A** and **B** start with an initial endowment of 100 ECU and **C** starts with 160 ECU. The scenario works as follows:

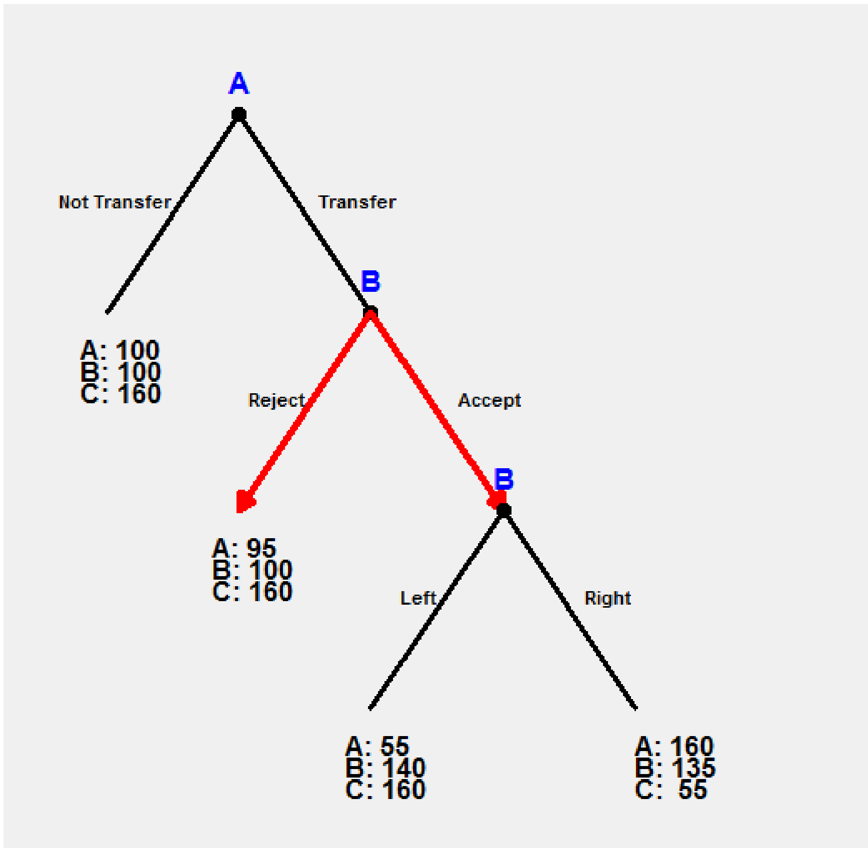


Stage 1

Stage 1: At the first stage, **A** decides whether to choose **"Transfer"** or **"Not-transfer"**.

- If **A** chooses **"Not-transfer"**, the round ends immediately, and all participants' final payoffs will be equal to their initial endowment (i.e. A=100, B=100, C=160).

- If **A** chooses to **"Transfer"** 40 ECU to **B**, his/her endowment will be reduced by 5 ECU. Whether 40 ECU will actually be transferred to **B** or not and the final payoffs will depend on choices made by **B** at the next stages.



Stage 2

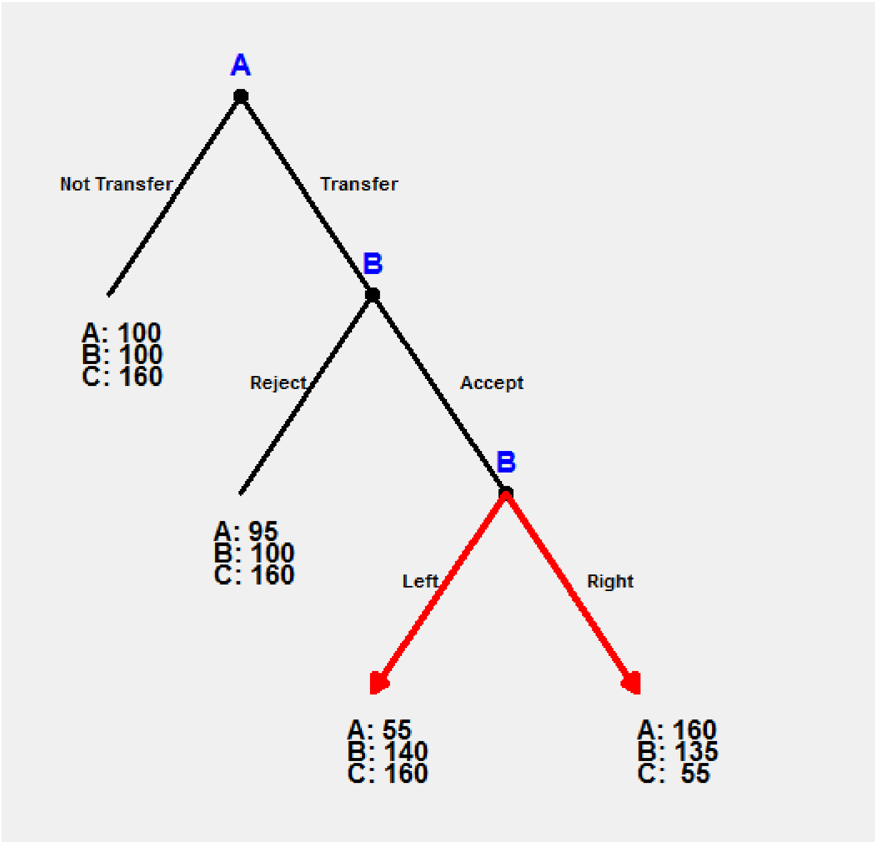
Stage 2: Assuming that **A** has transferred 40 ECU, **B** chooses **"Accept"** or **"Reject"**.

- If **B** chooses **"Reject"**, the round ends immediately. The final payoff of **A** will be 100-5=95, and the final payoff of **B** and **C** will be their initial endowments.

- If **B** chooses **"Accept"**, 40 ECU will be deducted from **A**'s endowment and will be added to **B**'s endowment. Then, the experiment moves to stage 3.

Stage 3: **B** who has accepted the transfer, now decides whether to choose **"Right"** or **"Left"**.

- If **B** chooses **"Left"**, the round ends immediately and the payoffs of participants are as follows:



Stage 3

A receives the initial endowment minus 5 ECU, minus the amount of transfer = 100 - 5 - 40 = 55 ECU.
B receives the initial endowment plus the transfer = 100 + 40 = 140 ECU.
C receives the initial endowment = 160 ECU.

- If **B** chooses **"Right"**, 5 ECU will be deducted from **B**, 105 ECU will be deducted from **C**, but 105 ECU will be added to **A**. Then the round ends, and the payoffs of participants are as follows:

A receives the initial endowment minus 5 ECU, minus the amount of the transfer, plus 105 = 100 - 5 - 40 + 105 = 160 ECU.
B receives the initial endowment plus the transfer, minus 5 = 100 + 40 - 5 = 135 ECU.
C receives the initial endowment minus 105 = 160 - 105 = 55 ECU.

B.2 Recruitment survey

Vancouver

Our online pre-experiment questionnaire in Vancouver included the following questions.

Pre-experiment Questionnaire

Please enter your email:

1. How old are you?

○ 18-22 ○ 23-25
○ 26-30 ○ more than 30

2. What is your field of study?

3. What is your gender?

○ Male ○ Female

4. Which country are you born in?

5. Are you a Canadian Citizen?

○ Yes
○ No

6. What is your PRIMARY ethnic origin?

Aboriginal, African, Arab, Caribbean, Chinese, Dutch, English, French, German, Indian, Iranian, Irish, Italian, Jewish, Norwegian, Polish, Portuguese, Russian, Scottish, Spanish, Swedish, Ukrainian, Welsh, Other

If you chose "other", please specify:

7. Please specify time slots (as many as you can) when you are available this semester for the experiment at [lab address at UBC/SFU].

8. Would you like to participate in our experiment with a parent or sibling (18 or older) in a public location (such as Starbucks, Tim Hortons, McDonalds, etc) around your neighbourhood?

○ Yes.
○ No

If "Yes", which family member of yours (parent or sibling) will participate in the experiment? How old is she/he?

and please specify the name and postal code of a public location.

Urmia

Our in-paper pre-experiment Persian questionnaire in Iran, titled "Pre-research Questionnaire", included the following questions. After we finished collecting data for our kin treatments, we just kept questions 1-7.

Pre-research Questionnaire

1. Choose your age group?
○ 18-22 ○ 23-25
○ 26-30 ○ more than 30

2. Choose your gender:
○ Male ○ Female

3. Choose your occupation group:
○ Student ○ Private sector
○ Government sector ○ Unemployed

4. Choose your ethnicity: (written in Persian alphabetical order)
○ Beluch
○ Azeri Turk
○ Arab
○ Persian
○ Kurd
○ Gilak
○ Lur
○ Other

5. What is your latest degree (or current level of study, if student)?
○ High school diploma
○ Kardani [2-year university or college degree]
○ Karshenasi (B.A)
○ Karshenasi Arshad (M.A)

6. Which university did/do you study? ———————

7. What is your field of study? ———————

8. Would your brother or sister also like to participate in the research?
(in this case, both you and your sibling will be separately paid around 20000 Tomans for your participation in the research session)
○ No
○ Yes. My brother would like to participate
○ Yes. My sister would like to participate

If your answer to question 7 is "Yes", please enter your brother or sister's age group:
○ 18-22 ○ 23-25
○ 26-30 ○ more than 30

If your answer to question 7 is "Yes", please enter your brother or sister's occupation group:
○ Student ○ Private sector
○ Government sector ○ Unemployed

9. To be informed of location, dates and hours of the research sessions, please enter your cell phone number. ———————

B.3 Post-experiment questionnaire

The following are the list of questions from post-experiment questionnaire. Questions 1 and 2 are the "Harm" and "Ingroup" questions from the Moral Foundations questionnaire (Graham *et al.*, 2008). Questions 3-5 are used to measure "family ties" and are drawn from the World Values Survey. Questions 11, 12, 13, 15 and 16 were not included in our experiments in Iran. The variables were coded numerically as indicated below.

Q1. When you decide whether something is right or wrong, to what extent are the following considerations relevant to your thinking? Please rate each statement using this scale:

0	1	2	3	4	5
not at all relevant	*not very relevant*	*slightly relevant*	*somewhat relevant*	*very relevant*	*extremely relevant*

- Whether or not someone suffered emotionally
- Whether or not someone cared for someone weak or vulnerable
- Whether or not someone was cruel
- Whether or not someone was good at math
- Whether someones action showed love for his or her country
- Whether or not someone did something to betray his or her group
- Whether or not someone showed a lack of loyalty

Q2. Please read the following sentences and indicate your agreement or disagreement:

0	1	2	3	4	5
Strongly Disagree	*Moderately Disagree*	*Slightly Disagree*	*Slightly Agree*	*Moderately Agree*	*Strongly Agree*

- Compassion for those who are suffering is the most crucial virtue.
- One of the worst things a person could do is hurt a defenseless animal.
- It can never be right to kill a human being.
- I am proud of my country's history.
- People should be loyal to their family members, even when they have done something wrong.
- It is better to do good than to do bad.
- It is more important to be a team player than to express oneself.

Q3. How important is family in your life?
(3) Very important (2) Rather important (1) Not very important (0) Not at all important

Q4. Which of two statements do you agree more?
• (1) Regardless of what the qualities and faults of one's parents are, one must always love and respect them.
• (0) One does not have the duty to respect and love parents who have not earned it.

Q5. Which of two statements do you agree more?
• (1) It is the parents' duty to do their best for their children even at the expense of their own well-being.
• (0) Parents have a life of their own and should not be asked to sacrifice their own well-being for the sake of their children.

Q6. Which of two statements do you agree more?
• (1) Regardless of what the qualities and faults of one's elderly relatives (grand-father and -mother, un-

cles and aunts) are, one must always love and respect them.
• (0) One does not have the duty to respect and love elderly relatives who have not earned it.

Q7. Generally speaking, would you say that most people can be trusted or that you need to be very careful in dealing with people?
(1) Most people can be trusted (0) Need to be very careful

Q8. How much do you trust . . .

(3) Trust completely (2) Somewhat (1) Not very much (0) No trust at all

• your extended family?
• people of same ethnicity?
• people you meet for the first time?
• your family?

Q9. To which of these groups would you say you belong first?
(0) Your country (1) Your ethnicity

Q10. How important is for you that your sibling would not marry someone of a different ethnicity?
(3) Very important (2) Rather important (1) Not very important (0) Not at all important

Q11. How important is for you to not have people of a different ethnicity as neighbor?
(3) Very important (2) Rather important (1) Not very important (0) Not at all important

Q12. Do you agree that ethnic diversity erodes a country's unity?
(1) Agree (0) Disagree

Q13. How many of your friends have the same ethnicity as yours?
(4) All of them (3) Most of them (2)About half of them (1) A few of them (0) None of them

Q14. People have different views about themselves and how they relate to the world. How strongly do you agree or disagree with each of the following statements about how you see yourself?

(3) Strongly agree (2) Agree (1) Disagree (0) Strongly disagree
• I see myself as a/an [ethnicity].
• I see myself as a/an [Nationality].
• I see myself as a world citizen.

Q15. In your opinion, what are the odds that someone in Vancouver pay a bribe to get a job?
(2) more than 50 percent (1) 50 percent (0) less than 50 percent

Q16. In your opinion, what are the odds that someone in Vancouver gets punished if he/she pays a bribe to get a job?
(0) more than 50 percent (1) 50 percent (2) less than 50 percent

Q17. Some people have a stronger sense of belonging to some things than others. How strong is your sense of belonging to . . .

Not strong at all Very strong

1 2 3 4 5

• your family?
• your extended family?
• your ethnicity?
• your country?

Q18. Do you know any cousins who are married to each other?
(1) YES (0) NO

Q19. Suppose your parent hit a pedestrian while exceeding maximum speed. You are the only witness and police knows that. The only way to save your parent from the serious consequences is that you lie that he/she was not exceeding maximum speed. Would you lie to the police?
(1) YES (0) NO

Survey results

For completeness, below we report the survey results from the post-experiment questionnaire, indicating whether there are significant differences between the responses in the two countries via Wilcoxon Rank-Sum tests. Note the sharp difference in the familiarity with cousin marriage (Q18), as well as differences in the WVS questions underlying studies of family ties (Q3 - Q5).

Question	Canada	Iran	p-value	Question	Canada	Iran	p-value
Q1.1	3.37	3.1	0.021	Q8.2	1.67	1.84	0.005
Q1.2	3.15	2.79	0.004	Q8.3	1.41	1.06	<0.001
Q1.3	3.47	3.32	0.372	Q8.4	2.72	2.91	<0.001
Q1.4	1.17	1.98	<0.001	Q9	0.5	0.33	0.248
Q1.5	1.61	3	<0.001	Q10	0.49	1.22	<0.001
Q1.6	3.15	3.79	<0.001	Q11	0.29		
Q1.7	3.21	3.6	0.009	Q12	0.19		
Q2.1	3.53	3.7	0.026	Q13	2.31		
Q2.2	3.72	4.09	<0.001	Q14.1	1.86	1.89	0.444
Q2.3	3.06	3.9	<0.001	Q14.2	2.23	2.52	<0.001
Q2.4	3.15	3.82	<0.001	Q14.3	2.17	2.44	<0.001
Q2.5	3.03	3.81	<0.001	Q15	0.33		
Q2.6	4.46	4.57	0.029	Q16	1.16		
Q2.7	2.74	3.75	<0.001	Q17.1	3.34	3.18	0.03
Q3	2.53	2.7	0.007	Q17.2	2.21	2.06	0.129
Q4	0.56	0.91	<0.001	Q17.3	2.17	2.06	0.327
Q5	0.68	0.45	<0.001	Q17.4	2.59	2.86	0.002
Q6	0.5	0.72	<0.001	Q18	0.04	0.86	<0.001
Q7	0.49	0.15	<0.001	Q19	0.45	0.36	0.072
Q8.1	2.07	2.05	0.929				
N Obs.	199	188			199	188	

Responses to post-experiment survey questionnaire, by country.

B.4 Experiment procedure in Urmia and Tehran

Our experiments in Iran were conducted with collaboration of the Moaser Research Center[2] which possesses a permit from the Ministry of Science, Research and Technology to conduct research in Economics and Management. The center took the full responsibility of planning, ethical review and official approvals to run experiments in Iran. We also had ethics approval for the Iranian experiment from Simon Fraser University's Office of Research Ethics.

Kin treatments in Urmia

Recruiting: We recruited from undergraduate students who were registered in summer semester courses at various colleges and universities in Urmia. We hired local research assistants (a teacher and some students) to help us with the recruiting for kin treatments. Our research assistants went to different colleges and universities throughout the city and invited students to participate in the experiments and earn cash. Those who were interested to participate in the experiment were given forms titled "pre-research questionnaire" in Persian, translated in Appendix B.2.

Based on their self-reported background, we chose subjects who were i) students, ii) less than 30 years old, iii) Azeri or Kurdish. Then our assistants contacted and asked them to choose one of the scheduled experiment sessions to attend. Those who had siblings interested in participating in the experiment (answered question 7 with "Yes") and whose siblings were i) students and ii) less than 30 years old, were invited in pairs to play in the roles of two players with kin relation in our kin treatments. Subjects who participated alone played the stranger role in our kin treatments.

Participants: In total 180 subjects participated in the kin treatments of our experiment (60 participants for each kin treatment; KKS, KSK, SKK). From 120 subjects in the roles of Person A and B, half were Azeri Turk and Half were Kurd. 57 of these subjects were female and 63 of them were male.

Recruiting student siblings below 30 years old during our two months conducting experiments in Urmia was achievable for some reasons; (i) in Iran, most of the undergraduate students spend their summers with their families in their hometowns, because most of the universities and colleges in Iran do not offer dormitories to undergraduate students during summer semesters. Those who want to take summer courses can take general courses in local universities and colleges as a "guest student" in their hometown, (ii) youth mostly live in the same place with their families until they get married, (iii) the age of marriage in Iranian metropolises is relatively high (23-4 for women, 27-8 for men), (iv) the show-up fee (7000 Tomans for each, i.e. 14000 for a sibling) covers costs of commuting to the experiment location from all areas of the city by chartered cab (max 5000 Tomans for a one-way trip, i.e. 10000 Tomans for commuting of a sibling pair), (iv) Higher education is a trend in today's Iran and there are variety of public and private colleges and universities. Many youth between 18-24 in cities are studying for a bachelor or master degree in some college or university.

Conducting experiment sessions: We ran the kin treatment sessions in a high school with the official approval of the West Azerbaijan province's Ministry of Education in June-July 2015. In the high school, we had access to three classrooms with twelve seats in each class. We labeled the classrooms with Persian letters "Aleph", "Be", "Jim" (same as A, B, C in English) and labeled seats with numbers 1 to 12. Subjects in the roles of Person A, Person B and Person C were directed to classes "Aleph", "Be" and "Jim" respectively. Each subject was matched with the other participants seating in the seats with the

[2]mem.ac.ir

same numbers in the other two classrooms. The number of subjects in each session varied between 12 (4 in each class) and 24 (8 in each class). Sessions lasted around an hour.

Experiments were run using pen-and-paper. All forms and booklets were anonymous and include only the class and seat number, except for the consent form and receipt, on which participants printed their full name, signed and dated. Subjects had been asked to bring their National and Student ID Cards. A National ID Card includes full name, the date of birth and the name of father which allowed us to check whether pairs were actually siblings.

Upon arrival, we handed subjects forms asking their background information (with the same questions 1-7 of pre-research questionnaire). After subjects filled the background information forms and signed consent forms, we handed them the instruction booklets, which were the same as in Appendix B.1 but translated to Persian, and with converted currency (see payments section). They were not allowed to talk to each other during experiments. They were asked to raise their hand to ask questions, and these were answered privately by experimenters. Two experimenters managed the "Aleph" classroom (subjects in the roles of Person A) and the "Be" classroom (subjects in the roles of Person B) and an assistant attended to the "Jim" classroom with the subjects in the passive role (C). After reading instructions, subjects received a decision booklet in three pages. The first page read (in Persian):

Decision booklet

Please note that:

I. Participants in roles of **A** and **B** make choices at the same time. We will match their choices to determine the final outcome. You will see the outcome and your final payoff at the end of the experiment.

II. You might observe some background information from the pre-experiment question–naire about participants in the other roles.

page 1

The second page of the decision booklet presented the information to the subjects about the other people in the three-person scenario (their kin and a stranger). About non-kin they saw only their age group, written as "18-30 years old" which was true about all subjects. This information was the same for all kin and ethnic treatments, therefore introduced no noise in the experiment. Below is the second page of decision booklet of player A in the KKS treatment who has a sister in the role of player B.

The third page displayed the game tree, a question asking which action the player would like to take, and a box asking subjects to explain their choice. Below is the third page as seen by Person B in a KKS treatment.

Your Role: Person **A**

The information provided to you and other participants:

Person **B**'s background information

Your sister

Person **C**'s background information

18-30 years old

Person B observes the same type of information about you.

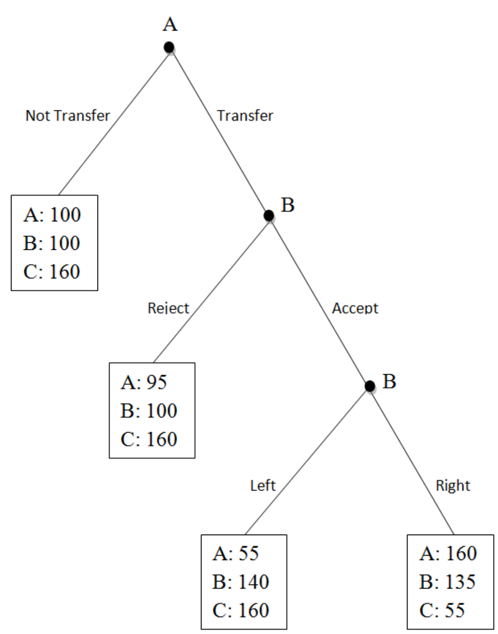
Person C observes the same type of information about you.

page 2

Your Role: Person **B**

Suppose Person A decided to Transfer 40 ECU to you.
Please choose one of the following options:

- ○ Accept, then Right
- ○ Accept, then Left
- ○ Reject



page 3

After collecting the decision booklets, we distributed post-experiment questionnaires. While subjects were answering questionnaires, we matched the decisions of players in roles A and B and wrote down their payoffs. Subjects remained seated until they got paid with cash in an envelope. The collected data was converted to a computer file after experiment sessions, and all the forms and booklets filled by subjects during experiments are stored.

Payments: In the kin level experiment, the minimum total payment was 13000 Tomans, the maximum total payment was 23000 Tomans and average payment to 180 subjects was 19000 Tomans which is equal to about 7 CAD based on free market rates.

Ethnic treatments in Urmia

We ran our ethnic treatments in the Faculty of Literature and Humanities of Urmia University in August 2015 with an approval from university officials. Urmia University is a public university and the oldest and largest university in the city. In summer 2015, the university offered general courses and also a range of courses in different fields of study (such as engineering and economics), but all classes were concentrated in the Faculty of Literature and Humanities.

Participants: The total number of subjects in the ethnic treatments was 180 (60 participants for each ethnic treatment; CCS, CSC, SCC). All participants were undergraduate students (except few medical students taking general courses) and were below 30 years old. From 120 subjects in the roles of Person A and B, 80 were Azeri Turk and 40 were Kurd. 46 of these subjects were female and 74 of them were male.

Recruiting, conducting experiment and payments: We had access to three classrooms with 20 seats each in the Faculty of Literature and Humanities. As in the kin treatment sessions, we labeled the rooms ("Aleph", "Be" and "Jim") and seats (from 1 to 20), and subjects played the three-person scenario with two other subjects sitting in the other classrooms in seats with the same numbers. The number of subjects in each session varied between 30 (10 in each class) and 60 (20 in each class). Each session lasted about an hour.

To recruit from students in the Faculty of Literature and Humanities, we prepared a form including questions 1-7 of the pre-research questionnaire used in the kin treatment sessions. We printed 60 of these forms and wrote a number (1 to 60) in two corners of each form. One corner of the form with a number on it was cut and could be tear apart easily. At the beginning of the classes, we asked instructors to give us 5 minutes to invite students to our experiment. After a brief introduction, we handed them the forms and told them to tear apart the number in the corner of the form in order to participate in the experiment right after their class and provided them with the room number of class "Jim". We had 1.5 hour to assign roles and seat numbers to the numbers on pre-experiment questionnaire forms. After students were dismissed from their classes, they started to show up and were directed to their seats based on the numbers in their hands.

Payments were the same as in the kin treatments, with an average payment of about 19111 Tomans. Experiments were conducted exactly the same as the kin treatments except that the second page of the decision booklets presented the information of a co-ethnic and a stranger player. Below is the second page of decision booklet for Person A in CCS treatment.

Your Role: Person **A**

The information provided to you and other participants:

Person **B**'s background information

18-30 years old
Azeri Turk

Person B observes the same type of information about you.

Person **C**'s background information

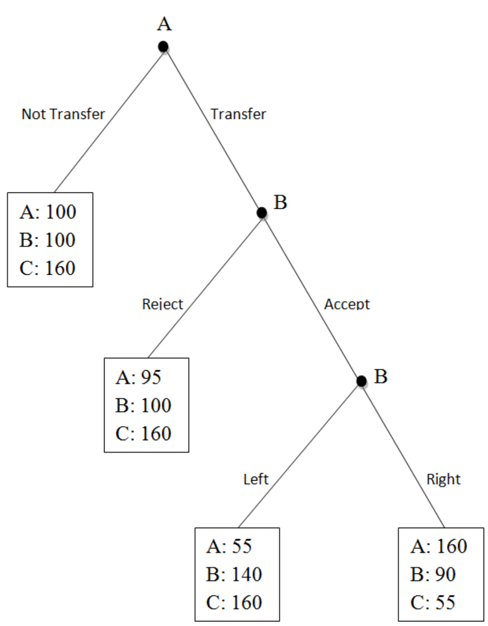
18-30 years old

Person C observes the same type of information about you.

page 2

Additional experiments in Tehran

For the robustness checks in Iran, we ran experiments in Tehran with strangers in both low and high effort cost variants, and with siblings, cousins and friends in the high cost variant. Tehran is the capital city of Iran and is highly ethnically diverse. The results of the experiments with strangers and siblings are not distinguishable from those in Urmia which indicates that our results are good representative of the urban society in Iran. The game tree below was presented to subjects in the high cost variant of the experiment.



The experiments in Tehran took place in August 2016 prior to a meeting of the Tehran Thought Club. The club hosts young adults (mostly students) interested in social sciences for various presentations and discussions. We collected the data from 12 triplets per treatment in our experiments in Tehran with almost the same procedure in Urmia except that in pre-experiment questionnaire we added choices to participate in the experiment with a close friend or a cousin. We specified that those who participate in the experiment as close friends should not be relatives.

B.5 Experiments in Ecuador

We conducted experiments in Ecuador, which has an ethnic fractionalization index of (0.66), more or less similar to Canada (0.71) and Iran (0.67), see Alesina *et al.* (2003). Ecuador is located in the northwest of South America with a 16 million population. Its consanguinity rate is 6.3% which is the largest one in the Americas, and while it is higher than Canada (1.5%), it is lower than Iran (32%), according to the measure presented in Bittles and Black (2015).

We looked within Ecuador for a variation related to norms about marriage practices, since it is a multi-ethnic country. We found that not all ethnic groups treat uniformly marriage among cousins. Two of these groups are: Sierra Kichwa and Shuar. The Sierra Kichwa are the largest indigenous group in the country with a population of 325,000, and they are distributed along the Andes cordillera in Ecuador. While the Kichwa people do not allow first-degree cousin marriage, this is still prevalent among the Shuar people. In the latter case this is found in the Ethnographic Atlas by D-PLACE (Database of Places, Language, Culture, and Environment) and see Kirby *et al.* (2016); meanwhile for the Kichwa we collected the same data from an ethnographic expert on the group (Waters, 1997, 2007).

We chose a Kichwa group located in the town of Guangaje (8,000 population), which is a rural parish of the canton Pujilí in the province of Cotopaxi. A conglomeration of scattered smaller villages, also known as communes, with population sizes between 80 up to 600 each one, characterizes this town. We preferred a community like this in order to keep it comparable to the Shuar community regarding population sizes and rural kind. The communes we visited to conduct our experimental sessions were Tingo Pucará (120 pop.) and Salamalag Chico (300 pop.). They speak Quechua and Spanish. All the experimental instructions were in Spanish.

The Shuar people in Ecuador are located in the eastern region in the Amazon rainforest. Overall there is a reported population of approximately 79,000. We conducted our experimental sessions in two communes: Chapintsa (200 pop.) and Shakap (150 pop.). These communes are located in the Pastaza province. These people speak Shuar and Spanish, and all the experimental instructions were also in Spanish.

Given the small population sizes it became necessary to work with what are called non-standard subjects in the experimental literature. Thus, we worked with subjects from the population who were at least 18 years old in each of these ethnic communities. The experiments took place between March and May of 2018.

B.5.1 Quito Experimental Procedures

Before going into the field, we first replicated the KKS and SSS treatments using a student population in Quito. The replication took place between October, 15th and November, 7th of 2017 at the Universidád San Francisco de Quito. Since we knew we would go to ethnic villages later on, we implemented the experiment on paper and pencil with instructions and response sheets translated into Spanish.

Students were recruited by filling out a pre-experiment questionnaire prepared in Google Forms and similar to the one used in Canada. For the KKS treatment, we invited to sessions only those students who answered positively about bringing a sibling to the university to participate for a session at a specified date.

There were four sessions for the KKS treatment since it was not so easy for students to coordinate with their siblings to come to campus (even though we included sessions at night and on Saturdays; in fact, the last option did not work). We recruited 11 triplets.

We could finish the SSS treatment in two sessions, with students who said they could not bring a sibling to campus. There were in total 11 triplets.

Three consecutive classrooms were prepared for each session with labels for each person role: A, B, and C. Also inside each classroom there were separated seats with numbers. In the KKS treatment, each pair of siblings selected a random number from a bag of tickets and were located by an assistant in their respective rooms. Subjects in the role of person C also selected a ticket randomly and were located in their room accordingly. In the SSS treatment, subjects selected a ticket with a random number and role was assigned to each of them, an assistant walked them to their respective classrooms.

For both treatments, once subjects were inside an experimenter read the instructions out loud, and any question was answered face to face. Subjects in the role of person A or B answered initially the decision booklets, while subjects as person C were answering the post-experiment questionnaire. Once subjects in roles for person A and B took their decisions, these were matched to compute payoffs for each triplet at an office, meanwhile subjects were answering the post-experiment questionnaire. Finally, subjects were paid in private one by one at the office.

B.5.2 Experiment procedure in Kichwa and Shuar communities

The experiments conducted in Ecuador focused on two ethnic groups: Kichwa and Shuar. To conduct these experiments, we got the ethics approval of the Universidad San Francisco de Quito's Institutional Review Board. This university is located in Quito, the capital of Ecuador. All subjects agreed to participate voluntarily and their consent was received orally.

Recruitment For both ethnic groups before recruiting subjects, we got permission from local leaders in each community we were going to visit. We contacted the community leaders via phone calls and field visits between four to one months before conducting the sessions. They allowed us to enter into the communities and together with student research assistants we were able to recruit subjects. We also used the pre-research questionnaire as in Canada and Iran, but in Spanish.

It is relevant to mention that during the planning stage to run this experiment in Ecuador, we established that all the material (the pre-research questionnaire, the instructions, and the post-experiment questionnaire) was to be translated into Spanish but delivered verbally rather than on paper or computer to secure understanding by all of them.

We recruited 135 participants from each ethnic group, plus 33 university students to participate with each of these groups. Thus, we have a total of 336 participants in these experiments. We needed university students to conduct the CCS and SSS treatments in each target group. They were going to play the role of strangers, since we were conducting these sessions in small-scale societies. Besides the CCS and SSS treatments we also implemented the KKS one. We decided to have 10 triplets for KKS and SSS treatments while for the CCS we got 18 triplets each in the CCS and CCS_High_Cost treatments, since that is our primary data of interest.

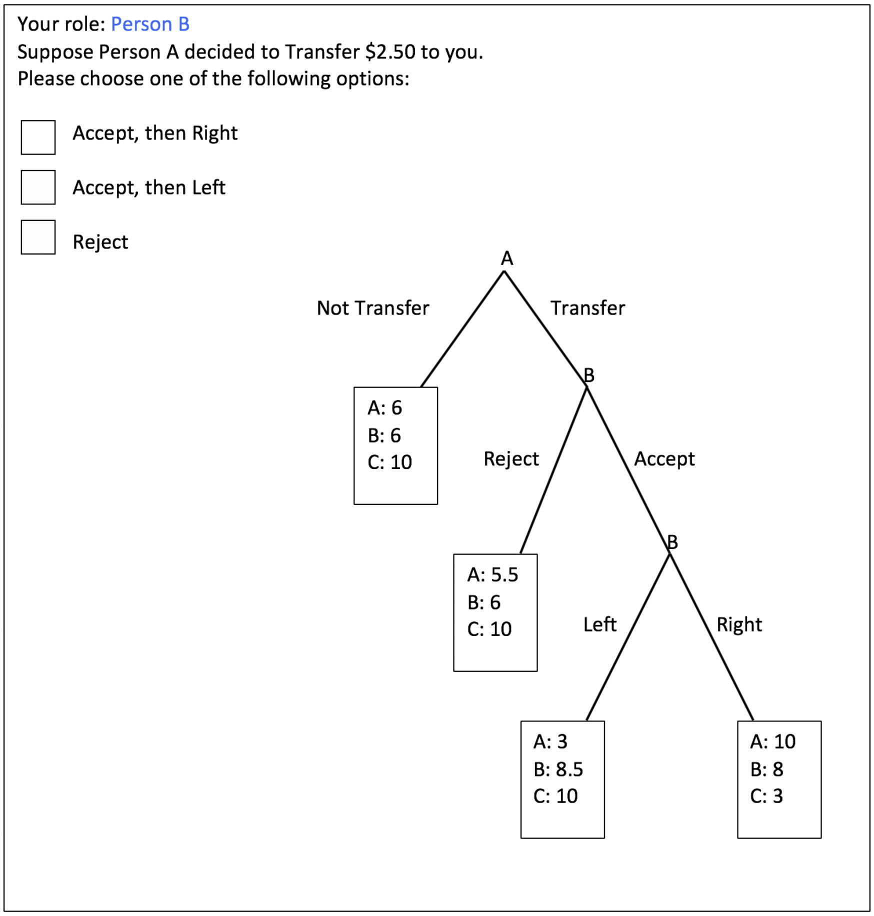
Kin treatment for Kichwa people For the kin treatment we recruited ten triplets in Tingo Pucará, Person A and Person B were siblings and Person C someone in the community unrelated to them. There were 16 females and 14 male subjects, between 18 and 65 years old. In a previous visit to the commune, subjects answered the pre-research questionnaire and told us whether they and a sibling would be willing to participate; if so, they were invited together. The day of the session this was confirmed in order to get the ten pairs of siblings by asking them to show a national ID card. The show-up fee was $2 US dollars, since in Ecuador that is the currency. We conducted this session on March, 4th, 2018. The minimum salary in the country is $2.3 US dollars per hour.

We ran the session in three different rooms located in a communal two-story house. Each room has an exterior mark signaling what persons were to be in there: A, B, and C; and we also labeled seats from one to ten. Yet there was one subject each time per room being served by an experimenter who will helped him/her to record his/her answers to the questions and the decisions made. The interaction between our written material, the experimenters, and subjects worked in the following fashion. We prepared instructions booklets as in Appendix B.4 but translated to Spanish and with payments directly in US dollars instead of experimental currency units. An experimenter explained the instructions to the subject with this booklet in hand, and he/she also made a drawing over a cardboard standing in front of the subject, since during pilots we realized that a graphical explanation of the game tree made understanding easier (McCabe *et al.*, 2000). In this interaction subjects could ask questions to make sure they fully understood instructions. Subjects not being served had to wait and were required to be silent and not to talk to each other. A student assistant was with them to make sure this was what happened. Each subject was matched with the other participants seating in the seats with the same numbers in the other two rooms. This random matching was done previously with the help of a software. When the session began, siblings were given a random order to be seated, and the same was done for the stranger. Sessions lasted about 90 minutes.

All forms and booklets were anonymous and include only the class and seat number, except for the receipt, on which participants printed their full name, signed and dated. Subjects had been asked to bring their National and Student ID Cards. A National ID Card includes full name, the date of birth and the name of father which allowed us to check whether pairs were actually siblings. After the instructions were read out loud to subjects and an experimenter answered questions, they received a decision booklet with two pages in Spanish. The first page was exactly the same as page 2 of the decision booklet used in our field site in Iran. The second page contained the game tree but with payoffs directly in US dollars modified like this (original was in Spanish):

Once each subject took his/her decision he/she answered the post-experiment questionnaire assisted as before. Again during the planning stage we decided to reduce the number of questions to be applied to non-student subjects, taking into account the potential issues that lack of understanding and, also, prolonged sessions could provoke. Thus, we included the following questions from the original post-experiment questionnaire in Appendix B.3: Q2, Q3, Q4, Q5, Q6, Q7, Q8, Q10, Q11, Q12, Q18. We, also, based our decision what were the questions most relevant for our empirical approach. While subjects were answering the questionnaire their decisions made for the game were being matched in order to compute the payoffs. Once each subject finished they were called into another room and privately paid cash in an envelope. The minimum payment was $5 and the maximum $12 per participant, with an average of about $9 dollars.

SSS treatment for Kichwa people InTingo Pucará we, also, recruited 15 people who were not closely related, at least, avoiding having first degree cousins or siblings-in-laws. This was actually the first session we conducted there, and it lasted less than an hour. We ran the SSS session with them and with 15 university students who were at the same moment located in three different rooms labeled as A, B and C on the campus of USFQ. There were 17 females and 13 males participating. The students were recruited through mail and the internal network of the university, and only students majoring in economics were excluded. This university has over 7,000 students. There, also, the students were seated according to their number they got upon arrival. This number was again generated with the help of software. The randomization allowed for having triplets dispersed in both sites. This was important in showing them that they were not interacting only with people in the village or in the university.



Record Sheet - Ecuador

The role of the stranger was key here and during our planning stage we considered that in order to make sure that Kichwa people believed that they were going to interact with strangers, it was best to match them randomly with students from Quito. This was possible in part because seat numbers were incomplete at each room in each location; and, also, due to each participant being informed that there was only a fifty percent chance of being matched with local or a student. Of course, the hardest part here was the communication between the two places to make the respective matching to determine the subjects? payoffs. What we did was that once all subjects made their decisions for the game tree, one of the members of the team at each location called each other to complete the matchings. After this was done everything also proceeded as we just described for the KKS treatment. Because of this design feature, the SSS treatments here are not strictly comparable to those conducted elsewhere.

CCS treatments for Kichwa people Three days later on March 7th, 2018 we went to Salamalag Chico to conduct our CCS and CCS_High treatments. We agreed to do this not just for the obvious reason of needing to find more people, but also to get a new population that had not been exposed to the experiment, so contamination could be controlled.

We applied the same procedures here regarding approaching the community with the help of a local leader well in advance of the actual session; having student assistants (five) and local assistants to help us to run the session; organization of three rooms labeled with the three letters A, B and C and numbering the seats in each of them; we also randomized the order of subjects in each room upon arrival.

Here we recruited 45 Kichwa participants plus nine university students for each treatment, low and high cost. The latter group was to induce the notion of strangers. We have 65 female and 43 male participants. For each treatment we had 19 subjects in rooms A and B; while for person C we had divided the group into two with nine people each one part in Salamalag Chico and the other in Quito. In the Kichwa village two subjects were being served per room at a time by two experimenters in room A and B and only one experimenter in room C. In the first two rooms after instructions were read out loud and the game tree drawn, each assistant helped one subject with both subjects being separated enough to have private explanations to each. Once they were done with this part, we proceeded with the post-experiment questionnaire in the same fashion. At this time one experimenter was matching the results from the first part to compute the payoffs. Here it was easier to determine this since A and B persons were in the same place, we only had to communicate by cell phone the payments to the subset of players C who were played by students in Quito. Each session lasted about two hours. We show below the information each participant in the role of Person A received about the others (original was in Spanish), and also the game tree for the high cost treatment.

Experiments with the Shuar people First and foremost, we attempted to maintain identical experimental procedures with the Shuar people, so that only the experimental context varied. We went to two communes: Chapintsa and Shakap. We visited the former on April 27th and the latter on May 19th, 2018. For both field sites we initially contacted local leaders to approach the community. We recruited again 168 subjects; there were 92 female and 76 male participants, 33 subjects were university students out of these participants, and these participated in the SSS treatments and as strangers in the KKS and CCS treatments. In Chapintsa we ran the treatments CCS and CCS_High_Cost; while, in Shakap we implemented the KKS and SSS treatments. The role of the stranger in the case of the CCS (high and low cost) and the SSS treatments was induced in the same fashion as before with matchings and payoffs determined similarly as with Kichwa. Average payments were about $9 dollars with a maximum of $12 and a minimum of $5; show-up fee was $2 dollars.

Your Role: Person A

The information provided to you and other participants.

Person **B**'s background information	Person **C**'s background information
18 – 65 years old Kichwa	18 – 65 years old
Person B observes the same type of Information about you.	Person C observes the same type of information about you.

Info Sheet - Ecuador

Your role: Person B

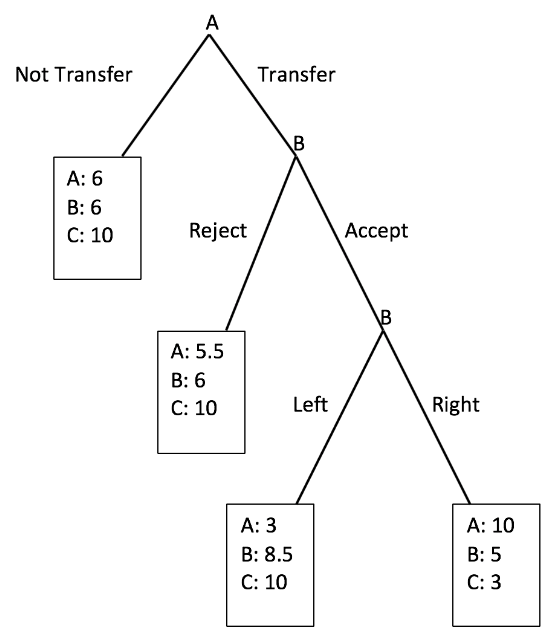
Suppose Person A decided to Transfer $2.50 to you.

Please choose one of the following options:

☐ Accept, then Right

☐ Accept, then Left

☐ Reject



Record Sheet - Ecuador, CCS_High