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Olga B. Stoddard
Brigham Young University, olga.stoddard@byu.edu

Andreas Leibbrandt

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AN EXPERIMENTAL STUDY ON THE RELEVANCE AND SCOPE OF NATIONALITY AS A COORDINATION DEVICE

OLGA STODDARD and ANDREAS LEIBBRANDT*

In a period marked by extensive cross-national interactions, nationality may present an important focal point that individuals coordinate on. This study uses an experimental approach to study whether nationality serves as a coordination device. We let subjects from Japan, Korea, and China play coordination games in which we vary information about their partner. The results show that nationality serves as a coordination device if common nationality is the only piece of information available to the subjects. The strength of this device is nationality-dependent and diminishes when participants are provided with additional information about their partner. We also find that subjects are likely to coordinate on the Pareto-dominant equilibrium at about the same rate if the partner has a different nationality than if nationality is unknown. (*JEL* C91, C92, Z1, Z13)

I. INTRODUCTION

The beginning of the new millennium has been marked by increased social, economic, technological, and cultural integration. These phenomena, in turn, promote contact between individuals from different countries and cultural backgrounds putting higher demands on the coordination of actions.[1] In this context, it is important to understand if and how coordination depends on the cultural backgrounds of the participating actors. One stylized fact in the economic literature on coordination is that in the absence of additional information, people tend to use a solution that seems relevant, natural, or special to them, known as a focal point (Schelling 1960; Crawford and Haller 1990; Mehta et al. 1994; Sugden 1995; Camerer 2003). Nationality may be such a focal point and hence one may hypothesize that nationality serves as a coordination device and that coordination is less likely to occur if interactions take place between partners from different nationalities (Schelling 1960; Sugden 1986).

The existing body of literature provides grounds for such a hypothesis. Efferson et al. (2008), for example, suggest that coordination among compatriots may be facilitated in strategic settings with multiple equilibria because of in-group favoritism, particularly when trivial groups evolve into cultural groups. Theoretically, Chen and Chen (2011) use a group-contingent social preference model to show that an induced salient group identity can lead to higher in-group coordination on the efficient high-effort equilibrium in the minimum-effort coordination games. As nationality represents an important dimension of individual identity, we expect nationality to matter in coordination settings and conjecture that individuals coordinate better when they

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Stoddard: Visiting Assistant Professor, Department of Economics, Brigham Young University, 149 FOB Provo, UT 84606. Phone 1-801-422-3580, Fax 1-801-422-0194, E-mail olga.bogach@byu.edu

Leibbrandt: Assistant Professor, Department of Economics, Monash University, Clayton, Victoria 3800. Phone 61-3-9905-2478, Fax 61-3-9905-5476, E-mail andreas.leibbrandt@monash.edu

1. We use the term culture, cultural background, and nationality interchangeably in this study. For a survey on the different definitions for culture, consult, for example, Kroeber and Kluckhorn (1952). Culture certainly has many meanings and nationality is just one aspect of it, albeit an important one. We use nationality as a proxy for culture and discuss the strength of this proxy and other aspects of culture in the conclusion.

ABBREVIATIONS

GPA: Grade Point Average
MIS: Miscoordination
PDE: Payoff-Dominant Equilibrium
RDE: Risk-Dominant Equilibrium

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interact with their compatriots as compared to non-compatriots or as compared to subjects whose nationality they do not know.

In this study, we use an experimental approach to investigate whether and under which conditions nationality serves as a coordination device in coordination games with multiple equilibria (Crawford and Haller 1990; Cooper et al. 1990; Van Huyck et al. 1990; Crawford 1995). We made use of the diverse student body at the University of Hawaii and recruited an equal amount of Japanese, Korean, and Chinese nationals. The subjects play simple stag-hunt coordination games with a payoff-dominant equilibrium (PDE) and a risk-dominant equilibrium (RDE), and interact both with their compatriots and with participants from the other two countries. To test for the robustness of the relevance of nationality as a focal point, we provide subjects with different levels of information about their partner: (1) no information, (2) information only about their partner's nationality (i.e., nationality is salient), and (3) information about their partner's nationality and some other presumably irrelevant characteristics such as hair color (i.e., we make nationality less salient). In addition, we observe the subjects' level of pro-sociality toward subjects from other nationalities and compatriots in ultimatum and dictator games to investigate whether potential differences in coordination are driven by in-group favoritism (Tajfel and Turner 1979).

Our findings show that nationality can indeed serve as a coordination device. Subjects are more likely to try to coordinate on the PDE if common nationality is salient as compared to if subjects do not know the nationality of their partner. However, if nationality is non-salient, nationality does not serve as a coordination device, that is, subjects are not more likely to try to coordinate on the PDE if their partner has the same nationality. Moreover, we do not find that subjects are less likely to try to coordinate on the PDE if their partner has a different nationality as compared to when the partner's nationality is unknown.

To the best of our knowledge, this is the first experimental study analyzing inter-cultural coordination between different nationalities in a systematic manner and inter-cultural behavior where the salience of nationality is experimentally manipulated. Probably the closest related study is that of Brandts and Cooper (2007) who compare the behavior of subjects in the United States and Spain and observe higher levels of coordination in the United States. This study, however, does not investigate coordination between subjects from different nationalities. Related to our findings is also the study by Crawford et al. (2008) in which the authors find that miscoordination (MIS) increases if the salience of focal points is reduced by minimally changing payoff constellations, and Holm (2000) who finds that information about gender affects coordination in a battle-of-sexes game.

In addition, a closely related literature in social psychology studies economic behavior in the context of social identity theory and nationality in particular. Examples include Kuwabara et al. (2007) and Takshashi et al. (2008). Both studies report the results of web-based laboratory experiments where individuals from two or three countries play a variant of the trust game online under two experimental conditions—one in which the partner's nationality is known, and another in which the partners remain anonymous. Similarly, Yamagishi et al. (2005) had participants from Japan and Australia play five rounds of Prisoner's Dilemma game, each time with a different partner, varying the extent of mutual knowledge of the partners regarding each other's nationality. However, while these studies all use nationality in their experimental conditions, they do not experimentally manipulate the salience of nationality, as we do in our study.

Our study contributes not only to the literature on coordination games which are characterized by the existence of multiple Nash equilibria (Crawford and Haller 1990; Cooper et al. 1990; Van Huyck et al. 1990; Crawford 1995) but also to the literature comparing behavior across cultures (Roth et al. 1991; Okada and Riedl 1999; Anderson et al. 2000; Henrich 2000; Henrich et al. 2001; Brandts et al. 2004), between cultures (Fershtman and Gneezy 2001; Buchan et al. 2006; Chuah et al. 2007; Bornhorst et al. 2008; Kuwabara et al. 2007; Yamagishi et al. 2008), and more generally to the literature on in- and out-group behavior (Sherif et al. 1961; Tajfel and Turner 1979; Kollock 1998; Eckel and Grossman 2005; Goette et al. 2006; Takshashi et al. 2008; Charness and Rustichini 2007; McLeish and Oxoby 2007; Chen and Li 2009) which typically reports that individuals treat in-group members better than out-group members.

Most of these studies do not manipulate the salience of group membership. Exceptions are Eckel and Grossman (2005) and Charness and Rustichini (2007), which create minimal groups to study cooperation and increase group identity by team goal attainment or passive audiences. Consistent with our findings, these two studies

point out that the saliency of group membership affects behavior. In contrast to these studies, we investigate *coordination* among *natural groups* of people with different nationalities and *decrease* group identity by providing subjects with different levels of information about their partners.

II. HYPOTHESES

In this section, we present our research hypotheses regarding subject behavior in coordination games with multiple equilibria as related to nationality, as motivated by the theoretical and empirical findings which we discuss in the following section.

HYPOTHESIS 1: *Nationality serves as a coordination device in coordination games with multiple equilibria.*

This hypothesis implies that relative to a condition where players have no information about their partner's nationality, information about common nationality serves as a focal point and enhances coordination between players. Theoretically, this hypothesis is motivated by a group-contingent social preference model (Chen and Chen 2011) that shows that an induced salient group identity can lead to higher in-group coordination on the efficient high-effort equilibrium in the minimum effort coordination games. We extend their analysis to natural group identity.

Furthermore, in order to explore not only *if* but also *under what conditions* nationality serves as a coordination device, we hypothesize that varying the salience of information about nationality may have an impact on the effectiveness of nationality as a coordination device. Empirical findings of Eckel and Grossman (2005) and Charness and Rustichini (2007) point to the importance of manipulating the salience of group membership in minimal groups, and we expect that it is even more important in natural groups.

HYPOTHESIS 1a: *Nationality serves as a coordination device if nationality is salient.*

HYPOTHESIS 1b: *Nationality serves as a coordination device if nationality is non-salient.*

These hypotheses imply that relative to having no information about the partner's nationality, having either salient or non-salient information about common nationality increases coordination between players.

HYPOTHESIS 2: *Coordination is more difficult if subjects know that their partner has a different nationality.*

This hypothesis is motivated by Tajfel and Turner's (1979) theory of social identity and an extensive empirical literature on in- and out-group behavior (cited in the previous section), which generally finds that subjects treat in-group members better than the out-group. We therefore expect coordination to be less likely when subjects know they are matched with a non-compatriot relative to when they are matched with a compatriot.

Together, hypotheses 1a, 1b, and 2 form the basis of our experimental design, which we present in the next section.

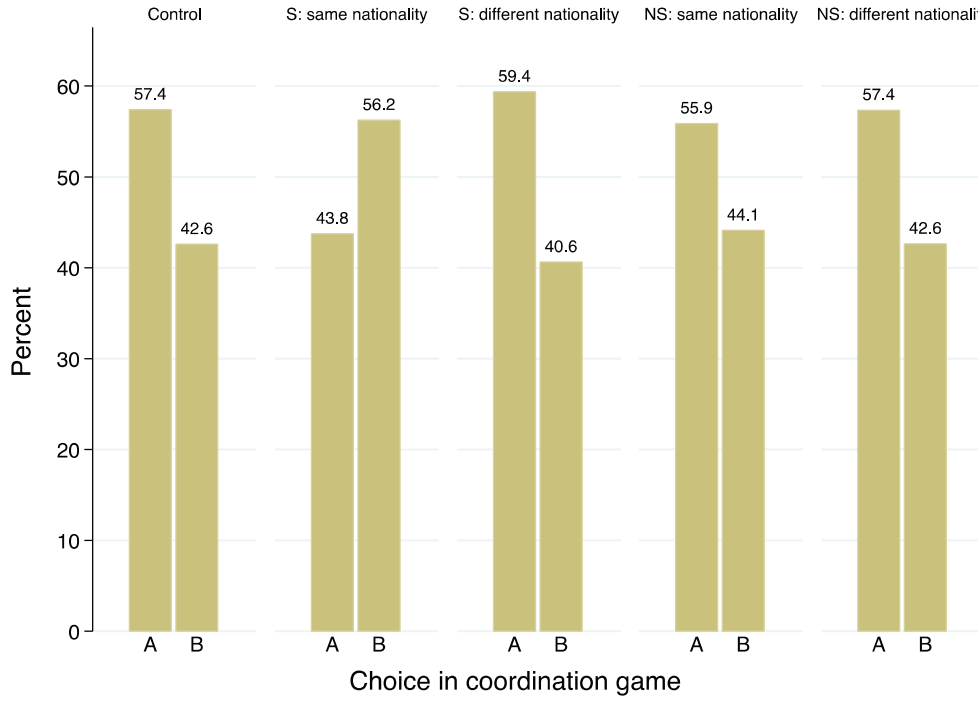
III. EXPERIMENTAL DESIGN

Our experiment consists of four parts: (1) a short pre-experimental questionnaire to collect the subjects' demographic information, including nationality; (2) instructions and control questions for the games (the complete set of experimental instructions and questionnaires is given in the Appendix); (3) the games; and (4) a short post-experimental questionnaire before subjects are paid privately.

All subjects first took part in three ultimatum games and three dictator games before they played three coordination games. Each game was presented to the subjects separately and they received *no information* about the behavior of other subjects or the outcomes of the games until the end of the experiment. The roles remained the same throughout the experiment, that is, a subject who was assigned a role of a proposer in the ultimatum game, was also a proposer in the dictator game. Players were *randomly paid* for one of the three ultimatum games, one of the three dictator games, and one of the three coordination games. In addition, we used the *perfect stranger matching*, so no player knew the identity of his/her co-player and no player was ever matched with the same player twice. Therefore, there is no theoretical reason to believe that the behavior in the coordination games is contaminated by the preceding games.[2] By taking into consideration the

2. In principle, there could be order effects, that is, subjects may in general play a coordination game differently after playing, for example, a dictator game. However, because our main analysis compares treatments where the order was identical, our treatment differences cannot be attributed to order effects. We briefly examine relationships between ultimatum game, dictator game, and coordination game behavior in Section III.

FIGURE 1
Choice in Coordination Game Depending on Treatment and Match



Notes: S, salient treatment; NS, non-salient treatment.

behavior in the ultimatum and dictator game, we can control for the possibility that the treatment differences in the coordination game are driven by some type of in-group favoritism.[3]

The three coordination games (as well as the three ultimatum and dictator games) differ according to the matching and were presented to participants in random order. In one decision, a subject was matched with a person from the same nationality, and in the other two he/she was matched with subjects from other nationalities than his/her own. The matching algorithm is presented in Figure 1. The experiment was programmed using *Z*-tree software (Fischbacher 2007).

3. The necessity to conduct multiple games in one session was motivated mainly by the unique subject pool in this experiment. The nature of the experiment required an equal number of subjects of three different nationalities to be present in one session at a time. It would be extremely difficult to find a sufficient number of participants from different nationalities if we had to avoid a multi-game design. Our multi-game design was also motivated by the many recently published experimental studies using multi-game designs (see Appendix D).

There are three between-subject treatments in this experiment which differ by the amount of information subjects have about their matched partners: control (treatment C), salient information about partner's nationality (treatment S), and non-salient information about partner's nationality (treatment NS). In C, a subject receives no information about his/her partner. In S, the only piece of information a subject receives is the nationality of his/her partner. In NS, a subject receives information about the age, university status (freshman, sophomore, junior, senior, or graduate student), eye color, hair color, and nationality of his/her partner. No subject participated in more than one treatment.

The coordination game we study is a symmetric two-person stag-hunt game in which the subjects simultaneously choose either A or B. The earnings are determined depending on their choice and the choice of their match according to the payoff matrix presented in Appendix B. For example, if Participant 1 chooses A, then Participant 2 earns seven tokens if he/she chooses A and one token if he/she chooses B. Each token

is worth $1 if the game is chosen for payment. Note that choice B is riskier for the subject as he/she could either make one or nine tokens depending on the choice of his/her match. By contrast, choice A is less risky as it secures at least seven tokens regardless of the other subject's decision. There are two Nash equilibria in this game: (A,A) which is the RDE, and (B,B) which is the PDE. Charness (2000) studies this game with the same parameter specifications.

In the ultimatum games, a proposer has to decide how to divide ten tokens between him/her and a responder. If the responder accepts, the offer is implemented; however, if he/she rejects both player types receive zero tokens. We implemented the strategy method for the responders, that is, the responder had to determine his/her minimal acceptable offer before he/she knew the actual offer of the proposer. In the dictator games, the proposer has also to decide how to divide ten tokens between him/her and a responder but the responder cannot reject the offer.

A total of seven sessions were conducted in the UH Experimental Laboratory in April 2009 (two sessions for treatments C and NS each, three sessions for treatment S).[4] Sessions typically included 18 participants: 6 Japanese, 6 Korean, and 6 Chinese students. A total of 126 subjects participated in the experiment (42 Japanese, 38 Korean, 42 Chinese, and 4 other nationalities).[5] These nationalities were chosen because of their significant representation at the University of Hawaii as well as their close regional ties. Choosing participants from the same region allows reducing possible cross-regional factors that may affect subjects' behavior and potentially contaminate the results of the experiment. One challenge is that these participants may be less representative for the population residing in the respective countries and consist of those who only weakly identify with their nationality. Thus, we have made every possible effort to recruit subjects who still have strong ties to their nationalities and our sample consists of mainly students who have not been abroad for a longer period (55% of our subjects had been abroad for less than 2 years) and still identify strongly with their nationality (98.3% of the subjects reported to strongly identify with their nationality).

Our subject pool has the following characteristics. Sixty-eight percent of the subjects are female; 57% identify themselves very strongly with their nationality, 41% somewhat strongly, and 2% not at all. Fifty-five percent of the subjects report to have a grade point average (GPA) of 3 (=mean grade in their university classes, out of 4), and 37% a GPA of 4. With regard to the information subjects receive about their partner in the NS treatment, we observe that 55% have black and 44% brown eyes, 86% have black and 13% brown hair. The mean age is 25 years; 38% are graduate, 25% are senior, 21% junior, and 16% sophomore and freshman students. Each subject participated in only one session. Sessions lasted approximately 45 minutes and the subjects earned on average $13 ($5 show-up fee, plus their earnings from the experimental sessions). Table 1 presents a summary of the sessions.

IV. RESULTS

We start this section with a brief overview of behavior in the coordination, dictator, and ultimatum games before we investigate whether nationality serves as a coordination device. In the coordination games, we find that overall the risky alternative B was chosen 44.1% of the time (156 out of 354). There are no significant differences in the mean probability to choose B among nationalities. Japanese choose B with a probability of .467, which is similar to Chinese (.443; Fisher's exact test, $p = .797$, two-sided) and Koreans (.409; Fisher's exact test, $p = .427$, two-sided). We observe that 18.1% of the pairings achieve the PDE, 29.9% the RDE, and 52% miscoordinate.

Table 2 summarizes the means of all three treatments under the two different matchings (same or different nationalities) for the coordination, ultimatum, and dictator games. In the control treatment, we observe that 42.6% of the subjects choose B in the coordination game (Japanese: 47.2%, Chinese: 41.7%, and Korean: 38.9%). In the salient treatment, 45.8% choose B

4. An extra session for the S treatment had to be conducted as a result of an insufficient number of Korean participants present at one of the previous sessions.

5. Subjects were recruited with campus flyers and e-mail announcements. Interested individuals were asked to fill out sociodemographic information as well as to report their nationality. We invited only individuals who reported to be Japanese, Korean, or Chinese. However, during the experimental sessions four participants answered in the pre-experimental questionnaire to be of another nationality (one participant in NS and three participants in S). Accordingly, in our analysis we exclude these participants and the participants that were matched with these in the S and NS treatments. More precisely, we excluded from our analysis three observations in NS and nine observations in S. None of the subjects analyzed in our results had a dual nationality. Upon entering the laboratory, subjects were not allowed to talk to each other.

TABLE 1
Experimental Design (number of observations by treatment and matching)

	Control (no informaion about the match)	Salient (information about nationality only)	Non-salient (information about nationality and other characteristics)
J–J	11	18	12
K–K	11	12	10
C–C	11	18	12
J–K	21	30	22
J–C	22	36	24
K–C	22	30	22
Total	108	144	102

Notes: J–K represents a matching in which a Japanese subject is paired with a Korean subject. J, Japanese; K, Korean; C, Chinese.

TABLE 2
Behavior in Coordination, Ultimatum and Dictator Games (means, number of observations in parentheses)

		S-Treatment		NS-Treatment	
	C-Treatment	Non-compatriot	Compatriot	Non-compatriot	Compatriot
Coordination (probability B)	0.43	0.41	**0.56**	0.43	0.44
	(108)	(96)	(48)	(68)	(34)
Ultimatum (proposer offer)	4.62	5.06	5.25	4.38	4.28
	(53)	(48)	(24)	(32)	(18)
Ultimatum (responder MAO)	3.13	3.27	3.50	3.00	2.35
	(53)	(48)	(24)	(33)	(17)
Dictator (proposer offer)	3.33	2.83	3.32	3.65	3.35
	(54)	(48)	(25)	(34)	(17)

Notes: Bold numbers indicate statistically significant differences. MAO, minimum acceptable offer as stated by a responder in ultimatum game.

(Japanese: 47.1%, Chinese: 41.2%, and Korean: 50%), and in the non-salient treatment 43.1% (Japanese: 45.7%, Chinese: 51.4%, and Korean: 31.5%).

In the dictator game, the mean token amount sent is 3.26 (treatment C = 3.33, S = 3.00, and NS = 3.55). In the ultimatum game, the mean token amount sent is 4.75 out of 10 (treatment C = 4.62, S = 5.12, and NS = 4.33) and the mean minimum acceptable offer is 3.12 (treatment C = 3.13, S = 3.35, and NS = 2.78). The mean individual behavior in the three coordination games is not significantly correlated to the mean individual behavior in the three dictator games ($r = .059$, $p = .654$), the mean individual proposer behavior in the ultimatum games ($r = .194$, $p = .138$) or the mean individual minimal acceptable offer in the ultimatum games ($r = .073$, $p = .574$).

We now address the question of whether nationality serves as a coordination device if nationality is salient. We observe that 56.3% of the subjects (27 out of 48) choose B in treatment S if they know that their partner has the same nationality. As shown in Figure 1, this percentage is considerably higher than the equivalent percentage in the control treatment C (46 out of 108; 42.6%; $p = .057$, $\chi^2 = 2.49$, one-sided); that is, subjects are approximately 33% more likely to attempt to coordinate on the Pareto-efficient outcome if they know that they are matched with a compatriot. This finding is significant at $p = .025$ after controlling for the subject's nationality, his/her level of identity with his/her nationality, GPA, and gender (Table 3, model 1). Identity and GPA predict positively the choice to play B ($p < .062$). Model 1 also shows that both Korean and Chinese students tend to be less likely to choose B in treatment C, as compared to the Japanese ($p < .144$).

Figure 2 illustrates that the strength of the coordination device (i.e., the information that the partner is a compatriot) is highly dependent on nationality. We observe the probability that subjects play B is the highest in the treatment

TABLE 3
Choice of Pareto-dominant Equilibrium Action in Coordination Game Depending on Matching and Covariates (Probit regression)

Model **Observations in treatments**	**(1)** **C & S if paired w/compatriot**	**(2)** **C & NS if paired w/compatriot**	**(3)** **C & S if paired w/non-compatriot**	**(4)** **C & NS if paired w/non-compatriot**
Compatriot?	0.055**	0.001		
	(0.025)	(0.987)		
Non-compatriot?			0.025	−0.012
			(0.448)	(0.912)
Identity	0.207*	0.074	0.231**	0.061
	(0.062)	(0.556)	(0.012)	(0.588)
Female?	0.090	0.097	0.029	0.149
	(0.434)	(0.459)	(0.770)	(0.213)
GPA	0.276***	0.121	0.091	0.088
	(0.000)	(0.216)	(0.199)	(0.345)
Subject is Korean?	−0.227	−0.130	−0.153	−0.190
	(0.126)	(0.394)	(0.224)	(0.157)
Subject is Chinese?	−0.233	−0.085	−0.171	−0.060
	(0.102)	(0.563)	(0.163)	(0.655)
Number of observations	154	142	200	176

Notes: Coefficients are average marginal effects. p values in parentheses. Robust standard errors clustered on subject level. Compatriot = 1 if subject is paired with compatriot, 0 otherwise. Non-compatriot = 1 if subject is paired with subject having a different nationality, 0 otherwise. Subject is Korean/Chinese? 1 if yes, 0 otherwise. Female = 2 if subject is a female, 1 otherwise.
*$p < .1$, **$p < .05$, ***$p < .01$.

condition S-IN (treatment S, partner is compatriot) for all three nationalities. However, for Japanese subjects salient information about the partner being Japanese has very little impact on the willingness to choose B as compared to having no information about the partner's nationality in treatment C (50% vs. 47.2%, respectively). By contrast, Korean subjects are more likely to choose B when paired with another Korean in treatment S than in C (66.7% vs. 38.9%; $p = .047$, $\chi^2 = 2.80$, one-sided). Chinese subjects are more likely to choose B when paired with a compatriot in treatment S than in C, but this effect is not statistically significant (55.6% vs. 41.7%; $p = .167$, $\chi^2 = .93$, one-sided).

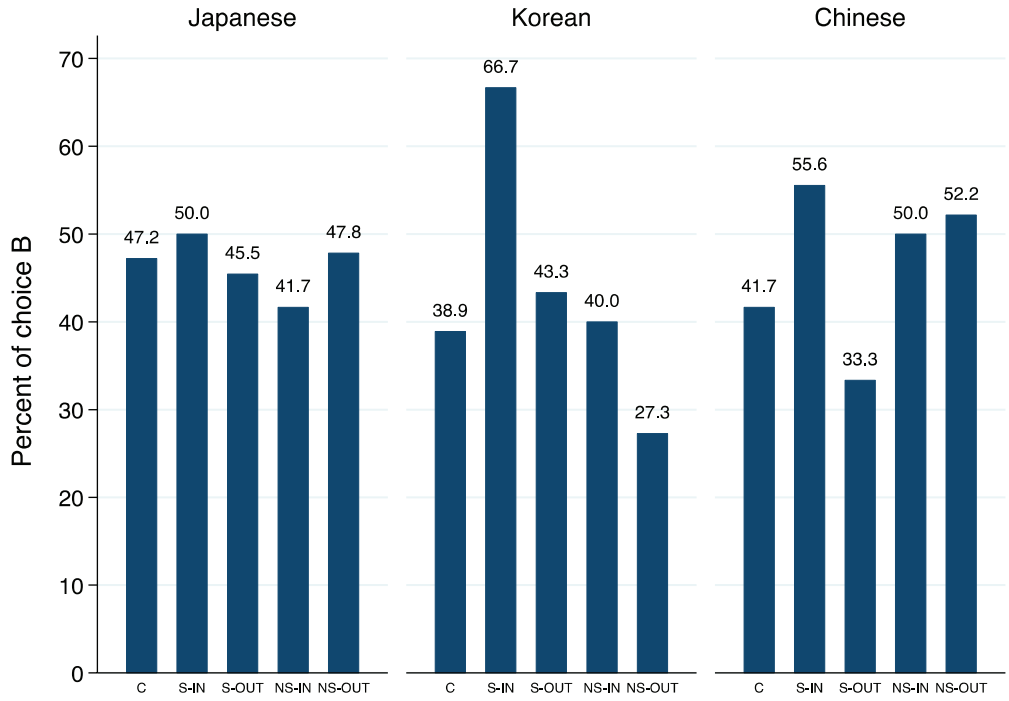
Figure 3 provides an overview of the outcomes in all treatments and distinguishes between the PDE outcome, RDE outcome, and MIS. This figure illustrates that the more pronounced willingness to coordinate on the PDE leads to more payoff-dominant outcomes (7 out of 24 or 29.2%) when matched with a compatriot in S than in C (12 out of 54 or 22.2%). It also leads to less coordination on the RDE than in C (16.7% vs. 37.0%) and when matched with a non-compatriot in S (31.3%).

How can we explain these coordination game results? Presumably, greater coordination in S with a compatriot could be explained by either in-group favoritism or the fact that nationality serves as a coordination device. We explore subjects' propensity to treat their compatriots better than non-compatriots by utilizing the results from ultimatum and dictator games. Interestingly, we do not find that subjects behave consistently more pro-socially toward their compatriots in the ultimatum and dictator games in our subject pool. For example, as reported in Table 2, the mean transfer in the dictator game to a compatriot in treatment S (3.32) is almost identical to the mean transfers in treatment C (3.33), and not statistically different from the mean transfer to a non-compatriot in treatment S (2.83).[6] We find some differential treatment in the ultimatum game on the side of the proposer: the mean offer in treatment S to a compatriot (5.25) is higher than the mean offer in treatment C (4.62, $p = .069$, Mann–Whitney, two-sided); however, it is not statistically higher than the mean offer to a non-compatriot in treatment S (5.06).[7] On the side of the responder, we find that the minimal acceptable offer is

6. Note also that if we only look at Koreans—in whom the propensity to coordinate with a compatriot is most pronounced—we also find no such statistical differences. In the dictator game, Koreans even give more in treatment C (3.73) than to compatriots in treatment S (3.17).

7. This finding is in line with the finding of Chuah et al. (2007) who find that Malaysian Chinese subjects gave on average higher offers in the ultimatum game to compatriots as compared to subjects from the United Kingdom. Note that

FIGURE 2
Choice of Pareto-Dominant Equilibrium Action Depending on Nationality and Treatment



Notes: C: control treatment, subject does not know nationality of partner; S-IN: Treatment S, subject is paired with compatriot; S-OUT: Treatment S, subject is paired with partner from a different nationality; NS-IN: Treatment NS, subject is paired with compatriot, NS-OUT: Treatment NS, subject is paired with partner from a different nationality.

higher with a compatriot in treatment S than in C, but this difference is not statistically significant (3.5 vs. 3.13, $p = .326$, Mann–Whitney test).

One possible explanation for the lack of in-group favoritism in our subject pool may lie in the dual nature of culture in this experiment. While nationality certainly comprises one aspect of culture, it does not represent the full extent of it. Besides being nationals of three different countries, subjects in this experiment are all students of the University of Hawaii and are united by a university culture and their common Asian heritage. As international students, they may perceive each other as members of the same group, rather than outsiders. This common culture may explain why we do not find significant in-group favoritism in the dictator and ultimatum games.

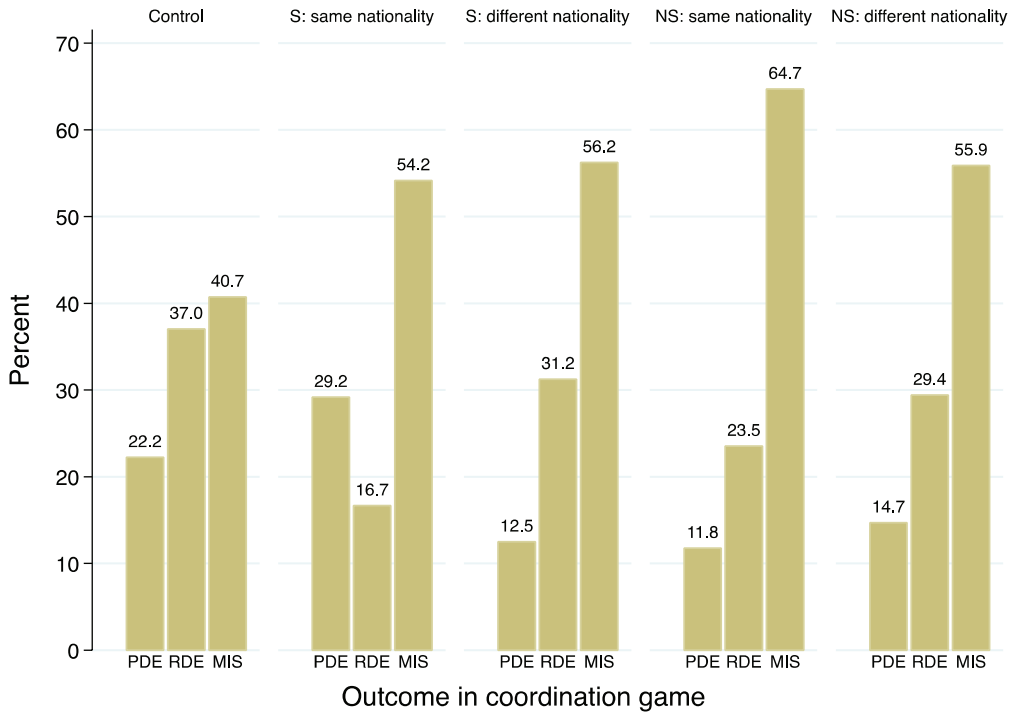
The lack of in-group favoritism suggests that our finding that compatriots are more willing to coordinate on the PDE is *not* primarily driven by a propensity—or a potential experimental demand effect—to behave more pro-socially toward compatriots.

FINDING 1a: *Nationality serves as a coordination device if nationality is salient: Subjects are more likely to choose a payoff-dominant equilibrium action if matched with a compatriot. The strength of this coordination device, however, is highly nationality-specific.*

Next, we assess whether nationality continues to serve as a coordination device if nationality is non-salient. We observe that 44.1% (15 out of 34) subjects choose B if they play with someone from the same nationality in treatment NS. This percentage is not statistically different from the percentage in the control treatment (42.6%). Note also that none of the other pieces of information

there are procedural differences between our and their study. In particular, Chuah et al. conducted their experiments in their subjects' respective home countries (Malaysia or United Kingdom) whereas we conducted our experiments outside the subjects' home countries.

FIGURE 3
Outcomes in Coordination Game Depending on Treatment and Match



Notes: PDE, payoff-dominant equilibrium outcome with payoffs (9,9); RDE, risk-dominant equilibrium outcome with payoffs (7,7); MIS, miscoordination outcome with payoffs (1,8) or (8,1). S, salient treatment; NS, non-salient treatment.

that we gave subjects about their partner in the NS treatment (age, status, hair color, and eye color) is significantly related to the choice of B ($p > .33$, Spearman). Table 3, Model 2 shows that even after controlling for our covariates, subjects are not more likely to choose B when matched with a compatriot in NS ($p = .987$).

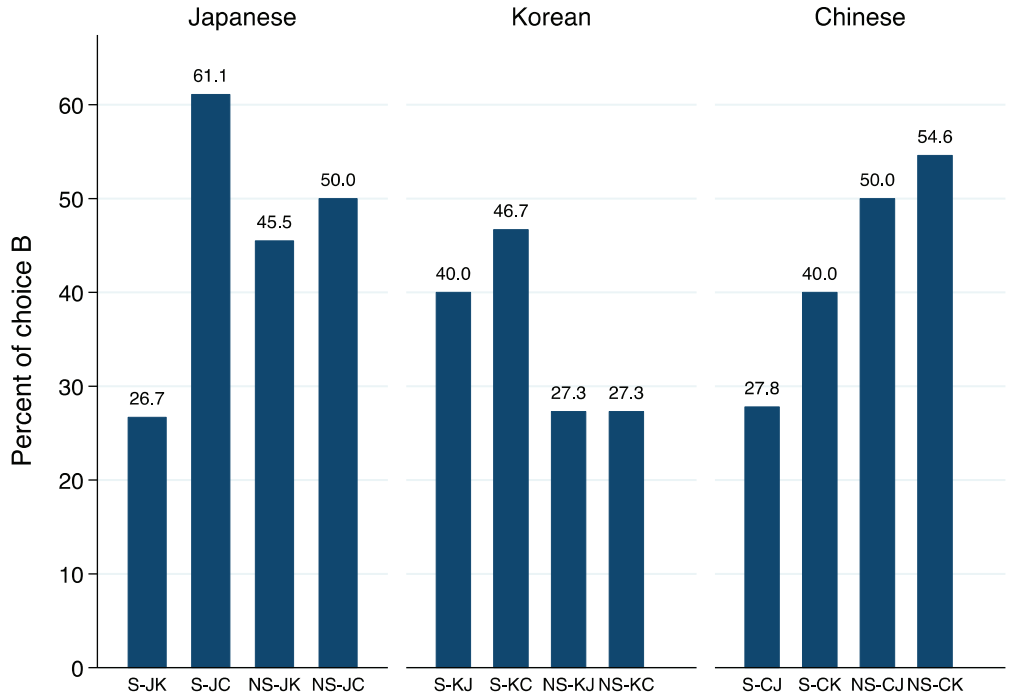
In Figure 3, we observe a low fraction of payoff-dominant outcomes in treatment NS when paired with a compatriot (12.5%) and a high level of MIS on the outcomes ((8,1) (1,8)), which is even somewhat higher than in treatment C (64.7% in NS compared to 40.7% in C; $p = .101$, Fisher's exact test, two-sided).

We also do not find that subjects behave more pro-socially toward their compatriots if nationality is non-salient in the dictator and ultimatum game. In the dictator game, subjects give 3.35 tokens to compatriots (treatment C = 3.32). In the ultimatum game, subjects offer 4.28 tokens to compatriots in treatment NS (treatment C = 4.62) and the minimal acceptable offer is 2.35 when matched with a compatriot in NS (treatment C = 3.13, $p = .185$, Mann–Whitney).

> **FINDING 1b:** *Nationality does not serve as a coordination device if nationality is non-salient. Subjects are not more likely to try to coordinate on the payoff-dominant equilibrium with someone from the same nationality if they are provided with additional information about their partner.*

The next question we address is whether subjects are less likely to choose a PDE action if they know that their partner has a different nationality. We observe that 40.6% (39 out of 96) of the participants choose B if they play with someone from a different nationality in treatment S and 42.6% (29 out of 68) of the subjects choose B if they play with someone from a different nationality in NS. These percentages are not different from the percentage in treatment C (42.6%, χ^2, $p > .776$). The non-significant impact of coming to know that the partner has a different nationality is also confirmed in Models 3 (for treatment S) and 4 (for treatment NS) of Table 3 ($p > .453$).

FIGURE 4
Choice of Pareto-dominant Equilibrium Action Depending on Treatment and Constellations of Nationalities



Notes: S-JK: Treatment S, Japanese subject is paired with Korean; S-JC: Treatment S, Japanese subject is paired with Chinese; NS-JK: Treatment NS, Japanese subject is paired with Korean; NS-JC: Treatment S, Japanese subject is paired with Chinese; S-KJ: Treatment S, Korean subject is paired with Japanese; S-KC: Treatment S, Korean subject is paired with Chinese; NS-KJ: Treatment NS, Korean subject is paired with Japanese; NS-KC: Treatment NS, Korean subject is paired with Chinese; S-CJ: Treatment S, Chinese subject is paired with Japanese; S-CK: Treatment S, Chinese subject is paired with Korean; NS-CJ: Treatment NS, Chinese subject is paired with Japanese; NS-CK: Treatment NS, Chinese subject is paired with Korean.

In Figure 3, we can observe that only a low fraction of outcomes are payoff-dominant (12.5%) when matched with someone from a different nationality in S. Moreover, 56.3% miscoordinate on the outcomes (8,1) or (1,8) in S when matched with someone from a different nationality, which is insignificantly higher than in C (Fisher's exact test, $p = .164$, two-sided). Also in treatment NS, few outcomes are payoff-dominant when matched with someone from a different nationality (14.7%)—but this percentage is still higher than when matched with someone from the same nationality in NS (12.5%). More than half of the subjects (55.9%) miscoordinate on the outcomes (8,1) and (1,8) which is somewhat higher than in the control treatment (40.7%, $p = .192$, two-sided, Fisher's exact test) but less than when matched with someone from the same nationality in S (64.7%).

FINDING 2: *Choice between payoff-dominant and risk-dominant actions is the same in C and S/NS. That is, knowing that the partner is of different nationality does not affect the choices in coordination game as compared to when nationality is unknown.*

We conclude this section by investigating the role of the constellations of nationalities. Figure 4 provides an overview of the probability of choosing B depending on the treatment and the constellation of nationalities. The figure shows some interesting, nationality specific patterns. First, we observe that Japanese subjects, who seemed, according to Figure 2, not to discriminate between compatriots and other nationals, discriminate between Koreans (only 27.0% choose B when paired with a Korean in treatment S) and Chinese (61.0%). Korean subjects tend to be less likely to choose B when the information about their partner's nationality

is non-salient as compared to when it is salient. The opposite is true for Chinese, who tend to be less likely to choose B when the information about their partner's nationality is salient. For example, when a Chinese only knows about his/her partner that he/she is Japanese (treatment S), he/she chooses B with a probability of .28 as compared to a probability of .50 when additional information about the partner is available besides his/her Japanese nationality (treatment NS).

Interestingly, in S and NS combined subjects are quite unlikely to choose B if their partner is Japanese and not a compatriot (35.7%). This percentage is lower than when the partner is Korean (40.4%) or Chinese (48.2%). While these differences are not uniform and not statistically significant, the patterns are roughly consistent with a contentious history of cross-national disagreements in the region.[8] One may speculate that both the Chinese and Korean subjects are biased against the Japanese in response to the Japanese imperialist policy and military occupations of their nations in the past. Recent disputes over the ownership of the islands in the East China Sea, for example, are evidence that these regional tensions are not entirely a historical artifact.

V. CONCLUSION

In this study, we experimentally test the relevance and scope of focal points when individuals make decisions under strategic uncertainty. In a period marked by extensive cross-national interactions, nationality may present an important focal point that individuals coordinate on. What is the relevance and scope of nationality as a coordination device? We recruited subjects from three countries that heavily engage in international trade and let them play coordination games in three treatments in which we manipulated the information they receive about their partner.[9]

Our findings suggest that nationality can function as a coordination device but that the scope of this device is limited. Subjects attempt to coordinate more on the PDE if their partner has the same nationality and the information about the partner's nationality is salient. In addition, our data suggest that the scope of nationality as a coordination device is highly nationality specific and provide suggestive evidence showing that this difference is not a result of more pro-social behavior toward compatriots, that is, in-group favoritism. However, if the information about the partners' nationality is not salient, that is, nationality is only one of several other attributes which subjects know about their partner, nationality seems to be irrelevant for coordination. Moreover, overall we do not find in our study that coordination is more difficult between partners of different nationalities.

One possible explanation of these results may lie in the dual nature of culture in this experiment. Nationality certainly constitutes an important part of one's culture and identity, but it does not represent the full extent of it. While being nationals of three different countries, the subjects in this experiment are all students of the University of Hawaii. They are united by a common university culture and international community. As the focus is diluted away from nationality in the non-salient treatment, common culture for university students may dominate and hence the results on nationalities are weakened. The dual nature of culture in our experiment may also explain why we do not find significant in-group favoritism in the dictator and ultimatum games.[10]

More generally, one may speculate that the scope of nationality as a coordination device is limited because (1) interacting parties often have access to more information about their partners than only their nationality and (2) there is a probability that they share different cultural aspects. On the other hand, our findings also suggest that having more information about trading partners may not necessarily be beneficial as it seems to increase the risk of MIS. Moreover, our experimental results imply that coordination is not more difficult between parties from different nationalities if subjects have more information about their partners than only their nationality, as compared to the benchmark case when nationality is unknown.

These results also contribute to the growing cross-cultural literature and the economic literature on group identity. Our findings suggest the necessity of conducting experiments that

8. Kuwabara et al. (2007) and Takshashi et al. (2008) find similar nationality specific effects in their variant of trust game between participants from Japan, China, and Taiwan and suggest that culture-specific content (e.g., collective guilt for WWII) may influence these national-level patterns.

9. According to the size of their exports China ranks 2nd, Japan 4th, and Korea 12th. From 2000 to 2008, China has almost sixfolded, Japan and Korea have more than doubled, their exports. Data from United Nations Statistics Department available at http://unstats.un.org/unsd/trade/imts/annual%20totals.htm.

10. Comparably, Buchan et al. (2009) find that globalization promotes cooperation.

manipulate the salience of cultural and group membership for testing the robustness of the findings in the in- and out-group literature, which use natural groups. Moreover, our findings point to the need of conducting additional research to investigate the ultimate mechanism(s) behind the PDE action. While we have learned through our design that it is not simply in-group favoritism that drives our nationality coordination device finding, it would be interesting to better understand the underlying rationale.

APPENDIX A. PRE-EXPERIMENTAL QUESTIONNAIRE

1. What is your age? (Mean = 25.01, st. dev = 5.6)
2. Please indicate your gender
   _____ Male (31.19%) _____ Female (68.81%)
3. What is your major at UH?
4. How long have you lived in the United States? (Mean = 3.71, st. dev = 4.74; 54.61% of subjects — <2 years)
5. Of which country are you currently a citizen? (Japanese — 34.4%, Korean — 30.94%, Chinese — 34.62%)
6. How strongly do you identify yourself with this country?
   _____ Not at all (1.7%) _____ Somewhat (41.51%)
   _____ Very strongly (56.79%)
7. Are you happy to identify yourself with this country?
   _____ No (5.75%) _____ Somewhat (30.28%)
   _____ Yes (69.72%)

APPENDIX B. EXPERIMENTAL INSTRUCTIONS

TREATMENT C (CONTROL)

Welcome and thank you for your participation in the economics experiment on decision making!

INTRODUCTION

Please note that you are not allowed to communicate with each other during the experiment.

During this experiment you will participate in decision tasks that give you the opportunity to earn money. All the earnings in this experiment will be in dollars. Immediately upon completion of the experiment, we will pay you your game earnings in cash. Your earnings are confidential and you will be paid in private.

This experiment will consist of several parts. In each part, you will be asked to make three decisions which will involve another participant with whom you will be randomly matched. For every decision task, you will be randomly matched with a **different** participant than in the previous decision. Your decision may affect the payoffs of others, just as the decisions of the person you are matched with may affect your payoffs.

At the end of the experiment, the computer will randomly choose one task from each part as the paid task. The other tasks will remain unpaid. You will not be informed of the results of any task until the end of the experiment.

We will proceed to the decisions once the instructions are clear. Are there any questions?

PART 1

In this part, you will be randomly matched with one other participant. Their identity will not be revealed to you and yours will not be revealed to them.

You will be assigned a role: Proposer or Responder. Your role will remain the same for all three decisions in this part and in the next.

Instructions to the PROPOSERS: A sum of **10** dollars has been allocated to both of you. The proposer has to choose how the money should be divided between you. The proposer's task is to choose an amount between 0 and 10 dollars to be offered to the responder.

Instructions to the RESPONDERS: The responders will not see the proposer's offer. The responder's task is to indicate the smallest amount which they will accept from the proposer. If the proposer's actual offer to the responder is at least as large as the smallest offer that responder is willing to accept, then the money is divided according to the proposer's offer. Otherwise, neither of you will receive anything.

Your decisions during this experiment will remain anonymous and private and you will not know the outcome of the decisions until the end of the experiment. You will be asked to make three decisions in this part, and each time you will be matched with a **different** person.

Any questions?

PART 2

In this part, you will be matched with different participants than before. You have not been matched with these people before. You have been assigned the same role as in the previous part (proposer or responder). The proposer has to make a decision, while the responder has no decision to make in this game. As before, you will not know the identity of the person you are matched with.

Instructions to the Proposers: A sum of **10** dollars has been allocated to the both of you. The proposer has to choose how the money should be divided between you. The proposer's task is to choose an amount between 0 and 10 dollars to be offered to the responder. The responder has no decision to make in this game, so the money will be divided according to the decision of the proposer.

You will be asked to make your decision three times, and each time you will be matched with a **different** person.

Please make your decision as prompted on the screen.

PART 3

In this part, you have been randomly matched with another person. You have not been matched with this person before. Both of you will make decisions at the same time and your payoff in this part will depend on your decision as well as the decision of the participant with whom you are matched. Their identity will not be revealed to you.

Your task in this part is to choose either "A" or "B."

Depending on your choice and the choice of your match, your earnings will be the following:

		Other participant: A	Other participant: B
You	A	7, 7	8, 1
	B	1, 8	9, 9

- If you choose "A" and the other participant chooses "A" then both of you receive $7 each
- If you choose "A" and the other participant chooses "B" then you receive $8 and the other participant receives $1
- If you choose "B" and the other participant chooses "B" then both of you receive $9 each
- If you choose "B" and the other participant chooses "A" then you receive $1 and the other participant receives $8.

Now, please make your decision as prompted on the screen.

APPENDIX C. EXIT QUESTIONNAIRE

1. What is your gender? _____ M (31.19%) _____ F (68.81%)
2. What is your major at UH? _____
3. What is your GPA? _____ (Mean = 3.26, st. dev = .69, Max = 4)
4. How long have you been living in the United States? _____ (Mean = 3.71, st. dev = 4.74; 54.61% of subjects – less than 2 years)
5. How easy to understand were the instructions? _____ _____ Difficult (33.68%) _____ Easy (66.32%)
6. [Only applicable to NS treatments] When making decisions in this experiment, you were matched with another person. Which of their characteristics were most important in your decision? _____
7. Do you have any friends participating in this session at the same time with you? _____ Yes _____ No
8. If you do have friends in this session with you, did that affect your decisions in this experiment? _____ Yes _____ No
9. Did you like the experiment? _____ Yes _____ No
10. Please add any additional comments you have about this experiment:

APPENDIX D

TABLE A1

Published Research with Multi-game Experimental Design

Author(s)	Place and Year of Publication	Exact Implementation of Multi-game Design (number of games, payment strategy, etc.)	Report Results for all Games?	Find Order, Framing, and Other Effects?
Tomomi, Camerer, and Nguen	AER, 2010	3 games: trust game (TG), risk and time discounting. TG was played first, but the outcomes were not revealed to the subjects until the end of the session. Subjects were paid for all 3 games	No. TG is not reported in the study	No discussion of any possible order or framing effects
Charness, Karni, and Levin	GEB, 2010	1–4 games: transparent test, public goods (PG), winner's curse, and hidden information and communication experiment. Some sessions included feedback and others did not	No. Only transparent test is discussed	No discussion of any possible effects.
Rode	GEB, 2010	6 games/exercises: 4 math/general knowledge contests, coordination game or matching pennies game, and communication game	Yes, but the analysis focuses on the communication game	No discussion of any possible effects
Charnes and Villeval	AER, 2009	3 games: public goods, real-effort competition game, and risk aversion test. Subjects were paid for all 3 games. Some sessions included feedback and others did not	Yes	No discussion of any possible effects, except the "order" variable in a regression is found to be insignificant

TABLE A1

Continued

Author(s)	Place and Year of Publication	Exact Implementation of Multi-game Design (number of games, payment strategy, etc.)	Report Results for all Games?	Find Order, Framing, and Other Effects?
Chen and Li	AER, 2009	24 games: variations of dictator game (DG) followed by 16 response games (strategy method). One random round was chosen for payment in each part. No outcome was revealed until the end of the experiment	Yes	No discussion of any possible effects
Botelho et al.	GEB, 2009	2 games (in some sessions): regular PG game and "sanctions" PG game (with the order reversed in some sessions)	No, the results of the "sanctions" PG game are not discussed	No discussion of any possible effects
Corbae and Duffy	GEB, 2008	5–9 games depending on the session: variations of stag-hunt game. Subjects were paid for all 3 games	Yes	No discussion of any possible effects
Charness and Rabin	QJE, 2002	2–8 games depending on the session: 7 variations of DG and 20 response games. Subjects who made 2–8 decisions were paid for random 1 or 2 choices. Role reversion and strategy method with no feedback were used	Yes	No discussion of any possible effects
Henrich et al.	AER, 2001	3 games: ultimatum game (UG) dictator game (DG), and public goods (PG) game	Yes	No discussion of any possible effects
Anderson, Rodgers, and Rodriguez	Economic Letters, 2000	2 games: UG and DG (with reversed order in some treatments). Perfect stranger design. Subjects were paid for one randomly chosen part	Yes	Find order effects in the United States, but not in Honduras

APPENDIX E. ULTIMATUM AND DICTATOR GAME RESULTS

TABLE A1

Ultimatum and Dictator Game Behavior: Constellation of Nationalities in NS Treatment

Variable (mean, $)	ja–ja	ja–ko	ja–ch	ko–ko	ko–ja	ko–ch	ch–ch	ch–ja	ch–ko
Proposer's share	5.4	5.5	5.6	5.6	4.5	6.2	6.2	5.7	6.0
In ultimatum game	*7*	*6*	*5*	*5*	*4*	*5*	*6*	*6*	*6*
Proposer's share	6.0	6.0	5.8	6.6	6.8	5.6	7.3	6.5	7.3
In dictator game	*6*	*6*	*6*	*5*	*5*	*5*	*6*	*6*	*6*
Responder's minimum	1.8	1.8	2.7	2.8	4.2	3.3	2.5	3.0	2.6
Acceptable offer	*6*	*4*	*6*	*5*	*6*	*6*	*6*	*6*	*5*

Notes: Numbers in italics show the respective number of observations. Ja–ko, for example, shows the mean decision of the Japanese proposers matched with Korean responders, whereas ko–ja shows the mean decision of the Korean proposer matched with a Japanese responder.

ja, Japanese; ch, Chinese; ko, Korean.

TABLE A2

Ultimatum and Dictator Game Behavior: Constellation of Nationalities in S Treatment

Variable (mean, $)	ja–ja	ja–ko	ja–ch	ko–ko	ko–ja	ko–ch	ch–ch	ch–ja	ch–ko
Proposer's share	5.0	4.8	4.9	4.7	5.3	5.4	4.6	5.2	3.7
In ultimatum game	*9*	*6*	*8*	*6*	*9*	*8*	*9*	*10*	*7*
Proposer's share	6.2	5.8	6.3	6.8	7.9	7.4	7.1	7.6	7.6
In dictator game	*10*	*6*	*8*	*6*	*8*	*8*	*9*	*10*	*8*
Responder's minimum	3.3	3.6	3.6	3.2	3.2	1.9	3.9	3.6	3.5
Acceptable offer	*9*	*9*	*10*	*6*	*6*	*7*	*9*	*8*	*8*

Notes: Numbers in italics show the respective number of observations. Ja–ko, for example, shows the mean decision of the Japanese proposers matched with Korean responders, whereas ko–ja shows the mean decision of the Korean proposer matched with a Japanese responder.

ja, Japanese; ch, Chinese; ko, Korean.

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