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Does Market Exposure Affect Economic Game Behavior?

The Ultimatum Game and the Public Goods Game among the Tsimane' of Bolivia

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INTRODUCTION

This chapter attempts to expand the cross-cultural literature on economic games by focusing on the game behavior of the Tsimane', a group of Bolivian forager–horticulturalists. One salient feature that has been proposed as a possible explanation for cross-cultural differences in game behavior is the degree of market exposure and acculturation (Henrich 2000; Henrich *et al.*, Chapter 2, this volume). This study therefore attempts to answer two questions: (1) Does Tsimane' game behavior differ from the standard results found among westernized, market-oriented, and industrialized populations? (2) Does differential exposure to competitive markets and an acculturated environment affect norms of fairness and game behavior across Tsimane' villages, or does a common Tsimane' identity and culture overshadow any differences due to acculturation?

Cross-cultural results

In one of the first cross-cultural comparisons in Ultimatum Game behavior, Roth *et al.* (1991) discovered only minor differences

in the distributions of offers and acceptances between student populations in Pittsburgh, Tokyo, Ljubljana, and Jerusalem. Although the four countries differ in cultural heritage (and hence cultural norms that may affect social and economic behavior), they are all examples of student populations living in industrialized nations with a long history of westernized market economies. Similarities in game behavior across the four countries suggest that the overwhelming market influence dominates any cross-cultural notions of fairness or norms of exchange, so that the sample was 'cross-cultural' only in a very limited sense. Henrich's (2000) finding of low offers and few rejections in the Ultimatum Game, and low contributions in the Public Goods Game among the Machiguenga, suggests that the cultural trajectory associated with a traditional, nonmarket oriented subsistence economy can lead to vastly different outcomes, thus calling into question the assumption that departures from game-theoretic predicted behavior are the result of a pan-human cognitive architecture (cf. Hoffman, McCabe, and Smith 1998).

The Tsimane' represent an interesting test case for exploring cross-cultural differences for two reasons. First, they are a self-sufficient forager–horticulturalist group very similar to the Machiguenga (see below). We might therefore expect to find similar patterns in Ultimatum Game and Public Goods Game behavior, which would then add more weight to the Machiguenga results. Second, Tsimane' villages vary significantly in the degree to which they are exposed to markets, wage labor, and Bolivian national society. For the most part (but see below), these differences in exposure are captured by the distance of various villages to the urban center, San Borja. The Tsimane' case allows us to test whether market association and acculturation are partly responsible for the game behavior found in the West.

Predictions

Expectations of game behavior are typically based on notions of short-term income-maximization, strategic play, fairness, reciprocity, altruism, or cultural norms. Precise predictions of game behavior in both Ultimatum Game and Public Goods Game have only been made with game theory, assuming that individuals selfishly act as if to maximize the amount of money they can expect to

receive. While it is recognized that the variance in responses deviating from these predictions can be due to a combination of strategic behavior, 'warm-glow' giving, a desire to punish unfairness, or partial adherence to behavioral norms, it is as yet unclear the extent to which exposure to markets and frequent dyadic interactions with strangers also account for cross-cultural differences in game behavior.[1]

Given the current state of knowledge of Ultimatum Game and Public Goods Game behavior, we are in a position to make several predictions regarding game behavior among the Tsimane':

Income-maximization

>   A1. All offers should be small (e.g. 1 B), and all positive offers should be accepted in the Ultimatum Game.
>   A2. All players should contribute nothing to the common pot in the Public Goods Game.

Universal 'fairness' (market-oriented norms)

>   B1. In the Ultimatum Game, all offers should hover around the 'fair' or 'strategic' offer of 50 percent and small offers (typically less than 25 percent) should be rejected.
>   B2. Contributions to the common pot in the Public Goods Game should range between 40 and 60 percent.

Market exposure versus culture-specific norms

>   C1. More acculturated Tsimane' living closer to San Borja should display Ultimatum Game and Public Goods Game similar to predictions B1 and B2, if long-term exposure to money-oriented markets leads to cultural norms that produce those behaviors.
>   C2. Less acculturated Tsimane' living farther away from San Borja should display Ultimatum Game and Public Goods Game significantly different than B1 and B2, as well as C1 (although it is unclear whether we need expect A1 and A2).
>   C3. If cultural norms of fairness common to all Tsimane' are a more powerful influence on fairness equilibria than exposure to competitive markets, wage labor, and urban living, then

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[1] Variation in game behavior can also be due to differences in stable personality traits, risk preferences, or pre-existing wealth among individual players.

we might not expect any differences in the pattern of offers and rejections in the Ultimatum Game, or in public good contributions in the Public Goods Game across villages.

The Tsimane'

The Tsimane' are an Amazonian forager–horticulturalist group inhabiting a vast area of lowland forests and savannas east of the Andes. Their territory is located between the villages of San Borja and San Ignacio de Mojos in the Ballivián province of the Beni department of Bolivia. There are currently about fifty Tsimane' villages settled along the banks of the Maniqui River, and about thirty other villages dispersed along the headwaters of the Cuvirene, Yacuma, Apere, Matos, and Sécure rivers. Estimates of total population size range from 5,967 (Primer Censo Indígena Rural de Ticssas Bajas, Bolivia:La PaZ:Instituto Nacional de Estadistica, 1996) to about 7,130 (VAIPO 1998) over a total area of 1.35 million ha (CIDDEBENI 1990), giving an overall population density of about 0.5 individuals per square kilometer.

Like other Amazonian rain forest indigenous groups, the Tsimane' subsist by practicing shifting swidden horticulture, fishing, hunting, and gathering wild forest products. The chief cultigen staple is the plaintain (*pe're*), while sweet manioc (*oyi*) is used only for processing into the beer (*shucdye*) that plays an important role in Tsimane' social life (Ellis 1996). Other important cultivated foods include corn (*tana*), rice (*arrosh*), papaya (*pofi*), and sweet potato (*ka'i*). Solitary and group fishing are important subsistence activities, particularly during the dry season months from May to October. The Tsimane' fish with hooks (purchased in San Borja or from upstream merchants), bow and arrow (sometimes in conjunction with *chito* or *washi*, the two most commonly used forms of barbasco poison), and occasionally with nets, if available. The Tsimane' mainly hunt with the use of rifles or shotguns, sometimes with the use of tracking dogs, and with machetes. However, the use of bow and arrow is not uncommon, especially when ammunition is not available.

A 1997 census of forty-five Tsimane' villages along the Maniqui River (PRODESIB 1997) (representing about 70 percent of the entire Tsimane' population) reveals a mean village size of ninety-three individuals (median = 75, SD = 75, range = 8–374), with 42 percent of all villages containing less than fifty individuals,

20 percent between 50 and 100, 25 percent between 100 and 150, and 13 percent greater than 150 individuals. The majority of Tsimane' villages are therefore still small-scale, where direct interactions with most group members on a daily basis is fairly common.

Although the Tsimane' were exposed to Jesuit missionaries in the late seventeenth century, they were never successfully settled in missions. New mission posts in several different villages only began in the 1950s, with an increasing influence of missionaries and other outsiders on the Tsimane' lifeway (Chicchón 1992). The greatest influence of the twenty year-old New Tribes Mission was to create a system of bilingual schools with trained Tsimane' teachers and an elected village chief (*corregidor*) in each of the villages downstream from the Catholic mission, Fátima. Indeed, three of the four villages with over 200 individuals contain either a Catholic Redemptorist or Evangelical New Tribes mission.

Tsimane' villages are typically composed of dispersed clusters of several kin related households (Riester 1978, 1993). The household is the basic economic unit for food production and consumption because each household has its own fields (*quijjodye*). Meat, fish, and cooked stew are often pooled among households within a cluster, although it is not uncommon for portions to be distributed to other nearby unrelated households, especially when large amounts are harvested. While the distribution of raw foods is restricted relative to that of many foragers, requests of cooked foodstuffs are not uncommon, and are rarely denied. Furthermore, high levels of visiting and sharing among members of different households are associated with s*hucdye* beer consumption. Huge vats of fermented manioc, corn, or plantains act always attract visitors from other household clusters and even other villages.

Study population   An attempt was made to choose villages of similar population sizes that were either in close or distant geographical proximity to San Borja. Thus, study villages were chosen based on only two characteristics: distance to San Borja (close and far away) and population size (40–70). The five study villages were Puerto Mendez, La Pampita, Ocuña, Catumare, and Cachuela. The first two were within several hours bus-ride of the main town, San Borja (population $\sim$ 13,000). The latter three were further away, requiring several days' journey upstream (up to about 6 days) in a dugout canoe. Table 7.1 lists the distance to San Borja (in km), the number

TABLE 7.1. Village demographics

Distance Rank	Village	Distance to San Borja (km)	Observed				Sampled		
			Number of individuals	Number of nuclear families	Number of houses		Number of players	Number of eligible players	% sampled
1	Puerto Mendez	6	77	16	10		34	40	85
2	La Pampita	7	71	14	13		31	35	89
3	Cachuela	58	49	8	8		21	21	100
4	Catumare	85	41	8	6		20	22	91
5	Ocuna	93	65	14	9		31	33	94

TABLE 7.2. Ultimatum Game and Public Goods Game sample sizes

Village	Ultimatum Game		Public Goods Game
	Proposer	Responder	
Puerto Mendez	17	17	34
La Pampita	16	15	31
Ocuna	16	15	31
Catumare	10	10	18
Cachuela	11	10	20
	70	67	134

of individuals reported to live in the village, the observed village size, complete sample size for the games, and percent of available adults (aged fifteen and up) who participated in the games. Table 7.2 gives the sample sizes for both proposers and responders in the Ultimatum Game and for all players in the Public Goods Game.

Market exposure and acculturation

In testing the effect of market exposure on game behavior, we must realize that geographical distance to the main town, San Borja, is only an approximate measure of overall market exposure. Furthermore, 'market exposure' is hardly synonymous with 'acculturation' and 'modernization'. Although there are some overlaps between the concepts, it is not entirely clear how these should independently influence the direction of game behavior. Among the Tsimane', migration between villages several times over one's lifespan is not infrequent, nor are extended visitations to nearby and distant villages by young men in search of wives, by newly wed couples shifting residences, or by kin. Also, while downstream villagers visit San Borja far more frequently than do distant upstream villagers (Table 7.3), merchants (*comerciantes*) often travel upstream, trading various items from San Borja (e.g. machetes, steel pots, cans of sardines, medicines) for roofing panels constructed from leaves of the *jatata* palm. Loggers have also maintained a presence in the area, especially in the upper Maniqui, where there remains much primary forest. Thus, familiarity with outsider exchange may not vary as much as one would expect by simply using distance to San Borja as a proxy variable of market exposure.

TABLE 7.3. Acculturation descriptors by village and sex

Village	n	Sex	Spanish	SE	Number of visits to San Borja	SE	Number of times hunted	SE	Number of times fished	SE	Number of years in education	SE	Number of days worked	SE
Puerto Mendez	34	All	2.79	0.14	2.32	0.34	0.73	0.25	5.64	1.41	2.71	0.50	18.42	8.16
La Pampita	31	All	3.06	0.13	2.37	0.25	3.87	1.33	11.80	1.89	2.19	0.52	25.30	8.54
Near san Borja	65	All	2.92	0.10	2.34	0.22	2.22	0.67	8.57	1.22	2.46	0.36	21.80	5.87
Cachuela	21	All	1.81	0.21	0.33	0.13	3.19	1.47	8.57	1.74	1.24	0.45	0.00	0.00
Catumare	20	All	1.30	0.11	0.50	0.18	2.90	1.36	7.20	1.50	0.00	0.00	0.00	0.00
Ocuna	31	All	1.68	0.14	0.19	0.10	0.77	0.49	7.30	1.53	0.34	0.16	6.61	2.53
Far away	72	All	1.61	0.09	0.32	0.08	2.07	0.61	7.65	0.92	0.51	0.16	2.85	1.15
Puerto Mendez	15	Male	3.13	0.19	2.93	0.50	1.36	0.44	9.21	2.59	3.47	0.79	32.21	15.45
La Pampita	17	Male	3.35	0.17	2.56	0.34	6.94	2.22	15.94	2.60	3.17	0.89	46.06	14.21
Near San Borja	32	Male	3.25	0.13	2.74	0.30	4.33	1.29	12.80	1.91	3.31	0.59	39.60	10.36
Cachuela	12	Male	2.42	0.26	0.58	0.19	5.58	2.39	10.50	2.19	1.68	0.73	0.00	0.00
Catumare	10	Male	1.60	0.16	0.60	0.27	5.80	2.43	10.90	1.93	0.00	0.00	0.00	0.00
Ocuna	14	Male	2.36	0.17	0.43	0.20	1.71	1.05	10.64	2.57	0.61	0.34	10.36	4.70
Far away	36	Male	2.17	0.13	0.53	0.12	4.14	1.13	10.67	1.31	0.79	0.29	4.03	1.98
Puerto Mendez	19	Female	2.53	0.17	1.84	0.45	0.26	0.26	3.00	1.28	2.11	0.62	7.06	7.06
La Pampita	14	Female	2.71	0.16	2.14	0.36	0.36	0.36	7.07	2.23	1.07	0.25	1.57	1.07
Near San Borja	33	Women	2.61	0.12	1.97	0.30	0.30	0.21	4.73	1.23	1.67	0.38	4.58	3.88
Cachuela	9	Female	1.00	0.00	0.00	0.00	0.00	0.00	6.00	2.73	0.67	0.33	0.00	0.00
Catumare	10	Female	1.00	0.00	0.40	0.27	0.00	0.00	3.50	1.63	0.00	0.00	0.00	0.00
Ocuna	17	Female	1.12	0.08	0.00	0.00	0.00	0.00	4.38	1.51	0.12	0.08	3.53	2.42
Far away	36	Women	1.06	0.04	0.11	0.08	0.00	0.00	4.54	1.07	0.22	0.10	1.67	1.16

To address these complications, several questions were asked that decompose various elements of market exposure and acculturation. In particular, (a) level of spanish ability, (b) frequency of visitations to San Borja in the past month, (c) frequency of hunting and fishing trips in the past month, (d) number of years of formal education, and (e) number of days of wage labor outside the village in the past year were examined. Examination of the effects of each of these variables on game behavior in the Ultimatum Game and Public Goods Game relaxes the assumption that all individuals in the three upstream villages are 'isolated' or that all individuals in the two downstream villages are all 'acculturated'. Furthermore, the effects of demographic variables such as sex and age on game behavior across villages were explored, because if different age and sex classes behave differently, and if villages vary in their age and sex composition, then differences across villages could be an artifact of demography.

METHODS

The games

Instructions for the Ultimatum Game and Public Goods Game were adapted from those used by Henrich (2000) for the Machiguenga, and are given in Appendices A–C of this chapter. The standard procedure used in all five villages was first to gather all individuals over age fifteen in one location. This location was the school in the three villages that had schools (Puerto Mendez, La Pampita, Cachuela), in a temporary shelter along the beach at Ocuña, and in an empty house in Catumare. After everyone had arrived, the instructions for the Ultimatum Game were read first in Spanish, then translated into Tsimane' with the help of a translator. In the villages with schools, bilingual teachers were used as translators, while in Ocuña and Catumare, a translator from the mission village of Fátima was used to facilitate understanding of the games to the villagers. The instructions were read again in both languages, and the details summarized in both Spanish and Tsimane'. Several hypothetical questions were asked of numerous individuals in an attempt to test understanding of the rules of the games. The answers were explained to all in the group, and more questions were asked until it seemed apparent that all individuals

understood the rules of the game. Special attention was given to younger and older individuals, who appeared to have greater difficulty in understanding how to play. Before beginning play, I re-emphasized the anonymity of their decisions. The Ultimatum Game was then played, and a similar procedure was then employed for the Public Goods Game.

In each game, individuals entered a separate area (i.e. the school, an abandoned house on the beach, or an empty house) one by one until all available individuals had played each game. During play, I was the only other individual exposed to the decisions of the players. Assistance from translators was used only if I felt a player still did not understand the rules of the game. For the Ultimatum Game, I told each individual whether they were the 'first person' (proposer) or the 'second person' (responder), then read the script given in Appendix B. After the 'first person' gave an offer, they were told the consequences of their choice (e.g. you offered 4 Bs, so if the second player accepts, you receive 16 and the other person receives 4; if the second player does not accept, neither of you receive anything) to insure further that their choice was based on a proper understanding of the game. The 'second person' was also told the consequence of their decision to accept or reject the offer in a similar manner.

Although the Public Goods Game was played after the Ultimatum Game, villagers were not aware that another game would follow the first one. The rules of the Public Goods Game were easy to understand, but the consequences of specific game behavior were not. To clarify the implications of specific game behavior in the Public Goods Game, I demonstrated through example the consequences of three group scenarios: (a) all contribute everything to the common pot; (b) all contribute nothing to the common pot; and (c) three players contribute everything while the fourth player contributes nothing. During actual play of the game, little interaction between myself and the players was required. Each player entered the separate area, and was given an envelope containing fifteen pieces of paper. During the instructions, the players were told that each piece of paper represented 1 B.[2] Players then decided how

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[2] Paper was used in the envelopes instead of actual boliviano coins because it would have been impossible to obtain sufficient quantities of 1 Bs coins for play. Finding change for even 10 Bs bills (<$2) was often difficult in the town of San Borja.

many pieces of paper to take with them, and how many to leave in the envelope, which represented the 'common pot'.

Total time for explaining the instructions and for play in each game totaled about 2 hours. After the games were played, I calculated the returns for each player, and paid each individual (or each nuclear family the combined total for its members since change was a rare commodity) the appropriate amounts they earned. Each player was also given a participation fee of 5 Bs. The stakes for the Ultimatum Game were set at 20 Bs, and for the Public Goods Game at 15 Bs ($1 = 5.8 Bs at time of study). These were based on current average daily wages obtained from Tsimane' during household interviews (mean = 16.5 Bs, SD = 4.4, $n = 41$) and on a larger sample of average wages in 1998 for Tsimane', Yuracare, Mojeño, and Chiquitano inhabiting the Maniqui and Isiboro-Secure region (mean = 12 Bs, SD = 12.5, $n = 376 - R$. Godoy, personal communication). The maximum possible earnings from the Ultimatum Game and Public Goods Game, respectively, are 20 Bs (offer nothing and this offer is accepted) and 37.5 Bs (self contributes nothing to public good while others contribute everything). Minimum earnings are zero in the Ultimatum Game (be offered nothing, or having an offer rejected) and 7.5 in the Public Goods Game (self contributes everything to public good whereas others contribute nothing).

Household interviews

Interviews were also conducted with the help of a translator several days prior to playing the games. These were done to obtain demographic and socioeconomic information on all potential players. For all adult household members, I recorded their name, sex, age, place of birth, number of children (and their sex and ages), the number of times they visited San Borja in the past month (and the purpose of their visits), the number of times they went hunting or fishing in the past month,[3] and the number of days they worked for wages outside the village in the past year (and their average daily wage). I also ranked their Spanish ability on a four point scale (4 = fluent speaking and can read and write, 3 = fluent speaking only, 2 = speaks little, 1 = speaks none). Table 7.3 gives the means and standard errors for these measures for the combined samples,

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[3] Most fishing and hunting trips are single-day trips, and usually occur once per day.

'distant' and 'close' to San Borja, for all individuals, only males, and only females, and presents the same information organized by village. As expected, individuals from Puerto Mendez and La Pampita are more fluent in Spanish, visit San Borja more frequently, have more years of formal education, and work more days outside the village than those from Ocuña, Catumare, and Cachuelita.

RESULTS

All Tsimane'

Figures 7.1 and 7.2 give the distributions of offers made in the Ultimatum Game ($n = 70$ pairs) and contributions made in the Public Goods Game ($n = 134$), respectively. The mean and median offer in the Ultimatum Game was 37 percent (7.5 Bs), with a primary mode at 50 percent (10 Bs) and secondary modes at 30 percent (6 Bs) and 25 percent (5 Bs). While the Tsimane' distribution of offers differs from several western university samples (Epps-Singleton test, Pittsburgh—CF = 12.99, $p = 0.01$; Jerusalem—CF = 12.92, $p = 0.01$: data from Roth *et al.* 1991), it also differs from that reported for the Machiguenga (CF = 15.70, $p < 0.01$: Henrich 2000). Significant differences are most likely due to the presence of multiple modes among the Tsimane'. Indeed, offers cluster around 25, 30, 40, and 50 percent. Thus, offers in the Ultimatum Game are lower than those typically reported in western university populations (and with significantly higher variance, including the presence of hyper-fair offers), but higher than those found among the Machiguenga.

Mean contribution in the Public Goods Game was 54 percent (8.1 Bs), with a median of 60 percent (9 Bs) and a mode of 67 percent (10 Bs). The distribution of contributions for the Tsimane' is significantly different from that found among a combined American sample of twenty-four University of California, Los Angeles students and forty University of Michigan students (CF = 100.59, $p < 0.0001$) and that found among the Machiguenga (CF = 31.00, $p < 0.0001$) (data from Henrich and Smith Chapter 5, this volume). Roughly one third of Henrich's Machiguenga and US samples contributed nothing to the public good and about a fifth gave between 60–80 percent, compared to 5 percent contributing nothing, and three-fifths giving between 60–80 percent among the
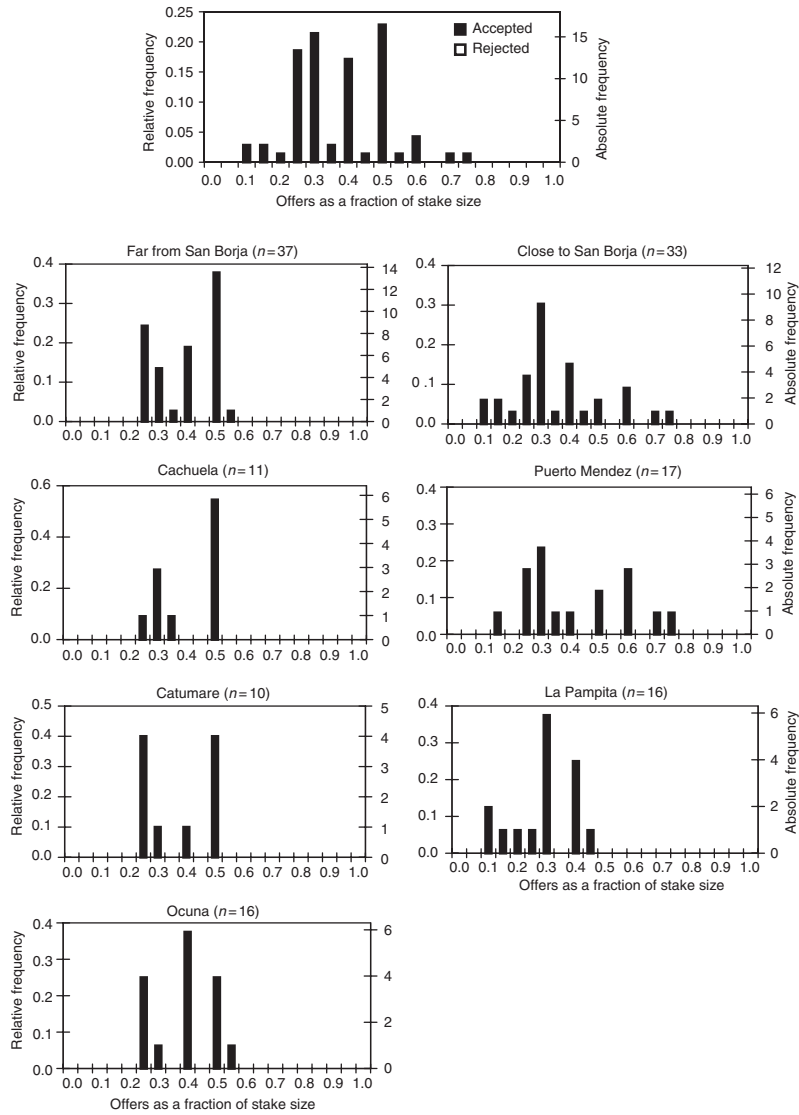
FIG. 7.1. Frequency distributions of offers in Ultimatum Game (stake size $S = 20$ Bs)

Tsimane'. Thus, contributions in the Public Goods Game are slightly higher than those typically reported in western populations (with again more variance in contributions), and significantly higher than those reported for the Machiguenga.
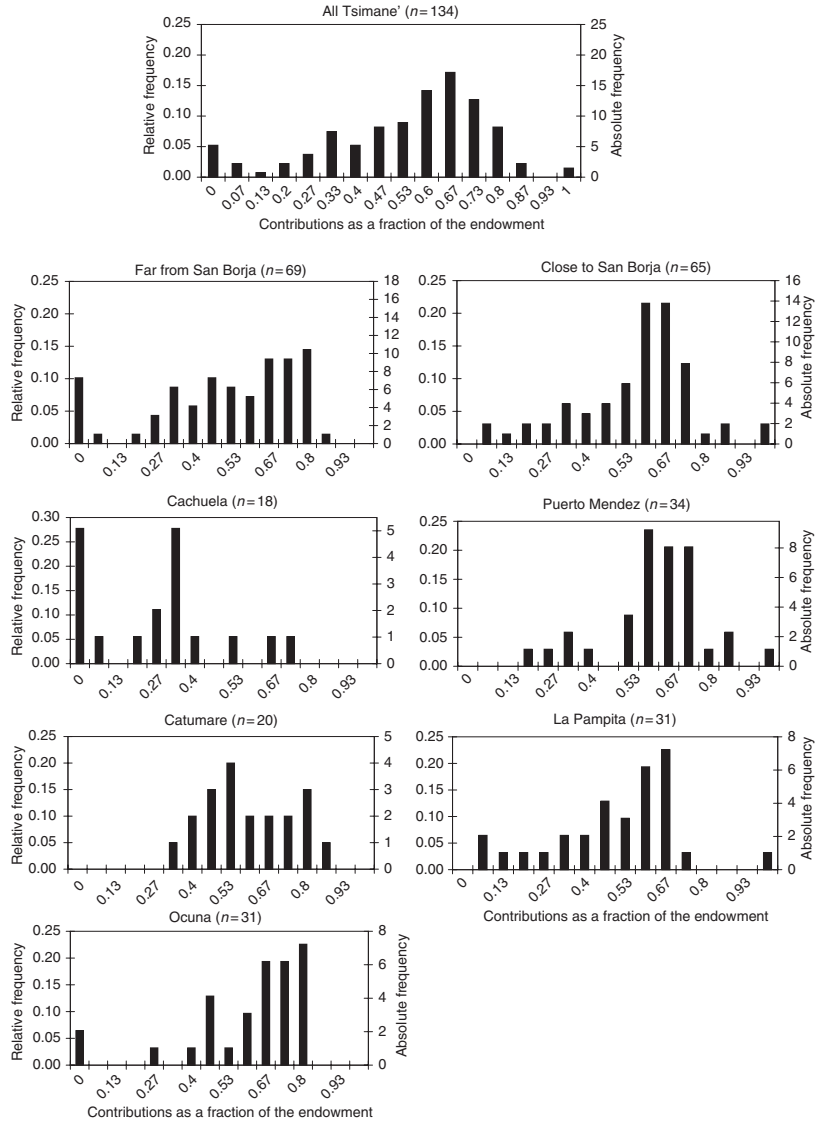
FIG. 7.2. Frequency distributions of Public Goods Game contributions (endowment e = 15 Bs)

By market context

Figures 7.3 and 7.4 give the distributions of offers and contributions for the clustered samples, 'distant' and 'close'. While means for the two sets of distributions in both games are not statistically different at the typical levels of 5 or 10 percent (Figures 7.1 and 7.2), the overall shapes of the distributions for the Ultimatum Game are different at the 6 percent level (CF $= 9.07$, $p < 0.06$). The median in the 'distant' sample is 10 percent greater (and the mode 20 percent greater) than that in the 'close' sample. The result that offers tend to be larger in the distant sample is in the opposite direction predicted if more intensive affiliation with money-oriented markets correlates with standard western notions of fairness (C1 and C2). Indeed, there were no offers less than 25 percent or greater than 55 percent
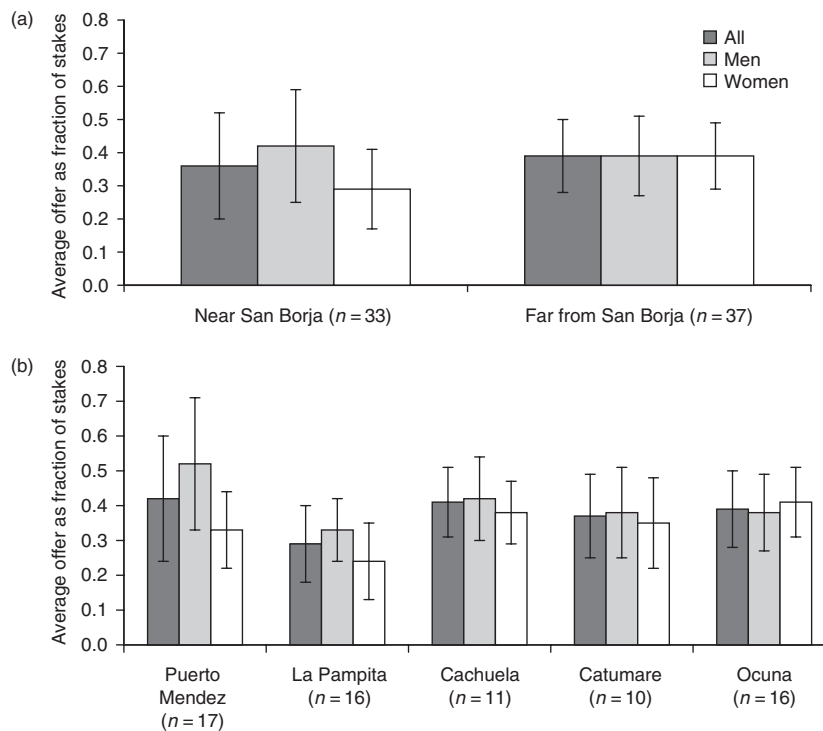

FIG. 7.3. Ultimatum Game results by market context and village (offers by proposers in Ultimatum Game)
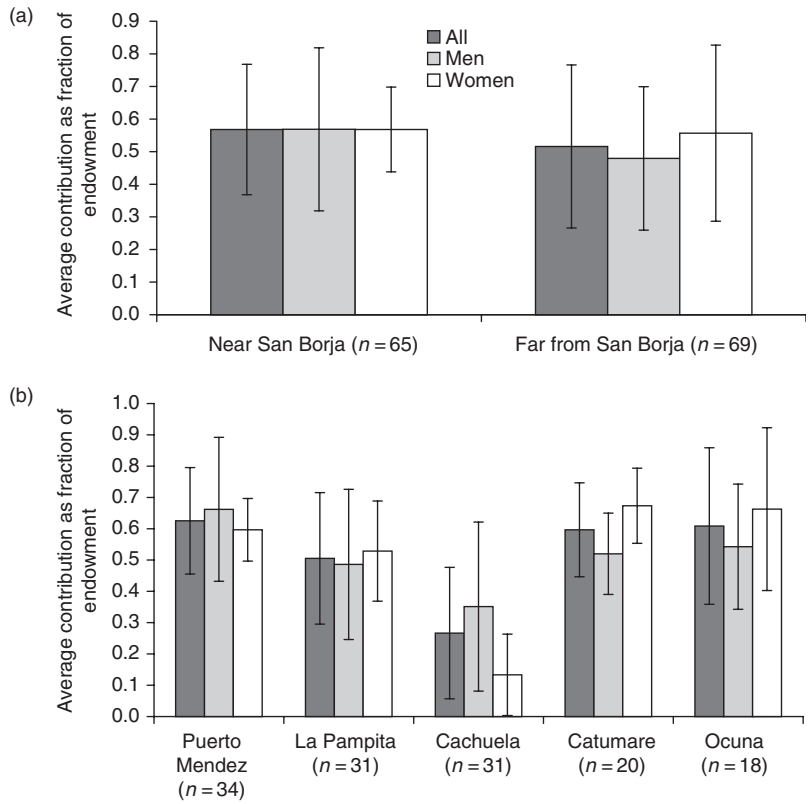
FIG. 7.4. Public goods contribution in Public Goods Game by, (a) distance to San Borja, (b) village (Contribution to common pot)

in the distant sample, compared with 15 percent offering both less than 25 percent and more than 55 percent in the close sample.

In the Public Goods Game, there was no statistically significant difference in means or in the distributions of contributions between the distant and close samples (Epps-Singleton, CF $= 3.73$, $p = 0.44$). Although the distributions were not statistically different, two distinguishing features are noteworthy. First, 10 percent of all contributions in the distant sample were zero, while there were no zero contributions in the close sample (Figure 7.4). Second, there was a clear mode of 60–67 percent in the close sample, while contributions in the distant sample were more uniformly distributed across the range of 33–75 percent (Figure 7.4).

By village

If distance to San Borja has a significant effect on Ultimatum Game offers, then any pair of two downstream or upstream villages should display similar distributions, and any pairwise comparison between up- and downstream villages should be significantly different. However, analysis of pairwise comparisons across villages is not consistent with this conclusion. Of the ten possible village comparisons, only four give results consistent (i.e. distant and close villages are significantly different, distant and distant, or close and close, are not) with the notion that distance from the city affects game behavior. In particular, Puerto Mendez is significantly different from La Pampita (the two close villages, $CF = 8.99$, $p = 0.06$), Ocuña is significantly different from Cachuela (two distant villages, $CF = 9.58$, $p < 0.05$), Puerto Mendez is similar to Ocuña, Catumare, and Cachuela ($p = 0.19$, $p = 0.68$, $p = 0.23$, respectively), and La Pampita is similar to Ocuña ($CF = 7.41$, $p = 0.12$). It therefore appears that although distance to San Borja produces an overall statistical difference in the distribution of Ultimatum Game offers, this difference is unlikely an effect of distance to San Borja.

A pairwise village comparison in the Public Goods Game reveals again that of the ten possible village comparisons, only four yield results consistent with the distance effect on game behavior. Again, the two close villages were significantly different ($CF = 10.30$, $p = 0.04$). Additionally, Cachuelita is significantly different from every other village (Puerto Mendez, Ocuña, and Catumare— $p < 0.0001$, La Pampita—$p = 0.02$), and is responsible for two-thirds of the statistically significantly different comparisons! Again, distance to San Borja is not an important predictor of Public Goods Game behavior across villages.

By acculturation variables

Although distance to San Borja was not a very significant predictor of game behavior in either game, we now explore the possibility that differential exposure within villages, as measured by Spanish-speaking ability, visitations to San Borja, work history, and formal education, might account for the effect of market exposure on fairness norms, and thus economic game behavior.

Individuals of different Spanish-speaking ability, as measured on a four-point qualitative scale, differ relatively little in their

Ultimatum Game or Public Goods Game behavior (Figure 7.5). However, those ranked as most fluent with the ability to read and write (also those most likely educated outside the village) offered significantly more money in the Ultimatum Game (45 percent) than those of lesser ability (37 percent) ($p < 0.05$). There are no consistent directional effects of Spanish-speaking ability, which suggests that perhaps any significant pairwise comparisons may be due to confounding factors.

There are also no statistically significant directional effects for visitations to San Borja in the month prior to interview for offers made in the Ultimatum Game (Figure 7.6(a)—$p = 0.87$) or contributions in the Public Goods Game (Figure 7.6(b)—$p = 0.38$). Similarly, the number of years of formal education and the number
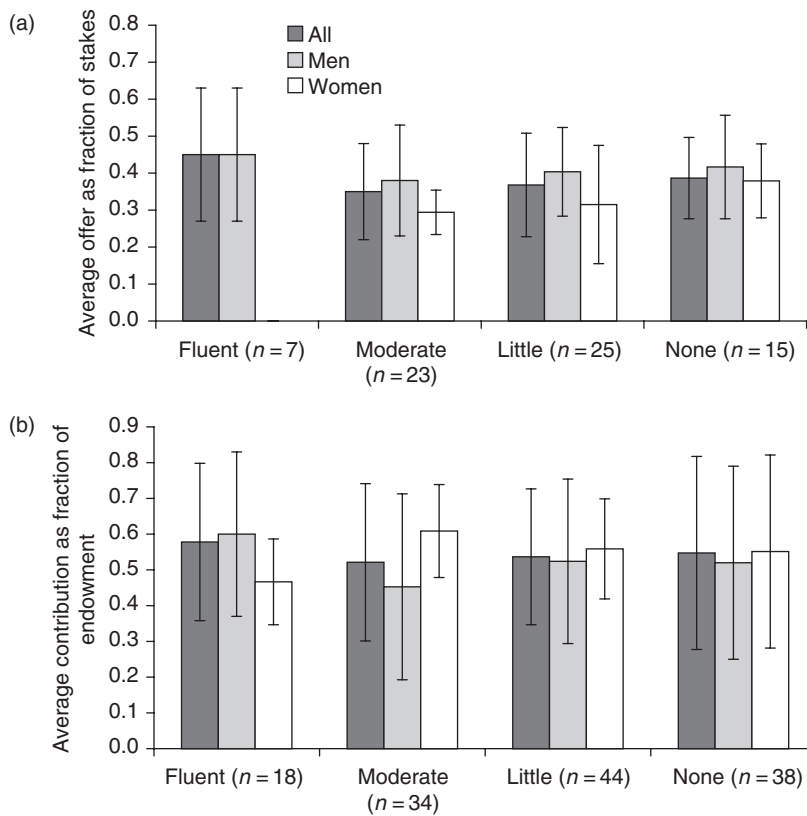

FIG. 7.5. Spanish-speaking ability and (a) Ultimatum Game and (b) Public Goods Game behavior
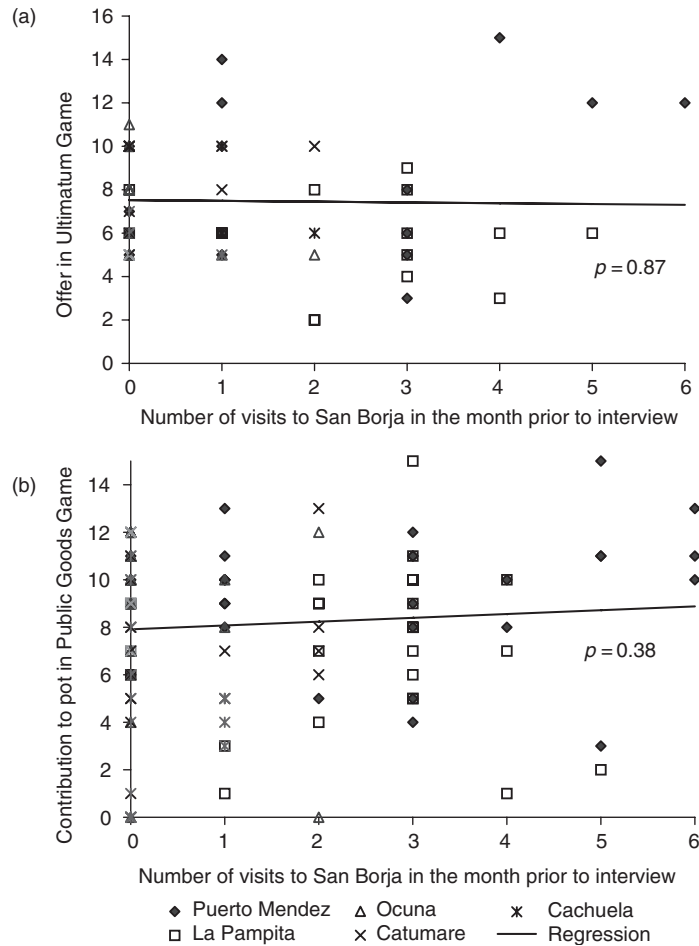
Fig. 7.6. Visits to San Borja and (a) Ultimatum Game and (b) Public Goods Game behavior

of days worked outside the village as a wage laborer both had negligible effects on Ultimatum Game offers (Figure 7.7(a)—$p = 0.68$, Figure 7.8(a)—$p = 0.49$) and Public Goods Game contributions (Figure 7.7(b)—$p = 0.80$, Figure 7.8(b)—$p = 0.31$).

By age and sex

If age and sex produce significant differences in game behavior due to either differential costs and/or benefits to cooperation or perhaps
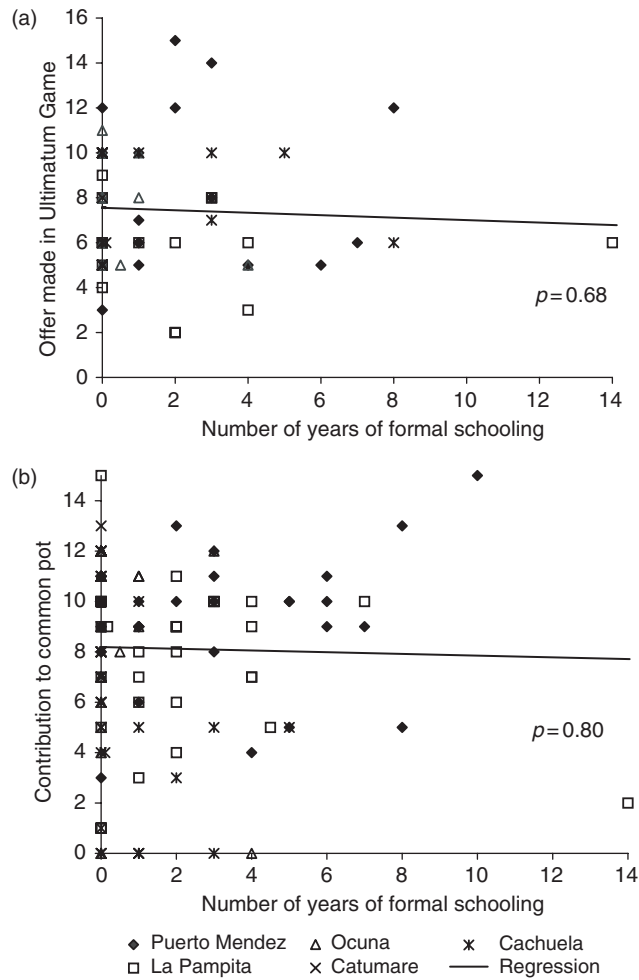
FIG. 7.7. Formal education and (a) Ultimatum Game, and (b) Public Goods Game behavior

an effect of differential learning, and if villages differ significantly in their age and sex profiles, then differences between villages might only be an artifact of demographic differences. Although men offered an average of 7 percent more money than women, there were no statistically significant differences between the distributions of offers (CF = 6.29, $p = 0.18$). Age also has little overall impact on Ultimatum Game offers or Public Goods Game contributions.
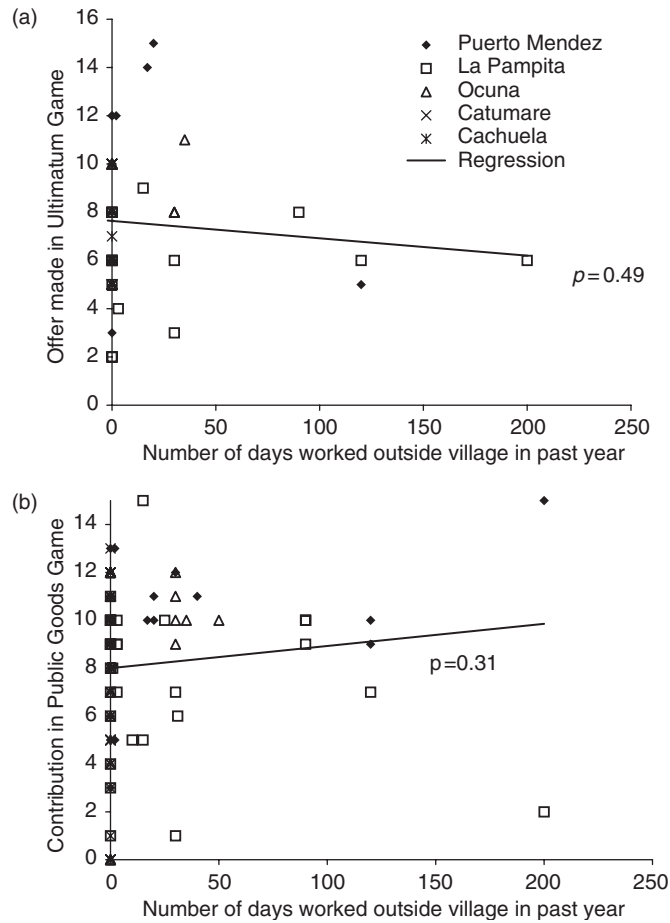
Fɪɢ. 7.8. Days worked outside village and (a) Ultimatum Game, and (b) Public Goods Game behavior

The only observed significant difference is that middle-aged women (age 40–55) contribute about 12 percent more money to the public good than their older or younger counterparts. See Figure 7.9.

Regression summary

A series of regressions designed to examine the relative contributions of village membership, demographic variables, and acculturation are presented in Table 7.4. For the Ultimatum Game, village membership accounted for 13 percent of the variance in offer

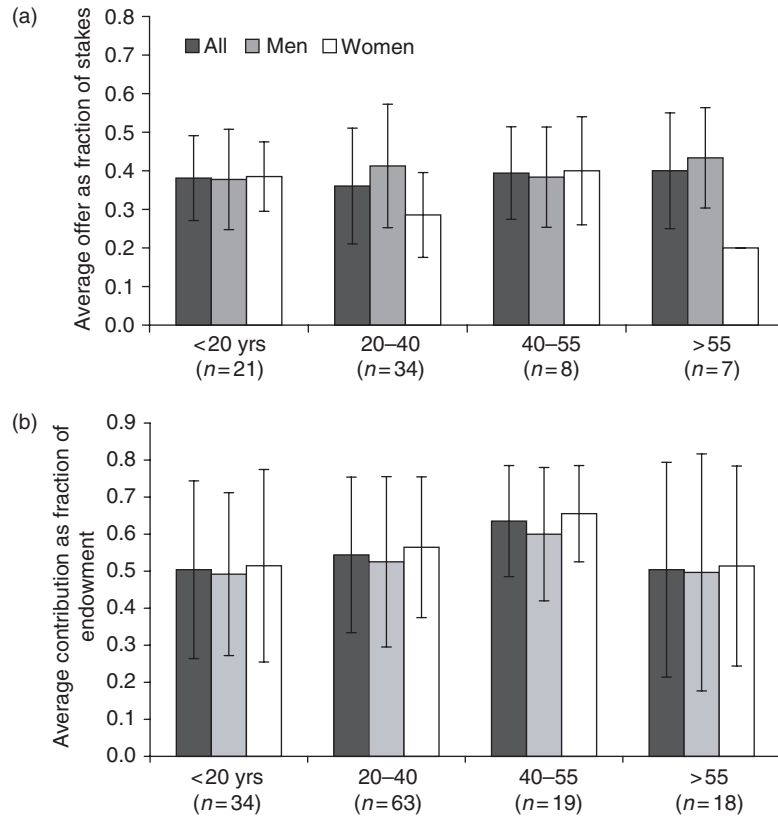FIG. 7.9. Age and sex for (a) Ultimatum Game, and (b) Public Goods Game behavior

responses and is thus the strongest predictor of Ultimatum Game offers. Indeed, the distribution of offers at La Pampita is responsible for much of this village effect (see above section). Ranked distance to San Borja is uninformative ($p = 0.84$, analysis not shown), as was evident from casual inspection of the distribution of offers in Figure 7.3. The sum total effect of all the acculturation variables accounts for 10 percent of the variance in offers. When all the variables are examined simultaneously (column 4), only village, sex, Spanish ability, and education are statistically significant. While holding other variables constant, males offered about 10 percent more than females, the most fluent offered about 18 percent more than the less fluent, and those with the highest level of formal

TABLE 7.4. Multiple regression of demographic and market variables on Ultimatum Game and Public Goods Game

Predictor	p estimate for Ultimatum Game (% offer)				p estimate for Public Goods Game (% contribution)			
Village								
Puerto Mendez	0	0		0	0	0		0
La Pampita	−11.70***	−13.46***		−17.23***	−12.01**	−11.81**		−15.38**
Cachuela	−0.86	−2.72		−10.19	−35.88***	−35.53***		−38.24***
Catumare	−4.76	−6.20		−16.65*	−2.88	−2.60		−7.56
Ocuna	−2.70	−2.77		−10.13^	−1.69	−1.57		−5.98
Age		−0.05		−0.04		0.03		−0.04
Sex (1 = male)		7.04		10.42*		−1.65		−1.41
Spanish								
None			0	0			0	0
Little			−1.21*	−9.08*			−2.69	−2.15
Speaks			0.78*	−6.09*			−4.17	−2.51
Literate			19.34*	8.70			2.42	6.51
Visit SB			−0.42	−0.04			1.74	0.17
Education			−1.26	−1.89^			−1.71	−1.99
Wage labor			−0.05	0.02			0.10	0.09
R^2	0.13	0.20	0.10	0.35	0.27	0.27	0.03	0.31
p-value	0.06	0.02	0.40	0.02	0.0001	0.0001	0.64	0.0001
Intercept	41.76***	36.95***	58.49***	59.72***	62.55***	62.13***	57.16***	76.03***

Note: ^ = p-value < 0.10, * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$. The parameter estimates of 0 refer to the baseline value (Puerto Mendez, no spanish knowledge) in a series of dummy variables for village and spanish ability.

education (about 8 years) offered about 14 percent less than those with no formal education. Thus, the Spanish result is consistent and the education result inconsistent with the notion that acculturation produces results more similar to those found in western populations.

In the Public Goods Game, the only significant predictor, which alone accounts for 27 percent of the variance in contributions, is village membership. Both Cachuela and La Pampita are responsible for the bulk of differences across villages (see above). As in the Ultimatum Game, ranked distance to San Borja is a poor predictor of contributions ($p = 0.87$, analysis not shown), and all variables related to acculturation or market exposure are statistically insignificant at the typical levels of significance.

SUMMARY

The important results of this chapter are summarized below:

1. Offers in the Ultimatum Game tend to be lower than those found among western populations and higher than those reported for the Machiguenga, while contributions in the Public Goods Game tend to be higher than those reported for the Machiguenga, but within the range found among western populations. There is also a high level of variation in Ultimatum Game offers and Public Goods Game contributions by Tsimane' in comparison to standard western results.
2. There are few differences in Ultimatum Game or Public Goods Game behavior that can be attributed to market exposure or acculturation, and the few differences that exist do not support the notion that exposure to modern markets produces game behavior similar to that found in the west:
   (i) Distance to San Borja is a poor predictor of game behavior (and perhaps of market exposure).
   (ii) The number of visits to San Borja, years of formal education, and days in wage labor outside the village, have only a small composite effect on Ultimatum Game behavior and negligible effects on Public Goods Game behavior.

The strongest predictor of both individual Ultimatum Game and Public Goods Game behavior is village membership.

DISCUSSION

Several important questions are raised by the current research:
(1) Has the methodology adequately captured the effects of market
exposure and acculturation? (2) What specific aspects of western
populations are responsible for norms that emphasize fairness and
punishment? (3) Why do not individuals in several traditional
populations ever reject unfair offers in the Ultimatum Game? (4)
Why do the Tsimane' offer low in the Ultimatum Game, but con-
tribute high in the Public Goods Game? (5) Why are there differ-
ences in game behavior across villages? (6) How can we begin to
understand the observed cross-cultural variation in Ultimatum
Game and Public Goods Game behavior?

Methodology and acculturation

Although Tsimane' villages vary considerably in their exposure
to San Borja and money-based, competitive labor markets, it is
possible that only minimal levels of exposure are necessary to adopt
norms of fairness similar to those purported to exist for western
populations. Therefore, the level of acculturation might not vary as
much as suggested by the differences in the acculturation measures
or distances to San Borja. Furthermore, as mentioned in a previous
section, families often migrate between villages, and indeed,
33 percent of all adults in the distant, upstream villages were ori-
ginally from downstream villages, and could therefore be respon-
sible for sharing experiences (and transmitting western-like values)
to other villagers.[4] Another possibility is that although downstream
villages are more acculturated, they are still not intensely involved
in the market economy and competitive labor markets of San Borja.
Indeed, individuals in downstream villages continue to obtain the
majority of their subsistence from cultivation, fishing, and hunting.[5]
In San Borja, visiting Tsimane' are regarded as low status by
Bolivian nationals, and often complain about being swindled during
economic transactions with nationals. Although I cannot rule out
the possibility that these confounders eliminate any true effect of

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[4] Individuals moving upstream may not be a random sample from the downstream
population, and may therefore self-select into the upstream sample.
[5] Another self-selection problem is that individuals in the downstream villages that
are heavily involved in the market were unlikely to be present during my brief study
period, and are therefore not included in the sample.

acculturation on game behavior, it seems more likely that Tsimane' social relations and cultural norms (see below) are a more salient influence on economic behavior than differential market exposure.[6]

Cultural norms

It has been suggested that norms of fairness can partly explain observed Ultimatum Game behavior in western populations (Roth *et al.* 1991; Camerer and Thaler 1995), and that propensities for reciprocity can lead to moderate levels of allocations to the public good even in one-shot versions of the Public Goods Game (Dawes and Thaler 1988). The fact that kindergarteners accept minimal offers about 70 percent of the time, third and fourth graders 40 percent of the time, and adults < 10 percent of the time, implies that any fairness-based norms or cooperative strategies are learned or condition dependent (Murnighan and Saxon 1994). If the gradual learning of norms results from interactions and socialization specific to modern western economies (rather than from rules-of-thumb derived from an evolved psychology tending towards reciprocity), we must ask which aspects of modern environments are responsible for evolving these learned norms. Is it exposure to money-based exchanges? The emphasis on free-market competition? An industrialized, service-oriented economy? Frequent interactions with large numbers of strangers?

Although the emphasis on money exchanges for all commodities is a relatively recent innovation in human cultures, trade has existed for tens if not hundreds of millenia, and is therefore not a unique feature to modern populations. When the Ultimatum Game is framed in a competitive market context of buying and selling, offers are lower and tend to be accepted (Roth *et al.* 1991; Schotter, Weiss, and Zapter 1996). Although immersed in these market-based competitive environments on a daily basis, individuals in bilateral bargaining situations without the market framing often reach cooperative outcomes.

The rule, 'cooperate unless information otherwise indicates you are being taken advantage of, in which case you should defect', is consistent with increasing frequencies of defection in repeated

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[6] Since all games were played in the villages, the village social context alone might account for similarities in game behavior despite differences in market exposure. It would be interesting to see if games played by Tsimane' in San Borja give results significantly different from those played in the village.

rounds of the Public Goods Game (Ledyard 1995), and the observation that low offers made by a computer are accepted more often than low offers made by humans in the Ultimatum Game (i.e. intentions matter) (Blount 1995). Furthermore, cooperative outcomes are even reached among groups of strangers that interact only once, suggesting that Axelrod and Hamilton's 'shadow of the future' (discount rate) may not be a critical component to explaining commonplace cooperation (but see below). Although membership in large groups is often viewed as an obstacle to stabilizing cooperation, and of generating significant contributions to the public good, assortative interactions can generate cooperative outcomes (Boyd and Richerson 1988). Future work should therefore focus on which aspects of modern economies should generate cultural norms different than those found in traditional societies.

Even though populations may consist of different proportions of obligate cooperators and defectors, institutions can affect cooperative outcomes by structuring the costs people pay and the potential benefits they can receive (Fehr and Gächter 2000). Institutions that promote harsh punishment to those caught defecting may be an important condition responsible for high levels of cooperation, no matter the composition of cooperators or defectors in the population (Fehr and Schmidt 1999). It appears that no such institutions exist among the Tsimane'. As mentioned above, village chiefs, schools, and town meetings are recent innovations; chiefs and teachers, however, hold little authority, and act mainly as village representatives for dealing with outsiders. This leads us to the third question.

No rejections of offers

Why do the Tsimane', Machiguenga, Ache, and Achuar players accept low offers in the Ultimatum Game? Moreover, if it is known that low offers would be accepted, why don't all individuals offer low? An obvious first answer to these questions is that the one-shot nature of the games did not capture learning effects (especially if players' daily experiences depart greatly from the artificial conditions of the games), and that if these groups played repeated rounds of the Ultimatum Game, their behavior might quickly resemble the game-theoretic predictions (or those of western populations). This possibility is observed in repeated rounds of the Public Goods

Game in western populations, but not in repeated rounds of the Ultimatum Game. Yet in the Public Goods Game, the first round of a new game played with different players does not see the high levels of defection found in the last round of the previous game. Contributions start high again, even though the players have 'learned' the game. These results suggest that even one-shot games still require explanation. One-shot games might reflect norms of behavior (especially if there is confusion as to how to play the game) that may only be 'extinguished' after repeated rounds and a deeper understanding of the true costs and benefits of the games. However, these norms might be difficult to extinguish even when players fully understand the rules and consequences of the games and know that they cannot connect specific actions with other individuals. The players are members of small communities who may continue to interact for much of their lives, and any event that greatly irritates or angers others might disrupt social partnerships, which if difficult to obtain, might constitute an opportunity cost to rejecting offers. From this perspective, the real costs of rejecting low offers may be much higher than simply losing the monetary offer.

Similarly, members of small traditional communities may be unfamiliar with strictly dyadic interactions, irrespective of the larger context of the public sphere. Frequent interaction in the public sphere might favor other ways of punishing individuals, such as public humiliation, damaging of reputations, negative gossip, and joking. Although public confrontations are uncommon among the Tsimane', grievances are commonly made known during extensive beer drinking events (when people lose their shyness, or *tsicadye'*) (Ellis 1996).

Another possibility is that 'groupish' behavior might lead these groups to accept any positive offer from a fellow group member, thereby giving the large remainder to another group member rather than to an outsider (the experimenter). While not explicitly requiring individuals to be altruistic towards group members, economic behavior based on in-group–out-group predilections at least requires a greater aversion to having money go to the experimenter. This may be particularly true if group members suspect that the same money is worth more to themselves than to the experimenter.[7]

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[7] In this sense, accepting any positive offer maximizes the total amount of money flowing from the experimenter to the community. This is, in essence, a contribution to the public good, and is consistent with the observed Public Goods Game results.

This possibility could be investigated by allowing any failure to coordinate to result in money being given either to an outsider (e.g. a Bolivian national) or to another Tsimane' (or perhaps the Gran Consejo Tsimane', the centralized organization representing all Tsimane'). Interestingly, Gil-White's results (Chapter 9, this volume) show that individuals offer less to other in-groupers, and more to out-group members.

Still another possibility is that if many Tsimane' wish to offer low (or can at least understand why others might offer low), and if they understand that being a proposer or responder is a random decision, responders might not have any reason to reject low offers that they themselves would have made had they been named as proposers. This argument requires a lack of spite and desire to punish, which is inconsistent with observed western behavior, but consistent with the common observation, typified by one player's postgame comments, 'I just want the money... it doesn't matter how much the other person gets'—these comments are remarkably similar to those made by the very similar Machiguenga (Henrich 2000; Henrich and Smith Chapter 5, this volume). In such a scenario, punishing the proposer by rejecting his or her offer is a costly act for the responder, more so perhaps than for the groups of university students in the west. Although the stakes were set at roughly one day's wage labor, wage labor opportunities for the Tsimane' are few, thereby perhaps inflating the perceived value of even small offers.

No relationship between Ultimatum Game and Public Goods Game results?

Figure 7.10 shows no relationship between game behavior in the Ultimatum Game and Public Goods Game by the same individuals ($p = 0.22$). However, if we separate individuals by sex, males show a slight relationship between their Ultimatum Game and Public Goods Game behavior (slope $= 0.16$, $p = 0.07$), while females show none (slope $= 0.02$, $p = 0.83$). If economic games capture real-life preferences, then how can no relationship exist between Ultimatum Game offers and Public Goods Game contributions made by the same individuals? There are several possibilities for this pattern. One potential boost in cooperation in the Public Goods Game could have come from communication that occurred among the crowd of
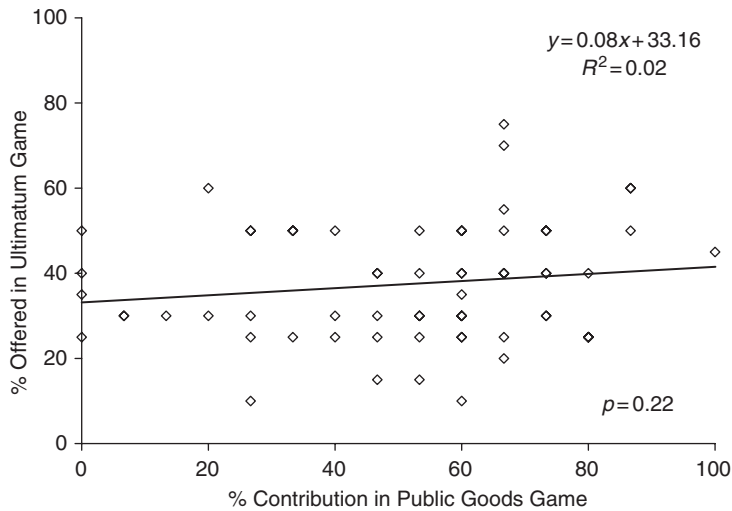
FIG. 7.10. Ultimatum Game and Public Goods Game behavior

players waiting to play, or from an understanding that doubling the sum of money in the common pot greatly increases individual pay-offs. Although the translator attempted to insure a lack of coordination-like discussion, this possibility cannot be ruled out, despite my emphasis to each player that their responses were confidential. Even pregame discussion unrelated to the game has been shown to lead to higher levels of cooperation in the Public Goods Game (Ledyard 1995), more so than in the Ultimatum Game. Another interpretation is that if the Tsimane' are risk prone, they might be more willing to sacrifice personal gain to win the big gamble of the doubled pot of money in the Public Goods Game, just as they might be more willing to offer a small amount in the Ultimatum Game and hope that the responder (rightly so) will accept. Given that males have been described as more risk prone than females cross-culturally across a wide spectrum of behaviors (Daly and Wilson 1988), it is surprising that Tsimane' males offered slightly more in the Ultimatum Game than did females, but there were no sex differences in public goods contributions.

Two anecdotes that mimic the flavor and results of the games are relevant to include in this section because they support the argument that common experience might be an important influence on game behavior. As an analogy to the Ultimatum Game, merchants

frequently travel upriver to the distant villages to trade various goods from San Borja for *jatata* roofing panels (collected and constructed by Tsimane'), which they later sell in San Borja and sometimes export to other areas of Bolivia at much higher prices. It takes 1 day to collect enough *jatata* to build about ten roofing panels, often requiring harvesters to carry heavy loads several hours distance back to the village, where it takes another day to construct the panels. The exchange rates imposed upon the Tsimane' by the merchants for different demanded goods are quite poor (e.g. five panels for 1 kg of sugar, twenty panels for a shirt, etc.). In essence, the merchants give the offer (i.e. the price), and the Tsimane' almost invariably accept the offer and make the trade. They acknowledge that prices are 'unfair' because the same goods are much cheaper if bought in San Borja, but then also acknowledge that merchants travel long distances to transport the goods (and hence are justified in charging higher prices). Still, others believe that the prices are so high only because the merchants know that the Tsimane' have few other means of obtaining the desired goods.

Analogous to the decision in the Public Goods Game in the upstream villages, individuals can choose between two main production options on any given day. They can collect *jatata* and/or construct roofing panels (which will be converted to goods that will be consumed or used almost exclusively by family members) or they can hunt or fish, where the spoils are typically shared outside the family (resembling a public good). Some Tsimane' spend much of their productive time involved in the *jatata* trade, often to the chagrin of others, who never see any returns from their labor. Most individuals involved in *jatata* work, however, harvest *jatata* in small groups on some days, and then engage in cooperative fishing or hunting together on other days.

Differences across villages

Why are there differences in Ultimatum Game and Public Goods Game behavior among the five villages? The most anomalous intervillage differences in the Ultimatum Game include hyper-fair offers in Puerto Mendez and the abundance of low offers in La Pampita (Figure 7.1, Table 7.4). In the Public Goods Game, members of Cachuela either contributed nothing to the common pot, or relatively little (Figure 7.2, Table 7.4). As mentioned above, pairwise

differences across villages are not easily explained by single variables such as distance to San Borja, or other acculturation measures. There are several possible interpretations of these results. First, small sample sizes for each village, or unexpected differences in protocol, may have produced spurious differences where none exist. While it is also possible that pregame communication may have caused different focal responses, there were no clear ordering effects of ultimatum offers or public goods contributions in any village.

If observed differences in game behavior are real, the most fascinating possibility to consider is that different villages can arrive at different game equilibria through some combination of local social interaction and learning processes. The same theory that should explain cross-cultural variability in norms that influence cooperative (and hence game) behavior, should also apply here for explaining cross-village variability. The presence of cross-village variability also cautions us when attempting to explain game results by fitting just-so anecdotal stories that capture key cultural traits or behaviors. Cachuela, for example, which saw relatively low public goods contributions, was a small village with the houses all within sight of each other, and where food sharing, production, and household visitations were more intensive than in other villages.

Understanding cross-cultural variation

What additional insight can these results add to our current understanding of cooperation in humans? Despite the variation in Ultimatum Game and Public Goods Game behavior, the robust cross-cultural result is that strict self-interest predictions are wrong in all societies where they have been tested. As mentioned in the introduction, revisions to neoclassical theory have included social utility modifications of normal utility functions (Bolton 1991), incorporation of fairness equilibria (Rabin 1993), invocations of an evolved psychology based on reciprocity (Hoffman, McCabe, and Smith 1998) or strong reciprocity (Bowles and Gintis 1998; Fehr and Schmidt 1999), and culturally transmitted social norms (Henrich 2000). The only revision that addresses the pattern of low offers (or very high offers) and high acceptances in the Ultimatum Game is the notion of differential cultural norms. However, we have little understanding of why certain norms have evolved in some societies and not in others, or what the relationship might be between these

norms and an evolved psychology based on reciprocity. Henrich (2000) suggests that because Machiguenga live in economically independent household clusters, as do the Tsimane', they need not be concerned about what others think of their choices, nor be concerned with the relative amounts that others receive. While this may be true, perhaps the same could be said about Americans, who are perceived and modeled as being very concerned about relative payoffs.

It is interesting to realize that Ultimatum Game and Public Goods Game results obtained so far in traditional populations, where daily cooperation is often viewed as a crucial component of subsistence strategies, are far closer to the self-interest predictions than those found in the western world. It is therefore somewhat tricky to link observed behavior in games such as the Ultimatum Game or Public Goods Game and the kinds of cooperation that typically occur within populations. Unless the costs and benefits over time are similar for two acts requiring cooperation, or if some individuals truly act out of nonegoistic or even 'warm-glow' altruism, we should not expect consistency in behavior. For example, groups that have no problem engaging in cooperative fishing or hunting often find it difficult to obtain levels of cooperation necessary for successful long-term outcomes of many conservation projects (also see Henrich and Smith Chapter 5, this volume).

There is little doubt that humans everywhere have worked out cultural ways of attaining gains from cooperative ventures, and that these cultural methods might require some universals of human cognitive machinery, including abilities to detect and punish cheaters (Cosmides 1989; Bolton and Zwick 1995; Bowles and Gintis 1998). Because cooperation is usually costly in terms of time, energy, or other resources, there are strong incentives to control free riding in cooperative ventures. However, most economic experiments, including the Ultimatum Game and Public Goods Game performed here, are costly only in the sense that part of the potential gains go to other individuals. The endowment of the games represents a 'windfall'—a large sum obtained without any cost. It is unclear whether rules of thumb or cultural norms designed to direct costly acts of cooperation apply for cooperative acts that are relatively costless. Deciding how much of a windfall should go to others might more accurately require an economics of etiquette or manners (Camerer and Thaler 1995).

The idea that cultural norms can explain cross-cultural variation in game behavior is an attractive one, and can surely benefit from further investigation. For example, the observation that individuals playing the Dictator Game offer smaller amounts the greater the perceived social distance between players (Hoffman, McCabe, and Smith 1996) is related to the above discussion on 'groupishness', but whether this is a common cultural norm or a part of an evolved human nature is debatable. Ultimately, we may discover that, although propensities for reciprocity exist as an important feature of human cognition, differences in actual behavior can be best explained as a combination of differences in rule-of-thumb norms based on long-term cultural experiences, as well as different weightings of short-term monetary and long-term social costs and benefits. It is true that players may not be conditional reciprocators if they cooperate in one-shot games, where the shadow of the future is narrow, but as discussed earlier, they may indeed be conditional reciprocaters if the perceived shadow of the future goes beyond the context of the games, extending to long-term mutual coexistence within their community. Whenever long-term consequences of short-term selfish behavior are sufficiently negative or uncertain, a successful rule-of-thumb might be to cooperate. Thus this rule-of-thumb might apply to interactions with in-group members, consistent with the above statements regarding groupishness effects on cooperative impulses. Future work focusing on repeated rounds, learning (or perhaps unlearning of cultural norms for the duration of the experiments), reputational effects, and groupishness might reveal that cross-cultural variation in game behavior is smaller than indicated by first glance at one-shot games.

APPENDIX A: THE ULTIMATUM GAME (EL JUEGO ULTIMATUM)

(Adapted from Henrich 2000)

Este juego está jugado en pares de individuos. Hay dos personas en cada par, una primera y una segunda persona. Voy a decir Ud. Si Ud. es el primer o la segunda persona del par. Cada persona en el par no sabe el nombre de la otra persona (son desconocidos). Yo proveo una suma de 20 bolivianos a cada par. La primera persona tiene que decidir como él quiere dividir la suma de plata. Esta

persona tiene que ofrecer una porción de la suma (desde 0 a 20) a la segunda persona (quien es desconocido).

Entonces, más tarde, yo se la dirá la oferta a la segunda persona (el nombre de la primera persona quedará desconocido). La segunda persona tiene que decidir si él o ella quiere aceptar o rechazar la oferta de la primera persona. Si la segunda persona acepta la oferta, la segunda persona recibe la oferta en pesos reales, y la primera persona recibe el resto (20 menos la oferta de la primera persona) en bolivianos. Sin embargo, si la segunda persona rechaza la oferta, ambos personas reciben nada (0 bolivianos)—la primera persona recibe cero pesos y la segunda persona recibe cero pesos.

La primera persona puede ofrecer a la segunda persona (en bolivianos):

0	1	2	3	4	5	6	7	8	9	10
	11	12	13	14	15	16	17	18	19	20

La segunda persona puede: aceptar o rechazar

Se Recuerda

1. No hay constestas correctos o incorrectos; escoga lo que usted prefiere. Nadie va a saber vos repuesta.
2. La plata es real y viene desde La fundación 'MacArthur' en los Estados Unidos.
3. Todos los participantes reciben 5 bolivianos por su participación en este juego.

APPENDIX B: ULTIMATUM GAME

To first player (Proposer):

Mi nash taschety muntyi. Juñucsi buty ma'je codaqui mi jaquivej muntyi? (You are the first player. How much do you want to offer to a second person?)

Jaquivej muntyi maje, mi ra so'me ___ Bs jedyeya mu ra so'me ___ Bs. (If the second player accepts, you will receive ___ Bs and he/she will receive ___ Bs.)

Jaquivej muntyi jam maje, mi jam ra so'me querecha jedyeya mu jam ra so'me querecha chimedye.
(If the second player does not accept, you will not receive any money and he/she will not receive any money, also).

To second player (Responder):

Mi nash jaquivej muntyi. Mis nash mo'ya yutacdye ___ Bs.
(You are the second person. The offer to you is ___ Bs.)

Are ma'je mi, are jam ma'je mi?
(Do you want the offer, or do you not want the offer?)

Ma'je mi, mi ra so'me ___ Bs, jedyeya yucsi muntyi ra so'me ___ Bs.
(If you accept, you will receive ___ Bs and the other person will receive ___ Bs.)

Jam ma'je mi, mi jam ra so'me querecha jedyeya yucsi muntyi jam ra so'me querecha chimedye.
(If you don't accept, you will not receive any money, and the other person will not receive any money, either).

APPENDIX C: PUBLIC GOODS GAME (EL JUEGO CONTRIBUCIONES)

(Adapted from Henrich 2000)
En este juego 4 personas juegan juntos. Al principio del juego, cada persona recibe 15 papeles. Cada papel significa un boliviano. Entonces cada persona tiene una oportunidad contribuir, en secreto, una porcion de su 15 bolivianos a la caja comunal (entra el cuarto y pon tu contribución *en la caja*, pon el resto en tu bolsillo). Cada persona puede contribuir entre 0 y 15 bolivianos a la caja comual (incluyendo 0 y 15). Depues de los contribuciones a la caja comual, la suma de plata en la caja comual se estará duplicado y estará distribuido *igualmente* entre las 4 personas.

Cuánto usted quiere contribuir a la caja comunal:

0	4	8	12
1	5	9	13
2	6	10	14
3	7	11	15

Se Recuerda

1. No hay constestas correctos o incorrectos; escoga lo que usted prefiere.
2. La plata es real y viene desde La fundación 'MacArthur' en Estados Unidos.
3. Los otras jugadores no van a saber cuanto plata usted recibe en total.

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