

WHEN CULTURE DOES NOT MATTER: EXPERIMENTAL
EVIDENCE FROM COALITION FORMATION ULTIMATUM
GAMES IN AUSTRIA AND JAPAN *

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Instructions and data set are available upon request.

Comments are welcome.

Abstract

This paper reports the results of a cross-country comparison between Austria and Japan for an experimental 3-person coalition formation ultimatum game. The experimental design allows the comparison with respect to three decisions. (i) The coalition decision, (ii) proposers' demand behavior in 2- and 3-person ultimatum subgames, and (iii) the responders' behavior in these subgames. In contrast to other cross-cultural studies in experimental bargaining environments we can not find any (significant) difference in behavior between subjects in Austria and Japan. We attribute the behavioral similarities mainly to a subtle focal point and responder competition effect, which wipe out possible cultural differences. Our conclusion is that even in environments - like bargaining - where cultural differences may play a prominent role the show-up of these differences is highly sensitive to the exact context in which people act.

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1 Introduction

In recent years experimental evidence has started an ongoing debate about the influence of culture on peoples' behavior. The questions if and under which circumstances differences in culture lead to different behavior is of particular importance for policy considerations. If in different countries people follow different norms and/or have different value orientations this has to be taken into account in economic modeling. Such differences can lead to quite different actual outcomes under the same pecuniary incentives. Although, the importance of investigation of possible cultural differences is not questioned the number of cross-cultural experiments is still rather small. Furthermore, the evidence from cross-cultural experiments conducted that far is quite mixed and indicates that the impact of culture on behavior depends strongly on the context in which people act. In this paper we investigate possible behavioral differences of people in Austria and Japan in the context of an experimental 3-person coalition formation ultimatum game. The main result of this paper is that contrary to other experimental bargaining studies we do not find any (significant) difference.

Roth, Prasnikar, Okuno-Fujiwara, and Zamir (1991) have conducted a cross-cultural experiment in four different countries (United States, Israel, Japan, and Slovenia). They run experimental sessions with a multiplayer market environment and an ultimatum bargaining environment. They find that in the market environment the outcomes are the same in all countries. In every country market behavior converged to the theoretical prediction. Similarly, Kachelmeier and Shehata (1992) do not detect cultural differences in market behavior experiments in North America (United States and Canada) and China. Hence, it seems that within a market context any cultural differences are over-powered by market forces. However, these cross-country similarities in behavior are not robust with respect to the experimental setting. In contrast to their market environment Roth, Prasnikar, Okuno-Fujiwara, and Zamir (1991) observe significant cross-cultural differences in their ultimatum game environment. In a recent study Lensberg and van der Heijden (1998) find evidence for behavioral differences between Norway and the Netherlands in a gift exchange game experiment. The observation that findings of cultural differences are very sensitive with respect to the set-up and procedure of experiments is also shown by two cross-cultural public goods experiments. Cason, Saijo, and Yamato (1997) study voluntary participation and spitefulness in Japan and the United States, and Brandts, Saijo, and Schram (1997) compare behavior in Japan, Spain, the Netherlands, and the United States. The first study finds significant differences between US and Japanese subjects, whereas in the latter observed behavior is rather similar across countries.¹

In view of these results one could draw the conclusions that within a market context culture makes no significant difference, whereas cultural differences become more prominent in environments where competitive forces are removed. In particular the observed differences in the ultimatum and gift exchange game experiments suggest that in the context of bargaining behavior is not independent of the cultural background of the subjects. In this paper we present the results from a two-country study

¹For another cross-country study see Hey and Burlando (1997). They observe behavioral differences between British and Italian subjects in a Public Bad experiment.

aimed at comparing the behavior in a coalition formation ultimatum game in Austria and Japan.² In our experiment a proposer has to choose between a 2- and 3-person coalition. Thereafter the proposer plays an ultimatum game either with two or only one responder, dependent on the chosen coalition. The 2-person coalition is inefficient and excludes one responder from participation. The bargaining subgame within the 2-person coalition is a usual 2-person ultimatum game. For that reason, and since Austria and Slovenia are not only neighboring countries but also similar in culture it is worthwhile to recall the main results in the ultimatum game environment of the study by Roth, Prasnikar, Okuno-Fujiwara, and Zamir (1991). Except for the United States and Slovenia they find statistically significant differences in behavior between countries. These differences apply to proposers as well as responders. The highest offers are made in Slovenia and the United States followed by Japan and Israel. Responders accept disproportionate offers more frequently in Israel than in Japan than in Slovenia and the United States. In particular they find quite pronounced behavioral differences between Slovenian and Japanese subjects. The modal offer in Slovenia was 50% but only 40% in Japan. Furthermore, Slovenian responders accepted disproportionate offers at a lower rate than Japanese responders. In addition, they also observe that the differences increase as subjects gain experience.

In contrast to the above findings we are not able to detect any behavioral difference among subjects in Austria and Japan. In our experiment we can investigate possible cultural differences with respect to three decisions. (i) The coalition decision of proposers, (ii) the proposers' behavior in the 2- and 3-person ultimatum subgames, and (iii) the responders' behavior in these subgames. It turns out that in spite of the obvious different cultures of Austria and Japan in none of these three possibilities behavior is significantly different between countries. In particular, some (non significant) differences observed for inexperienced proposers do not increase over time, but vanish almost completely when subjects gain experience.

In view of these results the question for the reason(s) of this similarity in behavior arises. We can offer intuitive and plausible explanations which deal with a subtle focal point and responder competition effect. This will be discussed in the last section. The next section deals with the experimental design and thereafter the results are presented.

2 Experimental Design

2.1 General Feature of the Experimental Design

The experiment is based on a simple 3-person coalition formation ultimatum game in extensive form with perfect and complete information (see also Figure 1). The sequence of the play is the following: (i) The *proposer* P decides between a 2- and a 3-person coalition. The 3-person coalition has a value of $V(P, R1, R2)$, where $R1$ and $R2$ denotes the *first responder* and the *second responder*, respectively. The value of the 2-person

²The experiment discussed in this paper is part of a larger project (see Okada and Riedl (1999)) for which some additional treatments and observations were required. The data reported here are representative for the larger data set.

coalition, denoted $V(P, Ri)$, is strictly smaller than the value of the grand coalition. (ii) After her coalition decision P makes a proposal about the division of the value of the chosen coalition. If she has chosen the 3-person coalition she has to propose how to divide $V(P, R1, R2)$ between herself and both responders. In a 2-person coalition, she has to make a proposal about the division of $V(P, Ri)$ only to the chosen responder Ri . (iii) If $R1$ is chosen as a member of either the 3- or the 2-person coalition he has to decide whether to accept or reject the proposal. If he is not chosen he is excluded from the game and has no veto power. (iv) If the 3-person coalition was chosen $R2$ decides whether to accept or reject after he has observed $R1$'s decision. Otherwise the same as for $R1$ holds. The payoffs are allocated as follows: Within the 3-person coalition the

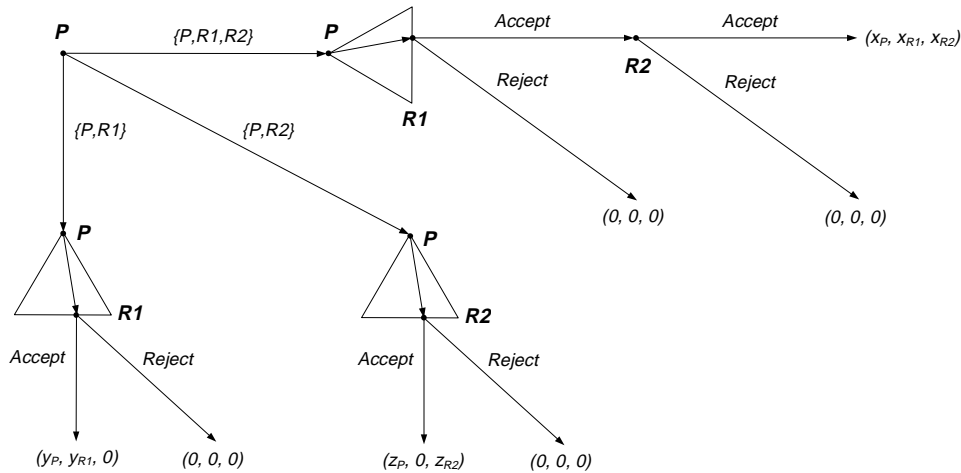


Figure 1: 3-Person Coalition Formation Ultimatum Game

players receive their shares according to the proposal only if *both* responders *accept*. Otherwise, nobody earns anything. In a 2-person coalition the *chosen* responder and the proposer receive their shares according to the proposal if the chosen responder *accepts*. If he *rejects* both earn nothing. The responder who is not chosen as a member of the coalition always earns nothing.

Using backward induction, it is easily shown that the game has a unique subgame perfect equilibrium (payoff). In equilibrium the proposer chooses the 3-person coalition, demands the whole surplus for herself, and both responders accept.³ In the experiment proposals had to be made in discrete steps of ten points. Although, this destroys the

³Consider first the case where P chooses the 3-person coalition and makes some proposal (x_P, x_{R1}, x_{R2}) . Consider $R2$ now and assume that $R1$ has rejected. In that case, the second responder is indifferent between accepting and rejecting, because in any case he will get nothing. Now suppose that the first responder has accepted. Then $R2$ will also accept as long as $x_{R2} \geq 0$. $R1$ will actually accept if $x_{R1} \geq 0$. Note that, after $R1$ has accepted $R2$ will also accept in equilibrium even if the proposal gives him a payoff of zero. The reason is that if he would not accept all players would get a payoff of zero. The proposer, however, could then change the proposal in a way such that $R2$ gets a slightly positive payoff and is still accepted by $R1$. Such a proposal will surely be accepted by $R2$ giving at least the proposer and the second responder a positive payoff. Hence, rejection of an offer of zero by $R2$ can not be part of a subgame perfect equilibrium. A similar reasoning holds for $R1$ when he receives a proposal which gives him a payoff of zero. Given this behavior of responders it is optimal for the proposer to offer nothing to both responders. Hence, in the subgame starting after the decision for the 3-person coalition exists a unique subgame perfect equilibrium where P demands

uniqueness property it can be shown that any proposal that gives each responder at least 10 points will be accepted in equilibrium.

2.2 Experimental Procedure

All experimental sessions were run as classroom experiments. All together we conducted three sessions in Austria and another three sessions in Japan. The Austrian sessions were run at the Institute for Advanced Studies in Vienna and the Japanese sessions at the Institute of Economic Research at Kyoto University (see also Table 1). In Japan 24 subjects participated in each session. In Austria the number of participants was 24 in the first session and 21 in the other two sessions.⁴ Most Japanese subjects were

Table 1: Experimental Treatments

Treatment	$V(P, R1, R2)$	$V(P, Ri)$	Sessions	# of Subjects
High	3000	2800	Kyoto I, 06/26/1997	24
			Kyoto II, 07/03/1997	24
			Kyoto III, 07/04/1997	24
Low	3000	1200	Vienna I, 11/05/1997	24
			Vienna II, 11/12/1997	21
			Vienna III, 11/13/1997	21

undergraduate students of Economics, Business Administration, Law, and Political Science. The remaining subjects came from Agriculture, Engineering, and Literature. In Austria subjects were undergraduate students of Business Administration (with two exceptions: one coming from Political Science and another one from Economics). No subject had ever participated in an experiment before, and one subject in Japan as well as one subject in Austria had some knowledge about game theory.

Subjects who participated in a session were randomly divided into three groups. The members of a group received code-names “R” (proposer), “M” (responder 1), and “L” (responder 2). Subjects did not change the roles throughout the whole experiment. They were seated in the classroom in three rows such that the R-group was on the right side, the M-group in the middle, and the L-group on the left side of the room. They were seated in a way that did not allow them to communicate with each other. Each session consisted of two phases. In the first phase the value $V(P, Ri)$ of a 2-person coalition

the whole pie for herself and both responders accept. (Since $R2$ is indifferent between rejection and acceptance after $R1$ has rejected there are two subgame perfect equilibria in pure strategies. Since, they are payoff equivalent for convenience we speak of a unique equilibrium.) Now assume that P has chosen the 2-person coalition with Ri ($i = 1, 2$) as her bargaining partner. Since P and Ri are playing an ultimatum game the unique subgame perfect equilibrium implies that the proposer demands the whole pie $V(P, Ri)$ for herself, leaving Ri a payoff of zero which he will accept. Since the value of the 2-person coalition is strictly smaller than the value of the 3-person coalition, the unique best decision for the proposer is to opt for the 3-person coalition.

⁴We have planned to run all sessions with 24 subjects, however there have been some no-shows in two Austrian sessions.

was 2800 points, and in the second phase it was 1200 points. (We will therefore refer to phase 1 as "High-Treatment" and to phase 2 as "Low-Treatment".) Subjects were not told that there will be two phases until the first phase was completely finished. After everyone was seated the instructions for the first phase were read aloud, a (guided) practice round took place, and thereafter subjects played eight rounds with changing partners after each round.⁵ During the instructions the subjects also learned about the earnings procedure. They were told that after the experiment two out of the eight rounds will be randomly selected, and that they will be paid according to their earnings in these rounds.⁶ After the last round of phase 1 subjects were told that there will be another experiment, again lasting eight rounds. After collecting all materials of phase 1 and distributing the instructions for phase 2 the instructions were read aloud. The participants learned that after the last round of the second phase the experiment will be over for sure; that in addition to the two rounds of the first phase also two rounds of the second phase will be chosen randomly and that they will be paid according to their earnings in these rounds. The matching of the subjects was the same as in phase 1. After the experiment subjects were confronted with their last round decisions in both phases and asked to briefly describe the reason(s) for their decisions. A session typically lasted three hours, and approximately three-quarters of an hour were spent for reading instructions and the practice round. The subjects' average earnings (net of show up fees) were YEN 3141,- in Kyoto and ATS 304,- in Vienna.

2.3 Controlling for Between-Country Effects

Along the lines of Roth, Prasnikar, Okuno-Fujiwara, and Zamir (1991) we put special attention to three aspects which are important when running multi-cultural experiments: language effects, experimenter effects, and currency effects (see also Roth (1995)).

To minimize the possibility of uncontrolled language effects we implemented the so called "back translation" procedures. Initially the instructions were written in English and then translated to German and Japanese. These versions were then translated back to English by another translator and compared with each other. When sensitive or misleading words were noted we changed it.

Second, to control for possible experimenter and procedural effects, we run pilot sessions in Japan where both experimenters have been involved. Furthermore, the written instructions were very detailed (including the procedure during the practice round) and the experimenters followed strictly these instructions.

With respect to possible currency effects, note that all values were stated in points. The exchange rates from points to money were 1:1 in Japan (i.e. 10 points = YEN 10) and 10:1 in Austria (i.e. 10 points = ATS 1). At the time the experiments were

⁵In sessions II and III in Vienna subjects were told that in the last round there is one member of the group with whom they have played in an earlier round. That, however, the identification numbers will be changed such that they are not able to identify with whom they play twice. This was necessary because of the no-shows in these two sessions.

⁶Subjects were also paid a show up fee of ATS 70,- in Vienna and YEN 1000,- in Kyoto. In Kyoto in addition to that a "transportation fee" of YEN 500,- was paid to subjects from universities other than Kyoto University.

conducted the exchange rate was YEN 10 \approx ATS 1. The exchange rate in terms of purchasing power was almost the same. In terms of US-Dollars 10 points were approximately worth USD 0.09. Hence, the worth of the grand coalition was around USD 27. There is a further issue, which is important in cross-cultural experiments. Observed differences could also be due to differences in the socio-economic background of participants. Therefore, after the experiment the subjects had to answer questions about their socio-economic background (like age, gender, parents education, profession, estimated income etc.).

3 Experimental Results

In this section we present the experimental results. We focus solely on possible differences in behavior between Austrian and Japanese subjects. (For a more detailed discussion and analysis of behavior using the pooled data see Okada and Riedl (1999)). Our experimental design allows us to investigate possible differences in behavior with respect to three decisions. (i) The coalition decision of proposers, (ii) proposers' demand (offer) behavior, and (iii) responders' acceptance behavior in 2- and/or 3-person coalitions. We start out with the analysis of coalition decisions.

3.1 Coalition Decisions

For the Low-Treatment we do not expect any difference between countries. Recall, that in this case the value of the 2-person coalition is only 1200 points. In a 3-person coalition a proposal giving everybody 1000 points can be expected to be accepted by both responders, whereas an offer of 200 points or below may almost surely be rejected. Hence, regardless of the cultural background, for any proposer who wants to earn money it seems not to make sense to choose the 2-person coalition in this case. In the High-

Table 2: Chi-Square Test for Differences in Coalition Decisions for High-Treatment

Round	1	2	3	4	5	6	7	8
χ^2	0.026	0.026	0.000	0.016	0.264	1.441	0.187	1.441
	(0.872)	(0.872)	(1.000)	(0.900)	(0.608)	(0.230)	(0.665)	(0.230)
# obs.	46	46	46	46	46	46	46	46

Notes: Value of χ^2 is continuity corrected; asymptotic significance (2-tailed) in parentheses.

Treatment, however, it may pay to choose the 2-person coalition. This implies on the one hand inefficiency and on the other hand exclusion (and zero earnings) for one group member. Hence, if perceptions of fairness and/or efficiency are (strongly) different in the two countries one may observe more 3-person coalitions in one than in the other. Figures 2a and 2b show the results. They depict the percentage of 3-person coalitions in the High- and Low-Treatment for Austria and Japan. In both countries a large majority chooses the 2-person coalition in the High-Treatment. In the Low-Treatment

almost all proposers choose the 3-person coalition. Although, the figures show some differences in coalition decisions between the countries they are not very pronounced. This is confirmed by rigorous statistical analysis. We run a round by round comparison

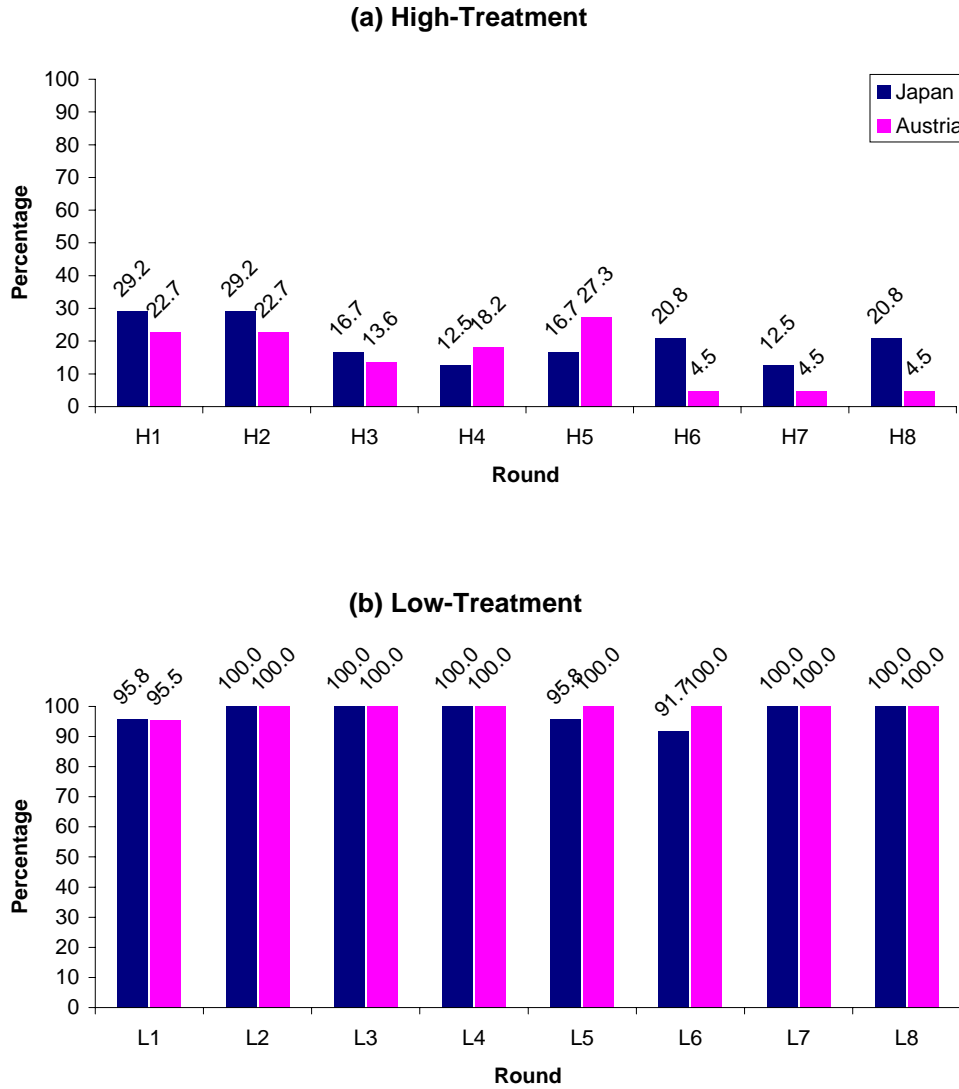


Figure 2: Percentage of 3-Person Coalitions in Austria and Japan

with the help of the chi-square test to investigate whether the observed differences are significant. The null hypothesis is that there is no difference with respect to coalition decisions between Austria and Japan. We employ the test only for the High-Treatment since for the Low-Treatment it is fairly obvious that there is no difference. Table 2 shows the test statistics and the associated p-values. For no round the null hypothesis can be rejected ($p \geq 0.23$ in each round). We can therefore conclude that there are no cultural differences with respect to the coalition decisions:

Result 1 *Neither in the High- nor in the Low-Value treatment coalition decisions differ between Austria and Japan.*

3.2 Proposer Behavior in Ultimatum Subgames

Table 3 gives a first impression about proposer behavior in the two countries. The table shows the average demands and standard deviations in 2- and 3-person coalitions in the High-Treatment as well as for the 3-person coalition in the Low-Treatment.⁷ The between-country differences in demands are rather small. Within 2-person coalitions in

Table 3: Summary of Proposer Behavior

Average Demands and Standard Deviations across Rounds by Treatment, Coalition, and Country						
Country	High-Treatment				Low-Treatment	
	2-Person Coalition		3-Person Coalition		3-Person Coalition	
	# Obs.	Demand	# Obs.	Demand	# Obs.	Demand
Austria	149	1702 (327)	25	1345 (435)	174	1173 (206)
Japan	153	1732 (267)	35	1326 (569)	187	1241 (231)

Notes: Standard deviations in parentheses.

the High-Treatment the difference is only 30 points (approximately 27 cents). Within 3-person coalitions the difference amounts to 19 points (≈ 17 cents) in the High-Treatment and 68 points (≈ 61 cents) in the Low-Treatment. In our view none of these differences can be regarded as significant. To test formally if these similarities are reliable we disaggregate the data by rounds.⁸ Figures 3 and 4 show the round 1 and round 8 distributions and cumulative distributions of demands in 2-person coalitions for the High-treatment and in 3-person coalitions for the Low-treatment. (The histogram bars group demand intervals of 100 points; except for the lowest and highest group, where it groups all demands lower or equal to 450 and all demands larger or equal to 2560, respectively.)

In 2-person coalitions in the High-Treatment the figures for round 1 reveal some difference between Austria and Japan. In Japan we observe two modal demand ranges, namely 1360 – 1450 (48.6% – 51.8%) and 1760 – 1850 (62.9% – 66.1%). In Austria the distribution has only one peak at 1460 – 1550 (52.2% – 55.4%). However, things change as proposers gain experience. By round 8 a shift towards more aggressive demands has taken place in both countries. In Japan there is now a unique modal demand range at 1760 – 1850 and there are also more demands above this range than in round 1. In

⁷In the High- as well as the Low-Treatment we observed two inefficient proposals. All four are excluded from the analysis. In the Low-Treatment we have observed only five 2-person coalitions (one in Austria and four in Japan). Therefore, no statistics are shown for this case.

⁸In the following we concentrate on behavior in 2-person coalitions in the High-Treatment and 3-person coalitions in the Low-Treatment. For the other two case we have too less observations to run a sensible statistical analysis. Since the results for the analyzed cases are quit clear-cut we are convinced that this does not lead to wrong conclusions.

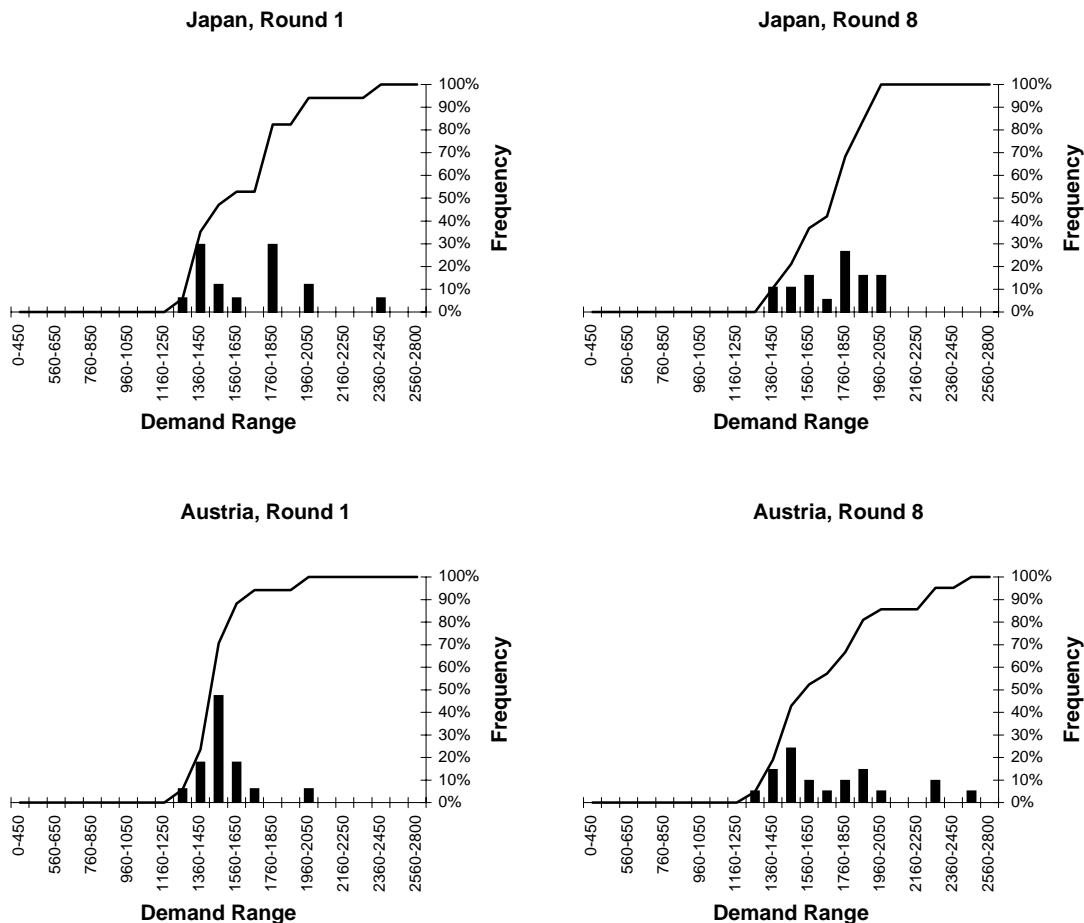


Figure 3: Distribution of Demands in 2-Person Coalitions High-Treatment

Austria the mode is still at 1460 – 1550 but there is a pronounced shift towards higher demands, too. The distributions in the two countries seem to become similar over time. Figure 4 reveals that in 3-person coalitions in the Low-Treatment demand behavior in Austria and Japan is very similar in round 1 as well as round 8. In both countries the modal demand range is 960 – 1050 (32.0% – 35.0%) in round 1. In Japan as well as Austria demands in the range 1160 – 1250 (38.7% – 41.7%) became more prominent by round 8. In Japan demands in this range form a second peak of the distribution and in Austria such demands become the second mode.

In summary, there seems to be not very much difference in demand behavior between the countries. This is confirmed by a round by round comparison with the help of the Wilcoxon-Mann-Whitney test. The null hypothesis is that the demands in Austria and Japan have the same distribution, while the alternative hypothesis is that the two distributions are different. Table 4 shows the results. For demands in 2-person coalitions in the High-Treatment we can not reject the null hypothesis for each round ($p > 0.24$ in all rounds). In 3-person coalitions in the Low-Treatment the demands are also not significantly different in the two countries with the exception of round 2 ($p < 0.05$) and round 5 (marginally significant; $p = 0.0999$). Hence, the impression of

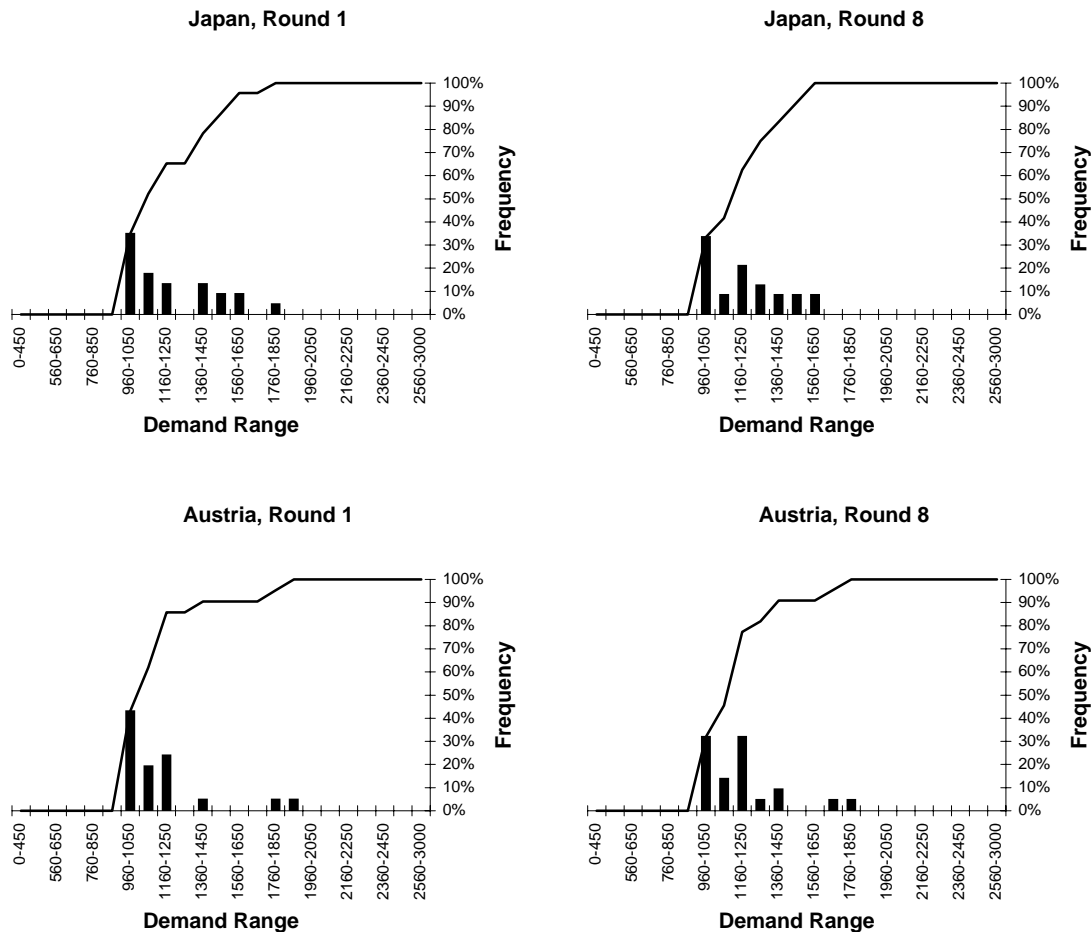


Figure 4: Distribution of Demands in 3-Person Coalitions Low-Treatment

(almost) no between-country difference in demand behavior is confirmed. In particular, there is no indication that differences occur (or even increase) over time, as observed by Roth, Prasnikar, Okuno-Fujiwara, and Zamir (1991). On the contrary, if there is any difference in demand behavior if players were inexperienced this difference vanishes with experience. This is supported by the fact that in 2-person coalitions in the High-Treatment as well as in 3-person coalitions in the Low-Treatment the mean demands are further apart in round 1 than in round 8 (see Figure 5 for the evolution of average demands over rounds). The difference in average demands between Japan and Austria decreases in 2-person coalitions in the High-Treatment from 132.4 points in round 1 to 9.2 points in round 8. For average demands in 3-person coalitions in the Low-Treatment it decreases from 58 points (round 1) to 17 points (round 8). We therefore conclude:

Result 2 *In no bargaining subgame proposer behavior is different between Austria and Japan.*

Table 4: Wilcoxon-Mann-Whitney Test for Differences in Demand Behavior

Round	Country	2-Person Coalitions in High-Treatment			3-Person Coalitions in Low-Treatment		
		# Obs.	Rank Sum	p-value	# Obs.	Rank Sum	p-value
1	Austria	17	274	0.4134	21	439	0.4172
	Japan	17	321		23	551	
2	Austria	17	308	0.7133	22	405.5	0.0198
	Japan	17	287		23	629.5	
3	Austria	19	341.5	0.2738	22	501	0.7170
	Japan	20	438.5		24	580	
4	Austria	18	324	0.4266	22	509.5	0.8656
	Japan	20	417		24	571.5	
5	Austria	16	274	0.4812	22	435	0.0999
	Japan	20	392		23	600	
6	Austria	21	387.5	0.2402	22	431.5	0.1267
	Japan	19	432.5		22	558.5	
7	Austria	20	397	0.5436	21	468.5	0.7356
	Japan	21	464		24	566.5	
8	Austria	21	407.5	0.5310	22	502	0.7360
	Japan	19	412.5		24	579	

Notes: two-tailed test; corrected for ties.

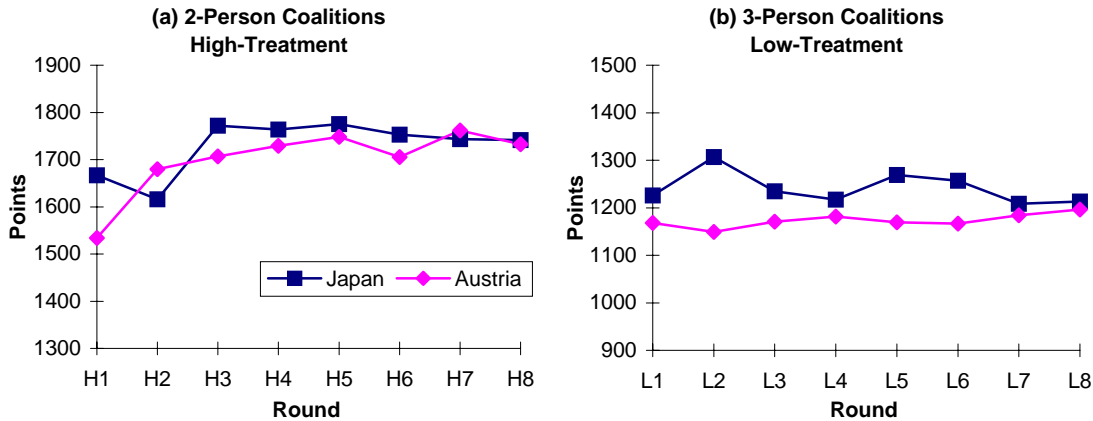


Figure 5: Evolution of Average Demands

3.3 Responder Behavior

We first look at the overall disagreement rates by treatment, coalition, and country.⁹ Table 5 depicts these figures. In all cases the difference between countries is not very large. However, since the presented rates are not conditional on the offer, we have to investigate in more detail whether responders in Austria and Japan have reacted differently to a particular proposal. Figures 6a and 6b show the rates of rejection by offer range, country and in 3-person coalitions also by responder. Bars with zero height

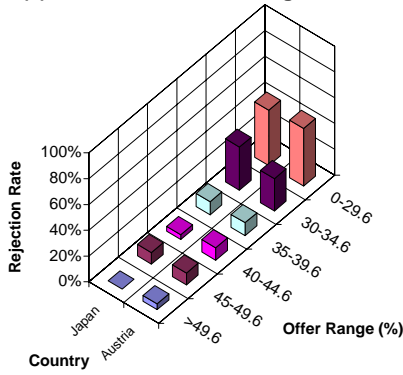
⁹Note that in 3-person coalitions disagreement occurs if at least one responder rejects the proposal.

Table 5: Responder Behavior

Disagreement Rates across Rounds by Treatment, Coalition, and Country						
Country	High-Treatment				Low-Treatment	
	2-Person Coalition		3-Person Coalition		3-Person Coalition	
	# Obs.	Dis. Rate (%)	# Obs.	Dis. Rate (%)	# Obs.	Dis. Rate (%)
Austria	149	16.1	25	28.0	174	17.8
Japan	153	14.4	35	22.9	187	22.5

indicate that all offers in this range have been accepted. The figures confirm the well-known result from other experimental ultimatum game studies that the rejection rates decrease with the offer. However, they do not indicate that there is any consistent difference in rejection behavior between Austria and Japan. In both countries the percentage of rejected offers is almost the same for each offer range in 2-person coalitions in the High-Treatment (Figure 6a). In 3-person coalitions in the Low-Treatment the

(a) 2-Person Coalitions High-Treatment



(b) 3-Person Coalitions Low-Treatment

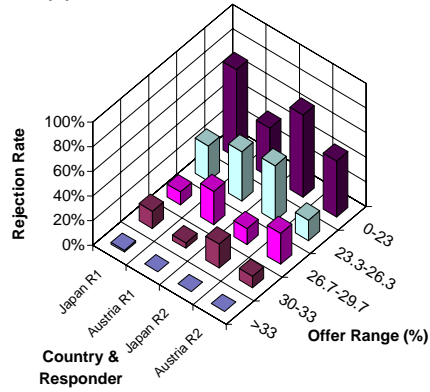


Figure 6: Rejection Rates

figures are similar although not that clear-cut (Figure 6b). For instance offers in the range of 30 – 33 percent are more often rejected by Japanese responders whereas offers in the range of 26.7 – 29.7 percent are more often rejected by Austrian responders. Beside the fact that the differences are small there is also no indication that responders in one of the two countries exhibit consistently lower rejection rates across the different offer ranges. This impression is confirmed by formal analysis. To see whether there is a statistically significant difference in rejection behavior between the countries we run the following logit regressions for 2-person coalitions in the High-Treatment and 3-person coalitions in the Low-Treatment.

$$\begin{aligned}
 AcceptR = & f(\alpha + \beta_{relofR} * relofR + \beta_{cult} * cult \\
 & + \beta_{avaccR} * avaccR_i),
 \end{aligned}
 \tag{3.1}$$

$$\begin{aligned} \text{AcceptR} &= f(\alpha + \beta_{\text{relof}R} * \text{relof}R + \beta_{\text{cult}} * \text{cult} \\ &\quad + \beta_{\text{avacc}R1} * \text{avacc}R1_i), \end{aligned} \tag{3.2}$$

$$\begin{aligned} \text{CondAcceptR2} &= f(\alpha + \beta_{\text{relof}R2} * \text{relof}R2 + \beta_{\text{cult}} * \text{cult} \\ &\quad + \beta_{\text{avacc}R2} * \text{avacc}R2_i), \end{aligned} \tag{3.3}$$

where $\text{AcceptR} = 1$, $\text{AcceptR1} = 1$, and $\text{CondAcceptR2} = 1$ if the offer was accepted by the chosen responder in a 2-person coalition High-Treatment, the first responder in a 3-person coalition Low-Treatment, and the second responder in a 3-person coalition Low-Treatment, respectively, and 0 otherwise. $f(x)$ denotes the logit function. $\text{relof}R$ is the offer (as a fraction of the value of the 2-person coalition) to the chosen responder in the 2-person coalition High-Treatment. $\text{relof}R1$ and $\text{relof}R2$ denote the offer (as a fraction of the value of the 3-person coalition) to responder 1 and responder 2, respectively, in a 3-person coalition Low-Treatment. $\text{cult} = 1$ if the responder is from Japan and 0 otherwise. The variable $\text{avacc}R_i$ equals the average number of offers accepted by responder i , excluding the current offer, in 2-person coalitions in the High-Treatment.¹⁰

$\beta_{\text{avacc}R} > 0$ means that the more often responders accept other offers, the more often they will accept the current offer. The variables and coefficients $\text{avacc}R1_i$ and $\beta_{\text{avacc}R1}$ for responder 1 and $\text{avacc}R2_i$ and $\beta_{\text{avacc}R2}$ for responder 2, in 3-person coalitions in the Low-Treatment have the same interpretation.¹¹ For all regressions we use observations across rounds. For the analysis of the second responder's acceptance behavior we use only those observations where the first responder has accepted. (This is necessary since if the first responder has already rejected the second responder's choice does not matter any more.) Hence, AcceptR measures the probability that an offer will be accepted by the chosen responder in a 2-person coalition High-Treatment, AcceptR1 measures the probability of acceptance of responder 1 in a 3-person coalition Low-Treatment, and CondAcceptR2 measures the probability of acceptance of responder 2 conditional on the acceptance of the first responder in such a coalition. Since we are interested in possible cultural differences the regressions are based on disproportionate offers (i.e. offers smaller than 1400 points in 2-person coalitions and smaller than 1000 points in 3-person coalitions). Offers above this levels are virtually always accepted in both countries, and thus we do not expect any cultural differences for such offers.

If there are (consistent) differences in acceptance behavior between countries we should observe that $\beta_{\text{cult}} \neq 0$. If the likelihood that a disproportionate offer is accepted is higher in Japan than in Austria, then $\beta_{\text{cult}} > 0$. If it is the other way round, then $\beta_{\text{cult}} < 0$. Furthermore, if negative reciprocal behavior is prevalent higher offers should be accepted more often (i.e. $\beta_{\text{relof}} > 0$). Table 6 shows the results of these logit regressions. In all cases β_{relof} is significantly greater than zero ($p < 0.001$). This shows the existence of a significant positive relationship between higher offers and the probability of acceptance in 2- as well as 3-person coalitions. The coefficient β_{avacc}

¹⁰By including this variable in the regression we follow the approach of Slonim and Roth (1998). The idea is to use this variable as a proxy for individual differences in acceptance behavior, since random as well as a fixed effects models are inappropriate given our data set. For some responders only one observation is available. For those avacc_i is set equal to the aggregate average acceptance rate of 82.63% for disproportionate offers.

¹¹For one R2 we have only one observation. In this case $\text{avacc}R2_i$ is set equal to the average conditional acceptance rate 83.33% of all R2's for disproportionate offers.

Table 6: Logit Regressions: Responder Behavior

Coefficient	2-Person Coalition High-Treatment	3-Person Coalition Low-Treatment	
	Chosen Responder	Responder 1	Responder 2
Constant	-5.9625*	-12.5332*	-14.1657*
β_{relof}^a	13.0061*	36.1830*	42.4165*
β_{cult}	0.0228 ($p = 0.959$)	0.3582 ($p = 0.482$)	0.8717 ($p = 0.123$)
β_{avacc}^a	4.5092*	5.7730*	5.2095*
Observations	259	226	192
Log Likelihood	-68.859	-54.900	-49.547
Pseudo R^2	0.42	0.48	0.43

Notes: ^a “.” stands for R , $R1$, and $R2$, resp.; * $p < 0.001$.

has the expected positive sign ($\beta_{avacc} > 0$; $p < 0.001$ in all cases). However, culture makes no difference. Although, Japanese responders seem to be more likely to accept disproportionate offers than Austrian responders ($\beta_{cult} > 0$ in all cases) the coefficient of the cultural variable is never significantly different from zero ($p = 0.959$ in 2-person coalitions High-Treatment, $p = 0.482$ for $R1$ and $p = 0.123$ for $R2$ in 3-person coalitions Low-Treatment). Hence, we cannot reject the hypothesis that responder behavior is the same in Austria and Japan.¹² These leads to the following result:

Result 3 *Neither in 2- nor in 3-person coalitions is responder behavior different between Austria and Japan.*

4 Discussion and Conclusions

In this paper we report the experimental results of a cross-country comparison between Austria and Japan in a 3-person coalition formation ultimatum game. The design of the experiment allows us to compare the results with respect to three decisions. The coalition decision, the proposers’ demand behavior in 2- and 3-person ultimatum subgames, and the responders’ behavior in these subgames.

To put the results presented in this paper into perspective, a thing to note is that generally the results are in line with other results from ultimatum game experiments (for a overviews see, e.g., Güth and Tietz (1990), Camerer and Thaler (1995), and Roth (1995)). In particular, in our 2-person ultimatum subgames we observe that responders punish proposers by rejecting offers that they perceive as unfair, and that the probability of acceptance is increasing with the offer. Proposers offer on average about 39 percent of the value of the 2-person coalition to the chosen responder. In the 3-person ultimatum subgames responders also act negatively reciprocal and - as in

¹²We have also estimated models including a round variable to investigate whether there is any monotonic trend in acceptance rates over time. In no case we find a significant impact.

2-person games - proposers adapt to that and demand on average only 40 percent of the value of the 3-person coalition and leave approximately 30 percent for each of the responders.

The result that stands out is that we can not detect any (significant) behavioral difference between subjects in Austria and Japan. This is surprising in view of the experimental evidence provided by Roth, Prasnikar, Okuno-Fujiwara, and Zamir (1991) and Lensberg and van der Heijden (1998). They find that in bargaining like environments different cultural backgrounds lead to difference in behavior. Our results show that this is not necessarily the case, but that it crucially depends on the exact context in which people act.

That there is no difference in coalition decisions we attribute to the fact that the expected income of being fair, in the sense of not excluding a responder in the High-Treatment, is too low compared to the expected income in a 2-person coalition in this treatment. Finding differences would imply that proposers in one country are ready to carry much higher opportunity costs connected with fair behavior than in the other country. This would be in contrast to the findings that - independent of the cultural background - proposers are more or less money maximizers who take possible punishment by responders into account. Nevertheless, we find it a quite strong result that the coalition decisions of proposers are almost the same in the two countries in each and every round.

Although, one has to be careful in comparing results from different experiments it is nonetheless interesting to ask why we do not find cross-country differences in our 2-person ultimatum subgames whereas Roth, Prasnikar, Okuno-Fujiwara, and Zamir (1991) find such differences in their 2-person ultimatum game environment. In our view two rather subtle effects over-powering possible cultural differences are at work.

(i) A focal point effect: In our experiment the 3-person coalition is worth 3000 points. For proposers this means that choosing the 3-person coalition and dividing the points equally leads to an (almost) sure payoff of 1000 points. For responders, on the other hand, this means that in a 3-person coalition they can not expect to get more than 1000 points, given the strategic advantage of proposers. Exactly this may - besides the equal division - lead to a second focal point of 1800 points for the proposer and 1000 points for the chosen responder in a 2-person coalition in our High-Treatment. Proposers expect that the chosen responders will accept offers that give them slightly more than 1000 points, and the responders feel obliged to accept such an offer since the best hypothetical alternative is to receive 1000 points in a 3-person coalition. Of course, not all proposers and responders may share this view and therefore such offers will still be rejected, however, at a lesser extent than in usual 2-person ultimatum games. In connection with that an additional argument for lower rejection rates is that the very fact that a responder is selected as a partner may affect the responder's behavior (a positive reciprocity effect). These considerations are supported by the fact that in our 2-person subgames in the High-Treatment the rejection rates for offers in the range 980 – 1110 points are with 10 percent (Austria) and 10.2 percent (Japan) virtually the same as for offers in the range 1260 – 1390 points where they are 9.3 percent (Austria) and 9.1 percent (Japan) (see also Figure 6a). Furthermore, in Austria as well as in Japan *all* offers in the range 1050 – 1150 have been accepted (14 observations in

Japan and 8 observations in Austria). A further piece of evidence comes from proposer behavior in round 8. In both countries the average offers are with 1068 points in Austria and 1063 points in Japan only slightly above the focal point offer of 1000 points. Last but not least in the after experiment questionnaires about 15 percent of the proposers have more or less explicitly argued that they expect responders to accept offers of 1000 points or slightly above.

(ii) Implicit competition between responders: If responders think that proposers choose their bargaining partners for 2-person coalitions by throwing a coin, then they expect to be chosen only half the time. This may put pressure on them to accept an offer that they otherwise would reject. In this respect a rough comparison with the rejection rates for low offers observed by Slonim and Roth (1998) may be constructive. They run 2-person ultimatum games with three different stake sizes. The across round rejection rates for offers below 30 percent they observe for the different stakes are 71% (5 rejections out of 7 observations) for low stakes, 58% (14/24) for middle stakes, and 54% (15/28) for high stakes, respectively. In our experiment in 2-person coalitions in the High-Treatment the rejection rates for the same offer range are below these numbers in both countries. In Austria offers in the range 0 – 29.6 percent have been rejected at a rate of 45% (13/29) and in Japan at a rate of 43% (12/28). Although, we are aware of the problems with this kind of comparisons we nevertheless believe that they provide some indication for the validness of the above hypothesis. In our view the focal point and the implicit competition effect have been strong enough to wipe out any cultural differences in the 2-person ultimatum subgames.

For the similarity of behavior in 3-person coalitions in the Low-Treatment it is harder to find explanations. The convergence of average demands in the two countries to each other and the fact that there is no difference in responder behavior between the two countries indicate that in 3-person ultimatum games the expectations about what an acceptable proposal is are not different in Austria and Japan. This is, of course, very speculative and more cross-cultural 3-person ultimatum game experiments are needed to be able to draw a definite conclusion.

In summary, we conclude that in environments where cultural differences have been shown to play a role the exact context in which people act seem to matter a lot. A slight change of the experimental set-up can (almost) completely wipe out any differences in behavior. Cultural differences do not play such an important role as indicated by some other experimental results. This, however, means that in the design of institutions one has to take the whole context into account. Since, depending on this context sometimes culture matter and sometimes not.

5 References

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