Goerg, Sebastian J.; Walkowitz, Gari

Working Paper

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Bonn Econ Discussion Papers, No. 4/2008

Provided in Cooperation with:
Bonn Graduate School of Economics (BGSE), University of Bonn

Suggested Citation: Goerg, Sebastian J.; Walkowitz, Gari (2008) : Presentation Effects in Cross-Cultural Experiments - An Experimental Framework for Comparisons, Bonn Econ Discussion Papers, No. 4/2008, University of Bonn, Bonn Graduate School of Economics (BGSE), Bonn

This Version is available at:
https://hdl.handle.net/10419/27165

Bonn Econ Discussion Papers

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Presentation Effects in Cross-Cultural Experiments - An Experimental Framework for Comparisons

by

Sebastian J. Goerg, Gari Walkowitz

February 2008

Bonn Graduate School of Economics
Department of Economics
University of Bonn
Adenauerallee 24 - 42
D-53113 Bonn

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Presentation Effects in Cross-Cultural Experiments[†]

An Experimental Framework for Comparisons[*]

Sebastian J. Goerg and Gari Walkowitz[**]

February 18, 2008

Abstract

This paper investigates the impact of game presentation dependent on ethnical affiliation. Two games representing the same logical and strategical problem are introduced. Presented games are continuous prisoner's dilemma games where decision makers can choose an individual level of cooperation from a given range of possible actions. In the first condition, a positive transfer creates a positive externality for the opposite player. In the second condition, this externality is negative. Accomplishing a cross-cultural experimental study involving subjects from the West Bank and Jerusalem (Israel) we test for a strategic presentation bias applying these two conditions. Subjects in the West Bank show a substantially higher cooperation level in the positive externality treatment. In Jerusalem no presentation effect is observed. Critically discussing our findings, we argue that a cross-cultural comparison leads to only partially meaningful and opposed results if only one treatment condition is evaluated. We therefore suggest a complementary application and consideration of different presentations of identical decision problems within cross-cultural research.

Keywords: Cooperation, presentation of decision problems, framing, methodology, cross-cultural research

JEL Classification: A13, C72, C91, F51, Z13

[†]This paper is a completely revised version of the Discussion Paper *The Janus Face of Cooperation - An Intra- and Cross-Cultural Review* (BGSE No. 5/2007).

[*]We are grateful for the help of Mai Abdeen, Zeina Barakat, Mohammed Dajani, Jan Meise, and Shani Kuna supporting the conduct of the experiments in the Westbank and Jerusalem. Furthermore, we would like to thank Marion Eberlein, Heike Hennig-Schmidt, Johannes Kaiser, Jan-Erik Lönnqvist, Reinhard Selten, Markku Verkasalo, Philipp Wichardt, and Eyal Winter for valuable comments and discussion. Financial support is gratefully acknowledged by Deutsche Forschungsgemeinschaft (SE 137/3-1).

[**]Laboratory for Experimental Economics, University of Bonn, Adenauerallee 24-42, 53113 Bonn, Germany. Please contact: Gari.Walkowitz@uni-bonn.de, corresponding author, phone +49-228-739196, fax +49-228-739193, and Sebastian.Goerg@uni-bonn.de.

1 Introduction

Nowadays it is widely accepted - even by economists - that human behavior is not solely driven by the ratio of the homo economicus, with it's egocentric profit maximization goal. Experiments have shown that subjects' behavior can be influenced among others by their risk attitudes[1], fairness, and equity preferences[2], and even by the mere presentation of the decision problem[3].

A vast body of literature demonstrates that differently framed descriptions of decision tasks can lead to divergent behavior[4]. In this broad field, studies dealing with problems creating either positive externalities (public good) or negative externalities (public bad) are well established (e.g., Andreoni, 1995; Sonnemans, Schram & Offerman, 1998; Willinger & Ziegelmeyer, 1999; Cookson, 2000; and Park, 2000). Results from these publications in general suggest that experimental designs enabling positive externalities are aligned with significantly higher cooperation levels compared to setups allowing for negative externalities.

In this paper we intend to analyze ancestry as a factor leading to different levels of cooperation dependent on presentations with positive and negative externalities. So far conducted cross-cultural experimental studies apply only experiments with one presentation. Possible, implicitly induced, presentation effects are ignored (e.g., Anderson, Rodgers & Rodriguez, 2000; Henrich, 2000; Henrich, Boyd, Bowles, Camerer, Fehr, Gintis & McElreath, 2001; Buchan, Croson & Johnson, 2004a,b; Roth, Pras-

[1] E.g., Kahneman & Tversky (1979).
[2] E.g., Selten (1978), Fehr & Schmidt (1999), Bolton & Ockenfels (2000), and Konow (2000).
[3] E.g., Pruitt (1967) and Selten & Berg (1970).
[4] Refer to Levin, Schneider & Gaeth (1998) and Abbink & Hennig-Schmidt (2006) for reviews on framing types and framing literature.

nikar, Okuno-Fujiwara & Zamir, 1991). To the best of our knowledge there exists only one cross-cultural questionnaire study by Levin, Gaeth, Evangelista, Albaum, and Schreiber (2001) that deals with country affiliation and goal framing effects involving American and Australian subjects. Therein, American subjects stated to reduce a significant higher amount of red meat if negative consequences of not reducing were stressed than in a treatment in which the positive consequences of reducing were emphasized. Australian subjects did not respond differently to the two frames.

In our study we conducted experiments in the West Bank and in Jerusalem (Israel) applying two games which represent different presentations of the same decision task, one presentation with a positive externality and one with a negative externality. The historical and political background of the participating subject pools makes them a promising testbed for investigating ancestry induced behavioral differences. Knowing the impact of diametral frames might be essential for the design of institutions built up to moderate the relationship between the conflict parties. Formally identical bargaining and cooperation setups might be perceived differently and might unconsciously lead to unintentional consequences.

Our West Bank data show that the presentation significantly influences decision makers' choices. In the positive condition substantially more cooperation is manifested. Moreover, in both games subjects do deviate remarkably from Nash and social optimum solutions. The experiment conducted in Jerusalem yielded different results. There, on an aggregate level, no significant presentation effect can be detected. Nevertheless, data also show that neither the Nash equilibrium nor the social optimal strategy is played.

Comparing the level of cooperation under each condition across the two populations yields opposite conclusions about cooperative behavior. While behavior in the game with positive externality is more cooperative in the West Bank, behavior in the game with negative externality is more cooperative in Jerusalem. In contrast to this a total evaluation of all data gathered from each of the two populations shows no significant difference in cooperation levels.

Our results shed new light on the impact of presentation conditioned by preferences and social norms in different habitats. Therefore, we will argue that for deriving a conclusion about a population's cooperative behavior, different presentations of logically identical experimental setups should be considered and evaluated adequately.

The remainder of this paper is organized as follows: In the next part we will introduce the two games. In the third section, we describe the method and procedure we applied conducting the experimental study in the Westbank and in Jerusalem. In part four, we present population-specific results. We compare data within and across populations. The final section five discusses our findings and their impact on cross-cultural research.

2 Experimental framework: Two games

The two applied games are both continuous prisoner's dilemma (PD) and public good (PG) games in which subjects can choose an individual level of cooperation from a given range of possible actions[5]. Thus, in contrast to the classical PD game the question whether to cooperate or to defect is not a binary choice. In the first game (PDP) a player's decision

[5]Refer to the Appendix for further details on the PD and PG nature of the two games.

creates a positive externality to the matched player's payoff, while in the second game (PDN) it represents a negative externality. We start with the description of the PDP game and turn than to the PDN game.

2.1 Continuous prisoner's dilemma with positive externality (PDP)

At the beginning of the game, two matched players i and j obtain an initial endowment $X = X_i = X_j$. Each player then has the opportunity to transfer an integer part a of X, nothing, or the entire amount X *to* the opposite player. Both players choose $a \in [0, 1, ..., X-1, X]$ simultaneously. Each amount a, which is transferred to the paired player, will be multiplied by factor k yielding to an efficiency gain by transferring a positive amount a. Players' payoffs consist of the initial endowment X minus the transferred amount a plus the obtained and k-multiplied amount a transferred by the opposite player. Formally, player i's payoff function is given by:

$$\pi_i^{PDP} = X_i - a_i^{PDP} + k \cdot a_j^{PDP}, \text{ with } X_i = X, a_i^{PDP} \wedge a_j^{PDP} \in [0, X], \text{ and } k > 1 \quad (1)$$

The payoff of the opposite player j is calculated analogously. The only Nash equilibrium is $a_i^* = a_j^* = 0$. Player i anticipates player j's choice $a_j^{PDP} = 0$ and will therefore also choose $a_i^{PDP} = 0$. The collective optimal choice is $\hat{a}_i = \hat{a}_j = X$ since it maximizes the joint payoff $\Pi^{PDP} = \pi_i + \pi_j$.

2.2 Continuous prisoner's dilemma with negative externality (PDN)

The design of the PDN game is equivalent to the first game, but instead of choosing an amount a which is transferred *to* the opposite player, decision makers must choose an integer which is transferred *from* the other player. Again two players i and j simultaneously interact. Initially, both receive an endowment $X = X_i = X_j$. Each player then has the opportunity to transfer a part a, nothing, or the entire amount X *from* the matched player. Thus, again, both players simultaneously choose $a \in [0, 1, ..., X-1, X]$. The difference $X - a$, which is respectively not transferred, will be multiplied with k. Thus, by transferring low amounts or nothing efficiency increases. In contrast to the PDP game, the amount a, which is transferred is not multiplied. Players' payoffs are determined by the multiplied difference of their initial endowments X and the amount a taken by the opposite player and the amount a which players take away from the counterpart. Formally, player $i's$ payoff function is given by:

$$\pi_i^{PDN} = (X_i - a_j^{PDN}) \cdot k + a_i^{PDN}, \text{ with } X_i = X, a_i^{PDN} \wedge a_j^{PDN} \in [0, X], \text{ and } k > 1 \quad (2)$$

Player j's payoff is calculated analogously. The only Nash equilibrium is $a_i^* = X_j$ and $a_j^* = X_i$. Player i anticipates player j's choice $a_j^{PDN} = X_i$ and will therefore also choose $a_i^{PDN} = X_j$. The optimal collective choice is $\hat{a}_i = \hat{a}_j = 0$ since it maximizes the joint payoff $\Pi^{PDN} = \pi_i + \pi_j$.

2.3 Equivalence of the two games

In both games player i's payoff π_i consists of two parts - a self-determined component π_{iA} and a part π_{iB} resulting from player j's actions. Therefore, the total payoff of player i can be stated as: $\pi_i = \pi_{iA} + \pi_{iB}$. Player i's self-determined payoff fraction in the PDP game is the amount $X_i^{PDP} - a_i^{PDP}$ which is not given to the other player. In the PDN game it is the amount a_i^{PDN} that is taken away from the other player. The foreign determined payoff $k \cdot a_j^{PDP}$ for player i in the PDP game is the amount which he receives from the matched player. In the PDN game it is the amount $k \cdot (X_i^{PDN} - a_j^{PDN})$ that the matched player leaves to him. In addition, each possible strategy combination in one game can be described by a strategy combination in the other game as well.

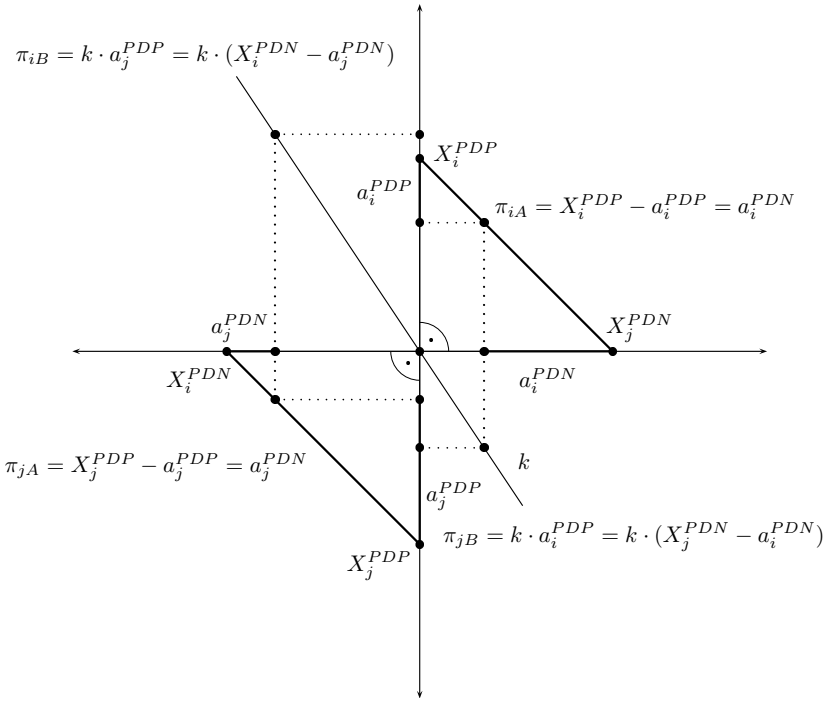

Figure 1: Graphical illustration for the equivalence of the two games

Figure 1 displays a graphical illustration of this equivalence. The initial endowment X

for both players is the same in both games. Thus, X_i^{PDP} and X_j^{PDN} form an isosceles triangle as shown in the upper right section of the figure. Player i chooses in the PDP-game his self-determined payoff $X_i^{PDP} - a_i^{PDP}$ (thin line). In the PDN-treatment player i can chose a_i^{PDN} (thick line), which ensures him the same self-determined payoff. If player i does so, the left over $X_j^{PDN} - a_i^{PDN}$ equals the amount a_i^{PDP} transferred in the PDP-treatment. These amounts are part of player j's foreign-determined payoff function and are multiplied with k which is shown in the lower right section. The multiplier k is described as a straight line. The lower left section of the graphic illustrates analogously the self-determined payoff of player j and the upper left section the foreign-determined payoff of player i. This illustrates that in each strategy space of the two games there exists a strategy a_i or a strategy-combination $(a_i; a_j)$ that also exists in the corresponding game in terms of cooperation, individual and, collective payoff.

3 Experimental procedure

The experiments were conducted in May 2006. The West Bank sessions were run at the AlQuds University located in the Westbank, close to the city of Jerusalem. Observations from Jerusalem were gained at the RatioLab of the Hebrew University in Jerusalem. In both universities students from different departments participated[6]. Showing up for the experiment each student received a fixed payment of 25 NIS. At each university both games

[6]In Israel only subjects with very limited experimental experience were recruited (excluding previous collaborations in trust game, prisoner's dilemma, gift exchange, or public good game experiments) participated. Palestinian subjects had no experimental experience. The median age of Israeli subjects was 25 years and 22 for Palestinian subjects. In Jerusalem nearly 40 percent of the participants were female, in the West Bank nearly 30 percent. We checked with regression models for possible effects of age and gender. We could not find any significant influence, neither for each separate subject pool nor for the complete sample of observations. Therefore, we will not go into more detail about this part of our analysis.

were played as one-shoot games, applying the pen and paper method. We have chosen one-shot games to avoid confounding framing effects with strategical issues. Table 1 gives the applied treatments:

Table 1: Treatment conditions

	Game	Location	Independent observations
1	PDP	West Bank	20
2	PDN	West Bank	20
3	PDP	Jerusalem	20
4	PDN	Jerusalem	20

Experiments were run by local helpers comprehensively instructed and supported by the authors, who stayed in the background. We are aware that this might result in an experimenter effect. We decided to choose this procedure to avoid self-presentation and face-saving effects (Bond & Hwang, 1986) of unexperienced subjects resulting from the presence of people from foreign countries. Since we are interested in the pure presentation effect this procedure seems to be justified.

Instructions were written in neutral language avoiding terms like 'give' and 'take'. According to the location, the instructions were either in Hebrew or Arabic[7]. They differed between treatments *only by the direction* of the conducted transfer. Accordingly, transfers were to be realized either *to* player j or *from* player j. This procedure ensured that only the technical presentation and not the wording or further frames could influence subjects' behavior.

[7]To avoid translation errors regarding the task and the cadence instructions were translated by natural speakers from German into the corresponding language and afterwards translated back into German applying the back-translation method (Brislin, 1970). Instructions are available on request.

Subjects were initially endowed with $X = 10$ Talers in the opening of every game[8]. The multiplier k was fixed with $k = 2$. The individual payoff in the Nash equilibrium was 10 Talers, for each player. The Pareto optimum outcome generated 20 Talers, respectively. In the run of the experiment participants received no feedback on matched player's decisions.

After running the experiment two questionnaires were passed out. In the first questionnaire we asked participants for their first-order beliefs on the behavior of the matched player[9]. Correct beliefs were rewarded with addition of 1 Taler. The second questionnaire covered socio-demographic questions. At the end of the session the outcome for each participant was calculated, converted into NIS, and paid out.

4 Results

In this section we present the results of our study. First, we start with our findings regarding the Palestinian subjects[10]. Afterwards we will present the Israeli data. Finally, we will merge and compare results from both societies. Basis of our analysis is the degree of cooperation exhibited by the participants. In the PDP game it is the transferred amount (a^{PDP}) and in the PDN game it is the amount left to the other player ($10 - a^{PDN}$).

[8]Taler=Experimental Currency. During the experiment all transfers were made in Taler. The exchange rate from Taler to NIS is 1 Taler = 2.5 NIS. We adjusted expected hourly payoffs to the average hourly wage of a local student helper.

[9]We are aware of the fact that stated beliefs can be biased by prior decisions already undertaken. However, since actual unbiased decisions are more valuable for our analysis, we agreed upon this procedure.

[10]At the moment, a Palestinian state does not exist. Most of our subjects are formally citizens of the states of Israel and Jordan. Nevertheless, we will refer to them as Palestinians to ease the notation.

4.1 Palestinian Choices

Table 2 gives an overview on Palestinians' aggregated transfers and beliefs in both conditions:

Table 2: Descriptive statistics for Palestinian choices

	Actions		Beliefs	
	PDP	PDN	PDP	PDN
Mean:	7.10	2.65	6.05	2.75
Median:	7	2	5	2
Mode:	5/10	2	5	0
SD:	2.36	2.08	2.89	2.34

On average, under the PDP-condition 7.10 Talers are transferred to the opposite player, contrary to the PDN-treatment, where 2.65 Talers are left. The observed treatment effect is highly significant ($p < 0.0001$, Mann-Whitney test, two-sided). Moreover, in the PDP-treatment the quadratic distance to the social optimum ($\Delta^2 = 0.137$) is significantly smaller than to the Nash equilibrium ($\Delta^2 = 0.557$, $p = 0.0019$, Wilcoxon signed rank test, two-sided)[11]. In the PDN-treatment the opposite holds. Here, the quadratic distance to the social optimum ($\Delta^2 = 0.582$) is significantly bigger than to the Nash equilibrium ($\Delta^2 = 0.112$, $p = 0.0007$, Wilcoxon signed rank test, two-sided). Our findings get additional support evaluating median (7 vs. 2) and mode (5/10 vs. 2) values from both treatments. Results for beliefs are in line with the behavior. There is more cooperation expected in the PDP game (6.05 Talers) than in the PDN game (2.75 Talers). The observed treatment

[11]The average quadratic distance is defined as $\Delta^2 = \frac{1}{n}\sum_{i=1}^{n}(r_i - t)^2$, with n being the number of participants, $r_i \in (0,1)$ being the transfer rate of player i, and $t \in (0,1)$ the predicted transfer rate. To apply the quadratic distance concept we calculated relative transfers.

effect for beliefs is also highly significant ($p = 0.0008$, Mann-Whitney-test, two-sided). Comparing actions and beliefs we find no statistically significant difference. This holds for both treatments. According to this we conclude our first result:

Result 1: *The formal presentation of the game influences Palestinian subjects' actions and beliefs substantially. Cooperation (and its expectation) is significantly and economically higher under the PDP-condition than in the PDN-treatment.*

4.2 Israeli Choices

Israelis' aggregated actions and beliefs are presented in the following table 3:

Table 3: Descriptive statistics for Israeli choices

	Actions		Beliefs	
	PDP	PDN	PDP	PDN
Mean:	4.40	4.55	3.40	3.40
Median:	4	5	4	4
Mode:	2	5	4/5	0
SD:	2.95	3.38	2.50	3.14

On average, under the PDP-condition 4.40 Talers are transferred to the opposite player. Similarly, in the PDN-treatment 4.55 Talers are chosen not to be taken by the participants. There is no statistical significant difference in behavior across the two treatments ($p = 0.9455$, Mann-Whitney-test, two-sided). Furthermore, we observe a weak tendency to play according to the Nash equilibrium - the quadratic distance to the Nash equilibrium (PDP: $\Delta^2 = 0.276$; PDN: $\Delta^2 = 0.316$) is smaller in both treatments than the distance to the social optimum (PDP: $\Delta^2 = 0.396$; PDN: $\Delta^2 = 0.406$). However, in both treatments the

difference is not significant (PDP: $p = 0.4039$; PDN: $p = 0.5295$, both Wilcoxon signed rank test, two-sided). The mean beliefs for both games are identical. On average, under both conditions 3.40 Talers were expected to be contributed from the opposite player. No statistical evidence for a difference can be found ($p = 0.9671$, Mann-Whitney-test, two-sided). These findings get further support considering median values from both treatments.

Contrasting actions and beliefs we find slightly higher amounts in actions compared to stated beliefs (4.40 Talers vs. 3.40 Talers) for the PDP-treatment ($p = 0.0467$, Wilcoxon signed rank test, two-sided). No statistically significant difference is detected under the PDN-condition. We summarize this as our second result:

Result 2: *No evidence is found that the formal presentation of the game influences Israeli subjects' behavior or beliefs in a significant way. Both conditions imply a similar level of cooperation (and its expectation).*

4.3 Comparison of presentation effect-size

Results 1 and 2 show that the difference in cooperation levels among the two treatment conditions is higher in the West Bank than in Jerusalem. We refer to this difference as the effect-size caused by the two different presentations of the game. The average effect-sizes[12] for behavior and beliefs, are given in table 4.

While in Jerusalem the impact on displayed behavior and built beliefs between the two games is nearly zero, actions (beliefs) in the West Bank are 44.5% (33%) more cooperative

[12]Recall, that all treatments are independent and therefore we could not calculate the effect size as the difference between the level of cooperation in the two games for one subject. To apply a statistical test on the effect size, we had to calculate all possible differences of cooperation levels $a^{PDP} - (10 - a^{PDN})$ for one location. This leads to a sample size of $20 \times 20 = 400$ for each location.

Table 4: Descriptive and statistical analysis of the effect sizes

Descriptive Analyses of effect size					Testing effect sizes in the West Bank against Jerusalem with a Monte-Carlo approximation of a two-sided permutation test. N=800 and 1000 repetitions		
Location	Effect behavior		Effect belief				
	Mean	SD	Mean	SD	Effect on	p-value	95 % Conf. Int.
West Bank	4.45	3.0726	3.3	3.6288	Behavior	0.0000	$0 - 0.0036$
Jerusalem	-0.15	4.3743	0	3.9139	Beliefs	0.0000	$0 - 0.0036$

in the PDP condition. Applying a Monte-Carlo approximation of a permutation test shows that the effect-sizes in Jerusalem and the West Bank are significantly different ($p < 0.001$ for transfers and $p < 0.001$ for beliefs, Permutation test, two-sided). This finding, together with results 1 and 2, leads to our third result:

Result 3: *Subjects in the West Bank are more sensitive to the game presentation than subjects from Jerusalem. The difference between observed behavior and beliefs in the two games is significantly and economically higher in the West Bank than in Jerusalem.*

4.4 Merging and crossing the data

We now want to compare our findings cross-culturally for each treatment condition in the two locations. We will start with the transfer behavior in the West Bank and Jerusalem in the PDP game. Afterwards we turn our attention to the PDN game. Figure 2 gives the mean level of cooperation for observed behavior beliefs in the 2 treatments.

In the PDP condition, on average, Palestinian subjects have transferred 7.10 Talers to their counterparts, while Israelis choose 4.40 Talers in this treatment-condition. Similarly, on average subjects in the West Bank expect the matched player to transfer 6.05 Talers compared to 3.40 Talers which reflect Israelis' expectations towards their counterparts

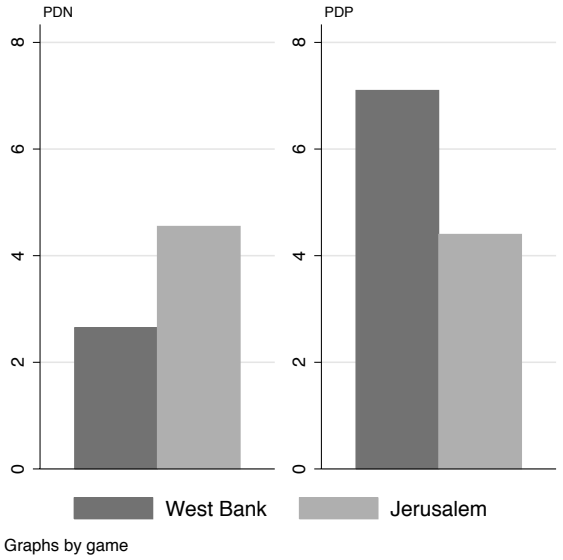

Figure 2: Location specific mean cooperation levels in the 2 treatments

(see tables 2 and 3). Both differences are highly statistically significant ($p < 0.005$ and $p = 0.0058$, Mann-Whitney test, two-sided). Hence, we conclude our fourth result:

Result 4: *In the West Bank cooperation is significantly higher under the PDP-condition than in Jerusalem. Moreover, under this condition stated beliefs are substantially and significantly higher in the West Bank than in Jerusalem.*

In the PDN-treatment, on average, Israelis have left 4.55 Talers to their counterparts. Contrary, Palestinians choose to contribute only 2.65 Talers on average under this treatment condition. Similarly, Israelis expect the matched player not to transfer 3.40 Talers compared to 2.75 Talers which reflect Palestinian expectations towards their counterparts (see table 2 and 3). The difference in actions is weakly significant ($p < 0.076$, Mann-Whitney-test, two-sided). Comparing stated beliefs delivers no significant effect. Thus, our fifth result states:

Result 5: *Israelis cooperate more under the PDN-condition than Palestinians do. Furthermore, under this condition the mean belief on cooperation by Israelis is higher than the expectations quoted by Palestinians.*

Taken together, results 4 and 5 directly lead us to a further stunning result:

Result 6: *Statistically robust results from different locations gathered under one presentation condition do not necessarily hold for other presentations of the same decision task applied in the same locations.*

Our results clearly show that depending on the presentation form we observe divergent levels of cooperation in the West Bank and Jerusalem.

In a next and final step we try to elicit whether cooperation in general is higher in one of the two subject pools involved. Hence we investigate all 80 independent observations (from PDP- and PDN-condition) gathered in the two societies. Table 5 gives an overview on actions and beliefs from both samples:

Table 5: Descriptive statistics and quadratic distances for aggregated data from the West Bank and Jerusalem

	West Bank		Jerusalem	
	Actions	Beliefs	Actions	Beliefs
Mean:	4.88	4.40	4.48	3.40
Median:	5	5	5	4
Mode:	5	5	5	0
SD:	3.15	3.09	3.13	2.80
Δ^2Nash:	0.334	0.287	0.296	0.192
Δ^2Pareto:	0.359	0.407	0.400	0.512

On average, Palestinians contribute 4.88 Talers when both treatments are considered. Similarly, Israelis add 4.48 Talers. There is no evidence for a statistical difference among the involved subject-pools ($p = 0.547$, Mann-Whitney-test, two-sided). The same can be stated for merged beliefs. Here, Palestinians on average expect to receive 4.40 Talers, and Israelis expect 3.40 Talers from their counterpart. Again, no statistical difference can be detected across both subject-pools ($p = 0.1938$, Mann-Whitney test, two-sided). Moreover, we observe no substantial difference among the quadratic distances to the Nash-equilibrium ($\Delta^2 = 0.334$ and $\Delta^2 = 0.296$, $p = 0.5470$, Mann-Whitney-test, two-sided) and to the Pareto optimum ($\Delta^2 = 0.359$ and $\Delta^2 = 0.400$, $p = 0.5470$, Mann-Whitney-test, two-sided) of transfer amounts from both societies. Our results considering actions are supported by evaluating median (5 vs. 5) and mode (5 vs. 5) values from both treatments and samples. Equally, for stated beliefs we find that median (5 vs. 4) values do not substantially differ[13]. Thus, our seventh and last result is:

Result 7: *In the aggregated data from both treatments no significant difference between the levels of cooperation (and its expectation) in the West bank and Jerusalem can be found.*

5 Summary and Discussion

The aim of this work was to investigate the impact of game presentations dependent on ancestry. Merging the experimental application of two logically and strategically identical decision problems with cross-cultural research methods we demonstrated that data ob-

[13]Mode values also support this finding. There, 5 is the amount chosen the *second* highest time by participants. This amount was chosen in 9 from 40 cases, contrary to the actual mode=0 which was chosen 10 times out of 40.

tained from only one presentation might lead to only partly valid results and conclusions on population-specific behavior. This finding holds especially true if results are compared and evaluated across ethnical borders.

Our results from the West Bank have shown that the formal presentation of a decision problem can influence subjects' choices and beliefs substantially. The cooperation level and associated beliefs are significantly higher when subjects can create positive externalities towards each other compared to a situation where resulting externalities are negative. In the positive condition subjects in the West Bank are more willing to transfer higher amounts to voluntarily increase the mutual welfare. On average, this attitude is also expected from the opposite player. Contrary, in the second condition subjects leave relatively less to the counterpart. In this interaction more negative beliefs about the opponents' behavior are formed. These findings give support to prior work by Andreoni (1995), Sonnemans et al. (1998), Willinger and Ziegelmeyer (1999), and Park (2000).

The behavior of our Palestinian subjects is analogous with results from goal framing experiments (e.g. Levin, Schneider & Gaeth, 1998; Meyerowitz & Chaiken, 1987). In these experiments the negative formulation of an identical problem has an higher impact on subjects behavior than a positive one. These authors argue that this attitude could be connected to the concept of loss aversion as introduced by Kahneman & Tversky (1979). It is possible that Palestinians perceive an amount taken away from them as a loss, while they perceive an amount voluntarily given away not or less as a loss. To avoid this loss, players take more from the matched player and thus cooperation is on a lower level in the PDN game compared to the PDP game. Therefore, Palestinians' behavior in

our experiment might be explained by Kahneman and Tversky's loss aversion. This might deliver an explanation why Palestinians seem to obtain a higher benefit from doing a good rather than from not doing a bad deed.

Another possible explanation for this consistent behavioral pattern might be that, even if the technical presentation of the implemented game designs was strictly neutral, Palestinian participants perceive situations with potential negative externalities as more competitive than situations with potential positive externalities. As a consequence of this cognition, they might react much more sensitive to the threat of a possible loss induced by the right of the second player to take away any amount as compared to the situation where they can determine themselves which amount to give away.

Future studies have to analyze whether Palestinians' behavior is similar to Western subjects' behavior as the cited public good game results suggest or whether they are specifically rooted in Arabic culture.

Herrmann, Thöni, and Gächter (2007) give evidence for the latter conjecture. They have found that Arabian participants are not - unlike most decision makers from Western populations who cooperate more under a punishment condition - sensitive to the threat and enforcement of punishment in public good game setups. As a consequence, Palestinians' choices in our framework appear to be similar to findings in Western societies. However, the driving motives behind could differ.

Although geographically not far away located from the West Bank, experiments run in Jerusalem yielded different results. There, aggregated subjects' actions and beliefs appear to be unaffected across treatments in terms of the measured outcome. No significant

presentation effect can be verified. Israelis seem to show a similar behavioral attitude in both treatments. Further studies must investigate the cause for this similar behavior displayed under different conditions. In fact, actual transfer amounts are different across treatments but the resulting cooperation levels are not. Do Israelis actually perceive the two games as presentations of the same decision problem, or do they apply different approaches leading to similar behavioral consequences and outcome?

The substantial difference between Palestinian and Israeli subjects in the positive condition and the similar results under both conditions in Israel might be rooted in the structure of the Israeli society. The Israeli society is ethnically heterogeneous and consists of different subcultures. The gaps between these ethnic groups do not decrease. In fact, the segregation of the society increases further, especially since the breakdown of the Soviet Union[14]. As Knack and Kefer (1999) point out cooperation on the national level of societies is negatively influenced by the degree of ethnic differences within these societies. Trust and cooperative norms are strong within ethnic groups but weak among different groups. Subjects in heterogeneous societies might be less influenced by the presentation of a problem since they already apply a certain pattern of thought on an decision problem.

As Levin et al. (2001), we observe that subjects in some regions might respond to framing effects, while others do not. In addition to this we have shown that this might confront results from cross-cultural research with new challenges: Comparing levels of cooperation under each of the conditions across subject pools might lead to opposite conclusions on society-specific behavioral attitudes. Palestinians display a *relatively* higher cooperation level and more positive beliefs on opponent player's contributions than Israelis when only

[14]Compare Fershtman & Gneezy (2001), Cohen & Haberfeld (1998), and Mark (1994).

the positive externalities condition is considered. Contrary, Israelis cooperate *relatively* more and state substantially higher beliefs when only the negative externalities condition is taken into account. However, when all available data gathered from each of the two populations are evaluated, we find no evidence that relative cooperation levels and stated beliefs are different. These striking results would not have been detected by the implementation of mere one-sided experimental designs. Taking findings from different presentations into account might not only enrich standard socio-economic theory but also refine our experimental methodology. Moreover, recognizing the impact of the presented frame might be essential for the design of international institutions where foreign actors repeatedly interact for the first time in rapidly changing environments. Bargaining and cooperation setups might be perceived differently by decision makers depending on their ethnical background. The culture-sensitive adaptation of constituting conditions is necessary for increasing mutual benefits from cooperation within such institutions.

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Appendix

External analogy with the classical PD and PG games

To show external analogy of our continuous games with a classical binary-choice PD we write down the 2×2-payoff matrix form of both designs including only the extreme points of total (e.g., $a_i^{PDP} = 10; a_i^{PDN} = 0$) and no cooperation (e.g., $a_i^{PDP} = 0; a_i^{PDN} = 10$):

π_1, π_2	$\mathbf{C_2}$	$\mathbf{D_2}$
$\mathbf{C_1}$	$k \cdot X, k \cdot X$	$0, X + k \cdot X$
$\mathbf{D_1}$	$X + k \cdot X, 0$	X, X

Table 2: 2 × 2-matrix, representing the prisoner's dilemma game.

The PD condition $(1 + k) \cdot X > k \cdot X > X > 0$ is satisfied for all $k > 1$ for both games. In our experiment this condition is fulfilled, with $k = 2$. Given these parameters, by linear interpolation payoffs from the discrete payoff matrix can be obtained[15]. Having a freely pre-determined range of possible actions a allows to obtain a non-binary measure of cooperation.

We now show external analogy of both games with a typical PG-design. The payoff function of a common 2-person PG is given by:

$$\pi_i^{PG} = X_i - a_i + k \cdot \frac{a_i + a_j}{2}, \text{ with } i \neq j, \text{ and } k > 1$$

X_i represents player i's initial endowment. The parameter a_i is the investment into the public good. Accordingly, $X_i - a_i$ represents the investment into the private good. All investments made to the public good are multiplied by the factor k. The fraction of one half of the increased public pie is returned to both players i and j by the addition to their investments into the private good. For $k < 1$ it is rational for both players to invest nothing into the public good since the public pie shrinks. In the case of $k > 1$ both players can increase their personal income by investing into the public good. However, in this case

[15] See also Verhoeff (1998).

each player has a strong incentive to free-ride hoping to reach even higher returns caused by a positive investment of the second player. From the initial PG-equation we get:

$$\pi_i = X_i - (1 - \frac{k}{2}) \cdot a_i + k \cdot \frac{a_j}{2}$$

$$\iff \pi_i = X_i - \theta \cdot a_i + k^* \cdot \theta \cdot a_j, \text{ with } \theta = 1 - \frac{k}{2} \text{ , and } k^* = \frac{k}{2 \cdot (1 - \frac{k}{2})}$$

The payoff-function of the PDP-game was given in equation by:

$$\pi_i^{PDP} = X_i - a_i^{PDP} + k \cdot a_j^{PDP}$$

It is evident that both games are of the same type: A PG-game with parameter k^* is formally similar to the PDP-game with parameter k. Because of internal equivalence among PDP and PDN it is obvious that the PDN-game is a PG too. Contrary to the PG-game, in PDP and PDN there is no back flow of own investments. Thus, each $a_i > 0$ is transferred directly to the opposite player thereby providing a lower individual incentive to cooperate.

Instructions for the experiment (for PDP and PDN)

Thank you for taking part in this experiment. Please read these instructions very carefully. It is very important that you do not talk to other participants for the time of the entire experiment. In case you do not understand some parts of the experiment, please read through these instructions again. If you have further questions after this, please give us a sign by raising your hand out of your cubicle. We will then approach you in order to answer your questions personally.

To guarantee your anonymity you will draw a personal code before the experiment starts. Please write this code on top of every sheet you use during this experiment. You will later receive your payment from this experiment by showing your personal code. This method ensures that we are not able to link your answers and decisions to you personally.

During this experiment you can earn money. The currency within the experiment is 'Taler'. The exchange rate from Taler to NIS is:

1 Taler = 2.5 NIS

Your personal income from the experiment depends on both **your own** decisions and on the decisions of **other** participants. Your personal income will be paid to you in cash as soon as the experiment is over.

During the course of the experiment, you will interact with a randomly assigned other participant. The assigned participant makes his/her decisions at the same point in time as you do. You will get no information on who this person actually is, neither during the experiment, nor at some point after the experiment. Similarly, the other participant will not be given any information about your identity. You will receive information about the assigned participant's decision after the entire experiment has ended.

After the experiment, please complete a short questionnaire, which we need for the statistical analysis of the experimental data.

Description of the experiment (PDP)

In this experiment you are randomly matched with another participant. You act as **Person A**, and the randomly assigned other participant acts as **Person B**. You and Person B must simultaneously make a similarly structured decision.

Person A and Person B first receive an initial endowment of **10 Talers**.

You now have the opportunity to transfer any part of your endowment to Person B. You can only transfer integer amounts - thus, you can only choose amounts $a_A \in$ **[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]**.

The amount you transfer to Person B is **doubled**. That means that Person B receives **twice the amount you have transferred** to him/her.

The randomly assigned participant acting as Person B is given exactly the same alternatives as you have. He/she also has the possibility to transfer any amount to you. The amount Person B transfers to you is also doubled. That means that **you receive twice the amount Person B has transferred** to you.

You will make your decisions **simultaneously**. During the course of the experiment neither person receives any information concerning the decision of the other person.

How the income is calculated

Your personal income can be calculated as follows:

Initial endowment
- amount you choose to transfer to Person B
+ twice the amount b Person B transferred to you
= **your personal income**

Description of the experiment (PDN)

In this experiment you are randomly matched with another participant. You act as **Person A**, and the randomly assigned other participant acts as **Person B**. You and Person B must simultaneously make a similarly structured decision.

Person A and Person B first receive an initial endowment of **10 Talers**.

You now have the opportunity to transfer any part of Person B's endowment to yourself. You can only transfer integer amounts - thus, you can only choose amounts $a_A \in$ **[0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10]**.

The remaining amount - that is the amount that you do not transfer from Person B's endowment to yourself - is **doubled**. This means that Person B receives **twice the amount that you do not transfer** from him/her.

The randomly assigned participant acting as person B is given exactly the same alternatives as you have. He/she also has the possibility to transfer any amount to himself/herself. The remaining amount that he/she does not transfer from your endowment to himself/herself is **doubled**. This means that you receive **twice the amount that he/she does not transfer** from you.

You will make your decisions **simultaneously**. During the course of the experiment, neither person receives any information concerning the decision of the other person.

How the income is calculated

Your personal income can be calculated as follows:

+ amount you choose to transfer from Person B to yourself
+ twice the amount Person B did not transfer from your endowment to himself/herself
= **your personal income**