Economics Bulletin

Volume 39, Issue 1

Cognitively differentiating between sharing games: inferences from choice and belief data of proposer participants

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Abstract

Proposer participants confront four sharing game types in a within subjects design, the symmetric demand, ultimatum, Yes-No and impunity game, varying the power structure from equal (symmetric demand game) to powerless recipients (impunity game). We additionally allow both types of participants to opt out of playing the game under consideration. Beside choice data we elicit action beliefs. Average demands choice and belief data) of proposer participants are significantly lower in symmetric demand than in Yes-No and impunity games. In Yes-No and impunity games the payoff demands of proposer participants react differently to recipients' outside option payoffs than in symmetric demand games, but not action beliefs. Ultimatum games are often seen as similar to symmetric demand games: When controlling for interaction effects between game type and outside option payoffs, actual demands and beliefs do not vary between symmetric demand and ultimatum games and they are not differently affected by outside option payoffs.

Citation: Werner Güth and Charlotte Klempt and Kerstin Pull, (2019) "Cognitively differentiating between sharing games: inferences from choice and belief data of proposer participants", *Economics Bulletin*, Volume 39, Issue 1, pages 605-614
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Submitted: February 13, 2018. **Published:** March 16, 2019.

1 Introduction

Human decision making has to rely on complexity reduction when facing complex decision tasks, for example in experiments. But does mental representation also differ from what is experimentally induced when the choice task is rather simple and easily understood? To answer this, we compare situations with similar choice sets but differences in subtle details. Will subtle differences be simply overlooked or intentionally neglected, e.g., by triggering the same motives and similar behavior across situations, or will one carefully consider and condition behavior on such details?

Specifically, we focus on four sharing game types with two players each, one proposing how to allocate a monetary amount and the other's reaction varying from doing the same to having no power at all: symmetric demand, ultimatum, Yes-No, and impunity games. For each game, first both players independently decide whether or not to play: when at least one player opts out, both players receive their outside option payoffs. If none opts out, they play the respective sharing game.

Although the game types differ strategically, participants may perceive them as rather similar (Pull, 1999, 2003, Selten, 2000). For example, when mentally representing a game only by its characteristic function, participants neglect the difference between ultimatum and demand game (see, e.g. Fischer et al., 2006, and Fischer et al., 2007).

We try to infer mental representation from choice and belief data of proposer participants who must anticipate how a more or less powerful other will react to their proposal. This can range from no risk at all to symmetric strategic interdependence. In our view, choice data alone do not sufficiently reveal whether and when veto power is mentally neglected.[1] To assess mental modeling, a "revealed mental model" approach trying to infer idiosyncratic mental representations only from choice data often becomes a matter of speculation.[2] We consider our richer data elicitation as a first attempt to shed light on how we cognitively generate choices when engaging in forward looking deliberation.

[1] For an alternative way to enrich the choice data from experiments by having pairs of participants deciding together and by audio-taping the discussion preceding their choice see the recent work by Berninghaus et al, 2017.

[2] Actually this at least partly applies to Pull (1999 and 2003) and Selten (2000) whose claims so far are mainly supported by equal sharing being focal and modal in most ultimatum experiments (Güth and Kocher, 2014).

2 The game types

All four game types involve two players, X and Y, who first independently decide whether or not to play the game. When at least one player opts out, players receive their non-negative outside option payoff c_x, respectively c_y. The choice to "play the game" expresses pre-trust in one's partner, for example that (s)he will share equally. When both have accepted to play the game outside option payoffs are foregone. Then X chooses $x \in (0, p)$, the amount which participant X demands for herself, where p denotes the positive monetary pie size satisfying $p > c_x + c_y$, i.e., the surplus $p - c_x - c_y$ of sharing is positive. Y's choice varies across game types:

In symmetric Nash demand games SG[3] , Y independently chooses a demand $y \in (0, p)$, i.e. without knowing X's choice of x. The payoffs are

$$(u_x(x,y), u_y(x,y)) = \begin{cases} (0,0) & \textit{in case of } x + y > p \\ (x,y) & \textit{otherwise.} \end{cases}$$

In ultimatum games UG, participant Y chooses an acceptance threshold[4] $\underline{y} \in (0, p)$ so that only offers $y(x) = p - x \geq \underline{y}$ are accepted. The payoffs are

$$(u_x(x,\underline{y}), u_y(x,\underline{y})) = \begin{cases} (0,0) & \textit{in case of } \underline{y} > p - x \\ (x, p-x) & \textit{otherwise.} \end{cases}$$

In Yes-No games YN, participant Y chooses $\delta \in \{0, 1\}$ without knowing the offer $y(x) = p - x$. With $\delta = 1$ denoting acceptance and $\delta = 0$ denoting rejection, payoffs can be expressed as:

$$(u_x(x,\delta), u_y(x,\delta)) = \delta(x, p - x)$$

Finally, in impunity games IG, participant Y also chooses $\delta \in \{0, 1\}$ without knowing the offer $y(x) = p - x$. In IG, acceptance ($\delta = 1$) vs. rejection ($\delta = 0$) only applies to Y's own share. X is informed about Y's decision.[5]

$$(u_x(x,\delta), u_y(x,\delta)) = (x, \delta(p - x))$$

For X, all four game types specify the same choice set $x \in (0, p)$ where in the experiment $x \in \{\epsilon, 2\epsilon, ..., p - \epsilon\}$ with ϵ denoting the smallest positive money unit. For player Y, two game types, SG and UG, offer similar choice variety via $y, \underline{y} \in (0, p)$, respectively in the experiment via $y, \underline{y} \in \{\epsilon, 2\epsilon, ..., p - \epsilon\}$ whereas in YN and IG, player Y faces the binary choice $\delta \in \{0, 1\}$. Assuming common (and partly expected) monetary opportunism once repeated elimination of (weakly) dominated strategies yields the same benchmark outcome $x = p - \epsilon$ for X and ϵ for Y in UG, YN and IG. Compared to this, SG has multiple strict (one loses when unilaterally deviating) equilibria. Compared to UG, SG has an additional efficiency aspect, namely anti-conflict with $x + y < p$ which, however, does not qualify as an equilibrium outcome. Both, SG and UG, feature the same multiplicity of equilibria which are strict in SG and mostly in weakly dominated strategies in UG, whereas YN and IG have

[3] Since when SG is played, the outside option payoffs, c_x and c_y, are foregone and since conflict in bargaining yields 0-payoffs for both, SG is symmetric.

[4] This rules out non-monotonic acceptance strategies which are partly observed in UG experiments that allow for non-monotonic acceptance strategies (see the review by Güth and Kocher, 2014).

[5] Since $\delta \in \{0, 1\}$ is chosen without knowing $y(x)$ as in Yes-No games one could speak of the YN-type of impunity games. Usually, impunity is explored with Y being aware of $y(x)$ when deciding (see, for instance, Yamagishi et al. 2009).

only one equilibrium result corresponding to the unique solution outcome of UG, derived from once repeated elimination of weakly dominated strategies.

The solution analysis above applies to the games if no player opts out, i.e. views c_x and c_y as foregone payoff alternatives. Forward induction reasoning (see Kohlberg and Mertens, 1986 and applied to outside option games Balkenborg and Nagel, 2016) predicts that X would opt out when $c_x > x^\star$, respectively Y when $c_y > y^\star$ where $x^\star$ and $y^\star$ denote the solution payoffs. Thus specifically when $c_y > \epsilon$ player Y should opt out in YN, IG and UG whereas in SG no player must opt out when anticipating equilibria with $x^\star \geq c_x$ and $y^\star \geq c_y$. The feedback information of all four game types is unrestricted. In SG and UG, both parties learn what the other party has chosen (i.e. (x, y) and $(x, \underline{y})$ respectively), whereas in YN and IG both players are informed about (x, δ) with $\delta = 1$ denoting acceptance and $\delta = 0$ denoting rejection by Y.

3 Experimental protocol

Participants face all four game types in both roles for several parameter constellations, namely:

$$(p, c_x, c_y) = A = (30, 10, 5), B = (30, 5, 10), C = (25, 5, 5), D = (20, 5, 0), E = (20, 0, 5)$$

which maintain the surplus $p - c_x - c_y = 15$. We employ a within-subjects design to explore how behavior reacts to (p, c_x, c_y) within and across parameter constellations and game types. Subjects successively and randomly confront the different parameter constellations for each game type. For $i = X, Y$ we denote by I_i i's choice to (not) play the given game: yes, $I_i = 1$, and no, $I_i = 0$ where the game is played only if $I_X I_Y = 1$.

Altogether the action data X_i of participant i in role X has the following format:

$$X_i = \left((I_i, x_i(p, c_x, c_y)/j) : \begin{array}{c} \textit{all } (p, c_x, c_y) \textit{ and} \\ j = SG, UG, YN, IG \end{array} \right).$$

In SG and for UG-proposers, best responses depend on first-order action beliefs about the behavior of the other party. For the other choice tasks, however, normative beliefs asking, for instance, which behavior an uninvolved third party would recommend might be more influential. The literature (see Güth and Kocher, 2014) provides ample evidence that at least first-order action beliefs are based on belief distributions. Eliciting such distributions in an incentivized way could rely on (axiomatically characterized) scoring (see Selten, 1998): one assigns probability weights to discrete realizations and is less sanctioned when predicting the actual x to be more probable. On the other hand, normative beliefs like "what do you recommend when not knowing your role of X or Y?" would be more naturally and intuitively elicited as point beliefs. Given the multiplicity of choice tasks confronted by our participants, always eliciting belief distributions would have meant to cognitively overburden them. For the sake of constant formats in belief elicitation we therefore asked participants for point beliefs throughout without monetary incentives. Specifically, we asked participants for all of the game types and parameter constellations to additionally state

- the choice $\widehat{x}$ they think that participants in the role of Y expect from participants in the role of X,
- the choice x^+ they think one should recommend to participants that do not know whether they will be acting in the role of X or Y,
- the choice $x^\oslash$ they think will be chosen most frequently from participants in the role of X.

Participants received a show-up fee of 4 EUR for showing up on time. Although they played all four game types, each for all different parameter constellations (p, c_x, c_y), only one of these 20 games was randomly selected for actual payment (to avoid the possible diversification incentives of cumulative earnings). Specifically, at the end of the experiment we randomly formed pairs and randomly selected one actual paid game for each pair.

Choices were elicited by employing the strategy vector method. Given the game, participants were only assigned to roles after collecting both decisions, the one in proposer role X and the one in responder role Y, after playing all 20 games, i.e. role assignment was randomly performed only after random pair formation and after random selection of the actually paid game. This obviously excluded any feedback information about other's choice and own outcomes in previously played games. Thus all individual constellations with five individual strategy vectors for each of the four game types are statistically independent what allows clustering at the individual level in the regression analyses.

Before actually playing one of the 20 successive games with varying parameters p, c_x, c_y, each participant had to decide for both roles, X and Y, whether to play the game, respectively whether to opt out. Only when, after random role assignment, both opt in, their role specific strategies determine their earnings. If at least one opts out via the role specific profile[6], both partners earn their role specific outside option payoff, c_x, respectively c_y. Altogether each participant has to opt in or out in 20 games and each of the two roles (X and Y), i.e. each participant provides 40 "in/out"-decisions in addition to the 20 strategy vector-choices for the $4 \cdot 5 = 20$ different games, 5 based on the same game type. Game types are played in the constant sequence (SG, UG, YN, IG), i.e. according to decreasing responder power.

Altogether the experiment, run in the computer laboratory of the Max Planck Institute of Economics in Jena, employed 124 participants, providing $20 \cdot 124 = 2,480$ $\widehat{x}, x^+, x^{\oslash}$-individual choices and, due to some opting out, $1,850$ choices of x. The experiment was programmed by using Z-tree (Fischbacher, 2007) and recruitment was implemented with the help of ORSEE (Greiner, 2015) without any attempts to control for gender composition, field of study or other socio-demographic characteristics.

4 Results

As our focus is on whether the more or less subtle differences between games are neglected, Table I depicts the percentage of X-demands in UG, YN and IG with the same demand x as in SG, respectively, the same belief on what participants in the role of Y would expect from participants in the role of X, $\widehat{x}$, the same recommended demand to participants that do not know whether they will be acting in role X or Y, x^+, and the same expected most frequent choice from participants in the role of X, $x^{\oslash}$. It also lists the shares of participants with higher, respectively lower levels than in SG.

More than 70 percent of participants in the role of X choose the same demand or state the same beliefs in UG and SG. The similarity in actual demands x, observed in earlier UG-experiments, mostly based on $c_x = 0 = c_y$ induced the claim by Pull (1999, 2003) and Selten (2000) that most proposer participants neglect the subtle, however for the benchmark prediction crucial difference between SG and UG. What Table I additionally shows is that this survives non-trivial outside options and also applies to different types of beliefs. In our view, this convincingly corroborates the claims of Pull and Selten.

[6] To avoid asking for counterfactual choices, opting out avoids being asked for a strategy vector in the given game whereas, when opting in, one has to state a strategy vector as it is only decided after the experiment whether one's partner has opted in or out.

Result 1: According to their choice and belief data, most X-participants seem to consider SG and UG as being similar, respectively neglect their strategic differences.

The evidence of Table I relies on average tendencies. Actually the share of X-data for which *all* components, x, $\widehat{x}$, x^+, $x^\oslash$, for SG and UG conicide is only 22.3%. For YN and IG, the shares of the same choices as in SG range from a little more than 20 percent ($x^\oslash$ in IG) to more than 50 percent of X-participants (x^+ in YN), i.e. as predicted, for a non-negligible proportion of the data.

Result 2: Compared to the SG and UG similarity in behavior, the similarity of SG and YN, respectively IG is much weaker, especially for x, $\widehat{x}$, and $x^\oslash$. The fact that at best 50% of x^+-data rely on the same values for all four sharing games suggests that most participants view all game types as demanding fair sharing, however, often without neglecting the exploitation incentives due to proposer power in UG, YN and IG.

Classifying X-participants according to their demands across all game types, the data reveals as the most frequent individual type (22,3%) the ones whose demands in SG and UG are identical, but smaller albeit equal in YN and IG. The second largest group of participants (16,1%) demands the same across all game types. Further, 8,4% of X-participants choose the same demand in SG and UG, a larger one in YG and still a larger one in IG, whereas 6,6% state the same demand in SG, UG and YG and a larger one in IG.

		Same as in SG	More than in SG	Less than in SG
x	UG	73.1	18.2	8.7
	YN	34.2	63.9	1.9
	IG	22.1	76.4	1.4
$\widehat{x}$	UG	70.3	21.5	8.2
	YN	31.1	63.9	5.0
	IG	22.6	74.2	3.2
x^+	UG	77.4	11.9	10.6
	YN	52.9	41.6	5.5
	IG	49.4	47.4	3.2
$x^\oslash$	UG	74.7	18.1	7.3
	YN	31.1	63.9	5.0
	IG	20.3	77.3	2.4

Table I: Percentage of demands of X-participants across games

To further explore in how far SG serves as a mental model also for other sharing games, we regressed the values of x, $\widehat{x}$, x^+ and $x^\oslash$ on game type with SG as the reference category controlling for outside option payoffs and interaction effects with the different game types (see Table II). Regressions (1) and (2) refer to x, regressions (3) and (4) to $\widehat{x}$, regressions (5) and (6) to x^+ and regressions (7) and (8) to $x^\oslash$. To compare demands across varying pie sizes, we use *relative demands* as the dependent variable, that is for the choice data we use $d_x = \frac{x}{p}$ and for the belief data we use $d_{\widehat{x}} = \frac{\widehat{x}}{p}$, $d_{x^+} = \frac{x^+}{p}$ and $d_{x^\oslash} = \frac{x^\oslash}{p}$. Note that equal surplus sharing, as suggested by the Nash (1950, 1953)-bargaining solution, applied to surplus $p - c_x - c_y$ rather than pie p-sharing, predicts $x = (p - c_x - c_y)/2$ or $d_x = 1/2 - (c_x - c_y)/(2p)$, i.e. demands x should increase in c_x and decrease in c_y.

With respect to the choice data (d_x), outside options c_y reduce demands. However, the regression results in Table II reveal that this effect disappears when including interaction effects between game type and outside option payoffs. Allowing for interaction effects between game type and outside option payoffs, renders the UG dummy insignificant whereas the YN- and IG-dummies remain significant (Table II) .

Result 3: The invariance claim of the benchmark solution based on monetary opportunism, that behavior does not depend on foregone outside option payoffs is confirmed only for c_x which does not directly affect x, $\widehat{x}$, x^+ (see columns (1), (2), (3), (4), (6), (7), (8) of Table II: the marginally significant effect of c_x in column (5) has the opposite sign than predicted by equal surplus sharing). Compared to this, c_y directly and robustly affects x, $\widehat{x}$ and x^+ but not $x^{\oslash}$. However, interaction effects of game type with c_y (as in columns (2), (4), (6) and (8) in Table II) render the direct effect of c_y insignificant.

Concerning belief data ($\widehat{x}$, x^+, $x^{\oslash}$) there are similarities as well as differences, compared to actual demands x. One similarity is that beliefs in YN and IG differ from those in SG, even when including interaction terms with outside option payoffs. Beliefs in UG do not differ from those in SG – at least when interaction terms are included. In contrast to demands x, for belief data none of the interaction terms is significant: X-participants do not react differently to outside option payoffs in belief generation for the different game types.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	x	x	$\widehat{x}$	$\widehat{x}$	x^+	x^+	$x^{\oslash}$	$x^{\oslash}$
UG	0.021**	0.028	0.033***	0.044	0.005	0.006	0.025**	0.041
	(0.007)	(0.020)	(0.008)	(0.029)	(0.008)	(0.027)	(0.008)	(0.028)
YN	0.206***	0.259***	0.205***	0.205***	0.111***	0.131***	0.216***	0.239***
	(0.008)	(0.027)	(0.008)	(0.029)	(0.008)	(0.027)	(0.008)	(0.028)
IG	0.267***	0.321***	0.271***	0.282***	0.150***	0.146***	0.295***	0.294***
	(0.008)	(0.028)	(0.008)	(0.029)	(0.008)	(0.027)	(0.008)	(0.028)
c_x	-0.027	-0.023	-0.029	-0.026	-0.071*	-0.047	-0.033	-0.015
	(0.030)	(0.053)	(0.030)	(0.060)	(0.028)	(0.056)	(0.030)	(0.059)
c_y	-0.192***	-0.048	-0.061*	-0.035	-0.063*	-0.064	-0.058*	-0.026
	(0.030)	(0.001)	(0.001)	(0.060)	(0.028)	(0.056)	(0.001)	(0.059)
UG*c_x		-0.225		-0.029		-0.019		-0.044
		(0.075)		(0.084)		(0.078)		(0.083)
YN*c_x		0.051		0.070		-0.059		-0.028
		(0.083)		(0.084)		(0.078)		(0.083)
IG*c_x		-0.036		-0.053		-0.017		-0.000
		(0.087)		(0.084)		(0.078)		(0.083)
UG*c_y		-0.012		-0.028		0.013		-0.038
		(0.075)		(0.084)		(0.078)		(0.083)
YN*c_y		-0.371***		-0.072		-0.045		-0.095
		(0.080)		(0.084)		(0.078)		(0.083)
IG*c_y		-0.291***		-0.003		0.038		-0.004
		(0.085)		(0.084)		(0.078)		(0.083)
Period	0.000	0.000	0.000	0.000	0.001*	0.001*	0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
const	0.517***	0.491***	0.507***	0.501***	0.481***	0.477***	0.499***	0.489***
	(0.015)	(0.025)	(0.016)	(0.023)	(0.016)	(0.022)	(0.016)	(0.023)
N	1850	1850	2480	2480	2480	2480	2480	2480
logLik	1150	1164	1120	1112	1292	1282	1158	1149

Table II: The impact of game type and outside option payoffs on X-data (choice and beliefs). Random effects GLS model with independent random effects for each participant. Standard deviation in parentheses. Significance levels: 0.001 '***' 0.01 '**' 0.05 '*'.

Another series of regressions (Table III) regresses $\max\{x-\widehat{x},0\}$, $\max\{x-x^+,0\}$ and $\max\{x-x^{\oslash},0\}$ on game type and outside option payoffs: $\max\{x-\widehat{x},0\}$ measures how much X is letting down Y, i.e. how much more X claims than what X believes Y to expect from her. Regression (1) in Table III explores how let down aversion depends on Y's outside option payoffs and game type and finds that let down aversion of proposers varies between SG on the one hand and YN and IG on the other whereas outside option payoffs do not seem to matter much.

Similarly, regressing $\max\{x - x^+, 0\}$ and $\max\{x - x^\oslash, 0\}$ allows to test how ethical concerns (x^+ is recommended for participants behind the veil of role uncertainty, regression (2) in Table III) and social influence in the sense of "following what one expects others to do" (regression (3) in Table III) affect proposer demands. Again, there are differences between game types (for x^+ also between UG and SG) as well as some dependence on own outside option payoffs c_x but not on Y's outside option payoff c_y.

	(1)	(2)	(3)
Variable	$\max\{x - \widehat{x}, 0\}$	$\max\{x - x^+, 0\}$	$\max\{x - x^\oslash, 0\}$
UG	0.005	0.019**	0.008
	(0.005)	(0.007)	(0.005)
YN	0.052***	0.116***	0.045***
	(0.006)	(0.008)	(0.005)
IG	0.063***	0.153***	0.051***
	(0.006)	(0.008)	(0.006)
c_x	0.000	0.002*	0.001*
	(0.001)	(0.001)	(0.001)
c_y	-0.000	-0.001	-0.000
	(0.001)	(0.001)	(0.001)
Period	-0.001	-0.000	0.000
	(0.000)	(0.000)	(0.000)
const	-0.011	0.022	-0.001
	(0.008)	(0.013)	(0.009)
N	1850	1751	1528
logLik	1783	1059	1415

Table III: The impact of game type and outside option payoffs on how demand data x differ from beliefs $\widehat{x}$, x^+, $x^\oslash$. Random effects GLS model with independent random effects for each participant. Standard deviation in parentheses. Significance levels: 0.001 '***' 0.01 '**' 0.05 '*'.

The game theoretically substantial differences between the four game types are hardly reflected in choices and beliefs: many participants either do not perceive the differences in Y's veto power across some game types as crucial or prefer to neglect them (Pull, 1999, 2003, Selten, 2000). Especially, SG seems to be a dominant mental model also when encountering UG. Strategic aspects, although game theoretically crucial, are at least in sharing games often neglected, i.e. either overlooked or consciously disregarded.

One overall conclusion is that the game theoretic invariance claim that foregone outside option payoffs do not matter when having agreed to play the game is not generally confirmed: however, only c_y significantly moderates behavior in the role of X. This suggests that participants view Y's choice of $I_Y = 1$ as Y's pre-trust in proposer fairness, at least in (p, c_x, c_y)-constellations A, B, C and E for which c_y is positive. Such pre-trust is in line with experimental evidence of trust (game) experiments (e.g. Berg et al., 1995) and also of gift exchange experiments (Fehr et al., 1998) but questions backward induction and sequential rationality.

More generally, our evidence that participants neglect game theoretically crucial differences between game types is only one aspect on how benchmark behavior and game theoretic reasoning differ. As early shown by Pruitt (1967) and later on more generally propagated by

Tversky and Kahneman (1981) participants often perceive even the same game type differently when presenting or framing it differently or when eliciting choice behavior differently (see the debate between "hot" play data and "cold" strategy vector data as in the study at hand, for instance, Zizzo 2010). What this demonstrates is that game theoretic choice explanations are often very informative but have to be considered with great care when applying them to at best boundedly rational decision makers.

5 Conclusions

We have robustly compared four sharing game types, symmetric demand, ultimatum, Yes-No, and impunity games, by systematically varying their payoff parameters. Participants could, furthermore, opt out rather than play the game under consideration. We especially wanted to test whether participants rely on the symmetric demand game as their mental model also when confronting and playing other, more or less closely related game types.

According to our data, average demands of proposers (choice and belief data) are significantly lower in symmetric demand than in Yes-No and impunity games. Especially as proposer in Yes-No and impunity games one reacts differently than in symmetric demand games to Y's outside option payoff. However, beliefs in Yes-No and impunity games are not differently affected by Y's outside option payoff than in symmetric demand games. So symmetric demand games can be confirmed as mental anchors only for ultimatum games: neither do demands significantly vary between symmetric demand and ultimatum games, nor do outside option payoffs matter differently when potential interaction between game type and outside option payoffs is controlled for. And this holds for choice as well as for belief data.

Altogether this suggests that subtle strategic aspects are often neglected, i.e. behavior and behavioral expectations often are less sensitive to aspects which are crucial in view of game theory, based on common monetary opportunism. There is, of course, also the opposite phenomenon: behavior and behavioral expectations often react to differences in aspects which, from a rational choice perspective, are completely irrelevant (see, e.g. Kahneman and Tversky, 1981). The latter provides a basis for nudging, i.e. trying to influence behavior without restricting the choice set and influencing their payoff implications (Thaler and Sunstein, 2008). Taken together this suggests that the – still dominating – rational choice approach has to be supplemented by behavioral theories of game playing which pay more than lip-service to the psychology of human decision making, especially to how we mentally perceive decision tasks with and without social interaction.

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