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Framing decisions: Hypothetical and real

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Abstract

This paper addresses the general issue of whether the practice of investigating human decision making in hypothetical choice situations is at all warranted, or under what conditions. A particularly relevant factor that affects the match between real decisions and hypothetical decisions is the importance of a decision's consequences. In the literature experimental gambles tend to confound the reality of the decision situation with the size of the payoffs: hypothetical decisions tend to offer large payoffs, and real decisions tend to offer only small payoffs. Using the well-known framing effect (a tendency of risk-aversion for gains and of risk-seeking for losses) we find that the framing effect depends on payoff size but hypothetical choices match real choices for small as well as large payoffs. These results appear paradoxical unless size of incentive is clearly distinguished from the reality status of decision (real versus hypothetical). Since the field lacks a general theory of when hypothetical decisions match real decisions, the discussion presents an outline for developing such a theory.

Keywords: Framing; Incentive; Risk

1. Introduction

The heuristics and biases approach is probably the dominant tradition in decision research. A pervasive feature of this approach is that it studies decision making almost exclusively in hypothetical decision situations. Participants are asked to imagine being in some hypothetical scenario and to evaluate possible options or to take some decision within this scenario. It is a remarkable fact about decision research that the use of imagined situations is accepted as a legitimate means of studying real decision behavior. In other areas of psychology, such methods would be considered extremely questionable if not absurd. For instance, would any psychophysicist be taken seriously who investigated perceived heaviness not by giving participants actual weights to lift but by asking participants to *imagine* lifting a two pound weight?

To be sure, there is much research on real decisions, but the point is that the area is characterized by a curious mix of studies using either real or hypothetical decision

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situations, or both, without providing a clear reason for using one or the other type of situation. This raises two important questions: firstly, is there any justification for decision researchers' use of hypothetical situations? Secondly, can we specify criteria when hypothetical situations can be profitably used instead of real ones?

2. Real and hypothetical decision situations

To clarify the focal distinction between real and hypothetical decision situations we need to keep it distinct from two related distinctions. Firstly, one might confuse it with the much discussed issue of whether *laboratory research* can tell us about *real life* decision problems. Indeed, decision research is dominated by laboratory experiments and real world settings are rarely looked at: Only recently has the Naturalistic Decision Making tradition (e.g., Klein, Orasanu, Calderwood, & Zsambok, 1995) set the focus outside the laboratory due to increased awareness that laboratory decisions may lack external validity, and boundary conditions for ensuring the external validity of laboratory decision research have been suggested (e.g., Ebbesen & Konecni, 1980; Hertwig, 1998; Lichtenstein & Slovic, 1973; Slovic & Lichtenstein, 1968). However, this distinction between artificial laboratory situations and real life situations is orthogonal to the one that concerns us here. One can investigate decision making in the laboratory by presenting real choices (e.g., participants can win real money), or one can ask participants to imagine being given such a choice. Similarly, one can investigate people's real life decisions in real life or ask them to imagine what they would do if they were in a particular real life situation.

Secondly, the real/hypothetical distinction is different from the substantial/insubstantial incentives distinction. Real payoffs may be substantial (e.g., to win $5000 for real) or insubstantial (e.g., to win 10 cents for real). However, the same is true for hypothetical payoffs. Research tends to equate hypothetical incentives with insubstantial incentives, but this is not correct, as we will show in Experiment 2.

Why is it (to some degree) admissible to study decision making using hypothetical decision situations with hypothetical payoffs? We suggest a straightforward answer: decision making is hypothetical in its very core. When making a decision we anticipate hypothetical states of the world, we consider events that may or may not obtain, and we consider feelings that we do not yet have. For instance, when considering whether or not to accept a gamble, we anticipate possible outcomes and evaluate these outcomes. However, at the time of the decision, none of these outcomes is real, all are hypothetical. In other words, the essence of decision making lies in the mental manipulation of hypothetical contents. Hence, decision researchers have some justification in assuming that people's real decisions can profitably be investigated by asking them to make hypothetical decisions. The reason is that the core process of real decision making consists of imagining and evaluating hypothetical options, and that this core process is the same for hypothetical decisions.

We have just given a justification for doing research with hypothetical decisions, but this does not necessarily mean that all real decisions can be studied hypothetically, because there is more to making decisions than considering hypothetical options. For instance, a purely hypothetical choice does not affect a participant's real future whereas a real choice does. It is quite plausible that the mere knowledge that one's decision does have real consequences may lead to a difference in the decision process. We do not know when and whether the knowledge that one is making a real decision does have this effect. One intuitively relevant factor is the importance of the decision. That is, when playing for small, trivial amounts, the mental processes involved in real and hypothetical decisions may be the same. If, however, the stakes are high, lives to be saved, or large amounts of money involved, important differences may emerge. An example: the choice between a small amount of money (say, $1) and an equivalent

gamble ($2 with probability 1/2) will leave me as calm as if I were asked hypothetically what I would prefer. The chances are high that my hypothetical and my real decision will match. When asked hypothetically how I would decide between $1000 for sure or $2000 with probability 1/2, I will stay equally calm. In contrast, when offered this choice for *real*, my hand might start to tremble, and I might feel butterflies in my stomach. This state of excitement can *relevantly influence* my decision which leads to a mismatch between the real and the hypothetical decision.

2.1. Gambles with hypothetical payoffs

Decision researchers have frequently been suspicious about there being substantial differences between real and hypothetical gambles. Edwards (1953) found an increase in the willingness to take risks when participants played for real money. Slovic (1969) found different choice strategies with real and hypothetical payoffs. Although these early findings demonstrate differences between real and hypothetical gambles, later research reports only minor or no differences. For instance, Knetsch and Sinden (1984) found a similar disparity between willingness to pay and compensation demanded for real and for hypothetical negotiations. The sunk cost effect (incurred loss after investment induces further investment) occurs in both real and imagined situations (Arkes & Blumer, 1985). The asymmetric dominance effect (adding an inferior alternative to a choice set increases the probability of choosing an unrelated item) empirically found in hypothetical scenarios could also be observed for real choices (Simonson & Tversky, 1992). Beattie and Loomes (1997) directly compared real and hypothetical gambles and found no differences for simple pairwise choice problems. In sum, the general consensus among psychologists seems to be that hypothetical choices give a reasonable, qualitatively correct picture of real choices (see also Beattie & Loomes, 1997; Camerer, 1995; Camerer & Hogarth, 1999; for a more pessimistic view see Harrison, 1994; Hertwig & Ortmann, 2001).

The most lively debate over the difference between real and hypothetical decisions concerned on the preference reversal phenomenon which consists in the finding that high probability bets of modest gain (P-bet) are chosen over high payoff bets with low probability ($-bet), even though the stated average selling price is higher for the $-bets than for the P-bets. Although psychologists (Lichtenstein & Slovic, 1971) as well as economists (Grether & Plott, 1979; Reilly, 1982) used real money (but with very low payoffs of approximately $1), they still found preference reversals. Pommerehne, Schneider, and Zweifel (1982) argued that the real payoffs in earlier studies had been too small. They multiplied the payoffs of Grether and Plott (1979) by a factor of 100 and repeated the experiment. However, the reality and size of their payoffs was compromised by the fact that the real condition was at first run with play-money and participants received a converted amount of real money only at the end which was much smaller (a total of 2000 Swiss Francs (about $1300) could be won by 84 participants). The reversals did not disappear, but were less frequent. Their conclusion was: ''Even when the subjects are exposed to strong incentives to make motivated, rational decisions, the phenomenon of preference reversal does not vanish'' (Pommerehne et al., 1982, p. 573).

But this conclusion may be premature. A closer look at the results of all these experiments shows that the percentage of preference reversals varied between 56% and 83%, with a mean of about 70% reversals for hypothetical and real but small payoffs (at most approximately $4; see Table 1). The studies that used substantially larger medium size payoffs found a lower percentage of preference reversals of about 50% (Pommerehne et al., 1982;[1] Reilly, 1982). Extrapolating this trend, if for real

[1] The authors do not report the exact payoffs, but we can estimate from the description of their experiment that the payoffs were around $15–$20 per participant.

Table 1
Real/hypothetical preference reversals

Source	Payoff type		
	Payoff size	Real	Hypo.
Lichtenstein and Slovic (1971)	Small	56[a]	83
Lichtenstein and Slovic (1973, Exp. 1)	Small	81	—
Lichtenstein and Slovic (1973, Exp. 2)	Small	76	—
Grether and Plott (1979)	Small	70	56
Reilly (1982), Stage 1	Medium	59	—
Reilly (1982), Stage 2	Medium	42	—
Pommerehne et al. (1982)	Medium	45	—

Note. Hypo.: hypothetical.
[a] Percentage of preference reversals.

large payoffs a further decline of approximately 20% occurred, then the incidence of preference reversals would reduce to a level of about 20–30%. This level, however, is not very impressive given that the chance level of (unpredicted) preference reversals is typically between 10% and 20% (Grether & Plott, 1979; Reilly, 1982). Moreover, Harrison (1994)[2] found that preference reversals disappeared with real payoffs if participants were motivated to behave consistently, and his conclusion is radically different: "The experimental evidence against expected utility theory is, on balance, either uninformative or unconvincing. When one modifies the experiments to mitigate these criticisms the evidence tends to support traditional theory" (p. 223).

In summary, the preference reversal literature has not yet adequately established that there is no difference between real and hypothetical decisions, because there are no experiments with large payoffs and the experiments with nontrivial, medium size payoffs did not directly contrast real and hypothetical decisions.

An interesting parallel to the preference reversal literature can be found in research on the framing effect. The prototype of a framing task is the Asian disease problem (Tversky & Kahneman, 1981). Participants are told about an epidemic of Asian flu, which is expected to kill 600 people in the USA. They then have to choose between two options: Option A saves 200 people for sure, and option B saves all 600 people with probability $p = 1/3$, or nobody. Options A and B are framed positively as gains. Another group of participants is presented with negatively framed options as losses: by implementing option C 400 people will die for sure, and by implementing option D all 600 people will die with probability $p = 2/3$ or nobody will die. The framing effect consists of the finding that participants prefer option A (the sure option) over B (the risky option) in the positive framing condition, and prefer option D (the risky option) over C (the sure option) in the negative framing condition (for recent overviews see Kühberger, 1998; Kühberger, Schulte-Mecklenbeck, & Perner, 1999; Levin, Schneider, & Gaeth, 1998; Rothman & Salovey, 1997).

There is some research on the framing effect comparing real with hypothetical outcomes. Wiseman and Levin's (1996, Experiment 1) participants had to choose between different durations of performing a boring task: either to work on the task for an additional 7 min (sure option), or to work on the task for either one additional minute ($p = 1/2$), or for another 13 min (risky option). Participants were first asked hypothetically and were then asked to choose for real. Twenty-seven out of the 30 participants were consistent in their choices. In their second and third experiments, Wiseman and Levin (1996) gave choices between framed gambles of small payoff size (the expected values ranged from \$1.00 to \$2.60). Again, a hypothetical decision was presented first and then the gambles were played with real money with a conversion factor

[2] The results of Harrison (1994) are not included in Table 1 because he calculated the preference reversals differently. Percentages are therefore not directly comparable.

of 5 (hypothetical) to 1 (real). No significant differences in choice behavior between hypothetical and real decisions were found. However, since the hypothetical choices preceded the real choices in all experiments, these findings may be due to carryover effects. Participants may simply have tried to appear consistent in their choices.

Levin, Chapman, and Johnson (1988) contrasted real and hypothetical gambles with payoffs of different magnitudes. They used between 15 cents and $2 in the real condition, and up to $200 in the hypothetical condition. In the hypothetical gambles, more risk-aversion was found in the positive condition than in the negative condition. In the real gambles the framing effect was less pronounced and the overall choices were more risk-seeking.

Paese (1995) conducted two experiments on the framing effect with actual time allocation decisions. The results for the unattractive (Experiment 1) as well as for the attractive task (Experiment 2) were small to moderate in magnitude, and there was some variability, but the results were generally in line with the standard findings.

However, all these experiments suffer from a serious shortcoming: there are no studies that contrast real and hypothetical outcomes with nontrivial real payoffs. High payoffs have only been used for hypothetical decisions. That is, all experiments suffer from one or more of the following shortcomings: (1) confounding of real versus hypothetical decisions with payoff-size: real decisions are typically made with small payoffs, hypothetical decisions with large payoffs (e.g., Hogarth & Einhorn, 1990); (2) type of decision (real vs. hypothetical) and location of research (laboratory vs. field) are confounded (e.g., Lichtenstein & Slovic, 1973); (3) the practice of presenting the real choice at the end of experimental sessions amounts to a confounding between type of decision and experience (e.g. Edwards, 1953); (4) many experiments purported to test real decisions with high payoffs use only quasi-real payoffs. They offer play-money or points for which participants receive a converted—much smaller—amount of real money at the end. Another form of quasi-real reward is the use of a random device to identify a participant, or for each participant a particular trial for which the hypothetical outcome is to be made real. Thus, the likelihood of a gamble to be actually played depends on the number of participants, or trials (e.g., Battalio, Kagel, & Jiraniakul, 1990; Grether, 1992; Slovic, 1969). The use of such a "random lottery mechanism" procedure is controversial (Wilcox, 1993), and experiments which test the random lottery mechanism show that it leads to results that differ both from real as well as from hypothetical payoffs (Beattie & Loomes, 1997).

The overall picture that emerges is of a preference reversal effect that might vanish when real payoffs are large. For the framing effect the same might be true but we cannot yet tell, because the critical experiment contrasting real decisions with small and large payoffs with hypothetical decisions involving small and large payoffs has not yet been done. Experiment 2 below makes this critical comparison. It tests the framing effect with large and small payoffs for real and hypothetical decisions. Since an experiment with large real payoffs is costly, Experiment 1 explored the effect of payoff size for hypothetical decisions only.

3. Experiment 1: Hypothetical framing with different payoffs

In a hypothetical gambling study, and a large meta-analysis of over 40 framing studies, Kühberger et al. (1999) found that the framing effect is weak for small payoffs. Similarly, Hsee and Weber (1997) found the framing effect to be more pronounced with large outcomes. Taken together, these findings indicate an interaction between payoff level and framing. Experiment 1 uses payoff levels that had resulted in a framing effect (high payoff; expected value = ATS 250, worth approximately $25 at the time of the study), or had failed to result in a framing effect (low payoff; expected value = ATS 10) in an earlier study by Kühberger et al. (1999). With

these payoff levels we expect a main effect of payoff-size (more risk-seeking with small payoffs than with large payoffs) irrespective of framing, because people in general tend to prefer risk with trivial outcomes. In contrast, for nontrivial payoffs, framing is expected to influence risk attitude, leading to risk-aversion with positive outcomes and risk-seeking with negative outcomes according to the literature. That is, we predict an interaction between payoff-size and framing.

3.1. Method

3.1.1. Participants

A group of 53 students in an introductory course in Communication Science at the University of Salzburg volunteered to participate (32 females, mean age = 20.8 years, and 21 males, mean age = 21.9 years).

3.1.2. Design and procedure

A 2 (positive versus negative frame) × 2 (small versus large hypothetical payoff) within-participants design was used. Each participant received a booklet containing all four tasks which were systematically varied across booklets, and had to indicate his or her preference for each of the four tasks. In the positive framing condition, participants had to indicate their preference for one of two options: either winning a specified amount x for sure (option A), or winning the double amount $2x$ with probability 1/2 (option B). In the negative framing condition participants were to assume that they had been given some amount $2x$ in advance and then had to choose either to give back x, or to gamble with the prospect of losing either nothing or the whole amount $2x$. Payoffs were either low (ATS 10, worth approx. $1 at the time of the study) for the sure option, and ATS 20 for the risky option, respectively, or high (ATS 250 for sure, or ATS 500 with probability 1/2).

3.2. Results and discussion

The percentage choosing the sure option was analyzed using a 2 (positive versus negative framing) x 2 (small versus large payoff) ANOVA. As expected, we found no main effect for framing, but an effect for payoff size ($F(1, 208) = 16.45$, $p < .001$), and an interaction between framing and payoff size ($F(1, 208) = 4.11$, $p < .05$). When dealing with large payoffs participants showed the usual framing effect of preferring the sure option more often in the positive (45.3%) than in the negative framing condition (24.5%; $\chi^2 = 4.2$, $p < .05$). However, there was no framing effect with small payoffs (only 11.3%, and 13.2% chose the sure option in the positive and negative framing conditions, respectively; $\chi^2 = .2$).

This finding that a framing effect occurs only for large payoffs is compatible with the existing evidence from hypothetical framing studies which tended to use large payoffs only. It also replicates the findings by Hsee and Weber (1997), and Kühberger et al. (1999), that there is no framing effect for trivially small payoffs. It is quite plausible that for trivial payoffs participants are more interested in the thrill of gambling and, therefore, prefer the risky option regardless of frame. Since the framing effect (and probably other effects like the preference reversal phenomenon) for hypothetical decisions depends on the size of the payoffs, it is high time to investigate the real-hypothetical issue with small and large payoffs.

4. Experiment 2: The framing effect with hypothetical and real payoffs

The aim of Experiment 2 is to investigate the difference between real and hypothetical decisions and to avoid the usual confounding of decision type (real vs. hypothetical) and payoff size (small vs. large).

4.1. Method

4.1.1. Participants

Eighty-four volunteers from the University of Salzburg were recruited via an e-mail list (45 females, mean age = 25.3 years, and 39 males, mean age = 24.3 years). All students of the university are on this list so everyone had the same chance of receiving the information. The message contained the information that people were needed for a paid 1 h memory experiment and that payment depended on performance. After replying to an initial mail, participants were given several appointment times to choose from.

4.1.2. Design and procedure

The design was a 2 (positive versus negative frame) × 2 (hypothetical versus real decision) × 2 (small versus large payoff) design in which framing was varied between participants, and decision type and payoff size were varied within participants. Thus each participant had to make two real and two hypothetical choices. Since a preliminary analysis showed complex order effects, we report here only the results of the first choice, reducing all three factors to between participant factors.

Participants were randomly assigned to the positive or negative framing condition. They then were introduced to a "memory task" (which was actually an implicit learning task, see Reber, 1993) in which an artificial grammar had to be learned in 50 trials lasting approximately 30–45 min, followed by a testing session lasting for another 15–20 min. This task was quite strenuous.

After completing the memory task participants were taken individually to a different room. They were informed that they now faced an unrelated different task. Then they were confronted with the first gambling task. At the time of the first choice participants were given no hint to expect additional choices. In the hypothetical condition, we used the standard procedure asking participants to choose between two hypothetical options. No actual money was involved and all instructions were standard: "Imagine that you are given the following choice ..." In the real condition people were explicitly told that this choice was for real as payment for their participation and bills of money were laid out on the table. In the positive framing condition, participants were informed that they could choose one out of two options: either take their earned amount (of ATS 250 in the large payoff condition and of ATS 10 in the small payoff condition) or play a gamble that offered to win the double amount or nothing.[3] For this gamble, participants were shown a box containing five black and five white marbles. They could select a color and bet on this color. They then were to draw without looking. If they drew a marble of the selected color, they were paid the offered amount, otherwise they received nothing. This meant that they would end up with ATS 500 or nothing in the large payoff condition and with ATS 20 or nothing in the small payoff condition.

In the negative framing condition participants were informed at the beginning of the memory experiment that their maximal payment would be ATS 500 but that their actual payment depended on their score in the memory task. Participants were asked whether they agreed to participate. All participants agreed. Then they were given custody of ATS 500 for potential payment. After completion of the memory task, they were informed that the analysis of their performance had resulted in approximately 50% correct items and that they had to return half of their endowment, or play a gamble. After their decision, participants were either paid the sure amount

[3] All participants were given both the large and the small payoff. However, the first choice was for half of the participants with small payoffs and for the other half with large payoffs. We only analyze data from the first choice.

or the gamble was played and they were paid according to the outcome of the gamble. Finally, all participants were fully debriefed.

4.2. Results and discussion

Choices were analyzed using an ANOVA with framing (positive, negative), payoff (small, large), and decision type (real, hypothetical) as between participant factors. Fig. 1 shows the results. Payoff size was significant ($F(1,76) = 6.16$, $p = .02$). More participants opted for the sure option with large payoffs (56.7%) than with small payoffs (17.4%). Framing ($F(1,76) = 1.47$, $p = .23$) as well as decision type ($F(1,76) = 1.44$, $p = .24$) showed no main effect. However, there was the expected framing × payoff size interaction ($F(1,76) = 5.78$, $p = .02$). This replicates the finding of Experiment 1 that the framing effect depends on the size of payoffs: with small payoffs there was no framing effect (14.8% choosing the sure option with positive frame and 20.0% choosing the sure option with negative frame), whereas with large payoffs the typical framing effect appeared (67.0% choosing the sure option with positive frame and only 46.3% choosing the sure option with negative frame). A simple effects analysis on large payoffs showed that the framing effect is significant with hypothetical payoffs ($t(22) = 1.69$, $p = .05$), as well as with real payoffs ($t(22) = 2.16$, $p = .02$). No other effects approached significance, in particular there was no significant effect involving decision type (all $F's < 1$). Thus there was no statistical indication, whatsoever, that choices differed for real and for hypothetical decisions.

In sum, Experiment 2 replicates the framing effect for large payoffs. Especially important is the finding that the factor decision type did not even approach significance in any of the analyses. Although the power of the experiment was greatly reduced by analyzing only the first trials, it is important to note that the framing effect with large real payoffs was significant even for only 12 participants per group. That is, real decisions with large amounts do not diminish the framing effect; it may even be stronger than is apparent from hypothetical decisions.

A potential problem with our framing manipulation needs to be addressed. In the negative framing condition participants were explicitly told that their payoffs are determined by their performance in the memory task, whereas this dependence of payment on performance was not so clearly expressed in the positive framing

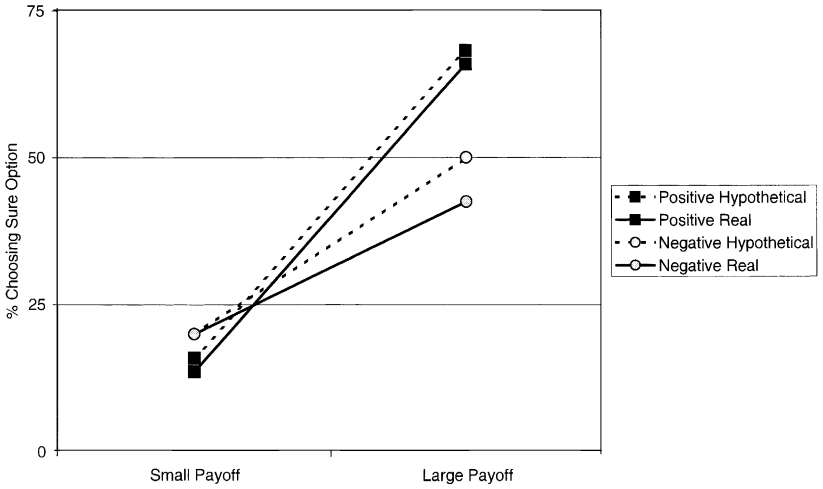

Fig. 1. Percentages choosing sure option with real/hypothetical small/large payoffs in positive and negative framing condition

condition. Therefore, the money earned in the positive framing condition could have the flavor of "house money," i.e., of money provided by the house rather than being one's own, hard earned money. Research on the "house money effect" shows that people tend to take more risk on house money (Thaler & Johnson, 1990). The possibility of a house money mentality in the positive framing condition creates a conservative bias and thus participants should have shown greater risk seeking in the positive than in the negative framing condition. However, since we observed the opposite pattern, it is implausible that this difference could account for the framing effect with real decisions.

In sum, the results show that people who imagine a hypothetical risky choice situation make the same choice as they make when dealing with a real decision for real money: they take risks with small payoffs regardless of frame, and they take risks with large payoffs when negatively framed, but they play it safe with large payoffs when positively framed. Moreover, Experiment 2 also shows that for real as well as for hypothetical choices the framing effect is limited to large payoffs. The most plausible explanation for this difference between small and large payoffs is that with small payoffs people use different choice strategies than for large payoffs. According to Fuzzy trace theory (Reyna & Brainerd, 1991) people may decide at a lower, qualitative level of discrimination with trivial payoffs (e.g., "Whether I have $1 or $2 does not matter, since both amounts are in fact nothing"), whereas, with nontrivial payoffs, they probably make clear quantitative distinctions (e.g., "$25 is clearly less than $50").

5. General discussion

The central findings of this research are that the framing effect differs for small and large payoffs, and that real and hypothetical decisions result in similar choices. We will now elaborate on two important theoretical implications of these results.

5.1. The economists' argument

Our results pose a problem for the "economist's argument" on the importance of substantial rewards: (i) Substantial incentives lead to more thorough processing, and (ii) more thorough processing makes economic (rational) anomalies disappear, because more cognitive effort leads to better decisions, mostly by reducing the within-subjects error variance ("effort-model of decision making"; Smith & Walker, 1993; Tversky & Kahreman, 1986; for unsupportive evidence see Wilcox, 1993). There is evidence that incentives do prolong deliberation (Paese & Sniezek, 1991; Tversky & Kahreman, 1986; Wilcox, 1993), and there is also evidence that more thorough processing makes economic anomalies disappear, thus indicating that increased understanding drives behavior in the direction of the normatively correct response (Slovic & Tversky, 1974). There is also some indirect evidence for this to occur specifically with framing, because being forced to take more time or to provide a rationale for a choice weakens the framing effect (Sieck & Yates, 1997; Takemura, 1992, 1994).

Our data pose a problem because the framing effect is an economic anomaly but it does not disappear with larger payoffs—if anything, it became stronger. These findings support Camerer (1995, p. 635): "The effect of paying subjects is likely to depend on the task they perform. In many domains, paid subjects probably do exert extra mental effort which improves their performance, but in my view choice over money gambles is not likely to be a domain in which effort will improve adherence to rational axioms."

5.2. Lack of theory

While our results are encouraging for the piecemeal validity of hypothetical decisions, we still lack a comprehensive theory of why in some cases hypothetical decisions match real decisions and in other cases they do not (Hertwig & Ortmann, 2001). Without such a theory the whole advantage of hypothetical decision research is nullified because for each question to be answered by a hypothetical decision experiment the results have to be validated by an accompanying real decision experiment (the do-it-both-ways rule, Hertwig & Ortmann, 2001). For instance, even though we now know that the framing effect exists for ATS 500, and perhaps for a range of similar monetary payoffs, we still do not know whether it exists for real decisions involving 600 human lives. Although our payoffs were clearly higher than typical payoff levels in decision research, they are still modest in the larger scheme of things (e.g., buying a house, or buying a car). Thus it is still possible that the lay intuition of risk-aversion is correct for truly "large" payoffs. For instance, Binswanger (1980) found that virtually all individuals were moderately risk-averse for truly large payoffs (approximately the monthly income of unskilled workers in India) with gain-framed gambles. This is consistent with our findings, but research on truly large loss-framed gambles is still lacking.

5.2.1. Substantial incentives

A related problem has been addressed in terms of when findings on small, insubstantial incentives can be generalized to decisions involving substantial incentives. This is relevant for the question about hypothetical and real decisions, because hypothetical decisions involve no real outcomes/incentives, except for the social value of pleasing the experimenter. Hence all hypothetical decision situations, irrespective of the size of the hypothetical outcome can be classified as decisions with trivial incentives.

One important attempt to characterize the relevant features that distinguish real from hypothetical decision situations is presented by Camerer and Hogarth (1999). By including person-specific and task-specific factors, they extend Smith and Walker's (1993) economic model which assumes that individuals respond to increased incentives by expending more cognitive effort. For instance, incentives will be of little influence when the task is either extremely simple (essentially no mental effort required), or extremely difficult (so that a solution is beyond a participant's reach). Camerer and Hogarth's (1999) review suggests that most studies fail to show a clear improvement with larger incentives. In the end, however, they come up with a relatively prosaic rule: one should "... use substantial incentives for tasks which have shown substantial incentive effects in previous studies; [one need] not us[e] incentives if previous studies have established little effect; and in cases where previous studies are ambiguous, authors must run at least one real-payment condition" (p. 31).

Our results highlight a problem for this methodological rule. On the one hand the change from small incentives (hypothetical payoffs, real low payoffs) to high incentives (real high payoffs) leads to a difference in choices (from universal risk-seeking to a framing effect) but on the other hand, the same choices are made with real high payoffs (high incentives), and with hypothetical high payoffs (low incentives). How could the rule tell us to expect change in the one case and no change in the other case?

One thing that follows from this problem is that one needs to keep distinct the difference between small and large incentives from real and hypothetical decisions. To our knowledge these two aspects are not distinguished in the literature. We now focus directly on when real decisions can be inferred from hypothetical decision behavior.

5.2.2. Hot/cold empathy gap

To understand the real/hypothetical issue better we need to know the features that are different in hypothetical and real decisions. One plausible source of difference between real and hypothetical decisions is that people might predict a quantitatively smaller and qualitatively different set of possible consequences in hypothetical decision situations than in real situations. Payne, Bettman, and Schkade (1999) give a list of possible shortcomings in fleshing out future consequences: myopic decision frames; inappropriate problem representation; inappropriate selectivity and the focusing illusion; lack of comprehension; avoidance of tradeoffs; influences of scale compatibility; biases in scale usage. However, one cannot simply assume that incentives will lead to a more thorough fleshing out in all these aspects. Rather, some aspects might profit from incentives (e.g., problem representation, selectivity, and tradeoffs), while others might not be influenced (e.g., comprehension, scale compatibility, and scale usage). Although systematic research on the role of incentives for the fleshing out of consequences is lacking, some general guidelines can be suggested. It can be assumed that only those features of real decisions that are themselves based mainly on projecting hypothetical situations are likely to be accurately captured in hypothetical decisions. For instance anticipated emotions, like disappointment and regret, are based on a mental comparison of the real situation with counterfactual possibilities. Therefore, these emotions should become operative in purely hypothetical and real situations in a similar way. Available research confirms that regret and disappointment influence choices in real and hypothetical situations alike (Josephs, Larrick, Steele, & Nisbett, 1992; Kirkpatrick & Epstein, 1992; Medvec, Madey, & Gilovich, 1995; Sanna & Turley, 1996; Van Dijk & van der Pligt, 1997).

In contrast, the influence of more visceral emotional changes due to inebriation or bodily changes (Loewenstein, 1996), and the influence of extremely strong affective states is less likely to be adequately captured by pure imagination, because the effects of physiological changes (e.g., inebriation) cannot be easily triggered by imagined events (e.g., imagining drinking whiskey). This is known as the hot-cold empathy gap (Loewenstein, 2001). People systematically misestimate the influence of visceral factors (e.g., emotions and drives) on their thinking. More specifically, they: (i) underpredict the force of visceral factors in constraining their thinking, and (ii) tend to misproject their current emotions onto the future (Loewenstein, 2001). For instance, recent research shows that this direct influence of emotions (concurrent rather than anticipated; see Loewenstein, Weber, Hsee, & Welch, 2001) can make a big difference for the fleshing out of consequences. The research of Loewenstein and his colleagues shows that visceral factors focus attention and motivation selectively on goods that can mitigate the negative state; on immediate mitigation, and on the self as opposed to others. That is, the fleshing out of consequences may be severely biased by visceral factors. Loewenstein (2001) also suggests a difference in the visceral bias dependent on the direction of the gap. If people are currently in a cold state and predict their behavior in a hot state (e.g., making a hypothetical decision that would have very important consequences if made for real) they tend to strongly underestimate the visceral influence. In contrast, if people are currently in a hot state and predict their behavior in a cold state (e.g., shopping on an empty stomach) they tend to overestimate the visceral influence. Interestingly, Loewenstein (2001) also suggests an underestimation of visceral influences for the hot/hot situation. Only in the cold/cold-situation he suggests no bias.

In general, decision research tends to present tasks that do not offer much room for strong visceral factors. Such factors may thus be of minor importance in experimental gambles, even when played for real money. However, they may play a strong role in affect-rich decision situations (e.g., to bet on the opportunity to kiss one's favorite movie star; see Rottenstreich & Hsee, 2001), and in all problems that involve a hot/cold empathy gap.

In the middle ground between "cognitive" emotions and visceral factors one may find time related feelings (e.g., boredom) or aspects related to the possession of something over time. In studies on time preference, for instance, decision makers have to trade off immediate for delayed outcomes. Such studies generally report a very weak, if any, relationship between predicted and actual decision behavior (Chapman, 1998). Similarly, research on the endowment effect (people become more attached to an object in their possession than they predict they would on the basis of their desire to possess the object before it belonged to them), indicates that this effect is difficult to find in hypothetical decisions (Loewenstein & Adler, 1995). Thus, we suggest that the real/hypothetical issue is dependent on the existence, and direction, of a hot/cold empathy gap. The stronger this gap, the more likely is it that hypothetical decisions will fail to match real decisions.

In conclusion, we found that the size of the incentive influenced participants' choices. Paradoxically, for "incentive theory," the high incentive has the same effect in the real and hypothetical gambles. This is paradoxical because a high payoff offered in a purely hypothetical gamble does not constitute a substantial incentive. The paradox can be resolved by realizing that the size of the payoff primarily affects the core decision process of projecting future outcomes, which is shared by hypothetical and real decisions. That is, at the time of the decision being made, a payoff is present only as a hypothetical future event even for real decisions. The difference between real and hypothetical decisions in this case is a fine one: in real risky decisions one knows that the offered payoff might or might not become real, and in hypothetical decisions one knows that the offered payoff will definitely not become real. Real and hypothetical decisions might differ, however, if there is a hot/cold empathy gap involved. With experimental gambles such a gap may be unlikely, but not with other decision tasks.

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