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Money, Lives, and Frames: What Evidence from Bulgarian Students Tells about Framing of Risky Choices

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Abstract: Prospect theory accounted for the framing effect by assuming an automatic translation of the problem content into expected utilities and a passive acceptance of the externally provided frame regardless of problem content. The size of the framing effect in the famous Asian Disease problem initially suggested that these assumptions are met but subsequent research showed otherwise. In a dataset collected during regular class sessions among Bulgarian students, a framing effect was found for monetary problems but not for the Disease problem. These results are consistent with previous findings by the author and add to the view that a top-down and domain-specific approach might be a necessary complication when one is aiming to account for the psychological processes during risky choices.

Keywords: Prospect Theory, Framing, Asian Disease Problem, Content Effects, Top-Down Processing

JEL: D91, D81, J17

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Kahneman and Tversky (1979) proposed prospect theory as an alternative to the rational theory of choice (Von Neumann & Morgenstern, 1947). They argued that prospect theory is a better account of how choices under risk are made, as opposed to how they should be made (Tversky & Kahneman, 1986). In particular, prospect theory predicts the framing effect, whereby different presentations of the same options lead to a predictable shift in preferences, in violation of rationality principles (Tversky & Kahneman, 1981). The framing effect has been subject to multiple studies and proved to be a robust phenomenon. However, there is always a fraction of participants who do not respond consistently with the framing effect. Furthermore, this fraction is likely to vary across different problem contents. The aim of the present paper is to examine the rationale for the variability of framing effects and to provide further evidence from Bulgarian students suggesting that additional factors, such as task content, might moderate the framing of risky decisions.

Prospect theory assumes a two-phase structure of the choice process: an initial editing phase and a later evaluation phase. The editing phase consists of a set of mental operations, resulting in a simplified mental representation of the options within a choice. The edited prospects are then evaluated in order to choose the option with the highest value. While the evaluation phase received a thorough attention and was formalized by Kahneman and Tversky (1979), the editing phase was only briefly outlined.

In particular, the nonlinear transformations of probabilities and objective values into decision weights and subjective values, predicted by prospect theory, are assumed to occur during the evaluation phase, as a result of the three principles of reference point, diminished sensitivity, and loss aversion. These are basic cognitive principles hard-wired in the human mind that generalize over many domains of mental life, starting from basic sensation and perception, and are conceived as automatic, fast, and effortless—features of a set of processes denoted as System 1 (Kahneman, 2011). Deviations from normative principles are thus explained by the propensity of the cognitive system to accept the solution provided by the automatic, effortless, and error-prone processing rather than engaging in effortful thinking (System 2) to check and override fast decisions.

However, this detailed view of the mental processing during the evaluation phase was not matched by a similar elaboration of the editing phase. Indeed, Kahneman and Tversky (1979) listed several editing processes such as coding, combination, segregation, and

cancellation, most of them in keeping with modern view of limited cognitive capacity (e.g. Cowan, 2001). Yet, they did not propose a clear model of the processes operating during this phase, despite Kahneman (2000) acknowledging the crucial role of the editing phase in prospect theory as a psychological theory.

Prospect theory thus implicitly assumes that the editing processes, much like the evaluative processes, are largely content-independent, leading to the same output across individuals and contexts. Such an assumption is consistent with the largely domain-general view of human decision processes implied by prospect theory from both economic and psychological perspective. As an expected utility theory, it assumes that any choice can be described as a non-linear transformation of probability and objective value. As a psychological theory, it relies on three general principles that operate irrespective of the domain of choice.

The assumption of domain-generality of the editing processes warrants the predominant use of monetary gambles as the "fruit fly" (Kahneman, 2000) of testing decision theories. Indeed, this type of problems is relatively familiar to participants and well-defined in terms of probabilities and values, the expectations being that the results would generalize to other areas of life. However, the domain-general view has at least two consequences that can be questioned: it assumes an automatic translation of the surface content into expected utilities, and it equates framing as an experimental manipulation with framing as an internal representation of the problem.

First, prospect theory assumes that the gist of the mental representation resulting from the editing phase always contains information about probabilities and values, providing material for the subsequent evaluation phase. In other words, prospect theory, among other expected utility theories, implies that the surface structure of the problem is automatically transformed into a deep structure in terms of expected utilities (following a psycholinguistically-flavored terminology proposed by Wagenaar, Keren, & Lichtenstein, 1988). If so, then problems sharing the same deep structure should always elicit the same choices, and thus most of the surface structure of the problem, such as the content domain, is irrelevant and can safely be ignored.

As argued by Rettinger and Hastie (2001), however, the assumption of an automatic translation from surface to deep structure should be considered problematic in cognitive psychology, where the role of surface features in processing has been an established phenomenon in many areas ranging from story comprehension (Kintsch & Van Dijk, 1978) to problem solving (Gick & Holyoak, 1980). More importantly, this assumption was not

supported in studies examining the content effect in decision making. For instance, Wagenaar and his colleagues (1988) showed that varying the contents of problems sharing the same underlying expected utilities had dramatic effects on participants' preferences.

Rettinger and Hastie (2001) further demonstrated that, while the story content did not influence subjective expected utilities across different problem contents, it did influence decision strategies, problem representations, and the resulting decisions. In particular, in a legal problem, moral considerations were the predominant strategy, while in problems of academic, financial, and casino gamble contents decisions were mostly influenced by numerical strategies. The legal problem also contained the highest proportion of non-numerical mental representations. Across problems, a numerical decision strategy was associated with choosing a safe option while a non-numerical, narrative strategy was predictive of risky decisions. These results make a strong case for the importance of the surface structure of the problem on decision making. They also suggest that the editing processes might be much more active than prospect theory has assumed. Wagenaar et al. (1988) explicitly stated that editing operations, as posited by prospect theory, are radically incomplete in describing representation of the problem.

A related consequence of the domain-generality assumption is the prediction that suitable wording of a task will inevitably elicit the framing effect. However, this view seems to omit a crucial step in the process: the internal representation that was generated as a result of the externally provided frame. This omission is important, since it is the framing in the mind of the individual, rather than the wording of the problem, that is conceived as the ultimate reason for the framing effect. The lack of elaboration of the mental processes during the editing phase thus lead to a crucial ambiguity in the use of the term framing: sometimes it is used to describe the way the interpretation constructed by the decision maker; other times it refers to the way the problem is formulated by the experimenter (Maule & Villejoubert, 2007). Kahneman (2000), too, acknowledged that the use of a single term led to confounding the mental activity of the individual with the third-party manipulations aiming to induce the framing effect. Kahneman responded to his self-critique by stating that people generally tend to passively accept whatever frame they are offered. Hence, the way a problem is formulated largely determines internal representations.

Such a passive, "bottom-up" view of the editing processes is, however, inconsistent with major findings in cognitive psychology, where even basic perception is conceived as active interpretation and construction, relying much on "top-down" processing (Maule & Villejoubert, 2007). That prospect theory would advocate a passive view is even more

surprising, given the very rationale to include an editing phase drew on the psychologically important distinction between objective reality and mental representation (Kahneman, 2000).

Yet, initial empirical evidence from the famous Asian Disease problem (Tversky & Kahneman, 1981, see the Method section for a version of the problem) provided a crucial support for this view, in showing that a framing effect of an impressive size can be demonstrated beyond monetary outcomes. This feature of the Asian Disease problem might have contributed to its iconic status as a demonstration of the framing effect: if the effect is found for human lives as well as for money, it seems natural to conclude, by induction, that it would also be present in all sorts of important situations.

However, subsequent results, although generally supportive of the framing effect, were sometimes mixed (Fagley & Miller, 1990, 1997; Levin, Schneider, & Gaeth, 1998; Miller & Fagley, 1991). For instance, Fagley and Miller (1997) found that, on problems involving human lives (including a modified version of the Asian Disease problem) rather than money, participants were risk seeking irrespective of frame. In a meta-analysis of the framing effects, Kühberger (1998) estimated an average effect size of 0.57, as measured by Cohen's *d*, based on 80 studies using the standard Asian Disease design. In comparison, the average effect size in a gambling design, based on 32 studies, was $d = 0.43$. A recent international replication effort (Klein et al., 2014) with data collected from 27 laboratories and nine online studies around the world, reported an average effect size of $d = 0.62$, quite close to Kühberger's estimate made two decades earlier but much lower than the size calculated from Tversky and Kahneman's (1981) original results, $d = 1.13$. While a significant effect in the expected direction was found in 31 out of 36 samples (i.e. 86%), only three samples (8%) showed an effect of the same size or greater than the one reported by Tversky and Kahneman (1981). Evidence thus shows that a considerable proportion of participants do not show a framing effect, which goes against what one should expect by equating the two senses of framing.

The distribution of effect sizes in Klein et al.'s (2014) study suggests that it is almost as unusual not to reproduce the effect at all as it is to reproduce the size of the original effect. Interestingly, in the only previous study using Bulgarian participants the author is familiar with, Mengov and Hristova (2004) had both extremes at once. In particular, the framing effect, in a Disease-like problem, was large among economists (estimated $d = 1.10$) but small and insignificant among computer specialists (estimated $d = 0.32$). Apart from this curious discrepancy, several factors prevent from drawing conclusions from this study about the size of the framing effect within a Bulgarian sample, most importantly the use of a within-subjects

design, the unusual samples (compared to other studies), and the altered problem domain (job layoffs rather than disease)[2]. Klein et al. (2014) has not included a Bulgarian sample in their replication study either. Thus, the size of the framing effect within a Bulgarian sample has been largely an open question.

Recently, Rachev and Petkova (2019) partially filled this gap by reporting results from an exploratory study of several well-known effects predicted by prospect theory, including the framing effect. Using the original between-subjects design, with participants comparable to those in previous studies (i.e. consisting predominantly of Bulgarian undergraduate students), and staying close to the original problem content (e.g. money or disease), they replicated the framing effect for a gambling problem but not for the Disease problem. However, in that study, the response format of the two types of tasks was different. In particular, the gambling problem required a choice between two options, while the Disease problem provided a six-point rating scale to indicate the direction and magnitude of the preference. Hence, the difference between the two formats might be due, in part, to the response format.

Accordingly, the present report complements Rachev and Petkova's (2019) results by presenting data from several monetary problems and the Disease problem using their original categorical format. The data were collected during roughly the same time period as the data reported in Rachev and Petkova (2019). The main difference between the two data collection settings was that data in the present report were typically collected at the beginning of regular classes on the topic of decision making. The original aim of the data collection was thus to illustrate the effects to be introduced. However, during a number of sessions, the Disease problem failed to illustrate the framing effect. Accordingly, the aim of the present report is to summarize these data in order to do a statistically more powerful test of the framing effect in the Disease problem and compare it to the effect in the relevant monetary problems. Subsequently, the effect sizes are compared to previous research with participants from different backgrounds (Klein et al., 2014; Kühberger, 1998) and from a highly comparable sample (Rachev & Petkova, 2019).

[2] In addition, the options, as reported, were framed somewhat ambiguously.

Method

Participants and Procedure

During university class sessions from 2011 to 2017, participants responded to sets of decision problems, including several framing tasks, printed on a sheet of paper in a fixed order. The number and the content of the tasks differed slightly from one administration to another, as did the order of the tasks. All participants were presented with a version of the Asian Disease problem and at least one relevant monetary problem. Since the primary interest was in the response pattern of ethnic Bulgarians, data from 19 participants having indicated nationality other than Bulgarian were removed prior to the analyses.

The final sample consisted of 206 Bulgarian students (51 male, 155 female), consisting predominantly of psychology undergraduates (n = 190) and small numbers of tourism undergraduates (n = 7) and masters' students in child and adolescent psychology (n = 9). The mean age (collected from 69 participants) was 20.9 years (SD = 2.04, Med = 20). Since materials were not identical across all administrations, the number sample sizes differ across tasks and are indicated in the relevant sections and tables.

Materials

Three monetary problems and one problem concerning human lives (i.e. the Disease problem) were relevant to the aims of this report. All materials were in Bulgarian.

Monetary Problem #1: Reflection Effect between Subjects. One subset of participants was presented with the following problem[3]:

> Choose between
> (A) sure gain of 80 leva[4], and
> (B) 85 percent chance of winning 100 leva, and 15 percent chance of winning nothing.

> Another subset of participants had to choose between
> (A) sure loss of 80 leva, and
> (B) 85 percent chance of losing 100 leva, and 15 percent chance of losing nothing.

According to the reflection effect in prospect theory (Kahneman & Tversky, 1979), in choices involving potential gains, people are risk averse: they prefer a sure gain over an uncertain gain with the same or higher expected value. In contrast, in choices involving

[3] The English back-translations, rather than the original problems, are presented.
[4] Lev (plural: leva) is the Bulgarian currency, approximately equivalent to 0.5 euros.

potential losses, people are risk seeking, preferring an uncertain loss with a lower expected value than a certain option. Hence, prospect theory predicts that the sure option (A) will be the predominant choice in the former problem while option (B) will be the most chosen option in the latter. Though not a framing problem *per se*, this problem is useful for establishing baseline estimates of risk aversion for potential gains and risk seeking for potential losses.

Monetary Problem #2: Reflection Effect in Concurrent Choices. Participants were presented with the following pair of problems (with several unrelated problems in between):

> *Combined Choice*[5]
> You have two options, X and Y. Choose the one that seems more profitable to you.
> X. A 25% probability of winning 240 leva and a 75% probability of losing 760 leva.
> Y. A 25% probability of winning 250 leva and a 75% probability of losing 750 leva
>
> *Concurrent Choices*
> Imagine having to make two choices at the same time. First, you have to choose between A and B and then, between C and D. Take a good look first at both pairs and then pick one option from Pair 1 and one from Pair 2. Select the combination that seems most profitable.
> Pair 1: Choose between:
> A. A sure gain of 240 leva
> B. A 25% probability of winning 1 000 leva and a 75% probability of not winning anything at all
> Pair 2: Choose between:
> C. A sure loss of 750 leva
> D. A 75% probability of losing 1 000 leva and a 25% probability of not losing anything at all.
> Which pair would you choose?

In line with the reflection effect, the vast majority of Tversky and Kahneman's (1981) participants chose options A and D in the Concurrent Choices. However, the combination of these options is equal to option X in the Combined Choice, while the combination of the least chosen options, B and C, is equal to option Y, which is obviously superior to X. Framing thus led to a violation of the principle of dominance in rational theory. In the present report, the Concurrent Choices task is regarded as a within-subjects test of the reflection effect. To check whether dominance was violated in the present sample, results from the two problems were also compared.

Monetary Problem #3: Isolation Effect. This type of problem was initially proposed by Kahneman and Tversky (1979) to illustrate what they called the isolation effect, or the

[5] Problems' titles were not presented to participants.

tendency to focus on certain aspects of the problem at the expense of others. Later, Tversky and Kahneman (1986) included a version of the problem in an overview of the framing effects, presumably implying that the isolation effect is an instance of the larger class of framing effects. In the reported task administrations, two versions of the problem were used, differing only in numerical values. In one version, participants in the gain frame condition read the following problem:

> Imagine having won 200 leva in a game and that you have to play one more round. You have to choose between:
> A. A sure gain of 50 leva
> B. A 25% probability of winning 200 leva and a 75% probability of not winning anything at all
> Which alternative would you choose? Please circle the right answer.

Participants in the loss frame read the following problem:

> Imagine having won 400 leva in a game and that you have to play one more round. You have to choose between:
> A. A sure loss of 150 leva
> B. A 75% probability of losing 200 leva and a 25% probability of not losing anything at all
> Which alternative would you choose? Please circle the right answer.

The second version used the same wording but the numbers were identical with those used by Tversky and Kahneman (1986, p. S258). Participants had to imagine they had just won 300 (500) leva and then given a choice between (A) a sure gain of 100 leva (sure loss of 100 leva), and (B) a 50 percent chance to win 200 leva (lose nothing) and 50 percent chance to win nothing (lose 200 leva). (The loss frame condition is given in parentheses). The two versions are referred to as the "200" and the "300" version, respectively, after the initial asset in the respective gain condition.

Asian Disease Problem. Three slightly different versions were presented during different data collection sessions. In Version #1, participants read:

> Imagine Bulgaria is facing a new deadly flu that 600 people are expected to die from. Two programs are suggested as a way to fight against the disease. Let's assume that the following precise calculations have been made to predict the outcome of the programs:
> *[Gain Frame]*
> - If Program A is selected, 200 people will be saved.
> - If Program B is selected, there will be a 1/3 probability that all 600 people will be saved and a 2/3 probability that none of them will be.
>
> *[Loss Frame]*

- If Program A is selected, 400 people will die.
- If Program B is selected, there will be a 1/3 probability that no-one will die and a 2/3 probability that all them will die.

You are the Minister of Health and the decision depends upon you. Which program would you choose?

In the other versions, the wording of the task was essentially equivalent, with two major differences. First, the Minister of Health perspective was omitted in all other versions. Second, the three versions had slightly different translations of the original phrase "the disease is expected to kill 600 people" (since literal translation of the verb *kill* would sound unusual in Bulgarian). Specifically, the phrase was translated as "the disease is expected to take 600 people's lives" and as "the disease is expected to affect 600 people" in Versions #2 and #3 respectively. The version used by Rachev and Petkova (2019), referred to as Version #4, was almost identical to Version #1, with two exceptions. First, the Minister of Health perspective was omitted. In addition, rather than a categorical response format, a six-point rating scale format was used ranging from 1 (strong support for the sure option) to 6 (strong support for the risky option) (for previous research using this format, see Bruine de Bruin, Parker, & Fischhoff, 2007; Levin, Gaeth, Schreiber, & Lauriola, 2002; Stanovich & West, 2008). To conform to the format of the other versions, in the present report data from Version #4 were transformed into categories by recoding ratings from 1 to 3 into preference for the sure option, and ratings from 4 to 6 into preference for the risky option (regardless of magnitude).

Results

Table 1 presents the results organized by the four versions of the Disease problem, which allows comparing the effect sizes across different tasks within the same sample. Thus, participants presented with Version #1 of the Disease problem were also presented with the Reflection Effect between Subjects Problem, the Concurrent Choices Problem, and the Isolation Effect Problem (Version 200). Within this sample, large between-subjects reflection and isolation effects were observed, as well as a within-subjects reflection effect of a moderate size in the Concurrent Choices problem. All effects were in the expected direction: potential gains elicited risk aversion while potential losses elicited risk seeking. However, there was literally no framing effect the Disease problem.

Similar results were obtained in the other three samples. When calculated over decent sample sizes, the size of the reflection effect in the concurrent choices was in the range of 0.7 to 0.8, which counts for a moderate to large effect (Cohen, 1988). The isolation effect ranged

from 0.45 to 0.55, standing for a small to moderate effect. In all cases, the effect in the Disease problem was significantly smaller, and of a negligible size of 0.19 or less. Evidently, regardless of the version of the Disease problem, it did not elicit a framing effect.

Table 1 also allows for comparisons by columns (i.e. within tasks across different samples).

Table 1

Proportion of participants who chose the risky option and effect size (Cohen's d and 95 percent confidence interval of d) on the four problems grouped by samples with the same version of the Disease Problem

		Refl. Effect (between-Ss)	Refl. Effect in Concur. Choices	Isolation Effect [a]	Asian Disease
Version #1	gain	17.4 (n = 40)	40.7 (n = 81)	30.2 (n = 43)	40.9 (n = 44)
	loss	77.5 (n = 46)	72.8 (n = 81)	84.6 (n = 39)	42.1 (n = 38)
	d [95% CI]	1.41 [0.88, 1.94]	0.65 [0.33, 0.98]	1.22 [0.70, 1.74]	0.0 [-0.44, 0.44]
Version #2	gain	–	48.8 (n = 41)	28.6 (n = 21)	57.1 (n = 21)
	loss	–	85.4 (n = 41)	60.0 (n = 20)	63.2 (n = 19)
	d [95% CI]	–	0.78 [0.30, 1.25]	0.55 [-0.12, 1.21]	0.02 [-0.63, 0.67]
Version #3	gain	–	35.8 (n = 81)	0.0 (n = 3)	47.6 (n = 42)
	loss	–	75.3 (n = 81)	100.0 (n = 2)	57.5 (n = 40)
	d [95% CI]	–	0.83 [0.49, 1.17]	1.28 [-2.63, 5.20]	0.15 [-0.3, 0.59]
Version #4 [b]	gain	–	38.2 (n = 304)	45.7 (n = 162)	47.2 (n = 161)
	loss	–	72.4 (n = 304)	68.0 (n = 147)	57.4 (n = 148)
	d [95% CI]	–	0.72 [0.55, 0.89]	0.45 [0.22, 0.68]	0.19 [-0.03, 0.42] [c]

Note. To calculate Cohen's *d*s from a chi-square test, an R script prepared by F. Hasselman for the Many labs replication project (Klein et al., 2014) was used (https://opensciceframework.org/project/WX7Ck/)

[a] In Versions #1 and #4 of the Disease Problem, Version 200 of the Isolation Effect Problem is used; for Version #2 & #3, Version 300 is used.

[b] Data reported by Rachev and Petkova (2019).

[c] Effect size calculated after converting into categorical format. See *Materials* for details.

Reflection effect in the concurrent choices was quite consistent while the isolation effect was relatively more variable across samples, even within the same version of the task (200 or 300). On one occasion, there were too few participants (n = 5, Disease Version #3). Nevertheless, consistent with prospect theory, the preference reversal is evident in all the

administrations of the monetary tasks. In contrast, the different versions of the Disease problem showed varied patterns of failure to reproduce the framing effect. In Version #1 (The Prime Minister Perspective), participants tended to avoid risk regardless of framing. In Version #2, participants tended to be risk prone regardless of framing. In Versions #3 and #4, there was a choice reversal but its size was negligible.

In Table 2, the results are aggregated across different versions of the same tasks (including the data reported in Rachev & Petkova, 2019), with the two versions of the isolation effect problems kept separate. The aggregated is consistent with the findings based on different samples: the three monetary problems show an effect of a moderate size while the Disease problem elicits a negligible effect, although consistent with expectations. The effect sizes in the two isolation effect problems were somewhat larger than the average effect size for this type of problems, $d = 0.43$, reported by Kühberger (1998). For Version 300, the sample size was relatively small and thus the estimate of the effect size is unstable, as shown by its large confidence interval. For Version 200, the overall effect (0.60) was a result of the combination of a small sample with a large effect (1.22, see Table 1) and a much larger sample with considerably smaller effect (0.45, data reported by Rachev & Petkova, 2019). The latter estimate is very close to the one reported by Kühberger. On the Disease problem, aggregation of data led to a fairly stable effect that is unlikely to be zero but its estimated size, 0.16 is considerably smaller than the respective sizes reported by Kühberger, 0.57, and Klein et al. (2014), 0.62.

In the transparent Combined Choice problem, the superior option Y was chosen by 92.5 of 510 participants overall. The preference for options A (60.9%) and D (74.0%, see Table 2) in the non-transparent Concurrent Choices problem clearly shows violation of dominance within this sample, consistent with prospect theory predictions.

Table 2

Proportion of participants who chose the risky option and effect size (Cohen's d and 95 percent confidence interval of d) on the problems summed across samples

	Reflection Effect in Concurrent Choices	Isolation Effect (200)	Isolation Effect (300)	Asian Disease
gain	39.1 (n = 507)	42.4 (n = 205)	25.0 (n = 24)	47.7 (n = 268)
loss	74.0 (n = 507)	71.5 (n = 186)	63.6 (n = 22)	55.5 (n = 245)
d [95% CI]	0.75 [0.62, 0.88]	0.60 [0.39, 0.81]	0.73 [0.09, 1.37]	0.16 [-0.01, 0.34]

Discussion

The aim of the present report was to summarize data concerning the framing effect in monetary tasks and in the Asian Disease problem among Bulgarian participants and to compare results to previous research. Consistent with a recent report by Rachev and Petkova (2019) but not with previous research on framing (Klein et al., 2014; Kühberger, 1998), the framing effect in three slightly different versions of the Disease problem was of a negligible size (0.16 in aggregate). Only one out of 36 labs in the replication effort by Klein et al. (2014) reported an effect of a comparably small size (0.11, the others ranging from 0.30 to 1.25). In contrast, a moderate to large reflection effect in concurrent choices was consistently found across different administrations, in line with both data from Bulgarian and international samples (Kühberger, 1998; Rachev & Petkova, 2019).

The present results thus converge with our previous findings (Rachev & Petkova, 2019) that Bulgarian students were prone to the framing effect in monetary tasks but not in the Disease problem, which largely rules out the possibility that the specific context of data collection, during regular class sessions discussing cognitive psychology topics, was a crucial extraneous factor impacting the results. The consistent divergence in the responses on the monetary problems and the Disease problem suggests that participants mentally represented the two types of problems in a quite different way. Moreover, it seems that participants represented the Disease problem differently than did typical participants in previous research. These results go against the domain-general view of the framing effect provided by prospect theory and favors accounts requiring a more elaborated version of the editing phase, allowing for variable outcomes across contexts, situations, and individuals (Fagley & Miller, 1997; Maule & Villejoubert, 2007; Rettinger & Hastie, 2001).

An important issue yet to be resolved is to discern what the crucial factors were that led to this discrepancy. Given the exploratory nature of the study, alternative explanations cannot be ruled out. Yet, two approaches to address the question can be suggested. One would be to look for manipulations, in previous research, leading to the decrease of the effect, and reflect on whether a similar context might have occurred naturally within the present sample. For instance, content factors (Fagley & Miller, 1997; Rettinger & Hastie, 2001; Wagenaar et al., 1988) are a reasonable candidate to account for the different response patterns on monetary problems and on the Disease problem. In light of previous findings (e.g. Rettinger & Hastie, 2001), one could speculate that monetary problems may have led to a heavy reliance on numerical strategies, which resulted in a framing effect. In contrast, narrative decision strategies, referring to moral considerations and emotional response, were likely to

be more common in choices concerning human lives. Such an interpretation would predict that the framing effect might depend on how much one has focused on the numerical aspects of the problem. If so, then using predominantly gamble scenarios to study decision biases could be a misleading research strategy, leading to important biases or omissions in the theories.

Another approach would be to test whether framing effects exist despite the experimental manipulation being unsuccessful. This possibility is suggested by the multi-faceted nature of the term "framing". As Maule and Villejoubert (2007) pointed out, the absence of a preference shift does not mean that there was no framing effect. For instance, if a participant mentally translates "200 people will be saved" into "400 people will die", a risky choice would be consistent with the framing effect, though inconsistent with framing as intended by the experimenter. Thus, if the mental representation resulting from the editing processes is the opposite of the externally provided one, a framing effect can be present but impossible to measure by simply registering the final choice. Exploring mental strategies and representations across different problem contents thus seem to offer a promising avenue for discerning the factors moderating the framing effect.

Yet another question is *why* these factors had an impact in this particular sample but not typically in previous research. Addressing this question might involve consideration of values, goals, and typical thinking styles of Bulgarian participants. One way the findings on the Disease problem might be interpreted is avoidance of the extremes in choices involving high-stake moral dilemmas. Such a search for the middle ground is consistent with a holistic cognitive style striving, among other things, to reconcile conflicting options rather than choosing one at the expense of the other (e.g. Peng & Nisbett, 1999). Although holism is usually associated with East Asians (Nisbett, 2003), Eastern Europeans' thinking styles have been found, too, to lean towards the holistic end of the analytical–holistic continuum (Varnum, Grossmann, Katunar, Nisbett, & Kitayama, 2008). Therefore, it seems reasonable to explore whether cultural specifics of thinking styles lead to predictable differences in preferences. A deeper exploration of dominant culturally shared values (e.g. Hofstede, Hofstede, & Minkov, 2010) seems also relevant in this respect, since the extent and the type of moral considerations elicited by the Disease problem can differ across cultures.

Another feature specific to this sample is the language in which the problem is presented. However, there are no specific aspects of Bulgarian language that are ready candidates to account for the lack of a framing effect. On the other hand, research has shown that presenting the Asian Disease problem in a foreign language reduces the framing effect

(Keysar, Hayakawa, & An, 2012). It would be thus interesting to see whether and how presenting the original problem in English would affect Bulgarian participants' performance.

The study has several limitations. First, hypothetical rather than real choices were used. However, the present report drew on previous research that also used hypothetical choices. That the conclusions might be limited to hypothetical choices thus does not make the comparisons less valid. Second, the present sample consisted predominantly of undergraduates in humanities and social sciences. Hence, the findings might reflect the peculiarities of the particular sample. There were also two methodological limitations worth considering. Within the same task administration, tasks were presented in a fixed rather than in a counterbalanced order. In addition, materials were not back-translated in English before the study administration. All these limitations, except the hypothetical nature of the choices, have been addressed in newer data collections on framing problems that are in progress now. Hence, there will soon be an answer as to whether these extraneous variables impacted the results.

An important difference between the monetary tasks designed to elicit the isolation effect and the Disease problem, in this report, is that, regardless of the framing of the options, the former are related to potential gains (considering the initial asset) while the latter are related to potential losses (of human lives). As Fagley (1993) pointed out, framing might make a loss look like a gain (if a larger loss was expected) but it remains, objectively, a loss. Hence, a more rigorous comparison of the framing effect across different story contents should be to control for the domain of the prospect (gains or losses) by varying it or keeping it constant. Such a study is also in progress.

Finding further supportive evidence whether the framing effect decreases or disappears among Bulgarian participants for a particular subtype of problems might have important implications not only for psychological theory, but also for economic decisions in practice. Behavioral economists have proposed "choice architecture" as a strategy to design the environment in a way that could lead people's default propensities to better personal and societal decisions (Thaler & Sunstein, 2008). However, if Bulgarians' most natural propensities diverge from Westerners', a careful examination of Bulgarians' defaults might be needed prior to putting choice architecture in action.

In conclusion, the present report joins an accumulating research evidence suggesting that prospect theory is incomplete in describing the editing mental processes that (sometimes) lead to framing. This might be the downside of using gambles as the "fruit flies" for a decision theory. Specifically, such an approach might underestimate the role of top-down

processing in the interpretation of choice options and the subsequent choice of decision strategy. A top-down and domain-specific approach will necessarily complicate the simple picture provided by prospect theory. However, this complication might be a reasonable cost for the benefit of a better understanding and prediction of individual choices across a wide variety of situations.

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