SONDERFORSCHUNGSBEREICH 504

Rationalitätskonzepte,
Entscheidungsverhalten und
ökonomische Modellierung

No. 03-39

More Thought - More Framing Effects? Framing Effects As a Function of Elaboration

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January 2004

Financial support from the Deutsche Forschungsgemeinschaft, SFB 504, at the University of Mannheim, is gratefully acknowledged.

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RUNNING HEAD: FRAMING EFFECTS AS A FUNCTION OF ELABORATION

More Thought - More Framing Effects?

Framing Effects As a Function of Elaboration

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This research was supported by a grant from the Deutsche Forschungsgemeinschaft within the "Sonderforschungsbereich 504" at the University of Mannheim. Correspondence should be addressed to Dr. Eric R. Igou, Mikrosoziologie und Sozialpsychologie, Universität Mannheim, Seminargebäude A5, D-68131 Mannheim, F.R.G., Phone: +49 621 2008, Fax: +49 621 2038, Email: ericigou@uni-mannheim.de

Abstract

Three studies investigate the impact of the amount of elaboration on framing effects. In all three studies, participants were exposed to decision scenarios similar to the 'Asian disease' problem (Tversky & Kahneman, 1981). The results replicated previous findings: Participants avoided the risky option when the scenario was framed in terms of gains, but preferred the risky option when the scenario was framed in terms of losses. Importantly, these effects were most pronounced when participants elaborated more on the decision, because of either increased elaboration time (Study 1 and 2) or increased processing motivation (Study 3). Moreover, increased elaboration led only to more pronounced framing effects when the scenario required to be enriched with additional information. The discussion focuses on the possibility that increased elaboration may not necessarily result in less bias in social judgment and decision making.

Keywords: Framing Effects, Social Cognition, Decision Making, Bias

More Thought - More Framing Effects? Framing Effects As a Function of Elaboration

Decisions are often made difficult by their associated chances of gains and potential risks of losses. And, as research in decision making has consistently demonstrated, individuals´ decisions are strongly dependent on whether the outcomes of alternatives are framed in terms of gains or in terms of losses. Most prominently, Prospect Theory (Kahneman & Tversky, 1979) provides a conceptual framework for such framing effects (Tversky & Kahneman, 1981). It holds that potential outcomes are considered in relation to a point of reference. As a consequence, when alternatives are framed in terms of losses, individuals are more likely to opt for a risky alternative that provides the chance to minimize or even eliminate potential losses, but when alternatives are framed in terms of gains, individuals tend to avoid risky alternatives. Tversky and Kahneman demonstrated this effect with the now classic "Asian disease" decision scenario. In this paradigm, participants are informed that 600 individuals are supposedly infected with an *Asian disease*. Half of the participants received a *gain* frame version of two intervention programs.

Program A: 200 individuals will be saved.

Program B: A 1/3 probability that 600 individuals will be saved and a 2/3 probability that nobody will be saved.

Although the two options are identical with respect to the product of probability and outcome, participants opted for the less risky (non-probabilistic) program A. However, different decisions were obtained when the scenario was presented in a loss frame:

Program A: 400 individuals will die.

Program B: A 1/3 probability that nobody will die and a 2/3 probability that 600 individuals will die.

When the alternatives were framed in terms of losses, individuals preferred the risky (probabilistic) program B. Numerous studies replicated the general pattern of risk aversion and

risk seeking when alternatives are presented in a gain frame or a loss frame, respectively (for an overview see Kühberger, 1998; Levin, Schneider & Gaeth, 1998).

Prospect Theory (Kahneman & Tversky, 1979; Tversky & Kahneman, 1981) may account for the impact of framing (as well as for other violations of principles of rational decision making). The theory holds that a decision is made after the completion of two phases, the editing and the evaluation phase. Decision makers first engage in an *editing phase*, which relates to the adoption of frames and to transformations of objective values and probabilities into subjective representations. In the subsequent *evaluation phase,* alternatives are weighed, compared, and the most preferred alternative is chosen. Prospect Theory assumes an S-shaped value function, and because framing shifts the reference point, individuals are more likely to prefer the uncertain, risky option when values are framed as losses, but to prefer the certain, risk-averse option when values are framed as gains.

Presumably because the predictions that can be derived from Prospect Theory (Kahneman & Tversky, 1979) account for a number of findings that are inconsistent with predictions of Expected Utility Theory (see von Neumann & Morgenstern, 1944), Prospect Theory has received considerable attention across a large variety of domains. With respect to framing effects, several overviews document the robustness of the classic Asian disease paradigm (Kühberger, 1998; Levin et al., 1998). These reviews also reveal that quite a number of different variables have been investigated, such as the good at stake (e.g., money vs. human lives), or variations of values or probabilities (see Kühberger, Schulte-Mecklenbeck & Perner, 1999). From a social psychological perspective it is interesting to note that few studies have addressed the role of elaboration, which plays a crucial role in much of the current theorizing in social psychology (e.g., for overviews see, for example, the various contributions in Chaiken & Trope, 1999).

Several positions regarding the effects of amount of elaboration are conceivable. It has been argued that frames serve as contextual cues, which are particularly influential when individuals engage in an elaborative, "holistic," non-analytic processing style (e.g., McElroy & Seta, 2003). In support of this assumption, attenuated framing effects were observed when individuals perceived the task as highly relevant or when they were explicitly asked to later justify their judgments (McElroy & Seta, 2003; Takemura, 1994; see also Takemura, 1992, for the impact of deliberation time). From this perspective, a frame allows for simplification, or it serves as a piece of information whose impact may be overridden by alternative information that is activated by additional processing.

The above perspective implies that more thinking will reduce contamination from biasing factors (e.g., Smith & Levin, 1996). However, the question of whether more thinking leads to less bias is not uncontested. For example, the work by Wilson and colleagues suggests that more thinking does not necessarily improve judgments and decisions (e.g., Wilson & Schooler, 1991; Wilson, Lisle, Schooler, Hodges, Klaaren & LaFleur, 1993). Similarly, with respect to processing motivation and accountability, it has been shown that accountability may – at least in some cases – increase rather than decrease biases (e.g., Tetlock & Boettger, 1989). If we consider frames as a starting point from which decision makers initiate additional processing, then framing effects may in fact increase the more individuals elaborate "within" frames. Similar assumptions have been made in other domains. For example, investigating how incidental affective states "infuse" social judgments, Forgas (1995) has reported consistent evidence that affective influences due to mood dependent memory increase with the amount of elaboration. Similar effects have been suggested with respect to the impact of anchoring. Specifically, Mussweiler and Strack (1999, Strack & Mussweiler, 1997) have proposed that the impact of an anchor increases, the more individuals think about the anchor--even if the anchor is totally arbitrary and out of range.

Similarly, “mere thought” (e.g., Tesser, 1978) or group polarization phenomena (e.g., Moscovici & Zavalloni, 1969) are examples for the possibility that additional processing may increase an initial judgmental tendency.

The present research directly addresses the impact of elaboration on the occurrence of framing effects. Drawing in part on our prior research (Bless, Betsch & Franzen, 1998), we argue that when participants form decisions about the Asian disease scenario, they are required to go beyond the information given (Bruner, 1957). Particularly because the Asian disease scenario and its alternatives are ambiguous, individuals need to enrich the scenario with additional information (e.g., the consideration of conflicting moral values, risking a few or all 600 human lives). We contend that with the starting point of a gain versus a loss frame, the enrichment process will lead into different directions. As long as additional thinking is influenced by frames, additional thinking should *increase* rather than decrease the impact of the frame.

There is direct and indirect support for the notion that increased processing may increase framing effects. In an intriguing chapter, Svenson and Benson (1993) report experimental research in which time pressure was manipulated by allowing participants either a mere 40 seconds or unrestricted time to make their decision. The results indicate that the differential effects of a gain versus a loss frame increased when decision time was not restricted. Note that on a general level this finding conflicts with the findings reported above, according to which increasing processing motivation decreases framing effects (e.g., McElroy & Seta, 2003).

In line with the findings reported by Svenson & Benson (1993), it has been suggested that framing effects are more likely when the situational context directly or indirectly implies an enrichment of the decision scenario. For example, pronounced framing effects were obtained when the Asian disease scenario was subtly described in the context of “medical decision making.” However, no framing effects were observed when the scenario was subtly embedded in

the context of “statistics” (Bless et al., 1998). Presumably, the latter did not require participants to go beyond the information given, but rather to focus on presented numbers and mathematical relations.

An enrichment of the decision scenario should require processing resources. If this is correct, then framing effects should be moderated by elaboration. Specifically, framing effects are expected to *increase* with the amount of time allocated to the task (Study 1 and 2) and with increased processing motivation (Study 3). Moreover, the impact of elaboration should depend on the necessity of engaging in an enrichment process. When the situational context implies no need to enrich the decision scenario, framing effects should be attenuated, independent of the processing time that is allowed (Study 1).

Study 1

Method

Participants, procedure, design and materials

One hundred-two students from the University of Heidelberg were assigned to the conditions of a 2(frame: gain vs. loss) x 2(context cue: statistics vs. medicine) x 2(elaboration time: short vs. long) quasi-experimental design. Participants were seated in front of a PC monitor, on which all information was presented and all dependent variables were assessed. Then participants were presented with the Asian disease decision scenario (Tversky & Kahneman, 1981), and two alternative intervention programs were provided from which participants were asked to choose one in order to take measures against the threatening disease.

Independent variables. To manipulate the *frame*, we presented the alternatives in terms of either gains or losses. The alternatives of the gain frame condition were: *If Program A is adopted, 200 people will be saved. If Program B is adopted, there is a 1/3 probability that 600 people will*

be saved, and a 2/3 probability that no people will be saved. The alternatives of the loss frame condition were: *If Program A is adopted, 400 people will die. If Program B is adopted, there is a 1/3 probability that nobody will die, and a 2/3 probability that 600 people will die.*

In addition, we varied the *context cue,* which was presented together with the scenario information as a running head in the upper right corner of the computer screen. Half of the participants were provided the cue "medicine." Earlier research has shown that the ambiguous Asian disease scenario is normally represented as an ethical, medical problem (see Maule, 1989; Bless et al., 1998). Consistently, we hypothesized that a "medicine" cue also establishes this impression, and that in order to understand this problem and the consequences of their decision, individuals need to go beyond the information given. The remaining participants were provided with the cue "statistics." In this case, the scenario should be clearly understood as a statistical problem, not requiring an enrichment process (for the success of this manipulation see Bless et al., 1998).

The computer was programmed to measure the time between the onset of the presentation of the scenario information and participants' choice of an alternative. A median split was conducted (*Mdn* = 47.3 sec.), which divided participants equally into two groups (short vs. long *elaboration time*) depending on the time they required for their decision.

Dependent Variable. Participants were asked for their preferred alternative. They indicated their decision for a program by pressing the computer keyboard's A or B keys, representing the programs A and B, respectively. We coded the certain alternative (Program A) with 1 and the uncertain alternative (Program B) with 0. Therefore, high values represent the tendency towards risk aversion and low values a tendency towards risk seeking. Finally, participants were debriefed and received 5 Deutsch Marks (at the time about 2.50 US Dollars) for their participation.

Results and Discussion

We conducted an analysis of variance (ANOVA) using a 2(frame) x 2(context cue) x 2(elaboration time) factorial design. Overall, the sure alternative was preferred over the unsure alternative when the alternatives were presented in terms of gains, $M = 0.39$, rather than in terms of losses, $M = 0.18$, $F(1,94) = 5.91$, $p < .05$. This finding reflects the reliability of the framing effect applying the Asian disease paradigm (see also Kühberger, 1998). Consistent with earlier results, this impact of the frame was moderated by the context cue (Bless et al., 1998). Specifically, the framing effect was more pronounced with the context cue "medicine," $M = 0.36$ versus $M = .08$, $t(48) = 2.49$, $p < .05$, than with the context cue "statistics," $M = 0.42$ versus $M = 0.27$, $t(50) = 1.16$, $p > .20$. In line with prior research, this finding suggests that framing effects are more pronounced when the context cue requires an enrichment of the provided information compared to when the context cue renders such enrichment unnecessary.

The observed impact of the processing time supports the conclusion that additional processing may lead to more pronounced framing effects. As can be seen in Figure 1, when the scenario information required enrichment (situational context cue "medicine"), longer elaboration times led to increased framing effects than shorter elaboration times, $M = 0.60$ versus $M = 0.00$, $t(24) = 4.71$, $p < .01$, and $M = 0.20$ versus $M = 0.22$, $t < 1$, respectively. A different picture emerged, however, when the context cue ("statistics") was assumed to determine the meaning of the task with less need for enrichment. Here, additional processing was less likely to increase the framing effect, $M = 0.33$ versus $M = 0.25$, $t < 1$, and $M = 0.47$ versus $M = 0.30$, $t < 1$, respectively. As expected, this pattern resulted in a significant three-way interaction of frame, elaboration, and context cue, $F(1,94) = 3.98$, $p < .05$.

Taken together, the obtained findings are in line with the hypothesis that framing effects result in part from additional processing that is necessary when individuals are required to go

beyond provided information. A pronounced impact of frames was observed when processing time was long and when an enrichment of the provided information was required. We will return to the implications of these findings and their relation to prior research in the general discussion section.

Study 2

The correlational nature of Study 1 limits the conclusions that can be derived from the obtained results. Study 2 was designed to address this issue by manipulating processing time. Moreover, Study 2 addresses the question of whether the reported findings of Study 1 are confined to the classic Asian disease scenario, or whether they generalize across different scenarios (see Kühberger, et al., 1999). Participants were presented with either gain or loss frame scenarios and were given either a short or a long elaboration time prior to selecting an alternative (an intervention program). We expected to replicate the findings of Study 1, namely that framing effects increase when more processing is allocated. Further, the impact of processing time was expected to generalize to another, structurally similar decision scenario. Finally, an additional measure was introduced to investigate whether more thoughts regarding the problem scenario are associated with an increased impact of decision frames. For this purpose, after participants had selected one alternative, they were asked to list the thoughts that came to mind while they had been working on the scenario.

Method

Participants, design, procedure, and materials

Fifty-eight students from the University of Heidelberg were randomly assigned to a 2 (frame: gain vs. loss) x 2 (elaboration time: short vs. long) between participants design. Participants were first presented with the *Asian disease* scenario (see Study 1) on the computer.

After making their decision, participants were asked to list their thoughts that had come to their mind while working on the decision scenario. Next, participants were presented an *oil tanker disaster* scenario, which was structurally similar to the Asian disease paradigm. In the oil tanker scenario, 200,000 tons of oil is threatening to spill out of an oil tanker into the North Sea, which would cause great environmental damage. Again, two alternatives were presented within either a gain or a loss frame. After indicating their decision, participants were asked for the thoughts that had come to their mind while working on the second decision problem.

Independent Variable. For the Asian disease, the *frame* was manipulated as in Study 1. As part of the oil tanker problem scenario, participants in the gain frame condition read the following: *If program A is adopted, 50,000 tons of oil will be saved. If program B is adopted, there is a 1/4 probability that 200,000 tons will be saved, and 3/4 probability that no oil will be saved.* In the loss frame condition participants read: *If program A is adopted, 150,000 tons of oil will spill. If program B is adopted, there is a 3/4 probability that 200,000 tons will spill, and a 1/4 probability that no oil will spill.*

Elaboration time was manipulated after the alternatives were presented: Participants were required to indicate their answer either within 25 seconds or 60 seconds, and they could not give their answer before the time was over. The provided decision times were selected on the basis of the results of Study 1. To indicate the remaining time for their decision, a time bar was displayed at the bottom of the screen. The procedure was identical for both scenarios.

Dependent Variables. As in Study 1, participants indicated their decision by pressing the computer keyboard's A or B keys, representing the programs A and B, respectively. We coded the certain alternative (Program A) with 1, and the uncertain alternative (Program B) with 0. Therefore, high values indicated a stronger risk aversion. Participants were then asked to list all

thoughts that had occurred to them while they were working on the decision tasks. Finally, participants were debriefed and thanked with 8 Deutsch Marks for their participation.

Results

Due to the structural equivalence of the two decision scenarios, and due to similar results (treating type of scenario as a within-subjects factor in the analyses did not reveal any impact of scenario type, all main effects and interactions $F < 1$), we averaged the scores for the two scenarios. A 2(frame) x 2(elaboration time) factorial analysis of variance (ANOVA) revealed the classic framing effect: Participants were more likely to prefer the sure alternative when the alternatives were presented in terms of gains rather than in terms of losses, $M = 0.58$ versus $M = 0.31$, $F(1,54) = 8.02$, $p < .01$. Most importantly, this framing effect was qualified by the extent of elaboration, as indicated by a significant interaction of frame and elaboration time, $F(1,54) = 4.64$, $p < .05$. Specifically, when participants had extensive time to make their decision, the impact of frames was more pronounced than when the decision had to be made after a short deliberation time, $M = 0.66$ versus $M = 0.17$, $t(54) = 3.50$, $p < .001$, and $M = 0.50$ versus $M = 0.43$, $t < 1$, respectively.

A composite measure was computed for the *amount* of thoughts that participants had listed for both scenarios ($r = .64$, $p < .001$). Not surprisingly, when participants were provided with an extended time for their decision, they reported later more thoughts, $M = 3.66$, than when they had a short time to elaborate, $M = 2.92$, $F(1,54) = 4.42$, $p < .05$, thus indicating that the manipulation of decision time indeed influenced elaboration.

To investigate how the amount of thoughts influence the framing effect, we conducted a median split of the sample ($Mdn = 3.0$) and analyzed participants´ decision as a function of frame and amount of thoughts. In line with the outlined hypothesis, participants´ decisions reflected a pronounced framing effects when they had listed many thoughts, $M = 0.63$ versus $M = 0.19$, $t(54)$

= 2.67, $p < .01$. In contrast, this framing effect was attenuated and not reliable when participants listed fewer thoughts, $M = .50$ versus $M = .37$, $t(54) = 1.26$, $p > .20$.

Discussion

These results support the core findings of Study 1. But the experimental manipulation of elaboration time eliminated the interpretation problems of Study 1's correlational results. Again, the classic framing effect was obtained, and again this framing effect increased, the more time participants thought about their decision. When given more deliberation time, participants presumably enriched the provided scenario with additional information. The frame thus served as a starting point, and the more individuals thought about it, the more pronounced was its impact. This interpretation is further supported by the thoughts participants reported. Framing effects were more likely for participants who reported many rather than few thoughts. Finally, the observed effects were not restricted to the Asian disease scenario. The same pattern of results was obtained with the structurally equivalent oil tanker scenario, a finding that supports the reliability of these effects.

Study 3

Study 1 and 2 investigated framing effects as a function of processing time and capacity for elaborative enrichment. Consistent with most current theorizing, processing elaboration is influenced not only by processing capacity but also by processing motivation (for various models see Chaiken & Trope, 1999). If the assumption is correct that the enrichment of the provided information and the associated elaborative processes may cause an accentuated influence of the decision frames, then increasing processing motivation should result in similar effects as increasing processing capacity.

With respect to processing motivation, it is important to note that its impact may depend on which specific motive is activated (e.g., Eagly & Chaiken, 1993). Being interested in enrichment processes, in Study 3 we focused on accountability (e.g., Tetlock, 1983). Earlier research on accountability has demonstrated that accountable individuals engage in more complex information processing than individuals who do not feel accountable for their decision or judgment (e.g., Tetlock, 1983; Tetlock & Boettger, 1989). On the basis of our general assumption, we predicted that high accountability would lead to more pronounced framing effects than low accountability.

Methods

Participants, design, procedure, and materials

One hundred and eighty-three students from the University of Heidelberg received a questionnaire (paper-pencil) with the Asian disease scenario, and were randomly assigned to a 2(frame: gain vs. loss) x 3(elaboration motivation: high vs. low vs. control) - factorial design. Before participants were exposed to the decision scenario, we experimentally manipulated three different levels of motivated elaboration.

Independent variables. Half of the participants were confronted with a gain *frame* of decision alternatives of the Asian disease, for the other half the alternatives were framed in terms of losses (see Study 1). In addition to the frame, we manipulated participants´ *accountability* for their judgments. To induce high accountability, one third of the participants was told that some of them would later be asked to explain and justify their judgments (see Tetlock, 1983). Another third of the participants was informed that the main purpose of the study was merely to pretest materials for further studies, thereby inducing low accountability. The remaining participants received no additional instructions (control condition).

Dependent variable. Participants made their choice for one of the two provided alternatives. As for Study 1 and 2, we coded the certain alternative (Program A) with 1, and the uncertain alternative (Program B) with 0. High values therefore represent risk-averse choices. Finally, participants were debriefed and received a bar of chocolate for their participation.

Results and Discussion

A 2(frame) x 3(accountability) factorial ANOVA revealed an overall framing effect: Participants were more likely to favor the risk aversive alternative when the alternatives were presented in a gain rather than a loss frame, $M = 0.52$ versus $M = 0.22$, $F(1,177) = 20.01$, $p < .01$. As expected, this impact of decision frames was qualified by participants´ accountability, resulting in a significant interaction of frame and accountability, $F(2,177) = 4.72$, $p < .01$. Further analyses of this interaction reveal that when processing motivation was neither increased nor reduced (control condition), a reliable framing effect emerged, $M = 0.53$ versus $M = 0.17$, $t(177) = 3.14$ $p < .001$. Increasing accountability resulted in an even more pronounced framing effect, $M = 0.67$ versus $M = 0.16$, $t(177) = 4.44$, $p < .001$, whereas decreasing accountability attenuated the impact of the frames, $M = 0.35$ versus $M = 0.33$, $t < 1$.

These findings are in line with the general hypothesis that increasing individuals´ elaboration about their decision increases the differential effects of gain versus loss decision frames. Added to the results from Studies 1 and 2, the obtained findings suggest that an increase in framing effects may result from increasing elaboration not only directly, by providing more time, but also indirectly, by inducing accountability. In line with prior research (e.g., Tetlock, 1983) we assume that inducing accountability increased the complexity of thinking about the scenario. Given that framing served as a starting point, additional processing elicited by participants´ accountability increased rather than decreased the impact of decision frames. Interestingly enough, this conclusion is in accordance with research on how accountability affects

the dilution effect. In this regard, Tetlock and Boettger (1989) demonstrated that non-diagnostic information had an increased impact on the required judgment when participants were being held accountable.

General Discussion

One of the classic findings in judgment and decision making pertains to the impact of decision frames. As perhaps most prominently demonstrated by Tversky and Kahneman (1981), individuals prefer risky alternatives when the decision scenario is presented in terms of losses, whereas risk aversion results from gain frames. The present findings consistently revealed that how much individuals thought about the scenario and the decision alternatives affected this classic framing effect. Across the three reported studies, framing effects were consistently more pronounced when the experimental conditions were likely to elicit an increased elaboration. This interaction pattern of frame and amount of processing was observed independently of how the amount of processing was manipulated -- either by self-administered processing time (Study 1), by an experimental manipulation of processing time (Study 2), or by an experimental manipulation of individuals´ accountability (Study 3). In each case, framing effects were reliably more pronounced, when individuals' elaboration of the decision problem increased.

The effects of the amount of processing are complemented by additional evidence. First, in Study 1, additional processing increased framing effects only when the situational context cue required an enrichment of the scenario. In line with prior research, we argue that this is the case when the Asian disease scenario is presented within the context of medical decision making, but not when it is presented in the context of statistics (Bless et al., 1998). In the latter case, no enrichment is necessary and individuals may simply stick to the numbers presented in the scenario. The obtained findings thus further underscore the notion that framing effects increase

when additional processing is necessary and is allocated. Second, in Study 2 we assessed individuals´ thoughts about the decision with a thought-listing method and treated the number of thoughts as an indicator for the amount of processing. Of importance with respect to the present hypothesis is the finding that framing effects were more pronounced, the more thoughts individuals had generated. In Study 3 we experimentally varied accountability, assuming that high accountability leads to more complexity of thinking (e.g., Tetlock, 1983). Consistent with the results of Studies 1 and 2, high accountability led to more pronounced framing effects.

In combination, the results provide consistent evidence for the notion that framing effects are more likely to occur when individuals think more about the decision scenario and the framed alternatives. We argue that these findings occur because frames serve as starting points from which decision makers engaged in their processing (see van Schie & van der Pligt, 1995, for pointing out the particular salience of the frames). If so, it is almost a logical conclusion that the more individuals´ processing is guided by a frame, the greater the observable impact of the frame should be (unless the additional processing focuses on aspects that are not related to the frame). Particularly because the Asian disease scenario and the alternatives are rather ambiguous, individuals need to enrich the scenario with additional information (e.g., the consideration of conflicting moral values, risking a few or all 600 human lives). Presumably, the activation and integration of this additional information is strongly influenced by the initially provided frame. Therefore, it is exactly the enrichment of the provided information, the going beyond the information given, which increases framing effects.

Both empirical and theoretical prior research is in line with the outlined general assumption. Empirically, the reported findings are consistent with data reported in a chapter by Svenson and Benson (1993), who observed increased framing effects when processing time was not restricted relative to conditions with a time pressure manipulation. Moreover, our results are

consistent with the assumption that situational context cues may invite enrichment of the provided information, thereby resulting in framing effects (Bless et al., 1998).

On a conceptual level, several lines of research support the notion that more elaboration may increase the impact of potentially biasing information. For example, in the domain of anchoring, Mussweiler and Strack (1999; Strack & Mussweiler, 1997) have argued that the impact of an anchor increases rather than decreases when individuals are thinking more about the anchor. These authors propose, and report supporting evidence, that the anchor serves as a starting point, which activates potentially relevant information. The more individuals think about the anchor, the more information is activated, and the more pronounced are the anchoring effects. Forgas (1995) has applied a similar argument with respect to the conditions under which incidental affective states contaminate social judgments. Focusing on mood congruent judgments that are due to differential accessibility of positive and negatively valenced information under happy versus sad mood, he argues that affect infusion - that is, judgments being influenced by individuals´ mood - is more likely when individuals process information in a substantive rather than a heuristic way.

While there is both empirical and conceptual work that is in line with the assumption that increased processing may lead to increased framing effects, conflicting evidence has to be acknowledged. In particular, recent work by McElroy and Seta (2003), as well as work by Takemura (1992, 1994), suggests that increased processing may lead to a decrease rather than an increase of framing effects. While some of this evidence is straightforward, some of the findings are somewhat inconsistent. For example, Takemura's research (1992) reveals that participants provided with a negative (loss) frame were more likely to prefer risky alternatives, when more processing time was allocated. While this pattern is in line with the hypothesis presented here, the results obtained for the positive frame show a reversed impact of processing time. Similarly

problematic, Takemura (1994) observed that with a negative frame, participants preferred the risky option, and that this effect was not only attenuated but completely reversed (more risk aversion) when the negative frame was presented to participants under high elaboration conditions. Inconsistent findings were also observed with respect to the impact of need for cognition (Cacioppo & Petty, 1982). Smith and Levin (1996) observed decreased framing effects for individuals low in need for cognition, while LeBoeuf and Shafir (2003) reported that neither individuals´ need for cognition scores nor a justification manipulation were related to the preferred alternatives.

How can we reconcile these seemingly conflicting findings? As a first step, it is important to detect and to acknowledge the potentially conflicting findings on the basis of state of the art research. Our research contributes to this first step by emphasizing that increased processing does not necessarily result in less framing effects. The second step, of course, is to look for potential moderators that may account for the seemingly conflicting evidence. Most obviously in this respect, additional processing will not result in more framing effects when the additional processing is not influenced by the provided frames. In this case, the additional processing may lead to an activation and consideration of information that is unrelated to the frame. As a consequence, the relative impact of the framing will be attenuated (see McElroy & Seta, 2003).

What might be conditions that trigger one or the other mechanism? It seems plausible that if the situational context implies the possibility of an objectively correct answer, individuals will be more likely to focus on the provided numbers rather than on the frame - for example, the label “statistics” may imply such an objectively correct answer (Bless et al., 1998). Similarly, the information that performance on the task is considered a criterion for graduation could imply the existence of an objectively correct solution (McElroy & Seta, 2003, Study 1). Or, it is conceivable that cues (e.g., “statistics”) enforce an analytic (versus holistic) processing style,

thereby reducing framing effects (see McElroy & Seta, 2003, Study 2). One may also argue that different scenarios might be associated with different degrees of how much enrichment is necessary. In this respect, it is interesting to note that LeBoeuf and Shafir (2003) observed quite different framing effects as a function of different scenarios (see also Kühberger et al., 1999, for the impact of the scenario type). Importantly, one needs to consider the possibility that the conflicting findings could be due to a curvilinear function between amount of processing and framing effects. It seems plausible that up to a point, additional processing will increase framing effects - as long as the provided frame is guiding information processing. However, later on in the elaboration process other aspects might come to mind that are independent of the frame. If so, framing effects will be attenuated. Here it is interesting to note that Takemura (1994) observed attenuated framing effects when rather long deliberation time (3 minutes) was induced.

The investigation of variables that influence whether additional processing increases or decreases framing effects is beyond the scope of the present work. We believe, however, that such investigation is necessary and important for a better understanding of those mediating processes that underlie framing effects. In this respect, the presented approach is important because it adds a different perspective to the existing evidence by emphasizing that more processing does not necessarily result in less bias due to the framing of the decision alternatives. On a more general level - independent of framing effects - this perspective is captured by quite a number of approaches. These approaches provide intriguing results, which demonstrates that more processing will not necessarily improve judgment and decision making (e.g., Wilson & Schooler, 1991, Wilson et al., 1993).

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Authors' Note

This research was supported by a grant from the Deutsche Forschungsgemeinschaft within the "Sonderforschungsbereich 504" at the University of Mannheim. We thank Wolfram Schenk, Nadja Kaczmarek, and Anne Hueg for their help.

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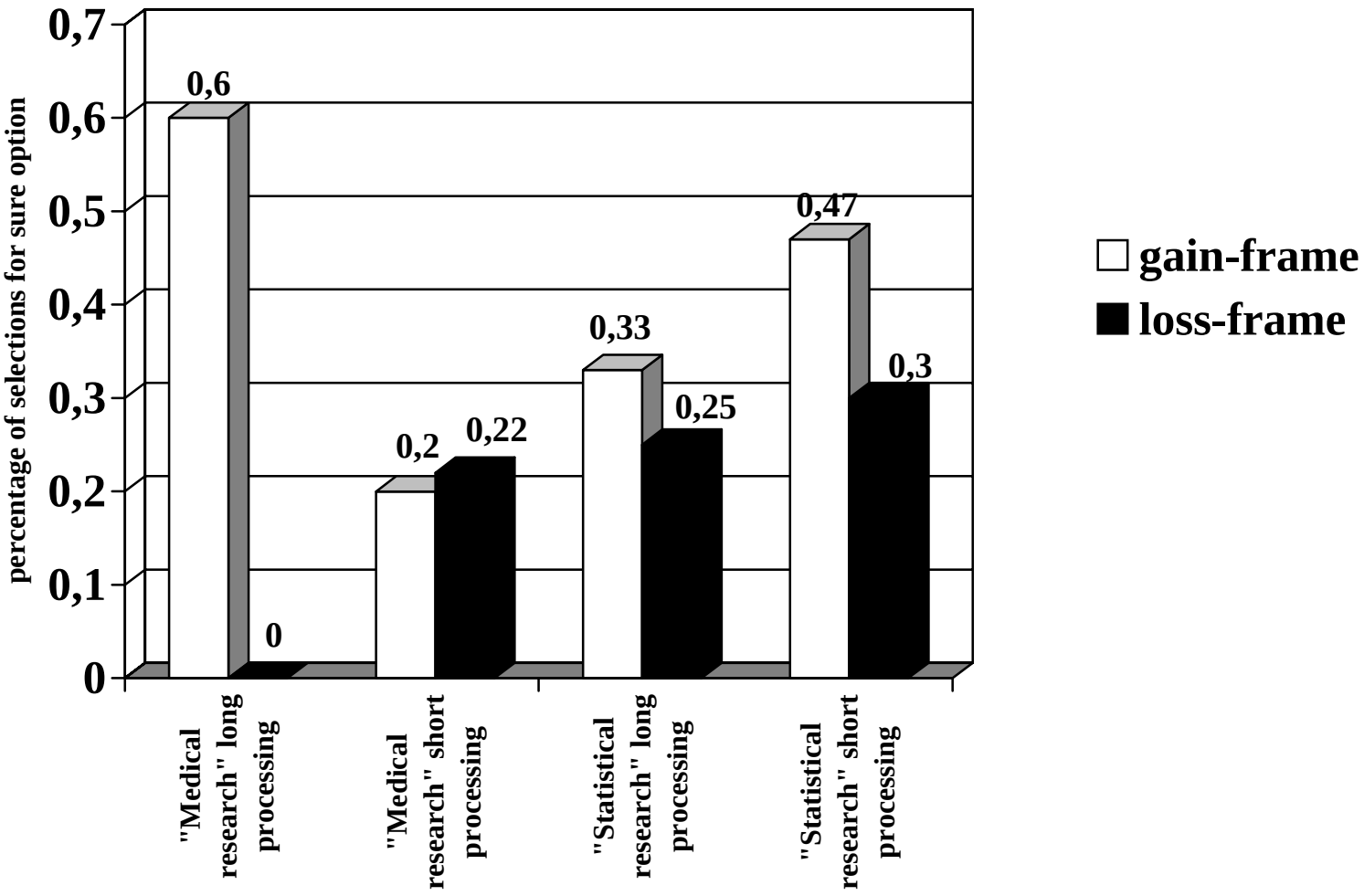
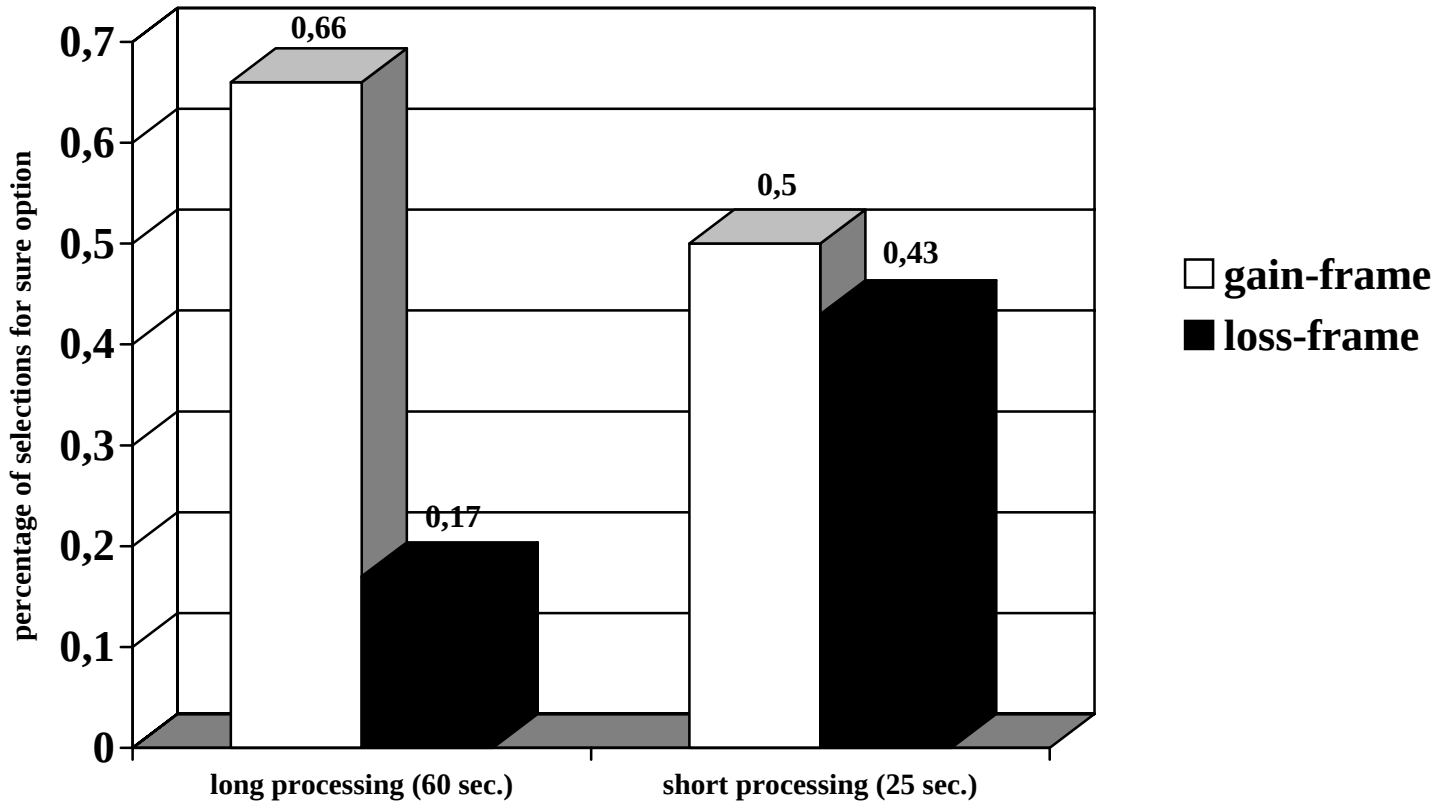
Figure Caption

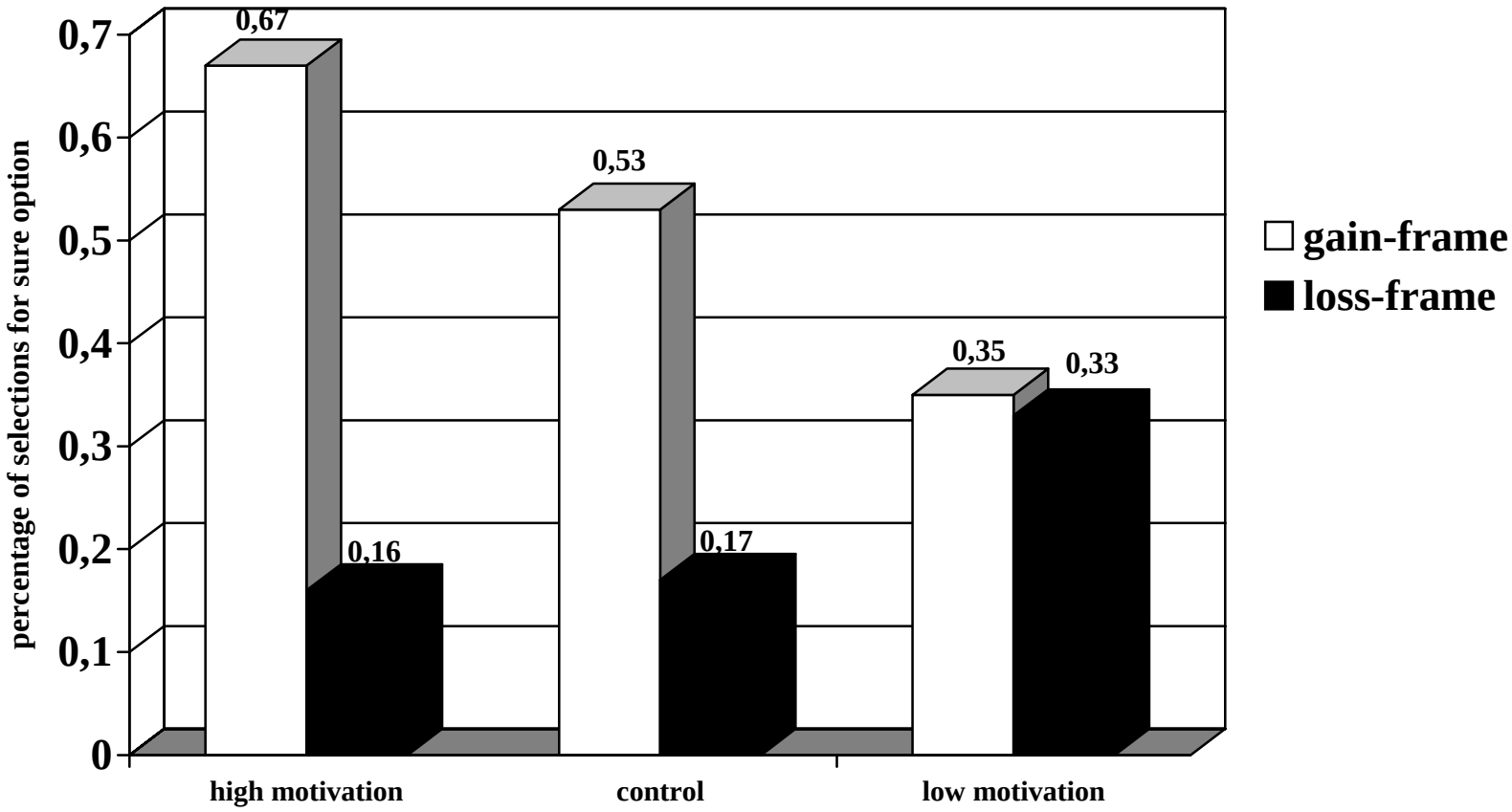
Figure 1. Percentage of participants selecting the sure option as a function of frame, context cue, and processing time.

Figure 2. Percentage of participants selecting the sure option as a function of frame and processing time.

Figure 3. Percentage of participants selecting the sure option as a function of frame and processing motivation.


percentage of selections for sure option
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0,6
0
0,2
0,22
0,33
0,25
0,47
0,3
"Medical research" long processing
"Medical research" short processing
"Statistical research" long processing
"Statistical research" short processing
gain-frame
loss-frame


0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
percentage of selections for sure option
0,66
0,17
0,5
0,43
long processing (60 sec.)
short processing (25 sec.)
gain-frame
loss-frame


percentage of selections for sure option
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
0,67
0,16
0,53
0,17
0,35
0,33
high motivation
control
low motivation
gain-frame
loss-frame

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