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The Interplay Between the Importance of a Decision and Emotion in Decision-Making

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The authors confirm that the materials and data supporting the findings of this study are  
available within the article or its supplementary materials.

### Abstract

Decision-making literature has demonstrated that individuals' preferences are strongly affected by the way in which choices are presented. This cognitive bias, termed the framing effect, is influenced by the importance of the possible outcomes that a decision can have. However, the direction of this influence remains poorly understood. The aim of this paper was to examine the role of the importance of a decision in framing susceptibility and to explore a potential mechanism underlying this influence. Our first study revealed that participants display a framing effect when their decision implies a high importance outcome, but resist framing manipulation when their decision implies a low importance outcome. Our second study confirmed that an increase in the importance of a decision is associated with increasing framing susceptibility. Moreover, a moderated mediation analysis revealed that the more a decision was important, the more the gain and loss frames aroused opposite emotions, and this accounted for the increase in framing susceptibility. The results of these two studies confirmed that an increase in the importance of a decision is associated with increasing framing susceptibility and suggest that this influence on framing susceptibility is underpinned by emotion. Implications and direction for future studies are discussed.

*Keywords:* Decision-making, Framing effect, Cognitive bias, Emotion

### The Interplay Between the Importance of a Decision and Emotion in Decision-Making

In the 1980s the pioneering experiments of Tversky and Kahneman revealed that well-adapted adults can systematically transgress elementary rules of logic, such as coherence and consistency, when making decisions (Tversky & Kahneman, 1981). They reported that when participants were presented with two mathematically equivalent choices, variations in choice formulation (for example, in terms of life saved *versus* life lost) strongly affected individuals' preferences. This decisional bias – leading individuals to irrationally rely on formulation when making a decision – has been called the framing effect. One of the main moderators of the framing effect is the importance of a decision outcome (Kühberger, Schulte-Mecklenbeck & Perner, 2002). However, because no consensus regarding the direction of this effect and regarding the mechanisms underlying this influence has yet been reached, this study aims to provide further insights into the role of the importance of a decision outcome on framing susceptibility.

In the Tversky & Kahneman's (1981) widely used framing paradigm, participants were told that an Asian disease would kill 600 people and that two programs could be used to combat the disease. Tversky & Kahneman (1981) revealed that when the two programs were "positively framed", in terms of sure versus risky *gains* (e.g., "200 people will be saved" for the sure program versus "1/3 chances that 600 people will be saved and 2/3 chances that no people will be saved" for the risky program), individuals were typically risk-averse and preferred the sure program. In contrast, when the same programs were "negatively framed", in terms of sure versus risky *losses* (e.g., "400 people will die" for the sure program and "2/3 chances that 600 people will die and 1/3 chances that nobody will die" for the risky program), people were typically risk-seeking and preferred the risky program. Although several forms of the framing effect have been described (Levin et al., 1998), the "risky-choice" framing effect described here remains the gold standard and is, therefore, the focus of this article.

Historically, numerous theories have been developed to explain the framing effect and to identify the factors which moderate it (e.g., Hogarth & Einhorn, 1990). One of these factors is the importance of the decision being made. Interestingly, amongst the main theories, contradictory predictions are made regarding the impact of this factor on framing susceptibility.

First, dual process theories are often used to account for the framing effect. Two of the main dual-process theories explaining framing susceptibility are the Fuzzy-Trace-Theory (FTT; Reyna & Brainerd, 1991, 1995) and the Analytic-Holistic Model (AHM; McElroy & Seta, 2003). These two theories hypothesize that framing susceptibility arises from the reliance on an intuitive/emotional system (named *gist* in the FTT, or *holistic thinking* in the AHM) rather than on a reflexive system (named *verbatim* in the FTT, or *analytic thinking* in the AHM). Because an increase in the importance of a decision is known to enhance reliance on the reflexive system and to reduce reliance on the intuitive/emotional system (Etzel et al., 2015), both theories predict that an increase in the importance of a decision should be associated with a decrease in framing susceptibility (Kühberger, 1997; McElroy, 2008; Rivers, Reyna & Mills, 2008).

Second, Seta and colleagues have recently proposed a new theory to account for the framing effect (named the Unification Model; Seta, Seta & McCormick, 2017). Based upon the inclusion/exclusion model (e.g., Bless & Schwarz, 2010), Seta and colleagues have suggested that the formulation of an option (i.e., the frame) is encoded contiguously with the content of the option. Therefore, the frame is directly embodied within the option's representation. One of the strength of this model lies in its ability to make clear predictions regarding the role of importance in framing susceptibility.

The Unification Model predicts that an increase in the decision importance should be associated with an increase in emotional response. Interestingly, this model places affective processing at the core of framing susceptibility, suggesting that emotion modulates the strength of the association between the frame and the representation of the options. When strong emotional processes are involved, then it is more likely that individuals will rely on the general gist of the options rather than proceed to a careful examination of their true value. Thus, because higher importance should be associated with stronger emotional response, and that stronger emotional response is associated with greater framing susceptibility, an increase in the importance of a decision should be associated with an increase in framing susceptibility (Seta et al., 2017).

It is important to note that, although the Unification Model generally predicts a positive relationship between importance of a decision and framing susceptibility, this may not be the case in all circumstances. Specifically, given that an increase in importance leads to higher amounts of cognitive resources being dedicated to the task, and that higher resources may sometimes lead to a decrease in framing susceptibility (Seta et al., 2017), there can be specific instances of a negative relationship between importance of a decision and framing susceptibility. We discuss this point further in the General Discussion.

In summary, according to different theories in the literature, increases in the importance of a decision may be associated with increased framing susceptibility (Unification Model) or decreased framing susceptibility (FTT and AHM). Previous empirical evidence has concluded that increases in the importance of a decision are associated with increases in framing susceptibility (e.g., Wang et al., 2001), decreases in framing susceptibility (e.g., Reyna et al., 2011) or are unrelated to framing susceptibility (e.g., Van der Pligt & Van Schie, 1990). Given the existence of contradictory predictions and contradictory empirical findings

in the literature, the aim of the present work was to explore further the role of the importance of a decision in framing susceptibility.

In the first study, we compared the strength of the framing effect in two problems, which involved either an important or a trivial decision. In the second study, we explored mechanisms underlying the influence of the importance of a decision on framing susceptibility. Because the Unification Model, the AHM and the FTT all posit that emotions are at the core of framing susceptibility and because emotions are closely related to the importance of a decision (Bayer, Ruthmann & Schacht, 2017), our second study also explored whether the importance of a decision impacts framing susceptibility via its effect on emotion.

### **Study 1**

Numerous methodologies have been used to investigate the effect of the importance of a decision, thus making it difficult to compare across studies. For instance, some studies have operationalized the importance of a decision outcome in terms of the size of a hypothetical financial reward (small versus large ; Kühberger et al., 1999), in terms of the reality of a financial reward (real versus hypothetical; Kûhberger et al., 2002), in terms of the delay of a reward (immediate versus delayed; Cheng & He, 2017), or in terms of the importance of the type of reward (money or human lives ; Fagley & Miller, 1997). In this study, we manipulated the importance of a decision by varying the type of recipient (culinary versus humanitarian association) of the reward. The Unification Model predicts that participants should be more susceptible to the framing effect in the high importance condition (humanitarian-cause) than in the low importance condition (culinary-specialty). In contrast, the FTT and the AHM predict that participants should be less susceptible to the framing effect in the high importance than in the low importance condition.

## Method

### *Participants*

Because previous studies comparing framing susceptibility for decisions with high *versus* low importance have produced mixed results, these data could not reliably be used in a power analysis. Therefore, our power analysis sought to determine the sample size needed to detect a main effect of framing in each scenario (data used for power calculations can be found in the study from which our material is based; Druckman & McDermott, 2008). This power analysis, conducted using G\*Power, revealed that sample sizes of at least 35 participants per group would be sufficient for the detection of a main effect of framing with a power of 0.95 and an alpha level of 0.05. Therefore, a total of 140 undergraduate students (62% women, mean age = 20.93, SD = 3.16) voluntarily participated in the study. Participants did not receive any incentive (i.e., payment or course credit) in order to avoid generating interference with the importance of the hypothetical outcome of the decision in the task. All participants were randomly assigned to one condition of a 2 (scenario: humanitarian causes versus culinary specialties) x 2 (frame: gain versus loss) between-subjects design. The university ethics review board approved this research, and the participants gave their written consent prior to the investigation, in accordance with the Declaration of Helsinki.

### *Materials and Procedure*

Participants completed a framing problem adapted from Druckman & McDermott (2008; (see Supplemental Text S1). In this problem, participants were asked to imagine that they were the financial manager of an association and had to invest a government grant of 3000€ in either a sure or a risky program. In the gain frame, the sure program indicated that only part of the grant could be kept (the association would keep 2100€) and the risky program indicated the probability that either the entire grant or nothing could be kept (the association would have a



70% chance to keep the 3000€ and a 30% chance to keep nothing). In the loss frame, the sure program indicated that a part of the grant would be lost (the association would lose 900€) and the risky program indicated the probability that the entire grant would be lost or that nothing would be lost (the association would have a 70% chance to lose nothing and a 30% chance to lose the 3000€). Sure and risky programs systematically had the same expected outcome value in both the gain and loss frames.

In order to assess the role of the importance of a decision in the framing effect, we manipulated the recipient of the grant. The participants were told that the grant would either be invested to promote humanitarian causes (high-importance condition) or to promote regional culinary specialties (low-importance condition). We conducted a manipulation check to confirm that importance differed across the two potential recipients. In this pre-test, 40 participants (65% females, mean age = 21.20, SD = 4.12) were randomly assigned to one condition of a 2 group (humanitarian cause versus regional-culinary specialties) between-subjects design. Participants were asked to rate the importance of investing money to promote humanitarian causes or regional-culinary specialties on a 7-point Likert scale with 1 = “not at all”, 4 = “moderately” and 7 = “extremely” as anchors. Results showed that investing money to promote humanitarian causes was rated as significantly more important than investing money to promote regional culinary specialties ( $F(1,39) = 24.85, p < .001$ ). In addition, we found that participants rated the importance of investing money in the promotion of humanitarian causes significantly higher than the medium score of 4 ( $M \pm SD; M_{Humanitarian} = 4.90 \pm 1.41, t(19) = 2.85, p < .05$ ), whereas participants rated the importance of investing money in the promotion of culinary specialties significantly lower than the medium score of 4 ( $M_{Culinary} = 2.70 \pm 1.38, t(19) = -4.21, p < .001$ ). Therefore, these pre-test results support the idea that investing money to promote culinary specialties and humanitarian causes have, respectively, low and high importance.

### *Statistical analysis*

To investigate whether participants' framing susceptibility was affected by the importance of the problem content, we ran a multiple logistic regression model with scenario (humanitarian causes versus culinary specialties) and frame (gain versus loss) as predictors and choice (sure option versus risky option) as the dependent variable in R environment. For parsimony, only results related to our hypotheses are reported in the paper. Interested readers may find the description of the complete regression models in Supplementary Materials 2. P-values of post-hoc probing of the significant interaction were adjusted with a Bonferroni correction.

### **Results and Discussion**

The logistic regression model revealed that the scenario X frame interaction was statistically significant ( $B = 1.68$ ,  $SE = 0.74$ ,  $p = 0.02$ ). Post-hoc comparisons (Figure 1) revealed that participants were susceptible to the framing effect in the humanitarian cause condition (mean difference = 34%,  $p < .01$ ) but not in the culinary specialty condition (mean difference = -3%,  $p > .99$ ).

— Figure 1 about here —

These results showed that framing susceptibility was affected by the importance of the decision. When participants were asked to invest a grant in a high-importance cause (i.e., the promotion of humanitarian causes), their decisions were affected by framing manipulation and participants were more likely to choose a risky program when the choice was framed in terms of loss rather than gain. In contrast, when participants had to invest the same grant in a low-importance cause (i.e., the promotion of regional culinary specialties), their decisions were no longer affected by framing manipulation. In line with the Unification Model (Seta et al., 2017), these results suggest that assigning importance to a decision is a prerequisite for susceptibility to the framing effect. These results are in the opposite direction to the

predictions derived from both the FTT (Reyna & Brainerd, 1991, 1995) and the AHM (McElroy & Seta, 2003) models.

## Study 2

Study 1 revealed that an increase in the importance of a decision was associated with an increase in framing susceptibility. In the second study, we aimed to uncover the mechanisms underlying this effect. Based upon neuroimaging data, Kahneman and Frederick (2007) proposed a central role for emotional processing in framing susceptibility. They predict that, on a continuum ranging from “Extremely attracted to sure prospects” to “Extremely attracted to risky prospects”, participants tend to fall closer to the “attracted to sure prospects” extreme when they make a choice framed in terms of gain, whereas they tend to fall closer to the “attracted to risky prospects” when they make a choice framed in terms of loss. This difference in emotional response (a greater attraction to risky prospects in the loss frame compared to the gain frame) would then account for the framing effect (i.e., an increase in risk seeking in the loss frame compared to the gain frame).

Positive emotions are linked to actions that lead to a significant progress towards the goals of a decision-maker while negative emotions are linked to actions that hinder progress towards the goals of a decision-maker (Ellsworth & Scherer, 2003). In framing paradigms that involve outcomes with a large importance, individuals are likely to comprehend sure gains as a progress towards their goals, and sure losses as a threat to goal achievement. Therefore, paradigms with a high importance may produce a large framing effect because sure gains trigger positive emotions of attraction (because they promote individuals’ ability to achieve their goals) whereas sure losses trigger negative emotions of aversion to sure losses (because they hinder individuals’ ability to achieve their goals). In contrast, in framing paradigms that involve outcomes with low importance, individuals may no longer interpret sure gains as a progress towards goal achievement and sure losses as a threat to goal achievement. As a

result, individuals would resist framing manipulation in conditions of low-importance decisions because sure gains and sure losses would no longer produce different emotions. This assumption is directly in line with the Unification Model (Seta et al., 2017).

The aim of the second study was to explore the relationship between the importance of a decision, emotion and framing susceptibility. In addition, because the first study did not provide direct evidence for the relationship between one's perception of the importance of a decision and framing susceptibility, in this second study, participants first rated the importance of an outcome and then completed a framing paradigm linked to this outcome. We expected that the importance of a decision would influence the framing effect *via* its role on emotion.

Based upon the predictions of Kahneman and Frederick (2007), we expected that emotional attraction to the risky option would be stronger in the loss frame compared to the gain frame. This difference in emotions across frames would, in turn, be responsible for the increase in risky choices in the loss frame (i.e., framing susceptibility). Moreover, based upon the predictions of the Unification Model, we expected that this difference in emotions across frames, and the resulting framing susceptibility, would be stronger when the decision domain is deemed important than when it is deemed unimportant.

## **Method**

### ***Participants***

A total of 246 undergraduate students (71% women, mean age = 19.50, SD = 4.03) were included in the second study (like in Study 1, participants did not receive any incentive). They were randomly assigned to one condition of a two-condition (frame: gain versus loss) between-subjects design. The university ethics review board approved this research, and the

participants gave their written consent prior to the investigation, in accordance with the Declaration of Helsinki.

Because testing of our main hypothesis relied on a moderated mediation analysis (see statistical analysis below), we had no reliable results that could be used in a power analysis to estimate participant numbers for this type of analysis. Therefore, rather than relying on a fixed-sample stopping rule procedure, we employed the composite open adaptive stopping procedure (COAST, Frick, 1998). This procedure allows the analysis of data at several points to precisely adjust sample size without inflating the alpha level beyond 5% despite multiple hypothesis tests. More precisely, the COAST fixes a lower bound (i.e., an *a priori* minimum number of required participants) and chooses a critical statistical analysis on which the COAST will be based. The first critical step when employing this procedure is to select a lower bound sufficiently large to minimize the probability of Type II Error. After reaching the lower bound (i.e., after the inclusion of the *a priori* minimum number of required participants), the experimenter should run the critical statistical analysis on data already collected and 1) retain the null hypothesis and stop the experiment if the analysis yields a *p-value* greater than 36%, 2) reject the null hypothesis and stop the experiment if the *p-value* is lower than 1% and 3) continue the experiment by collecting data from more participants, if the *p-value* falls between the two values. In a first step, we have chosen to include approximately 250 participants, which gives roughly 80% power to detect an effect of Cohen's  $d = 0.40$  with an alpha of 1%. The critical statistical analysis on which the COAST was based was the index of moderated mediation described below. Note that because statistical significance was obtained at the end of the first wave of recruitment (i.e., *p-value* of this index was inferior to 1%), no additional participants were included.

### *Materials and Procedure*

To assess the importance of the decision domain used in the framing problem, we first asked participants – undergraduate students of Nîmes University – to rank the importance of “promoting the cultural heritage of the city of Nîmes” on a 5-point Likert scale (with 1 = “not at all”, 3 = “moderately” and 5 = “extremely” as anchors) just before completing the framing problem. Contrary to our first study, we used a within-subjects design (rather than a between-subjects design) in order to assess the impact of the importance of a decision on framing susceptibility more directly (i.e., the same participants indicated the importance of the decision outcome *and* then completed the framing problem). Distribution of the importance scores was as follow: very low importance (score of 1): n=16; low importance (score of 2): n=21; moderate importance (score of 3): n=94; high importance (score of 4): n=83; very high importance (score of 5): n=32.

Framing susceptibility was assessed using a problem inspired from the initial Asian-disease problem. In our problem, participants were asked to imagine themselves as the director of a cultural association which aims to finance the production of 6 video clips promoting the cultural heritage of the city of Nîmes (see Supplemental Text S1). Participants were then told that, because of the financial difficulties faced by their association, they needed to choose between two alternative plans to use the funds dedicated to the production of the video clips. In the gain frame, while the sure plan allowed the completion of 2 video clips (“The shootings of 2 video clips will continue”), the risky plan allowed either the completion of all 6 video clips, with a 1/3 probability, or of no video clip, with a 2/3 probability (“There is 1/3 chance that shootings of 6 video clips will continue and 2/3 chance that no shooting will continue”). In the loss frame, while the sure program ceased the production of 4 video clips (“The shootings of 4 video clips will stop”), the risky program jeopardized the production of either all 6 video clips, with a 2/3 probability, or of no video clip, with a 1/3 probability

(“There is a 2/3 chance that shootings of all video clips will stop and a 1/3 chance that no shooting will stop). Note that, like in Study 1, the expected value of both the sure and risky programs were kept systematically constant in both the gain and loss frames.

To assess the role of emotion in framing susceptibility, we used the procedure described by Gosling and Moutier (2018). Before choosing between the two (i.e., sure and risky) options, participants rated the emotion triggered by each option, using the 5-point valence Self-Assessment Manikin scale (from  $-2 =$  “very negative” to  $+2 =$  “very positive”; Bradley & Lang, 1994). Immediate emotions were assessed for the sure and risky options separately, but an index labelled ‘Emotional Attraction’ was created to explore the emotional mechanisms described by Kahneman & Frederick (2007). This index was obtained by linearly transforming the emotion felt for each option to a scale ranging from 1 (“very negative”) to 5 (“very positive”) and by subtracting the emotion evoked by the sure option from the emotion evoked by the risky option. A positive value for this index indicated a higher emotional attraction to the risky than to the sure option, while a negative value for this index indicated a higher emotional attraction to the sure than to the risky option. Previous results suggest that we should observe a negative value in the gain frame (corresponding to an attraction to sure gains) and a positive value in the loss frame (corresponding to an aversion to sure losses; Kahneman and Frederick, 2007). Because previous between-subjects studies have shown that the presentation order of the sure and risky options (sure then risky *versus* risky then sure) influences the framing effect (Kühberger & Gradl, 2013), we kept the order fixed in this study, so that participants always faced the sure option first and the risky option second.

### ***Statistical analysis***

Our analyses were conducted using *R* and *Mplus* (Version 8; Muthén & Muthén, 1998-2017). In order to investigate whether participants’ framing susceptibility differed as a function of the importance of the decision outcome, we ran a multiple logistic regression model in *R* with

importance (from 1 “very low” to 5 “very high”) and frame (gain versus loss) as predictors and the choice (sure option versus risky option) as the dependent variable. Then, to investigate whether importance impacted the framing effect via its role on the emotions triggered by sure and risky options, we explored whether the mediation of the framing effect via emotion differed across levels of importance. Figure 3 shows a graphical representation of this moderated mediation analysis. All paths graphed were simultaneously estimated in a Structural Equation Model (SEM) in *Mplus*. Significance of the moderated mediation model was tested using the index described by Hayes (2015).

### Results and Discussion

First, the results showed that, in our sample of participants, the promotion of the cultural heritage of the city of Nîmes was rated as relatively important. The mean score ( $M = 3.38 \pm 1.03$ ) was significantly higher than the medium score of 3,  $t(245) = 5.82, p < .001$ .

Second, the multiple logistic regression model revealed a significant frame X importance interaction on participants’ choices ( $B = 1.20, SE = 0.33, p < .001$ ). A “region of significance” analysis on the importance of the decision (Preacher, Curran & Bauer, 2006) revealed a lower Johnson-Neyman point of 1 and an upper Johnson-Neyman point ranging between values 2 and 3. In other words, this analysis revealed that participants resisted framing manipulation when they attributed a low importance to the decision domain (importance scores of 1 or 2) while they were susceptible to the framing effect when they attributed a moderate or high importance to the decision domain (importance scores of 3, 4 or 5; Figure 2a).

— Figure 2 about here —

Third, we investigated whether framing effect variations across levels of importance were mediated by variations in emotion. The moderated mediation analysis first revealed that



the frame X importance interaction on the emotional attraction to each option was significant ( $B = -0.56$ ,  $SE = 0.14$ ,  $p < .001$ ), such that an increase in the importance score was associated with an increase in emotional attraction to the risky option in the loss frame, compared to the gain frame. Then, this analysis showed that emotional attraction to each option was a significant predictor of choices ( $B = -0.95$ ,  $SE = 0.19$ ,  $p < .001$ ), such that a higher emotional attraction to the risky option predicted an increase in the choice of this option. These results suggested that emotions were affected by the importance attributed to the decision domain and participated in driving participants' choices. Accordingly, the moderated mediation analysis was statistically significant ( $B = 0.53$ ,  $p < .01$ , 95% CI: [0.19, 0.87]). Probing of this moderated mediation was conducted using conditional indirect effects. Typically, conditional indirect effects for continuous moderators are observed at the mean and at  $\pm 1$  SD from the mean (e.g., Hayes, 2015). Because this procedure could not be efficiently implemented with our scale, we probed the moderated mediation at importance values strictly inferior to 3 (the scores of 1 and 2 were recoded as "low importance"), equal to 3 (the score of 3 was recoded as "moderate importance") or superior to 3 (the scores of 4 and 5 were recoded as "high importance"). This analysis revealed that, for low importance, the loss and gain frames aroused similar emotional attraction, leading participants to resist the framing manipulation ( $B = -0.50$ ,  $p > .15$ , 95% CI: [-1.21, 0.20]). In contrast, for both moderate and high importance, emotional attraction to the risky option was stronger in the loss frame than in the gain frame, leading participants to display a framing effect ( $Bs > 1.16$ ,  $ps < .001$ , 95% CIs: [0.62, 1.71]).

— Figure 3 about here —

With this second study, we confirmed and extended the results obtained in the first study. We showed a direct relationship between the importance of a decision domain and the strength of framing susceptibility. In addition, we showed that this relationship was mediated by emotional response. When a decision was deemed important by an individual, the options

triggered opposite emotional response, and this led to a robust framing effect. In contrast, when a decision was deemed unimportant, the option did not trigger different emotion, and the framing effect was absent. These results, like those of Study 1, are in line with the Unification Model (Seta et al., 2017).

### **General Discussion**

The present paper aimed to clarify the influence of the importance of a decision on framing susceptibility and to uncover possible mechanisms underlying this influence. First, our results confirmed that the importance of a decision plays a critical role in promoting the framing effect. We found that increases in importance were systematically associated with increases in framing susceptibility. Second, our results gave us some insight into the mechanisms underlying this effect. They suggested that the importance of a decision moderates framing susceptibility through an effect on emotion. When importance was medium to high (i.e., when participants judged the decision domain to be relatively important), the formulation of the options affected the emotional response, such that the loss frame produced more attraction to the risky option compared to the gain frame. This difference then yielded the framing effect. In contrast, when importance was low (i.e., when participants judged the decision domain to be trivial), sure and risky options triggered similar emotional responses in both frames, leading participants to make their choice independently of the frame.

These findings are directly in line with predictions from the Unification Model, but not with what would be expected from the FTT (Fuzzy-Trace-Theory) or the AHM (Analytic/Holistic Model). These two dual-process theories propose that decision-makers should rely more heavily on emotional processing for low-importance decisions, compared to high-importance decisions. Consequently, individuals should be more susceptible to the framing effect for decisions of low, compared to high, importance. Our data do not support these predictions.

Our results provide a potential explanation for the heterogeneity of results in previous studies investigating the effect of “level of importance” on framing. For example, Fagley & Miller (1997) contrasted problems involving either human lives or money, Van der Pligt & Van Schie (1990) described the consequences of choosing governmental programs with either ecological or economic impact, and Rothman et al. (1993) investigated how concern about skin cancer influenced a framing problem that involved a choice about skin cancer prevention. Fagley & Miller (1997) showed that problems involving human lives and money elicited similar framing effects. In the same way, Van der Pligt & Van Schie (1990) showed that although participants attached more importance to the ecological versus financial impact of a government program, both domains elicited a similar framing effect. In contrast to these studies, Rothman et al. (1993) found that men, who exhibited little concern about skin cancer, resisted the framing manipulation while women, who were highly concerned about skin cancer, exhibited a robust framing effect. We believe that the heterogeneity of findings between these studies may be explained by the fact that the first two studies varied importance levels, but nonetheless employed domains with high importance (Van der Pligt & Van Schie, 1990 ; Fagley & Miller, 1997). Fagley & Miller (1997) compared human lives to money and although individuals likely judge human lives to be more important than money, both domains would have a high importance. The participants in the Van der Pligt & Van Schie (1990) study scored the importance of ecological impact higher than the importance of financial impact but, once again, both domains were deemed important (i.e., both were rated higher than the medium score of 4 on a 7-point Likert scale). In contrast, in the Rothman et al. (1993) study showing a significant effect of decision importance on framing susceptibility, men rated their concern about skin cancer as trivial (i.e., they rated it as less important than the medium score of 5 on a 9-point Likert scale) while women rated it as an important domain (i.e., they rated it as more important than the medium score of 5 on a 9-point Likert scale). In

line with this interpretation, our first study confirmed that a trivial domain cancelled framing susceptibility while an important domain produced a large framing effect. In addition, our second study showed that a decision domain rated as moderately important produced a standard framing effect (as revealed by the Johnson-Neyman point analysis and the significant conditional indirect effect in participants rating the decision domain as moderately important). These data thus suggest that, in order for participants to resist the framing effect, they must show a clearly low concern for the decision domain (Bosone & Martinez, 2017).

Moreover, our results help clarify the influence of payoff size on the framing effect. In line with our results, the literature has pointed out that larger payoff sizes tend to produce larger framing effects (e.g., K uhberger et al., 2002). However, some studies have shown that very small payoff sizes can produce large framing effects (e.g., Wang, 1996) and that very large payoff sizes can lead to resistance to the framing effect (e.g., Wang et al., 2001). Our results reconcile these apparent contradictions by emphasizing how importance of a decision outcome could interact with payoff size. Specifically, Wang et al. (2001) found that participants resisted the framing effect despite a payoff size of 1,000,000 when the payoff involved 1,000,000 alien lives. In contrast, Wang (1996) found that participants were highly susceptible to the framing effect for a payoff size of 6 when the payoff involved 6 human lives. The participants likely judged 6 human lives as having a higher importance than 1,000,000 hypothetical alien lives, which, consistent with our results, would explain why the effect of payoff size on framing susceptibility varied across studies.

Nevertheless, it is noteworthy that some studies have reported findings inconsistent with our own. For example, in keeping with studies about the role of payoff size in framing susceptibility, Reyna et al. (2011) reported that increases in financial payoff size are associated with reduced framing susceptibility. Similarly, McElroy & Mascari (2007) reported that closer temporal proximity with a decision outcome is associated with increased

importance and with reduced framing susceptibility (a more exhaustive list of studies with either consistent or opposite findings to those presented in this paper can be retrieved in Igou & Bless, 2007; Meyers-Levy & Maheswaran, 2004; McElroy & Seta, 2003, or Seta et al., 2017).

We believe that an important research direction will be to explore potential moderators of the relationship between importance of a decision and framing. It is noteworthy that very heterogeneous methods have been used to manipulate the level of importance of a decision. For example, studies have compared large versus small hypothetical financial rewards (Kühberger et al., 1999), real versus hypothetical financial rewards (Kühberger et al., 2002), immediate versus delayed rewards (McElroy & Mascari, 2007), decisions for self versus others (Ziegler & Tanney, 2015) or have compared outcome domains for which participants attribute either a high or a low importance (Krishnamurthy, Carter & Blair, 2001). Moreover, these studies have also used various forms of framing effects (risky-choice, attribute or goal framing effects; Levin et al., 1998). A systematic assessment of the consequences of each of the importance manipulation on each of the three forms of framing effect would potentially allow to uncover some of the moderators of the relationship between importance and framing susceptibility.

Interestingly, the Unification Model informs us of what one of these moderators may be. Specifically, this model predicts that the impact of importance on framing will depend on the difficulty to process the frame's implications. When a message is easy to process and the framing manipulation is blatant, the participants who have allocated larger amounts of cognitive resources may be more able to re-frame the message (and thus more likely to resist the framing effect). In contrast, when the message is more difficult to process and the framing manipulation is thus more subtle, the participants who have allocated larger amounts of cognitive resources may be more susceptible to access the frame's implications (and thus

more likely to be affected by the frame). Future systematic reviews and meta-analyses assessing the effect of this moderator would provide an observational assessment of this moderator, which could then be explored using experimental settings.

There are two main limitations to the current studies. First, based upon our experimental design, we cannot exclude the possibility that participants from the low importance condition in Study 1, and participants rating the decision domain as trivial in Study 2, resisted the framing manipulation because they were less focused and therefore inaccurately evaluated the choice that they faced. However, our results do allow us to interrogate this interpretation. If participants made their decision without assessing the options when importance was low, we would have expected them to choose similar numbers of sure choices (~50%) and risky choices (~50%) across frames. Instead, they were consistently risk-averse (Study 1: 37% of risky choices; Study 2: 24% of risky choices). In addition, the non-significant main effects of importance in both studies confirmed that participants in the low and high importance conditions exhibited overall similar patterns (Study 1: 36% of risky choices overall; Study 2: 21% of risky choices overall). Furthermore, if participants had not accurately assessed their immediate emotional status in the low importance condition of our second study, we would have expected them to overwhelmingly report a neutral emotional state for both the sure and risky options (in other words, they should not have “cared” about either option). Our data revealed that this pattern appeared no more than 25% of the time for low importance (versus 16% for high importance) and concerned an average of 24% of the answers for low importance (versus 14% for high importance)<sup>1</sup>. Future work may however further address this limitation.

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<sup>1</sup> Note that this difference was not significant ( $\chi^2 = 1.52, p > .20$ , Cramer's  $V < .10$ ).

A second limitation lies in the method used to assess emotional response in Study 2, which consisted of self-reports. Although the scale that we used to capture emotion is known to correlate with physiological measures (Greenwald, Cook, & Lang, 1989; Podesvijn et al., 2016), we believe that a promising research direction would consist in extending the present results to other measures of emotional response, for instance electro-dermal activation or time perception. Several studies have indeed shown that combining a time production task (in which participants have to judge an ongoing duration) and a concurrent task (e.g., a decision-making task) is a reliable procedure to discriminate between the effects of attention and arousal on the concurrent task (Viau-Quesnel, Savary & Blanchette, 2019). A study combining a framing task – including high or low importance decisions – with a time perception task or an electro-dermal measure may help clarify the mechanisms underlying the impact of the importance of a decision on framing susceptibility.

In conclusion, we found that decisions involving important outcomes produce large framing effects, compared to decisions involving unimportant outcomes. In addition, our results suggest that this effect arises through a modulation of emotional response. Decisions involving an important outcome elicit strong emotional attraction to sure gains in the gain frame and strong emotional aversion to sure losses in the loss frame, yielding a large framing effect. In contrast, decisions involving a trivial outcome elicit similar emotional response, irrespective of the frame, yielding an absence of framing effect. The results of this work are important and could have practical implications. For instance, they provide a direction for improving the framing of government-related messages, such as public health campaigns (De Bruijn, & Janssen, 2017; De Bruijn, Visscher & Mollen, 2015; Keyworth et al., 2017).

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**Figure captions**

*Figure 1.* Percentage of risky choices made as a function of the scenario and frame. When participants made a decision related to the promotion of humanitarian causes, they displayed a significant framing effect ( $p = .01$ ). In contrast, when they made a decision related to the promotion of culinary specialties, they resisted the framing manipulation ( $p > .99$ ). \*\* $p < .01$ ; *ns* = non significant.

*Figure 2.* (a) Percentage of risky choices and (b) emotional attraction index (which was obtained by subtracting the emotion felt for the sure option from the emotion felt for the risky option) as a function of frame and importance.

*Figure 3.* Graphical representation of the moderated mediation. The moderated mediation assesses whether the influence of the frame on choice – via emotional attraction – differs across levels of importance.