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Having second thoughts: Consequences of decision reversibility

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Second thoughts oftentimes are the very worst of all thoughts.

– W. Shenstone

CHAPTER THREE

REVERSIBLE DECISIONS: THE GRASS ISN'T MERELY GREENER ON THE OTHER SIDE; IT'S ALSO VERY BROWN OVER HERE

This chapter is based on Bullens, L., van Harreveld, F., Förster, J., & van der Pligt, J. (2013). Reversible decisions: The grass isn't merely greener on the other side; it's also very brown over here. *Journal of Experimental Social Psychology*, 49, 1093-1099.

Return policies, temporary contracts, lease products, and cancellation insurances; they all provide the opportunity to change our minds about the decisions we make. People often indicate to have a preference for such reversible decisions, and generally expect that the option to revise ultimately leads to the most optimal decision outcome. An experiment by Gilbert and Ebert (2002), however, suggests that this preference for reversible decisions can backfire (see also Bullens, Förster, van Harreveld, & Liberman, 2011). More specifically, reversible decisions seem to yield lower levels of satisfaction with the decision outcome than decisions that are final. This finding is especially surprising because the opportunity to revise a choice accommodates preference shifts subsequent to one's initial decision, and, thus, at first glance should increase outcome satisfaction. The goal of the present research is to gain insight into the underlying processes driving the counterintuitive and negative relation between decision reversibility and outcome satisfaction.

Decision reversibility and choice satisfaction

The notion that decision reversibility diminishes choice satisfaction stems from research by Gilbert and Ebert (2002). In one of their studies, participants were asked to rank nine art posters and were subsequently given a choice between their third and fourth ranked posters as a reward for their participation. After making this decision, they were randomly allocated to a reversible or irreversible condition. Those assigned to the reversible condition were told that they could change their poster for the other one anytime during the following month, whereas those assigned to the irreversible decision condition were told that their decision was final. After 15 min, all participants were again asked to evaluate the art posters. Results revealed an increase in liking of the chosen poster for those in the irreversible decision condition. The reversible decision condition showed the opposite. These findings are in line with results from an earlier study showing that the difference in attractiveness ratings of the chosen and rejected alternatives increases over time when the decision is irreversible and decreases when the decision is reversible. That is, when the decision is irreversible, the chosen alternative is relatively more attractive than when the decision is reversible (Frey, Kumpf, Irle, & Gniech, 1984).

More recently, Bullens, van Harreveld, and Förster (2011) demonstrated that reversible decisions also result in higher levels of choice regret and found this effect to be mediated by participants' cognitive capacity. More specifically, in a first experiment, Bullens and colleagues asked participants to make a reversible or irreversible choice between two lotteries, and, subsequently, measured the accessibility of words related to each of the choice options (i.e., words related to the prizes in each of the lotteries) and unrelated neutral words with a lexical decision task. Results revealed that relative to the neutral words, choice-related words were more accessible for those who still had the opportunity to change their minds, compared to those for whom the decision had been final. Furthermore, as soon as the decision became final for those in the reversible decision condition (i.e., after participants had the opportunity to revise their initial decision), the relative accessibility of choice-related words decreased. These results are in line with research showing that upon goal fulfillment the accessibility of goal relevant constructs is reduced or inhibited (e.g., Förster, Liberman, & Higgins, 2005; Liberman, Förster, & Higgins, 2007; Zeigarnik, 1927).

In a second study, Bullens, van Harreveld, et al. (2011) showed that decision reversibility curtails people's cognitive resources as indicated by the finding that participants in the reversible decision condition had lower working memory capacity than their counterparts in the irreversible decision condition. Moreover, reversible decision-making increased levels of choice regret, and this effect appeared to be mediated by participants' working memory capacity as measured with an operation span task. Altogether, these results suggest that the decision-related thoughts people are occupied with during the time their choice is reversible result in lower levels of satisfaction. Previous research, however, did not address the *content* of these thoughts. The latter might play an important role in the differences in choice satisfaction after reversible versus irreversible decisions.

Underlying mechanisms: focused attention on consonant versus dissonant aspects

In explaining their findings regarding choice satisfaction, Gilbert and Ebert (2002) briefly speculated about what aspects of the decision particularly come to mind when having made a reversible choice. In general, they suggested that the "psychological

immune system” is unable to start operating when decisions are reversible. The “psychological immune system” comprises people’s fundamental tendency to restructure their views of outcomes in such a way that these outcomes are experienced more positively. One of the most prominent theories describing this general tendency within the decision-making domain is cognitive dissonance theory (Brehm, 1956; Festinger, 1957). Research on cognitive dissonance theory has compellingly shown that people augment the attractiveness of the chosen alternative, and reduce the attractiveness of the rejected alternative(s) (i.e., the desirability ratings of the chosen and rejected alternatives spread apart) after making a difficult decision. Such “spreading-apart” helps to reduce possible bad feelings produced by cognitive inconsistencies (i.e., thoughts on the negative aspects of the chosen alternative or the positive aspects of the rejected alternative) people may have about the attitude object.

According to Gilbert and Ebert (2002), individuals increase the attractiveness of the chosen alternative after having made an *irreversible decision*, as a way to boost choice satisfaction. However, after people have made a *reversible decision*, they do not optimize their attitudes toward the chosen alternative (see also Festinger, 1964; Frey, 1981, 1986; Frey et al., 1984; Frey & Rosch, 1984). Instead, as Gilbert and Ebert reason, they continue to critically evaluate the chosen option and especially pay attention to its imperfections in order to decide whether or not to keep this alternative. When they finally decide to stick with the initially chosen alternative, all their critical thinking may have negatively impacted upon their satisfaction.

Although never examined directly, there is some indirect evidence supporting the notion that decision reversibility yields people to pay more attention to those aspects of the choice alternatives that are prone to reduce post-choice satisfaction. For instance, research on the link between decision reversibility and information search demonstrated that people show a weaker preference for choice-consistent new information (i.e., seeking positive information and avoiding negative information about the chosen option) following reversible rather than irreversible decisions (Frey, 1981). On the basis of these results it was suggested that choice-inconsistent information may be more useful than choice-consistent information when in the process of deciding whether to reverse the decision or not. Frey’s findings thus showed differences in people’s preference for choice *consistent* information; later research provided more

compelling evidence for the idea that choice *inconsistent* information may especially be useful after reversible decisions (Frey & Rosch, 1984). They compared people's preferences for consonant versus dissonant information about their choice and showed that preference for consonant over dissonant information was greater for irreversible than for reversible decisions, especially when the information was new rather than old.

Altogether, there seems reason to believe that reversible decision-making yields lower levels of satisfaction (characterized by less spreading of alternatives), because people may especially focus on those aspects of the decision that are likely to reduce feelings of satisfaction. In their studies, Gilbert and Ebert (2002) merely considered variations in people's tendency to boost the attractiveness of the chosen alternative, but they did not present evidence for the idea that reversible decision-making directs people's attention to the negative aspects of the chosen alternative. The present research is designed to directly investigate this assumption, and aims to shed more light onto what particular aspects of the decision people focus on after reversible versus irreversible decision-making. That is, to determine more specifically what it is exactly that makes people less satisfied with their decision after having had the opportunity to revise their initial preference.

Gilbert and Ebert (2002) speculated that decision reversibility should particularly direct one's attention to the *negative aspects of the chosen* alternative. In our view there is reason to believe that reversible decision-making also drives people's attention to the *positive aspects of the rejected* alternative. The latter may also provide information on whether to change the chosen alternative for the rejected one, and may also contribute to reduced levels of choice satisfaction (e.g., Houston, Sherman, & Baker, 1991). Hence, the present research will assess people's attitude toward both the rejected and the chosen alternative.

Present research

The goal of the present research is twofold. First, in Study 1, we want to replicate previous findings and show that spreading of alternatives especially occurs after irreversible (and not reversible) decision-making. In contrast to the research of Gilbert and Ebert (2002), the present study will, however, compute spreading scores based on

people's attitudes toward both the chosen and the rejected alternatives. The second goal is to determine on what aspects of the decision individuals specifically focus (Study 2), and to see whether this focus relates to the potential differences in spreading (Study 3).

Study 1

Method

Participants and design. 51 students (44 females; $M_{age} = 20.86$, $SD_{age} = 2.99$) participated in the study that had a one factor (reversible vs. irreversible) between subjects design with spreading scores as the main dependent variable. One participant was excluded, because a Tukey box plot identified this individual as an outlier on one of the dependent variables (spreading Time 1), leaving a sample of 50. Participants received course credit or 7 euro for their participation.

Materials and procedure. Upon arrival at the laboratory, participants were seated behind a computer and told that the experimental session would comprise a number of unrelated experiments. They were further informed that all experimental tasks were predetermined, except for the task in the final experiment. More specifically, they were told that the goal of this final experiment would be to examine whether people are more creative after working on a pleasant task than after a neutral task. All participants then learned that they were randomly assigned to the 'pleasant task condition' and were informed that two pleasant tasks had been created from which they could choose one. In other words, participants were to decide which of these tasks they would later work on (see Liberman & Förster, 2006). For half of the participants this decision was irreversible. They would not be able to revise their decision anymore. For the other half of the participants this decision was reversible. They were told that they would be allowed to change their preliminary decision right before the start of the final experiment, if they wished to do so (for a similar manipulation of decision reversibility see for instance Bullens, van Harreveld, et al., 2011; Gilbert and Ebert, 2002).

Participants were then given unlimited time to read the two task descriptions. The first task involved watching a 15-minute movie about life in the jungle and the second task involved watching a 15-minute movie about life in the ocean. A pilot study

showed that both tasks were rated equally attractive on a 9-point Likert scale, $t(14) = -.521, p = .61$ ($M = 6.47, SD = 1.51; M = 6.73, SD = 1.39$ respectively).

After participants read the task descriptions and indicated their reversible or irreversible choice, they were asked to indicate the attractiveness of both alternatives on a 9-point Likert scale. Furthermore, as a manipulation check, they were asked to indicate the extent to which they thought the decision between the two tasks had been a reversible one, on a scale ranging from *not at all* (1) to *very much* (9). Subsequently, they continued with the next part of the experimental session that was outside the scope of the current study.

Twenty minutes before the end of the experimental session, at the start of the final (bogus) experiment on creativity, participants in the reversible decision condition were given the opportunity to change their initial choice. At this point, their decision thus became final. Subsequently, all participants, including those in the irreversible decision condition, were asked again to indicate the attractiveness of both alternatives on a scale ranging from *not at all* (1) to *very much* (9). Finally, to preserve the credibility of our experimental procedure, all participants watched the selected movie for 15 min and were subsequently asked to write down a title for a picture being shown to them, supposedly to measure their creativity. At the end of the experimental session, all participants were thanked and rewarded for their participation.

Results and Discussion

Manipulation check. Results revealed that participants in the reversible decision condition considered the decision to be more reversible ($M = 4.68, SD = 2.43$) than those in the irreversible decision condition ($M = 1.68, SD = 1.11$), $t(48) = -5.62, p < .001$. Only three participants in the reversible decision condition changed their preliminary decision.

Spreading of alternatives. In order to determine possible changes in the amount of spreading over time, participants were asked to indicate the attractiveness of the alternatives twice. The first time immediately after the initial decision was made and the second time right after the decision had become final for all participants (i.e., after those in the reversible condition had had the opportunity to change their minds).

Spreading scores were calculated by subtracting the attractiveness rating of the rejected alternative from that of the chosen alternative (see Liberman & Forster, 2006). The means and the standard deviations of the attractiveness ratings and the spreading index are displayed in Table 3.1.

It was hypothesized that spreading scores would be larger for those in the irreversible decision condition than for those in the reversible decision condition. Indeed, as predicted, both at Time 1 and Time 2 the difference between the attractiveness of the chosen and rejected alternatives was more pronounced for those in the irreversible decision condition ($M_{time1} = 1.12, SD_{time1} = .88; M_{time2} = 1.64, SD_{time2} = 1.58$) than for those in the reversible decision condition ($M_{time1} = .64, SD_{time1} = .81; M_{time2} = .16, SD_{time2} = 1.60$), $F(1, 48) = 4.02, p = .051$, and $F(1, 48) = 10.85, p = .002$ respectively. Hence, those who were not able to revise their decision were, at both times, more likely to spread the attractiveness of the alternatives.

Table 3.1

Mean attractiveness ratings of chosen and rejected alternatives (Study 1, $N = 50$; Study 3, $N = 56$). Standard deviations are in parentheses.

	Irreversible decision	Reversible decision
<i>Time 1</i>		
Chosen alternative	7.32 (1.10)	7.24 (1.23)
Rejected alternative	6.20 (1.19)	6.60 (1.19)
Spreading score	1.12 (0.88)	0.64 (0.81)
<i>Time 2 (Study 1)</i>		
Chosen alternative	7.40 (0.87)	6.72 (1.37)
Rejected alternative	5.76 (1.45)	6.56 (1.69)
Spreading score	1.64 (1.58)	0.16 (1.60)
<i>Time 2 (Study 3)</i>		
Chosen alternative	7.23 (0.61)	6.95 (0.72)
Rejected alternative	5.35 (1.18)	5.64 (1.05)
Spreading score	1.88 (1.12)	1.32 (0.78)

Note. Spreading is the difference between the ratings of the chosen and the rejected alternatives.

Altogether, the results of this first study replicate the findings of Gilbert and Ebert (2002). Participants who were given the opportunity to change their minds were less likely to spread the attractiveness of the alternatives than those for whom the decision was final (both at Time 1 and Time 2). Our next study was designed to determine what aspects of the two choice alternatives remain accessible for the decision-maker after reversible versus irreversible decision-making.

Study 2

As argued in the introduction, we believe that reversible decision-making drives people's attention to both the negative aspects of the chosen alternative and the positive aspects of the rejected alternative (i.e., aspects potentially decreasing satisfaction). When it comes to irreversible decision-making we expect the opposite. That is, we predict that irreversible decision-making will mostly drive people's attention to the positive aspects of the chosen alternative and the negative aspects of the rejected alternative (i.e., aspects potentially increasing satisfaction). To test these predictions, participants are again asked to make a reversible or irreversible choice. However, whereas the decision alternatives of the first study merely contained positive features, the choice alternatives of Study 2 will encompass both positive and negative features. To measure the accessibility of the positive and negative aspects of both chosen and rejected alternatives, we will employ a lexical decision-making task containing positive and negative words related to the alternative options.

Method

Participants and design. A total of 69 students (57 females; $M_{age} = 20.43$, $SD_{age} = 3.08$) participated in this study. One participant was excluded from the analysis, because a Tukey box plot identified this individual as an outlier on the amount of errors on the lexical decision task, leaving a sample of 68. The study was a one factor (reversible vs. irreversible) between subjects design with lexical decision reaction times as a measure of accessibility. Participants received course credit or 7 euro for their participation.

Materials and procedure. Upon entering the lab, participants were seated behind individual computers and told that the experimental session would include several unrelated experiments. As in Study 1, they were informed that they could choose

the task they would wish to perform in the final experiment of the experimental hour. More specifically, they were told that the goal of the final experiment was to investigate how well individuals perform on an *unpleasant* task after working on a *pleasant* task. They were further told that two combinations of an unpleasant and a pleasant task had been created and that they were allowed to choose between these two. For half of the participants this decision was irreversible. They would not be able to revise their decision anymore. For the other half of the participants, however, this decision was reversible. They were told that they could change their preliminary decision at the start of the final experiment, if they wished to do so.

Participants were given unlimited time to read the task descriptions. The first task combination consisted of a pleasant task in which participants would watch a piece of stand-up comedy, and an unpleasant task in which they would have to translate a mortgage deed from Dutch to English while wearing a headphone producing loud and unpleasant sounds. The second combination of tasks included one in which they would read from a selection of newspapers and popular magazines (pleasant task) and a task in which they would have to write an essay on immigration while writing down a code from a code list between every five words (unpleasant task). Both pleasant and unpleasant tasks in each task combination would last for 10 min.

After participants read the task descriptions and indicated their reversible or irreversible choice, they were introduced to an ostensibly unrelated task on speed of word recognition: the lexical decision task. In reality this task was administered to measure the accessibility of positive and negative aspects of the chosen and rejected alternatives¹. Participants were informed that letter strings would appear at the center of the screen and were asked to press as quickly and accurately as possible the “Z”-key if the string was a word and the “/”-key if the string was a non-word. They were instructed to put their right and left index fingers on the response keys before the first trial and to keep them there throughout the task. In each trial, an uppercase letter string (font size 16, Arial) was presented at the center of the computer screen and remained there until the response was given. The next letter string appeared immediately after the response. In random order, 12 positive words related to the decision (six positive words per task

¹ The positive aspects are derived from the descriptions of the pleasant tasks (e.g., cabaret, magazine), and the negative aspects from the descriptions of the unpleasant tasks (e.g., immigration, policy).

combination; e.g., cabaret, newspaper), 12 negative words related to the decisional alternatives (six negative words per task combination; e.g., mortgage, immigration) 48 words unrelated to the options (e.g., plant), and 96 non-words (e.g., pesfen) were presented. Option-related and -unrelated words did not differ in length or word frequency.

After participants finished the lexical decision task, they were asked, as a manipulation check, to indicate on a 7- point Likert scale the extent to which they thought the decision between the two task combinations had been reversible, on a scale ranging from *not at all* (1) to *very much* (7). Subsequently, they continued with a part of the experimental session that was outside the focus of the current study. To preserve the credibility of the experimental procedure, during the last 20 min of the experimental hour all participants were required to do the pleasant and unpleasant tasks they had chosen at the start of the experimental session. However, those assigned to the reversible decision condition were first given the opportunity to change their initial decision if they wished to do so. At that moment, their decision became final. Finally, all participants were thanked and rewarded for their participation.

Results and Discussion

Manipulation check. Results revealed that those in the reversible decision condition considered the decision to be more reversible ($M = 4.54, SD = 1.98$) than those in the irreversible decision condition ($M = 2.03, SD = 1.40$), $t(66) = -6.01, p < .001$. Only one participant in the reversible decision condition changed the preliminary decision.

Satisfaction-increasing and decreasing aspects. As a result of dissonance-reduction processes, it was hypothesized that for those in the irreversible decision condition the satisfaction-increasing aspects of the decision (positive aspects of the chosen alternative and negative aspects of the rejected alternative) would be relatively more accessible than the satisfaction-decreasing aspects of the decision (negative aspects of the chosen alternative and positive aspects of the rejected alternative). In contrast, on the basis of our results in Study 1 and earlier findings (Hafner, White, & Handley, 2011), for those in the reversible decision condition we predicted that the satisfaction-decreasing aspects of the decision would be relatively more accessible than

the satisfaction-increasing aspects. To test this, we first conducted logarithmic transformations (\ln) of the reaction times to reduce the skewness of the response distribution (Fazio, 1990). Thereafter, we calculated the mean summed transformed reaction times of the positive aspects of the chosen alternative and the negative aspects of the rejected alternative (satisfaction-increasing score). Likewise we calculated the mean summed transformed reaction times of the negative aspects of the chosen alternative and the positive aspects of the rejected alternative (satisfaction-decreasing score). A lower score on both indices reflects higher accessibility. Although transformed reaction times were used for the analyses, for a clear interpretation of the results, we only report non-transformed reaction times throughout this results section.

A 2 (satisfaction-increasing vs. satisfaction-decreasing aspects) by 2 (reversible, irreversible decision) repeated measures ANOVA revealed an interaction, $F(1, 66) = 3.86, p = .054$. As expected, for those in the irreversible decision condition the satisfaction-increasing aspects were relatively more accessible ($M_{increasing} = 593, SD_{increasing} = 83$) than the satisfaction-decreasing aspects ($M_{decreasing} = 601, SD_{decreasing} = 95$), whereas for those in the reversible decision condition the reverse seemed to be true ($M_{increasing} = 619, SD_{increasing} = 112; M_{decreasing} = 607, SD_{decreasing} = 88$)². No further main effects were found, $F < 1$.

Thus, consistent with our prediction, results of this second study demonstrate that, after having made a reversible decision, people focus relatively more on the satisfaction-decreasing aspects than on the satisfaction-increasing aspects, whereas the reverse holds for those having made an irreversible decision.

In sum, both studies seem to support the propositions of Gilbert and Ebert (2002); when individuals have made a reversible decision, they are not only less likely to spread apart the alternatives (Study 1), they also seem to pay more attention to the choice's imperfections (Study 2).

² The simple effects were not significant [$F(1, 66) = 1.73, p = .194; F(1, 66) = 2.15, p = .147$ respectively].

Study 3

Gilbert and Ebert (2002) seemed to view spreading of alternatives and peoples' focus on specific aspects of alternative options as two different constructs. So far, we also dealt with them separately. The goal of the next study was to find out whether the two constructs are actually inter-related. More specifically, we aim to determine whether people's focus on specific aspects mediates the relationship between decision reversibility and spreading of alternatives. In our view spreading is the result, or is at least facilitated by a focus on specific aspects of the decision alternatives. This could be related to the motivation to reduce dissonance, which leads to a focus on the positive aspects of the chosen alternative and to the negative aspects of the rejected alternative in order to justify – or facilitate – one's choice.

In Study 2 we measured accessibility of satisfaction-increasing versus satisfaction-decreasing aspects. In Study 3, we will measure attribute importance as a proxy of accessibility. Attribute importance has been found to be closely related to attribute accessibility (see van der Pligt, de Vries, Manstead, & van Harreveld, 2000; van Harreveld, & van der Pligt, 2004; van Harreveld, van der Pligt, de Vries, & Andreas, 2000; van Harreveld, van der Pligt, de Vries, Wenneker, & Verhue, 2004). Specifically, this research demonstrated shorter response latencies for important attributes as compared to less important attributes. Hence, on the basis of our results in Study 2, we expect reversible decision-makers to consider satisfaction-decreasing aspects relatively more important than satisfaction-increasing aspects as compared to irreversible decision-makers. Moreover, we expect these differences in attribute importance to mediate the relationship between decision reversibility and spreading of alternatives.

Method

Participants and design. Sixty-one students (52 females; $M_{age} = 19.74$, $SD_{age} = 2.09$) participated in this study. Five participants were excluded, because a Tukey box plot identified them as outliers on spreading of alternatives leaving a final sample of fifty-six. The study was a one factor (reversible vs. irreversible) between subjects design with aspect importance scores as a measure of accessibility and with spreading scores as the dependent variable. Participants received course credit for their participation.

Materials and procedure. Participants were recruited for an online experimental session. Participants were introduced to a task allegedly measuring their emotional intelligence. They were told that emotional intelligence can be assessed by measuring one's ability in evaluating others on the basis of a personality description that includes positive and negative personality characteristics. Participants were led to believe that the experiment was designed to determine their emotional intelligence score.

Participants were asked to imagine working for an employment agency. Their task was to evaluate the personality descriptions of two job applicants applying for a position as a kindergarten teacher, and to decide which applicant was best suited for this job. These descriptions consisted of two positive and two negative personality characteristics and were made equally (un)attractive³. The decision between the two job candidates was either irreversible or reversible. Participants assigned to the irreversible decision condition were told that they were not able to revise their decision at a later point in time, whereas participants assigned to the reversible decision condition were told that the decision was only preliminary and that they would have the opportunity to revise their decision right before the end of the experimental session. Performance on the evaluation task ostensibly provided their emotional intelligence score.

Immediately after having made their decision, participants were asked to report how important each positive or negative personality characteristic was for reaching their decision. In order to do this, they were given a hundred points and asked to divide these over the attributes (see van der Pligt et al., 2000). Higher points would indicate higher importance. Participants were free to divide the points according their own preference. They could, for instance, evenly spread the points over all eight attributes or allocate the points to only one or two attributes.

After all points were allocated to the eight positive and negative characteristics, participants were asked, as a manipulation check, to indicate the extent to which they thought the decision between the two tasks had been a reversible one, on a scale ranging

³ The descriptions of these two candidates were constructed in such a way that all candidates were almost equal in the extent to which they would be suitable for the respective job, making the decision as difficult as possible. Analysis revealed that participants indeed considered the decision to be difficult ($M = 6.02$ on a 9-point Likert scale, which significantly deviates from the midpoint of the scale, $t(55) = 3.93, p < .001$). Difficulty did not differ between conditions, $t(54) = -.78, p = .439$.

from *not at all* (1) to *very much* (9). Then, they continued with the next part of the experimental session that was outside the focus of the current study. Right before the end of the experimental session, those assigned to the reversible decision condition were given the opportunity to change their initial decision if they wished to do so. At this moment, their decision, thus, became final. Subsequently, all participants, also those in the irreversible decision condition, were asked to indicate the attractiveness of both alternatives with the decision outcome on a scale ranging from *not at all* (1) to *very much* (9). Finally, all participants were thanked and rewarded for their participation.

Results and Discussion

Manipulation check. Results revealed that those in the reversible decision condition considered the decision to be more reversible ($M = 4.73, SD = 1.98$) than those in the irreversible decision condition ($M = 3.00, SD = 1.73$), $t(53) = -3.42, p = .001$. None of the participants in the reversible decision condition changed the preliminary decision.

Satisfaction-increasing and decreasing aspects. As in Study 2, it was hypothesized that for those in the irreversible decision condition the satisfaction-increasing aspects of the decision would be relatively more important than the satisfaction-decreasing aspects. In contrast, for those in the reversible decision condition it was predicted that the satisfaction-decreasing aspects of the decision would be relatively more important than the satisfaction-increasing aspects. To test this, we summed the importance ratings of the positive aspects of the chosen alternative and the negative aspects of the rejected alternative (satisfaction-increasing score). Likewise we summed the importance ratings of the negative aspects of the chosen alternative and the positive aspects of the rejected alternative (satisfaction-decreasing score). A higher score on both indices reflects higher importance.

A 2 (satisfaction-increasing vs. satisfaction-decreasing aspects) by 2 (reversible, irreversible decision) repeated measures ANOVA showed that for all participants satisfaction-increasing aspects were generally more important than satisfaction-decreasing aspects, $F(1, 54) = 89.65, p < .001$. As expected, the interaction was significant, $F(1, 54) = 6.69, p = .012$. As predicted, satisfaction-increasing aspects were relatively more important for those in the irreversible decision condition than for those

in the reversible decision condition ($M_{irreversible} = 68, SD_{irreversible} = 12; M_{reversible} = 60, SD_{reversible} = 9$). Because means add up to 100, the mirror pattern was obtained for satisfaction-decreasing aspects that were relatively more important for those in the reversible decision condition than for those in the irreversible decision condition ($M_{reversible} = 40, SD_{reversible} = 9; M_{irreversible} = 32, SD_{irreversible} = 12$), $F(1,54) = 6.69, p = .012$. Altogether, in line with the results of Study 2, the interaction pattern shows that after having made a reversible decision people tend to focus relatively more on the satisfaction-decreasing aspects than after having made an irreversible decision.

Mediation analysis. We also measured the attractiveness of alternatives right after the decision had become final for all participants (i.e., after those in the reversible condition had the opportunity to change their minds) in order to see whether the importance of satisfaction-increasing versus decreasing decisional aspects mediates the relation between decision reversibility and spreading of alternatives. Spreading scores were again calculated by subtracting the attractiveness rating of the rejected alternative from that of the chosen alternative (see Liberman & Förster, 2006).

Regression analysis revealed that the difference between the attractiveness of the chosen and rejected alternatives was again more pronounced for those in the irreversible decision condition ($M = 1.88, SD = 1.12$), than for those in the reversible decision condition ($M = 1.32, SD = .78$), $\beta = -.269, p = .045$. Hence, participants who were not able to revise their decision were more likely to spread the alternative options. Subsequently, results also showed that that importance of decisional aspects (i.e., satisfaction-increasing aspects) affects the spreading of alternatives, $\beta = .329, p = .013^4$. Most importantly, the effect of decision reversibility on spreading of alternatives was considerably decreased when importance of decisional aspects was controlled for, $\beta = -.180, p = .189$. Additionally, as recommended by Shrout and Bolger (2002), a bootstrapping analysis was performed to test the mediation effect, demonstrating that the estimation of the mediation effect parameter was marginally significantly different

⁴ Besides attractiveness ratings, we also asked participants to indicate their satisfaction with the choice on a 9-point Likert scale and found that levels of satisfaction differed significantly between conditions, $t(54) = 2.402, p = .020$. Participants assigned to the irreversible decision condition were more satisfied with their decision than those assigned to the reversible decision condition ($M = 7.09, SD = .97; M = 6.45, SD = .96$ respectively). Furthermore, we found satisfaction to positively correlate with the spreading score ($r = .455, p < .001$).

from zero, $p = .078$, two-tailed. Thus, the relation between decision reversibility and spreading of alternatives seems to be mediated by the importance ratings on satisfaction-increasing versus decreasing decisional aspects.

General Discussion

The aim of the present research was to gain more insight into the underlying processes driving the relation between decision reversibility and the subsequently lower levels of outcome satisfaction. Gilbert and Ebert (2002) speculated that, contrary to irreversible decision-making, reversible decision-making yields less spreading of alternatives, and a stronger focus on the choice's imperfections – both decreasing choice satisfaction. Although they did examine differences in spreading of alternatives, their research did not provide insight into the specific aspects of the choice people focus on after reversible versus irreversible decision-making. Accordingly, the current research was designed to find evidence for the idea that, in line with what would be expected on the basis of cognitive dissonance theory (Brehm, 1956; Festinger, 1957), irreversible decision-making would both yield stronger spreading of alternatives (Study 1), and a focus on those aspects of the decision that potentially *increase* levels of choice satisfaction, i.e., a focus on the positive aspects of the chosen alternative and the negative aspects of the rejected alternative. Alternatively, we expected reversible decision-making to yield reduced spreading of alternatives, and a focus on those aspects of the choice alternatives that actually *decrease* levels of choice satisfaction i.e., a focus on the negative aspects of the chosen alternative and the positive aspects of the rejected alternative (Study 2). Finally, the present research was designed to determine whether both constructs (i.e., spreading of alternatives and focus on decisional aspects) are actually related to one another (Study 3).

The results of our first study indeed replicated the spreading effects found in previous research (e.g., Gilbert & Ebert, 2002; Liberman & Förster, 2006). Furthermore, in line with our expectations, results of the second study demonstrated an increased relative focus on satisfaction-increasing aspects after irreversible decision-making, and an increased relative focus on satisfaction-decreasing aspects after reversible decision-making. Finally, we provided evidence that the focus on decisional aspects (as indicated by aspect importance) has a direct impact on the spreading of alternatives.

Apparently, people evaluate the attractiveness of the chosen and the rejected alternative differently as a function of the reversibility of the decision, and attend to different aspects of the decision alternatives. As the present research shows, the opportunity to revise actually drives people's attention to those aspects of the decision alternatives that negatively impact upon choice satisfaction. These findings are particularly interesting in light of the fact that people often do not change their minds (see Bullens, van Harreveld, et al., 2011; Gilbert & Ebert, 2002). Apparently, people do not revise their choice, even though reversible decision-making directs one's attention to those aspects of the decision actually decreasing choice satisfaction. Bullens, van Harreveld, et al. (2011) suggested that the so-called 'endowment effect' probably underlies people's general reluctance to change their mind. Specifically, the endowment effect refers to the phenomenon whereby an individual values an object more because he or she possesses it (Thaler, 1980; Kahneman, Knetsch, & Thaler, 1990). Accordingly, people's reluctance to change is probably due to decision-makers already experiencing a sense of ownership of the preliminary chosen object (see also Cialdini, Cacioppo, Bassett, & Miller, 1978). Exchanging this object for another will feel as a loss, which people generally try to avoid (e.g., Kahneman & Tversky (1979; Tversky & Kahneman, 1991).

In our third study, we used attribute importance as an indicator of accessibility. We opted for this approach because research has convincingly shown a link between accessibility and attribute importance (see van der Pligt et al., 2000; van Harreveld, & van der Pligt, 2004; van Harreveld et al., 2000; van Harreveld et al., 2004). However, when one would take a dual-system perspective on these two variables, this could yield some doubts as to whether attribute importance indeed provides conclusive evidence for the operation of an accessibility mechanism. Dual-process theory distinguishes between two modes of processing; low-level processes that are unconscious, rapid and automatic, and high-level processes that are conscious, slow and deliberative (Evans, 2008). According to this perspective, the accessibility effect as obtained in Study 2 involves a low level process, whereas the attribute importance effect in Study 3 involves a high level process. It has been argued that low- and high level processes can operate independently and parallel from one another. This means that in many cases they yield similar outcomes (Förster & Liberman, 2007), but under specific conditions can also

result in different outcomes (Chaiken, 1980; Chen & Chaiken, 1999). As such, although the relation between accessibility and importance is well established, at this point we cannot entirely rule out the possibility that another mechanism rather than accessibility may have driven the relation between decision reversibility, attribute importance, and differences in spreading of alternatives in the present research. Future research should investigate this possibility more carefully.

One may also wonder how our findings relate to cognitive dissonance theory, which generally supposes that dissonance processes are only invoked after irreversible decision-making (e.g., Festinger, 1964). In accordance, research showed that spreading of alternatives (i.e., a way to reducing dissonance) only occurs after irreversible decision-making (see for instance Frey, Kumpf, Irle, and Gniech, 1984). The results of our second and third studies, however, could imply that extant assumptions about the non-existence of cognitive dissonance after reversible decision-making are not necessarily right. In our introduction we proposed that, after reversible decision-making, individuals focus on the negative aspects of the chosen alternative and the positive aspects of the rejected alternative, because these aspects are most indicative of whether one has to change or not. However, it could also be that reversible decision-makers *do* experience dissonance after their initial choice, and that their focus on the satisfaction-decreasing aspects of the decision alternatives is in fact the mere manifestation of them not yet having been able to reduce the dissonance they experience as both alternatives are still available. In order to rule out one of these possibilities, future research should investigate what process exactly underlies reversible decision-makers' focus on satisfaction-decreasing aspects. Perhaps, as a first step in this direction, it could be examined whether previous assumptions made about decision reversibility and the non-existence of dissonance processes are truly correct.

To conclude, the present research tried to unfold how decision reversibility affects the way people think about each of the choice alternatives. Altogether, we demonstrated that when people have the option to change their minds they especially focus on the choice's imperfections, which consequently affects the amount of spreading of alternatives. As such, for reversible decision-makers, the grass on the other side is not only much greener, they also view their own as awfully brown.