

How Decision Reversibility Affects Motivation

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The present research examined how decision reversibility can affect motivation. On the basis of extant findings, it was suggested that 1 way it could affect motivation would be to strengthen different regulatory foci, with reversible decision making, compared to irreversible decision making, strengthening prevention-related motivation relatively more than promotion-related motivation. If so, then decision reversibility should have effects associated with the relative differences between prevention and promotion motivation. In 5 studies, we manipulated the reversibility of a decision and used different indicators of regulatory focus motivation to test these predictions. Specifically, Study 1 tested for differences in participants' preference for approach versus avoidance strategies toward a desired end state. In Study 2, we used speed and accuracy performance as indicators of participants' regulatory motivation, and in Study 3, we measured global versus local reaction time performance. In Study 4, we approached the research question in a different way, making use of the value-from-fit hypothesis (Higgins, 2000, 2002). We tested whether a fit between chronic regulatory focus and focus induced by the reversibility of the decision increased participants' subjective positive feelings about the decision outcome. Finally, in Study 5, we tested whether regulatory motivation, induced by decision reversibility, also influenced participants' preference in specific product features. The results generally support our hypothesis showing that, compared to irreversible decisions, reversible decisions strengthen a prevention focus more than a promotion focus. Implications for research on decision making are discussed.

Keywords: decision reversibility, regulatory focus, motivation, processing style

Many of the decisions we make are irreversible—from mundane choices such as deciding whether or not to put sugar in our coffee to more consequential dilemmas such as deciding whether or not to take a full-body tattoo. Other decisions leave more room for second-guessing our initial preferences, for instance, when we can return goods within a few weeks after purchase or when we include a probationary period when hiring a new employee.

While individuals seem to initially prefer reversible decisions over irreversible ones (Gilbert & Ebert, 2002), surprisingly little is known about the psychological consequences of decision reversibility. Some extant research examined how decision reversibility affects information search, and particularly demonstrated that decision makers have a stronger preference for decision-supportive information after irreversible than after reversible decisions (e.g., Frey, 1981; Frey & Rosch, 1984). Other studies investigated the effects of reversible and irreversible decisions on people's subjective perceptions of the decision outcome (Bullens, van Harreveld, & Förster, 2011; Frey, Kumpf, Irle, & Gniech, 1984; Gilbert & Ebert, 2002). Gilbert and Ebert (2002), for instance, showed that

although people generally express a preference for the opportunity to revise, such reversible decisions yield lower levels of post-choice satisfaction.

The scarce literature on the topic of decision reversibility primarily relies on behavioral or self-report measures and, thus, investigates processes likely to take place in the conscious realm. Only recently, researchers started to tap into more basic cognitive processes associated with the decision-making process (Bullens, van Harreveld, & Förster, 2011; Hafner, White, & Handley, 2012). On the basis of the goal fulfillment literature, Bullens, van Harreveld, and Förster (2011), for instance, predicted and found that decision-related concepts remain relatively more accessible after reversible than after irreversible decisions. Moreover, as soon as decisions change from reversible to irreversible (e.g., because the window during which a purchase can be returned has passed), the relative accessibility of decision-related concepts decreases. Decision accessibility, in this study, was measured with a lexical decision task, that is, a classic implicit measurement to detect which concepts are currently on top of one's mind. Apparently, people remain occupied with the decision as long as they can change their minds. Bullens and colleagues also showed that reversible decisions have detrimental consequences for working memory capacity, which suggests that the option to revise puts a strain upon people's cognitive resources.

Decision reversibility is still a relatively under-examined topic (Bullens, Förster, van Harreveld, & Liberman, 2011). Up until now, for instance, insight into the *motivational* underpinnings of both types of decisions is lacking. Our goal in the present research is to take an initial step toward filling this gap. Specifically, we try

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to find out what motivations are strengthened by reversible and irreversible decisions. Although decision reversibility may relate to several motivational mechanisms, on the basis of extant decision-making literature, we believe that *regulatory* focus motivation is the most applicable. Next, we discuss this motivational theory in more detail and argue why it may be related to decision reversibility.

A Motivational Approach Toward Decision Making

Recently, researchers started to acknowledge the importance of taking a motivational approach toward decision making. One theory that increasingly has been applied to the psychology of decision making is regulatory focus theory (RFT). According to this theory (Higgins, 1997, 1998, 2002), there are two self-regulatory systems that can help to achieve a goal; a promotion system and a prevention system. Individuals in a promotion focus are concerned with growth, accomplishment, and the presence or absence of positive outcomes. Individuals in a prevention focus are concerned with security, responsibility, and the presence or absence of negative outcomes. These distinct regulatory concerns can be emphasized either chronically or situationally. A person's chronic regulatory focus represents a personality feature (i.e., an enduring disposition). A situational focus, on the other hand, is determined by the situation in which individuals find themselves. Thus, simply through situational characteristics, an inclination for promotion or prevention can be triggered. A situational focus can, for example, be generated by providing negative versus positive feedback (Förster, Grant, Idson, & Higgins, 2001), by having participants think about their hopes or responsibilities (e.g., Higgins, Roney, Crowe, & Hymes, 1994), or by having them perform motor tasks related to approaching versus avoiding goals (e.g., Friedman & Förster, 2000, 2002).

Regulatory focus theory proposes that the promotion and prevention systems utilize different means of regulating toward desired end states and involve different strategic inclinations. While individuals in a promotion focus prefer approach strategic means and show eager behavior, individuals in a prevention focus prefer avoidance strategic means and show vigilant and careful behavior (Crowe & Higgins, 1997; Förster, Higgins, & Idson, 1998; Higgins et al., 1994; Seibt & Förster, 2004). In signal detection terms (e.g., Green & Swets, 1966; Tanner & Swets, 1954; Trope & Liberman, 1996), under normal neutral conditions, people in a state of promotion-focused eagerness should be motivated to ensure hits (gains) and to ensure against errors of omission (ensure against non-gains). People in a state of prevention-focused vigilance should be motivated to ensure correct rejections (non-losses) and to ensure against errors of commission (ensure against losses). Accordingly, a classic study by Crowe and Higgins (1997) demonstrated that, when performing a recognition task, individuals in a promotion focus were generally apt to produce false positive responses (i.e., a risky or leniency bias), whereas those in a prevention focus more often produced false negative responses to yes/no decisions (i.e., a conservative bias).

Crowe and Higgins's (1997) study implies that people's regulatory focus influences the strategic decisions they make. Extant research showed that individuals' chronic or situationally induced regulatory focus also affects consumer-like decisions (e.g., Aaker & Lee, 2001; Briley & Wyer, 2002; Pham & Avnet, 2004; Pham

& Higgins, 2005; Werth & Förster, 2007; Zhou & Pham, 2004). Werth and Förster (2007), for instance, demonstrated that consumer's regulatory focus influenced their product evaluations (see also Higgins, 2002). Participants in a prevention focus showed more interest in prevention-related product features (e.g., safety-oriented qualities, preventing for potential failures), whereas participants in a promotion focus were mostly interested in promotion-related product features (e.g., comfort oriented qualities, promoting accomplishments). These studies, thus, show that decision makers' motivational orientation (i.e., their promotion or prevention focus) influences the way in which they approach or deal with different kinds of decisions.

In these types of studies, regulatory focus is generally induced by using priming and framing methods—for instance, by framing a task in terms of gains versus non-gains and loss versus non-losses (e.g., Higgins, Shah, & Friedman, 1997; Idson, Liberman, & Higgins, 2000) or by having participants think about their hopes versus responsibilities (e.g., Higgins et al., 1994). However, there is reason to believe that real-life situations that are merely associated with regulatory motivation may also strengthen distinct regulatory foci (e.g., Seibt & Förster, 2004; Zhou & Pham, 2004). Seibt and Förster (2004), for instance, demonstrated that certain self-stereotypes affect individuals' regulatory focus. More specifically, they found that positive self-stereotypes (e.g., as a psychology student you are likely to perform well on these tasks) activate a promotion focus state of eagerness, speeding up performance and decreasing accuracy. Conversely, negative self-stereotypes (e.g., as a psychology student you are likely not to perform well on these tasks) activate a prevention focus state of vigilance, slowing down performance and increasing accuracy. Apparently, phenomena associated with advancement, eagerness, or gains are not only *caused* by a promotion focus, they can also *strengthen* it. There appears to be a similar bidirectional relation between phenomena associated with safety, vigilance, or loss on the one hand and a prevention focus on the other. Earlier we discussed that regulatory focus has an influence on decision making. In a similar vein, we believe that the *manner of decision making* (reversible or irreversible) may also strengthen distinct regulatory foci and, in turn, influence the way in which people deal with the decision at hand.

Decision (Ir)Reversibility and Regulatory Focus

Although intuitively one might think that reversible decision making fits better with a promotion orientation because reassurance from knowing that one can revise one's choice encourages a person to take more risks in order to maximize outcomes (a promotion inclination), indirect empirical evidence actually points to the opposite direction—that is, reversible decisions activate the prevention system. Specifically, in one set of studies on the relation between decision reversibility and counterfactual thinking, Hafner et al. (2012) predicted and found that the number of counterfactuals is likely to be higher after reversible than after irreversible decision making. More recent studies (Bullens, van Harreveld, Förster, & van der Pligt, 2013) revealed the content of these counterfactuals and showed that reversible decision making leads people to especially focus on the negative aspects of the chosen alternative (and the non-negative aspects of the rejected alternative). Apparently a reversible choice makes decision makers especially sensitive to the potential presence or absence of nega-

tive outcomes, likely because potential negative outcomes provide information about whether one has to revise the decision. As mentioned earlier, sensitivity to the absence and presence of negative outcomes is associated with prevention vigilance (e.g., Crowe & Higgins, 1997; Förster et al., 2001, 1998; Higgins, 1998; Higgins et al., 2001; Zhou & Pham, 2004). Indeed, counterfactual thinking about undoing a mistaken choice you made has been associated with a prevention focus (see Roese, Hur, & Pennington, 1999). Hence, we expect that decision makers become relatively prevention focused as soon as they anticipate decision reversibility.

Just as reversible decisions seem to augment decision makers' sensitivity toward the presence or absence of negative outcomes, extant findings imply that irreversible decisions increase decision makers' sensitivity toward the presence or absence of positive outcomes. More specifically, previous research showed that upon irreversible decision making, compared to reversible decision making, people are likely to increase the attractiveness of the chosen alternative and reduce the attractiveness of the rejected alternative(s) as a means to enhance perceptions of a positive decision outcome (see, e.g., Frey et al., 1984). In a similar vein, Bullens et al. (2013) showed that irreversible decision making leads people to especially pay attention to the positive aspects of the chosen and the non-positive aspects of the rejected alternative. As mentioned earlier, sensitivity to the presence or absence of positive outcomes is related to promotion-focused eagerness (e.g., Crowe & Higgins, 1997; Förster et al., 2001, 1998; Higgins, 1998; Higgins et al., 2001; Zhou & Pham, 2004).

In sum, on the basis of previous findings, we hypothesize that reversible decisions are more likely than irreversible decisions to elicit a careful and vigilant prevention strategic inclination rather than an eager promotion strategic inclination. Notably, to the best of our knowledge, no single method exists to show changes in regulatory focus motivation. Instead, aspects of vigilant, prevention-oriented behavior versus eager, promotion-oriented behavior affect responses to a variety of different tasks and activities (Seibt & Förster, 2004). These range from strategies involved in interpersonal relations, basic speed/accuracy tasks, and preferences in consumer decisions. Thus, it is possible that the mechanism triggered by decision reversibility is very general, affecting a variety of responses. Hence, we used a multi-method approach to examine our propositions and to determine whether a relatively more prevention than promotion focus is induced when people are faced with reversible compared to irreversible decisions. We describe these regulatory focus indicators next.

Regulatory Focus Indicators

Approach and Avoidance Strategies Toward Desired End States

Regulatory focus theory assumes that people can reach a desired end state either by approaching matching the desired end state or by avoiding mismatching the desired end state (Higgins et al., 1994). This distinction is illustrated by Higgins et al. (1994), who demonstrated that individuals oriented toward ideal self-guides (promotion focus) were more likely to choose eager, approach strategies to work toward the desired end state of friendship (e.g.,

“Be loving and attentive”), whereas individuals oriented toward ought self-guides (prevention focus) were more likely to choose vigilant, avoidant strategies to achieve the same desired end state (e.g., “Stay in touch”; “Don’t lose contact with friends”). The priming procedure Higgins et al. used was unrelated to the domain of friendships. Hence, they demonstrated that people’s concern with strategic approach or avoidance to a desired end state is contingent upon their regulatory focus orientation, and, apparently, such concerns can impact responses to an unrelated task.

The present research uses the same friendship task in order to find out whether, and how, decision reversibility influences people’s inclination to choose prevention or promotion strategies. If reversible decisions, compared to irreversible decisions, indeed strengthen a relative prevention motivation, those who can reverse their decision should spontaneously choose relatively more avoidant strategies for being a good friend.

Speed and Accuracy of Performance

Beyond its effects on strategic approach and avoidance, regulatory focus motivation also influences how people deal with certain tasks. As we alluded to earlier, a promotion focus emphasis on eagerness leads to a concern with getting hits (speed), whereas a prevention focus emphasis on vigilance yields a concern with avoiding mistakes (accuracy; Crowe & Higgins, 1997). Indeed, Förster, Higgins, and Bianco (2003) showed faster performance and lower accuracy for people in a promotion focus, and slower performance and higher accuracy for people in a prevention focus. In the present research, speed and accuracy are also used as indicators of regulatory focus motivation. If reversible decisions, compared to irreversible decisions, strengthen a relative prevention focus, one should find slower performance and higher accuracy for those who can reverse their decision compared to those who cannot.

Global Versus Local Processing Style

Förster and Higgins (2005) suggested that individuals with safety motivations (prevention focus) are inclined to concentrate on their concrete surroundings to maintain security. Conversely, individuals with growth and accomplishment motivations (promotion focus) are likely to profit more from abstract rather than concrete construals (see also Schwarz, 1990). That is, Förster and Higgins expected participant’s processing style (i.e., global vs. local processing) to depend on their regulatory motivations. In line with their suggestions, the authors found that, on a perceptual level, global processing was facilitated for promotion-focused participants, and local processing was facilitated for prevention-focused participants. Based upon this relation between regulatory focus and processing style, the present research examines differences in participants’ processing style depending on whether they have made a reversible or irreversible decision.

Value From Fit

Higgins (2000) proposed that the overall hedonic evaluations of objects or situations depend on the fit between people’s chronic regulatory orientation and how a current goal is pursued. When people engage in a goal pursuit activity in a manner that fits their

regulatory motivation, they tend to feel right about what they are doing and, consequently, use this feeling as a basis for their judgment, evaluating a positive activity or object more positively (e.g., Freitas & Higgins, 2002). Regarding a decision-making context, this so-called *value-from-fit hypothesis* suggests that decision makers will evaluate their choice more positively if the decision-making process fits their regulatory focus motivation (see, e.g., Higgins, Idson, Freitas, Spiegel, & Molden, 2003). In accordance, the present research studies whether a fit between a person's chronic regulatory focus on the one hand, and the motivational focus currently induced by the reversibility of the decision on the other, affects the decision makers' evaluative experiences of the choice outcome.

Choice of Products With Attributes Serving Regulatory Focus Concerns

As already alluded to, research has demonstrated that decision makers display a relatively greater concern with luxury-oriented product features when being in a promotion focus, and a relatively greater concern with security or safety-oriented product features when being in a prevention focus (see Higgins, 2002; Werth & Förster, 2007). Thus, decision makers' motivational orientation influences their decisional preferences. On this basis, the present research examines whether and how decision reversibility will affect participants' preference for luxury- versus safety-oriented product features. If reversible decisions, compared to irreversible decisions, indeed strengthen a relative prevention motivation, those who can reverse their decision should have a relatively greater preference for safety-oriented (vs. luxury-oriented) product features.

Summary

In sum, the goal of the present research is to see whether and how the mere anticipation of decision ir(reversibility) affects regulatory focus in order to obtain some initial insight into motivational effects of decision reversibility. We conducted a series of five studies to test our hypothesis concerning the link between decision reversibility and regulatory focus motivation. In all studies, participants were introduced to either an irreversible or a reversible decision. Although the specific decisions across the experiments differed with respect to their contents, in general those in the irreversible decision condition were told that their decision would be final, whereas those in the reversible decision condition were told that they could potentially revise their decision at a later time during the experiment. Immediately upon this manipulation of decision reversibility, and *before* indicating their choice, participants' regulatory focus motivation was measured.

We believe that this way of manipulating decision reversibility is externally valid because people often know about the reversibility of the decision before they actually make their choice. For instance, when buying a product in a shop with a return policy or when providing a temporary contract to a new employee, the individual is typically already aware of the reversibility of the choice during the *pre-decisional* phase. Hence, we believe that testing regulatory focus motivation prior to participants' actual decision making in the present studies comes closest to (ir)reversible decision making in real life. Moreover, through this design

any effects of our manipulation on focus will be due to the anticipation of a reversible or irreversible decision in the pre-decisional stage rather than participants being in a different stage of the decisional process (pre-decisional vs. post-decisional).

As described above, our studies employed a variety of indicators of participants' regulatory focus. By using a wide variety of regulatory focus indicators, we increased the likelihood that any consistent pattern of results can indeed be attributed to a difference in regulatory focus rather than to some other motivation. In addition, Study 4 on value from fit and Study 5 on preference for particular product features were designed to be very specifically related to regulatory focus motivations rather than other motivations. Moreover, our approach relates to various psychological sub-disciplines such as interpersonal relations (Study 1), cognitive psychology (Studies 2 and 3), and consumer behavior (Studies 4 and 5) in an aim to show that the motivational effects of decision reversibility have a variety of psychological and behavioral consequences.

Study 1

The aim of Study 1 was to gain some preliminary insight into how decision reversibility affects strategic motivation. Hence, Study 1 measured decision makers' eager approach versus vigilant avoidance orientations toward the desired end state of friendship as an indication of their regulatory focus. Specifically, participants were asked to make a reversible or irreversible choice between four candidates applying for a job. Immediately after the manipulation of decision reversibility (i.e., before indicating their choice), they were handed out an unrelated task on friendships developed by Higgins et al. (1994) designed to measure their current inclination toward strategic approach versus strategic avoidance.

Method

Participants and design. Sixty-three students (10 men and 53 women; $M_{age} = 20.51$, $SD_{age} = 3.17$) participated in the experiment. Two participants were excluded from the analyses because their scores on the main dependent variable deviated more than 2.5 *SDs* from the mean for the rest of the sample, leaving a final sample of 61 participants. The experiment was introduced as a testing session with various unrelated experiments. Participants received course credit or a monetary reward for their participation. The study was a one factor (irreversible vs. reversible) between-participants design with choice of friendship strategies as an indicator of regulatory focus being the main dependent variable.

Materials and procedure. Participants were seated behind a computer and were randomly assigned to one of the two experimental reversibility conditions.

Participants were introduced to a task allegedly measuring their emotional intelligence. They were told that emotional intelligence can be assessed by (a) measuring one's ability in evaluating others on the basis of a personality description and (b) measuring one's flexibility in task switching. They were led to believe that the study was designed to determine which factor is a stronger predictor of emotional intelligence. They were asked to imagine themselves working for an employment agency. Their task was to evaluate the personality descriptions of four job applicants applying for a

position as a kindergarten teacher, and to decide which applicant was best suited for this job.¹

This decision was either irreversible or reversible. Participants in the irreversible decision condition were told that they would not be able to revise their decision at a later point in time. Participants in 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 hour. Finally, participants were told that this evaluation task could be interrupted at any time by another task. Both performance on the evaluation task (as a measure of ability in evaluating others) and performance on the unexpected other task (as a measure of flexibility) ostensibly provided their emotional intelligence score.

After receiving the instructions, participants started the evaluation task and got to see the descriptions of the four applicants. However, after 15 s, the task was suddenly interrupted, and participants were asked to perform another short task before continuing with the evaluation task they were working on earlier. This second task, supposedly measuring their task-switching ability, was in fact designed to measure their strategic preferences and required them to choose three among six listed strategies for being a good friend (Higgins et al., 1994; Sengupta & Zhou, 2007). Three items reflected an eager approach strategy (e.g., “Be loving and attentive”), and three items reflected a vigilant avoidance strategy (e.g., “Stay in touch”; “Don’t lose contact with friends”). Vigilant (eager) strategy scores were calculated by adding the number of vigilant (eager) items a participant chose (scores could range from 0 to 3).² The 15-s period after which participants were interrupted rendered it impossible for participants to have already read all the descriptions and, thus, to have made a decision. As such, at the moment their strategic motivation was measured, all participants were still in the pre-decisional phase of the decision-making process.

As soon as participants finished the friendship task, they returned to the evaluation task and decided which of the candidates was most appropriate for the job. Immediately after this decision, participants were asked to indicate on a 7-point Likert scale the extent to which they thought the decision for one of the candidates had been a reversible one on a scale ranging from *not at all* (1) to *very much* (7). This measurement was included in order to see whether participants had paid attention to, and remembered, the instructions in each experimental condition. Subsequently, all participants continued with the next part of the experimental session that was outside the purpose of the current study. At the end of the experimental session, those in the reversible decision condition returned to the emotional intelligence experiment and were told that they could now revise their initial decision if they wished to do so. At this point, their decision became final. Finally, all participants were thanked for their participation and debriefed.

Results and Discussion

Attention to and memory for instructions. Results revealed that participants in the reversible decision condition considered the decision to be more reversible ($M = 4.47$, $SD = 1.70$) than those in the irreversible decision condition ($M = 2.35$, $SD = 1.58$), $t(59) = -5.03$, $\eta^2 = .30$, $p < .001$. Only two of the participants in the reversible decision condition changed their preliminary decision.

Regulatory focus strategies. Results revealed that the degree of decision reversibility indeed had an influence on participants’ preferences for friendship strategies, $t(59) = 2.10$, $\eta^2 = .07$, $p = .04$. The likelihood of choosing vigilant avoidance strategies rather than eager approach strategies for being a good friend was relatively greater for those participants who were assigned to the reversible decision condition ($M = 1.30$, $SD = 0.53$) than those who were assigned to the irreversible decision condition ($M = 1.00$, $SD = 0.58$).

This first experiment shows that reversible decision making, compared to irreversible decision making, induces a relatively greater preference for strategic vigilance in the domain of friendship strategies. Apparently, the different preferences for vigilant versus eager strategies that were induced by the reversibility of a decision even affected a task unrelated to the decision itself. These results support our proposal that reversible decisions compared to irreversible decisions increase a preference for strategic vigilance that is associated with a prevention focus.

Study 1 looked at regulatory focus motivation in terms of the differences in individuals’ inclination to choose approach or avoidance strategies after anticipating reversible or irreversible decision making. As we alluded to earlier, prevention and promotion inclinations can also be conceptualized in signal detection terms (Higgins et al., 2001). That is, promotion-focused individuals are inclined to use eager means to ensure successful outcomes or gains, and prevention-focused individuals are inclined to use vigilant means to ensure non-losses. Thus, in Study 2 we used a speed-accuracy performance task (i.e., a signal detection task) to measure differences in decision makers’ inclination either to ensure hits (speed) or to ensure against errors of commission (accuracy) after a manipulation of decision reversibility. If the anticipation of reversible decision making increases decision makers’ focus on ensuring against negative outcomes (i.e., a relative prevention focus), this should slow down performance and increase accuracy compared to the anticipation of irreversible decision making.

Study 2

Whereas in the first study participants had to make a reversible or irreversible decision between four candidates applying for a job (supposedly measuring their emotional intelligence), this time they had to make a reversible or irreversible decision between different animals they could possibly buy. Thus, in this second study, we used a consumer decision to establish the generalizability of our assumptions regarding the impact of decision reversibility on regulatory motivation.

¹ The descriptions of these four 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 ($M = 4.89$ on a 7-point Likert scale, which significantly deviates from the midpoint of the scale), $t(60) = 4.85$, $p < .001$. Difficulty did not differ between conditions, $t(59) = 0.99$, $p = .323$.

² Since the sum of both promotion and prevention focus scores is always three, the value of one score automatically implies the value of the other. Hence, we only report one of both focus scores.

Method

Participants and design. Thirty-two undergraduate students were recruited to participate in a set of unrelated studies. Participants received a monetary reward for their participation. The study was a one-factor (irreversible vs. reversible) between-participants design with a speed versus accuracy measure as the main dependent variable.

Materials and procedure. Upon arrival at the laboratory, participants were told that they would take part in a decision-making study. As in Study 1, we announced that the decision-making task could be interrupted by other tasks. Specifically, participants were first asked to take the perspective of a grandmother/father who wanted to buy an exotic animal for her/his grandchild. She/he had to decide between zots and wops, both African animals that were described by 24 attributes (e.g., “is silent,” “bites sometimes,” “lives long,” “fond of children,” etc.). Pretests had shown that both pets were equally likable and that the decision was difficult.

Participants in the irreversible decision condition were told that they soon had to make a decision between the two African animals and that this decision could not be revised anymore. Participants in the reversible decision condition, on the other hand, were told that they soon had to make their initial decision, but that, at the end of the experimental battery, they were allowed to change their decision if they wished to do so.

Before receiving the animal descriptions, and thus before they could make their reversible or irreversible choice,³ all participants were interrupted and received the D2 speed versus accuracy task. Performance on the D2-Task (Brickenkamp, 1981) reflects both (in)accuracy and speed. Hence, when measuring their speed versus accuracy motivations, all participants were in the pre-decisional phase. The task was introduced as a concentration test, measuring intelligence as a function of speed and ability to concentrate. Participants were instructed to be as accurate and fast as possible. It was emphasized that speed and accuracy were equally important. The task consisted of marking as many *ds* with two dashes as possible. The test sheet consisted of 14 lines with *ds* and *ps* with up to two dashes above and below the letter. All letters *ds*, where the sum of the dashes equaled two, had to be marked (see Brickenkamp, 1981). Participants were given 15 s for each line and worked on all 14 lines successively. They were instructed to circle the letter they were examining each time the experimenter said “stop” after 15 s. The first two trials counted as training trials and were not analyzed.

As soon as participants finished the speed/accuracy task, they were given the descriptions of the animals and asked to indicate their reversible or irreversible decision. At the end of the experimental session, participants in the reversible decision condition were told that they could revise their decision if they wished to do so. All participants were then thanked and debriefed.

Results and Discussion

The standard test procedure to analyze the data as suggested by Brickenkamp (1981) was used. The speed index was calculated by the sum of the number of letters up to the letter circled for all of the 12 lines. The total number of false alarms (i.e., incorrect hits) served as the measure of inaccuracy.

Speed measure. Results revealed that participants in the reversible decision condition worked on fewer letters in the D2-Task ($M = 345$, $SD = 35$) compared to those in the irreversible decision condition ($M = 400$, $SD = 70$), $t(30) = -2.82$, $\eta^2 = .21$, $p = .008$.

Inaccuracy. An inspection of the means for the number of mistakes indicated that in the reversible decision condition participants made fewer mistakes ($M = 4.31$, $SD = 3.32$) than in the irreversible decision condition ($M = 7.63$, $SD = 3.96$), $t(30) = -2.56$, $\eta^2 = .18$, $p = .016$.

Speed/accuracy. We found speed and accuracy to positively correlate with one another ($r = .668$, $p < .001$). We also calculated a speed/accuracy index (mistakes * 100/speed) to see how many mistakes participants made relative to the amount of letters they worked on. In other words, we measured differences in accuracy while controlling for speed. As expected, in the reversible decision condition, participants made relatively fewer mistakes ($M = 1.22$, $SD = 0.94$) than in the irreversible decision condition ($M = 1.86$, $SD = 0.80$), $t(30) = -2.04$, $\eta^2 = .12$, $p = .05$.

In line with Study 1, these results show that, in contrast to irreversible decisions, reversible decisions strengthen a relative prevention (vs. promotion) motivation as participants who were about to make a reversible decision performed both slower and more accurate on the D2-Task. Thus, those participants who had the opportunity to change their minds exhibited a relative conservative bias compared to those in the irreversible condition.

In sum, Studies 1 and 2 support the proposal that decision (ir)reversibility activates different regulatory focus orientations, with reversible decisions making one relatively more strategically avoidant (Study 1) and also relatively more vigilant and careful (Study 2)—both associated with a more prevention than promotion orientation—compared to irreversible decisions. Study 3 was designed to extend these findings to a regulatory focus indicator involving participants’ processing style—whether they perceive the world in a relatively global or local manner (Förster & Higgins, 2005). Whereas global processing supports a promotion focus on advancement, local processing supports a prevention focus on safety. As a next step, then, we wanted to examine the relation between decision reversibility and processing style. We expected that those in the reversible decision condition would process information relatively more locally compared to those in the irreversible decision condition.

Study 3

Method

Participants and design. One hundred one students (29 men and 72 women; $M_{age} = 20.87$, $SD_{age} = 2.86$) participated in the study. Three participants were excluded from the analyses because the number of errors in the global–local reaction time task was

³ In Study 1, participants worked on the decision-making task for 15 s before their regulatory motivation was measured. In Study 2, we used a more conservative method, as regulatory motivation was measured even before participants could engage in the decision-making task.

more than 2.5 *SDs* above the mean.⁴ Furthermore, two participants were excluded because their mean scores on the global and/or local reaction times trials deviated more than 2.5 *SDs* from the mean of the rest of the sample. Thus, in total five outliers were excluded, leaving a sample of 96 participants. The experiment was the first in a testing session with various unrelated experiments. Participants received a monetary reward or course credit for their participation. The study was a one-factor (irreversible vs. reversible) between-participants design with reaction times to the global–local task as the dependent variable.

Materials and procedure. Upon arrival, participants were seated behind a computer and were randomly assigned to one of two experimental conditions. As in Study 1, they were then introduced to a task on emotional intelligence. Again, they were told that emotional intelligence can be determined by people's capacity to evaluate others and by task switching ability. Also this time, their task was to evaluate four job applicants on the basis of a personality description and to choose the applicant most suited for the job at hand.⁵ For half of the participants this decision was irreversible, and for the other half this decision was reversible.

After receiving the instructions, participants started the evaluation task. However, after 15 s the task was suddenly interrupted, and participants were asked to complete a so-called "letter task": the global–local reaction time measure, a variant of the Navon Letters Task (Navon, 1977) as used by Förster, Friedman, Özelsel, and Denzler (2006). As in Study 1, at the moment of interruption, it was impossible for participants to have read already all of the descriptions and, thus, to have made a decision. As such, at the moment their global–local reaction times were measured, all participants were still in the pre-decisional phase of the decision-making process. Participants were told that the score on the letter task would indicate their flexibility. In reality, the letter task was administered in order to measure participants' current processing style as an indicator of regulatory focus orientation. For this task, participants were presented with a series of global letters (approximately 2.1 × 2.1 cm) made up of local letters (approximately 0.4 × 0.4 cm). Each horizontal or vertical line composing a global letter was formed from five closely spaced local letters. On each trial, participants were first presented with a fixation cross ("+") in the center of the screen for 500 ms. Then, one of eight global composite letters was randomly presented, and participants were instructed to press a blue response key if the stimulus contained the letter L and to press a red response key if a given stimulus contained the letter H. They were asked to respond as quickly as possible. Four of the composite letters included global targets (an H made of Fs, an H made of Ts, and L made of Ts, and an L made of Fs), and four included local targets (an F made of Hs, an F made of Ls, a T made of Hs, and a T made of Ls). Overall, 18 local and 18 global trials were presented, with 12 practice trials that were not analyzed.

As soon as participants finished the global–local reaction time measure, they returned to the evaluation task and decided which of the candidates was most appropriate for the respective job. Immediately after this decision, participants were asked to indicate on a 7-point Likert scale the extent to which they thought the decision for one of the candidates had been a reversible one on a scale ranging from *not at all* (1) to *very much* (7). Subsequently, all participants continued with the next part of the experimental session that was outside the focus of the current study. At the end

of the experimental session, those in the reversible decision condition returned to the emotional intelligence experiment and were told that they could now revise their prior decision if they wished to do so. At this point, their decision became final. Finally, all participants were thanked for their participation and debriefed.

Results and Discussion

Attention to and memory for instructions. Results revealed that those in the reversible decision condition considered the decision to be more reversible ($M = 3.60$, $SD = 1.72$) than those in the irreversible decision condition ($M = 1.98$, $SD = 1.13$), $t(94) = -5.48$, $\eta^2 = .24$, $p < .001$. None of the participants in the reversible condition changed their preliminary decision.

Global–local reaction time measures. We followed Fazio's (1990) recommendations for analyzing reaction time data and log-transformed all response times. Mean reaction times to global and local targets were subjected to a 2 (local, global targets) × 2 (reversible, irreversible decision) mixed-factorial analysis of variance (ANOVA). The main effect of reversibility was not significant, $F(1, 94) = 2.77$, $\eta^2 = .03$, $p = .099$. Replicating Navon's (1977) global dominance effect, we found overall faster responses for global target letters ($M = 6.18$, $SD = 0.18$) than for local target letters ($M = 6.28$, $SD = 0.19$), $F(1, 94) = 88.37$, $p < .001$. In line with our expectation, the Reversibility × Processing style interaction, $F(1, 94) = 6.52$, $\eta^2 = .07$, $p = .012$, showed that this difference was smaller in the reversible decision condition, $F(1, 94) = 22.96$, $\eta^2 = .20$, $p < .001$ ($M_{local} = 6.30$, $SD = 0.20$; $M_{global} = 6.22$, $SD = 0.19$), than in the irreversible decision condition, $F(1, 94) = 72.98$, $\eta^2 = .44$, $p < .001$ ($M_{local} = 6.27$, $SD = 0.18$; $M_{global} = 6.14$, $SD = 0.17$). Pairwise comparison revealed slower responses for global target letters for participants in the reversible decision condition than in the irreversible decision condition, $F(1, 94) = 5.91$, $\eta^2 = .06$, $p = .017$ ($M_{reversible} = 6.22$, $SD = 0.19$; $M_{irreversible} = 6.14$, $SD = 0.17$). No differences between conditions were found for responses on local target letters, $F(1, 94) = 0.698$, $\eta^2 = .01$, $p = .406$ ($M_{reversible} = 6.27$, $SD = 0.18$; $M_{irreversible} = 6.30$, $SD = 0.20$). Hence, people making a reversible decision responded relatively slower to global targets compared to people making an irreversible decision. This pattern of results conceptually replicates that of Förster and Higgins (2005), who found a reduced global dominance effect when participants were in a prevention focus compared to a promotion focus.

⁴ The percentage of errors of these excluded participants were 25%, 29.1%, and 41.7% compared to 4.7% of errors for the entire sample.

⁵ This time, half of the participants could choose between four applicants applying for a position as a kindergarten teacher, and half of the participants could choose between four applicants applying for a position at a car dealer. However, no differences in effects were found for the type of job. As a further note, the descriptions of the kindergarten applicants were equal to the ones used in Study 1. The descriptions of the four car dealer candidates were constructed in a similar way such that the decision would be as difficult as possible. No differences were found for the level of choice difficulty ($M_{kindergarten} = 5.29$, $M_{car dealer} = 4.79$), $t(94) = 1.621$, $p = .108$. We therefore decided to combine the two groups. Further analyses revealed that the mean difficulty score of both types of decisions together ($M = 5.01$) differed significantly from the midpoint of the scale, $t(95) = 7.42$, $p < .001$. Furthermore, this difficulty score did not differ across conditions, $t(94) = 0.23$, $p = .821$.

Study 4

Studies 1–3 established a relationship between decision reversibility and effects that are associated with regulatory focus motivations. Moreover, evidence for this relationship was obtained under conditions where *all* participants were in a pre-decisional phase when the regulatory focus indicators were measured. Study 4 was designed to determine whether the relationship between decision reversibility and regulatory focus would also affect people's evaluations of the decision outcome itself.

As discussed in the introduction, the *value-from-fit hypothesis* (Higgins, 2000) proposes that people will evaluate a positive outcome of a decision more positively if the decision-making process is done in a manner that fits the decision makers' regulatory motivation. In a study by Higgins et al. (2003), for example, participants were asked to make a decision between a pen and a coffee mug, with these products being selected such that all participants chose the mug. Half of the participants made the decision with an eager strategy, whereas the other half used a vigilant strategy to arrive at the same decision. Results revealed that participants assigned a higher monetary value to the mug when the strategy they used to make the decision matched their chronic regulatory focus; that is, those with a chronic promotion focus assigned higher value to the mug when they had made the decision with an eager strategy, whereas those with a chronic prevention focus assigned higher value when they had used a vigilant decision strategy.

In the current context, this could mean that choice satisfaction would be greater when the reversibility of the decision fits the decision maker's chronic regulatory focus. Consequently, one would expect that when having the option to revise (a manner of decision making that fits a prevention focus), compared to an irreversible decision, individuals with a chronic prevention focus would evaluate the decision outcome more positively than individuals with a chronic promotion focus. The following study tested this prediction. It adds to the previous studies by examining the decision makers' evaluative experiences of the choice outcome. Furthermore, whereas the first three studies primarily relied on hypothetical decisions, Study 4 involved a real decision. That is, in Study 4 participants were asked to make a decision between two prizes that they could actually win in a lottery. Finally, Study 4 provided more direct evidence that regulatory focus motivations are involved because it specifically measured chronic prevention focus and promotion focus to test for the fit effect.

Method

Participants and design. Eighty-one students (26 men and 55 women; $M_{age} = 20.85$, $SD_{age} = 4.20$) participated in the study. Four participants were excluded from the analysis because they were either outliers on the chronic regulatory measure or the main dependent variable ($SD > 2.5$ above the mean), leaving a final sample of 77 participants. This experiment was the first in a testing session with various unrelated experiments. Participants received course credit for their participation. The study was a 2 (irreversible vs. reversible) \times 2 (promotion focus vs. prevention focus) between-participants design with participants' evaluative experience with the choice outcome as the dependent variable.

Materials and procedure. Upon entering the lab, participants were informed that they would take part in a lottery. Separate

draws were going to be held for two different prizes: an iPod and a portable DVD player.⁶ Pretests had shown that both prizes were equally attractive ($M_{iPod} = 4.63$, $SD = 1.50$; $M_{DVD} = 4.74$, $SD = 1.63$), $t(18) = -0.40$, $p = .72$. It was their task to choose which of the prize draws they wanted to enter. This decision was either irreversible or reversible. Those in the irreversible decision condition were told that their decision would be final, meaning that they would not be able to revise their decision at a later point in time. Participants assigned to the reversible decision condition, on the other hand, were told that the decision would only be preliminary and that they would have the opportunity to revise their decision right before the end of the experimental hour. Participants were given unlimited time to read the prize descriptions and to make their decision.

Immediately after participants indicated their decision, they all continued with the next part of the experimental session that was outside the focus of the current study and lasted approximately 40 min. At the end of the experimental hour, participants returned to the lottery experiment and were asked about both their satisfaction with their decision ("How satisfied are you with the decision you made?") and certainty about the rightness of their decision ("How certain are you that you made the right decision?") as a combined measure of their overall positive evaluation of their decision ($\alpha = .86$). Furthermore, they were asked to indicate the extent to which they thought the decision had been a reversible one. All questions were rated on a 7-point scale ranging from *not at all* (1) to *very much* (7). Subsequently, participants in the reversible decision condition were told that they could revise their prior decision if they wished to do so. At this point, their decision thus became final. Participants' chronic regulatory focus was measured with the 11-item regulatory focus questionnaire developed by Higgins et al. (2001), after which participants were thanked and debriefed.

Results and Discussion

Attention to and memory for instructions. Results revealed that those in the reversible decision condition considered the decision to be more reversible ($M = 3.65$, $SD = 1.96$) than those in the irreversible decision condition ($M = 1.46$, $SD = 0.90$), $t(75) = -6.23$, $\eta^2 = .34$, $p < .001$. None of the participants in the reversible decision condition changed their preliminary decision.

Chronic regulatory focus. We created a measure of dominant regulatory focus by subtracting scores on the Prevention subscale ($\alpha = .79$) from scores on the Promotion subscale ($\alpha = .63$; see also Cesario, Grant, & Higgins, 2004; Sassenberg, Jonas, Shah, & Brazy, 2007). Higher scores reflect relatively greater promotion focus than prevention focus. Regression analyses with participants' decision evaluations as the dependent variable were conducted with decision reversibility (irreversible = -1 ; reversible = 1) and the measure of chronic regulatory focus (continuous measure) as the independent variables. In order to test whether a fit between decision reversibility and participants' chronic regulatory focus indeed enhances individuals' evaluations of the decision outcome, we also included the interaction term between regulatory focus difference and decision reversibility. Decision evaluations were not per se related to a predominant promotion versus prevention strength, $t(76) = 0.959$, $\beta = .108$, $p = .341$. Results

⁶ The actual lottery took place immediately after the data collection.

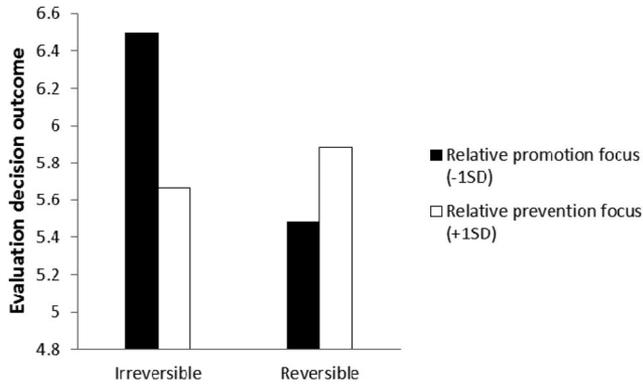


Figure 1. Results of regression analyses for participants' evaluation of the decision outcome. Higher scores indicate more positive evaluations.

revealed that the decision evaluations of those assigned to the irreversible decision condition were generally more positive compared to those assigned to the reversible decision condition, at a marginal level of significance, $t(76) = -1.82$, $\beta = -.220$, $p = .073$. However, this effect was moderated by chronic regulatory focus as revealed in a significant interaction term, $t(76) = -2.77$, $\beta = -.309$, $p = .007$. As expected, the greater positivity of the decision evaluations in the irreversible than the reversible condition was more pronounced for chronic promotion-focused participants. For chronic prevention-focused participants, it was not only reduced but (non-significantly) reversed (see Figure 1). This significant interaction pattern is generally consistent with the *value-from-fit hypothesis* (Higgins, 2000) by showing that a fit between people's chronic regulatory focus and the manner of decision making leads to more positive evaluations than a non-fit.⁷

Study 5

Studies 1–4 showed that decision reversibility has specific effects that relate to distinct regulatory focus motivations. In the final study, we wanted to determine whether regulatory focus motivations related to decision reversibility also influence the decision itself. On the basis of the previous studies and earlier research, one could expect that decision makers become interested in different product features depending on the regulatory focus that is relatively strengthened by the (ir)reversibility of the decision.

As we already briefly alluded to in the introduction, Werth and Förster (2007) examined whether people with different regulatory foci consider different product features important (see also Higgins, 2002). In one of their studies, participants were asked to evaluate 12 attributes for a wristwatch and 8 attributes for sunglasses and to indicate to what extent they were interested in these product features when buying a watch or sunglasses. Half of the items were promotion-related in the sense that these features go beyond the essentials of the of the product to serve maximal or luxury concerns (e.g., "time zone setting"), and half of them were prevention-related in the sense that these features are essential to the product and serve safety or security concerns (e.g., "long guarantee period"). Their results revealed that prevention-focused individuals were more interested in prevention-related security-oriented product features, whereas promotion-focused individuals

were more interested in promotion-related luxury-oriented product features. In a similar vein, one could predict a higher relative preference for security or safety-oriented product features when making a reversible decision and a higher relative preference for luxury-oriented product features when making an irreversible decision. Study 5 tested these predictions and thus aims to show that the effects of decision reversibility on regulatory focus motivations are also consequential for the decision itself. In addition, as for Study 4, this study tests a regulatory focus indicator that is more directly and distinctively associated with regulatory focus motivations because it examines promotion-related maximal luxury concerns and prevention-related security or safety concerns.

Method

Participants and design. Ninety-six students (29 men and 67 women; $M_{age} = 21.17$, $SD_{age} = 4.25$) participated in the study. The experiment was one of a testing session with various unrelated experiments. Participants received course credit or a monetary reward for their participation. The study was a one factor (irreversible vs. reversible) between-participants design with participants' relative interest in promotion-related luxury product features versus prevention-related security or safety product features as the main dependent variable.

Materials and procedure. Participants were led to believe that previous research found a link between people's personality and the type of clothes they tend to wear. Moreover, they were told that the present study was designed to examine whether this would also hold for "less prominent accessories" such as a wristwatch. Thus, participants were informed that the goal of the current study was to find out whether specific character traits determine the type of accessories people prefer to wear. In order to test this, they would have to fill-out a personality questionnaire and decide which of eight different wristwatches would fit them best. This decision was either irreversible or reversible. Participants in the irreversible decision condition were told that they would not be able to revise their decision at a later point in time. Participants in 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 hour.

After the manipulation of decision reversibility, but before making their choice, participants were first asked to indicate how important they considered 12 different product features when deciding between wristwatches on a scale ranging from *not at all* (1) to *very much* (9). This questionnaire (i.e., the dependent variable) contained an equal amount of promotion-oriented (e.g., time zone setting) and prevention-oriented product features (e.g., secure buckle). All features were equal to those used in the research by Werth and Förster (2007). At this point, all participants had not yet received any information about the eight wristwatches. This means that any effects on preference for certain product features occur

⁷ The chronic regulatory focus measurement was administered at the end of the experimental session. Although several tasks were administered between the manipulation of decision reversibility and the chronic regulatory focus measurement, one may argue that our manipulation of decision reversibility could have affected people's answers to the regulatory focus questionnaire. Results, however, revealed that this was not the case, $t(75) = 1.34$, $p = .186$.

within the pre-decisional phase of the decision-making process for all participants.

Immediately after participants finished the questionnaire, they indicated their reversible or irreversible choice by specifying which of the eight different wristwatches would fit them best. They were subsequently asked to specify the extent to which they thought the decision had been a reversible one on a 9-point scale ranging from *not at all* (1) to *very much* (9). Furthermore, for credibility reasons, they were asked to fill out a few items of the Big Five Personality Inventory (Barrick & Mount, 1991) in order to supposedly measure their personality. Answers to this questionnaire were, however, not used for further analyses. Then, all participants continued with the next part of the research session that was outside the focus of the current study. At the end of the experimental session, those in the reversible decision condition returned to the present research and were told that they could now revise their prior decision if they wished to do so. Finally, all participants were thanked for their participation and debriefed.

Results and Discussion

Attention to and memory for instructions. Results showed that those in the reversible decision condition considered the decision to be more reversible ($M = 4.62$, $SD = 2.77$) than those in the irreversible decision condition ($M = 3.04$, $SD = 2.52$), $t(94) = -2.93$, $\eta^2 = .08$, $p = .004$. Only four of the participants in the reversible decision condition changed their preliminary decision.

Product feature importance. The scores for each feature type (promotion-related luxury product features versus prevention-related security or safety product features) were averaged. The two resulting mean values of the importance evaluation of the promotion versus prevention-related product features were subjected to a 2 (promotion, prevention features) \times 2 (reversible, irreversible decision) mixed-factorial ANOVA. The main effect of reversibility was not significant, $F = 1.06$, $p = .306$. Replicating Werth and Förster (2007), we found that prevention-related product features were more important to participants ($M = 5.52$, $SD = 1.43$) than promotion-related product features ($M = 3.60$, $SD = 1.33$), $F(1, 94) = 193.10$, $\eta^2 = .67$, $p < .001$. As expected, the Reversibility \times Product Feature interaction, $F(1, 94) = 5.79$, $\eta^2 = .06$, $p = .018$, showed that this difference was larger in the reversible decision condition, $F(1, 94) = 125.08$, $\eta^2 = .57$, $p < .001$ ($M_{prevention} = 5.57$, $SD = 1.63$; $M_{promotion} = 3.29$, $SD = 1.28$), than in the irreversible decision condition, $F(1, 94) = 70.40$, $\eta^2 = .43$, $p < .001$ ($M_{prevention} = 5.48$, $SD = 1.24$; $M_{promotion} = 3.87$, $SD = 1.33$). Altogether, these results demonstrate that, compared to those making an irreversible decision, those making a reversible decision have a relative greater interest in prevention-related product features than in promotion-related product features. Apparently, the motivational effects of decision reversibility as it relates to regulatory focus motivations even appears to impact what matters in the decision itself.

General Discussion

Five studies examined how reversible and irreversible decisions have effects that are associated with differences between prevention and promotion motivations. Overall, the results revealed that

reversible decisions, compared to irreversible decisions, tend to fit a *prevention* focus more than a *promotion* focus as indicated by an enhanced concern with strategic avoidance, higher performance accuracy, stronger local (vs. global) processing, greater outcome value from greater fit with chronic prevention concerns (vs. chronic promotion concerns), and a relatively greater interest in prevention-related (vs. promotion-related) product features. Thus, relative to irreversible decision makers, reversible decision makers are relatively more prevention-focused than promotion-focused.

More specifically, Study 1 demonstrated that those who were able to change their minds were relatively more likely to choose vigilant, avoidant strategies to work toward the desired end state of friendship, compared to those for whom the decision was final. Study 2 showed that participants in the reversible decision condition were relatively more accurate and slow than those assigned to the irreversible decision condition. Study 3 demonstrated that participants in the reversible decision condition were relatively more local (vs. global) processors compared to participants in the irreversible decision condition. Study 4 demonstrated that a fit between the reversibility of the decision and the decision maker's chronic regulatory motivation produced higher evaluations of the chosen alternative. Those who were relatively more chronic prevention-focused evaluated the decision outcome more positively when the decision was reversible, whereas those who were relatively more chronic promotion-focused evaluated the decision outcome more positively when the decision was irreversible. Finally, Study 5 demonstrated that decision reversibility can also have an effect on the actual decision-making process by changing the relative importance of different product features. When the decision was reversible instead of irreversible, participants were relatively more interested in prevention-related security or safety product features than in promotion-related luxury product features. Studies 1, 2, 3, and 5 also showed that these regulatory focus effects of decision reversibility can occur even when all participants are in the pre-decisional phase of the decision-making process.

Altogether, these findings support our hypothesis that reversible decisions, relative to irreversible decisions, induce a stronger prevention than promotion focus.⁸ In line with previous findings (Bullens et al., 2013; Hafner et al., 2012), this suggests that people who are in a position where they can change their minds, compared to those who cannot, are more likely to direct their attention toward the potential presence or absence of negative outcomes. As we discussed in the introduction, such a shift is likely a result of the fact that whether or not there is a problem with the decision provides information about whether or not the decision maker should revise the choice. That is, the *presence* of a negative outcome will indicate that one probably has chosen the wrong alternative and that one will have to change the temporarily chosen alternative for another in order to reach a desired outcome. The *absence* of a negative outcome, on the other hand, will be a sign of a good decision, which, in turn, will probably render changing unnecessary.

⁸ While our research adds to the growing literature on regulatory focus and its effects, future research has to incorporate challenges to the concept. For example, research by Glass, Maddox, and Markman (2011) implied that gains/non-gains and loss/non-loss contingencies could be orthogonal to regulatory focus, at least in certain situations. However, at this point, these recent findings do not challenge the consistent effects we found in the present research.

A Link to Previous Research on Decision Reversibility

From the present research findings, it seems that the reversibility of the decision influences the decision-making *process* through inducing regulatory focus motivations. It should also be noted that the regulatory motivations that are triggered by the reversibility of the decision could also have effects beyond the decision-making process. For instance, it is possible that these regulatory motivations play an important role when it comes to explaining some of the previous findings in research on decision reversibility and its effects on the decision *outcome*. Indeed, the results of Study 4 provide some evidence for effects of decision reversibility on decision outcome through the role of regulatory focus motivations and value from fit.

Choice satisfaction. As we discussed in the introduction, extant research showed that reversible decisions decrease choice satisfaction (Bullens, van Harreveld, & Förster, 2011; Gilbert & Ebert, 2002). Gilbert and Ebert (2002) explained these findings by suggesting that spreading of alternatives, as a means to increase satisfaction (i.e., cognitive dissonance reduction), only occurs when the decision is irreversible. Decision makers spread the alternatives either by increasing the attractiveness of the chosen alternative or by decreasing the attractiveness of the rejected alternative (Brehm, 1956; Festinger, 1957). According to Gilbert and Ebert, spreading apart of alternatives does not occur when the decision is reversible. Instead, they reasoned that people who have made a reversible decision 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 decision makers finally decide to stick with the initially chosen alternative, all the critical thinking may have already negatively impacted upon their satisfaction. Thus, according to Gilbert and Ebert (2002), differences in choice satisfaction are not only due to the extent in which people are likely to spread apart the desirability of the alternatives, satisfaction also depends on people's tendency to pay attention to the negative aspects of the chosen alternative.

As briefly alluded to in the introduction, Bullens et al. (2013) indeed found evidence for this assumption as they showed that upon reversible rather than irreversible decision making, people particularly attend to the negative aspects of the chosen alternative, that is, to its imperfections. The current research points toward regulatory motivation as the driving force behind this effect. That is, our findings suggest that it could be the case that people attend to the negative aspects of the chosen alternative *because* they become relatively more prevention-focused through the reversibility of the decision, which, in turn, likely affects their levels of choice satisfaction. Subsequent research should elucidate how exactly decision reversibility, regulatory focus, and attention toward attributes of the alternatives influence each other.

Working memory capacity. Besides a possible link with choice satisfaction, regulatory motivation may also play a role when it comes to the detrimental effects of decision reversibility on working memory capacity. Bullens, van Harreveld, and Förster (2011) demonstrated that reversible decision making curtails the decision maker's cognitive resources. They argued that this is probably because those who can still revise the decision continue to think about the relevant choice options, which will likely usurp cognitive resources. However, on the basis of the present results, it could be argued that regulatory motivation may also (partly)

explain the effects found on working memory capacity. One aspect of prevention focus vigilance is that it requires more attentional resources (e.g., Förster, Higgins, & Strack, 2000) and could thus be linked to ego-depletion. Along those lines, Förster et al. (2006) argued that avoidance-related states should narrow the breath of conceptual attention and thereby impede working memory capacity.

Similarly, Muraven and Baumeister (2000) suggested that vigilance depletes self-control resources. They argued that a self-control effort such as vigilance requires one to ignore distracters in the environment, which may consequently consume cognitive resources. Indeed, research by Trawalter and Richeson (2006) suggests that such a link between prevention focused vigilance and ego-depletion exists, as they found that prevention focused participants performed worse on a Stroop task (aimed to assess executive attentional task performance) than their promotion focused counterparts (see also Friedman & Förster, 2005). Future research should investigate more thoroughly the role of a relative prevention focus in the relation between decision reversibility and working memory capacity.

Explanations

Although our studies were designed simply to establish initially the relationship between decision reversibility and regulatory focus motivations by examining indicators of regulatory focus rather than to identify mechanisms underlying this relationship, we think it is worth to at least speculate on reasons *why* exactly individuals become relatively more prevention-focused from anticipating reversible decision making compared to irreversible decision making. That is, we wish here to consider briefly some possible explanations for the effects we found in order to inspire future research on this topic.

A first reason why reversible decision making yields relatively prevention-focused vigilance may be that the option to revise primes the individual with the possibility of making a wrong choice. Usually, revising is only necessary when the decision turns out negative (Gilbert & Ebert, 2002). Making people aware of the reversibility of the decision could therefore shift their attention toward the likelihood of making a wrong choice. Such anticipation of failures has been found to strengthen prevention vigilance (e.g., Crowe & Higgins, 1997; Förster et al., 2001, 1998; Higgins, 1998; Higgins et al., 2001; Zhou & Pham, 2004).

One may also suggest that the option to revise augments feelings of pressure and responsibility to make the very best choice. That is, the allowance for corrective action after reversible decision making (Epstude & Roese, 2008; Hafner et al., 2012; Roese & Summerville, 2005) may increase people's subjective feelings of responsibility to end up with the right alternative (for a similar line of reasoning, see Iyengar & Lepper, 2000). As prevention-focused vigilance has been found to correlate with feelings of responsibility (e.g., Higgins et al., 1994), one may argue that decision reversibility triggers a relative prevention focus (i.e., directs attention to the fulfillment of duties) specifically because the decision maker feels more responsible to end up with the right choice.

Future research should more directly identify the role of the anticipation of failures, as well as the role of responsibility involved in the process, and also consider other possible underlying mechanisms. Such knowledge would also provide insight into

possible moderating variables and boundary conditions. For example, if it would turn out that the current effects are indeed driven by the anticipation of failures, then enhancing individuals' confidence in the quality of their decision (e.g., via consensus information) should mitigate the effects of reversible decision making on regulatory focus.

Possible Additional Motivational Contributors

As already noted, the present research was specifically designed to establish the relation between decision reversibility and effects associated with regulatory focus motivations (especially during the pre-decisional phase). This, however, does not necessarily mean that other motivational factors might not contribute, at least partially, to some of the effects we found in some of our studies. In other words, it is possible that other motivational mechanisms are (also) induced by reversible and irreversible decision making, which would then contribute to some of our effects. We now consider what such potential additional motivational mechanisms might be.

Need for cognitive closure. Proximity to the decision deadline enhances the desirability of closure (Kruglanski & Webster, 1996). One may argue that those who are about to make a decision that is immediately final are closer to the decision deadline than those who know they will have the opportunity to revise their choice. In that sense, one may suggest individuals who are about to make an irreversible decision to have a relatively higher need for cognitive closure compared to individuals who are about to make a reversible decision.

Individuals with a high need for cognitive closure have a desire to attain closure quickly. They are often contrasted with individuals with a high need for accuracy. The former prefer order and predictability, and they have a low tolerance for ambiguity. Furthermore, individuals with a high need for closure tend to selectively focus on readily available solutions to a problem and tend to rely on heuristics (see, e.g., de Dreu, Koole, & Oldersma, 1999; Webster & Kruglanski, 1997). Conversely, individuals with a low need for cognitive closure engage in extensive information search and tend to have a preference to suspend judgments (Kruglanski & Webster, 1996). As such, heightened (or lowered) levels of need for cognitive closure could contribute to some of the effects found in the present research. It could, for instance, be the case that differences in need for cognitive closure contribute to the relation between decision reversibility and speed versus accuracy concerns (Study 2), and perhaps even the relation between decision reversibility and global versus local processing (Study 3), as previous research has found a link between the tendency to rely on heuristics and global processing (Tan, Jones, & Watson, 2009). It should be noted, however, that the theory of need for cognitive closure is silent with respect to the effects predicted for Studies 1, 4, and 5.

Completeness versus incompleteness. Research has shown that any manipulation that renders a task incomplete (e.g., task interruption) will induce a motivation to re-establish order (Gollwitzer, 1993; Wicklund & Gollwitzer, 1982). As such, an (in)complete mental state could have some consequences that are similar to prevention-focused motivation if one assumes that re-establishing order is similar to maintaining responsibilities and the status quo that are associated with a prevention focus. One might reasonably argue that, generally speaking, a reversible decision

would be experienced as more of an incomplete mental state than an irreversible decision. This means that there should be conditions where the effects predicted by the mechanism of incomplete versus complete mental states parallel those predicted by prevention versus promotion motivations. It should be noted, however, that in our Studies 1, 2, 3, and 5, the procedure involved the regulatory focus indicator being introduced as an interruption to the decision-making task during a pre-decisional phase. This means that all participants were in an interrupted, incomplete mental state at the time that the regulatory focus effects were being measured. Thus, for our conditions, it is not likely that a mental state completeness mechanism is contributing to the effects we found.

It is, of course, worth considering whether, beyond the fact that all participants were interrupted and thus would be in an incomplete mind set, those participants in the reversible condition were relatively more in a state of incompleteness compared to their counterparts in the irreversible condition because it might be easier for the latter to *anticipate* themselves in the later stage in which the decision-making process has been completed. Given the strength of the interruption in Studies 1, 2, 3, and 5 that stopped the participants from even having the necessary information to make a decision, this seems unlikely, but future research should investigate this possibility. It should be noted as well that a mental state completeness mechanism would be silent with respect to the predicted effects for Studies 4 and 5 that were designed with regulatory focus chronicity and product features specifically in mind. Nonetheless, it would be interesting in future research to find those conditions where mental state completeness and regulatory focus motivations both apply and to find ways to distinguish between their predicted effects.

Mindset theory. Mindset theory (Gollwitzer, 1990) distinguishes between the phase before (pre-decisional) and after (post-decisional) the decision has been made. In the *pre-decisional* phase, individuals tend to be in a deliberative mindset. A deliberative mindset is characterized by an even-handed and realistic (i.e., accurate) analysis of information in order to reach a good decision. In the *post-decisional* phase, however, individuals tend to switch to an implemental mindset, characterized by a general concern to successfully implement the goal (Gollwitzer, 1990; Kuhl, 1984). As such, implemental mindsets foster more selective information processing (e.g., Armor & Taylor, 2003; Taylor & Gollwitzer, 1995) and activate approach motivational processes (Harmon-Jones & Harmon-Jones, 2002).

Regulatory focus theory and mindset theory do share some commonalities in terms of distinguishing types of motivational inclinations. Both theories, for example, make predictions about the extent to which individuals will have approach or accuracy inclinations. One could reasonably argue that, generally speaking, individuals who have made an irreversible decision are more likely to move from a deliberative to an implemental mindset compared to those who have made a reversible decision who are more likely to still be in a deliberative mindset. This would allow mindset theory to contribute to effects that would also be predicted by the difference between promotion and prevention motivations. However, once again the actual conditions of our Studies 1, 2, 3, and 5 make this very unlikely with respect to the effects we found, because the interruption of the decision-making process before the relevant information could have been processed implies that all participants are still in the

deliberation stage. Future research, however, should examine those conditions where both mechanisms do apply and again try to find ways to distinguish between their predicted effects. It should also be noted, once again, that mindset theory would be silent with respect to the predicted effects for Studies 4 and 5 that were designed with regulatory focus chronicity and product features specifically in mind, and it also remains silent regarding the Study 3 findings for global versus local processing effects.

In sum, we have considered how need for cognitive closure, (in)completeness, and mindset theory could have predicted effects regarding decision reversibility similar to regulatory focus motivations. Given the actual conditions of our Studies 1, 2, 3, and 5, and the fact that Studies 4 and 5 were specifically tailored to test predictions directly associated with promotion and prevention motivations, none of these alternative mechanisms can account for the full range of effects currently found. We have discussed, however, how there might be contributions of these mechanisms to some of our effects and, importantly, the need for future research that sets conditions to compare and contrast the effects predicted by these mechanisms versus regulatory focus motivations. For the findings of our current studies though, we believe that regulatory focus theory provides the most comprehensive and parsimonious explanation for our obtained effects of decision (ir)reversibility. The potential role of other motivational mechanisms during later stages of the decision-making process and under different conditions clearly merits additional research.

Concluding Remarks

The present research is the first to show that the manner of decision making can itself orient the decision maker toward prevention versus promotion decision-making styles that affect a variety of different tasks. More specifically, the present studies demonstrate a link between decision reversibility and regulatory focus motivations and find support for the idea that reversible decisions, relative to irreversible decisions, fit better with a prevention motivation than with a promotion motivation. Moreover, they show that the induced regulatory motivation is consequential for the actual decision-making process and evaluated outcomes. Finally, we have argued that these distinct regulatory focus motivations may be the driving force behind some detrimental effects of reversible decision making that have been found in previous research.

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