

**OPTION ATTACHMENT: WHEN DELIBERATING
MAKES CHOOSING FEEL LIKE LOSING**

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Option Attachment: When Deliberating Makes Choosing Feel like Losing

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Common sense suggests that consumers make more satisfying decisions as they consider their options more closely. Yet we argue that such close consideration can have undesirable consequences because it may induce attachment to the options—a sense of prefactual ownership of the choice options. When consumers then select one option, they effectively lose this prefactual possession of the other, non-chosen option(s). This yields a feeling of discomfort (choosing feels like losing) and an increase in the attractiveness of the forgone option, compared to its appeal before the choice. A series of nine experiments provides evidence of this phenomenon and support for our explanation.

Common sense suggests that consumers make more satisfying decisions as they consider their choice options more closely. For example, people who face a difficult decision might extensively elaborate on the benefits of the options, take a closer look at them, or simply think about the decision longer. Yet in contrast to that commonly held belief, consumers who consider their options closely are often struck by a feeling of discomfort as soon as they have chosen one alternative over others (deliberating makes choosing feel like losing). This is accompanied by a sense that the forgone options are more desirable than they had seemed before the choice.

To illustrate, consider what happened to one of us while he was in the market for a car. He had identified two contenders but couldn't decide which of them to buy, a car that was sporty but not very comfortable, or one that had the opposite features. So he deliberated extensively, rehashing the features of the two options. In the end, he selected the sporty car. But as soon as he had placed the order, rather than feeling relief about having put the conflict behind him, he was struck by a feeling of unease about his decision and by a sense that the other car was more appealing than it had seemed before the choice.

We propose that consumers who become attached to the choice options during the deliberation process before choosing among them experience post-choice discomfort and find non-chosen options more attractive after the choice than they did before the choice. These effects of option attachment are interesting as they conflict with the common sense notion that close consideration of decision options enhances satisfaction with decisions. We identify conditions when the opposite may occur—consumers feel bad after considering their options closely. The phenomenon is also theoretically interesting because it seems to conflict with prominent psychological theories, which predict that choice leads to a spread in the attractiveness of choice options (e.g., Festinger 1957; Russo, Meloy, and Medvec 1998; Tversky, Sattath, and Slovic

1988). In other words, the less preferred option is widely thought to become less attractive when evaluated in a choice context. In contrast, we show when the less preferred option becomes more attractive immediately after choosing.

Despite phenomenological similarities, the post-choice discomfort we study is different from regret and buyer's remorse that arise from outcome information and invoke attempts to reverse one's choice because the forgone option ends up looking better than the chosen one (Inman and Zeelenberg 2002; Tsiros and Mittal 2000). The effects of option attachment that we study arise independently of outcome information about the options after the choice and do not predict attempts to undo the decision. Our focus is on affective and evaluative effects that are generated by the decision process itself rather than by characteristics of the options.

In the next section, we introduce the notion of option attachment (attachment to multiple choice options before selecting among them) as a driver of post-choice discomfort and of an increase in the appeal of forgone options. We propose that consumers can develop a sense of prefactual possession of the choice options as they deliberate about which option to select (cf. Dhar and Wertenbroch 2000; Hoch and Loewenstein 1991; Sanna 1996; Wertenbroch and Carmon 1995). Once they select an option, they can no longer think of themselves as potentially owning the non-chosen options. This induces a feeling of loss, manifested by post-choice discomfort and by an increased appeal of the forgone option. This prediction is in line with loss aversion (Tversky and Kahneman 1991) whereby items appear more attractive when viewed as being lost. Or it can be understood via people's tendency to infer their attitudes from their feelings (Schwarz 2001), coupled with consumers' focus on what is forgone in transactions (Carmon and Ariely 2000; Sen and Johnson 1997)—the discomfort signals that the forgone option must be more attractive than it had seemed. We test our theory of post-choice effects of

option attachment in four studies, along with predictions of competing accounts of these effects.

EFFECTS OF OPTION ATTACHMENT

Option Attachment

We propose that closer consideration of choice options may lead consumers to become attached to them, giving rise to a sense of prefactual ownership of these options. For example, elaborating on advantages of each choice alternative can increase the psychological proximity to those options, which increases attachment (cf. Dhar and Wertenbroch 2000; Hoch and Loewenstein 1991; Lewin 1938). The same is true when choice alternatives are physically or temporally proximate, as is the case in many retail environments. Moreover, pre-choice exposure to the sensory features of decision alternatives, past ownership of alternatives, and concrete expectations and anticipation of consumption experiences all likely induce some form of option attachment (Hoch and Loewenstein 1991; Shiv and Fedorikhin 1999; Strahilevitz and Loewenstein 1998). More generally, option attachment occurs when the choice task or context lead consumers to imagine, simulate, remember, or anticipate the consumption experience during the deliberation process. Consumers thus develop anticipatory feelings of possession of the choice options during the deliberation period—a sense of possessing the options prefactually.

Consequences of Forfeiting Prefactual Ownership

The notion of option attachment suggests that consumers may experience a sense of loss after choosing even though the non-chosen options were technically not yet theirs to lose. Simply put, if prior to making the final choice consumers developed a sense of prefactual ownership of the choice options, they must let go of that sense once they select one option, which implies

losing the other(s). This sense of loss, in turn, manifests itself by feelings of discomfort.

We further propose that this discomfort is accompanied by an increase in the post-choice attractiveness of the forgone option. This aspect of the phenomenon can be understood in terms of multiple mechanisms. One is loss aversion (Tversky and Kahneman 1991), which predicts an increase in the subjective value of forgone options that consumers had incorporated into their endowment before the choice. This prediction closely resembles the well-known endowment effect (Kahneman, Knetsch, and Thaler 1990)—except that the endowment induced by option attachment (our focus) is prefactual.

A second possible mechanism combines research showing that consumers focus on what they forgo when evaluating transactions (Carmon and Ariely 2000; Sen and Johnson 1997; see also Brendl, Higgins, and Lemm 1995) with the notion that they view their feelings as informative when they make judgments (Schwarz 2001; Pham et al. 2001). That is, they infer their evaluation of an item from their accompanying affective state. A focus on the forgone thus suggests to consumers that their discomfort arose because the forgone option was better than they had thought initially. Note that such a positive re-evaluation of the forgone option is logically (rather than affectively) consistent with the emotional state, in line with Schwarz's (2001) argument that affective states can have mood-incongruent implications for judgment.

Both these mechanisms focus on the appeal of the forgone, rather than the chosen, option. Our theory does not predict a change in the subjective value of the *chosen* option, unlike other theories that predict that choice enhances the appeal of the preferred (chosen) alternative due to such factors as pre-decision distortion (Meloy and Russo 2002; Russo et al. 1998), dissonance reduction (Festinger 1957), and prominence effects (Tversky et al. 1988). Note that, in line with our theorizing, our empirical focus is on effects on the *forgone* option rather than on concurrent

effects of choice on evaluations of the *chosen* option that these theories predict. We discuss how these theories relate to our findings in the General Discussion.

To summarize, our theory predicts that the magnitude of the two effects—the extent of post-choice discomfort and the accompanying change in the attractiveness of forgone options—depends on two main factors. The first is the degree of option attachment prior to the choice—the more attached the decision maker the stronger the discomfort and the increase in the attractiveness of the non-chosen options after the choice. The second is the size of the loss—the larger the loss implied by forgoing options, the stronger these two effects.

We test these predictions in four studies, two of which include multiple experiments. Study 1 shows the effect of option attachment on post-choice discomfort and the related increase in the appeal of forgone options. The effect is robust across five scenario-based experiments, each using different subject populations and different attachment manipulations. Study 2 reports two scenario-based experiments showing that these effects of option attachment depend on the size of the loss entailed by choosing one option over the other(s). Finally, studies 3 and 4 provide additional tests of our theory and its ecological validity with a different experimental design involving actual choices with real consequences. Results across all nine experiments and several follow-up experiments consistently support our model. We now turn to our studies.

STUDY 1: MANIPULATING OPTION ATTACHMENT

This study includes five different scenario-based experiments each offering a different illustration of the phenomenon—post-choice discomfort and the enhanced appeal of forgone options. These experiments also test the dependence of the phenomenon on the first element of the proposed underlying process—attachment to the choice options. Because option attachment

can come about in multiple ways, but cannot be manipulated directly, and because we wanted to guard against parsimonious rival explanations, each experiment relied on a different mechanism to induce attachment.

In each experiment, subjects read a scenario in which two people, a target (called Ms. A) and a non-target (called Ms. B), were described as independently making identical choices between the same two options. The target faces circumstances that should induce greater option attachment whereas the non-target faces circumstances that should induce less attachment. We asked subjects to imagine how the target and the non-target would feel in the situation described. We predicted that subjects expect the target, more so than the non-target, to feel badly and to find the forgone alternative more attractive after having made the choice.

Note that in this study as well as in study 2 we examine subjects' reactions to scenario-based stimuli, which reflect our subjects' beliefs, rather than actual responses to situations such as those described in the scenarios. Such a scenario-based approach is common in research on related phenomena such as regret (e.g., Inman and Zeelenberg 2002; Tsiros and Mittal 2000) and decision-making in general (e.g., Kahneman and Tversky 2000). Yet subjects' intuitions may not be entirely accurate. So we elicit subjects' responses to real choices in studies 3 and 4.

Experiment 1 manipulated option attachment by varying physical *proximity* of the choice options. This builds on Hoch and Loewenstein's (1991) notion that physical proximity enhances attachment to choice options (cf. Shiv and Fedorikhin 1999). Experiment 2 manipulated option attachment by varying the *duration of deliberation* about the options prior to choice. Research suggests that prefactual thinking about options and imagining how owning and consuming options would feel induces psychological proximity and option attachment (see Carmon and Ariely 2000; Dhar and Wertenbroch 2000; Sanna 1996). We expect this attachment to intensify

with the duration of pre-choice deliberation about the options. Experiment 3 manipulated option attachment by comparing *forfeiture* and *acquisition* choices. We predict that consumers develop attachment to (a sense of prefactual ownership of) the choice options when they expect to receive or consume all the options in a set. Choices, in which they then receive only a subset, seem as choices of which of the options to give up, or forfeit. We contrast these with acquisition choices, in which consumers do not expect to receive any option but then get to select a subset.

Experiment 4 manipulated option attachment by comparing *hedonic* and *utilitarian* choices. This is based on the notion that consumers experience greater attachment to hedonic than to utilitarian outcomes because hedonic outcomes stimulate more prefactual elaboration than utilitarian ones (Dhar and Wertenbroch 2000). Finally, Experiment 5 manipulated option attachment by varying *prior ownership* of the choice options. This is based on research suggesting that past ownership increases attachment to valued objects (Strahilevitz and Loewenstein 1998).

To summarize, we predict greater post-choice discomfort and enhanced attractiveness of forgone options under various conditions that foster option attachment, that is, when consumers (1) face choice options that are close by, (2) have deliberated more about the options, (3) face forfeiture rather than acquisition choices, (4) face hedonic rather than utilitarian choices, or (5) have owned the options in the past.

Method

Design and Procedure. In each of the five experiments, we manipulated option attachment within subjects, using the scenario-based target versus non-target manipulation described above. We tested whether this leads to post-choice discomfort and accompanying changes in the evaluation of forgone alternatives. We describe the individual scenarios below,

along with the different manipulations of attachment.

After reading a scenario, subjects were asked how ‘psychologically attached’ Ms. A and, separately, Ms. B was to [the non-chosen option] as she was choosing. They responded with ratings on two 10-point scales, one for Ms. A and the other, separately, for Ms. B (1 = “not at all attached,” 10 = “very much attached”). This served as a check of the attachment manipulation. Our results indicate that for all 10 scenarios in study 1 (two per experiment), the target was rated as significantly more attached to the non-chosen alternative than the non-target, with *t*-values ranging from 3.2 to 16.8. Thus, the manipulation was successful throughout.

There were two sets of dependent measures. First, there were two questions asking how Ms. A and, separately, Ms. B felt after the choice about not having chosen [the non-chosen option]. Subjects responded with ratings on two 10-point scales, one for Ms. A and the other, separately, for Ms. B (1 = “feels good,” 10 = “feels bad”). Second, there were two questions asking how attractive [the non-chosen option] was to Ms. A and, separately, to Ms. B right after the choice compared to how attractive it was right before the choice (1 = “less attractive right after the choice,” 10 = “more attractive right after the choice”). For all measures, subjects also had the option to indicate that none of the answers reflected their opinion.

Proximity (Experiment 1a of Study 1). Subjects were 53 undergraduate students at a mid-western U.S. university, who received course credit for their participation. Thirty-three of them read the Desserts scenario. For easier reading, we show the scenarios in this and all subsequent studies with Ms. A as the target. In the experimental descriptions we showed to our subjects, the target and non-target assignment (Ms. A and Ms. B) was counterbalanced, which had no effect.

DESSERTS. Two people, Ms. A and Ms. B, who do not know one another, are seated at opposite ends of a restaurant. Throughout the meal, each of them is independently trying to

decide which dessert to order, a mouth-watering, rich, and smooth vanilla bean ice cream, or a piece of luscious chocolate cake. Ms. A and Ms. B are equally excited about having dessert and both find the two particular desserts equally attractive.

- Ms. A sees both options displayed on the dessert tray in front of her during the main course.
- Ms. B sees both options displayed on the menu in front of her during the main course.

Both Ms. A and Ms. B independently consider long and hard which of the two attractive desserts to have. After the main course, Ms. A and Ms. B both decide independently to order ice cream.

Twenty other subjects similarly read a Bar scenario about two students who ordered their favorite beer and sandwich at a bar. Both discover that they do not have enough money on them for both items. The target finds this out only after the items have been served, while the non-target finds this out before. Both students decide to have the sandwich (and forgo the beer).

Proximity (Continued; Experiment 1b of Study 1). The within-subjects design allowed us to reduce the number of subjects needed, which was important in conducting the series of experiments. To see if this came at the cost of inducing an experimental demand effect from exposing subjects to multiple levels of the independent variable, we also ran this experiment with a between-subjects design. We recruited 114 Dutch undergraduates, paying each student 2.50 Dfl. (~\$1). Subjects either read the Desserts scenario or the Bar scenario but only saw the description of one person (target or non-target) and provided ratings only for that person.

Duration of Deliberation (Experiment 2 of Study 1). Subjects were undergraduates at a mid-western U.S. university who received course credit for their participation. One group (N = 27) read the following Vacation scenario.

VACATION. Ms. A and Ms. B have independently been planning a week-long vacation either to Paris or to Rio de Janeiro ever since each of them has found out that she is due for a vacation.

Ms. A and Ms. B are equally excited about the trip and both find the two destinations equally attractive. Therefore, they find it very difficult to decide between the two. From the moment they found out about this opportunity to go on vacation they have been torn between the two exciting destinations. They have pictured themselves eating fabulous French meals, drinking famous French wines, and overlooking Paris from the Eiffel Tower. They have also pictured themselves relaxing on the beautiful Copa Cabana Beach, drinking tropical cocktails, and overlooking Rio from the famous Sugar Mountain.

- Ms. A found out about her vacation opportunity 2 months ago.
- Ms. B found out about her vacation opportunity 2 days ago.

Both end up choosing to go to Paris.

Another group ($N = 47$) read a Movie Stars scenario about two women who are anticipating the possibility of spending an evening with one of their two favorite movie stars, Wynona Ryder and Cameron Diaz, as a prize they may win in a television game show. The target was informed about this opportunity two months before the show and has been thinking about which of the two to meet since then. The non-target learned about it only two days before the show and has been thinking about it since then. Both choose to meet Wynona Ryder in case they win the prize.

Forfeiture and Acquisition Choices (Experiment 3 of Study 1). Subjects were English-speaking undergraduates at a Hong Kong university who received a gift item (e.g., a T-shirt with a university logo) for their participation in a series of unrelated questionnaire studies. One group ($N = 56$) read the following Vacation Packages scenario:

VACATION PACKAGES. A company has bought several vacation packages to reward select employees. One package offers a week in New York City with many exciting activities (accommodation at the Waldorf Astoria, fine dining, Broadway shows, etc.). The other offers a relaxing week in a beach resort (luxurious hotel rooms, gorgeous private beach, fine dining, etc.).

Ms. A and Ms. B are equally excited about taking a vacation and both find the two vacation packages equally attractive.

- Ms. A expected that she would receive both vacation packages.
- Ms. B did not expect to receive either vacation package.

Both find out that they are eligible for one of the two packages. So now A has to decide which of the two vacation packages to forgo, and B has to decide which of the two packages to choose.

Both Ms. A and Ms. B end up selecting the New York package.

Another group (N = 57) read a Rental Cars scenario that described two people who were independently planning a trip by a rental car. The target reserved (and thus expected to rent) a car with a sunroof and a CD player. The non-target did not have a chance to specify the features she wanted. When they arrive at the rental car agency, each learns that the cars available that day have either a sunroof or a CD player but not both. So the target effectively faces a forfeiture choice while the non-target faces an acquisition choice. Both choose a car with a sunroof.

Hedonic and Utilitarian Choices (Experiment 4 of Study 1). Subjects were another group of English-speaking undergraduates in Hong Kong, who took part in this experiment within a series of unrelated questionnaires and received a small gift item for their participation. One group (N = 57) read the following CDs scenario.

CDs. Two music students, Ms. A and B, who do not know one another, are shopping for a CD.

- Ms. A wants to buy a CD purely for her listening pleasure.
- Ms. B wants to buy a CD because she must write a college term paper on music of her choice.

Ms. A and Ms. B have both narrowed down their choice to a CD by their favorite male singer and a CD by their favorite female singer. Both CDs cost the same. A and B have listened to both CDs in the store and like both equally much. So they find it very difficult to decide which one to

buy. However, because they don't carry enough money on them, they can only buy one CD for the time being. Both end up buying the CD by their favorite female singer, thereby forgoing the purchase of the CD by their favorite male singer.

Another group (N = 58) read a Jackets scenario that described two people who each face the same choice between two sports jackets. The target wants to buy a jacket to wear when going out at night (a more hedonic goal), while the non-target wants to buy a jacket to wear primarily at work (a more utilitarian goal). Both end up choosing the same jacket.

Prior Ownership (Experiment 5 of Study 1). Subjects were yet another group of 41 English-speaking Hong Kong undergraduates who received a small gift item in return for their participation. One group (N = 18) read this Beatles scenario.

BEATLES. Ms. A and Ms. B, who do not know one another, are both big Beatles fans.

- Until recently when they were stolen, Ms. A owned two rare bootleg albums by the Beatles, one recorded in 1963 and the other in 1965. Ms. A now wants to replace these two albums.
- Ms. B never owned either album but has been looking for these two albums for years.

Both Ms. A and Ms. B each have a friend who happens to own the two bootleg albums. On their birthday both Ms. A and Ms. B are visited by their respective friend and both get offered a choice of one of these two albums. Ms. A and Mr. B are equally excited about this opportunity and find the two albums equally attractive. So they find it very difficult to decide and spend quite some time deliberating which choice would make them happier. Both end up choosing the 1963 album.

Another group (N = 23) read a Prints scenario about two people who each independently receive an inheritance. As part of their inheritance, they must choose one of two lithographs. The target had once borrowed prints of the two lithographs, while the non-target never had the opportunity to possess a print of either. Both people choose the same lithograph.

Results and Discussion

Table 1 reports the mean differences between the target and the non-target ratings for the two dependent measures, post-choice discomfort and attractiveness changes of the non-chosen options. All means are positive, showing consistent support for our first prediction across all five experiments. As predicted, subjects consistently expected the target to feel significantly worse than the non-target about not having selected the non-chosen option. Also as predicted, subjects ascribed a greater tendency to the target than to the non-target to find the non-chosen option more (not less) attractive after the choice than before. Note that each study tested a different mechanism for inducing option attachment, showing that each mechanism leads to the predicted post-choice discomfort and enhancement in the attractiveness of the forgone option. We used these different operationalizations of option attachment to guard against parsimonious alternative accounts for our results, and since attachment cannot be directly manipulated. The convergence of the results shows their robustness, suggesting that post-choice discomfort and changes in the attractiveness of forgone options can be induced by multiple forms of option attachment.

 Insert table 1 about here

Importantly, table 1 also shows that the between-subjects version of the proximity experiment replicated the results obtained in the within-subjects version, suggesting that our within-subjects results are not due to a demand effect. Under such a demand effect, subjects in the within-subjects experiment might have guessed our prediction because they saw both the target and the non-target directly juxtaposed against each other. However, subjects in the between-subjects experiment saw only one description, either of the target or of the non-target. Yet, the results were the same in both experiments, arguing against this possibility.

A second potential concern is that the post-choice attractiveness ratings simply reflect differences between the target and the non-target that subjects infer already existed *before* the choice. To avoid this, we clearly stated in the scenario descriptions that the target and the non-target find the non-chosen alternative equally attractive before they choose. Moreover, the questions about the attractiveness of the non-chosen option specifically asked respondents to rate how the target and the non-target perceived it right after the choice compared to right before. So even if subjects were to believe that the target and the non-target do not find the non-chosen alternative equally attractive before choosing, their answers should reflect only a net change.

To further assure us that our attractiveness measures reflect differences that arise after rather than before the choice, we conducted a follow-up study with two scenarios (Desserts from experiment 1, and Movie Stars from experiment 2, both described above). We asked 70 students to rate for each of the scenarios on an 11-point scale whether the target (Ms. A = -5) or the non-target (Ms. B = 5) found the non-chosen option more attractive before the choice. The results indicated that subjects did not infer any differences between how attractive the target and the non-target perceived the non-chosen option to be in either scenario ($M_{\text{Desserts}} = 0$, $s = 1.6$, *n.s.* and $M_{\text{Movie Stars}} = .1$, $s = 1.5$, $p < .75$). We conclude that differences in post-choice attractiveness ratings between the target and the non-target occur only after the choice.

Mediation Analyses. We argued that the change in attractiveness of the forgone alternative is caused by option attachment. We further proposed two possible mechanisms for the increase in the attractiveness of the forgone option. One combined a focus on the forgone with the notion that consumers view their feelings as information when making judgments. This account directly predicts that discomfort mediates changes in the attractiveness of the non-chosen option (rather than attractiveness changes mediating discomfort). In the General

Discussion, we address how this mediation prediction relates to the other possible mechanism, by which loss aversion causes the increase in the appeal of the forgone option. We tested for mediation using the data from all five experiments, following Baron and Kenny (1986).

To examine the degree of mediation, we regressed psychological discomfort on the independent variable attachment [dummy coded for target versus non-target; Baron and Kenny's link (*a*)], regressed attractiveness changes on attachment [link (*c*)], and finally regressed attractiveness changes on both attachment and discomfort [link (*b*)]. The degree to which the impact of attachment on attractiveness changes is reduced when accounting for the impact of discomfort expresses the degree of mediation by discomfort. To find mediation, the impact of attachment must drop significantly, as determined by Sobel's (1982) test. For full mediation, it must become non-significant. The top part of table 2 shows the results of these analyses. For all five experiments we find that discomfort mediates attractiveness changes of the forgone options, with three of the five showing complete mediation (i.e., the effect of attachment, c_{target} , becomes non-significant when accounting for the effect of discomfort, b_{target}). In sum, all five experiments in study 1 show that option attachment leads to post-choice discomfort, which mediates an accompanying increase in the appeal of forgone options.

 Insert table 2 about here

STUDY 2: MANIPULATING THE LOSS FROM FORGOING AN OPTION

The preceding series of experiments suggests that the phenomenon results from attachment to the choice options (supporting our first prediction). But the process that we proposed as underlying the phenomenon entails a second step. We suggested that consumers may experience a prefactual sense of ownership of the alternatives due to option attachment.

Choosing among those alternatives is then perceived as resulting in a painful loss (“choosing feels like losing”). To test this, we manipulated the size of that potential loss in two experiments by varying the unique benefits provided by the non-chosen option that are forgone.

One way to manipulate the size of the loss is to vary the degree of *substitutability of the options*. We predict that post-choice discomfort and the increased appeal of the forgone option will be attenuated the more substitutable the choice options are, that is, when choosing an option entails giving up non-chosen options with less unique features. After all, a choice between two similar items (in an extreme case, two replicas) entails minimal loss. Another way to manipulate the size of the loss that decision makers may experience due to choosing is to increase the *number of forgone options*. The more different options consumers must forego, the greater the loss they experience after choosing one over the others (due to option attachment). Note that finding greater discomfort in the case of either greater substitutability among the choice options or in the case of a greater number of forgone options is not surprising but in line with our theory. On the other hand, finding an enhanced appeal of the forgone options in these two cases (especially in the case of more forgone options) supports our theory *and* is not obvious.

In summary, we predict greater post-choice discomfort and enhanced attractiveness of forgone options under conditions that enhance the size of the loss implied by forgoing choice options, that is, (1) as options are less substitutable and (2) as more options must be forgone.

Method

Design and Procedure. As in study 1, subjects read a scenario, describing two people, a target and a non-target, as independently making the same choice from a set of options. The independent variable, the loss implied by forgoing an option, was manipulated within subjects by

describing a target (Ms. A) either as facing less substitutable options (in experiment 1) or as facing more options (in experiment 2) than the non-target (Ms. B). We again asked subjects to imagine how the target and the non-target would feel in the situation described. The dependent variables were the same as in study 1. We predict that subjects judge the target, more so than the non-target, to feel badly and to find the non-chosen option more attractive after the choice.

Substitutability of Choice Options (Experiment 1 of Study 2). Subjects were Dutch undergraduate students who were paid 2.50 Dfl. (~ \$1) for their participation. One group (N = 85) saw the following Beatles scenario, slightly modified from the one described in study 1.

BEATLES. Ms. A and Ms. B, who do not know one another, are both big Beatles fans. Both have been very eager to acquire two rare but well-known bootleg albums by the Beatles.

- Ms. A is interested in an album recorded in 1963 and in another that was recorded in 1967. These two albums contain different songs; the album covers are very different in appearance.
- Ms. B is interested in an album recorded in 1963 and in another recorded in 1964. All but one of the songs on these two albums are the same; the album covers are similar in appearance.

Both Ms. A and Ms. B each have a friend who happens to own the bootleg albums that each is interested in. On their birthday, both Ms. A and Ms. B are visited by their respective friends, who offer both of them a choice of one of the two albums. Ms. A and Ms. B are equally excited about this opportunity. They find the two albums equally attractive. Hence, they find it difficult to decide. Both choose the 1963 album.

Another group (N = 84) saw a Scotch scenario, in which two whiskey connoisseurs were described as independently facing a choice between two bottles of rare single-malt Scotch. The target feels that the two brands taste very different, while the non-target feels that they taste very similar. Both people choose the same brand.

Number of Forgone Options (Experiment 2 of Study 2). In this experiment, subjects saw scenarios, in which the target faces three decision options (so that choice implies forgoing two) and the non-target faces two options (so that choice implies forgoing only one). Another sample of Dutch undergraduate students participated in this experiment receiving 2.50 Dfl. (~\$1) for their participation. One group (N = 57) saw the following Vacation scenario.

VACATION. Ms. A and Ms. B have independently been planning a weeklong spring vacation.

- Ms. A has been debating whether to travel to Paris (France), to Sydney (Australia), or to Rio de Janeiro (Brazil), ever since she has found out that she is due for a vacation.
- Ms. B has been debating whether to travel to Paris (France) or to Rio de Janeiro (Brazil), ever since she has found out that she is due for a vacation.

Ms. A and Ms. B are equally excited about taking a trip. Each finds the destinations she is considering equally attractive. Therefore, they find it very difficult to decide between them. From the moment they found out about this vacation opportunity they have been torn between the exciting destinations. In the process of trying to decide, Ms. A and Ms. B have spent many hours daydreaming about scenes from both vacations. They have both pictured themselves eating great French food, drinking famous French wines, and overlooking Paris from the Eiffel Tower. They have also pictured themselves relaxing on the beautiful Copa Cabana Beach, drinking tropical cocktails, and overlooking Rio from the famous Sugar Mountain. Ms. A has also pictured herself mingling with the famously friendly Australians, snorkeling in the beautiful reefs, and seeing unique Australian animals (e.g., kangaroos, koalas). Both end up choosing Paris.

Another group (N = 48) saw another Beatles scenario, in which the target faces a choice between three Beatles bootleg albums and the non-target faces a choice between two. Both choose the same album (so that the target forgoes two albums and the non-target forgoes only one).

Results and Discussion

The results of both experiments (see table 3) are consistent with our theory. As predicted, subjects felt that the target who faced a greater loss when choosing (either due to forgoing a less substitutable option or due to forgoing more options) would feel worse than the non-target about not having selected the non-chosen options. They also thought that the target more so than the non-target would find the non-chosen option(s) more attractive immediately after the choice than before. Note that there was an increase in the appeal of each of the two forgone options in the second experiment, which is consistent with, but not specifically required by our theory, attesting to the strength of the effect of discomfort on ratings of the appeal of forgone options. Altogether, the results of this study provide strong support for our prediction that post-choice discomfort and the increase in the attractiveness of forgone options depend on the size of the loss entailed by forgoing these options in a choice task.

 Insert table 3 about here

Mediation Analyses. We performed a set of mediation analyses to examine if discomfort (our measure of experienced loss from forgoing choice options) mediates the attractiveness changes that we found. We conducted the mediation analyses as in study 1. For the second experiment (where two options were forgone), we averaged the two attractiveness ratings (of the two forgone options) for the target to provide a summary score for the attractiveness changes that we could use as a dependent variable in the regression analyses. Results shown at the bottom of table 2 reveal that discomfort again mediates the attractiveness changes in both experiments.

STUDY 3: THE ATTRACTIVENESS OF FORGONE OPTIONS IN REAL CHOICES

The results described so far repeatedly illustrate the phenomenon we described and consistently support our explanation of the underlying process. In study 3, we explore two issues relating to the ecological validity of these findings. One question is whether our results hold when subjects participate in a task requiring real decisions with real consequences, rather than simply reflecting on hypothetical ones. A related question is whether we can replicate the phenomenon under less obtrusive, more realistic circumstances, in which we do not make the discomfort that is associated with the choice salient (i.e., we do not ask the decision makers about their feelings). One might expect the predicted changes in the perceived attractiveness of forgone choice options to be much smaller under conditions of less explicit discomfort. Hence, finding an increase in the attractiveness of forgone options even under these circumstances would provide strong support for the robustness of our results and the validity of our theory.

The manipulation we use in this study follows the car choice anecdote described at the outset of the article, which partly motivated this research. It also builds on experiment 2 in study 1 where we manipulated how much people deliberated about the choice options. Specifically, in the present study we manipulate option attachment by instructing half the subjects to elaborate on the benefits of eating at restaurants for which they will receive promotional coupons. We use these coupons to provide true incentives, promising subjects three coupons as compensation for their participation. We manipulate the possibility of post-choice discomfort by allowing only half the subjects an opportunity to choose between coupons. Our theory predicts that those subjects who have elaborated will evaluate the forgone option more positively if they choose than if they do not (i.e., without forgoing an option). The theory predicts no such difference between the choice and no-choice conditions when subjects have not elaborated.

Method

Forty-three staff members at a southeastern U.S. university were randomly assigned to the conditions of a 2 (ELABORATION: yes vs. no) $\times$ 2 (CHOICE: yes vs. no) full factorial design. As a dependent variable, we examined attractiveness ratings of the non-chosen/less appealing coupon, measured on an 11-point scale.

Subjects completed the surveys at their leisure in about 15 minutes. They learned that they would receive three of the six coupons as compensation. These could be redeemed at local restaurants to obtain two meals for the price of one. Coupon values ranged from \$9.75 to \$16.95 each. Each coupon described the restaurant's menu (dishes offered and prices). The elaboration manipulation followed—we asked half the subjects to list benefits of dining at each restaurant, whereas we did not ask the other half to do that. Next, we asked half the subjects to select which of the two coupons they would like to receive (choosers), while the other half proceeded without choosing (raters). We told the choosers that they would receive the coupon when turning in their completed survey. Finally, all subjects rated the attractiveness of the less appealing coupon. This procedure was then repeated with two more coupon pairs (with subjects in the same CHOICE and ELABORATION conditions for all coupon pairs). Upon completing their surveys, choosers received the three coupons they had chosen and raters received three randomly selected coupons.

Results and Discussion

We conducted a repeated-measures ANOVA of ratings of the less preferred option across all coupon pairs. Since coupon pairs did not interact with any other effect, we report least-square mean attractiveness ratings (see figure 1) of the non-chosen option (for ratings in the choice condition) and of the less appealing option (for ratings in the no-choice condition), collapsed

across coupons. The ANOVA revealed the predicted ELABORATION $\times$ CHOICE interaction, $F(1, 39) = 5.08, p < .03$. There was also a marginally significant main effect of CHOICE, $F(1, 39) = 3.48, p < .07$, showing that the less appealing option was more attractive when it had been forgone in a choice ($M_{\text{Choice}} = 5.78$) than when it was rated without having been forgone ($M_{\text{No Choice}} = 4.72$). No other effects approached statistical significance.

 Insert figure 1 about here

Among subjects who elaborated on benefits of eating at the restaurants, choosers found the less appealing option more attractive ($M_{\text{Choice}} = 6.42$) than raters ($M_{\text{No Choice}} = 4.11, t = 4.0, p < .0001$). Choosers who elaborated also found the forgone option more attractive than choosers ($M_{\text{Choice}} = 5.14, t = 2.3, p < .03$) and raters ($M_{\text{No Choice}} = 5.33, t = 1.9, p < .06$) who had not elaborated. We attribute this to raters not experiencing discomfort (because they did not give up an option) and to lesser attachment to the options by those who did not elaborate.

In sum, we found the predicted increase in the appeal of the less attractive option in conditions that enhance option attachment and induce post-choice discomfort. Elaboration on the options makes the non-chosen option appear more attractive after the choice than before. Importantly, this effect emerged in a real choice task under conditions where the discomfort was not made explicitly salient, even though we had found in another study (not reported in this article) that reducing the salience of post-choice discomfort (by not asking subjects about it) significantly limited the increase in the appeal of the forgone option.

Study 3 also revealed a result we had not explicitly predicted—raters evaluated the less appealing option *less* highly when they elaborated ($M_{\text{Elab}} = 4.11$) than when they did not ($M_{\text{No Elab}} = 5.33, t = -2.1, p < .05$). This is in line with social judgment research that has shown that judgments become more extreme when context information is used to evaluate a stimulus (e.g.,

Petty and Wegener 1993; Stapel, Koomen, and Zeelenberg 1998). Specifically, when one option is superior to another, each may provide an anchor against which the other is contrasted. This effect may be enhanced, the more thoroughly subjects evaluate the options (e.g., when subjects elaborate on the options). Hence, less appealing options would be evaluated as even less attractive when elaborated upon. It is interesting to examine whether or not there is such a contrast effect of elaboration in the no-choice condition in the contexts we investigate. If that were the case, the evaluative changes we predict if consumers elaborate on and then forgo a choice option would have to overcome such an opposing contrast effect to be detected.

To test this, we asked 66 university community members to evaluate paired items described in a survey. In a $3 \times 2 \times 2$ mixed design, subjects rated the appeal of each of the two items on separate 11-point scales (1 = “not attractive at all,” 11 = “very attractive”). These items were pairs of toasters, restaurants, or cameras (between subjects). Half the subjects elaborated on the benefits of the items in a pair before rating them, while the second half provided ratings without elaborating (between subjects). The ratings of the two items served as the third (within-subjects) factor. A repeated-measures ANOVA showed an interaction effect of elaboration and the more versus less attractive item [$F(1, 66) = 4.15, p < .05$] that did not depend on the item pair. The interaction effect entailed a drop in the attractiveness of the less appealing item from $M_{\text{No Elab}} = 6.03$ without elaboration to $M_{\text{Elab}} = 5.14$ under elaboration ($t = 1.68, p < .10$), while elaboration did not affect the attractiveness of the more appealing item ($M_{\text{No Elab}} = 8.39, M_{\text{Elab}} = 8.78; t = -.82, n.s.$). Hence, elaboration reduced the attractiveness of the less appealing item. It thus enhanced the attractiveness differential between the items in each pair, rather than boosting the attractiveness of both items. This suggests a negative baseline effect of elaboration on evaluations without choice that the option attachment effect must overcome to be detectable.

This finding is also important as it sheds light on a rival account that suggests that greater elaboration (which subjects in studies 1 and 2 might have inferred the target engaged in before choosing and that we induced in study 3) increases the attractiveness of the less appealing option before, not after, choosing. This would make the decision more difficult, which, in turn, would cause post-choice discomfort. The follow-up experiment shows that elaboration by itself reduces the attractiveness of the less appealing item, in contrast to what this rival account predicts.

STUDY 4: ALTERNATIVE EXPLANATIONS AND BEHAVIORAL IMPLICATIONS

Study 3 demonstrates the predicted evaluative consequences of option attachment and post-choice discomfort in a real choice situation without explicitly measuring (and making salient) the discomfort. Thus, the phenomenon has ecological validity and is robust because it occurs in the absence of explicit measurement of the mediating variable, discomfort (which may direct subjects' attention to the loss implied by forgoing a choice option). To show the robustness of this key result, we now extend and replicate study 3 with different stimuli and subjects.

Another purpose of this study is to further examine the competing explanation of a simple elaboration effect on the perceived attractiveness of forgone options. Our mediation analyses already showed that discomfort mediates the increased appeal of the forgone option, the reverse of what this competing explanation predicts. And the follow-up to study 3 described above also showed the reverse of what the rival explanation predicts for the forgone option. Now we want to test a third prediction that it makes. If elaboration enhances perceived attractiveness, we should see an increased appeal of both options (i.e., also the chosen option). In contrast, our theory predicts a change in the appeal of the forgone (less preferred) but *not* the chosen (preferred) option. To test this, we ask all subjects in study 4 to also assess the appeal of the chosen option.

A third purpose of study 4 is to explore if the post-choice effects of option attachment can be consequential in the sense that they affect behavior. For that purpose, we add a choice-based measure [willingness to pay (WTP) for the option subjects decided not to choose] to the attitudinal rating scale used in study 3.

Method

As compensation for their participation in an unrelated study, we offered 88 international MBA students at a business school in France a music CD from a set of four CDs of their choice. We told them that we would order the CD (average retail price was €20, or ~\$18) from an online retailer after they completed the experiment. After the unrelated study, we asked them to list four music CDs they didn't own but wanted to buy. They then rank-ordered these CDs according to their preferences. Finally, we picked their third and fourth most preferred CDs as stimuli.

As in study 3, we randomly assigned subjects to the conditions of a 2 (ELABORATION: yes vs. no) $\times$ 2 (CHOICE: yes vs. no) full factorial design. We manipulated elaboration, asking half the subjects to consider what they found appealing about each of the two CDs. Next we manipulated choice by having half the subjects choose which of the two CDs they would receive. Those who didn't choose were told they would receive one of the two CDs determined at random. Then we elicited two dependent measures. We first asked choosers for their willingness to pay (WTP) for the non-chosen CD (so they would receive both CDs). To have a comparable measure for the non-choosers, we asked them for their WTP for the equivalent CD (the one they ranked fourth on their list). Next, all subjects were asked to rate the attractiveness of the third and fourth ranked CDs on 11-point scales (0 = "not at all attractive," 10 = "very attractive").

To measure WTP, we used a sequential choice procedure recently tested by Wertenbroch

and Skiera (2002) who found that it yields WTP estimates that are as reliable and internally valid as estimates derived from Becker, DeGroot, and Marschak's (1964) standard incentive-compatible procedure. So the sequential choice procedure preserves differences in WTP between experimental conditions as effectively as the standard procedure. Subjects made a series of buy/don't buy choices at different price points. Specifically, we asked them if they would buy the CD for €20. If the answer was 'no' ('yes'), subjects were asked if they would buy the CD at a price of €10 (€30). Contingent on the second answer, one of four lists of additional prices (€1 to €9, €11 to €19, €21 to €29, or €31 to €40) was then presented in increments of €1, and they were asked if they would pay each of those prices for the CD. This narrowed down the price range to a small enough interval so that we could then directly ask subjects exactly how much they were willing to pay. The procedure took about 20 minutes.

Results and Discussion

Mean WTP and attractiveness ratings for the non-chosen CD (in choice) and the less appealing CD (in no-choice) are shown in figure 2. Separate ANOVAs of the evaluations of these options revealed only the predicted ELABORATION $\times$ CHOICE interaction for both dependent measures [$F_{\text{WTP}}(1, 79) = 4.34, p < .05$ (logged WTP yielded the same results) and $F_{\text{Ratings}}(1, 83) = 4.33, p < .05$]. Consistent with the results of study 3, subjects who elaborated on benefits of the options stated a higher WTP for the less appealing CD if they had given it up in a choice ($M_{\text{Choice}} = €17.31$) than if they had not chosen ($M_{\text{No Choice}} = €11.72, t = 2.8, p < .01$) and than if they had not elaborated, whether or not they had made a choice ($M_{\text{Choice}} = €11.68, t = 2.8, p < .01, M_{\text{No Choice}} = €11.96, t = 2.8, p < .01$). No other contrasts approached significance. Just like in study 3, subjects who had elaborated rated the less appealing CD as more attractive if they

had forgone it in a choice ($M_{\text{Choice}} = 7.43$) than if they had not made a choice ($M_{\text{No Choice}} = 6.00$, $t = 2.1$, $p < .05$). They also found it more attractive than did subjects who had not elaborated, whether or not they had made a choice ($M_{\text{Choice}} = 5.65$, $t = 2.6$, $p < .02$; $M_{\text{No Choice}} = 6.25$, $t = 1.8$, $p < .08$). No other contrasts approached significance.

 Insert figure 2 about here

As for the attractiveness of the chosen (preferred) option, an ANOVA of the ratings of both the non-chosen and the chosen options (within-subjects factor OPTION) failed to show that elaboration enhances the appeal of the two options similarly under both choice and no-choice, as the rival explanation predicts. Rather, a three-way interaction of OPTION $\times$ ELABORATION $\times$ CHOICE [$F(1, 83) = 4.47$, $p < .05$] shows that the ELABORATION $\times$ CHOICE interaction for the chosen option differs from the significant interaction we found for the non-chosen option, consistent with our theory. A follow-up ANOVA of ratings of the chosen option revealed neither a main effect of ELABORATION [$F(1,83) = 1.62$, *n.s.*] nor an interaction of ELABORATION $\times$ CHOICE [$F(1,83) = 0.54$, *n.s.*]. Subjects rated the more appealing CD as equally attractive in all four conditions ($M_{\text{Choice}} = 8.0$ and $M_{\text{No Choice}} = 7.6$ with elaboration; $M_{\text{Choice}} = 7.3$ and $M_{\text{No Choice}} = 7.4$ without elaboration; no individual contrast approached significance).

In sum, study 4 replicates the finding of the enhanced appeal of the forgone option we found in all previous studies. In contrast to the rival prediction, we find that elaboration does not similarly enhance the appeal of both the preferred and the less preferred options. The increased WTP for forgone options under elaboration shows that the effects of option attachment (post-choice discomfort and enhanced appeal of forgone options) that we document in this article influence not only consumers' experiences but, importantly, their behavior.

GENERAL DISCUSSION

We propose a theory of option attachment, explaining why consumers who consider their decision closely, may feel discomfort rather than relief or satisfaction, once they arrive at their decision. As a result of deliberating consumers become attached to the options before selecting among them, developing a sense of prefactual ownership of the options. A variety of factors can create such option attachment, such as elaborating on advantages of each option, or taking longer to decide. Consumers then experience not selecting one or more of the options in choice as a loss of their prefactual possessions, whose benefits they had anticipated. The negative hedonic impact of that loss manifests itself as immediate post-choice discomfort, accompanied by a perception that the forgone option is more attractive than it had seemed before the choice. In short, post-choice discomfort and the enhanced appeal of forgone options express the sting of forgoing options that had become psychologically proximate to consumers before they chose.

We identified and documented this phenomenon and tested our underlying theory in four studies with multiple experiments and some 1,000 respondents. Study 1 showed the effect of option attachment on post-choice discomfort and the increased appeal of forgone options across different manipulations of attachment (physical proximity, duration of deliberation, forfeiture versus acquisition choices, hedonic versus utilitarian choices, and prior ownership), indicating the robustness of the effects. We further predicted that choosing induces a sense of loss of forgone options that evokes post-choice discomfort. Support came from study 2, showing that discomfort and evaluative changes were greater when the loss implied by forgoing was bigger (either when a less substitutable option or when a greater number of attractive options was forgone). Finally, studies 3 and 4 replicated the main result, the enhanced appeal of forgone options, in real decisions with real consequences, even though we did not ask subjects about their

feelings so as to generate an ecologically valid level of discomfort (in real decisions, people are seldom asked about their post-choice discomfort).

Our results are fully consistent with our theory of option attachment effects. But aside from option attachment, there may be further causes for the phenomena we study. We discuss them below and explain why option attachment, rather than those causes, underlies our findings.

Alternative Explanations

Elaboration Effects on Attractiveness. A possible rival explanation already introduced in studies 3 and 4 assumes that elaboration generally enhances the appeal of the options (both the less and the more attractive one). This might reduce the relative advantage of the chosen option before the choice and lead to greater discomfort as a result of a (relatively) more favorable attitude toward the forgone alternative, contrary to our theory. While a plausible route to post-choice discomfort, the discussion sections of studies 3 and 4 explain why this rival is inconsistent with our data, specifically with (i) the finding that discomfort mediates evaluative changes rather than the other way around, (ii) study 3 (including the follow-up), which shows a reduction rather than an increase in the appeal of the forgone option in the absence of choice, and (iii) study 4, which shows no effect of elaboration on the appeal of the more attractive option.

Inferred Decision Difficulty and Tie Breaking. A related type of rival account suggests that our subjects may have inferred from the scenarios in studies 1 and 2 that the target engaged in more extensive thought about the options than the non-target because s/he found it more difficult to choose among the options (see, e.g., Amir 2002). So the forgone option might have seemed more attractive to the target than to the non-target to begin with (and hence also after the choice), leading to discomfort from rejecting it. Also, decision difficulty might lead consumers to

use a tie-breaking procedure [e.g., increasing the weight, or boosting the value, of the more prominent attribute (Tversky et al. 1988) or even choosing randomly] to resolve the conflict between non-dominated options. But after choosing consumers correct the temporary preference distortion, reverting to their original pre-choice evaluations of the options. So they find the non-chosen option more, and the chosen option less, desirable than is implied by the tie-breaking procedure. This might leave them with a sense of loss and discomfort, either from the judgmental correction or their failure to resolve the choice in a more reasoned manner. But study 4 showed no changes for the chosen option, in line with our theory and not with the rival account.

A more significant flaw of accounts of our findings based on decision difficulty is due to their assumption that the non-chosen option is already more attractive before the choice (so consumers resort to a tie-breaking procedure, which results in post-choice discomfort). This assumption is inconsistent with four aspects of our empirics. First, in studies 1 and 2 our dependent measures clearly asked subjects to what extent the target's and the non-target's evaluations of the non-chosen option had *changed after the choice* compared to their evaluations before the choice. Therefore, our findings should be net of possible attractiveness differences before the choice. Second, the follow-up test of scenarios in study 1 showed that subjects felt that the target does not find the non-chosen option more attractive than the non-target *before* choosing, implying that the perceived differences in appeal that we find arise only after choosing. Third, results of the mediation analyses in studies 1 and 2 show that post-choice discomfort is a mediator and not a consequence of a more favorable attitude toward the non-chosen option, contrary to what decision difficulty accounts assume. Finally, this account requires additional assumptions to explain why, contrary to what it implies, studies 3 and 4 showed no reduction in the attractiveness differential under elaboration (study 3 and its follow-

up even showed a spread) when subjects did not choose—which reduces its parsimony.

Experimental Demand Effects. Might our findings reflect experimental demand effects?

The between-subjects results in study 1 replicate those found within subjects, suggesting that the scenario-based findings are not simply driven by a demand effect from subjects being exposed to both levels of the attachment manipulation. Also, results of the study 1 follow-up suggest that subjects did not interpret the description of the target as being closer to, or having thought more about, the options as communicating that the target found the non-chosen options more attractive than the non-target. If they had, that might have created greater discomfort and more favorable ratings compared to the non-target. Finally, such a demand effect is unlikely to have operated in studies 3 and 4 that involved between-subject comparisons and real consequences.

Taken together, competing explanations are either inconsistent with some of the findings or need additional assumptions to fully explain them or both. In contrast, option attachment is consistent with all the data and is more parsimonious.

Theoretical Implications

How do our theory and findings relate to the existing literature? Several prominent psychological theories (e.g., Festinger 1957, 1964; Russo et al. 1998; Tversky et al. 1988) suggest that choice contexts may enhance the spread in evaluations of options. In contrast, we proposed and demonstrated an attenuation of the spread in evaluations. Unlike these theories, we predict no change in the appeal of chosen options, in line with our findings. We show conditions, under which non-chosen options become more attractive immediately after choice.

Russo et al. (1998) observed a spread in the appeal of decision options before choice due to pre-choice information distortion. They found that people distort sequentially presented

information in favor of their preferred option, thereby increasing the spread in the appeal of options before the choice. In contrast, our research focuses on when and how options will be *less* differentiated *after* choice. We believe the processes we study operate independently of predecisional distortion. Predecisional distortion cannot account for the post-choice evaluative changes we predict; in fact, it works in the opposite direction.

Our theory and findings relate more closely to cognitive consistency theories of post-choice affect. From the perspective of cognitive dissonance theory (Festinger 1957, 1964), post-choice discomfort would be the temporal and theoretical prerequisite of a reduction in post-choice cognitive dissonance. While dissonance reduction by way of increasing the judgmental spread is well known, its dependence on post-choice discomfort is not. Yet it was the first evidence of such discomfort that gave rise to Festinger's (1964) major extension of cognitive dissonance theory (Festinger 1957). Festinger proposed that choice induces conflicting cognitions about the negative aspects of the chosen options and the positive aspects of the non-chosen ones (i.e., cognitive dissonance). These cognitions are uncomfortable and only at a second stage evoke dissonance reduction efforts that result in the well-known spread of attitudinal judgments. Similarly, Reactance theory (Brehm 1972) suggests that the commitment of making a choice restricts the consumer's freedom to select the rejected option and reject the selected one. This loss of freedom is an aversive post-choice experience.

These classic theories invoke cognitive and motivational constructs such as cognitive consistency and freedom of choice to explain post-choice attitudinal changes. But the precise antecedents and consequences of dissonance and dissonance reduction remain controversial (Elliot and Devine 1994; for a contemporary review see Harmon-Jones and Mills 1999). Our findings suggest a novel parsimonious interpretation of post-choice discomfort as a direct

consequence of choice. From our perspective, post-choice discomfort arises because giving up a coveted choice option, to which one has become attached before choosing, feels bad. One contribution of this article is thus to show that experiences that are commonly associated with dissonance and reactance may arise from, and be understood via, option attachment (which can prompt post-choice discomfort and an enhanced appeal of the forgone option).

A second contribution of this article is in understanding the boundaries of the endowment effect that is central to the decision-making literature. Our theory emulates aspects of this well-known effect, which refers to an asymmetry in evaluations depending on whether a good is acquired or forfeited relative to the consumer's present state, or endowment (e.g., Kahneman et al. 1990). Consumers value a good more when they consider giving it up than when they consider acquiring it. Recently, there has been evidence of endowment effects even without possession of the good, for instance, when consumers are given promotional coupons instead of the promoted items themselves (Sen and Johnson 1997) or when they vividly imagine possession (Carmon and Ariely 2000). We extend the literature on the endowment effect by providing evidence of the option attachment effect that is due to discomfort from forgoing a choice option that had only prefactually become part of the person's endowment—we view all these cases as examples of a 'mental endowment effect.'

A related issue arises from the mediation analyses in studies 1 and 2 that show that post-choice discomfort mediates the effect of option attachment on the increased attractiveness of forgone choice options. This was predicted by, and supports, one of the mechanisms we proposed as underlying these evaluative changes, the feelings-as-information mechanism (Schwarz 2001). Loss aversion, the other mechanism, predicts both negative affect such as discomfort and an enhanced evaluation of the forgone option. But to the best of our knowledge,

there is no empirical evidence yet that one causes the other. Rather, they are generally viewed as co-occurring. One interpretation of our results is that in loss aversion experienced or anticipated negative affect may mediate the effect of losses on the enhanced evaluation of forgone options.

A third contribution of this article lies in extending research that suggests that consumers are not always better off if they think carefully about their decisions. For example, subjects who carefully think about reasons for their choices tend to overweigh utilitarian versus hedonic factors, which decreases their long-run satisfaction with their choices (e.g., Wilson et al. 1993). Also, recently Priester and Dholakia (2002) challenged the assumption that consumers make better decisions if they think more carefully about the options (see also Stapel et al. 1998). They show that consumers who think more are more susceptible to context effects on choice. We add to this growing body of research by demonstrating undesirable, immediate effects of pre-choice deliberation on how consumers feel about their decisions.

Finally, the consumer discomfort concept introduced here broadens what is known about negative experiences associated with consumer choices, complementing the extensive literature on consumer regret (e.g., Connolly, Ordóñez, and Coughlan 1997; Gilovich and Medvec 1995; Inman and Zeelenberg 2002; Tsiros and Mittal 2000). Unlike extant conceptualizations of regret, the effects we study arise independently of outcome information about the options after the choice (Zeelenberg et al. 1996) but are instead generated by the decision process itself (see also Garbarino and Edell 1997). Also, the typical regret experience induces a wish to reverse the choice, whereas for consumer discomfort this may not be the case. That is because the appeal of the non-chosen option, although enhanced, does not typically exceed that of the chosen option. Furthermore, an impulse to reverse the choice will be outweighed by a loss-averse reluctance to give up the chosen option that the decision maker already possesses.

Outlook and Conclusion

Future work should address several issues. One is to explore other drivers of post-choice discomfort such as the alternative explanations discussed above. Second, we have only studied choices between desirable options. What happens when consumers are faced with undesirable options (e.g., two painful medical treatments)? In such settings it is not obvious whether and how attachment would develop. Third, are some people (such as ourselves) more prone (as a trait) to post-choice discomfort than others? A fourth question is how the negative effects we investigate here change over time. What determines how quickly the discomfort weakens? How does the attractiveness of the non-chosen option change over time, or similarly, when does dissonance reduction kick in? Of practical interest is how long the increase in willingness to pay for the non-chosen option lasts. Fifth, we did not intend to present an exhaustive list of mechanisms that create or enhance option attachment. Which other factors exist? Finally, given seemingly conflicting evidence about the extent to which the endowment effect requires actual possession of the good in question (e.g., Kahneman et al. 1990; Sen and Johnson 1997), it will be interesting to explore boundary conditions of mental endowment effects.

In conclusion, in this article we shed light on an important and under-researched aspect of the psychology of choice. While common sense suggests that consumers who consider their options more closely make more satisfying decisions, we show that deliberating can have undesirable consequences. As consumers deliberate, they become attached to the choice options and experience discomfort once they forgo those options that they did not select. In turn, this discomfort increases the appeal of those forgone options. In short, we show that deliberation can make choosing feel like losing.

REFERENCES

- Amir, On (2002), "Information Aversion: Indecision, Procrastination, and Consumer Choice Online," working paper, MIT Sloan School of Management, Cambridge, MA 02142.
- Baron, Reuben M. and David A. Kenny (1986), "The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic, and Statistical Considerations," *Journal of Personality and Social Psychology*, 51 (December), 1173-1182.
- Becker, Gordon M., Morris H. DeGroot, and Jacob Marschak (1964), "Measuring Utility by a Single-Response Sequential Method," *Behavioral Science*, 9, 226-232.
- Brehm, Jack W. (1972), *Responses to Loss of Freedom: A Theory of Psychological Reactance*. Morristown, NJ: General Learning Press.
- Brendl, C. Miguel, E. Tory Higgins, and Kristi M. Lemm (1995), "Sensitivity to Varying Gains and Losses: The Role of Self-Discrepancies and Event Framing," *Journal of Personality and Social Psychology*, 69 (December), 1028-1051.
- Carmon, Ziv and Dan Ariely (2000), "Focusing on the Forgone: Why Value Can Appear so Different to Buyers and Sellers," *Journal of Consumer Research*, 27 (December), 360-370.
- Connolly, Terry, Lisa D. Ordóñez, and R. D. Coughlan (1997), "Regret and Responsibility in the Evaluation of Decision Outcomes," *Organizational Behavior and Human Decision Processes*, 70, 73-85.
- Dhar, Ravi and Klaus Wertenbroch (2000), "Consumer Choice between Hedonic and Utilitarian Goods," *Journal of Marketing Research*, 37 (February), 60-71.
- Elliot, Andrew J. and Patricia G. Devine (1994), "On the Motivational Nature of Cognitive Dissonance: Dissonance as Psychological Discomfort," *Journal of Personality and Social Psychology*, 67 (September), 382-394.

- Festinger, Leon (1957), *A Theory of Cognitive Dissonance*, Stanford, CA: Stanford Univ. Press.
- _____ (1964), *Conflict, Decision, and Dissonance*, Stanford, CA: Stanford Univ. Press.
- Garbarino, Ellen C. and Julie A. Edell (1997), "Cognitive Effort, Affect, and Choice," *Journal of Consumer Research*, 27 (September), 147-158.
- Gilovich, Thomas D. and Victoria H. Medvec (1995), "The Experience of Regret: What, When, and Why," *Psychological Review*, 102, 379-395.
- Harmon-Jones, Eddie and Judson Mills (1999), *Cognitive Dissonance: Progress on a Pivotal Theory in Social Psychology*, Washington, DC: American Psychological Association.
- Hoch, Stephen J. and George Loewenstein, (1991), "Time-Inconsistent Preferences and Consumer Self-Control," *Journal of Consumer Research*, 16 (March), 492-507.
- Inman, J. Jeffrey and Marcel Zeelenberg (2002), "Regret in Repeat Purchase versus Switching Decisions: The Attenuating Role of Decision Justifiability," *Journal of Consumer Research*, 29 (June), 116-128.
- Kahneman, Daniel, Jack Knetsch, and Richard H. Thaler (1990), "Experimental Tests of the Endowment Effect and the Coase Theorem," *Journal of Political Economy*, 98 (December), 1325-1348.
- Kahneman, Daniel and Amos Tversky (2000), *Choices, Values, and Frames*, New York: Russell Sage Foundation and Cambridge University Press.
- Lewin, Kurt (1938), *The Conceptual Representation and the Measurement of Psychological Forces*, Durham, NC: Duke University Press.
- Meloy, Margaret and J. Edward Russo (2002), "Growing Commitment to Developing Preferences," presentation, Behavioral Decision Research in Management conference, Chicago, IL.

- Petty, Richard E. and Duane T. Wegener (1993), "Flexible Correction Processes in Social Judgment – Correcting for Context-Induced Contrast," *Journal of Experimental Social Psychology*, 29 (March), 137-165.
- Priester, Joseph R. and Utpal Dholakia (2002), "The Role of Thought in Decision Biases and Bias (Over-) Correction," presentation, Association for Consumer Research conference, Atlanta, GA.
- Pham, Michel Tuan, Joel Cohen, John Pracejus, and David Hughes (2001), "Affect Monitoring and the Primacy of Feelings in Judgment," *Journal of Consumer Research*, 28 (September), 167-188.
- Russo, J. Edward, Margaret G. Meloy, and Victoria H. Medvec (1998), "Predecisional Distortion of Product Information," *Journal of Marketing Research*, 35 (November), 438-452.
- Sanna, Lawrence J. (1996), "Defensive Pessimism, Optimism, and Simulating Alternatives: Some Ups and Downs of Prefactual and Counterfactual Thinking," *Journal of Personality and Social Psychology*, 71 (November), 1020-1036.
- Schwarz, Norbert (2001), "Feelings as Information: Implications for Affective Influences on Information Processing" in *Theories of Mood and Cognition: A User's Guidebook*, eds. Leonard Martin and Gerald L. Clore, Mahwah, NJ: Lawrence Erlbaum Associates, 159-176.
- Sen, Sankar, and Eric J. Johnson (1997), "Mere-Possession Effects without Possession in Consumer Choice," *Journal of Consumer Research*, 24 (June), 105-117.
- Shiv, Baba and Alexander Fedorikhin (1999) "Heart and Mind in Conflict: Interplay of Affect and Cognition in Consumer Decision Making," *Journal of Consumer Research*, 26 (December), 278-282.
- Sobel, Michael E. (1982), "Asymptotic Intervals for Indirect Effects in Structural Equations Models," in *Sociological Methodology*, ed. S. Leinhardt, San Francisco: Jossey-Bass, 290-312.

- Stapel, Diederik A., Willem Koomen, and Marcel Zeelenberg (1998), "The Impact of Accuracy Motivation on Interpretation, Comparison and Correction Processes: Accuracy Motivation $\times$ Knowledge Accessibility Effects," *Journal of Personality and Social Psychology*, 74 (April), 878-893.
- Strahilevitz, Michal A. and George Loewenstein (1998), "The Effect of Ownership History on the Valuation of Objects," *Journal of Consumer Research*, 25 (December), 276-289.
- Tsiros, Michael and Vikas Mittal (2000), "Regret: A Model of Its Antecedents & Consequences in Consumer Decision Making," *Journal of Consumer Research*, 26 (March), 401-417.
- Tversky, Amos and Daniel Kahneman (1991), "Loss Aversion in Riskless Choice: A Reference-Dependent Model," *Quarterly Journal of Economics*, 107 (November), 1039-1061.
- Tversky, Amos, Shmuel Sattath, and Paul Slovic, (1988), "Contingent Weighting in Judgment and Choice," *Psychological Review*, 95 (July), 371-384.
- Wertenbroch, Klaus and Ziv Carmon (1995), "The Reference Dependence of Immediate Post-Decision Regret," presentation, Association for Consumer Research conference, Copenhagen, Denmark.
- Wertenbroch, Klaus and Bernd Skiera (2002), "Measuring Consumer Willingness to Pay at the Point of Purchase," *Journal of Marketing Research*, 39 (May), 228-241.
- Wilson, Timothy D., Douglas J. Lisle, Jonathan W. Schooler, Sara D. Hodges, Kristen J. Klaaren, and Suzanne J. LaFleur (1993), "Introspecting About Reasons Can Reduce Post-Choice Satisfaction," *Personality and Social Psychology Bulletin*, 19 (June), 331-339.
- Zeelenberg, Marcel, Jane Beattie, Joop van der Pligt, and Nanne K. de Vries (1996), "Consequences of Regret Aversion: Effects of Expected Feedback on Risky Decision Making," *Organizational Behavior and Human Decision Processes*, 65 (February), 148-158.

TABLE 1. MEAN DIFFERENCE SCORES IN STUDY 1.

Manipulation	Scenario	How does X feel about not having chosen [the non-chosen option]?			Is the non-chosen option more or less attractive (post- vs. pre-choice)?		
		Mean	<i>t</i>	<i>p</i> <	Mean	<i>t</i>	<i>p</i> <
Proximity (Within)	Desserts (n = 33)	2.27	4.9	.0001	1.26	2.7	.05
	Bar (n = 20)	2.26	3.2	.001	2.50	3.1	.01
Proximity (Between)	Desserts (n = 58)	2.29	4.3	.0001	2.00	3.2	.01
	Bar (n = 56)	2.07	3.5	.001	3.04	6.5	.0001
Deliberation	Vacation (n = 27)	2.78	10.1	.0001	1.96	4.1	.001
	Movie Stars (n = 47)	2.62	9.3	.0001	1.38	3.5	.001
Forfeiture vs. Acquisition	Vacation Packages (n = 56)	4.68	12.8	.0001	1.79	5.1	.0001
	Rental Cars (n = 57)	3.02	9.1	.0001	0.08	2.2	.05
Hedonic vs. Utilitarian	CDs (n = 57)	1.21	3.2	.01	0.58	1.8	.08
	Jackets (n = 58)	1.86	4.7	.0001	1.48	3.8	.001
Past Ownership	Beatles (n = 18)	2.61	4.0	.001	2.22	4.8	.0001
	Prints (n = 23)	1.78	2.6	.05	1.35	2.2	.05

Note. Means are coded such that bigger numbers imply greater discomfort and attractiveness changes for the target.

TABLE 2.

RESULTS OF MEDIATION ANALYSES: REGRESSION PARAMETER ESTIMATES [a : DISCOMFORT = F(TARGET), b : ATTRACTIVENESS = F(TARGET, DISCOMFORT), c : ATTRACTIVENESS = F(TARGET)] AND SOBEL (1982) TEST

	Parameter Estimates				Sobel Test Statistic
	c_{target}	a_{target}	b_{target}	$b_{\text{discomfort}}$	$ab / (b^2 s_a^2 + a^2 s_b^2 + s_a^2 s_b^2)^{1/2}$
Experiment 1.1: Proximity	1.25***	1.13**	.73*	.47***	2.28*
Experiment 1.2: Deliberation	.75***	1.27*****	.36	.30**	2.32*
Experiment 1.3: Forfeiture	.39*	1.51*****	.01	.26***	3.04**
Experiment 1.4: Hedonicity	.74*****	.93*****	.44*	.32*****	3.22**
Experiment 1.5: Prior ownership	.67*	1.11*****	-.03	.64***	2.82**
Experiment 2.1: Substitutability	2.18*****	1.73*****	1.14**	.30*****	3.89*****
Experiment 2.2: Two out of three	.84***	1.32*****	.09	.30*****	4.70*****

* $p < .05$, ** $p < .01$, *** $p < .001$, ***** $p < .0001$

TABLE 3.
MEAN DIFFERENCE SCORES IN STUDY 2.

Manipulation	Scenario	How does X feel about not having chosen [the non-chosen option]?			Is the non-chosen option more or less attractive (post- vs. pre-choice)?		
		Mean	<i>t</i>	<i>p</i> <	Mean	<i>t</i>	<i>p</i> <
Substitutability	Beatles (n = 85)	3.68	9.8	.0001	4.96	7.8	.0001
	Scotch (n = 84)	4.31	14.5	.0001	5.01	7.9	.0001
Choose 1 out of 3 ^a	Beatles (n = 48)	2.56	7.9	.0001	2.69	4.2	.0001
					2.57	4.3	.0001
	Bar (n = 57)	2.70	9.2	.0001	0.75	1.7	.09
					0.95	2.2	.05

Note. Means are coded such that bigger numbers imply greater discomfort and attractiveness changes for the target.

^a In the Choose 1 out of 3 study, there are 2 non-chosen alternatives.

FIGURE 1

LEAST-SQUARES MEAN ATTRACTIVENESS RATINGS OF LESS APPEALING
COUPONS IN STUDY 3.

FIGURE 2

LEAST-SQUARES MEAN WILLINGNESS TO PAY (UPPER PANEL) AND
ATTRACTIVENESS RATINGS (LOWER PANEL) OF LESS APPEALING MUSIC CDs IN
STUDY 4.

FIGURE 1

LEAST-SQUARES MEAN ATTRACTIVENESS RATINGS OF LESS APPEALING COUPONS IN STUDY 3.

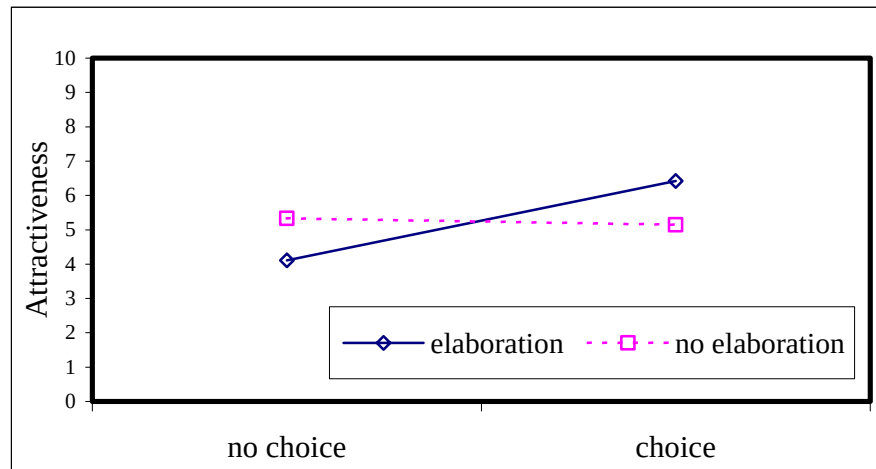


FIGURE 2

LEAST-SQUARES MEAN WILLINGNESS TO PAY (UPPER PANEL) AND ATTRACTIVENESS RATINGS (LOWER PANEL) OF LESS APPEALING MUSIC CDs IN STUDY 4.

