Research Article

MISREMEMBRANCE OF OPTIONS PAST: Source Monitoring and Choice

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Abstract—*This study reveals that when remembering past decisions, people engage in choice-supportive memory distortion. When asked to make memory attributions of options' features, participants made source-monitoring errors that supported their decisions. They tended to attribute, both correctly and incorrectly, more positive features to the option they had selected than to its competitor. In addition, they sometimes attributed, both correctly and incorrectly, more negative features to the nonselected option. This pattern of distortion may be beneficial to people's general well-being, reducing regret for options not taken. At the same time, it is problematic for memory accuracy, for accountability, and for learning from past experience.*

People's conception of who they are is shaped by the memories of the choices they make: the college favored over the one renounced, the job chosen over the one rejected, the candidate elected instead of another one not selected. Memories of chosen as well as forgone alternatives can affect one's sense of well-being. Regret for options not taken can cast a shadow, whereas satisfaction at having made the right choice can make a good outcome seem even better. Memories of past options also have implications for other people and for collective decisions. For example, a person may rely on memories of past car purchases when advising a friend about buying a car. Similarly, members of search committees need to recall candidates encountered and evaluated in the recent past when making a joint decision.

How likely are people to remember their options accurately? One possibility is that making a choice will lead people to remember some types of information better than others. There are a number of possible patterns of selective memory. For example, making a decision may lead to better recall of supporting than nonsupporting information—with positive features of the chosen option and negative features of nonchosen options being the most memorable. Alternatively, after making a choice, people may experience regret and focus their attention on the positive features of the foregone options, or on the negative features of their chosen option. In this case, positive attributes of rejected options and negative attributes of selected options should prove particularly easy to remember. Finally, the process of making and later reviewing a choice may lead people to focus more on the option selected than on its alternatives, and may result in better recall of both the positive and the negative features of the selected option.

Memory biases following a choice may go beyond selective memory. When a decision maker is remembering a previous choice—say, between two job candidates—simply remembering a particular fact, such as that one of the candidates had a master's degree, is not very informative. It is important to remember which of the two had the degree. Especially when this is hard to do (e.g., when there is not enough other information associated with the memory to indicate which candidate had the degree), people may implicitly or explicitly rely on the knowledge that they chose one of the candidates and not the other to attribute the uncertain information. Attributing information in a choice-consistent fashion may lead to distorted memories—rather than merely selectively accurate memories.

In general, memory source monitoring can be affected by a person's schematic knowledge about the source (Johnson, Hashtroudi, & Lindsay, 1993). For example, people are likely to misattribute the statement "I'm pro-choice" to the speaker they know is a Democrat, even though they heard the Republican say it (Mather, Johnson, & De Leonardis, 1999; see also Mather, Henkel, & Johnson, 1997; Sherman & Bessenoff, 1999). Knowing that one has selected one option as opposed to another also constitutes information that could be used to make memory source attributions. Our hypothesis is that choice-supportive source-monitoring biases can systematically distort remembered choices, reducing the discrepancy between the decision made and features of the chosen and foregone options that do not support that decision. Specifically, people should be more likely to misattribute positive items to the option they chose than to the option they rejected and more likely to misattribute negative items to the option they rejected than to the chosen option.

Previous studies provide evidence that making a decision can lead to selective memory for information supporting that decision. For example, having made a decision about whether or not to hospitalize a hypothetical patient, participants recalled more decision-supportive information than decision-nonsupportive information (Dellarosa & Bourne, 1984). In another study (Davidson & Kiesler, 1964), participants chose between two job candidates. For each of eight different qualities, such as leadership and experience, one candidate was superior whereas the other candidate was average. Participants later recalled more qualities for which their chosen candidate had been superior (they were not asked to attribute the qualities to the candidates). People's overconfidence in evaluating the correctness of their responses to general-knowledge questions may be another example of selective recall of information. This overconfidence can be reduced by asking participants to generate arguments against their chosen responses (Koriat, Lichtenstein, & Fischhoff, 1980). As with recall, people sometimes also show selective recognition for decision-supportive information. In a study by Greene (1981), participants heard an unsolved detective story in which either of the two characters could be the criminal and were asked to decide which one was guilty. Participants later recalled and recognized more clues suggesting the character they had selected was guilty than clues suggesting the other character's guilt.

The aforementioned studies, however, do not shed light on a critical aspect of remembering choices: Correctly remembering that a particular feature was involved in a decision does not guarantee accurate memory for which option that feature was associated with. Even if people have completely accurate memory for the content of the options' features, they may nevertheless be biased when attributing these features to options. Conversely, selective memory for choice-supportive features may exist without any confusion about the

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source of features. In the present study, we used various scenarios to investigate whether people show choice-supportive source monitoring after making choices. Each scenario had two options (e.g., two job candidates) that each had some positive and some negative attributes.[1] After choosing their preferred option, participants were given filler tasks, which were followed by a source-identification memory test for the attributes of the two options. We also included a condition in which participants were asked to reject, rather than choose, one of the options, to see if choice-supportive source monitoring would appear in this task as well.

METHOD

We used four different scenarios involving choices between job candidates, blind dates, and roommates.

Job-Candidate Choice

Participants

Participants for this scenario were 142 Princeton students recruited at the beginning of registration for semester courses.

Materials and procedure

Participants were given a choice between two job candidates. Each job candidate had 4 positive (e.g., "quite intelligent") and 4 negative (e.g., "easily discouraged") features. These features were presented in one of two (roughly equally frequent) random orders. The memory test (administered following a 5-min filler questionnaire) consisted of the 16 old features randomly intermixed with 4 new ones. Participants were asked to indicate whether each feature had belonged to the first job candidate ("Marisa, a junior"), had belonged to the second job candidate ("Luke, a sophomore"), or was new.[2]

Blind-Date Choice

Participants

Seventy-five Princeton undergraduates completed the dating questionnaire as part of a larger questionnaire booklet.

Materials and procedure

Participants were asked to choose between two hypothetical blind dates. Each was described by a list of features, some negative (e.g., "awkward in social situations such as parties") and some positive (e.g., "always interesting to talk to"). None of the features mentioned the gender of the potential blind date. After about 45 min spent on unrelated questionnaires, participants were presented with a memory test for the features. This test consisted of a randomly ordered list of some features belonging to the options (2 positive and 3 negative features from each option) and of 6 positive and 10 negative new features that had not been associated with either option. Participants were instructed not to refer back to earlier pages of the questionnaire booklet. They were to indicate whether each feature belonged to the first option ("the self-employed person"), belonged to the second option ("the person who worked at a newspaper"), or was new (i.e., was not part of either description).

Roommate (I) Choice

Participants

Seventy-seven University of North Carolina-Chapel Hill undergraduates filled out this questionnaire during experimental sessions.

Materials and procedure

Participants were given a choice between two hypothetical roommates (see Table 1). Each roommate had 5 negative features (e.g., "leaves dirty laundry piled around the room") and 5 positive features (e.g., "good at resolving conflicts"). The features did not reveal the gender of the roommate (when necessary, we used "he/she," "his/her," etc.). These features were presented in one of two random orders for each participant. After about 45 min of unrelated tasks, participants filled out the roommate memory test, which consisted of the 20 features that had been associated with the roommates randomly intermixed with 3 positive and 3 negative new features. Participants were asked to indicate whether each feature had belonged to the first roommate (identified as someone who was from England and planned to become an engineer), had belonged to the second roommate (identified as someone who was from California and who would like to become a journalist), or was new.

Roommate (II) Choice

Participants

Participants were Princeton students recruited at course registration. One hundred seventy-two filled out the choice version, and 207 filled out the rejection version of the questionnaire.

Materials and procedure

The options were the same as those used for the roommate I questionnaire. One group of participants was asked to choose (by circling) one of the two roommates, whereas a second group was asked to reject (by crossing out) one of the two roommates. The features were listed in one of two (roughly equally frequent) random orders. The memory test (administered following a 5-min filler questionnaire) was the same as that used in the roommate I scenario.

RESULTS AND DISCUSSION

Choice-Supportive Source Monitoring

Overview of analysis

For each choice problem, we called one option A and the other B. To obtain summary measures of choice-supportive memory attributions, we did the following. First, we calculated how much each

1. Each attribute was pretested, and, on average, 21 out of the 22 raters agreed on whether the attribute would be positive or negative in its specific decision context. Minimum agreement per item was 16 out of 22 raters.

2. In this and the following questionnaires, some participants made additional ratings of the options. Participants who made ratings had the same pattern of memory results as those who did not. We do not discuss these ratings further.

Table 1. *Roommate decision scenario and test items*

Decision scenario

Imagine that you need to choose a roommate for the coming year. You know two students who are also looking for roommates. Based on the descriptions below, which one of the following would you choose to room with? Please circle your preferred choice. Even if neither person fits exactly the description of someone you would want to live with, please indicate the one you would prefer.

From England	From California
plans to become an engineer	would like to become a journalist
likes to hang out and talk	leaves dirty laundry piled around the room
someone you would like to get to know better	has poor table manners
sometimes brags about parents' wealth	likes to include friends in his/her activities
rarely in a bad mood	has many interests
quiet and considerate when others are studying	often mentions that he/she was valedictorian in high school
often gets so drunk at parties, he/she passes out	happy to share his/her music CD's
somewhat competitive with friends	has a car he/she is happy to lend to others
has a girlfriend/boyfriend who would often be in your room	often has long phone conversations
gets very depressed when he/she gets a less than perfect grade	easily annoyed
good at resolving conflicts	would never use your things without permission

Additional new items on the memory test[a]

interesting to talk to
always happy to help out friends with homework
easy to get along with
snores at night
was suspected by high school classmates of cheating
mean to people he/she doesn't like

[a]The memory test included the items from the original scenario intermixed with these additional new items.

participant favored option A by subtracting a measure of the attributed features favoring option B from a measure of those favoring option A:

> (proportion of positive features attributed to option A + proportion of negative features attributed to option B) − (proportion of negative features attributed to option A + proportion of positive features attributed to option B)

We converted the resulting sums to *z* scores (separately for each of the four scenarios) so that for each scenario the mean value across participants was zero. A positive score thus indicated that a participant's attributions favored option A relative to the mean (which equaled zero), whereas a negative value indicated they favored option B. Next, for participants who chose option B, we multiplied their *z* score by −1. (For participants asked to reject an option, we assumed that the nonrejected option was the chosen option.) The resulting value provided an "asymmetry" score. A positive score indicated that a participant's memory attributions were choice-supportive (i.e., were particularly favorable toward the chosen as opposed to the rejected option), whereas a negative score indicated they were relatively less favorable toward that option than were other participants' attributions. Note that if participants' decisions do not help predict memory attributions, then the expected value of the average asymmetry score is zero.[3]

Overall asymmetry scores

For each choice scenario, the overall asymmetry score was significantly greater than zero. As shown in Table 2 (top left-most entry for each scenario), participants' average overall asymmetry scores were as follows: job-candidate scenario, $M = .22$, $t(141) = 2.73$, $p < .01$; dating scenario, $M = .22$, $t(74) = 1.99$, $p < .05$; roommate I scenario, $M = .35$, $t(76) = 3.26$, $p < .01$; and roommate II choice scenario, $M = .44$, $t(171) = 5.76$, $p < .001$. In addition, participants given the roommate II rejection scenario favored the roommate they did not reject, $M = .28$, $t(206) = 4.56$, $p < .001$.[4] Overall, the positive scores indicate that participants' memory attributions systematically favored the option they had selected.

Asymmetry scores for correct and incorrect attributions

We next investigated the occurrence of memory-attribution asymmetry across different types of attributions. We calculated the asym-

3. The numbers of participants choosing option A versus option B were as follows: job-candidate scenario—39, 103; dating scenario—21, 54; roommate I scenario—43, 34; roommate II choice scenario—88, 84; and roommate II rejection scenario—121, 86. Note that the asymmetry measure avoids spurious effects due to unequal *N*s choosing the two options (e.g., if most people choose A and most also favor A, but the two tendencies are not correlated, we would not find a significant choice-supportive asymmetry). For this measure, unequal *N*s reduce the likelihood of revealing a choice-supportive bias. For example, in the most extreme case, if everyone in a particular sample chose the same option, the mean asymmetry score would be zero.

4. Interestingly, participants who chose a roommate were more biased in favor of their selection than those who rejected a roommate, but this difference failed to reach significance, $t(377) = 1.70$, $p < .1$.

Table 2. *Choice-supportive asymmetry scores for each decision scenario*

Attribution type	Item type		
	All items	Positive items	Negative items
Job-candidate scenario			
All attribution types	.22 (.08)**	.26 (.08)**	.07 (.08)
Correct attributions	.18 (.08)*	.23 (.08)**	.01 (.08)
Misattributions—old items	.19 (.08)*	.21 (.08)*	.04 (.08)
Misattributions—new items	.17 (.08)*	.11 (.08)	.13 (.08)
Dating scenario			
All attribution types	.22 (.11)*	.38 (.11)**	−.19 (.11)
Correct attributions	.35 (.11)**	.48 (.10)***	−.09 (.12)
Misattributions—old items	.26 (.11)*	.35 (.11)**	−.10 (.12)
Misattributions—new items	−.05 (.11)	.07 (.12)	−.21 (.11)
Roommate I scenario			
All attribution types	.35 (.11)**	.45 (.10)***	.12 (.11)
Correct attributions	.28 (.11)*	.43 (.10)***	−.03 (.12)
Misattributions—old items	.35 (.11)**	.38 (.10)**	.19 (.11)
Misattributions—new items	.21 (.11)	.19 (.11)	.16 (.11)
Roommate II choice scenario			
All attribution types	.44 (.08)***	.48 (.08)***	.20 (.08)*
Correct attributions	.39 (.08)***	.37 (.08)***	.17 (.08)*
Misattributions—old items	.33 (.08)***	.32 (.08)***	.19 (.08)*
Misattributions—new items	.38 (.07)***	.41 (.07)***	.05 (.08)
Roommate II rejection scenario			
All attribution types	.28 (.06)***	.30 (.06)***	.13 (.06)*
Correct attributions	.28 (.06)***	.25 (.06)***	.15 (.07)*
Misattributions—old items	.18 (.06)**	.20 (.06)**	.07 (.07)
Misattributions—new items	.21 (.07)**	.23 (.07)**	.03 (.06)

Note. Standard errors are in parentheses. The "all attribution types" cells of the table are not averages of their respective rows and columns. Instead, *z* scores were calculated separately to obtain each asymmetry score. Asterisks indicate asymmetry scores significantly different from zero.
*$p < .05$. **$p < .01$. ***$p < .001$.

metry scores separately for correctly attributed old features (e.g., features from option A attributed to option A), incorrectly attributed old features (e.g., features from option A attributed to option B), and incorrectly attributed new features (i.e., features that formed part of neither option, but were attributed to one of the options). As shown in the left-hand column of Table 2, participants exhibited significant choice-supportive asymmetry for each type of attribution across almost all the decision scenarios (the only nonsignificant asymmetry scores were for new features in the dating and roommate I scenarios). The fact that the pattern was observed among misattributions of both old and new items as well as among correct attributions suggests that at least part of the choice-supportive asymmetry in attribution arises during source monitoring, not during choice (because the new items had not been previously encountered).

Asymmetry scores for positive and negative items

To see whether there were systematic differences due to valence, we calculated asymmetry scores separately for positive and for negative features. For both positive and negative features, a positive score indicated the chosen option was favored (with more positive features or fewer negative features attributed to it than to its competitor, respectively).

Participants were more likely to show choice-supportive asymmetry in the attribution of positive than negative features for each of the decision scenarios (see Table 2). Participants who chose between job candidates showed asymmetry scores of .26 and .07 for positive and negative features, respectively, $t(141) = 1.87$, $p < .07$; respondents who filled out the dating questionnaire had overall choice-supportive asymmetry scores of .38 among positive features and −.19 among negative features, $t(74) = 3.93$, $p < .001$; and for the roommate I scenario, participants had scores of .45 and .12 for positive and negative features, respectively, $t(76) = 2.96$, $p < .01$. In addition, a 2 (decision frame: choice, rejection) × 2 (item type: positive, negative) analysis of variance (ANOVA) revealed a main effect of item type for the roommate II scenario, $F(1, 377) = 15.76$, $MSE = 9.80$, $p < .001$; participants showed greater choice-supportive asymmetry for positive items ($M = .39$) than for negative items ($M = .16$). There were no effects of decision frame: Both participants asked to choose an option

and those asked to reject an option exhibited a more extreme choice-supportive asymmetry for positive than for negative items.

Differential Old/New Recognition and Source Identification for Positive and Negative Items

Each participant's corrected recognition score was the proportion of old features attributed to either option minus the proportion of new features attributed to either option. Participants had higher corrected recognition for negative than for positive features in each decision scenario (see Table 3). Corrected recognition scores for positive and for negative features, respectively, were as follows: job-candidate scenario, $M = .64$, $M = .79$, $t(141) = 4.98$, $p < .001$; dating scenario, $M = .41$, $M = .52$, $t(74) = 2.72$, $p < .01$; roommate I scenario, $M = .41$, $M = .71$, $t(76) = 8.55$, $p < .001$; roommate II choice scenario, $M = .26$, $M = .72$, $t(171) = 15.84$, $p < .001$; and roommate II rejection scenario, $M = .32$, $M = .81$, $t(206) = 19.77$, $p < .001$.

Each participant's source-identification score was the proportion of correctly recognized features attributed to the correct option. As shown in Table 3, source-identification scores were higher for negative than for positive features. Source-identification scores for positive and negative features, respectively, were as follows: job-candidate scenario, $M = .82$, $M = .95$, $t(140) = 9.65$, $p < .001$; dating scenario, $M = .74$, $M = .90$, $t(74) = 5.45$, $p < .001$; roommate I scenario, $M = .80$, $M = .84$, $t(76) = 1.79$, $p < .08$; roommate II choice scenario, $M = .82$, $M = .87$, $t(170) = 3.83$, $p < .001$; roommate II rejection scenario, $M = .87$, $M = .89$, $t(206) = 2.15$, $p < .05$.

The greater memorability (for both recognition and source identification) of negative features in our decision scenarios is consistent with people's general tendency to weight negative information more heavily than positive information in impression formation (e.g., Kanouse & Hanson, 1972) and in decision making (e.g., Tversky & Kahneman, 1991).

Choice-Supportive Selective Recognition

We were also interested in whether, in addition to the choice-supportive source monitoring already demonstrated, participants exhibited choice-supportive recognition. That is, were items supporting their decision (positive features of the selected option and negative features of its competitor) more likely than nonsupporting items to be correctly recognized as old (regardless of which option they were attributed to)?

First, to see if participants' choices affected how well they recognized positive features from each option, we conducted 2 (decision: A, B) × 2 (item source: A, B) ANOVAs on the hits for positive features (the old items correctly recognized as old, regardless of source attribution) for the job-candidate, dating, and roommate I data (see the top half of Table 4). There was a significant interaction of decision and item source for the dating scenario, $F(1, 73) = 6.65$, $MSE = .06$, $p < .05$, indicating that participants were more likely to remember positive features of their chosen option than of the other option. This interaction did not attain significance for the job-candidate or roommate I scenarios. For the roommate II choice and rejection scenarios, we conducted the same ANOVA with the additional factor of decision frame. There was a significant interaction of decision and item source, $F(1, 375) = 10.51$, $MSE = .03$, $p < .01$. Like the dating-scenario participants, roommate II participants remembered more positive features from their chosen option than from its alternative. The decision-frame factor did not interact with any other factors. As can be seen from the means, participants had selective recognition for the positive features of their preferred option in both the choice and the rejection conditions.

We repeated the previous analyses with negative features (see the bottom half of Table 4) and did not find a significant interaction of decision and item source for any of the decision scenarios. Thus, which option participants selected affected which positive items but not which negative items they recognized as old.

Table 3. *Average corrected recognition and correct source attribution*

	Corrected recognition[a]		Correct source attributions[b]	
Scenario	Positive items	Negative items	Positive items	Negative items
Job candidate	.64 (.02)	.79 (.03)	.82 (.01)	.95 (.01)
Dating	.41 (.33)	.52 (.03)	.74 (.03)	.90 (.02)
Roommate I	.41 (.04)	.71 (.03)	.80 (.02)	.84 (.02)
Roommate II				
Choice	.26 (.03)	.72 (.03)	.82 (.01)	.87 (.01)
Rejection	.32 (.02)	.81 (.02)	.87 (.01)	.89 (.01)

Note. Standard errors are in parentheses.
[a]Calculated as the proportion of old items correctly recognized minus the proportion of new items falsely identified as old.
[b]Calculated as a proportion of correctly recognized items.

Summary

Participants exhibited choice-supportive source monitoring (especially for positive features), resulting in memories that were distorted in favor of the option they had selected (or had not rejected). That is, participants were more likely to attribute positive features to the chosen than to the nonchosen option and were sometimes more likely to attribute negative features to the nonchosen than to the chosen option. This asymmetry was observed for both correctly and incorrectly attributed old features, and sometimes for falsely recognized new features as well.

In addition to exhibiting choice-supportive source monitoring, for some of the scenarios, participants had choice-supportive selective recognition for positive features. They were more likely to correctly recognize positive items associated with the item they chose than positive items associated with the foregone option. They did not exhibit selective recognition for negative features.

We also found a number of differences in memory for positive and negative features. Participants correctly recognized and attributed negative features more often than positive features. They were less likely to show choice-supportive source monitoring or choice-supportive selective memory for negative features than for positive features. This suggests that differences in the way positive and negative information is weighted during decision making has implications for memory.

Table 4. *Average hits (proportion of old items correctly identified as old) and false alarms (proportion of new items incorrectly identified as old)*

	Hits to old items				
	Chose A		Chose B		
Scenario	Source was A	Source was B	Source was A	Source was B	False alarms
			Positive items		
Job candidate	.83 (.03)	.79 (.03)	.82 (.02)	.85 (.02)	.23 (.03)
Dating	.83 (.06)	.65 (.07)	.74 (.04)	.80 (.04)	.35 (.03)
Roommate I	.87 (.03)	.89 (.02)	.84 (.03)	.91 (.03)	.46 (.04)
Roommate II					
Choice	.87 (.02)	.78 (.02)	.79 (.02)	.80 (.03)	.54 (.03)
Rejection	.85 (.02)	.79 (.02)	.80 (.02)	.81 (.03)	.49 (.02)
			Negative items		
Job candidate	.90 (.03)	.91 (.03)	.93 (.02)	.94 (.02)	.12 (.02)
Dating	.90 (.05)	.83 (.05)	.88 (.03)	.84 (.03)	.33 (.02)
Roommate I	.94 (.02)	.87 (.03)	.89 (.03)	.92 (.03)	.19 (.02)
Roommate II					
Choice	.88 (.02)	.90 (.02)	.85 (.02)	.86 (.02)	.15 (.02)
Rejection	.91 (.02)	.92 (.02)	.89 (.02)	.84 (.02)	.09 (.02)

Note. Standard errors are in parentheses.

GENERAL DISCUSSION

Memory about choices can be important. Choices made in the past form part of one's personal narrative; they underlie feelings of responsibility, accountability, elation, and regret; they trigger the counterfactuals one naturally entertains as life unfolds; and they can contribute to learning from previous experience. Numerous studies motivated by the cognitive dissonance framework have shown that after making a choice, people's attitudes shift in favor of their chosen option (e.g., Brehm, 1956). The present study indicates that attitudes are not the only thing affected—memory for the options can itself become distorted. Indeed, it is possible that memory distortion is part of the process of postchoice attitude change.

The present study shows a general tendency for memory errors to favor one's chosen option, by misattributing positive qualities to the chosen option and negative qualities to the foregone alternative. Furthermore, recognition of the relevant qualities is itself biased in favor of the chosen option. It is highly unlikely in the context of this anonymous study that subjects consciously distorted their recognition and their attributions (because of hypotheses about the experiment or in order to make their chosen options look better). Rather, source errors tend to occur as people use information (including knowledge of the choice they made) that is activated during remembering to make attributions about features whose source is uncertain (Johnson et al., 1993).

Biased processing may occur both at encoding and during retrieval and evaluation of memories. Thus, increased attention to supporting as opposed to nonsupporting evidence at encoding may have contributed to the higher recognition we found for choice-supporting old items. Attentional differences at encoding, however, cannot alone explain the choice-supportive misattributions. For example, the asymmetric source attribution of new items suggests that at least part of the choice-supportive memory distortion occurs at the time of source attribution.

Studies of self-perception have shown that people construct or infer their attitudes partly on the basis of external cues, including their own previous behavior (e.g., Bastardi & Shafir, 1998; Bem, 1965). In addition, people use their current knowledge about themselves along with implicit theories of stability or change to help reconstruct their personal histories (Ross, 1989, 1997). We suggest that in a similar fashion, people use their knowledge of which option they chose along with implicit theories of choice to help them attribute features to a source. Presumably, the option selected was more attractive than the option not selected. All else being equal, it is thus more likely that a desirable feature belonged to the preferred rather than the discarded alternative and that an unattractive feature belonged to the foregone rather than to the chosen option.

In this vein, it appears that when other source-specifying qualities are unavailable, people's memory attributions rely more heavily on schematic knowledge of the potential sources (e.g., the fact that one person was a writer and another an athlete) than when other source-specifying information is available. In a recent study (Mather et al., 1999), older and younger participants watched a videotape of two women speaking. Those participants who focused on themselves rather than on the speakers during encoding relied more on stereotypes when later remembering the statements. Thus, they were more likely to misattribute to the athlete athletic statements made by the writer. In addition, older adults—who tend to have relative difficulty making source attributions (compared with their recognition ability; e.g., Henkel, Johnson, & De Leonardis, 1998; McIntyre & Craik, 1987)—relied more than younger adults on stereotypes of the speakers when attributing statements. In a similar fashion, choice-supportive source monitoring is expected to occur most often when people have relatively poor source-specifying memorial information

or poor access to such information—but can make inferential attributions based on past choices.

The fact that we found choice-supportive asymmetries for hypothetical choices suggests that the cognitive heuristics generating these asymmetries do not require powerful emotional or motivational factors to operate. Emotional and motivational factors, however, could certainly amplify choice-supportive biases in memory. After making an emotionally engaging choice, people may be especially likely to spend time mentally reviewing the good things about the option they chose or the bad things that they successfully avoided in the foregone option. In line with motivated reasoning (e.g., Kunda, 1990), the desire to believe that one has made the right choice should exacerbate choice-supportive memory biases. This effect, moreover, may figure even more prominently in real choices. However, for important real-life decisions, choice-supportive biases may be counteracted by richer memory representations for which misattributions are less likely.

The choice-supportive pattern we have found may belong to a collection of positive illusions that seem to promote well-being (e.g., Taylor & Brown, 1988). Furthermore, it is possible that factors that influence a person's tendency to exhibit optimistic illusions (such as overly positive self-evaluations) may also influence choice-supportive memory. For example, depressed individuals (who typically have fewer positive illusions about themselves) may be less likely to engage in choice-supportive remembering than happy individuals. In fact, recent findings that happy and unhappy individuals exhibit different patterns of postchoice attitude change (Lyubomirsky & Ross, 1999) suggest the possibility that there may be similar individual differences in postchoice memory distortion. In general, choice-supportive source monitoring is likely to influence people's memories of various choices made throughout life. On the one hand, these memory distortions can serve to reduce postdecisional regret. On the other hand, they may make it harder for people to learn from their mistakes, and may lead them to have a false sense of confidence and satisfaction that they have made the right choices.

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