The Cognitive Impact of Past Behavior: Influences on Beliefs, Attitudes, and Future Behavioral Decisions

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To study the processes by which past behavior influences future behavior, participants were led to believe that without being aware of it, they had expressed either support for or opposition to the institution of comprehensive exams. Judgment and response time data suggested that participants' perceptions of their past behavior often influenced their decisions to repeat the behavior. This influence was partly the result of cognitive activity that influenced participants' cognitions about specific behavioral consequences and the attitude they based on these cognitions. More generally, however, feedback about past behavior had a direct effect on participants' attitudes and ultimate behavioral decisions that was independent of the outcome-specific cognitions. Results are discussed in terms of their implications for biased scanning of memory, dissonance reduction, self-perception, and the use of behavior as a heuristic.

People who have behaved in a certain way at one point in time are likely to do so again (Bentler & Speckart, 1981; Budd, North, & Spencer, 1984; Mittal, 1988; Ouellette & Wood, 1998). There are, of course, many exceptions to this general rule. For example, a behavior is unlikely to be repeated if the consequences of performing it the first time were disastrous (Skinner, 1953). Moreover, situational factors that did not exist when the behavior was first performed may prevent its recurrence (Liska, 1984). Still, all things being equal, people's past actions are often a good predictor of their future behavior (Bentler & Speckart, 1981; Ouellette & Wood, 1998).

Why is this so? In many instances, the consistency of a person's behavior over time is the result of personality and motivational factors that are common to the situations in which the behavior occurs (Eagly & Chaiken, 1993). For example, it might reflect the influence of a priori beliefs about the consequences of the behavior that are independently activated each time the behavior is contemplated. Alternatively, a causal influence of one behavior on another can also occur. Sometimes, for example, people who have performed a certain behavior might later think about its possible consequences, and these postbehavior cognitions could guide their future actions. In other instances, people might use their past behavior as a heuristic basis for their later decisions (Taylor, 1975). For example, they might simply assume that the conditions that led to their earlier behavior exist in the present situation as well and might repeat the behavior without bothering to verify this assumption.

These alternative possibilities seem intuitively obvious. Nevertheless, the processes that mediate the impact of past behavior on future behavioral decisions have rarely, if ever, been established empirically. The lack of evidence reflects the difficulty of separating the effects of a person's past behavior per se from the effects of situational and motivational factors that accompany the decision to engage in it; therefore, past behavior and situational and motivational factors might independently influence both this decision and future ones (Eagly & Chaiken, 1993). To avoid this ambiguity, one must be able to manipulate persons' past behavior (or, at least, their perception that they performed it) independently of any prebehavior cognitive activity that could potentially influence their decision to engage in it. In the present research, we devised a procedure that accomplished this objective. Specifically, we induced participants to believe that, outside of awareness, they had either supported or opposed the institution of comprehensive examinations at their university. This manipulation permitted us to examine the causal influence of participants' past behavior on both

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their later behavior decisions and the cognitive processes that were likely to mediate these decisions. Four experiments bearing on these processes were conducted. Before describing the experiments, however, we will summarize the issues at stake in the research.

Cognitive Mediators of Behavior Consistency

Several different conceptualizations of attitude and belief change have implications for the phenomena we investigated. Two conceptualizations assume that the influence of one's past behavior on future decisions is mediated by effortful attempts to confirm the legitimacy of the behavior once one becomes aware of its occurrence. Two other theories suggest that this influence can occur with very little thought about the behavior in question and the consequences of engaging in it. We discuss these alternative possibilities in turn.

Biased Scanning

Janis and King (1954) postulated that after people have engaged in a particular behavior they often conduct a biased search of memory for previously acquired knowledge that confirms the legitimacy of their act. For example, they may identify reasons why desirable consequences of the behavior are likely to occur (and reasons why these consequences are, in fact, desirable). They may then combine their estimates of the likelihood and desirability of these consequences to form a new attitude toward the behavior (Fishbein & Ajzen, 1975), and this attitude, in turn, might influence both their intentions to repeat the behavior and their actual decision to do so when the occasion arises.

Dissonance Reduction

Cognitive dissonance theory (Festinger, 1957; Festinger & Carlsmith, 1959; Wicklund & Brehm, 1976) assumes that when people become aware that they have voluntarily performed a behavior that contradicts the implications of a previously formed attitude, they experience discomfort (dissonance). Therefore, they attempt to rationalize their counterattitudinal behavior by convincing themselves that they had good reasons for engaging in it. This rationalization is likely to produce a change in their estimates of both the likelihood and desirability of the behavior's specific consequences and, therefore, a revision of the attitude for which these estimates have implications. The new attitude, in turn, may provide the basis for their future behavioral decisions. The process of reducing dissonance is similar to that implied by the biased-scanning hypothesis. However, it theoretically occurs only when participants' past behavior conflicts with their prior attitudes, whereas biased scanning presumably occurs regardless of any prior attitude that participants might have formed. In either event, because the processes require retrieval of prior knowledge, they are likely to be cognitively demanding (see, e.g., Stroebe & Diehl, 1981; Zanna & Aziza, 1976; Zanna, Lepper, & Abelson, 1973). Therefore, biased scanning and cognitive dissonance are most likely to be evident when people have an opportunity to think carefully about the implications of their past behavior.

Self-Perception

The biased-scanning and dissonance-reduction hypotheses imply that the effects of past behavior are mediated by the recall of prior knowledge about the behavior's consequences and a reassessment of its implications. However, this mediating cognitive activity may not be necessary for the effects to occur. Self-perception theory (Bem, 1965, 1972), for example, postulates that when persons are called on to report an attitude, they often infer this attitude from the implications of a past behavior that happens to be salient to them at the time. Moreover, they engage in this process with little if any conscious deliberation, simply reasoning that if they have performed the behavior voluntarily, they must consider it to be desirable. They may make this inference without consulting any cognitions they might have formed about the behavior and its consequences at an earlier point in time (Bem & McConnell, 1970). This hypothesis, like the biased-scanning hypothesis, suggests that the effects of past behavior on persons' perceptions of their attitudes (and consequently their future behavioral decisions) may occur independently of their preexisting attitudes (but see Fazio, Zanna, & Cooper, 1977, for a discussion of the conditions under which self-perception and dissonance-reduction processes are likely to predominate). However, the processes that underlie these effects, unlike those that characterize biased scanning and dissonance reduction, require little mediating cognitive activity. Thus, their effects are likely to be evident even when people are either unmotivated or unable to think about why they might have performed this behavior.

Behavior as a Heuristic

Self-perception theory has generally been applied in conceptualizing the effects of past behavior on attitudes. However, similar considerations suggest that persons' past behavior might have a direct influence on their future behavior that is independent of their attitudes toward the behavior. That is, people who are called on to make a behavioral decision when a relevant past behavior is salient to them might simply assume that the reasons they performed the behavior at an earlier point in time are likely to apply in the present as well. To this extent, they might use their past behavior as a heuristic basis for a decision to repeat it without considering their attitude toward it at all (Bentler & Speckart, 1979; Cialdini, 1988). The possibility of this mechanism occurring in the present research was somewhat unclear. That is, the direct influence of past behavior on future behavior is more likely when the behavior is habitual and occurs in stable contexts (Ouellette & Wood, 1998; see also Triandis, 1977, 1980). In contrast, the behavior that participants ostensibly performed in the conditions we investigated (voting in favor of comprehensive examinations) was fairly novel. Nevertheless, the possibility of this heuristic process was worth examining.

Summary

Figure 1 summarizes the implications of the four hypotheses we considered in the present research. All but the behavior-heuristic hypothesis assume that persons' attitude toward a behavior influences their intentions to repeat the behavior and, ultimately, their desire to do so (cf. Fishbein & Ajzen, 1975). However, the hypotheses have different implications for how a person's past behavior is likely to affect this attitude and the outcome-related cognitions that are associated with it. As Figure 1 makes salient, however, the effects implied by the various hypotheses we have identified are generally not incompatible. That is, several of the

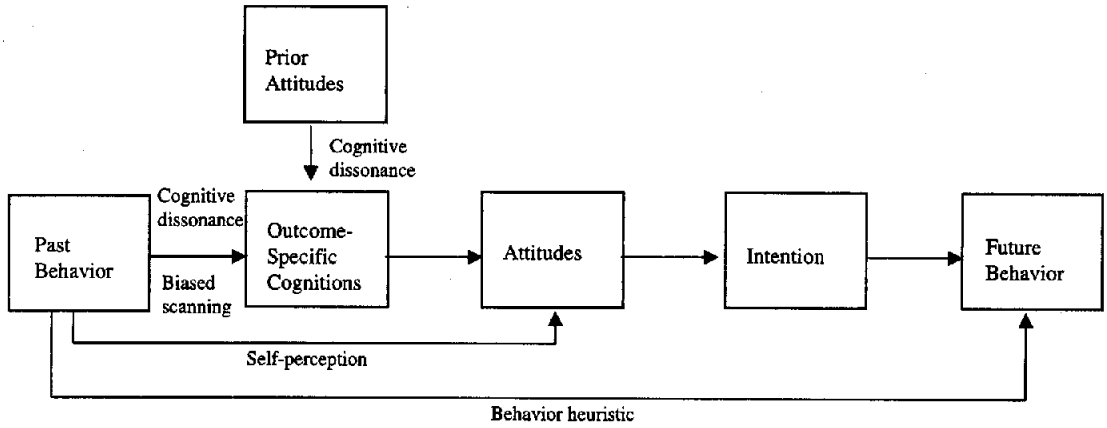

Figure 1. The influence of past behavior on cognitions and future behavioral performance.

effects could co-occur and could contribute independently to the overall impact of past behavior on future behavior. Our objective in the present research was not to confirm one of these hypotheses to the exclusion of others but rather to circumscribe the subset of factors that are most likely to account for the effects of past behavior on future behavior under the conditions we investigated.[1]

In this effort, we considered two factors that theoretically influence the magnitude of the effects implied by the hypotheses we considered. First, dissonance reduction theoretically occurs only when participants perceive their behavior to be inconsistent with their prebehavior attitudes. Thus, the extent to which the effects of participants' past behavior depend on their prebehavior attitudes should provide an indication of the extent to which dissonance-reduction processes contribute to these effects. Second, both dissonance reduction and biased scanning require the recall and reassessment of the implications of prior knowledge about the behavior they have performed and its consequences. To this extent, distracting participants from engaging in this cognitive activity should decrease the effects of their past behavior on their attitudes and, therefore, on their decision to repeat the behavior at some later time. In contrast, self-perception processes and the use of past behavior as a heuristic, which do not require extensive cognitive deliberation, should be less influenced by distraction. Therefore, the extent to which the impact of past behavior on future behavior decisions both depends on participants' prebehavior attitudes and is influenced by the situational distraction that participants experience subsequent to performing the behavior was expected to provide an indication of the extent to which these alternative processes were operative.

Manipulation of Past Behavior

An examination of the issues of concern in this research requires a manipulation of participants' behavior (or, more accurately, their perceptions that they performed the behavior) independently of any cognitions that might normally accompany a decision to engage in that behavior. To attain this objective, we told participants that they would be taking part in an investigation of a new technique for assessing their unconscious reactions to social policies that were presented subliminally. After generating each response, participants received feedback that they had unconsciously either supported or opposed the policy in question. The feedback they received about their support of the target policy (instituting comprehensive examinations) was experimentally manipulated. We determined the effects of this feedback on participants' attitudes toward the behavior of supporting the policy in the future, on their cognitions about the likelihood and desirability of specific consequences of this behavior, and on their actual decision to vote for or against the policy a second time.

In Experiment 1 we established the effectiveness of this methodology by using participants who had neutral attitudes toward the comprehensive exam policy. In Experiments 2, 3, and 4, we gained insight into the processes that underlie these effects by determining the extent to which the effects depended on both (a) participants' a priori attitudes toward the policy to which their behavior pertained (i.e., the institution of comprehensive examinations) and (b) the situational distraction and motivation that participants experienced in the course of thinking about the behavior subsequent to its occurrence. We discuss the effects of these variables in more detail in the context of the studies to which they pertain.

Experiment 1

Method

Overview

In Experiment 1 we determined the validity and credibility of our manipulation of past behavior. To maximize the effectiveness of the manipulation in this preliminary study, we restricted our consideration to participants who had neutral attitudes toward the institution of comprehensive examinations. All participants were told that we were testing a

[1] Other possible effects of past behavior are worth considering. For example, if calling attention to a past behavior increases the accessibility of a strongly held attitude with which this behavior is associated, it could increase the use of this attitude as a basis for future decisions and, therefore, might correspondingly decrease the impact of the behavior itself. (For evidence that the effect of persons' attitudes on their behavioral decisions increases when these attitudes are easily accessible in memory, see Fazio, 1986, 1990.) This possibility, which could attenuate the effect implied by the hypotheses of concern in this article, will be discussed in the context of the results to be reported.

computerized instrument for assessing spontaneous responses to statements about campus issues. On this pretense, they were exposed to statements, which were presented subliminally on a computer screen, that described a number of university policies. In response to each, participants pressed one of two keys to express their intuitive reaction to the policy that was allegedly described. The computer ostensibly interpreted these responses and gave participants feedback that they had unconsciously voted either in favor of or against the policy in question. The feedback that participants received was consistent with normative responses to all issues except "instituting comprehensive exams at the university." (These were defined as major-specific exams that all students would have to take prior to graduation.) In the latter case, half the participants were told they had voted in favor of the policy and the other half were told they had voted against it. After receiving this feedback, participants reported both their attitudes toward voting for the institution of comprehensive exams in a forthcoming referendum and their actual voting decision.

Selection of Participants and Stimulus Materials

The participants in the study and the policies presented as stimulus materials were both selected on the basis of data collected during a prescreening session early in the semester. In this session, all introductory psychology students reported their agreement with statements concerning a number of campus policies, one of which was, "I am in favor of instituting comprehensive exams at the university," on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Thirty-six students were selected who had checked the scale midpoint, indicating neither agreement nor disagreement with the policy. Six additional policies were selected that virtually all students at the university either supported or opposed (e.g., "maintaining civil liberties on campus," "receiving free tickets to sports events," "raising tuition"). These issues were used to provide feedback to participants in the main experiment in a manner to be noted.

Procedure

Participants, run individually, were informed that the study was designed to test a new computerized procedure for measuring "unconscious" behavioral tendencies. The procedure consisted of presenting statements about campus issues (e.g., "giving students free tickets to sports events") subliminally and having participants respond to them without being consciously aware of their content. Participants were told that although the stimulus statements would appear to be only flashes of light, they would elicit unconscious feelings that would give rise to a more conscious "intuition." They were informed that to provide a measure of their behavior they should "follow their intuition" and generate a "yes" or "no" response to each statement, which would be interpreted by the computer as a vote either "in favor of" or "against" the campus issue to which it pertained.

In subsequent experiments, we manipulated participants' ability to think carefully about their answers to the postexperimental questionnaire by distracting them while they were completing it. To pretest the instructions surrounding this manipulation, we indicated that because the methods we were investigating would later be used in natural settings such as a student union, we would simulate these settings by playing a tape of background noise of the sort that might be present in such conditions. Participants were instructed to pay attention to it if they wanted to, just as they might if they were in the computer room of a student union. In this experiment, the tape contained low-volume, content-free background material that had ostensibly been recorded at a student union. This low-distraction tape was played throughout the experiment.

Participants were informed that they would be exposed to statements concerning a number of university policies (e.g., receiving free tickets for sports events). They were told that the statements might express either support for or opposition to the policy and that the computer program would take this into account in determining the implications of their responses. (Thus, a "yes" response to a statement that favored the policy and a "no" response to a statement that opposed the policy would be interpreted similarly.) Because participants did not know the actual framing and order of the statements, they had no way of knowing a priori how their sequence of "yes" and "no" responses translated into endorsing or opposing the subliminal issues.

Participants were told that they would be exposed to 14 statements concerning 7 different social policies and that these statements would be conveyed in random order. On each trial, a statement about an issue was presented on the computer screen for 50 ms, followed by a 50-ms mask. Immediately afterward, a message appeared on the screen. The first line of the message read, "A phrase was just presented subliminally." The second line read, "Yes" and "No," as a reminder to make a choice. Participants responded either "yes" or "no" to the subliminally presented policy by pressing 1 or 0, respectively. This procedure was followed for 14 trials, with each of the 7 policies presented twice, in a random sequence. The actual policies presented were the same as the ones on which they later received feedback with one exception. That is, the target policy "instituting comprehensive exams at the university" was replaced by "insuring fairness in exams at the university." This procedure was a safeguard against the possibility that exposure to the target policy, albeit subliminal, might unconsciously activate cognitions about the target (Bargh, 1997).

After completing the 14 trials, participants pressed "F" to instruct the computer to provide feedback about their behavior. During the time that the computer ostensibly took to calculate the feedback, participants saw a "wait" sign that blinked for several seconds. The next screen informed participants of the ostensible nature of each policy and whether they had voted for or against it.

All participants received the same feedback about their vote on each policy except for the target, which was listed third in the set of policies they had ostensibly considered. In the case of the target, 50% of the participants were told they had voted in favor of instituting the exams and 50% were told they had voted against it. (The assignment of participants to the two feedback conditions was random.)

Dependent Measures

After receiving the feedback on their ostensible past behavior, participants were told that to understand the unconscious decisions we needed to know their personal feelings about the policies under consideration. However, they were informed that because time constraints would not allow us to ask questions about all 7 issues, the computer would randomly assign only 1 of the 7 policies for them to evaluate. (In fact, the policy assigned to them in all cases was the institution of comprehensive exams.) In this context, participants were informed that the university was likely to hold a referendum on whether each of the policies of concern in the study should be instituted.

Attitudes. Response items were presented on the computer screen and participants responded to the questions by typing a number on the keyboard. Attitudes toward the behavior were assessed by asking participants to rate "voting in favor of the exams in the referendum" along six bipolar dimensions (i.e., *something I don't like* vs. *something I like, unpleasant* vs. *pleasant, something that makes me feel bad* vs. *something that makes me feel good, something that makes me feel unhappy* vs. *something that makes me feel happy, something that ruins my mood* vs. *something that improves my mood,* and *something bad* vs. *something good*). Participants responded along each dimension by entering a number from 0 (e.g., *unpleasant*) to 9 (e.g., *pleasant*) on the keyboard. Preliminary analyses indicated the 6 items provided a reliable index of attitude (Cronbach's $\alpha = .88$). Responses to the items were therefore averaged and used as an overall index of attitudes toward voting in favor of comprehensive exams.

Behavior. After obtaining judgment measures, we told participants that we needed to establish their overt response to the issues tested by our subliminal methodology. On this pretense, participants were asked to

indicate their vote in favor of or against the seven issues of concern in the study, including the institution of comprehensive exams. They then entered either 0 (*no*) or 1 (*yes*) on the keyboard to indicate their vote.

Perception of method reliability. Participants were asked at the end of the questionnaire, (a) "How reliable was the method as a measure of your unbiased behavior?" (b) "How reliable was the method as a measure of your unbiased behavior concerning campus issues?" and (c) "How reliable was the method as a general measure of your unbiased behavior?" Responses to all items were entered on a scale from 0 (*not at all*) to 9 (*extremely*). These ratings, which were highly intercorrelated (Cronbach's $\alpha = .88$), were therefore averaged to provide a single index of perceived method reliability used in some analyses.

Results and Discussion

Perceived Method Reliability

Participants clearly believed the manipulation of past behavior. Participants' estimates of the reliability of the instrument ($M = 5.3$) were significantly above the scale midpoint of 4.5 ($p < .05$) and did not depend on the behavioral feedback received (Ms = 5.4 vs. 5.3 for favorable and unfavorable past behavior, respectively), $F < 1$. Specific reliability judgments concerning the ability of the method to detect reactions to comprehensive exams were consistent with this conclusion. Thus, only 8% of participants judged the reliability to be less than or equal to 2. (Responses in the subsequent experiments to be reported were distributed similarly.)[2]

Judgments and Future Behavior

As we expected, participants' attitudes toward voting in favor of comprehensive exams were more favorable when they were told they had previously voted in favor of the exams ($M = 5.7$) than when they were told they had voted against them ($M = 3.7$), $F(1, 34) = 13.68$, $p < .01$. Correspondingly, a greater proportion of participants voted for instituting the exams in the former conditions (72%) than in the latter (11%), $F(1, 34) = 21.21$, $p < .01$ (for a discussion of the use of analysis of variance procedures with dichotomous data, see Huynh & Feldt, 1970). Thus, participants appeared to use the behavior feedback as a basis not only for the attitudes they formed toward the behavior but also for their disposition to perform the behavior again.

Experiment 2

Experiment 1 confirmed the effectiveness of our manipulation of participants' perceptions of their past behavior. In doing so, it replicated previous evidence that persons' past behavior influenced both their attitudes (Bem, 1965, 1967; Festinger, 1957) and their later behavioral decisions (Ouellette & Wood, 1998). However, the study had obvious shortcomings. For one thing, the measure of participants' behavior was embedded in the computer-based questionnaire that we administered to the participants and could easily have been influenced by attempts to comply with implicit experimental demands to be consistent (Schlenker, 1980, 1982). To remedy this problem in Experiment 2, we obtained a measure of future behavior that was ostensibly both anonymous and unrelated to participants' questionnaire responses.

In addition, Experiment 2 provided data that helped to diagnose the cognitive processes underlying the effects we observed. First, we obtained measures of participants' postbehavior estimates of both the likelihood and the desirability of possible consequences of the behavior that were likely to come to mind when thinking about it and, therefore, were likely to influence participants' attitudes toward performing the behavior again. Second, we examined the effects of two variables that theoretically influence the processes implied by the alternative hypotheses we considered: the amount of situational distraction that participants experienced while thinking about and reporting their behavior-related cognitions and the valence of the attitudes they had formed toward comprehensive examinations before participating in the experiment.

The inference processes implied by the self-perception and behavior-heuristic hypotheses require relatively little cognitive effort. Therefore, these processes might not be appreciably influenced by the extent to which participants are distracted from thinking about the implications of the behavior after performing it. In contrast, biased scanning and dissonance reduction both require extensive cognitive activity; therefore, these processes may be less evident when participants are distracted than when they are not. Moreover, dissonance reduction, unlike either biased-scanning or self-perception processes, should only occur when participants' behavior is inconsistent with their prebehavior attitudes. Thus, by determining the extent to which both distraction and participants' preexperiment attitudes influenced the effects of participants' past behavior on their subsequent decisions and the cognitions that mediated them, the viability of the dissonance-reduction and biased-scanning hypotheses could be evaluated.

Additional Considerations

The processes implied by the hypotheses we considered cannot always be inferred from the effects of past behavior on each factor considered in isolation. For example, evidence that distraction decreases the influence of past behavior on postbehavior attitudes and behavioral decisions would be consistent with the biased-scanning hypothesis. However, it would not necessarily contradict the self-perception and behavior-heuristic hypotheses, because these processes could contribute to future behavioral decisions over and above the effects of biased scanning. To evaluate these possibilities, we performed path analyses that permitted the independent contributions of these processes to be more effectively isolated (see Figure 1).

Further insight into these processes was gained from the effects of giving participants feedback about their behavior on the time they took to report the cognitions that theoretically mediated their decisions to repeat this behavior. For example, suppose people who become aware of their past behavior spontaneously review

[2] This conclusion was further confirmed on the basis of responses by an independent sample of 52 randomly selected participants who received the same behavioral feedback as participants in the main experiment but, instead of completing questionnaire measures, were asked to write down "their thoughts about the subliminal technique to measure unconscious behavior." Only 2 of the 52 participants expressed disbelief or suspicion. A typical thought in support of the method was, "I can't believe the computer could guess so accurately!" Thoughts that were coded as referring to the invalidity of the method included, "I don't know what the computer could do . . . I just sat there and hit the same key without thinking about it." However, these thoughts were very infrequent.

and reassess its possible consequences to confirm its legitimacy. As a result of this spontaneous review and reassessment, the consequences should become more easily accessible in memory, and so their likelihood and desirability should be reported more quickly than they would otherwise. Moreover, suppose persons who are aware of their past behavior infer their attitudes from this behavior rather than conducting a search of memory for other attitude-relevant knowledge. These persons should report their attitudes more quickly than they would if an attitude-related behavior were not salient. These possibilities were also examined in Experiment 2.

Method

Participants and Procedures

Experimental conditions. Participants in the main experiment were 96 introductory psychology students who, as in Experiment 1, were selected on the basis of attitudes toward comprehensive exams that they reported during a prescreening session at the beginning of the semester. Attitudes were reported along scales from 1 (*strongly disagree*) to 5 (*strongly agree*). One third of the participants we selected had reported strong disagreement with the institution of the exams (1 on a scale from 1 to 5), one third reported a neutral position (3), and the remaining third reported strong agreement with the policy (5). Eight participants of each type were randomly allocated to each condition of a 2 (behavioral feedback: voting in favor vs. voting against comprehensive exams) × 2 (distraction: low vs. high) factorial.

In this experiment, the level of distraction experienced by participants was manipulated over two levels using the same instructions and procedures used in Experiment 1. In low-distraction conditions, participants throughout the experiment listened to the same low-volume, content-free tape used in Experiment 1. In high-distraction conditions, however, when reporting their judgments, participants were exposed to a high-volume taped conversation between a man and a woman who met in the student union. Data from other studies (Albarracin, 1997) indicated that this type of background material was both interesting and distracting.

Control conditions. To more effectively evaluate the effects of making salient a past behavior on the accessibility and use of behavior-related cognitions, it was necessary to compare the time required to report these cognitions under experimental conditions with the time required by participants who did not receive feedback about their behavior. To this end, we collected data from 64 unselected participants who filled out the experimental questionnaire in low- and high-distraction conditions without receiving information about their past behavior. (Actual behavioral decisions were not obtained from these participants.) These data allowed us to compare the time required to generate cognitive responses after receiving behavioral feedback with the time required in the absence of this feedback.

Dependent Measures

We made a few changes in the dependent measures used in the experiment. These changes included (a) the addition of measures of outcome beliefs, outcome evaluations, and intentions, and (b) the modification of the behavior measure to make it ostensibly more anonymous.

Outcome-specific cognitions. Seven belief statements were constructed on the basis of the outcomes that participants had spontaneously generated in an independent study. Specifically, 21 participants were asked to list the consequences of instituting comprehensive exams. Seven outcomes were selected that, as recommended by Ajzen and Fishbein (1980), were listed in at least 10% of the cases. These outcomes were all negative and reflected opposition to the exams; specifically, the seven outcomes were as follows:

1. It would imply a lot more work for students.
2. A lot of capable students would not do well on this exam.
3. It would make students, instructors, and employers put the emphasis on a single test score.
4. It would make or destroy a student's career.
5. It would decrease the number of the university graduates, because people may fail or drop out.
6. It would imply a lot more stress and pressure for students.
7. The exams would be unfair because of bias or invalidity (e.g., may not measure other relevant skills).

Participants in the main experiment reported their belief that each of the consequences would occur along a scale from 0 (*not at all likely*) to 9 (*extremely likely*). In addition, participants judged the desirability of each outcome along a 10-point scale from 0 (*something I dislike*) to 9 (*something I like*).

To create an overall index of the implications of outcome-specific cognitions, outcome beliefs and evaluations were each mapped onto a scale from −5 to 5 with no neutral point. Each belief was then multiplied by the evaluation corresponding to the same outcome, and these products were summed to construct a summary index similar to that suggested by Fishbein and Ajzen (1975):

$$A = \sum b_i e_i, \tag{1}$$

where A is attitude, b_i is the belief that outcome i will occur, and e_i is the evaluation of that outcome. The internal consistency of this measure was satisfactory (Cronbach's $\alpha = .86$). The average time (in seconds) that participants took to enter these responses into the computer was also recorded.

Attitudes and intentions. Attitudes were measured as in Experiment 1. The measure of intentions included two items (i.e., "I will vote in favor of the exams in the referendum" and "I intend to vote in favor of the exams in the referendum"). Participants entered a number from 0 (*not likely at all*) to 9 (*extremely likely*) on the computer. Responses to these items were correlated at .70 and were therefore averaged to provide a single index of behavioral intentions.[3] The average time taken to report both attitudes and intentions was recorded.

Items in the experimental and control questionnaires were presented in different orders, including (a) attitudes, intentions, and outcome-related cognitions, (b) intentions, attitudes, and outcome-related cognitions, (c) outcome-related cognitions, intentions, and attitudes, and (d) outcome-related cognitions, attitudes, and intentions.

Manipulation checks. We also included an item that tapped the level of distraction participants experienced. Specifically, participants judged the extent that they felt distracted during the experiment on a scale from 0 (*not at all*) to 9 (*extremely*).

Future behavior. After participants had completed the computerized questionnaire, we indicated that because participants had thought about comprehensive exams, we wanted to take the opportunity to see how students might vote on the actual referendum. Participants were then left alone with instructions to select the slip of paper that represented their choice and to place it in a secured ballot box that was in the room and that appeared to be partially full. An equal number of ballots supporting and opposing the policy were left on a nearby table. Participants' votes were ostensibly anonymous. However, because the ballot box contained only blank slips of paper, we were able to record their behavior on the basis of the new slip that was in the box after each session. A favorable vote was scored as 1 and an unfavorable vote as 0.

[3] In this and other experiments to be reported, measures of attitudes and behavioral intentions were highly correlated ($r = .86$, $p < .01$) and were affected similarly by experimental manipulations. However, because of the theoretical distinction between the two constructs (cf. Fishbein & Ajzen, 1975), we have reported data for each construct separately.

Results

Preliminary Analyses

Distraction. The manipulation of distraction was successful. Participants who listened to the distracting tape reported feeling more distracted (M = 4.2) than those who listened to the nondistracting tape (M = 1.8), $F(1, 95) = 25.16$, $p < .001$.

Perceived method reliability. As in Experiment 1, participants with neutral prior attitudes toward comprehensive examinations had similar perceptions of the method's reliability regardless of whether they received feedback that they had voted in favor of the exams or against them (Ms = 5.5 vs. 6.2), $F(2, 94) = 1.30$, *ns*, replicating the results of Experiment 1. Furthermore, participants with polarized a priori attitudes toward the exams did not judge the feedback to be appreciably more reliable when it confirmed these attitudes (M = 6.1) than when it disconfirmed them (M = 5.2), $F < 1$.

Influence of Preexperiment Attitudes

The attitudes toward comprehensive examinations that participants had reported before taking part in the experiment were recoded as −1 (*disagree*), 0 (*neutral*), or 1 (*agree*). These attitudes were correlated at .17 (*ns*) with outcome-related cognitions, at .38 ($p < .01$) with their postbehavior attitudes, at .52 ($p < .01$) with intentions, and at .34 ($p < .01$) with their future behavioral decisions. However, the impact of participants' reports of their behavior in the experiment was not contingent on these preexperiment attitudes.

Judgments and Future Behavior

Separate analyses were performed on attitudes, intentions, behavioral decisions, and the composite index of outcome-specific beliefs and evaluations (see Equation 1) as a function of behavior feedback (in favor vs. against the institution of comprehensive exams) and distraction (high vs. low).[4] These analyses were supplemented by planned contrasts to evaluate the contingency of these effects on participants' preexperiment attitudes. We discuss the results of these analyses in turn.

Attitudes, intentions, and actual behavior. As expected, participants reported more favorable attitudes toward comprehensive examinations if they perceived they had voted in favor of the exams (M = 5.5) than if they perceived they had voted against them (M = 3.7), $F(1, 92) = 24.23$, $p < .01$. Moreover, behavior feedback had similar effects on participants' reports of their intentions to repeat the behavior (Ms = 5.3 vs. 3.0), $F(1, 92) = 28.07$, $p < .01$, and their likelihood of actually doing so (Ms = 0.45 vs. 0.09), $F(1, 92) = 22.86$, $p < .01$. These overall effects, which confirmed the results of Experiment 1, are compatible with all four hypotheses we considered concerning the effect of past behavior on future behavior decisions. The contingency of these effects on participants' preexperiment attitudes, and also on distraction, permitted the hypotheses to be more effectively evaluated.

Specifically, the dissonance-reduction hypothesis implies that the effects of participants' awareness of their past behavior on their postbehavior beliefs and attitudes depends on their preexperiment attitudes. In fact, supplementary analyses indicated that the effects of telling participants they had voted for or against comprehensive examinations on the attitudes they reported did not significantly depend on whether their preexperiment attitudes were polarized (Ms = 5.5 vs. 3.7, pooled over participants with positive and negative a priori attitudes, respectively) or neutral (Ms = 6.2 vs. 3.8), $F < 1$. Moreover, the effects of behavior feedback on participants' intentions to perform the behavior, and on their likelihood of actually doing so, likewise did not depend significantly on whether participants' preexperiment attitudes were polarized (Ms = 4.9 vs. 3.0 and .41 vs. .13, for intentions and actual behavior, respectively) or not (Ms = 6.2 vs. 2.8 and .52 vs. .00); in each case, $p > .10$.[5] These results, therefore, raise questions about the role of dissonance reduction in responses to behavior feedback under the conditions we investigated.

Suppose the impact of behavior feedback on attitudes, intentions, and future behavior is partly the result of cognitive activity of the sort implied by the biased-scanning hypothesis. Then, distracting participants from performing this activity should decrease the magnitude of this impact. Results, summarized in Table 1, were marginally consistent with this prediction. That is, distraction decreased the effect of behavior feedback on not only attitudes, $F(1, 92) = 3.27$, $p < .07$, but also intentions, $F(1, 92) = 3.23$, $p < .08$, and actual behavior, $F(1, 92) = 2.58$, $p > .10$. However, none of these effects depended on participants' a priori attitudes; no interactions of distraction, behavior feedback, and participants' initial attitudes even approached significance ($F < 1$).

Outcome-specific cognitions. According to the biased-scanning hypothesis, the influence of behavior feedback on participants' attitudes is mediated by its effect on participants' cog-

[4] In this and other experiments to be reported, additional analyses were performed in which perceived method reliability was used as a covariate. The introduction of this covariate had little effect on either the magnitude or the significance of the results, and so these results are not reported in detail. Similarly, excluding participants with reliability judgments of 2 or less did change the pattern of results. In addition, we replicated the analyses introducing the order in which attitudes were reported (before or after outcome cognitions) and the order in which intentions were reported (before or after attitudes). The order in which intentions were reported had no effect on any of the variables we measured, either alone or in combination with behavior feedback and distraction. The order in which attitudes were reported had minor influences on the strength of these judgments. That is, attitudes were more positive when they were reported prior to outcome cognitions than when they were reported afterwards (Ms = 5.2 vs. 4.2), $F(1, 91) = 4.34$, $p < .05$. In no case, however, did the order in which attitudes were provided interact with either distraction or behavior feedback, $F < 1$. (Order effects were very similar in subsequent experiments.)

[5] A more direct test of dissonance reduction might appear to involve a comparison of the effect of behavior feedback under conditions in which participants' behavior and their prebehavior attitude were inconsistent (dissonant) with their prebehavior attitude with its effects under conditions in which they were consistent. In fact, as judged by effects on actual behavior, the effect of behavior feedback was considerably less when the feedback was consistent than when it was inconsistent, which would appear to contradict implications of dissonance theory. However, the comparison is confounded with the independent effects of participants' preexperiment attitudes on their postbehavior cognitions and behavior. These effects were opposite in direction to those that would result from dissonance reduction and, therefore, might have prevented the latter effects from being detected. Therefore, the test described here seems more appropriate.

Table 1
Judgments and Future Behavior as a Function of Behavior Feedback and Distraction: Experiments 2, 3, and 4

	Behavior feedback								
	Experiment 2 (n = 98)			Experiment 3 (n = 64)			Experiment 4 (n = 64)		
Measure	In favor	Against	Difference	In favor	Against	Difference	In favor	Against	Difference
Attitudes									
Low distraction	6.1	3.3	2.8	5.3	3.4	1.9	6.3	4.4	1.9
High distraction	5.3	4.1	1.2	4.0	4.4	−0.4	6.4	5.1	1.3
Intentions									
Low distraction	5.7	2.5	3.2	5.0	2.3	2.7	5.8	3.5	2.3
High distraction	5.0	3.6	1.4	3.1	3.3	−0.02	6.2	3.6	2.6
Behavior									
Low distraction	.54	.04	.50	.38	.00	.38	.50	.19	.31
High distraction	.35	.13	.22	.19	.13	.06	.69	.19	.50
Outcome-related cognitions (Equation 1)									
Low distraction	−37.2	−76.5	39.3	−43.7	−50.0	6.3	−31.0	−74.5	43.5
High distraction	−38.1	−55.1	17.0	−28.4	−17.9	−10.5	−34.9	−36.0	1.10

nitions about specific consequences of this behavior. However, this effect should be less when participants are distracted from thinking about these consequences and from retrieving prior knowledge that bears on their likelihood and desirability. Support for this hypothesis was equivocal. The effects of feedback on the composite index of outcome-related beliefs and evaluations are shown in Table 1. The generally negative values of the index reflect the fact that the outcomes used to compute the index were all undesirable. As expected, the index was relatively more favorable when participants were told they had voted in favor of comprehensive exams (M = −37.7) than when they were told they had voted against them (M = −65.8), $F(1, 92) = 5.83$, $p < .05$. Nevertheless, although this difference was somewhat less when distraction was high (−38.1 vs. −55.1) than when it was low (−37.2 vs. −76.5), the difference was not significant ($p > .10$).

Supplementary analysis. The attitudes and intentions reported by participants who received feedback that they had voted in favor of comprehensive examinations (Ms = 5.6 and 6.1 for attitudes and intentions, respectively) did not differ appreciably from those reported by control participants who did not receive any feedback about their behavior (Ms = 5.4 and 5.6, respectively). These data are not strictly comparable, because participants under experimental conditions were preselected to represent three distinct levels of a priori attitudes, whereas control participants were not. Nevertheless, these data suggest that although feedback that participants had voted against comprehensive examinations decreased their attitudes and intentions, feedback that they had voted in favor of the exams had little influence. This asymmetry does not compromise our interpretation of the results, however.

Path Analyses

To identify the independent contributions of the processes implied by the hypotheses we considered, we used path analyses. The model we evaluated was guided by the models presented in Figure 1. That is, it assumed that participants' perceptions of their past behavior potentially influence their decisions to repeat the behavior either directly (as implied by the behavior-heuristic hypothesis) or indirectly through its mediating impact on attitudes. The impact of these perceptions on attitudes could also be either direct (as implied by the self-perception hypothesis) or mediated by its influence on outcome-specific cognitions. In addition to these possible effects, the influence of participants' prebehavior attitudes on their outcome-related cognitions, attitudes, and intentions were also taken into account. Maximum likelihood estimation techniques were used to evaluate the model's applicability under each distraction condition, on the basis of the correlation matrices in the Appendix. The four goodness of fit indexes we used, presented in Table 2, indicate that the fit of the model was satisfactory in both distraction conditions.

Figure 2 presents the path diagrams for data obtained in both distraction conditions, with solid and dashed lines denoting significant and nonsignificant pathways, respectively. The significant paths connecting participants' outcome-specific cognitions, attitudes, intentions, and ultimate behavioral decisions are consistent with Fishbein and Ajzen's (1975) theory of reasoned action and suggest that the processes implied by this theory contributed to the behavioral decisions that participants made. In addition, participants' preexperiment attitudes had a direct influence on their postbehavior attitudes that was independent of their outcome-specific beliefs and evaluations. These effects occurred regardless of distraction and were independent of behavior feedback.

More relevant to the issues of concern in the present research are the effects of participants' perceptions of their past behavior. These perceptions had a substantial effect on their outcome-related cognitions under low-distraction conditions. However, this effect was reduced to nonsignificance when distraction was high. This finding is consistent with the notion that participants spontaneously reevaluated the consequences of their behavior, but introducing distraction prevented them from engaging in this postbehavior cognitive activity. However, some caution should be taken in drawing this conclusion, because the paths linking behavior feedback and outcome-specific cognitions did not differ significantly as a function of distraction ($p > .10$).

Table 2
Goodness-of-Fit Indexes

Experiment	Low distraction			High distraction		
	NNFI	CFI	SRMR	NNFI	CFI	SRMR
Experiment 2	1.00	1.00	.01	1.00	.99	.03
Experiment 3	0.99	.95	.07	1.00	.99	.03
Meta-analysis of Experiments 3 and 4	1.00	.99	.03	1.00	.99	.03
Experiment 4	1.00	1.00	.06	0.99	.97	.05

Note. The Bentler–Bonett nonnormed fit index (NNFI) and comparative fit index (CFI) indicate good fit when they approach .90 (Schumacker & Lomax, 1996). The standardized root-mean residual (SRMR) is a measure of the average of the fitted residuals and indicates good fit when it is .07 or less, marginal fit between .08 and .10, and poor fit above .10 (Hu & Bentler, 1998).

The implications of the path analyses for self-perception and behavior heuristic processes are less equivocal. Specifically, participants' past behavior had a direct impact on their attitudes that was independent of their cognitions about specific outcomes. Although this impact was less when distraction was high than when it was low ($p < .06$), it was significant in both cases. This effect is consistent with the self-perception hypothesis. In contrast, there was no support for the behavior-heuristic hypothesis; a direct path from past behavior to future behavior was not significant in either distraction condition.

Response Times

Further insight into the effects of behavior feedback was obtained by comparing the judgment response times of participants who received their feedback with those of control participants who completed the same questionnaire but did not receive feedback about their behavior. First, suppose participants who became aware of their behavior spontaneously assessed the implications of its possible consequences, as implied by the biased-scanning hypothesis. Then, these participants should report the likelihood and desirability of these consequences more quickly than participants who did not receive this feedback. This possibility was evaluated under conditions in which outcome-specific beliefs and evaluations were assessed first in the questionnaire (before attitudes and intentions). As expected, participants took less time to report these cognitions if they had received feedback about their past behavior ($M = 0.96$ s) than if they had not ($M = 1.37$ s), $F(1, 153) = 39.91$, $p < .01$.[6] However, this difference was similar regardless of whether participants were distracted (Ms = 0.69 s vs. 1.38 s) or not (Ms = 0.95 s vs. 1.36 s).

Path analyses suggested that participants based their attitudes on both outcome-specific cognitions and their past behavior. This conclusion is confirmed by differences in the time that participants took to report their attitudes under conditions in which these criteria were or were not salient. Specifically, participants who did not receive feedback about their past behavior reported their attitudes much more quickly when they had estimated their outcome-specific beliefs and evaluations earlier in the questionnaire ($M = 0.95$ s) than when they had not ($M = 1.53$ s), $F(1, 143) = 37.51$, $p < .01$. Thus, these participants appeared to base their attitudes on the implications of the behavior's possible consequences, taking less time to integrate these implications when they had estimated the outcomes' likelihood and desirability earlier in the questionnaire. When participants had received feedback about their behavior, however, they reported their attitudes quickly regardless of whether they had considered the behavior's consequences beforehand or not (Ms = 0.91 s vs. 1.12 s). Although this latter difference is reliable, $F(1, 143) = 14.24$, $p < .01$, it is significantly less than the difference that occurred when participants had not received behavior feedback, $F(1, 143) = 12.36$, $p < .01$. In combination, therefore, these data suggest that participants based their attitudes primarily on whatever criteria happened to be salient to them at the time they were asked to report these attitudes. That is, they used the implications of salient outcome-specific beliefs and evaluations if they had formed and reported these cognitions earlier in the questionnaire. However, when outcome-specific cognitions were not easily accessible but an attitude-relevant past behavior was salient, participants based their attitudes on the implications of this behavior, as implied by the self-perception hypothesis.

Response time data also provided further evidence bearing on the dissonance-reduction hypothesis. That is, suppose participants spontaneously reduce cognitive dissonance at the time they first learn that their behavior is inconsistent with their prebehavior attitudes. If this occurs, they should later report their outcome-specific beliefs and evaluations more quickly than participants whose behavior was ostensibly consistent with their initial attitudes and who did not spontaneously reevaluate these cognitions at the time they first learned of their behavior. If anything, however, the opposite was true. That is, participants took longer to report these cognitions when the behavior feedback was inconsistent with their prebehavior attitudes than when it was consistent (Ms = 0.97 vs. 0.85), $F(1, 92) = 5.83$, $p < .02$. Whatever the reason for its occurrence, this reversal suggests that the effect of behavior feedback on the time that participants took to report outcome-specific cognitions is more likely to be the result of processes postulated by

[6] The interpretation of these data, however, is complicated by the fact that the control group had not been preselected on the basis of prior attitudes, and thus prior opinions could have been less extreme, taking less time to be reported than moderate attitudes. To control for this possibility, we analyzed the time taken to report attitudes and outcome-related cognitions when experimental participants had neutral prior attitudes. A comparison between this subgroup and the control group led to identical conclusions.

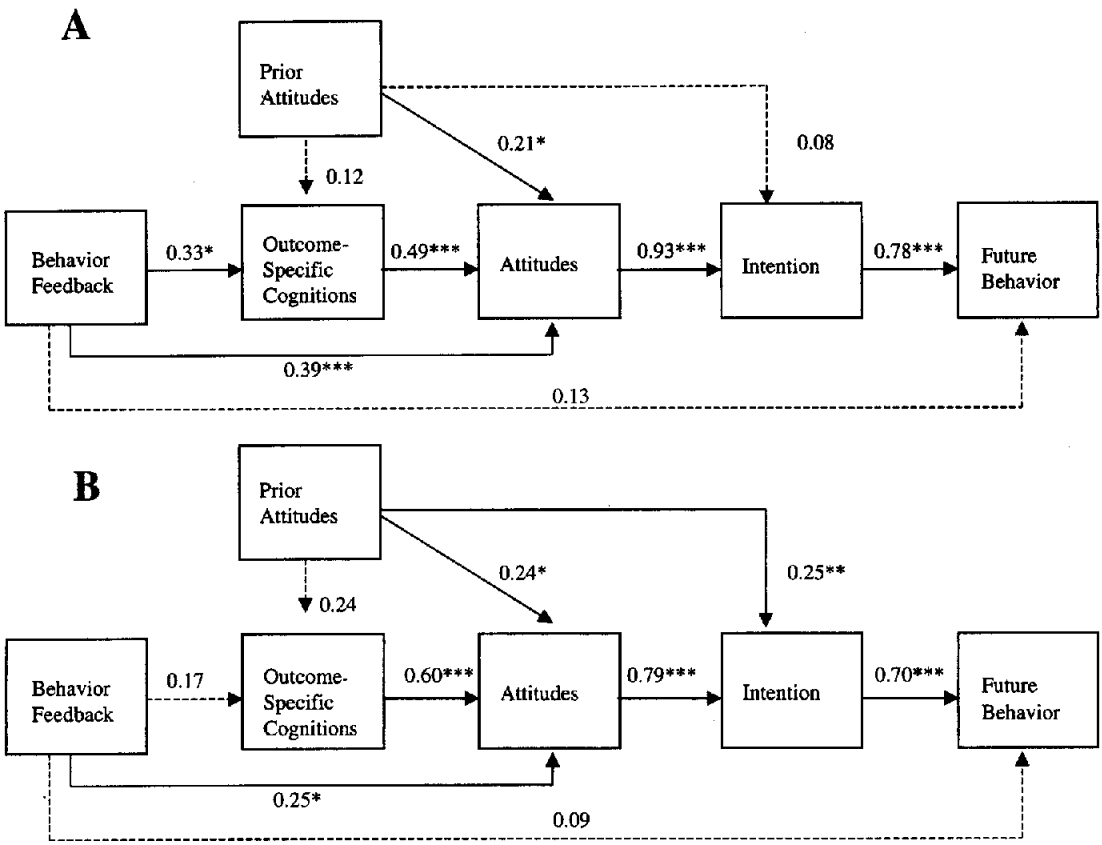

Figure 2. Path analyses from Experiment 2. Panel A: Low distraction. Panel B: High distraction. $*p < .05$. $**p < .01$. $***p < .001$.

Janis and King (1954) than of attempts to reduce cognitive dissonance per se.[7]

Discussion

The results of Experiment 2 allowed us to draw clear conclusions concerning the processes implied by several of the hypotheses we considered. First, in contrast to the implications of the behavior-heuristic hypothesis, there was no evidence that participants based their future behavioral decisions directly on their past behavior. Second, there was little evidence that the effects of past behavior were the result of tendencies to reduce cognitive dissonance.

In contrast, results were quite consistent with implications of the self-perception hypothesis that participants would infer their attitudes toward comprehensive examinations directly from their past behavior independently of any evaluations they made of the specific consequences of the behavior. Path analyses revealed a direct effect of past behavior on attitudes. Although the effect appeared to be less when participants were distracted from thinking about their behavior than when they were not, it was significant in both cases (see Figure 2). Furthermore, participants took much less time to report these attitudes when their past behavior was salient to them than when it was not. These findings converge on the conclusion that when participants had received feedback about their behavior, they inferred their attitudes toward this behavior and these attitudes, once formed, provided a basis for decisions to repeat the behavior later.

The contribution of biased scanning to the effects of past behavior is somewhat less clear. We assumed that if participants spontaneously retrieve and reassess the implications of their prior knowledge about comprehensive examinations to confirm the legitimacy of their behavior, distracting them from performing this activity would decrease the effect of the behavior on their outcome-specific beliefs and evaluations and would increase the time to report these cognitions. In fact, however, the effect of participants' past behavior on their outcome-specific beliefs and evaluations did not significantly depend on distraction as the biased-scanning hypothesis would predict. Nevertheless, the ef-

[7] One possible interpretation of the reversal assumes that participants did not spontaneously revise their outcome-specific beliefs and evaluations when they learned of their behavior. Rather, they only engaged in this activity at the time they were asked about these cognitions in the questionnaire, taking more time to report them than persons who were unmotivated to revise these cognitions. In fact, Simon, Greenberg, and Brehm (1995; but see also Wilson, Lindsey, & Schooler, 2000) obtained some evidence that persons do not make dissonance-reducing changes in their attitudes and beliefs until they are asked to report them. However, although this interpretation would permit the response time data to be reconciled with a dissonance-reduction hypothesis, other aspects of the results we have reported also call this hypothesis into question.

fects of distraction on attitudes were only marginal. Therefore, before drawing conclusions about the mediating effects of biased scanning on the impact of past behavior on future behavior, a replication of the results of Experiment 2 seemed desirable.

Experiment 3

Method

Participants were 64 students who participated in exchange for credit in their introductory psychology class. The design was identical to the one in Experiment 2 except that participants were not preselected on the basis of their prior attitudes. Rather, 16 participants were assigned randomly to each cell of a 2 (behavior feedback: favorable vs. unfavorable) × 2 (distraction: low vs. high) factorial. Within each condition, 4 participants reported judgments in each of the four orders indicated earlier.

Results

Preliminary Analyses

As in Experiment 2, participants in high-distraction conditions reported feeling more distracted than participants in low-distraction situations (Ms = 5.0 vs. 3.5), $F(1, 60) = 4.18$, $p < .01$. Also as before, the perceived reliability of the method was not contingent on the level of distraction experienced (Ms = 5.2 vs. 5.3 for high and low distraction, respectively), $F < 1$, or on the information about past behavior received by participants (Ms = 5.4 vs. 5.1 for voting in favor or against the exams, respectively), $F < 1$. As in Experiment 2, however, none of the results to be reported were significantly dependent on perceived method reliability (see Footnote 4).

Judgments and Future Behavior

Judgment and behavioral data, summarized in Table 1, were analyzed as a function of behavior feedback and distraction and were generally consistent with the conclusions drawn from Experiment 2. That is, participants who believed they had voted in favor of the exams, compared with those who were told they had voted against them, had nonsignificantly more favorable attitudes toward the behavior, $F(1, 60) = 1.99$, $p > .10$, reported more favorable intentions to repeat it, $F(1, 60) = 5.27$, $p < .02$, and were actually more likely to do so, $F(1, 60) = 5.38$, $p < .02$. Moreover, the influence of past behavior on attitudes, intentions, and future behavior was in each case less when distraction was high than when it was low. The interactive effects of distraction and behavior feedback were significant for attitudes and intentions, $F(1, 60) > 3.99$, $p < .05$, and marginally significant for actual behavior, $F(1, 60) = 3.17$, $p < .08$. In fact, participants' perceptions of their behavior under high-distraction conditions of the present study had little effect at all on their attitudes, intentions, and decisions to repeat the behavior (see Table 1). These data, therefore, confirm the marginally significant effects of distraction observed in Experiment 2.

In contrast, the effects of behavior feedback on outcome-specific cognitions appeared less consistent with those observed in Experiment 2. In the earlier study, behavior feedback influenced outcome cognitions reliably, but the effect did not depend on distraction. In the present study, however, behavior feedback had little effect on participants' outcome-specific cognitions at either level of distraction ($F < 1$). Thus, the effects of behavior feedback on attitudes, intentions, and decisions to repeat the behavior did not appear to be mediated by its effects on the particular outcome-related cognitions assessed in this experiment, even when distraction was low.[8]

To evaluate the consistency of the results of this experiment with those of Experiment 2, a post hoc analysis was performed in which experiment (2 vs. 3) was treated as an additional independent variable. This analysis yielded significant effects of behavior feedback on attitudes, intentions, and behavior that were in each case contingent on distraction ($p < .05$ in all cases). However, as shown by a meta-analysis of the data from the two experiments, none of these effects was significantly contingent on the experiment in which data were collected. Analyses of outcome-specific cognitions revealed a marginally significant effect of behavior feedback ($p < .07$) that did not depend on distraction ($p > .10$). These effects, however, also did not depend on the experiment in which the data were collected.

Path Analyses

Path analyses confirmed the conclusions drawn from analyses of variance. The models we tested (see Figure 1) were similar to those evaluated in Experiment 2 except that the relations involving preexperiment attitudes (which were not assessed in this experiment) were not included. The correlations on which the analyses were based are shown in the Appendix. The fit of the model was satisfactory in both distraction conditions (see Table 2). The pattern of significant paths that emerged in each condition, conveyed in Figure 3, indicates that behavior feedback had little effect on outcome-specific cognitions regardless of distraction. Moreover, a direct effect of behavior feedback on participants' attitudes of the sort implied by the self-perception hypothesis was only evident when distraction was low. In this study, therefore, distraction appeared to eliminate all effects of behavior feedback on participants' decisions to repeat the behavior.

To evaluate the similarity of the results in Experiments 1 and 2, we applied path analyses to the weighted mean correlation matrices in the Appendix following Hedges and Olkin's (1985) procedures. The resulting model had an adequate fit (see Table 2), and, as shown in Figure 4, replicated the path analysis from Experiment 2. That is, past behavior had a significant influence on attitudes under both distraction conditions, although this influence was less when distraction was high ($p < .01$). The influence of past behavior on outcome-specific cognitions, however, was small (although significant when distraction was low) and did not de-

[8] Response time data were also collected in this experiment. However, because conditions in which participants did not receive behavior feedback were not run, the impact of the feedback on the time to generate behavior-related cognitions could not be directly evaluated. Nevertheless, the response time data obtained under experimental conditions were similar to those obtained in Experiment 2. For example, participants took less time to report their attitudes when they had previously reported outcome-specific beliefs and attitudes than when they had not (Ms = 0.88 s vs. 1.10 s), $F(1, 60) = 7.48$, $p < .01$. This difference is virtually identical to that observed in Experiment 2 (Ms = 0.90 s vs. 1.12 s) and did not depend on the level of distraction experienced ($F < 1$). Other comparisons were equally similar.

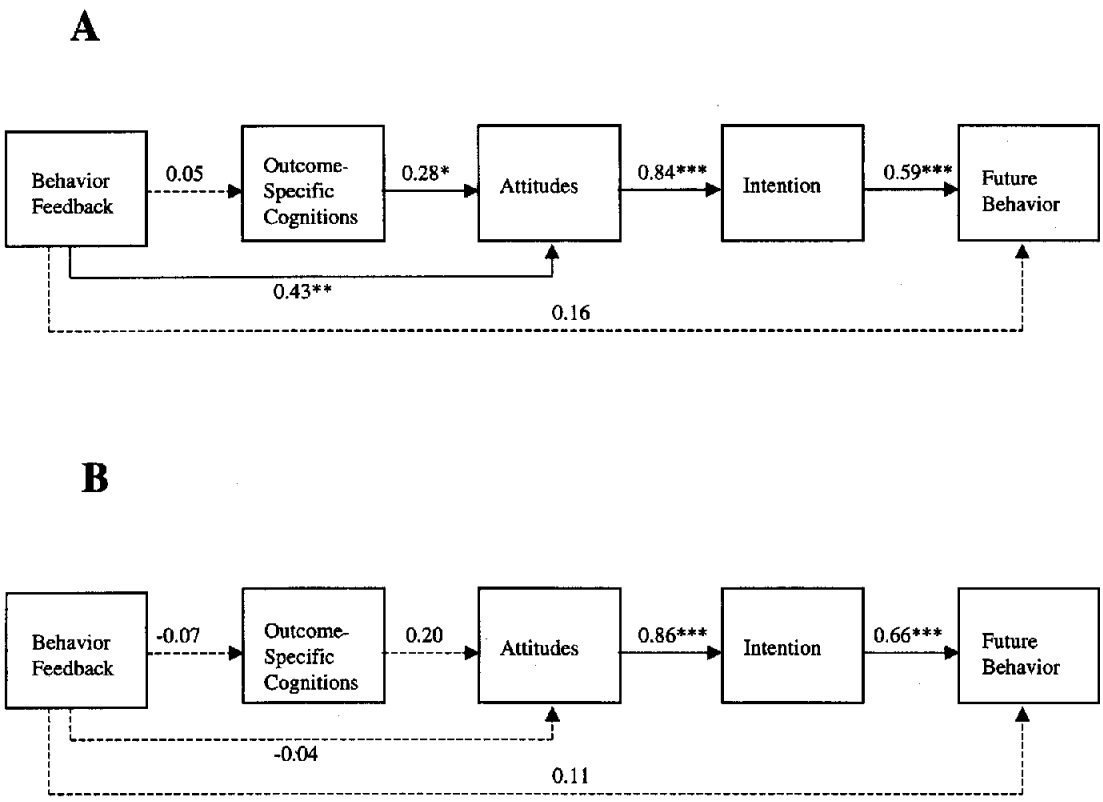

Figure 3. Path analyses from Experiment 3. Panel A: Low distraction. Panel B: High distraction. $^{*}p < .05$. $^{**}p < .01$. $^{***}p < .001$.

pend on the level of distraction that participants experienced. Finally, behavior feedback did not have a direct influence on future behavior at either level of distraction.

Discussion

The results of Experiment 3 provided partial confirmation of the conclusions drawn from Experiment 2. At the same time, they raised further questions concerning the conditions in which persons' perceptions of their past behavior are likely to influence their decisions to repeat the behavior. That is, distracting participants from thinking about the implications of their past behavior decreased the impact of this behavior on their attitudes, intentions, and future behavior, reducing the effects of both biased scanning and self-perception (see Figure 3). Thus, the impact of distraction in this experiment appears to be similar to that observed in the previous study but more pronounced.

The failure for behavior feedback to influence participants' outcome-specific cognitions in low-distraction conditions was nonetheless surprising in light of its influence on attitudes, intentions, and later behavioral decisions. This finding, in combination with the equivocal role of outcome-specific cognitions in Experiment 2, provides weak support for the biased-scanning hypothesis. In retrospect, however, it seemed likely that the processing that underlies the influence of behavior feedback on future behavior decisions depends not only on participants' ability to engage in this processing but also on their motivation to do so. It is conceivable that participants in Experiment 3, which was run at a different point in the semester than Experiment 2, might have had little motivation to think about the comprehensive examinations at all, despite the behavior feedback they received. This lack of motivation, coupled with the effect of distraction, could have eliminated any effect of feedback on outcome-specific cognitions when distraction was low and eliminated any effects of feedback whatsoever when distraction was high.

If this is the case, however, increasing participants' incentive to think about their behavior should reinstate its effects. This possibility was explored in Experiment 4. This experiment was identical to the preceding one except that in this case, we told participants before performing the task on which behavior feedback was provided that they would later be asked to discuss their behavior with the faculty member who was serving as principal investigator of the project. We predicted that creating this expectation would increase participants' desire to justify the behavior they ostensibly performed. However, we further speculated that the effects of this increased motivation would depend on participants' ability to engage in this cognitive activity. That is, participants who were not distracted from thinking carefully about the implications of their past behavior might be more inclined to retrieve previously acquired knowledge that would help them to reassess the specific consequences of their behavior, resulting in outcome-specific judgments that confirmed the desirability of the behavior they had ostensibly performed (i.e., biased scanning). When participants are

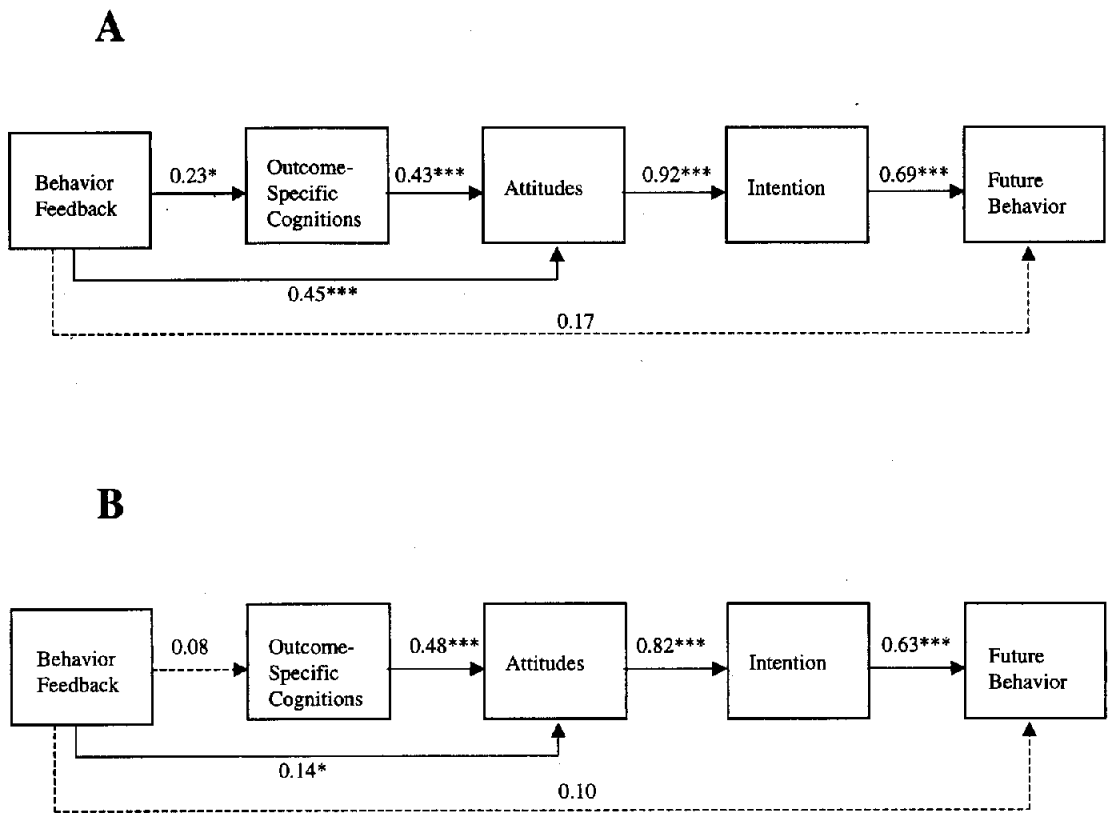

Figure 4. Path analyses for meta-analysis of Experiments 2 and 3. Panel A: Low distraction. Panel B: High distraction. $*p < .05$. $***p < .001$.

distracted from performing this cognitive activity, however, they may nevertheless be motivated to adopt an attitude that is consistent with their behavior and, therefore, may infer this attitude directly from this behavior without considering its specific consequences. As a result, the effects of self-perception processes might be more apparent in high-distraction conditions than they were in the other studies we conducted.

Experiment 4

Method

Participants were 64 introductory psychology students who participated in the experiment for course credit. The design and procedure were identical to those in Experiments 2 and 3 except that, in addition to manipulating past behavior and distraction, participants in all conditions were told that at the end of the study the principal investigator of the project would come in to discuss their answers with them. These participants were randomly allocated to a 2 (behavior feedback: in favor vs. against) × 2 (distraction: low vs. high) factorial. Sixteen participants were assigned to each cell.

Results

Perceived Method Reliability

As in the previous experiments, participants' perceptions of the reliability of the behavior feedback method were not contingent on either the level of distraction experienced (Ms = 5.2 vs. 5.3 for high and low distraction, respectively), $F < 1$, or the nature of the feedback that participants were given about their behavior (Ms = 5.4 vs. 5.1 for voting in favor or against the exams, respectively), $F < 1$.

Judgments and Behavior

Attitudes, intentions, behavioral decisions, and outcome-specific cognitions are shown as a function of behavior feedback and distraction in the last three columns of Table 1. As can be seen, behavior feedback had a strong influence on attitudes, $F(1, 60) = 12.70$, $p < .01$, intentions, $F(1, 60) = 17.50$, $p < .01$, and future behavior, $F(1, 60) = 12.87$, $p < .01$. Unlike Experiments 2 and 3, however, these effects were not at all contingent on distraction ($F < 1$ in all cases). Moreover, this is due largely to an increase in the effect of behavior feedback on attitudes, intentions, and behavior under high-distraction conditions compared with the earlier experiments (see Table 1). Thus, providing an incentive to justify their behavior to others not only increased distracted participants' tendency to report attitudes and intentions that were consistent with the behavior, but also increased their likelihood of deciding to repeat the behavior, and this motivation was sufficient to override the effects of distraction that were evident in Experiments 2 and 3. This conclusion was confirmed by an overall interaction of behavior feedback, distraction, and motivation (Ex-

periment 3 vs. Experiments 1 and 2) on attitudes, intentions, and behavior, $F(4, 210) = 2.66$, $p < .03$.

In contrast, providing this incentive did not increase the effect of past behavior on distracted participants' outcome-specific beliefs and evaluations. The overall effect of past behavior on the composite index of outcome-specific cognitions was significant when distraction was low, $F(1, 60) = 4.67$, $p < .05$, and nonsignificant when distraction was high, $F < 1$. However, although this effect was not significantly contingent on distraction, $F(1, 60) = 2.37$, $p > .10$, it seems clear that the effect of behavior feedback was restricted to conditions in which distraction was low (−31.2 vs. −74.0, when the feedback favored vs. opposed comprehensive exams, respectively); it had very little impact on these cognitions when distraction was high (−33.3 vs. −37.7, respectively).

Thus, it seems reasonable to conclude that when participants were not distracted from thinking about the implications of outcome-specific beliefs and evaluations for their attitudes, increasing their motivation to justify their behavior may have led them to modify their estimates of the likelihood and desirability of its consequences in a way that confirmed the legitimacy of this behavior. When participants were distracted, however, and thus were prevented from performing this cognitive activity, they adopted behavior-consistent attitudes without appreciably altering their beliefs and evaluations of its consequences.

Path Analyses

Path analyses confirmed these conclusions. The path model applied in Experiment 3 was again applied to data obtained in each distraction condition separately, on the basis of the correlations shown in the Appendix. The fit of the model was again satisfactory (see Table 2). The significant paths implied by the model applied in each distraction condition, shown in Figure 5, indicate that participants' perceptions of their past behavior had a direct impact on attitudes in both distraction conditions. Moreover, this effect was nonsignificantly greater when participants were distracted from thinking carefully about their past behavior than when they were not. However, whereas past behavior had a significant impact on outcome-specific cognitions under low-distraction conditions, it was totally unrelated to these cognitions when distraction was high. (The difference between the two coefficients, however, was nonsignificant.) These results are therefore consistent with the conclusion that motivating persons to justify their behavior to others induced them to revise their attitudes to be consistent with the implications of their behavior. Furthermore, this revision was mediated in part by changes in cognitions about specific behavior outcomes when distraction was low. When distraction was high, however, participants inferred their attitude to be consistent with their behavior without engaging in this cognitive activity, as implied by the self-perception hypothesis.

General Discussion

The fact that persons' past behavior influences their future behavioral decisions may seem rather obvious. For reasons suggested earlier, however, a convincing empirical demonstration of this influence has been elusive. By inducing participants to believe they had engaged in a behavior without conscious awareness, we

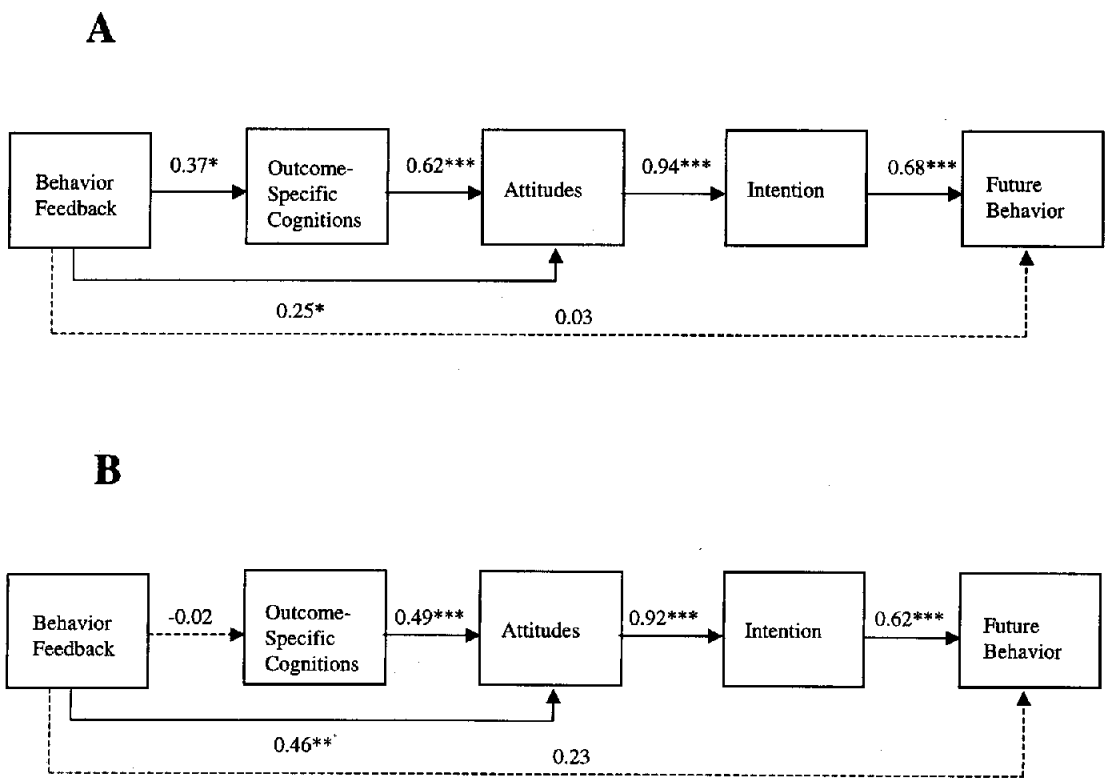

Figure 5. Path analyses from Experiment 4. Panel A: Low distraction. Panel B: High distraction. $*p < .05$. $**p < .01$. $***p < .001$.

not only confirmed the causal influence of this behavior on future decisions but also gained insight into the cognitive processes that are likely to mediate this effect.

Fishbein and Ajzen (1975) assumed that people combine their estimates of the desirability and likelihood of specific consequences of a behavior to form an attitude toward the behavior (Equation 1) and that their behavioral intentions and ultimate decisions to perform the behavior are based on this attitude. This sequence of cognitive operations may indeed underlie many behavioral decisions. However, our results indicate that when people are made aware of the past behaviors they have performed, this behavior can often have a direct impact on their attitudes and intentions independently of any specific consequences of the behavior that the individuals might otherwise take into account.

It might seem reasonable to suppose that participants are more likely to use their past behavior as a basis for their future behavioral decisions if they do not have the motivation or ability to think carefully about the consequences of performing it at the time these decisions are made. If this were so, however, distracting participants from thinking about the consequences of their past behavior or its implications for their attitudes should increase the impact of this behavior on their decisions. More generally, however, the opposite was the case. That is, in Experiments 2 and 3, distraction decreased the impact of behavior feedback on attitudes, intentions, and decisions. In these cases, the impact of past behavior on future behavior was mediated in part by effortful cognitive activity, and factors that interfered with this activity decreased the behavior's impact.

In conceptualizing the possible ways that persons' perceptions of their past behavior might influence their decisions to repeat it, we considered four alternative hypotheses. The processes implied by these hypotheses were not mutually exclusive, and we expected that several might potentially contribute to the influence of past behavior. In the conditions we investigated, two processes appeared to predominate. However, several considerations arise in evaluating the generality of their occurrence.

Dissonance Reduction and Biased Scanning

Two cognitive processes—dissonance reduction and biased scanning—were hypothesized to underlie the impact of people's perceptions of their past behavior on their judgments and later behavioral decisions. Although dissonance reduction is likely to govern attitude and belief change in many situations (cf. Wicklund & Brehm, 1976), there was little evidence of its occurrence in the conditions we investigated in the present research. According to dissonance theory, participants who become aware of a past behavior that is inconsistent with previously formed attitudes and beliefs are motivated to change these attitudes and beliefs in a way that makes them consistent with the behavior. However, Experiment 2 provided no indication that participants' cognitive reactions to the behavior feedback they received depended on the nature of their previously formed attitudes toward the behavior or the object toward which it was directed (i.e., comprehensive examinations). That is, participants' cognitive reactions to the behavior feedback they received were independent of the consistency of this feedback with their preexperiment attitudes.

Our findings were somewhat more compatible with the biased-scanning hypothesis. That is, persons who become aware of their past behavior may be stimulated to conduct a selective review of memory for previously acquired knowledge that justifies this behavior, and this may occur independently of their preexperiment attitudes. The fact that behavior feedback decreased the amount of time that participants took to report their outcome-specific beliefs and evaluations is compatible with the assumption that these outcomes were spontaneously retrieved and evaluated on receipt of this feedback. Furthermore, distracting participants from thinking carefully about the implications of their past behavior typically decreased its impact on participants' attitudes, which suggests that the influence of the behavior decreases when this spontaneous cognitive activity is disrupted.

Further research is nevertheless required to obtain a complete understanding of biased scanning. We assumed that the effects of biased scanning would be reflected in the influence of behavior feedback on the outcome-specific beliefs and evaluations that participants reported. In fact, this influence was not evident in Experiment 3. As we noted earlier, however, the outcomes that participants judged in the present experiment were likely to come to mind spontaneously when thinking about comprehensive examinations. It is therefore conceivable that participants considered these outcomes regardless of the type of feedback they received about their behavior. The effects of biased scanning may be more evident in the selective retrieval and evaluation of consequences that are less easily accessible and, therefore, require a more intensive search of memory. If this is so, it could account for the evidence that behavior feedback typically had weaker effects on the particular subset of outcome-specific beliefs and evaluations we assessed, despite its more pronounced effects on participants' attitudes, intentions, and behavior decisions. It could also explain why distraction had a greater impact on the effect of behavior feedback on the participants' attitudes than it had on their outcome-specific cognitions.

Other considerations are worth noting in this context. For example, Fazio (1986) suggested that if an attitude is strongly associated with an object (or behavior) toward which it is directed, exposure to this object (behavior) may spontaneously activate this attitude (Fazio, 1990). Thus, in the present research, the feedback participants received about their support for or opposition to comprehensive exams might spontaneously activate a preexisting attitude toward these exams, and this preexisting attitude, once activated, could provide a basis for the postbehavior attitude that participants reported. Results of the path analyses performed in Experiment 2 suggest that this possibility might have taken place (see Figure 2). However, the effect of behavior on attitude accessibility cannot easily account for the results we obtained in the present research. That is, if behavior feedback cued the retrieval of previously formed attitudes, the effects of the feedback should be negligible, whereas the influence of the cued prior attitudes should be marked.

Note that the procedures we used in Experiment 4 presumably motivated participants to appear consistent in the eyes of others rather than to justify their behavior to themselves. There are theoretical reasons to distinguish between these two motives (e.g., Tedeschi, Schlenker, & Bonoma, 1971). However, Schlenker (1980, 1982) suggested that even if the effects of a past behavior on beliefs and attitudes are the result of a desire to appear consistent to others, these effects are likely to produce a true underlying attitude change. Moreover, empirical support for this possibility

was obtained by Higgins and McCann (1984). Nevertheless, similarities and differences in the cognitive dynamics that underlie the justification of one's behavior to oneself and justification of one's behavior to others warrant further consideration. The procedure used in the present research could be useful in this effort.

Self-Perception and Heuristic Processes

On the basis of self-perception theory, we speculated that people who become aware of a past behavior are likely to infer their attitude from this behavior and that this attitude would then mediate their decision to repeat the behavior later. We also considered the possibility that persons use their past behavior as a heuristic basis for their later decisions without considering their attitude toward it at all. Although we obtained consistent support for the first hypothesis, we found no evidence for the second. That is, path analyses failed to detect a direct influence of participants' past behavior on their future behavioral decisions in any of the experiments we conducted. The conclusion that persons never base their behavior decisions directly on their past behavior would, of course, be unjustified. In the research paradigm we constructed, participants reported their attitudes in the questionnaire we administered before they were given an opportunity to repeat the behavior. This procedure undoubtedly increased the salience of these attitudes and consequently may have increased the likelihood that participants based their behavioral decisions on these attitudes rather than on their past behavior directly. A demonstration that past behavior affects future behavior under conditions in which participants' attitudes are not assessed would be desirable.

The procedures we used should also be considered in evaluating the consistency of our results with self-perception theory. Bem (1972) postulates that people often do not form their attitudes from the behavior until they are explicitly asked to report them. This hypothesis suggests that persons might not have formed an attitude from the behavior feedback they received if they had not been required to report it in the questionnaire (see Wilson, Lindsey, & Schooler, 2000). The evidence that behavioral feedback decreased the time that participants took to report their attitudes could indicate that the feedback stimulated participants to form their attitudes spontaneously, thus allowing them to report these attitudes more quickly when later asked to do so. This finding, however, could also mean that participants inferred their attitude at the time of judgment in all cases but that they did so more quickly and easily when a judgment-relevant criterion (i.e., a recent behavior) was salient to them.

Be that as it may, there are contingencies in the conditions in which self-perception processes occur. For example, path analyses of the data in Experiments 2 and 3 suggest that distraction decreased participants' tendency to infer their past behavior from their attitudes, despite the fact that this inference required little cognitive effort. This effect of distraction, however, was reversed when participants were given an extrinsic incentive to justify their behavior to others (see Figure 4). Apparently, when participants are unmotivated as well as unable to think carefully about their past behavior, they do not even use this behavior as a heuristic basis for their attitudes. Thus, the use of past behavior as a basis for attitudes may be most likely when people are motivated to justify their behavior to others but find it difficult to assess the implications of specific behavioral consequences that bear on its appropriateness.

Two additional considerations are necessary when evaluating the role of self-perception processes in the present research. First, the conclusions drawn from Experiment 4 might seem inconsistent with evidence that motivation increases systematic processing. However, this increase has generally been observed when persons have two external sources of information available, one of which is more difficult to evaluate than the other, and when persons differ in their motivation to make an accurate judgment (cf. Chaiken, 1987; Chaiken, Liberman, & Eagly, 1989; Petty & Cacioppo, 1986). In the present case, however, only one source of new information (one's past behavior) was available, and participants were motivated to justify their behavior to others, independent of accuracy. To provide this justification, participants who are distracted from thinking about other reasons for their behavior may be inclined to infer that it is a result of their general attitudes and to respond accordingly.

Second, the conclusion that persons' use of their past behavior as a basis for their attitudes and intentions was independent of the attitudes they had formed before taking part in the experiment might seem to conflict with the hypothesis that self-perception processes have less influence when internal standards for judgment are strong (e.g., Chaiken & Baldwin, 1981; Tybout & Scott, 1983; Wood, 1982). In Chaiken and Baldwin's (1981) study, for example, participants with poorly defined prior attitudes became more proenvironmentalist after being asked to report their agreement with a number of proenvironmental policies but became less proenvironmentalist after being asked to report their disagreement with these policies. However, the effects were not evident among participants who had well-defined attitudes about ecological matters. In Chaiken and Baldwin's study, however, participants' preexperiment beliefs were made salient by the framing of the questions they were asked. This procedure could lead these beliefs to have an impact on the attitudes they reported later over and above their behavior of agreeing or disagreeing per se (see also, Killeya & Johnson, 1998). In contrast, participants' perceptions of their behavior in the present research were influenced without explicitly calling their attention to any previously formed cognitions to which their attitudes were relevant. In combination, therefore, the two sets of studies suggest that the critical factor underlying the occurrence of self-perception processes may not be whether persons actually hold strong a priori beliefs about the issues of concern but rather whether these beliefs are salient at the time attitudes are reported (Bem & McConnell, 1970).

Final Comment

In conclusion, the present research provides several new insights into the effect of past behavior on future behavior and the cognitions that mediate this effect. Furthermore, the methodology we used, in which participants' past behavior was made salient to them without their awareness that they had engaged in it, clearly eliminates any possibility that its impact on later decisions was the result of some third factor that had a common influence on both. Thus, the causal impact of past behavior on later decisions was clearly established under the conditions we investigated. Moreover, the fact that this impact decreased with distraction, rather than increasing, indicates that it was not simply due to participants'

use of their past behavior as a heuristic basis for judgment when they were unable or unmotivated to think carefully about the decision they were called on to make. As is the case in any research that uses a new methodological paradigm, ambiguities exist in the interpretation of the results. However, the combination of judgment data and response times, supplemented by path analyses, provides a reasonably clear picture of these processes and when they occur. Further research using this methodology therefore appears warranted.

References

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behavior.* Englewood Cliffs, NJ: Prentice-Hall.

Albarracin, D. (1997). *Elaborative and nonelaborative processing of a behavior-related communication.* Unpublished doctoral dissertation, University of Illinois.

Bargh, J. A. (1997). The automaticity of everyday life. In R. S. Wyer (Ed.), *Advances in social cognition* (Vol. 10, pp. 1–62). Mahwah, NJ: Erlbaum.

Bem, D. J. (1965). An experimental analysis of self-persuasion. *Journal of Experimental Social Psychology, 1,* 199–218.

Bem, D. J. (1967). Self-perception: An alternative interpretation of cognitive dissonance phenomena. *Psychological Review, 74,* 183–200.

Bem, D. J. (1972). Self-perception theory. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 6, pp. 1–62). San Diego, CA: Academic Press.

Bem, D. J., & McConnell, H. K. (1970). Testing the self-perception explanation of dissonance phenomena: On the salience of premanipulation attitudes. *Journal of Personality and Social Psychology, 14,* 23–31.

Bentler, P. M., & Speckart, G. (1979). Models of attitude–behavior relations. *Psychological Review, 86,* 452–464.

Bentler, P. M., & Speckart, G. (1981). Attitudes "cause" behaviors: A structural equation analysis. *Journal of Personality and Social Psychology, 40,* 226–238.

Budd, R. J., North, D., & Spencer, C. (1984). Understanding seat-belt use: A test of Bentler and Speckart's extension of the theory of reasoned action. *European Journal of Social Psychology, 14,* 69–78.

Chaiken, S. (1987). The heuristic model of persuasion. In M. P. Zanna, J. M. Olson, & C. P. Herman (Eds.), *Social influence: The Ontario symposium* (Vol. 5, pp. 3–39). Hillsdale, NJ: Erlbaum.

Chaiken, S., & Baldwin, M. W. (1981). Affective-cognitive consistency and the effect of salient behavioral information on the self-perception of attitudes. *Journal of Personality and Social Psychology, 41,* 1–12.

Chaiken, S., Liberman, A., & Eagly, A. H. (1989). Heuristic and systematic information processing within and beyond the persuasion context. In J. S. Uleman & J. A. Bargh (Eds.), *Unintended thought* (pp. 212–252). New York: Guilford Press.

Cialdini, R. B. (1988). *Influence: Science and practice* (2nd ed.). Glenview, IL: Scott, Foresman.

Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes.* San Diego, CA: Harcourt Brace.

Fazio, R. H. (1986). How do attitudes guide behavior? In R. M. Sorrentino & E. T. Higgins (Eds.), *Handbook of motivation and cognition: Foundations of social behavior* (pp. 204–243). New York: Guilford Press.

Fazio, R. H. (1990). Multiple processes by which attitudes guide behavior: The MODE model as an integrative framework. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 23, pp. 75–109). San Diego, CA: Academic Press.

Fazio, R. H., Zanna, M. P., & Cooper, J. (1977). Dissonance and self-perception: An integrative view of each theory's proper domain of application. *Journal of Experimental Social Psychology, 13,* 464–479.

Festinger, L. (1957). *A theory of cognitive dissonance.* Evanston, IL: Row, Peterson.

Festinger, L., & Carlsmith, J. M. (1959). Cognitive consequences of forced compliance. *Journal of Abnormal and Social Psychology, 58,* 203–210.

Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behavior. An introduction to theory and research.* Reading, MA: Addison-Wesley.

Hedges, L. V., & Olkin, I. (1985). *Statistical methods for meta-analysis.* Orlando, FL: Academic Press.

Higgins, E. T., & McCann, C. D. (1984). Social encoding and subsequent attitudes, impressions, and memory: "Context-driven" and motivational aspects of processing. *Journal of Personality and Social Psychology, 47,* 26–39.

Hu, L., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model specification. *Psychological Methods, 3,* 424–453.

Huynh, H., & Feldt, L. S. (1970). Conditions under which mean square ratios in repeated measurements designs have exact *F*-distributions. *Journal of the American Statistical Association, 65,* 1582–1589.

Janis, I. L., & King, B. T. (1954). The influence of role playing on opinion change. *Journal of Abnormal and Social Psychology, 49,* 211–218.

Killeya, L. A., & Johnson, B. T. (1998). Experimental induction of biased systematic processing: The directed-thought technique. *Personality and Social Psychology Bulletin, 24,* 17–33.

Liska, A. E. (1984). A critical examination of the causal structure of Fishbein/Ajzen attitude–behavior model. *Social Psychology Quarterly, 47,* 61–74.

Mittal, B. (1988). Achieving higher seat belt usage: The role of habit in bridging the attitude–behavior gap. *Journal of Applied Social Psychology, 18,* 993–1016.

Ouellette, J. A., & Wood, W. (1998). Habit and intention in everyday life: The multiple processes by which past behavior predicts future behavior. *Psychological Bulletin, 124,* 54–74.

Petty, R. E., & Cacioppo, J. T. (1986). *Communication and persuasion. Central and peripheral routes to attitude change.* New York: Springer-Verlag.

Schlenker, B. R. (1980). *Impression management: The self-concept, social identity, and interpersonal relations.* Monterey, CA: Brooks/Cole.

Schlenker, B. R. (1982). Translating actions into attitudes: An identity-analytic approach to the explanation of social conduct. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 15, pp. 193–247). San Diego, CA: Academic Press.

Schumacker, R. E., & Lomax, R. G. (1996). *A beginner's guide to structural equation modeling.* Mahwah, NJ: Erlbaum.

Simon, L., Greenberg, J., & Brehm, J. (1995). Trivialization: The forgotten mode of dissonance reduction. *Journal of Personality and Social Psychology, 68,* 247–260.

Skinner, B. F. (1953). *Science and human behavior.* New York: Macmillan.

Stroebe, W., & Diehl, M. (1981). Conformity and counterattitudinal behavior: The effect of social support on attitude change. *Personality and Social Psychology Bulletin, 14,* 136–144.

Taylor, S. E. (1975). On inferring one's attitudes from one's behavior: Some delimiting conditions. *Journal of Personality and Social Psychology, 31,* 126–131.

Tedeschi, J. T., Schlenker, B. R., & Bonoma, T. V. (1971). Cognitive dissonance: Private ratiocination or public spectacle? *American Psychologist, 26,* 685–695.

Triandis, H. C. (1977). *Interpersonal behavior.* Monterey, CA: Brooks/Cole.

Triandis, H. C. (1980). *Values, attitudes, and interpersonal behavior.* In H. E. Howe, Jr. & M. M. Page (Eds.), *Nebraska Symposium on Motivation: Vol. 27. Beliefs, attitudes and values, 1979* (pp. 195–259). Lincoln: University of Nebraska Press.

Tybout, A. M., & Scott, C. A. (1983). Availability of well-defined internal knowledge and the attitude formation process: Information aggregation versus self-perception. *Journal of Personality and Social Psychology, 44,* 474–491.

Wicklund, R. A., & Brehm, J. W. (1976). *Perspectives on cognitive dissonance.* Hillsdale, NJ: Erlbaum.

Wilson, T. D., Lindsey, S., & Schooler, T. Y. (2000). A model of dual attitudes. *Psychological Review, 107,* 101–126.

Wood, W. (1982). Retrieval of attitude-relevant information from memory: Effects on susceptibility to persuasion and on intrinsic motivation. *Journal of Personality and Social Psychology, 42,* 798–810.

Zanna, M. P., & Aziza, C. (1976). On the interaction of repression-sensitization and attention in resolving cognitive dissonance. *Journal of Personality, 44,* 577–593.

Zanna, M. P., Lepper, M. R., & Abelson, R. P. (1973). Attentional mechanisms in children's devaluation of a forbidden activity in a forced compliance situation. *Journal of Personality and Social Psychology, 28,* 355–359.

Appendix

Correlation Matrices

	1	2	3	4	5	6
Experiment 2						
1. Prior attitudes[a]	—	.02	.23	.38*	.54***	.40***
2. Past behavior	.00	—	.17	.32*	.30*	.28*
3. Outcome cognitions	.12	.33*	—	.64***	.60***	.49***
4. Attitudes	.26	.53***	.62***	—	.78***	.64***
5. Intentions	.30*	.53***	.60***	.93***	—	.65***
6. Future behavior	.29*	.54***	.54***	.77***	.83***	—
Experiment 3						
2. Past behavior		—	−.07	−.05	−.03	.09
3. Outcome cognitions		.05	—	.20	.28	.24
4. Attitudes		.44**	.30	—	.86***	.62***
5. Intentions		.55***	.17	.84***	—	.66***
6. Future behavior		.48**	.30	.40*	.67***	—
Meta-analysis of Experiments 2 and 3						
2. Past behavior		—	.08	.18*	.18*	.21*
3. Outcome cognitions		.22*	—	.49***	.49***	.40**
4. Attitudes		.50***	.51***	—	.82***	.63***
5. Intentions		.54**	.45***	.90***	—	.65***
6. Future behavior		.52***	.45***	.66***	.78***	—
Experiment 4						
2. Past behavior		—	−.03	.36*	.51***	.50**
3. Outcome cognitions		.37*	—	.54**	.32	.32
4. Attitudes		.47**	.66***	—	.88***	.66***
5. Intentions		.44**	.66***	.88***	—	.67***
6. Future behavior		.33	.51**	.63***	.66***	—

Note. Correlations below and above the diagonal correspond to low and high distraction, respectively.
[a] Prior attitudes were measured only in Experiment 2.
* $p < .05$. ** $p < .01$. *** $p < .001$.

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