

Intentional Forgetting Can Increase, Not Decrease, Residual Influences of To-Be-Forgotten Information

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Intentionally forgotten information remains in memory at essentially full strength, as measured by recognition and priming, but access to that information is impaired, as measured by recall. Given that pattern, it seemed plausible that intentionally forgotten information might have a greater impact on certain subsequent judgments than would intentionally remembered information. In 2 experiments, participants cued to forget nonfamous names were subsequently more likely to make false attributions of fame to those names than were participants instructed to remember them. These findings implicate retrieval inhibition as a potent factor in the interplay of recollection and priming in memory and judgment. They also point to possible unintended consequences of instructions to forget, suppress, or disregard in legal or social settings.

Forgetting—although typically a major complaint people have about their memories—is often exactly what individuals need to do to keep their memories functioning effectively in a changing world. Put differently, as we and others have argued (e.g., E. L. Bjork & Bjork, 1988, 1996; R. A. Bjork, 1972; Geiselman, Bjork, & Fishman, 1983; MacLeod, 1998), an efficient memory system needs some means to suppress information that is out of date and a possible source of errors and interference.

Research on directed, or intentional, forgetting suggests that a key mechanism of forgetting, as an updating process, is retrieval inhibition. When people are cued, explicitly or implicitly, that previously learned information needs to be forgotten and replaced with new information, a process is initiated that inhibits the subsequent retrieval of the to-be-forgotten (TBF) information. Such retrieval inhibition serves to reduce, and can eliminate, the interference due to the TBF information on the subsequent retrieval of to-be-remembered (TBR) information (e.g., R. A. Bjork, 1972; E. L. Bjork & Bjork, 1996). As indexed by measures other than retrieval, however, the TBF information remains in memory, typically at full strength. For example, TBF items can be recognized as well as comparable TBR items (Block, 1971; Elmes, Adams, & Roediger, 1970; Geiselman et al., 1983; Gross, Barresi, & Smith, 1970) and can be relearned as readily as TBR items (e.g., Geiselman & Bagheri, 1985; Reed, 1970). Additionally, under certain conditions, the proactive interference of TBF items that is diminished or eliminated in response to the forget cue can be reinstated at full strength, such as when TBF items are encountered as foils on a recognition test for TBR items (E. L. Bjork & Bjork, 1996; E. L. Bjork, Bjork, & Glenberg, 1973).

Indirect measures of retention also provide evidence that intentionally forgotten information remains in memory at essentially

full strength, even when access to that information, as measured by recall tests, is impaired (e.g., Basden, Basden, & Gargano, 1993; E. L. Bjork & Bjork, 1996; E. L. Bjork, Bjork, & Kirkpatrick, 1990). In a study by E. L. Bjork and Bjork (1996), for example, TBF items primed subsequent completions on a word-fragment-completion test to the same extent as did comparable TBR items, even when retrieval access to the TBF items remained inhibited.

Possible Consequences of Preserved Storage and Impaired Access

Given the evidence that intentionally forgotten information continues to reside in memory and to have indirect influences on behavior, it seems possible that the indirect influences of forgotten information might actually be greater than those of intentionally remembered information in certain situations. Of particular concern in this regard would be situations in which indirect influences could contaminate or impair some judgment; that is, situations in which optimal performance depends on recollection to check or mitigate undesirable indirect effects. To create such a situation in which to test this possibility, we capitalized on the false-fame paradigm and results of Jacoby and his colleagues (e.g., Jacoby, Kelley, Brown, & Jasechko, 1989).

In the false-fame paradigm of Jacoby et al. (1989), participants were first asked to read a list of names aloud as part of a pronunciation task. Following this task, some participants were immediately required to engage in a fame-judgment task, whereas others did so on the following day. In this task, participants saw a series of famous and nonfamous names and, for each, were asked to judge whether it was the name of a famous person. Half of the presented nonfamous names had appeared in the earlier pronunciation task and thus were *old* nonfamous names, and half were *new*. The remaining names were those of moderately famous people, that is, names recognizable as famous but not so famous that the reason for their fame could generally be specified. Before beginning this task, participants were told that some of the names they would see had been presented in the earlier pronunciation task, and they were reminded that all of the names in that task had been

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nonfamous. Thus, if they recognized a name during the fame-judgment task as one from the earlier task, they could know it was a nonfamous name. In essence, then, participants were given a rule that could be used whenever they encountered a name that seemed familiar but that they could not specifically recollect as being the name of a famous person. If they could recollect that it had appeared in the pronunciation task, then they could know to judge it as being nonfamous despite its familiarity.

Of primary interest was whether participants in the immediate and delayed conditions would respond differently to old and new nonfamous names, and their pattern of responding to such names proved to be markedly different. On the immediate test, the proportion of old nonfamous names judged to be famous was .12, and the corresponding proportion for new nonfamous names was .21. After 24 hrs, however, the proportion of old nonfamous names called famous was .16, whereas the corresponding proportion for new nonfamous names was .08.

As interpreted by Jacoby et al. (1989), this complete reversal in the pattern of false-fame judgments arises because the priming effects attributable to a nonfamous name's prior occurrence in the pronunciation task persist across 24 hrs, whereas the ability to recollect that a given name appeared in that task is largely lost at that point. The combination of preserved priming, making the name seem familiar, and impaired recollection thus creates an attribution problem. To what should that familiarity be attributed? For participants tested immediately, it can typically be attributed to the name's occurrence in the earlier task, but if the ability to recall whether a given name occurred during that earlier task is impaired, as was apparently the case at 24 hrs, an attribution problem arises. One may think that a given name, "Sebastian Weisdorf," for example, is familiar because it is the name of an artist or actor to whom one has been exposed in the media. To the extent a participant arrives at that decision, Sebastian Weisdorf, to quote Jacoby et al. (1989), can become "famous overnight" (p. 326).

The Present Paradigm and Hypothesis

In the false-fame paradigm, whether a given nonfamous name is recollected as having occurred earlier has a dramatic effect on later judgments of fame. If recollection succeeds, the name is surely not famous, but if recollection fails, the familiarity of the name might be attributable to its occurrence in the media rather than in the present context. Thus, this paradigm represents just the type of situation in which we suspected information intentionally forgotten might have a greater effect on one's judgment than would information intentionally remembered.

To test this possibility, we combined features of the false-fame paradigm and the list method of directed forgetting into a single paradigm that included the three tasks illustrated in Figure 1. During the memory task, all participants received a first list of nonfamous names to study for a later memory test. Participants receiving a forget-remember (FR) list were then told that this first list had been presented in error, that they had accidentally been shown a list of nonfamous names, whereas they should have been shown a list of famous names. They were thus instructed to forget that first list of names, and a second list of famous names was presented. Participants receiving a remember-remember (RR) list were told that the first list con-

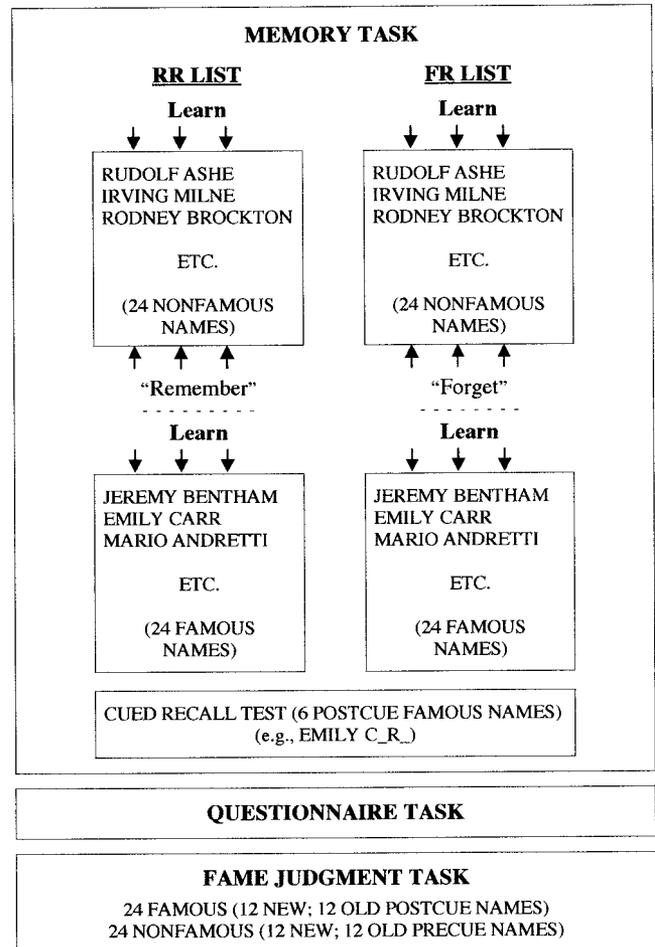


Figure 1. Pictorial illustration of the paradigm and tasks used in Experiment 1. RR = remember-remember condition; FR = forget-remember condition.

tained only nonfamous names and they would now be presented with a second list to remember that would contain only famous names. Next, all participants received a cued-recall test for a few famous names to give a sense of closure to the memory task. Then, following a brief questionnaire task, all participants engaged in a fame-judgment task in which some of the famous and nonfamous names presented were ones that had also been presented earlier in the memory task.

Our primary interest was how old nonfamous names would be judged when participants were cued to forget them versus to remember them. We hypothesized that if an instruction to forget the list of nonfamous names does not diminish the indirect effects of a given nonfamous name's prior presentation but does impair participants' ability to recollect that the name was on that list, there should be an increased tendency for participants to label such names incorrectly as famous. In short, the tendency for participants to misattribute the familiarity of old nonfamous names to real-world fame should be exacerbated when they are instructed to forget those names rather than to remember them.

Experiment 1

Method

Participants. A total of 48 students attending the University of California, Los Angeles, participated in partial fulfillment of an introductory psychology course requirement.

Design. The design was a four-way mixed factorial. The one between-subjects variable, list type (FR vs. RR), had 24 participants assigned to each condition. The remaining within-subjects variables were fame status (famous vs. nonfamous), presentation status (old vs. new), and judged order (first half vs. second half) of the judged names. The dependent variable was the proportion of famous judgments made to each type of name during the fame-judgment task.

Materials. Two memory lists (Versions 1 and 2), each containing 24 nonfamous names in the precue part of the list and 24 famous names in the postcue part of the list, were constructed from a subset of the names used by Jacoby et al. (1989), and half the participants ($n = 12$) in each memory condition were randomly assigned to receive one of these versions, which were created as follows. From an original pool of 36 nonfamous names, 24 names were randomly selected to constitute the precue part of Version 1. From each one third of this list, 4 names were randomly selected to appear as the old nonfamous names in the fame-judgment task, and these 12 names were randomly replaced by the remaining 12 nonfamous names from the original pool to create the precue part of Version 2. Thus, the precue parts of Versions 1 and 2 contained 12 identical and 12 different nonfamous names. For participants receiving Version 1, the 12 different names in Version 1 appeared as old nonfamous names and the 12 different names in Version 2 appeared as new nonfamous names in the fame-judgment task. For participants receiving Version 2, the reverse was true. The two postcue parts of each list, which contained only famous names, were constructed in the identical manner and then randomly assigned to be the postcue part of Version 1 or Version 2.

Owing to this construction and the assignment of participants to the two versions, names appearing as old nonfamous and famous names, respectively, in the fame-judgment task for a random half of the participants appeared as new nonfamous and famous names, respectively, for the other half of the participants and vice versa. Thus, across participants and for both memory conditions, the same names appeared equally often as old and new nonfamous names and as old and new famous names, respectively, in the fame-judgment task.

A questionnaire consisting of geography and history questions was constructed to serve as an engaging 5-min distractor task between the memory and fame-judgment tasks.

Four versions of the fame-judgment list were created. Versions 1 and 2 corresponded to Versions 1 and 2 of the memory list in terms of the counterbalancing of old and new names. Thus, items appearing as old nonfamous names and old famous names in Version 1 appeared as new nonfamous names and new famous names, respectively, in Version 2. Each version presented 48 names, 12 of each type, randomly ordered except that the same type could not appear more than twice in succession and 6 of each type had to occur in the first and second halves so that the second half would be a replication of the first. Versions 3 and 4 were created by reversing the first and second halves of Versions 1 and 2, respectively. For participants receiving Version 1 and 2 of the memory list, half ($n = 12$)—in both memory conditions—were randomly assigned to receive Versions 1 and 3 or Versions 2 and 4, respectively, of the fame-judgment list. This construction and assignment of participants allowed a comparison of performance, unbiased by specific item effects, across the two halves of the fame-judgment task.

Procedure. Each participant was seated at a computer in a testing room and informed that he or she would be performing several tasks to see if a relationship existed between one's ability to learn names and to perform other tasks. All participants were told that the first task would present a list of names on the screen, at a rate of 5 s each, and they were to try to learn

them for a later memory test. The experimenter explained that after beginning the program, he would leave the room and that soon thereafter a message would appear instructing the participant to start the list when ready by hitting any key. The experimenter then left the room, and the participant began the list when ready.

At the end of the list, the experimenter returned to the testing room. At this point, for FR participants only, he pretended to discover that he had made a mistake, explaining that he had presented a list of nonfamous names when he should have presented a list of famous names. The participant was then told to forget all the nonfamous names that had been presented by mistake, that they would not be on the memory test, and that the participant should now try to learn the correct list of famous names to be presented next. The experimenter further clarified that the famous names would not be those of very famous people, only slightly famous people, so the participant should not be disconcerted if he or she was not able to recognize all of them. As before, the experimenter then started the program and left the room. When ready, the participant began the list of famous names, which also appeared at a 5-s rate.

For RR participants, the experimenter, upon returning to the testing room, explained that the names just presented had all been nonfamous ones and that the participant should try to keep remembering them for a later memory test. He then explained that a list of famous names would be presented next and that the participant should try to learn these names as well for the later test. From this point, instructions concerning the list of famous names were the same as in the FR condition.

After the last famous name was presented, the experimenter returned and explained that a cued-recall test for some of the names would now be given. In this test, the first name and some letters of the last name appeared as cues for six of the famous names, and participants typed their responses into the keyboard. The purpose of the test was to give a sense of closure to the memory task, no responses were collected, and no name tested appeared in the fame-judgment task later.

After the cued-recall test, participants were given 5 min to work on the questionnaire, after which the experimenter returned to the testing room. At that point, the experimenter informed participants that the next task would assess their knowledge of famous people. They were told that names would be presented, one at a time, and that they were to decide whether each name was that of a famous person and then press one of two keys on the number pad of the keyboard labeled *y* (for *yes*) and *n* (for *no*), doing so as quickly and accurately as possible. They were also informed that the famous names presented would be those of only slightly famous people and that they would not be asked to report the basis for their decision.

The above instructions were delivered to all participants. Thereafter, for FR participants, the experimenter went on to say, in an ad-lib fashion, that some of the nonfamous names appearing in the fame-judgment task might be ones that had been in the list shown to them earlier by mistake. They were then reminded that this incorrect list had presented only nonfamous names. Thus, it was pointed out, if they were trying to decide whether a given name was famous, and just happened to remember that it was a name on that first list presented by mistake, then they could be sure that it was not a famous name. They were also informed that some of the famous names appearing in the fame-judgment task might be ones that were presented in the second list—that is, the correct list. Thus, again, if they were trying to decide whether a given name was famous and could remember that it was a name presented on the second list, then they could be sure that it was the name of a famous person. For RR participants, the experimenter, also in an ad-lib manner, gave the same advice but with reference to the “first list” and “second list,” rather than the “list presented by mistake” and the “correct” list.

Results

The effect of judged order, included in Experiment 1 as a way of checking whether performance changed over the course of the

fame-judgment task, was not significant by a planned comparison, $F(1, 40) = 0.27$, $MSE = 0.97$, $p > .50$, so the results presented below have been collapsed across the first and second halves of the judgment task.

Famous names. The proportions of old and new famous names judged to be famous by FR and RR participants are shown in Figure 2A. In this and all other comparisons between old and new names, it should be remembered that across participants, given the counterbalancing procedures, nothing is different about the two sets of names other than whether they were or were not presented in the experiment. As appears to be the case in Figure 2, and as confirmed by planned comparisons, the proportions of famous judgments made to old famous names by FR and RR participants did not differ significantly ($M_s = .82$ and $.84$, respectively), $F(1, 40) = 0.13$, $MSE = 1.26$, $p > .50$; nor did the proportions of famous judgments made to new famous names by FR and RR participants ($M_s = .42$ and $.51$, respectively), $F(1, 40) = 1.80$, $MSE = 3.34$, $p = .19$.

Nonfamous names. The proportions of old and new nonfamous names judged to be famous (i.e., to which participants made false judgments of fame) are presented in Figure 2B for FR and RR participants. In terms of the present hypothesis, the most important result in Figure 2B is the apparent greater proportion of famous judgments made to old nonfamous names by FR participants ($M = .52$) than by RR participants ($M = .36$). And, indeed, this difference was revealed to be significant by a planned comparison, $F(1, 40) = 7.37$, $MSE = 2.99$, $p = .01$. In contrast, the proportion of famous judgments made to new nonfamous names by FR participants ($M = .21$) did not differ from that made by RR participants ($M = .19$), $F(1, 40) = 0.19$, $MSE = 1.96$, $p > .50$.

Thus, as predicted, the FR participants, who had been instructed to forget the nonfamous names presented in the memory task, made false judgments of fame significantly more often to such names than did the RR participants, who had been instructed to keep remembering them. Also of note in Figure 2 is the difference in the proportions of famous judgments made by the FR participants to new famous names (see Figure 2A) versus old nonfamous

names (see Figure 2B). Although, unlike the former comparisons, this one involves different sets of names, it is interesting that FR participants judged more old nonfamous names that they had been instructed to forget to be the names of actual famous people (which, of course, they were not) than they judged new famous names to be the names of actual famous people (which, of course, they were). In contrast, the judgments of RR participants were more veridical: RR participants were more likely to judge a new famous name to be that of a famous person than they were to judge an old nonfamous name as such.

Discussion

One possible explanation of the observed vulnerability of FR participants for making false judgments of fame would be in terms of a problem of source memory. As discussed earlier, research shows that indirect memory effects of intentionally forgotten information persist and that recognition memory for TBF items (at least as measured by yes–no and forced-choice tests) is typically not impaired compared with that for TBR items. Hence, during the present fame-judgment task, one might expect (a) old nonfamous names to seem more familiar than new nonfamous names to both FR and RR participants and (b) that FR and RR participants might be equally capable of recognizing that an old nonfamous name had been presented earlier in the memory task. Thus, one might also expect FR and RR participants to be equally capable of correctly interpreting the familiarity evoked by such names as arising from their earlier occurrence in the experiment, rather than from real-world fame.

In the present paradigm, however, for the familiarity evoked by old nonfamous names to be interpreted correctly, participants have to be able to do more than just recognize that the name had been presented previously. Beyond simply recognizing that an old nonfamous name occurred earlier in the experiment, they must be able to recollect where in the memory task it occurred. Specifically, they must recollect that it had been presented in the precue part of the memory list—exactly what FR participants, given their inhib-

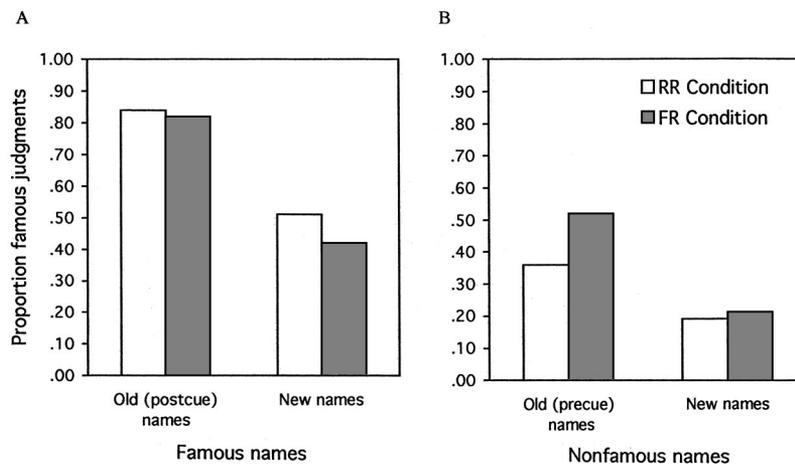


Figure 2. Proportions of old and new famous names judged famous (A) and proportions of old and new nonfamous names judged famous (B) in Experiment 1. RR = remember–remember list; FR = forget–remember list.

ited retrieval access to the precue list, would have trouble doing relative to RR participants. Thus, instructing FR participants to forget the precue part of the memory list could have created a serious source-memory problem for them relative to the RR participants.

We hypothesized that if this source-memory problem was primarily of a list-discrimination nature, then FR participants might frequently be led to interpret the familiarity evoked by an old nonfamous name as indicating that it was a name presented in the postcue part of the list, which they knew to contain only famous names, and thus be led to judge it incorrectly as being famous. In contrast, we believed that RR participants would be better at recollecting the specific list membership of an old nonfamous name that they recognized and could use such information to keep from making false judgments of fame. That FR participants had this list-discrimination type of source-memory problem would, in our view, also be consistent with the previous observation of Geiselman et al. (1983) that FR participants tended to judge the TBF items that they were able to recall as belonging incorrectly to the second (or postcue) list rather than to the first (or precue) list in which they had actually been presented.

It is also possible, however, that the source-memory problem leading FR participants to make more misattributions of real-world fame to old nonfamous names is not limited to that of a list discrimination problem, but is of a more severe or extensive nature. Perhaps, upon encountering an old nonfamous name, although it often evokes a feeling of familiarity, FR participants are frequently not able to recollect that it had been presented earlier in the experiment at all. Although we knew from past results that recognition performance for TBF items is usually not impaired as compared with that for TBR items in standard recognition-memory tasks, we could not necessarily assume that this would be the case for the present task. Thus, we conducted Experiment 2 to try to distinguish between these two possible types of source-memory problems.

Experiment 2

In Experiment 2, we repeated the design of Experiment 1 but required an additional response during the fame-judgment task. After each judgment of fame, we asked participants to indicate whether they could remember if that name happened to be one that had occurred earlier in the memory task, with the idea that the resulting joint responses—*famous-yes*, *famous-no*, *nonfamous-yes*, *nonfamous-no*—would allow us to determine more precisely the nature of the source-memory problem suffered by the FR participants of Experiment 1.

To illustrate, suppose their source-memory problem had been of a list-discrimination nature. If so, then the FR participants in Experiment 2 should mainly respond *yes* following a judgment of fame to an old nonfamous name. Alternatively, suppose their source-memory problem had been of a more extensive nature than not being able to recollect the list membership of an old nonfamous name that seemed familiar. Suppose, instead, they were frequently not able to recognize that the name had been presented earlier at all. If so, then the FR participants in Experiment 2 should predominantly respond *no* following a judgment of fame to an old nonfamous name.

Method

As in Experiment 1, 48 students attending the University of California, Los Angeles, participated, with 24 individuals assigned randomly to each memory condition. The design was identical to that of Experiment 1, except for the second judgment made during the fame-judgment task. The materials and procedure were also identical, except for the additional instructions to all participants that after making their judgment of fame to a given name they then needed to say whether they thought that name was one that had been presented earlier in the memory task. The question: *Presented today?* appeared on the screen after each name was judged as famous or not famous, and participants were asked to respond by pressing a *yes* or *no* key.

Results and Discussion

The effect of judged order was found to be nonsignificant, $F(1, 40) = 1.01$, $MSE = 1.04$, $p = .32$; in the results below, therefore, the data have been averaged across the first and second halves of the fame-judgment task.

Fame judgments. The proportions of old and new famous names judged to be famous by FR and RR participants are shown in Figure 3A. As appears to be the case, and as confirmed by planned comparisons, the proportions of famous judgments made to old famous names by FR participants ($M = .75$) and RR participants ($M = .75$) and to new famous names by FR participants ($M = .40$) and RR participants ($M = .42$) did not differ, $F(1, 40) = 0.38$, $MSE = 0.51$, $p > .50$; $F(1, 40) = 2.00$, $MSE = 4.17$, $p = .16$, respectively.

The proportions of old and new nonfamous names judged as famous (i.e., to which false judgments of fame were made) are presented for FR and RR participants in Figure 3B. As before, the result of most interest is the greater proportion of famous judgments made to old nonfamous names by FR participants ($M = .46$) as compared with RR participants ($M = .27$), a difference revealed to be significant by a planned comparison, $F(1, 40) = 11.66$, $MSE = 23.01$, $p < .01$. In contrast, the proportions of famous judgments made to new nonfamous names by FR participants ($M = .21$) and RR participants ($M = .19$) did not differ, $F(1, 40) = 1.86$, $MSE = 2.67$, $p = .18$. Thus, the pattern of results obtained in Experiment 2 constitutes a striking replication of that observed in Experiment 1. The critical difference—judgments of fame made to old nonfamous names by FR and RR participants—was again highly significant, with participants who had been told to forget the nonfamous names making significantly more false judgments of fame to such names than were participants instructed to remember them.

Joint responses. The top panel of Table 1 presents the proportions of *nonfamous-yes*, *famous-yes*, and *famous-no* joint responses made to old nonfamous names by FR and RR participants, and next to each response, we have indicated what, in our view, that type of response reflects. The joint response of *nonfamous-yes*, for example, reflects accurate remembering because participants would report both (a) that an old nonfamous name was not the name of a famous person and (b) that it had been presented earlier only if they could correctly remember it as having been presented in the precue part of the memory list (which they knew contained only nonfamous names). The other two joint responses, however, can each represent a type of source-memory problem. *Famous-yes* can be thought to reflect failed list discrimination

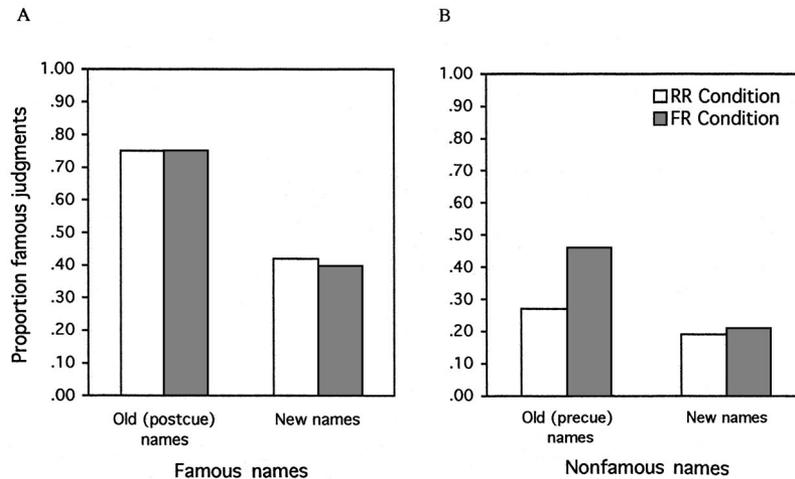


Figure 3. Proportions of old and new famous names judged famous (A) and proportions of old and new nonfamous names judged famous (B) in Experiment 2. RR = remember–remember list; FR = forget–remember list.

because participants would incorrectly report both (a) that an old nonfamous name was the name of a famous person and (b) that it had occurred earlier in the memory task, only if they incorrectly remembered it as having appeared in the postcue list (which they knew contained only famous names). *Famous–no*, on the other hand, reflects *episodic forgetting* because participants would incorrectly report both (a) that an old nonfamous name was the name of a famous person and (b) that it had not been presented earlier, only if they were not able to recollect it having occurred at all during the memory task.

For all of the joint responses shown in the top panel of Table 1, planned comparisons revealed significant differences in the proportions of times each was made by FR versus RR participants, $F(1, 40) = 14.16$, $MSE = 10,072.48$, $p < .01$; $F(1, 40) = 4.05$, $MSE = 1,807.96$, $p = .05$; $F(1, 40) = 11.00$, $MSE = 1,400.64$, $p < .01$, for the responses of *nonfamous–yes*, *famous–yes*, and *famous–no*, respectively. These results thus indicate a somewhat

Table 1
Joint Response Proportions Made to Old (Precue) Nonfamous and Old (Postcue) Famous Names in the FR and RR Conditions of Experiment 2

Joint response	What Joint response reflects	Condition	
		FR	RR
Old nonfamous names			
Nonfamous–yes	Accurate remembering	.36	.57
Famous–yes	Failed list discrimination	.29	.20
Famous–no	Episodic forgetting	.12	.04
Old famous names			
Famous–yes	Accurate remembering	.73	.72
Nonfamous–yes	Failed list discrimination	.14	.14
Famous–no	Episodic forgetting	.05	.08

Note. FR = forget–remember list; RR = remember–remember list.

surprising conclusion: It is not one type of source-memory problem versus the other from which FR participants are suffering. Rather, the instruction to forget appears to have created both types of source-memory problems. Thus, unlike previous studies indicating that TBF items can be recognized as well as TBR items (e.g., Geiselman et al., 1983), the FR participants in the present experiment recognized TBF items less well ($M = .65$, sum of rows 1 and 2 for FR participants in Table 1) than RR participants recognized the corresponding TBR items ($M = .77$, sum of rows 1 and 2 for the RR participants in Table 1). This result appears to arise from the increased episodic forgetting by the FR participants.

The bottom panel of Table 1 presents the proportions of *famous–yes*, *nonfamous–yes*, and *famous–no* responses made to old famous names by FR and RR participants. As these were TBR items for all participants, it was not expected that the joint responses of the FR and RR participants would differ, and this expectation was confirmed by the outcomes of planned comparisons, $F(1, 40) = 0.02$, $MSE = 11.56$, $p > .50$; $F(1, 40) = 0.10$, $MSE = 26.04$, $p > .50$; $F(1, 40) = 2.14$, $MSE = 234.5$, $p = .15$, for *famous–yes*, *nonfamous–yes*, and *famous–no*, respectively.

Thus, with respect to joint responses as well, it is only with old nonfamous names that the fame judgments and memory performance of FR participants differed from that of RR participants. As in Experiment 1, the judgments of FR participants have been influenced to a greater extent by the indirect effects of information they were told to forget than the judgments of RR participants were influenced by the indirect effects of information they were instructed to remember.

General Discussion

In Experiment 1, and strikingly replicated in Experiment 2, participants instructed to forget nonfamous names presented during the memory task made significantly more misattributions of real-world fame to such names during the subsequent fame-judgment task than did participants instructed to continue remembering those same names. Apparently, old nonfamous names

evoked feelings of familiarity in the fame-judgment task, and for participants instructed to forget them, recollection of the source of this familiarity was impaired, resulting in an increased tendency to attribute it to prior real-world fame. Furthermore, their increased susceptibility to the misleading effects of such familiarity seems to stem from two types of source-memory problems: (a) impaired list discrimination (i.e., an inability to recollect in which part of the earlier memory task the old nonfamous name had occurred) and (b) episodic forgetting per se (i.e., an inability to access a memory representation for the old nonfamous name being presented during the experiment).

Although unintuitive, this pattern of behavior is consistent with our original speculation that under certain circumstances, the indirect memory effects of intentionally forgotten information might be greater than those of corresponding intentionally remembered information. As we speculated, individuals apparently become susceptible to such enhanced indirect effects when, owing to inhibited retrieval access for the intentionally forgotten information, the subsequent indirect or data-driven consequences of such information cannot be checked or mitigated by accurate recollection of their source. Furthermore, the present findings suggest that there may be two ways in which people become vulnerable to such indirect effects of intentionally forgotten information. One is to reduce what might be called *episodic discrimination*: Individuals may know or be able to recognize that the intentionally forgotten information was presented earlier as part of a particular episode but have lost the ability to discriminate exactly when or where in that episode it occurred. The second way arises from something more like actual episodic forgetting: When the intentionally forgotten information continues to seem familiar, yet one is unable to recollect that it occurred at all as part of a specific episode in the past. In either of these cases, however, the indirect or unconscious influences of the intentionally forgotten information remain in effect and unchecked by accurate source recollection. Thus, these indirect influences can have—as evidenced by the present results—a greater effect on certain behaviors than would be the case were that same information to be intentionally remembered.

The evidence for continuing, and even enhanced, indirect influences of intentionally forgotten or inhibited information on subsequent behaviors has potentially important practical implications regarding unintended consequences of instructions to forget in certain legal and social settings. One might, for example, expect sleeper-type effects to occur, not only owing to the inability of individuals to recollect that the source of some argument was unreliable with delay but also if, for some reason, they had been instructed to forget that information or had even instructed themselves to forget it. Although well intended, the consequences of such instructions to forget may be to strengthen the indirect effects of the unreliable information.

The present findings also have implications for certain practices in legal settings, particularly the practice by judges of instructing jurors to disregard inadmissible evidence. Research concerned with this practice has shown that instructions to disregard inadmissible evidence are not, by and large, successful (see Golding & Long, 1998). Again, ironically, the present findings suggest that the effects of such instructions to disregard inadmissible evidence may be worse than useless; rather, they might actually increase the indirect or unconscious influences of such evidence on jurors' later verdicts or judgments of guilt or innocence. Thus, the impact of

inadmissible evidence might prove more contaminating given instructions to forget that testimony than it would have been without such an instruction.

Finally, although here and elsewhere we have often lauded the virtues of retrieval inhibition as a unique and adaptive mechanism for avoiding interference and resolving competition in memory as well as other levels of cognitive processing (e.g., E. L. Bjork, Bjork, & Anderson, 1998; R. A. Bjork, 1989), the present findings suggest a dark side to retrieval inhibition as well. To the extent that intentionally forgotten information remains in memory but recollective access to the source of that information is impaired, individuals become susceptible to misattributions of the familiarity or processing fluency of that information when it is reencountered. Those misattributions, in turn, can color certain judgments, as in the legal and social examples discussed above, and produce errors, as in the increased frequency of false-fame judgments reported in the present research, and do so in ways that escape awareness.

References

- Basden, B. H., Basden, D. R., & Gargano, G. J. (1993). Directed forgetting in implicit and explicit memory tests: A comparison of methods. *Journal of Experimental Psychology: Learning, Memory, and Cognition*, *19*, 603–616.
- Bjork, E. L., & Bjork, R. A. (1988). On the adaptive aspects of retrieval failure in autobiographical memory. In M. M. Gruneberg, P. E. Morris, & R. N. Sykes (Eds.), *Practical aspects of memory: Current research and issues: Vol. 1. Memory in everyday life* (pp. 283–288). London: Wiley.
- Bjork, E. L., & Bjork, R. A. (1996). Continuing influences of to-be-forgotten information. *Consciousness and Cognition*, *5*, 176–196.
- Bjork, E. L., Bjork, R. A., & Anderson, M. C. (1998). Varieties of goal-directed forgetting. In J. M. Golding & C. M. MacLeod (Eds.), *Intentional forgetting: Interdisciplinary approaches* (pp. 103–137). Hillsdale, NJ: Erlbaum.
- Bjork, E. L., Bjork, R. A., & Glenberg, A. (1973, November). *Reinstatement of interference owing to to-be-forgotten items*. Paper presented at the 14th Annual Meeting of the Psychonomic Society, St. Louis, MO.
- Bjork, E. L., Bjork, R. A., & Kirkpatrick, H. A. (1990, November). *Direct and indirect measures of inhibition in directed forgetting*. Paper presented at the 31st Annual Meeting of the Psychonomic Society, New Orleans, LA.
- Bjork, R. A. (1972). Theoretical implications of directed forgetting. In A. W. Melton & E. Martin (Eds.), *Coding processes in human memory*. Washington, DC: Winston.
- Bjork, R. A. (1989). Retrieval inhibition as an adaptive mechanism in human memory. In H. L. Roediger & F. I. M. Craik (Eds.), *Varieties of memory and consciousness: Essays in honor of Endel Tulving* (pp. 309–330). Hillsdale, NJ: Erlbaum.
- Block, R. A. (1971). Effects of instructions to forget in short-term memory. *Journal of Experimental Psychology*, *89*, 1–9.
- Elmes, F. J., Adams, C., & Roediger, H. L. (1970). Cued forgetting in short-term memory: Response selection. *Journal of Experimental Psychology*, *86*, 103–107.
- Geiselman, R. E., & Bagheri, B. (1985). Repetition effects in directed forgetting: Evidence for retrieval inhibition. *Memory & Cognition*, *13*, 51–62.
- Geiselman, R. E., Bjork, R. A., & Fishman, D. (1983). Disrupted retrieval in directed forgetting: A link with posthypnotic amnesia. *Journal of Experimental Psychology: General*, *112*, 58–72.

- Golding, J. M., & Long, D. L. (1998). There's more to intentional forgetting than directed forgetting: An integrative review. In J. M. Golding & C. M. MacLeod (Eds.), *Intentional forgetting: Interdisciplinary approaches* (pp. 103–137). Hillsdale, NJ: Erlbaum.
- Gross, A. E., Barresi, J., & Smith, E. E. (1970). Voluntary forgetting of a shared memory load. *Psychonomic Science*, 20, 73–75.
- Jacoby, L. L., Kelley, C., Brown, J., & Jasechko, J. (1989). Becoming famous overnight: Limits on the ability to avoid unconscious influences of the past. *Journal of Personality and Social Psychology*, 56, 326–338.
- MacLeod, C. M. (1998). Directed forgetting. In J. M. Golding & C. M. MacLeod (Eds.), *Intentional forgetting: Interdisciplinary approaches* (pp. 1–57). Hillsdale, NJ: Erlbaum.
- Reed, H. (1970). Studies of the interference processes in short-term memory. *Journal of Experimental Psychology*, 84, 452–457.

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