Intentionally Forgetting Other-Race Faces: Costs and Benefits?

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Abstract

Eyewitnesses to events with multiple actors might be aware that during a subsequent investigation some actors will need to be remembered and others can be forgotten. Research on the directed-forgetting procedure suggests that when some information is cued to be forgotten, retention of other information is enhanced. In three experiments, directed-forgetting conditions were compared with control conditions to assess potential costs and benefits of forgetting other-race faces. In Experiment 1, undergraduate students (*N* = 148; mostly Caucasian) viewed all Black faces or all Asian faces followed by overt remember or forget cues. Participants in the directed-forgetting conditions of Experiments 2 and 3 received more covert cues instructing them to remember the faces of one race and to forget the faces of another race. In Experiment 2, undergraduate students (*N* = 116; all Caucasian) viewed Black and Asian faces within the context of a criminal storyline. In Experiment 3, undergraduate students (*N* = 94; all Caucasian) again viewed Black and Asian faces; however, the remember and forget cues were embedded in a noncriminal narrative. Although faces generally were forgotten on cue, forgetting some faces did not enhance memory for other faces. Furthermore, recognition of remember-cued faces was impaired by exposure to forget-cued faces. These findings indicate that faces can be forgotten on cue, but that doing so confers no benefit for remembering other faces. Eyewitnesses are advised that exposure to irrelevant faces reduces the likelihood that relevant faces will be remembered, even when effort is allocated to forgetting the irrelevant faces. *Keywords:* directed forgetting, other-race face recognition, item method, cost, benefit

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The use of laboratory tasks to understand eyewitness memory has been a fruitful endeavor. For example, laboratory research by Loftus and colleagues has been used to show how memories of an event can be shaped by the manner in which questions are phrased. In a seminal study, Loftus and Palmer (1974) found participants were more likely to erroneously report observing broken glass when asked about two cars that had “smashed” into each other than when asked about two cars that had “hit” each other. Subsequent research showed that a carefully worded question can lead a picture of a stop sign to be misremembered as a yield sign (Loftus, Miller, & Burns, 1978). Demonstrations of eyewitness suggestibility such as these have contributed to the development of best practices for interviewing eyewitnesses, such as the preference for nonleading, open-ended questions. Similarly, the retrieval-induced forgetting paradigm, which was first used to show that retrieving one word can facilitate the forgetting of a related word (Anderson, Bjork, & Bjork, 1994), has been argued to have implications for memory of details of criminal events (Camp, Wesstein, & De Bruin, 2012; García-Bajos, Migueles, & Anderson, 2009; M. D. MacLeod, 2002; Migueles, & García-Bajos, 2007; Shaw, Bjork, & Handal, 1995). For example, Saunders and MacLeod (2002) showed that retrieval-induced forgetting can influence eyewitness suggestibility.

The directed-forgetting procedure— which consists of cueing some stimuli to be remembered and other stimuli to be forgotten— is another task typically performed in laboratory settings that is believed to have implications for eyewitness memory (Epstein & Bottoms, 2002; Gordon & Connolly, 2010). Research on directed forgetting suggests that having the freedom to forget some items can enhance memory for other items (C. M. MacLeod, 1998). Although directed forgetting has been primarily demonstrated for verbal material, directed-forgetting effects have also been found using symbols (Hourihan, Ozubko, & MacLeod, 2009), simple drawings (Basden & Basden, 1996; Goernert, Widner, & Otani, 2007; Quinlan, Taylor, & Fawcett, 2010), and photographs (Hauswald & Kissler, 2008; Payne & Corrigan, 2007). In addition, faces have been used as stimuli in a small number of directed-forgetting experiments (Goernert, Corenblum, & Otani, 2011; Metzger, 2011; Paller, Bozic, Ranganath, Grabowecky, & Yamada, 1999; Reber et al., 2002).

How might directed forgetting apply in an eyewitness setting? Consider, for example, a recent popular news story in Montréal involving a Chinese restaurant that became the scene of a violent encounter between two parties, a group of Asian people and a group of Black people (Gilbert, 2012). Although there were no serious injuries reported, imagine that someone from the Asian group had murdered someone from the Black group. If the tenets of directed forgetting apply, perhaps a witness would have a better chance of identifying the murderer by intentionally forgetting the faces of the Black people and focusing on remembering the faces of the Asian people. Alternatively, if the witness mistakenly believed that the murderer was a Black person, the witness might intentionally forget the faces of the Asian diners, inadvertently reducing the likelihood of accurately describing or recognizing the faces of the Asian people in the restaurant during a subsequent police investigation. Thus, depending on the validity of the assumptions held at the time of witnessing a crime, witnesses might unintentionally be cued to forget details they will later need to remember or rehearse details they later learn are irrelevant.

When faces have been used in previous directed-forgetting experiments, recognition of the remember-cued faces has typically exceeded recognition of the forget-cued faces (Goernert et al., 2011; Metzger, 2011; Paller et al., 1999; but see Reber et al., 2002); however, the design of these experiments makes it unclear whether forgetting some faces actually enhanced memory for other faces. In each of the four previously reported applications of directed forgetting to faces, a single condition design was employed. Consequently, data analyses were limited to a measure of the difference in accuracy between faces cued to be remembered and faces cued to be forgotten (i.e., the R-F difference). Such analyses provide no information about whether forgetting some faces enhances memory for other faces. In the present research, directed-forgetting groups were compared with groups that were instructed to remember all the faces in the set. By including comparison groups, we were able to calculate the extent to which forget instructions produced costs and benefits for recognizing remember-cued faces.

One of the goals of the present research was to determine whether sets of faces would be subject to directed-forgetting benefits, using natural methods of categorization. In particular, we were interested in whether forgetting faces of one race could facilitate remembering faces of another race. Given that own-race faces are typically remembered better than other-race faces (Malpass & Kravitz, 1969), it was important to have participants always study faces of a race other than their own. Black and Asian faces were chosen because they were likely to be other-race faces for the majority of people in the pool from which participants were recruited. Before testing the effectiveness of a racial cue, however, we first used conventional remember and forget cues to clarify whether cueing some faces to be forgotten would yield costs and/or benefits in recognition of remember-cued faces.

Three experiments were conducted to assess the utility of the directed-forgetting procedure in remembering faces. Although the experiments reported here probably differ substantially from the typical experiences of eyewitnesses, we used laboratory tasks that were expected to provide information about memory processes similar to those underlying decisions made by eyewitnesses who quickly recognize that some actors in a given situation will need to be remembered and that others can be forgotten. In Experiment 1, the standard item-method directed-forgetting procedure was employed by associating each face with an overt cue indicating that the face should be either remembered or forgotten. After confirming the presence of both costs and benefits of directed forgetting in the first experiment, the utility of the forget instructions was evaluated in two additional experiments by embedding the cue to forget faces of one race and remember faces of another race in the context of a crime scenario (Experiment 2) and a sports scenario (Experiment 3). This involved using a less conventional form of the directed-forgetting procedure in which the remember and forget cues were more covert, in that the assumptions under which participants operated served as cues implying that faces of one race or the other could be forgotten.

Experiment 1

Experiment 1 was conducted to determine the extent to which forget instructions produce costs and benefits in memory for faces. This was achieved by comparing performance in a directed-forgetting condition to performance in remember-half and remember-all conditions (C. M. MacLeod, 1998). In the remember-half condition, only the remember-cued faces from the directed-forgetting condition were studied and tested. If there is a cost of exposure to the forget-cued faces, the remember-cued faces should be better recognized in the remember-half condition than in the directed-forgetting condition. In the remember-all condition, participants studied the same number of faces as in the directed-forgetting condition, but all faces were cued to be remembered. If there is a benefit of having the freedom to forget some items, the same faces that are cued to be remembered in the directed-forgetting condition should not be recognized as well in the remember-all condition. The presence of these effects with faces would provide a first step in determining whether the directed-forgetting procedure has implications for eyewitness memory.

Method

Participants. The sample consisted of 148 undergraduate students (*M* = 21.07 years, *SD* = 5.00; 115 women) who participated in exchange for partial course credit. Participants self-identified as Caucasian (*n* = 139), First Nations (*n* = 4), and East Indian (*n* = 5).

Materials. The stimuli consisted of 96 photographs of Black men and 96 photographs of Asian men. The Black faces were obtained from the Eberhardt Lab Face Database (https://stanforduniversity.qualtrics.com/SE/?SID=SV_aX0ovSkASZR9Py4). The Asian faces were obtained from the Facial Recognition Technology (FERET) Database (http://www.itl.nist.gov/iad/humanid/feret/ feret_master.html). All images were cropped so that only the face was visible (i.e., no shoulders or clothing) and were 190 pixels in height and 144 pixels in width.

Design and procedure. Participants were randomly assigned to study all Black faces or all Asian faces (group; between-subjects) in directed-forgetting, remember-all, or remember-half conditions (condition; between-subjects). In the directed-forgetting condition, items were designated as remember-cued or forget-cued (item cue; within-subject). The set of faces that was cued to be remembered or forgotten was counterbalanced between Set A and Set B (set; between-subjects). Thus, a 2 (group) × 3 (condition) × 2 (set) × 2 (item cue) mixed design was employed.

Faces in all conditions were presented in random order for 5 s each, followed by a 1-s interstimulus interval and a memory instruction that was displayed for 2 s. Memory for the studied faces was subsequently tested in an untimed, old–new recognition test containing all the studied faces and an equal number of distractors. An overview of the stimulus sets used in directed-forgetting, remember-half, and remember-all conditions is provided in Table 1.

Directed-forgetting condition. Participants in the directed-forgetting condition were told that they would view a series of faces followed by instructions to either remember or to forget the faces that had just been viewed. They were advised that only the faces followed by the remember instruction needed to be remembered. They were then presented with 48 faces, 24 that were cued to be remembered (“REMEMBER”) and 24 that were cued to be forgotten (“FORGET”). After the study phase, participants were told that they would be tested on all the items that were studied in an old–new recognition test. They were instructed to press “O” for faces that had been previously viewed and to press “N” for faces that not been previously viewed. They were instructed that the recognition test was self-paced and that they could take as long as needed to make a response. The recognition test consisted of 48 studied faces and 48 distractors.

Remember-half condition. Participants in the remember-half condition were similarly told that that they would view a series of faces; however, these participants were told that each face would be followed by the same instruction: to remember the face that had just been viewed (“REMEMBER”). In the study phase, the 24 remember-cued faces from the directed-forgetting condition were viewed. After the study phase, participants received the same instructions as in the directed-forgetting condition. The recognition test consisted of 24 studied faces and 24 distractors.

Remember-all condition. Participants in the remember-all condition received the same prestudy instructions that were given to participants in the remember-half condition. In the study phase, participants viewed the same 48 faces that were presented in the directed-forgetting condition; however this time all the faces were followed by a remember instruction. After the study phase, participants completed the same recognition test that was given to participants in the directed-forgetting condition.

Results

Discrimination (*d'*) and response bias (*c*) measures, both derived from signal detection theory (Swets, 1961), were calculated from the hit and false-alarm rates.[1] An independent-samples t test indicated that false-alarm rates for Asian and Black faces did not differ, $t(146) = 1.26$, $p = .21$, $d = .21$. Nevertheless, individual hit and false-alarm rates for each race were used to calculate d' and c. For example, the *d'* value for Asian faces was based on the hit rate for Asian faces and the false-alarm rate for Asian faces.

R-F difference. Calculation of the signal-detection measures *d'* and *c* for the R-F difference is not straightforward because there are two hit rates (one for remember-cued items and one for forget-cued items) and only one false-alarm rate for the distractors (see Table 2). Thus, although a common false-alarm rate could be used to calculate the signal-detection measures for the remember- and forget-cued items, this approach would be no more informative than simply contrasting the remember-cued hits and the forget-cued hits because they are the only rates that varied. Accordingly, the R-F difference was assessed by a 2 (group: study Asian faces vs. study Black faces) × 2 (item cue: remember vs. forget) mixed ANOVA on hit rates in the directed-forgetting condition, which revealed a main effect of item cue, $F(1, 49) = 14.74$, $p = .001$, $\eta_p^2 = .23$. The item-cue effect was indicative of a higher hit rate for remember-cued faces

[1] Because *z* scores of 0 and 1 are undefined, hit rates of 100 and false-alarm rates of 0 pose a problem for computing *d*= and *c*. To circumvent this issue, as per Snodgrass and Corwin's (1988) recommendation, 0.5 was added to both the number of hits and the number of false alarms (i.e., the numerators in the fractions that were used in the rate computations) and 1 was added to the number of possible hits and the number of possible false alarms (i.e., the denominators in the fractions that were used in the rate computations).

(*M* = .72, *SD* = .12) than for forget-cued faces (*M* = .63, *SD* = .15). There was no effect of group; however, the difference in hits between remember- and forget-cued items was greater for Asian faces than for Black faces, resulting in a significant interaction, $F(1, 49) = 7.31$, $p = .009$, $\eta_p^2 = .13$. Paired samples *t* tests showed that although the difference between the remember- and forget-cued items was significant for Asian faces, $t(25) = 4.09$, $p = .001$, $d = .79$, the difference was nonsignificant for Black faces, $t(24) = 0.91$, $p = .37$, $d = .16$. Thus, although the Asian faces were forgotten on cue, the Black faces were not. Although the false-alarm rate was higher for Asian faces than for Black faces in the directed-forgetting condition, an independent samples *t* test indicated this difference did not reach significance, $t(49) = 1.80$, $p = .08$, $d = .52$.

Cost–benefit analysis. Table 3 presents the mean hits, false alarms, discriminability, and response bias for remember-cued items from the remember-half, directed-forgetting, and remember-all conditions. The focus of the cost– benefit analysis is on comparing memory for the same 24 remember-cued items across the three conditions, so only remember-cued items are considered in this analysis. Accordingly, the costs and benefits were assessed by a 2 (group: study Asian faces vs. study Black faces) × 3 (condition: remember-half vs. directed-forgetting vs. remember-all) × 2 (set: A vs. B) factorial ANOVA on *d'* scores for remember-cued items, which revealed a main effect of condition, $F(2, 136) = 16.46$, $p = .001$, $\eta_p^2 = .20$. Although the main effect of group did not reach significance, $F(2, 136) = 2.79$, $p = .10$, $\eta_p^2 = .02$, *d'* scores were marginally higher for participants who studied Asian faces (*M* = 1.61, *SD* = 0.65) than for those who studied Black faces (*M* = 1.40, *SD* = 0.64). The main effect of set and all interactions were nonsignificant. A 2 (group) × 3 (condition) × 2 (set) factorial ANOVA on *c* scores for remember-cued items yielded no significant effects. 1 Because *z* scores of 0 and 1 are undefined, hit rates of 100 and false-alarm rates of 0 pose a problem for computing *d'* and *c*. To circumvent this issue, as per Snodgrass and Corwin's (1988) recommendation, 0.5 was added to both the number of hits and the number of false alarms (i.e., the numerators in the fractions that were used in the rate computations) and 1 was added to the number of possible hits and the number of possible false alarms (i.e., the denominators in the fractions that were used in the rate computations).

A series of follow-up tests were conducted to further explore the main effect of condition (i.e., to assess for costs and benefits). First, the presence of a cost was assessed in an independent samples t test comparing the remember-half and directed-forgetting conditions. This test indicated *d'* scores were higher in the remember-half condition (M = 1.93, SD = 0.68) than in the directed-forgetting condition (M = 1.43, SD = 0.49), $t(95) = 4.19$, $p = .001$, $d = 0.86$. In other words, there was a directed-forgetting cost. To examine whether the cost was influenced by the race of the faces, a 2 (group: study Asian faces vs. study Black faces) × 2 (condition: remember-half vs. directed-forgetting) ANOVA was conducted. This test revealed only a main effect of condition, $F(1, 93) = 15.95$, $p = .001$, $\eta_p^2 = .15$. There was no effect of group and no interaction, suggesting that the cost was unaffected by the type of faces studied. A directed-forgetting benefit was also observed, as indicated by higher *d'* scores in the directed-forgetting condition than in the remember-all condition (M = 1.21, SD = 0.57), $t(100) = 2.09$, $p = .04$, $d = 0.42$. A 2 (group: study Asian faces vs. study Black faces) ×2 (condition: directed-forgetting vs. remember-all) ANOVA revealed no effect of group and a main effect of condition, $F(1, 98) = 5.21$, $p = .02$, $\eta_p^2 = .05$. However, this effect was qualified by a significant interaction between group and condition, $F(1, 98) = 5.93$, $p = .02$, $\eta_p^2 = .06$. As can be seen in Table 3, the benefit only occurred when Black faces were studied.

In the preceding analyses, all of the remember-cued items from each of the three conditions were compared. One consequence of including all the remember-cued items is that the recognition test in the remember-half condition was shorter than the recognition tests in the directed-forgetting and remember-all conditions. This discrepancy in test length poses a potential confound because participants in the directed-forgetting and remember-all conditions might have experienced more mental fatigue than participants in the remember-half condition. This issue was anticipated during the planning of the experiment, which led to a design feature that would enable a comparison among tests of equal length. Specifically, the recognition tests for the directed-forgetting and remember-all conditions were designed so the first half of the test would have the same number of remember-cued targets and distractors as the remember-half condition (i.e., 24 of each). This allowed for an alternative analysis of directed-forgetting costs, which only included the first half of the test in the directed-forgetting condition. This analysis revealed a pattern of results similar to that found when all the items were included. Specifically, *d'* scores in the remember-half condition (*M* = 1.93, *SD* = 0.64) were higher than *d'* scores on the first half of the test in the directed-forgetting condition (*M* = 1.58, *SD* = 0.60), $t(95) = 2.71$, $p = .008$, $d = .55$. Thus, the directed-forgetting cost cannot be attributed to differences in test length.

Discussion

Experiment 1 replicated previous experiments showing forget-cued faces are less likely to be recognized than remember-cued faces (e.g., Paller et al., 1999). More important, this experiment provides the first demonstration that the standard item-method directed-forgetting procedure can yield both costs (arising from exposure to irrelevant items) and benefits (arising from the freedom to forget some items) in recognition of remember-cued faces. Discrimination accuracy in the directed-forgetting condition was significantly lower than in the remember-half condition, suggesting that exposure to the forget-cued items negatively impacted memory for the remember-cued items (cost). In contrast, discrimination accuracy in the directed-forgetting condition was significantly higher than in the remember-all condition, suggesting that the freedom to forget the forget-cued items positively impacted memory for the remember-cued items (benefit).

Although the main effects were consistent with previous studies of directed forgetting, analyzing the influence of the race of the studied faces revealed some important nuances associated with the procedure. In particular, two differences between those who studied Black faces (Group 1) and those who studied Asian faces (Group 2) are worthy of note. First, although participants in the directed-forgetting condition generally performed better than those in the remember-all condition, Table 3 shows the instruction to forget only produced a benefit in memory for the Black faces. In contrast, performance in the directed-forgetting and remember-all conditions was similar among those who studied Asian faces. The second departure between Groups 1 and 2 concerns the R-F difference, which was present for Asian faces but absent for Black faces. Thus, although the forget-cued Asian faces were forgotten on cue, this did not benefit memory for the remember-cued Asian faces. Conversely, a benefit was observed for Black faces even though the forget-cued Black faces were not actually forgotten. Taken together, these effects suggest that, although the freedom to forget some faces can be beneficial, the act of forgetting may actually do more harm than good.

Why might forgetting the forget-cued items negatively affect memory of the remember-cued items? One explanation is that forgetting requires attentional resources, which interrupts processing of the remember-cued items. This idea is consistent with previous research suggesting that intentional forgetting is effortful (Cheng, Liu, Lee, Hung, & Tzeng, 2012; Fawcett & Taylor, 2008). Exposure to the forget-cued Black faces may not have had a negative effect on the remember-cued faces because they were not actually forgotten.

Experiment 2

The instruction to forget certain faces in Experiment 1 yielded both costs and benefits. Although the method employed in Experiment 1 was consistent with the conventional directed-forgetting paradigm (i.e., an overt cue was given after each face), such procedures are unlikely to correspond with an eyewitness scenario in which the remember and forget cues would likely be more covert in nature. Rather than receiving explicit instructions to forget or to remember each person shortly after the encounter, an eyewitness might readily identify the important actors and focus encoding efforts toward those individuals and away from others. For example, if a group of teenagers committed a robbery at a bank filled with adult customers and employees, witnesses could use age as a cue to determine the important players to remember and those who can be forgotten.

In Experiment 2 we embedded remember and forget cues within the context of a crime scenario to explore eyewitnesses' capabilities to focus efforts toward remembering members of one race and forgetting those of another. To make this experiment more similar to an actual crime scenario, the remember- and forget-cued faces belonged to distinct categories, and participants knew whether a face needed to be remembered or forgotten as soon as it was encountered.[2] Participants were informed that Black and Asian men attended a party at which a murder took place, and that they could forget the faces that were inconsistent with the murderer's race, as reported by an eyewitness. Thus in contrast to Experiment 1, in which participants were

[2] The simultaneous cueing method represents a noteworthy departure from the conventional directed-forgetting paradigm in which cues are presented after the stimulus is encoded. Although simultaneous cues have been used in previous studies that have purported to investigate directed forgetting (e.g., Paller et al., 1999), some might question whether it is appropriate to call studies such as these "directed forgetting," given that participants had the opportunity to immediately stop encoding the forget-cued stimuli as soon as they were perceived. Although we recognize there is a fundamental distinction between simultaneous and post-item cues, we nonetheless refer to the experimental conditions of Experiments 2 and 3 as directed-forgetting conditions to facilitate their comparison with Experiment 1.

instructed to remember and forget faces of the same race, participants in Experiment 2 were instructed to remember the faces of one race and forget the faces of another race. We hypothesized that the use of a simultaneous cue combined with the distinct categories of remember- and forget-cued faces would facilitate directed-forgetting effects. Specifically, we expected remember-cued items to be recognized better than forget-cued items and the presence of both costs and benefits.

Method

Participants. The sample consisted of 116 undergraduate students (*M* = 22.13 years, *SD* = 4.94; 87 women) who participated in exchange for partial course credit. All participants self-identified as Caucasian.

Materials. Half of the faces from Experiment 1 were used as stimuli (48 photographs of Black men and 48 photographs of Asian men). Pilot testing (*n* = 20) indicated no significant differences in recognition difficulty between the two face types.

Design and procedure. Participants were randomly assigned to remember-half, directed-forgetting, and remember-all conditions. Within each condition, two groups of equivalent size were formed to counterbalance which type of face was cued to be remembered and, in some cases, forgotten. In the directed-forgetting condition, one group was cued to remember Black faces and forget Asian faces, and the other group was cued to remember Asian faces and forget Black faces. In the remember-half condition, one group was cued to remember Black faces and another group was cued to remember Asian faces. In the remember-all condition, all participants were instructed to remember both Asian and Black faces; however two groups were nonetheless created for the purposes of the cost– benefit analyses. Specifically, the recognition scores for Black faces were used for one group in the remember-all condition (even-numbered participants) and the recognition scores for Asian faces were used for the other group in the remember-all condition (odd-numbered participants). This allowed for the data to be analyzed in a 3 (condition: remember-half vs. directed-forgetting vs. remember-all) × 2 (group: remember Black faces vs. remember Asian faces) factorial ANOVA without violating the assumption of independence. In addition to the between-subjects factors of condition and group, the cue associated with faces in the directed-forgetting condition was a within-subject factor (item cue: remember vs. forget). An overview of the stimuli that were studied and tested in each of the conditions and groups is provided in Table 4.

In all three conditions, participants were informed that a man was murdered at a party. Subsequently, they were presented with images of the party attendees' faces at a rate of 5 s per face. Presentation of each face was separated by a blank screen for a 1-s interstimulus interval. Participants then completed a recognition test, which required them to discriminate between faces of party attendees and distractors. Participants were instructed to press the "P" key on the computer's keyboard for faces of people who were present at the party and to press the "A" key for faces of people who were absent from the party. There was no time limit on the recognition test.

Directed-forgetting condition. In the directed-forgetting condition, participants were informed that Black and Asian men attended a party. One group was told that an eyewitness saw a Black man commit a murder. The other group was told that an eyewitness saw an Asian man commit the murder. Before the faces of the party attendees were presented, participants were instructed to remember the faces that belonged to the killer's race and to forget the faces that belonged to the other race. For example, participants cued to forget Asian faces were given the following prestudy instructions:

> Black and Asian men were at the party. According to an eyewitness, the killer was a Black man. You are about to see the faces of the people who were at the party. The eyewitness said the killer was a Black man, so you should try to remember the Black faces. Don't worry about remembering the Asian faces.

Following the prestudy instructions, participants viewed 48 faces (24 Black and 24 Asian). After the study phase was complete, participants were informed of the following:

> The detective investigating the case has learned some new information. Apparently the eyewitness has a history of prejudice toward Black people and is the type of person who would fabricate a story to cause trouble for a Black person. Furthermore, several party guests have reported that the person who claimed to be an "eyewitness" actually left the party long before the murder took place. Therefore, the race of the killer is uncertain. The killer could have been a Black person or an Asian person.

Participants were then informed of an upcoming test in which they would be asked to differentiate between people who were at the party and people who were not at the party. They then completed an untimed old–new recognition task, consisting of the faces of the 48 party attendees and 48 distractors.

Remember-half condition. In the remember-half condition, participants were told there was a murder at a party, but the race of the party attendees was not mentioned. No eyewitness information was provided, and participants were instructed to remember all of the party attendees. In the study phase, 24 faces were presented. For one group, the party attendees were Black men. For the other group, the party attendees were Asian men. After the faces were studied, participants read a paragraph that described a potential motive for the murder. The sole purpose of the paragraph was to keep the amount of information that was given in the time separating the study and test phases constant across conditions. In other words, the paragraph was used to control for possible influences of retroactive interference. To do so, the number of words in the motive paragraph was identical to the number of words that were read between the study and test phases in the directed-forgetting condition. After reading about the motive of the killer, participants completed an old–new recognition task consisting of the 24 party attendees and 24 distractors. The distractor faces were of the same race as the studied faces.

Remember-all condition. The prestudy instructions in the remember-all condition were the same as in the remember-half condition. Following these instructions, participants studied the same set of faces as in the directed-forgetting condition. Unlike in the directed-forgetting condition, however, the race of the party attendees was of no importance. In addition, there was no mention of an eyewitness report. The participants were simply told there was a murder, the faces of the party attendees will be presented, and that they should to try to remember all the faces. After the study phase, participants read the same paragraph about a motive that was read in the remember-half condition and then completed an old–new recognition test. The recognition task was identical to the one used in the directed-forgetting condition.

Results

R-F difference. In contrast to Experiment 1, it was possible to compute signal-detection measures for the R-F difference in Experiment 2 because there were two distinct categories of studied items, as well as two distinct categories of distractors. For example, if Black faces were forget-cued, the hit rate for forget-cued items would be the proportion of "old" responses for the Black faces that were studied and the false-alarm rate would be the proportion of "old" responses for the Black faces that were distractors. Table 5 presents the mean hits, false alarms, discriminability, and response bias for remember- and forget-cued faces within the directed-forgetting condition.

The R-F difference was assessed with a 2 (item cue: remember vs. forget) × 2 (group: remember Black faces vs. remember Asian faces) mixed ANOVA on *d'* scores. This test revealed a significant interaction, $F(1, 41) = 23.36$, $p = .001$, $\eta_p^2 = .36$. Table 5 shows participants who were cued to remember Black faces (and to forget Asian faces) performed better on remember-cued items than on forget-cued items, $t(21) = 2.99$, $p = .007$, $d = 0.68$. Conversely, participants who were cued to remember Asian faces (and to forget Black faces) performed better on forget-cued items than on remember-cued items, $t(20) = 3.88$, $p = .001$, $d = 0.85$. Thus, within the directed-forgetting condition, Black faces were remembered better than Asian faces regardless of which type of face was cued to be forgotten. In light of this finding, one could speculate that, relative to the Asian faces, the Black faces were simply easier to remember. However, data from the remember-half and remember-all conditions indicated that Black and Asian faces were similar in recognition difficulty. For example, in the remember-half condition, *d'* scores for participants who studied Asian faces ($M = 1.84$, $SD = 0.63$) were not significantly different from (and were numerically higher than) *d'* scores for participants who studied Black faces ($M = 1.64$, $SD = 0.60$), $t(38) = 1.04$, $p = .30$, $d = 0.33$. Similarly, in the remember-all condition, *d'* scores for Asian faces ($M = 1.39$, $SD = 0.71$) did not significantly differ from *d'* scores for Black faces ($M = 1.22$, $SD = 0.52$), $t(32) = 1.10$, $p = .27$, $d = 0.28$. Thus, Black and Asian faces were similar in recognition difficulty.

Although the within-subject comparison indicated an R-F difference when Asian faces were cued to be forgotten, this test involves comparing remember-cued races of one race and forget-cued faces of another race. Another way to compute the R-F difference is through a between-subjects comparison of the remember- and forget-cued faces of the same race. An independent samples *t* test indicated the remember-cued faces for Group 1 did not differ from the forget-cued faces for Group 2, $t(41) = 0.92$, $p = .36$, $d = 0.29$. In other words, there was no R-F difference for Black faces. Furthermore, the remember-cued faces for Group 2 did not differ from the forget-cued faces for Group 1, $t(41) = 0.34$, $p = .73$, $d = 0.10$, indicating no R-F difference for Asian faces. Therefore, when the stimuli were controlled, no R-F differences were present.

Response bias was assessed with a 2 (item cue: remember vs. forget) × 2 (group: remember Black faces vs. remember Asian faces) mixed model ANOVA on *c* scores. Participants had a slight liberal response bias for remember-cued items (M = 0.06, SD = 0.44) and a conservative response bias for forget-cued items (M = 0.23, SD = 0.43), leading to a main effect of item cue, $F(1, 41) = 18.47$, $p = .001$, $\eta_p^2 =.31$. The main effect of group and the interaction were nonsignificant.

Cost–benefit analysis. Table 6 presents the mean hits, false alarms, discriminability, and response bias for remember-cued items in the directed-forgetting, remember-half, and remember-all conditions. An independent samples *t* test indicated that false alarm rates for Asian and Black faces did not differ, $t(114) = 0.40$, $p = .69$, $d = .06$.

To assess the costs and benefits, a 3 (condition: remember-half vs. directed-forgetting vs. remember-all) × 2 (group: remember Asian faces vs. remember Black faces) factorial ANOVA was conducted on remember-item *d’* scores. This test revealed a main effect of condition, $F(2, 110) = 8.20$, $p = .001$, $\eta_p^2 = .13$. The effect of condition was driven by higher *d’* scores in the remember-half condition than in the directed-forgetting condition, $t(81) = 3.59$, $p = .001$, $d = 0.80$. The directed-forgetting and remember-all conditions did not reliably differ, $t(76) = 0.33$, $p = .75$, $d = .07$. Thus, although there was a directed-forgetting cost, there was no directed-forgetting benefit. There was no effect of group, but the interaction between group and condition approached significance, $F(2, 110) = 2.83$, $p = .06$, $\eta_p^2 = .05$.

The recognition test in the remember-half condition was shorter than the recognition test in the directed-forgetting condition, leaving open the possibility that mental fatigue differed among these two conditions. Consistent with the analysis conducted in Experiment 1, effects of test length were assessed by designing the first half of the recognition test for the directed-forgetting condition to include the same number of remember-cued targets and distractors as the remember-half condition (i.e., 24 of each). When tests of equal length were compared, the pattern of results for *d'* was similar to the pattern observed when the entire test in each condition was included. Specifically, *d'* scores in the directed-forgetting condition (*M* = 1.30) were lower than in the remember-half condition (*M* = 1.74), *t*(81) = 2.85, *p* = .006, *d* = 0.63. This suggests that mental fatigue was not an issue.

The remember-half and directed-forgetting conditions also differed in how many types of faces were studied. Specifically, faces of two races were studied in the directed-forgetting condition and faces of only one race were studied in the remember-half condition. Thus, it is possible that performance in the remember-half condition was aided by only having to study one type of face.[3] To explore this possibility, we compared *d'* scores from the remember-all condition in Experiment 1 (one race of faces) to *d'* scores from the remember-all condition in Experiment 2 (two races of faces). An independent samples *t* test indicated no difference in *d'* in the remember-all conditions of Experiment 1 (*M* = 1.19) and Experiment 2 (*M* = 1.21), *t*(79) = 0.13, *p* = .90, *d* = .03. This analysis suggests that performance was not negatively affected by having to study two types of faces.

A 3 (condition: remember-half vs. directed-forgetting vs. remember-all) × 2 (group: remember Asian faces vs. remember Black faces) factorial ANOVA on remember-item *c* scores revealed a main effect of condition, *F*(2, 110) = 7.07, *p* = .001, η_p^2 = .11. Follow-up analyses showed significantly more conservative c scores in the remember-all condition (*M* = 0.21, *SD* =

[3] We thank an anonymous reviewer for suggesting this possibility.

0.38) than in both the remember-half condition (*M* = 0.08, *SD* = 0.29), $t(71) = 3.81$, $p = .001$, $d = 0.90$, and the directed-forgetting condition (*M* = 0.06, *SD* = 0.44), $t(74) = 2.92$, $p = .005$, $d = 0.68$. The main effect of group and the interaction were nonsignificant.

Discussion

The simultaneous cue yielded mixed results. Within-subject comparisons between remember- and forget-cued items revealed effects similar to those observed in Experiment 1. In particular, the presence of an R-F difference for Asian faces and the absence of an R-F difference for Black faces was replicated. This time, however, the forget-cued Black faces were actually remembered better than the remember-cued Asian faces. Furthermore, when the stimuli were controlled, neither Black nor Asian faces yielded an R-F difference.

The comparison between the remember-half and directed-forgetting conditions revealed a cost, replicating the finding from Experiment 1; however, in contrast to Experiment 1, the freedom to forget some faces had no benefit on remembering other faces. The absence of a directed-forgetting benefit in Experiment 2 could have been related to the absence of an R-F difference. However, there were also three prominent differences in methodology between the first and second experiments.

The first methodological difference was the timing of the cue. In Experiment 1, the cue was provided after each item was studied (i.e., a poststimulus cue). In Experiment 2, the cue was apparent as soon as each stimulus was viewed (i.e., a simultaneous cue). One issue that is often associated with the simultaneous cue is that participants could simply ignore the forget-cued items, rather than having to encode and subsequently forget them. For example, in one study remember-cued faces were accompanied by an auditory cue (which was intended to resemble the voice of the face that was studied), and forget-cued faces had no auditory stimuli associated with them (Paller et al., 1999). In that study, participants could have adopted a strategy of only paying attention when they heard a voice and looked away from the screen when they did not hear a voice.

In Experiment 2, however, we used a visual cue that was essentially embedded within each stimulus, so participants needed to attend to the forget-cued faces, at least briefly, to determine whether each face was supposed to be remembered or forgotten. Participants classified as old about 74% of the old items they were instructed to forget, but only about 32% of the new items they had not previously encountered. If the forget-cued faces had been ignored altogether (making them “new” to participants at the time of test), the hit rate should not have greatly exceeded the observed false-alarm rate, as it did.

Although the difference in cue timing between Experiments 1 and 2 could explain the discrepant results, it seems more likely that a simultaneous cue would enhance, rather than prevent, directed-forgetting effects. Although the stimuli could not have been ignored altogether, the simultaneous cue in Experiment 2 made it possible to employ different encoding strategies as soon as the stimulus was perceived. For example, as soon as the remember cue (race) was perceived, participants could have started rehearsing retrieval cues (e.g., facial features). Conversely, as soon as a forget cue was perceived, participants could have ceased encoding altogether. Such encoding strategies would have been more difficult to implement in Experiment 1, when the cue was presented after the stimulus was no longer in view. Therefore, the simultaneous cue seemingly would have only increased the likelihood of a directed-forgetting benefit.

The second methodological difference was that the remember- and forget-cued items belonged to distinct categories. In Experiment 1, the remember- and forget-cued items were both of the same race (i.e., participants studied all Black faces or all Asian faces). In Experiment 2, the remember-cued items were all of one race and the forget-cued items were all of another race. In previous research (Golding, Long, & MacLeod, 1994; Lehman, Srokowski, Hall, Renkey, & Cruz, 2003; Zacks, Radvansky, & Hasher, 1996), directed-forgetting effects were attenuated by the use of forget-cued items that were semantically related to remember-cued items. In Experiment 2, however, the remember-cued items were related to each other rather than to the forget-cued items. If segregation of remember- and forget-cued items plays a role in directed forgetting (Bjork, Laberge, & Legrand, 1968), then using items that naturally fit into two groups should enhance the effects of directed forgetting.

Although having remember- and forget-cued items segregated into distinct categories should have had positive consequences on encoding, studying more than one type of face might have had negative consequences on retrieval. Specifically, it might have influenced response bias. In Experiment 1, when remember- and forget-cued faces were both of the same race, there was no difference in response bias between the directed-forgetting and remember-all conditions. In Experiment 2, when remember-cued faces were of one race and forget-cued faces were of another race, a more liberal response bias was observed in the directed-forgetting condition than in the remember-all condition. Consequently, although the hit rate in the directed-forgetting condition was higher than in the remember-all condition, the increase in hits corresponded with an increase in false alarms. This shift in response criterion may have been related to the organization of remember- and forget-cued faces into distinct categories. That is, participants in the directed-forgetting condition of Experiment 2 might have been inclined to respond “old” when they encountered a stimulus that was consistent with the race of faces that was cued to be remembered. In contrast, for faces that were consistent with the race of those that were cued to be forgotten participants might have relied more on “new” responses as a default option because they were not supposed to remember them in the first place. Thus, the absence of a directed-forgetting benefit in Experiment 2 could have been related to a change in response criterion that was associated with having faces of more than one race to study.

The third methodological difference was the inclusion of a criminal storyline, which might have had unintended consequences on participants’ adherence to the memory instructions. When participants were cued to forget Asian faces and remember Black faces, they appeared to have complied with the instructions. In contrast, when participants were cued to forget Black faces and remember Asian faces, they did the opposite and remembered the Black faces better than the Asian faces. One potential explanation for this finding is that adherence to the forget instruction was influenced by preexisting schemas pertaining to race and crime. Previous research indicates that research participants often associate Black people with violent crimes (Willis Esqueda, 1997), and murder in particular (Gordon, Michels, & Nelson, 1996), to a greater extent than Asian people. Moreover, previous research has shown that when information is inconsistent with preexisting schemas, it tends to be disregarded (Fyock & Stangor, 1994). Thus, when participants were told that an Asian person committed the murder they might have disregarded that information because it was inconsistent with their expectation that the murderer would be a Black person. We explored this possibility in an additional experiment that contrasted memory instructions that were either consistent or inconsistent with racial stereotypes.

Experiment 3

Experiment 3 was designed to further explore the possible influence of stereotypes on adherence to memory instructions. The procedures were similar to those of Experiment 2 (simultaneous cue, distinct categories of remember- and forget-cued items); however, the memory instructions were embedded within the context of a football tryout rather than a criminal event. Participants took the role of a football coach, working under the assumption that they would only be able to recruit players if they could recognize their faces. Some participants were told they could forget the Asian faces because the best player was Black. More than 65% of players in the National Football League are Black (Lapchick, Costa, Sherrod, & Anjorin, 2012), so this information was considered stereotype-consistent. Other participants were told they could forget the Black faces because the best player was Asian. Only 2% of players in the National Football League are Asian (Lapchick et al., 2012), so this information was considered stereotype-inconsistent. If stereotypes influence adherence to memory instructions, the R-F difference should only be present when Asian faces are cued to be forgotten.

Method

Participants. The sample consisted of 94 undergraduate students (*M* = 20.63 years, *SD* = 3.84; 68 women) who participated in exchange for partial course credit. All participants self-identified as Caucasian.

Design. A 2 (condition: directed-forgetting vs. remember-all) × 2 (group: remember Black faces vs. remember Asian faces) × 2 (item cue: remember vs. forget) mixed design was employed. Condition and group were between-subjects factors. Item cue was the within-subject factor.

Materials. Half of the faces from Experiment 1 were used as stimuli (48 photographs of Black men and 48 photographs of Asian men). The number of stimuli that were studied and tested correspond with the directed-forgetting and remember-all conditions in Experiment 2 (see Table 7).

Procedure. At the start of the experiment, all participants were instructed to assume they were the head coach of a professional football team. They were further instructed that they would soon be viewing the faces of the players who attended the tryouts for the team. Before viewing these faces, participants were told that in order to recruit players they would need to remember their faces. The study phase involved viewing 48 faces (24 Black and 24 Asian) for 5 s each, separated by a 1-s interstimulus interval. The untimed recognition test contained 48 targets and 48 distractors. Whether a face was used as a target or a distractor was counterbalanced across participants.

Directed-forgetting condition. Participants in the directed-forgetting condition were immediately informed that only Black and Asian men attended the tryouts. They were further informed that an assistant coach who administered the tryouts reported that one of the players was truly exceptional. Some participants were told the exceptional player was Black; this instruction was designed to be consistent with stereotypes about race and football (Lapchick et al., 2012). Other participants in the directed-forgetting condition were told the exceptional player was Asian; this instruction was designed to be inconsistent with stereotypes about race and football (Lapchick et al., 2012). All participants were instructed to imagine that their chances of getting the really good player on their team depended on their ability to remember his face. Participants in the stereotype-consistent group were then given the following instructions:

> You are about to see the faces of all the players who attended the tryouts. The assistant coach said the best player was Black, so you should try to remember the faces of the Black players. Don’t worry about remembering the faces of the Asian players.

The words “Black” and “Asian” were reversed for participants in the stereotype-inconsistent group. After studying the faces, participants learned that it was unclear whether the best player was Asian or Black because another assistant coach reported that the best player belonged to a different race than was reported by the first assistant coach. Given this new information, participants were instructed that they should try to remember all of the faces they saw earlier in preparation for the upcoming recognition test.

Remember-all condition. In the remember-all condition, the race of the players who attended the tryouts was not mentioned. Participants were simply told that a group of men tried out for the team. They were also informed that an assistant coach noted that one of the players was truly exceptional. Consistent with the directed-forgetting condition, participants were instructed to imagine that their chances of getting the really good player on their team depended on their ability to remember his face; however, participants in the remember-all condition were instructed that because they did not know the identity of the exceptional player, they should try to remember all of the players' faces. After studying the faces, participants in the remember-all condition read a paragraph that described characteristics of the exceptional player, which kept the amount of information that was given in the time separating the study and test phases constant across conditions.

Although all of the items were cued to be remembered in the remember-all condition, participants in this condition were split into two groups for analytical purposes. For the even-numbered participants, the Black faces were designated as the remember-cued items. For the odd-numbered participants, the Asian faces were designated as the remember-cued items. This allowed the data to be analyzed in a 2 (condition: directed-forgetting vs. remember-all) × 2 (group: remember Black faces vs. remember Asian faces) factorial ANOVA without violating the assumption of independence.

Results

Preliminary analyses were conducted to ensure that Black and Asian faces were similar in recognition difficulty. In particular, a series of paired samples t tests were used to compare performance on Black faces and performance on Asian faces for all 94 participants, irrespective of their condition or group. These tests indicated that the race of the faces had an influence on response bias. That is, the hit rate was higher for Black faces (*M* = .73, *SD* = .15) than for Asian faces (*M* = .68, *SD* = .15), *t*(93) = 2.69, *p* = .008, *d* = 0.29, and the false-alarm rate was also higher for Black faces (*M* = .36, *SD* = .16) than for Asian faces (*M* = .31, *SD* = .15), *t*(93) = 3.07, *p* = .003, *d* = 0.32. This produced a more liberal response bias (*c*) for Black faces (*M* = 0.15; *SD* = 0.40) than for Asian faces (*M* = 0.01, *SD* = 0.35), *t*(93) = 3.60, *p* = .001, *d* = 0.37. Race had no effect on *d'* scores (Black: *M* = 1.03, *SD* = 0.57; Asian: *M* = 1.01, *SD* = 0.52). Therefore, Black and Asian faces were similar in recognition difficulty.

R-F difference. Table 8 presents the mean hits, false alarms, discriminability, and response bias for remember- and forget-cued faces within the directed-forgetting condition. The R-F difference was assessed with a 2 (group: remember Black faces vs. remember Asian faces) × 2 (item cue: remember vs. forget) mixed ANOVA on *d'* scores. This test revealed a main effect of item cue, *F*(1, 46) = 18.83, *p* = .001, η_p^2 = .29. There was no effect of group and, in contrast with Experiment 2, there was no interaction between item cue and group. Table 8 clearly shows that, regardless of whether the cue was stereotype-consistent or stereotype-inconsistent, *d'* scores were higher for remember-cued items than for forget-cued items. A 2 (group: stereotype consistent vs. stereotype inconsistent) × 2 (item cue: remember vs. forget) mixed ANOVA on *c* scores revealed no main effects and no interaction.

Following the procedure in Experiment 2, independent-samples *t* tests were conducted to test whether the R-F difference would be observed when the stimuli were controlled. These analyses revealed an R-F difference for Black faces, indicated by higher *d'* scores for Group-1 remember-cued faces than Group-2 forget-cued faces, *t*(46) = 3.54, *p* = .001, *d* = 1.04, and an R-

F difference for Asian faces, indicated by higher *d’* scores for Group-2 remember-cued faces than Group-1 forget-cued faces, $t(46) = 2.19$, $p = .03$, $d = 0.65$. Thus, R-F differences were observed even after controlling for the stimuli.

Benefit analysis. Table 9 presents the mean hits, false alarms, discriminability, and response bias for remember-cued items in the directed-forgetting and remember-all conditions. The presence of a directed-forgetting benefit was assessed with a 2 (condition: directed-forgetting vs. remember-all) × 2 (group: remember Asian faces vs. remember Black faces) factorial ANOVA on remember item *d’* scores. This test revealed no main effects and no interaction. The same 2 × 2 ANOVA on remember item *c* scores also revealed no significant effects.

Discussion

Experiment 3 showed that the simultaneous cueing method can produce higher recognition of remember-cued faces than forget-cued faces. In Experiment 2, the effectiveness of the simultaneous cue was equivocal: within-subject comparisons only showed the predicted R-F difference for Asian faces; between-subjects comparisons showed no R-F differences. In contrast, the R-F differences were robust in Experiment 3. It did not matter whether it was Black or Asian faces that were cued to be remembered, and it also did not matter whether the comparison was within- or between-subjects. Recognition was always better for the remember-cued faces than for the forget-cued faces.

Experiment 3 showed no indication that stereotypes influence adherence to memory instructions. Black faces were forgotten on cue, even though the justification for forgetting them was inconsistent with racial stereotypes about football. This is inconsistent with Experiment 2, in which participants did not forget the forget-cued Black faces and actually recognized them better than remember-cued Asian faces. Although further research will be needed to fully understand this discrepancy, we offer two potential explanations. The first explanation is relatively straightforward: The results of Experiment 2 were a statistical anomaly (i.e., Type I error) and the results of Experiment 3 represent the true state of affairs. In other words, stereotypes do not affect adherence to memory instructions.

The second explanation leaves open the possibility that stereotypes can affect adherence to memory instructions, but only under certain circumstances. In particular, it may depend on whether an attitude is held explicitly or implicitly. Explicit attitudes refer to evaluations that are conscious and deliberate, whereas implicit attitudes are unconscious and automatic (Greenwald & Banaji, 1995). The stereotype in Experiment 2 was negative (associating Black people with criminality), whereas the stereotype in Experiment 3 was positive (associating Black people with athleticism). If a negative stereotype is only implicitly held, it may be more difficult to control its influence. In contrast, a positive stereotype that is explicitly held may be easier to control because it is within the realm of conscious experience. For example, participants in Experiment 3 might have immediately recognized that the memory instructions were inconsistent with their stereotypical expectation, but decided to follow the instructions rather than acting on an explicitly held stereotype.

One consistent finding between Experiments 2 and 3 was the absence of a directed-forgetting benefit. Several of the factors that could have contributed to the absence of a benefit in Experiment 2 were not present in Experiment 3, which helps to narrow down the list of potential reasons no benefit was observed in these experiments. In Experiment 2, the absence of a benefit could have been related to the absence of an R-F difference. However, even when the forget-cued items were forgotten in Experiment 3, the simultaneous cue did not yield a directed-forgetting benefit. Another factor that could have influenced the absence of a benefit in Experiment 2 was the difference in response bias between the directed-forgetting and remember-all conditions. However, if this difference in response bias prevented a benefit from occurring in Experiment 2, then a benefit should have occurred in Experiment 3 because condition had no effect on response bias. These results suggest that even when using a simultaneous cue under ideal circumstances (i.e., forget-cued items are forgotten; no difference in response bias), the freedom to forget some faces does not enhance memory for other faces.

General Discussion

The present research provides support for the notion that faces can be forgotten on cue, both when explicitly designated as items that can be forgotten in a standard variant of the task, and when covertly cued to be forgotten in a novel application of the task that exploits the natural categorizations eyewitnesses are likely to use in lieu of explicit remember and forget cues. A key feature distinguishing the present research design from previous investigations of directed forgetting with faces was the inclusion of comparison conditions in which only remember cues were given, which enabled an analysis of directed-forgetting costs and benefits. In Experiments 1 and 2, better memory was observed in the remember-half conditions than in the directed-forgetting conditions, indicating that exposure to the forget-cued items resulted in a cost. Although these two conditions differed in both the number of items that were studied and the number of items that were tested, the effect remained even when test length was controlled, suggesting that it was exposure to the additional forget-cued items that negatively impacted performance in the directed-forgetting conditions.

Although the cost of exposure to forget-cued items was consistently observed, the benefit of having the freedom to forget some items was elusive. In both Experiments 2 and 3, which involved simultaneous cues, there was no evidence of a directed-forgetting benefit. Even when traditional poststimulus cues were used in Experiment 1, we did not find convincing evidence of a directed-forgetting benefit. When Asian faces were studied in Experiment 1, remember-cued items in the directed-forgetting condition were recognized better than the forget-cued items, but no better than those same items in the remember-all condition. When Black faces were studied in Experiment 1, there was a benefit; however, it is unclear whether this benefit can be attributed to the forget cue because the forget-cued Black faces were recognized just as well as the remember-cued Black faces. In summary, not once did we observe an R-F difference that led to a directed-forgetting benefit. This suggests that forgetting some faces has no benefit, only a cost.

Implications for Eyewitness Memory

The present research was driven partly by an interest in whether eyewitness memory could be improved by intentionally forgetting irrelevant faces. In each of our three experiments, forgetting some faces conferred no benefit for remembering other faces. Nevertheless, items that were believed to be irrelevant (i.e., faces of the forget-cued race) were generally forgotten on cue. In the context of eyewitness memory, this finding is important, because witnesses are frequently mistaken in their belief about who committed a crime. These errors can even be a result of mistaking presumably obvious characteristics like race (Oliver, 1999) or sex (Earles, Kersten, Curtayne, & Perle, 2008) of the offender. Such errors could influence the strategies witnesses use to remember the faces of the people present at the time of the crime.

Consider, for instance, the restaurant scenario described in the introduction. A witness to that altercation might be biased to believe that if an Asian diner was murdered, the killer must have been Black, because the conflict appeared to result from racial tensions between the two groups. As a result, the witness might try to remember the faces of the Black diners and make no effort to remember the faces of the Asian diners, thereby using an internal forget cue. If it later becomes clear that the murderer was actually Asian, the experiments reported here suggest that the accuracy of distinguishing the faces of Asian people who were in the restaurant from Asian people who were not in the restaurant at the time of the murder would be impaired. In general, the results of the present work suggest that the belief (mistaken or otherwise) that some people can be excluded as potential suspects in a crime can influence memory for the faces of those actually present at the scene.

Of course, our experiments were not true eyewitness events. The conditions we created more closely paralleled a standard face-recognition paradigm than an eyewitness event. For example, the studied faces were presented without bodies or other forms of contextual information that might aid recognition of faces in an eyewitness context. Furthermore, instead of having participants try to identify one face from a lineup, participants were tested on all the faces they encountered. Indeed, our purpose was not to emulate the conditions that an eyewitness would experience. On the contrary, we sought to demonstrate both the negative and the positive effects of forgetting faces using the more covert remember and forget cues that are likely to be present in such situations. Future research should explore the directed-forgetting procedure in situations more closely resembling actual eyewitness events, using other natural category cues (e.g., sex, age, hair color).

In summary, the results of the present investigation confirm that costs arise when participants are required to remember faces they believed could be forgotten. Our results extend this finding by providing the first evidence that these costs occur when the directed-forgetting procedure is used with faces as stimuli. Moreover, we demonstrate that directed forgetting can influence recognition memory for faces in a context in which remember and forget cues are similar to those that would be available to eyewitnesses to an actual crime.

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Table 1

Stimulus sets for directed-forgetting, remember-half, and remember-all conditions (Exp. 1)

		Study Items		Test Items	
Condition	Group	Remember	Forget	Old	New
Directed-Forgetting	1	24 B	24 B	48 B	48 B
	2	24 A	24 A	48 A	48 A
Remember-Half	1	24 B	-	24 B	24 B
	2	24 A	-	24 A	24 A
Remember-All	1	48 B	-	48 B	48 B
	2	48 A	-	48 A	48 A

Note: B = Black faces; A = Asian faces

Table 2

Hits and false alarms within the directed-forgetting condition (Exp. 1)

Group	Race	Hits		False Alarms
		Remember Items	Forget Items	
1	Black	.70 (.14)	.68 (.14)	.18 (.09)
2	Asian	.73 (.11)	.59 (.15)	.23 (.11)

Note: Values show means (standard deviations).

Table 3

Hits, false alarms, discriminability, and response bias for remember-cued faces (Exp. 1)

Condition	Group	Race	Hits	False Alarms	*d'*	*c*	*n*
Directed-Forgetting	1	Black	.70 (.14)	.18 (.09)	1.47 (.49)	.20 (.30)	25
	2	Asian	.73 (.11)	.23 (.11)	1.39 (.50)	.07 (.24)	26
		Total	.72 (.12)	.20 (.11)	1.43 (.49)	.13 (.29)	51
Remember-Half	1	Black	.81 (.10)	.20 (.14)	1.81 (.80)	.00 (.31)	19
	2	Asian	.81 (.10)	.14 (.10)	2.02 (.59)	.12 (.31)	27
		Total	.81 (.10)	.16 (.12)	1.93 (.68)	.07 (.31)	46
Remember-All	1	Black	.66 (.13)	.28 (.08)	0.99 (.37)	.08 (.24)	24
	2	Asian	.73 (.13)	.23 (.12)	1.41 (.65)	.07 (.24)	27
		Total	.70 (.13)	.25 (.10)	1.21 (.57)	.07 (.24)	51

Note: Values show means (standard deviations).

Table 4

Stimulus sets for directed-forgetting, remember-half, and remember-all conditions (Exp. 2)

		Study Items		Test Items	
Condition	Group	Remember	Forget	Old	New
Directed-Forgetting	1	24 B	24 A	24 B, 24 A	24 B, 24 A
	2	24 A	24 B	24 A, 24 B	24 A, 24 B
Remember-Half	1	24 B	-	24 B	24 B
	2	24 A	-	24 A	24 A
Remember-All	1	24 B, 24 A	-	24 B, 24 A	24 B, 24 A
	2	24 B, 24 A	-	24 B, 24 A	24 B, 24 A

Note: B = Black faces; A = Asian faces

Table 5

Hits, false alarms, discriminability, and response bias for remember- and forget-cued faces within the directed-forgetting condition (Exp. 2)

Group	Item Cue	Race	Hits	False Alarms	*d'*	*c*
1	Remember	Black	.77 (.12)	.29 (.22)	1.47 (.64)	-.08 (.50)
	Forget	Asian	.62 (.12)	.24 (.13)	1.16 (.46)	.26 (.40)
2	Remember	Asian	.70 (.13)	.34 (.17)	1.02 (.50)	-.04 (.38)
	Forget	Black	.66 (.14)	.23 (.13)	1.41 (.52)	.19 (.46)

Note: Values show means (standard deviations).

Table 6

Hits, false alarms, discriminability, and response bias for remember-cued faces (Exp. 2)

Condition	Group	Faces	Hits	False Alarms	*d'*	*c*	*n*
Directed-Forgetting	1	Black	.77 (.12)	.29 (.22)	1.47 (.64)	-.08 (.50)	22
	2	Asian	.70 (.13)	.34 (.17)	1.02 (.50)	-.04 (.38)	21
		Total	.74 (.13)	.32 (.20)	1.25 (.61)	-.06 (.44)	43
Remember-Half	1	Black	.84 (.08)	.27 (.15)	1.64 (.60)	-.16 (.30)	20
	2	Asian	.81 (.11)	.18 (.08)	1.84 (.63)	.00 (.27)	20
		Total	.83 (.09)	.23 (.13)	1.74 (.62)	-.08 (.29)	40
Remember-All	1	Black	.67 (.12)	.24 (.15)	1.30 (.52)	.14 (.41)	18
	2	Asian	.60 (.16)	.23 (.18)	1.11 (.84)	.27 (.34)	17
		Total	.64 (.14)	.24 (.16)	1.21 (.70)	.21 (.38)	35

Note: Values show means (standard deviations).

Table 7

Stimulus sets for directed-forgetting and remember-all conditions (Exp. 3)

		Study Items		Test Items	
Condition	Group	Remember	Forget	Old	New
Directed-Forgetting	1	24 B	24 A	24 B, 24 A	24 B, 24 A
	2	24 A	24 B	24 A, 24 B	24 A, 24 B
Remember-All	1	24 B, 24 A	-	24 B, 24 A	24 B, 24 A
	2	24 B, 24 A	-	24 B, 24 A	24 B, 24 A

Note: B = Black faces; A = Asian faces

Table 8

Hits, false alarms, discriminability, and response bias for remember- and forget-cued faces within the directed-forgetting condition (Exp. 3)

Group	Stereotype	Item Cue	Faces	Hits	False alarms	*d'*	*c*
1	Consistent	Remember	Black	.76 (.13)	.35 (.17)	1.18 (.52)	-.17 (.40)
		Forget	Asian	.65 (.16)	.36 (.11)	0.77 (.42)	-.02 (.31)
2	Inconsistent	Remember	Asian	.72 (.17)	.31 (.20)	1.13 (.69)	-.03 (.42)
		Forget	Black	.66 (.15)	.39 (.14)	0.70 (.39)	-.06 (.34)

Note: Values show means (standard deviations).

Table 9

Hits, false alarms, discriminability, and response bias for remember-cued faces (Exp. 3)

Condition	Group	Faces	Hits	False Alarms	*d'*	*c*	*n*
Directed-Forgetting	1	Black	.76 (.13)	.35 (.17)	1.18 (.52)	-.17 (.40)	24
	2	Asian	.72 (.17)	.31 (.20)	1.13 (.69)	-.03 (.42)	24
		Total	.74 (.15)	.33 (.18)	1.15 (.61)	-.10 (.41)	48
Remember-All	1	Black	.77 (.16)	.34 (.16)	1.25 (.52)	-.19 (.45)	23
	2	Asian	.70 (15)	.30 (.15)	1.07 (.42)	-.01 (.39)	23
		Total	.73 (.16)	.32 (.15)	1.16 (.48)	-.10 (.42)	46