

Confirming Feedback Following a Mistaken Identification Impairs Memory for the Culprit

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This research examined whether confirming postidentification feedback following a mistaken identification impairs eyewitness memory for the original culprit. We also examined whether the degree of similarity between a mistakenly identified individual and the actual culprit plays a role in memory impairment. Participant-witnesses ($N = 145$) made mistaken identifications from a “similar” or a “dissimilar” culprit-absent photo lineup. The similar lineup contained individuals who were similar in appearance to the actual culprit and the dissimilar lineup contained individuals who were dissimilar in appearance to the actual culprit. After their identifications, witnesses were given confirming feedback (“Good job! You identified the suspect.”) or no feedback. The experimenter then feigned having accidentally given the witnesses the wrong photo lineup. After telling witnesses to disregard whatever they saw in the first lineup, the experimenter gave witnesses the “correct” (culprit-present) lineup and told the witnesses to do their best to identify the culprit. Identifying a dissimilar individual and receiving confirming feedback after a misidentification had independent impairing effects on memory for the original culprit. Results extend the traditional conceptualization of the postidentification feedback effect by showing that confirming feedback not only distorts witnesses’ retrospective self-reports, but it also impairs recognition memory for the culprit.

Keywords: eyewitness memory, eyewitness identification, postidentification feedback, postevent suggestion, memory impairment

One night in July of 1984, 22-year-old Jennifer Thompson was asleep in her bed when a man broke into her apartment, held a knife to her throat, and raped her. Determined to identify the assailant if she survived the attack, Jennifer deliberately studied the man’s face throughout the 30 minutes he was in her apartment. Three days after the rape, Jennifer viewed a photo lineup at the police station and identified Ronald Cotton as her attacker. After announcing her identification, the detective remarked “We thought this might be the one.” One week later, Jennifer again identified Ronald Cotton—this time from a live lineup—and was told, “That’s the one you picked out in the photo.” She testified against Cotton in two separate trials. Both times, the jury found Cotton guilty of rape and burglary and sentenced him to life plus 54 years in prison. After Cotton had served 10 and a half years of his sentence, DNA testing exonerated Cotton and conclusively proved that a man named Bobby Poole was the rapist.

This story is only one of many miscarriages of justice that have resulted at least in part from mistaken eyewitness identification. Eyewitness misidentification is the leading cause of wrongful conviction, accounting for 75% of DNA-exoneration cases in the United States (www.innocenceproject.org). But, perhaps what makes Jennifer Thompson’s case so unique is the fact that Jennifer

had the opportunity to identify Bobby Poole—her actual attacker—during Ronald Cotton’s second trial. Cotton’s lawyer had subpoenaed Poole, who was in prison for similar assaults, after inmates reported that they heard Poole bragging about getting away with raping Jennifer and another woman. Yet, when Bobby Poole stood before Jennifer in the courtroom, Jennifer denied ever having seen him and reasserted her claim that Ronald Cotton was the rapist. What happened to Jennifer’s memory of Bobby Poole, the man whose face she carefully studied during the attack? The current research tests the possibility that confirming postidentification feedback after a mistaken identification, such as the kind that Jennifer received after identifying Ronald Cotton from the photo lineup (“We thought this might be the one.”) and from the live lineup (“That’s the one you picked out in the photo.”), harms eyewitnesses’ abilities to later recognize the actual culprit.

Postidentification feedback given to eyewitnesses after they have made an identification has been shown to profoundly distort witnesses’ recollections of testimony-relevant judgments. For example, confirming feedback (e.g., “Good job! You identified the suspect.”) leads witnesses to recall having experienced more favorable witnessing conditions, having paid more attention to the culprit during witnessing, and having been more certain at the time of their identification (Wells & Bradfield, 1998; Wells & Bradfield, 1999). This *postidentification feedback effect* is a large effect and has been replicated numerous times, including with real eyewitnesses to crimes (Wright & Skagerberg, 2007; see meta-analysis by Douglass & Steblay, 2006).

There are reasons to believe that, in addition to distorting witnesses’ subjective recollections of their witnessing experience, postidentification feedback given to witnesses after they have

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made a mistaken identification might also impair their memory of the culprit. Studies have shown that confirming feedback increases witnesses' false memories of event details that they had previously confabulated (Hanba & Zaragoza, 2007; Zaragoza et al., 2001). And many other forms of social influence have been shown to distort people's memories of past events. For example, participants paired for discussion with partners who saw an accomplice in a series of photos were more likely to report having seen the accomplice themselves (Wright, Self, & Justice, 2000). Reinforcement from questioners has led children to make inaccurate claims about a past event (Garven, Wood, Malpass, & Shaw, 1998). And analyses of documented false-confession cases illustrate that suggestive and coercive interrogation tactics used by police can lead some innocent people to "remember" having committed a crime (Kassin, 1997). Although psychologists who study eyewitness identification generally believe that a mistaken identification taints the witness' memory toward the identified person (Wells & Quinlivan, 2009), little research has investigated whether postidentification feedback might exacerbate this effect.

Two previous experiments have examined questions that are related to the current work. Dixon and Memon (2005) found that postidentification feedback after a mistaken identification did not influence the quantity or accuracy of crime event details recalled by witnesses or their willingness to answer misleading questions. However, Dixon and Memon tested the effects of feedback on recall of details, rather than on recognition memory for the object of the feedback (the culprit). It has been suggested that different processes may underlie recall and recognition (Anderson & Bower, 1972), making it important to examine independently the effects of feedback on recognition memory. Moreover, the questions used by Dixon and Memon to test memory for the culprit might have been ill-suited to demonstrating memory impairment because they did not differentiate between memory originating from the witnessed event and memory originating from the lineup misidentification. Specifically, memory for the culprit was tested by asking participants questions like "What color was the robber's hair?" However, lineup fillers in the study were selected "on the basis of their physical similarity [to the culprit]" and, presumably, all had the same hair color as the actual culprit. Hence, even if participants' memories of the culprit had been influenced by feedback after a misidentification, one would not expect a decrement in accuracy to emerge on this type of general-description measure. In the current experiment, we tested for possible impairment effects from feedback using a forced-choice recognition-memory test, which we describe in detail in the next section.

In another study related to the current work, Palmer, Brewer, and Weber (2010) examined the effects of postidentification feedback after a mistaken identification on performance in a second lineup that either included or did not include the culprit. However, Palmer et al. never gave confirming feedback to witnesses who made mistaken identifications; instead, Palmer et al. gave confirming feedback only to witnesses who made no identification. In addition, the confirming feedback given in the Palmer et al. experiment was given only to witnesses who had in fact made the correct decision (to identify no-one from the first lineup). In the current research, the confirming feedback is more akin to mistaken eyewitness-identification cases in which the witness receives confirming feedback after the mistake and then later encounters the actual culprit. The central question in the present work is whether

confirming feedback after a mistaken identification harms witnesses' abilities to later recognize the culprit.

The Test for Memory Impairment

The conceptual basis of the memory test used in the current work derives from the misinformation-effect literature, in which a theoretical debate about the fate of memory after misinformation led to the development of what is now the widely accepted method for testing memory impairment. The memory test used in the original misinformation experiments consists of implanting some form of postevent misinformation, such as suggesting that a person was holding a screwdriver when in fact it was a hammer. Later, witnesses are asked whether the person was holding a hammer or a screwdriver. Whereas Loftus (1979) claimed that the increased rate of endorsing the suggested item indicated that witnesses' memories had been impaired, McCloskey and Zaragoza (1985) contended that impairment of the original memory trace could not be inferred from this version of the memory test. They argued that witnesses might have selected the suggested item because of demand effects, for example, or that witnesses might have developed a second memory (for the suggested item) without sustaining impairment to their memories of the original item. Accordingly, they proposed what is now the widely accepted test of memory impairment, in which the witness makes a forced choice between a novel item (e.g., a wrench) and the original item (the hammer). Impairment of the original memory is then evidenced by fewer choices of the original item when the suggested item (screwdriver) is not available to be chosen. We will term this the "misinformation-absent" test of memory impairment.

The forced-choice nature of the misinformation-absent test is critical to the question of whether the original memory has been impaired. Specifically, if the witness were given a "not sure" option or an "item not present" option, then any decrease in accuracy could be attributable either to memory impairment (memory for the hammer has been impaired) or to an unwillingness to choose when the suggested item is not present. Memory impairment for the original item can only be assessed by forcing a choice between the original item and novel items. It is also important to keep in mind that the term memory impairment refers to diminished *performance* and does not make assumptions about the ultimate state of the original memory. In fact, as Loftus and Loftus (1980) articulated, there are many reasons why it might be impossible to ever definitively determine whether the original memory has been altered, replaced, or simply made less accessible by the misinformation.

We used the logic of the misinformation-absent test to examine the effects of postidentification feedback on eyewitness memory for the culprit. Specifically, we tested for memory impairment resulting from feedback after a mistaken identification by using a culprit-present lineup that did not include any members of the lineup from which the mistaken identification was made. Instead, the memory-test lineup contained all new fillers plus the original culprit. As suggested by McCloskey and Zaragoza (1985), if the memory-test lineup were to include the person who the witness originally identified, then the witness might select him simply in an effort to behave consistently (Cialdini & Trost, 1998). In fact, there is plenty of evidence that witnesses become committed to their prior identifications (Deffenbacher, Bornstein, & Penrod,

2006; Dysart et al., 2001; Memon et al., 2002). Commitment to a previous mistaken identification is an important problem, but it is not our purpose to study the possible augmentation of commitment effects that might result from feedback. Instead, our purpose is to study any impairment of the original memory of the culprit that might result from feedback. As described above, memory impairment can only be assessed by forcing a choice between the original item and new items. Accordingly, participants in this study made a forced choice from a culprit-present lineup that contained the culprit and all new fillers.

Confirming-Feedback Impairment Hypothesis

Confirming feedback functions to increase witnesses' belief that the suspect is in fact the culprit (Wells, Olson, & Charman, 2002). Accordingly, might confirming feedback also shape witnesses' recollections of what the culprit looked like? Cognitive psychologists have long been aware that memory retrieval is highly dependent on, and influenced by, current knowledge and beliefs (e.g., Bartlett, 1932; Schacter, 1999). To the extent that confirming feedback increases witnesses' belief that the identified individual is the culprit, it might also lead witnesses to adjust their memories of the culprit to be more in line with the appearance of the identified individual. Much like in the traditional misinformation studies in which misinformation serves as a form of feedback regarding the witness' recollection of an event detail (e.g., "I thought I saw a hammer but I guess it was a screwdriver"), confirming feedback after a misidentification might lead witnesses to modify their recollections about the culprit's appearance (e.g., "I thought he had a big nose, but I guess it actually wasn't very big."). These mental adjustments, prompted by confirming feedback, could lead witnesses to retain a memory that is more similar to the misidentified individual and less similar to the actual culprit.

By inflating witnesses' belief that the identified individual is the culprit, confirming feedback might also function to grant witnesses permission to consider the identified person and the culprit to be "one and the same." Hence, witnesses might begin to rely on the image of the identified individual during subsequent event recollections rather than on their original memory of the culprit. Retrieving and rehearsing the image of the misidentified individual rather than that of the culprit would presumably strengthen witnesses' memories of the identified individual and weaken their memories of the culprit. In summary, we theorized that confirming feedback—operating via one (or both) of these processes—would lead witnesses to retain weaker memories of the culprit who they originally witnessed. Accordingly, we hypothesized that witnesses who received confirming feedback after a mistaken identification would later be less able to recognize the culprit than would witnesses who did not receive feedback after their mistaken identification.

Similarity of the Misidentified Individual to the Actual Culprit

Working against our confirming-feedback impairment hypothesis is the fact that witnesses who are confronted with a culprit-absent lineup tend to direct their identifications toward the person who best resembles the culprit (e.g., Lindsay, 1986; Wells, 1984,

1993). One implication of this is that the effect of confirming feedback could be relatively small because dissimilarities between the mistakenly identified person and the original culprit could be minimal. In the section above, we speculated that confirming feedback might lead witnesses to shift their memory of the culprit toward the appearance of the identified individual and/or lead witnesses to substitute their memory of the culprit for the image of the identified individual. However, to the extent that the misidentified individual is very similar in appearance to the actual culprit, these processes would be expected to cause relatively little interference to witnesses' memories of the culprit. We sought to test this proposition by manipulating the degree of similarity between the mistakenly identified individual and the actual culprit. Specifically, witnesses were given one of two versions of the culprit-absent lineup: a version containing individuals who were relatively similar in appearance to the culprit or a version containing individuals who were relatively dissimilar in appearance to the culprit. We hypothesized that confirming feedback would be most detrimental to participants' memories of the culprit when it reinforced the identification of someone who is relatively dissimilar in appearance to the actual culprit.

Methodological Note

To create a stringent test of the confirming-feedback impairment hypothesis, all witnesses were told before the final lineup test that the initial lineup they had been given was actually the wrong lineup. This "oops" manipulation (described in the Methods section) creates a stringent test of the confirming-feedback impairment hypothesis because it invalidates the confirming feedback the participants received. Specifically, participants were told that the first lineup that they saw was the wrong lineup and that they should "disregard whatever they saw in the first lineup." Accordingly, participants who received confirming feedback were disabused of the belief that their identification was actually correct. Although some research indicates that discrediting feedback moderates the effects of feedback on participants' reports of their certainty and other self-report measures (e.g., Neuschatz et al., 2007), the moderating effect of discrediting the feedback is only partial and the feedback effect appears to rebound from discrediting manipulations with the passage time (e.g., Quinlivan et al., 2012). Moreover, evidence indicates that attempts by witnesses to "undo" the effects of confirming feedback in their retrospective judgments are merely guesses (flexible adjustments participants make on a scale) based on reasoning about the ways that the feedback might have influenced their judgments (Charman & Wells, 2008). However, there is no reason to expect that discrediting the feedback would repair an already-altered memory. Hence, if confirming feedback alters memory, it should not matter whether the feedback is later discredited. And, importantly, if confirming feedback impairs memory even after the feedback is discredited, it allows us to attribute any feedback effects on recognition accuracy to memory impairment rather than to demand effects associated with participants' expectations about the purpose of the second lineup-identification task.

Method

Participants and Design

Participants were 147 undergraduates at a large Midwestern university who participated in the experiment to satisfy a course requirement. The study used a 2 (Culprit-absent lineup: similar vs. dissimilar) \times 2 (Postidentification feedback: confirming feedback vs. no feedback) between-participants design.

Materials and Procedure

Stimulus video. The stimulus video depicted an airport scene in which a suspicious individual switched his luggage bag with another passenger's bag at the check-in line. After switching the bag, the culprit exited the airport. The video lasted 1 min 28 s and showed multiple clear views of the culprit's face. In an effort to create less-than-optimal encoding conditions for participant-witnesses, we degraded the quality of the stimulus video (see Figure 1 for a screen shot). There are two reasons why we felt that degrading the quality of the stimulus video was an important methodological feature of the current research. First, half of the participants in this study viewed a lineup that contained individuals who were relatively dissimilar to the actual culprit. We wanted to avoid the possibility that participants' memories of the culprit would be so strong so as to preclude them from making an identification from the dissimilar lineup or from believing confirming feedback after their identification from the dissimilar lineup. Second, eyewitness scientists tend to agree that the stronger a witness' memory, the less susceptible the witness will be to suggestion (Wells & Quinlivan, 2009). Accordingly, we felt that a fair test of the confirming-feedback impairment hypothesis required that participants' memories were not so strong from the outset that they would be impenetrable to the suggestive influence of confirming postidentification feedback.

Lineups. To manipulate the similarity between the mistakenly identified individual and the culprit, we generated two versions of the culprit-absent lineup. The two lineups were created using data collected in a pilot study in which undergraduate students ($n = 20$)



Figure 1. Still shot from the degraded stimulus video.

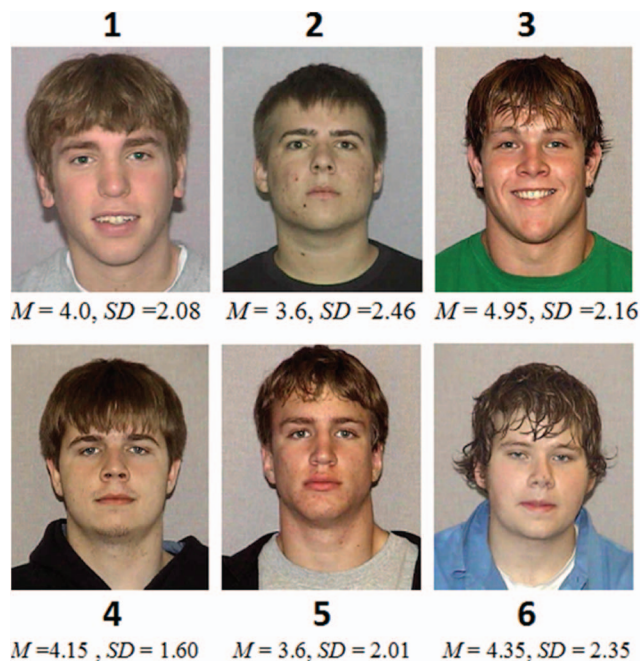


Figure 2. Similar culprit-absent lineup.

rated on a scale from 1 (extremely dissimilar) to 7 (extremely similar) the similarity of 30 photographs—presented individually and in random order—to two still images of the culprit from the stimulus video. The 30 photographs were preselected by the first author such that 15 of the photographs comprised a “similar” set and 15 of the photographs comprised a “dissimilar” set. After collecting similarity ratings from the raters, the six photographs

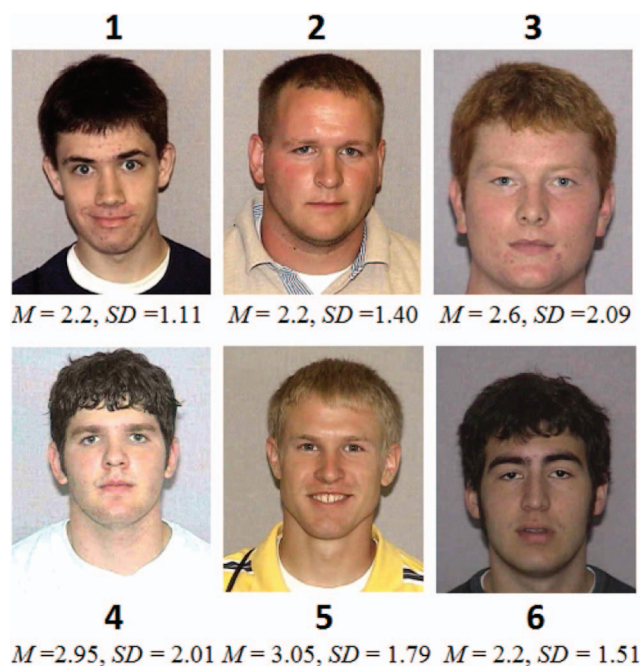


Figure 3. Dissimilar culprit-absent lineup.

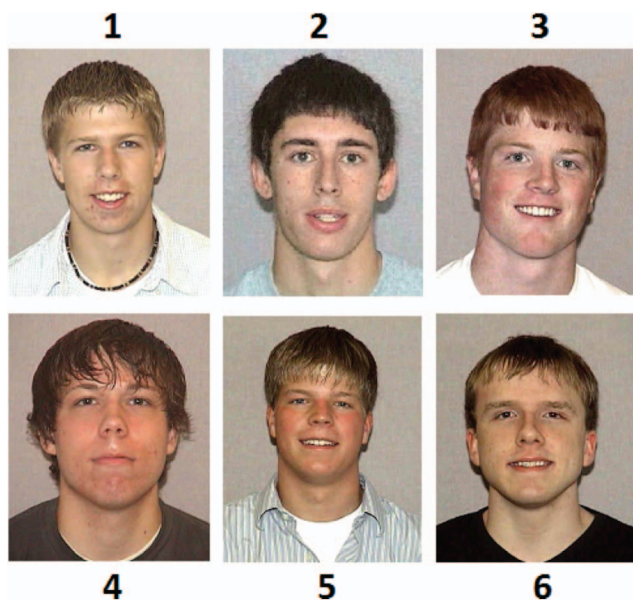


Figure 4. Culprit-present lineup (Culprit is #4).

from similar set that were rated highest in similarity were selected for the similar lineup. The six photographs from the dissimilar set that were rated lowest in similarity were selected for the dissimilar lineup. A paired-samples *t* test on the average similarity scores (1 being very dissimilar and 7 being very similar) confirmed significant differences between the similar lineup ($M = 4.11$) and the dissimilar lineup ($M = 2.53$), $t(19) = 7.86$, $p < .001$. Figures 2 and 3 display the similar and dissimilar lineups as well as the mean similarity ratings for each person in the lineups.

The culprit-present memory-test lineup consisted of a photo of the actual culprit plus five new filler photos of individuals who varied in similarity to the culprit (see Figure 4). We tested the fairness of the lineup using a mock-witness paradigm in which nonwitnesses to the crime were given a description of the culprit and asked to identify him from the lineup (Doob & Kirshenbaum, 1973; Wells, Leippe, & Ostrom, 1979). We obtained the descriptions from six eyewitnesses who viewed the crime video and immediately provided written descriptions of the culprit. Two composite descriptions were created by combining the features that were most frequently described by the witnesses. Each of these descriptions was then given to a sample of 50 mock witnesses, yielding data from a total of 100 witnesses. Twenty-four of the 100 witnesses selected the culprit, indicating that the culprit-present lineup had an average functional size of 4.2 and hence constituted a fair test of witnesses' memories of the culprit.

Witnessed event and feedback manipulation. Upon arriving at the lab, participants were directed to a small room where they were left alone to watch the video of the man switching bags at an airport. After the video ended, the experimenter reentered the room and opened a computer program while explaining to the participant that he or she would be asked some questions about what was witnessed in the video. The experimenter then left the room and the participant viewed either the similar or the dissimilar culprit-absent lineup. In line with procedures from the original postidentification feedback study (Wells & Bradfield, 1998), participants

were given biased lineup instructions to elicit a high rate of mistaken identifications. Hence, participants were not informed that the culprit might not be present nor were they given the option to select "Not There." As expected, all participants made mistaken identifications.

After making their identifications, participants were randomly assigned to receive confirming feedback ("Good job! You identified the suspect") or no feedback ("You identified Number X"). The feedback (or absence of feedback) was administered on the computer screen and was presented concurrently with the image of the identified person. The feedback was not administered by the experimenter because the experimenter would later need to claim to have opened the wrong computer program for displaying the initial lineup. We describe this oops manipulation in detail in the paragraphs that follow. If the experimenter had intervened to provide feedback (rather than the feedback being presented by the computer), the subsequent oops manipulation would not have been credible.

After the feedback manipulation, participants completed the standard postidentification feedback questionnaire to assess their witnessing experience and their confidence in their identification (see Table 1). Participants then completed a number of personality questionnaires that were irrelevant to our research aim but were included to increase the credibility of the oops manipulation that was to follow. After completing all of the personality questionnaires, a screen appeared that prompted participants to alert the experimenter to "Begin ELT task." When the experimenter reentered the room and looked at the prompt on the computer screen, he or she feigned distress about having possibly "set up the wrong computer program for displaying the lineup." The experimenter then typed a password ostensibly to view the name of the program that was currently running, at which time the experimenter confirmed that he or she had accidentally clicked on the wrong program file. The experimenter explained that the name of the program for this study is very similar to the name of a program that is used in a different study in the lab. After apologizing for the mistake, the experimenter proceeded to open the "correct" program file and said:

Okay, this is the right program. So the video you saw was the right video, it's just that the lineups in the studies are different because the video for the other study is different. So just disregard whatever you saw in the first lineup. You'll see the right lineup now and you'll be asked to identify the guy who switched the bags. Just do the best you can. Sorry about that again . . . this shouldn't take very long at all . . . I was wondering what was taking so long! But it's because the other study asks you a bunch of extra personality questions. Okay, you should be good to go now. Let me know when you're done.

Participants then viewed the final memory-test lineup, which consisted of a photo of the actual culprit and five new filler photos of individuals who varied in similarity to the culprit (see Figure 4). As discussed in the introduction, we used a forced-choice recognition test in which participants were not given the option to select "Not There." Hence, we collected identification data from all participants. After their identifications, participants were prompted by the computer to call for the experimenter, at which time the experimenter asked participants two questions that assessed participants' understanding of the oops manipulation:

Table 1
Witness Self-Report Measures

Question	Scale
At the time you identified the person from the photo lineup, how certain were you that the person you identified from the photo lineup was the person you saw in the video?	10% (not at all certain) to 100% (totally certain), in 10% intervals
How good a view did you get of the person in the video?	0 (very poor) to 10 (very good)
How well were you able to make out specific features of the person's face from the video?	0 (not at all) to 10 (very well)
How much attention were you paying to the face of the person in the video while viewing the tape?	0 (none) to 10 (my total attention)
To what extent do you feel that you had a good basis to make an identification?	0 (no basis at all) to 10 (a very good basis)
How easy or difficult was it for you to figure out which person in the photo lineup was the person from the video?	0 (extremely difficult) to 10 (extremely easy)
From the time the lineup started, how much time do you estimate it took you to make an identification?	0 (I needed almost no time) to 10 (I had to think about the lineup for a long time)
On the basis of your memory of the person in the video, how willing would you have been to testify in court that the person you identified was the same person you saw in the video?	0 (not at all willing) to 10 (totally willing)
Generally, how good is your recognition memory for faces of strangers you have encountered on only one prior occasion?	0 (very poor) to 10 (excellent)
How clear is the image you have in your memory of the person you saw in the video?	0 (not at all clear) to 10 (very clear)

I just realized that I should confirm with you that you understood what happened in the mix-up from earlier.

Question 1. Did you understand that the first lineup that you saw was the wrong lineup?

Question 2: And did you understand that whoever you identified from the first lineup was definitely NOT the person who switched the bags in the video?

Finally, participants completed a manipulation check in which they were asked to identify their feedback condition and were questioned to assess suspicion.

Results

Preliminary Analyses

Two participants indicated during suspicion questioning that they believed that the oops manipulation was part of the experiment. Because we were interested in memory impairment from confirming feedback after the first lineup and subsequent feedback had been discredited, we excluded these two participants from our analyses. Thus, analyses were based on the remaining sample of 145 participants.

Participants were asked about their understanding of the oops manipulation to ensure that they did not believe that there was any informational value in the first lineup that they saw. However, it did not occur to us to ask about the oops manipulation until after we had already collected data from 37 participants. Hence, data are available for only 108 of the participants about their understanding of the oops manipulation. Ten participants (9%) failed both of the oops manipulation-check questions, which asked whether they understood that the first lineup that they saw was the wrong lineup and that the person they identified from the first lineup was not the person from the video. The number of participants who failed both of these questions did not vary systematically as a function of experimental condition, $\chi^2 = 2.1$, $p = .55$. Because the majority (91%) of participants understood the implications of the oops

manipulation and participant understanding did not vary by condition, all participants were used in the final data analyses. The pattern of results did not change based on whether or not these individuals were included in the analyses.

All participants were also asked at the end of the study to identify the type of feedback (if any) they received after making an identification from the first lineup. Eleven of the participants were unable to accurately report their feedback condition. We suspect that some of these participants might have failed to accurately report their feedback condition because the first lineup (and feedback) was discredited by the experimenter. The number of participants who failed the feedback manipulation check did not vary significantly as a function of experimental condition ($\chi^2 = 6.4$, $p = .10$) and the pattern of results did not change based on whether or not these individuals were included in the analyses. Therefore, we included all participants in our final data analyses.

Was the Standard Postidentification Feedback Effect Observed?

We first analyzed participants' self-report measures after they made the first (mistaken) identification to confirm that the postidentification feedback had its standard effect on participants' retrospective judgments about the witnessed event and their confidence at the time of the identification.¹ A one-way MANOVA was conducted using all 10 self-report variables (the *time* variable was reverse coded), which constituted a single measure of witnesses' self-reported reliability. Replicating the standard postidentification feedback effect, participants who received confirming feedback self-reported greater reliability than did participants who did not receive feedback, $F(10, 132) = 3.04$, $p = .002$, $\eta^2 = .19$.

¹ Means and SDs for the full 2×2 factorial are available from the first author upon request.

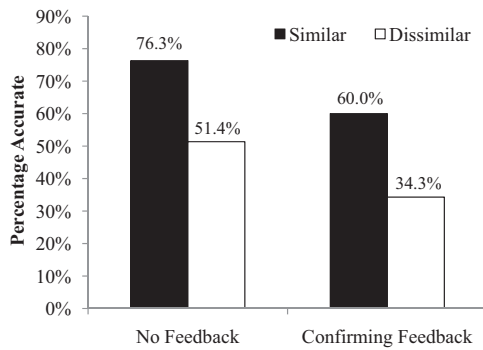


Figure 5. Identification accuracy as functions of feedback and similarity conditions.

Did Confirming Feedback and Similarity of the Misidentified Individual Affect Identification Accuracy?

We tested the effects of confirming feedback and the similarity manipulation on identification accuracy using a logistic regression in which feedback, similarity, and the feedback-by-similarity interaction were specified as categorical predictors of identification accuracy. Effect size estimates for differences in proportions are reported using Cohen's *h*. An *h* of 0.2, 0.5, and 0.8 correspond to a small, medium, and large effect size, respectively (Cohen, 1988).

Consistent with the confirming-feedback impairment hypothesis, confirming feedback reduced participants' abilities to accurately identify the culprit from the culprit-present lineup, Wald = 4.32, $p = .04$, $\exp(B) = 2.09$, 95% CI [$\exp(B)$] = [1.04, 4.17], Cohen's *h* = .34. Whereas 64.0% of participants who did not receive feedback were able to accurately identify the culprit from the culprit-present lineup, only 47.1% of participants who received feedback made accurate identifications (see Figure 5). In addition, the manipulation of similarity between the mistakenly identified person and the culprit also had a main effect on identification accuracy: participants who made identifications from the dissimilar lineup were less able to accurately identify the culprit (42.8%) than were participants who made identifications from the similar lineup (68.2%), Wald = 9.44, $p = .002$, $\exp(B) = .34$, 95% CI [$\exp(B)$] = [0.17, 0.68], Cohen's *h* = .51. These two effects were independent of each other as there was no significant feedback-by-similarity interaction, Wald = .01, $p = .93$.

Discussion

Feedback and Similarity Effects on Memory Impairment

We began this research to explore the question of whether confirming postidentification feedback following a mistaken identification harms witnesses' abilities to later recognize the actual culprit. And, in fact, we found that it does: participants who received confirming feedback after their mistaken identifications performed more poorly on a subsequent test of recognition memory for the culprit than did participants who received no feedback after their mistaken identifications. Moreover, recognition-

memory impairment from confirming feedback occurred in this work despite having told participants before the final memory test that they had been given the wrong initial lineup. This means that participants knew that their initial identification was not correct and that any confirming feedback they had received was invalid. Nevertheless, our findings show that reinforcing witnesses' memories of a misidentified individual by confirming their identifications impairs memory for the culprit.

We theorized that there might be multiple mechanisms by which confirming feedback impairs witnesses' memories of the actual culprit. To the extent that witnesses are aware of discrepancies between the appearance of the misidentified individual and the appearance of the original culprit, confirming feedback might function as a form of informational feedback regarding the appearance of the culprit. Specifically, confirming feedback could lead witnesses to adjust their recollections of the culprit in a way that more closely corresponds to the appearance of the identified individual. If the identified individual is not in fact the culprit—as was the case for participants in our experiment—such mental adjustments would presumably weaken witnesses' memories for actual culprit's appearance. Another possibility is that confirming feedback simply grants witnesses permission to consider the identified person and the culprit to be “one and the same.” Thus, rather than conjuring up an image of the culprit from the witnessed event during subsequent recollections, witnesses might simply rely on retrieving the image of the identified individual. Repeated retrieval of the image of the identified individual rather than that of the culprit would also presumably weaken witnesses' memories for the culprit. These two proposed processes, however, are not necessarily mutually exclusive. Confirming a witness' identification might lead the witness to adjust her recollections of the culprit to be more in line with the appearance of the identified individual. And, the witness might also be more likely to rely on the image of the identified individual during subsequent recollections of the witnessed event. Having now established that confirming feedback does in fact impair memory for the original culprit, future research should test the conditions under which these two psychological processes account for memory impairment effects.

Confirming feedback impaired memory for the culprit as much in the similar conditions as it did in the dissimilar conditions. The fact that there was no significant interaction between the similarity manipulation and the feedback manipulation suggests that even misidentifications of a similar individual will produce a robust confirming feedback effect. However, the absence of an interaction should not be taken as evidence that similarity and feedback would never interact. Even in the similar conditions, similarity was just above the midpoint of the 1 to 7 scale ($M = 4.11$), and the most similar person was rated an average of 4.95 (No. 3). At some higher level of similarity, an interaction would almost certainly be observed. Consider an extreme example in which the initial culprit-absent lineup included clones or near-clones of the culprit. Clearly, identifying a clone of the culprit would not impair memory for the culprit and giving confirming feedback for the identification of a clone would not further impair memory for the culprit.

This main effect of similarity on memory impairment is important in its own right. Participants in this study who made a mistaken identification from the dissimilar lineup were later less able to accurately identify the culprit than were participants who made a mistaken identification from the similar lineup. Despite a

relatively large literature on the effects of prior misidentifications on later identifications (e.g., Deffenbacher, Bornstein, & Penrod, 2006; Godfrey & Clark, 2010; Goodsell, Neuschatz, & Grondlund, 2009; Pezdek & Blandon-Gitlin, 2005; Valentine et al., 2011), none of these studies has shown that a prior misidentification impairs memory for the culprit. Instead, these studies show that preference for the misidentified person persists in later tests that include the misidentified person (i.e., a commitment effect). As discussed in the introduction to this article, evidence that memory of the culprit has been impaired requires the use of a memory test that includes the culprit but does not include the person who was previously identified.

From an applied perspective, our observation that misidentifying a dissimilar individual impairs memory for the culprit begs the question: how often do eyewitnesses identify someone who does not look much like the actual culprit? The relative judgment conceptualization suggests that this could happen more often than one might expect. Relative judgments allow witnesses to make identifications based on relative, rather than absolute, similarity judgments (Wells, 1984). Witnesses relying on a relative-judgment process might end up identifying someone who looks quite dissimilar to the person who committed the crime simply because he looks *more* like the culprit than do the other lineup members. In addition, some people are placed in lineups as suspects based on tips, their proximity to the crime, or other leads despite bearing little resemblance to the description given by the witness. Although there is no way to know in real cases the extent to which an innocent suspect placed in a police lineup resembles the person who committed the crime, numerous instances of wrongful conviction for which the true culprit was later found indicate that witnesses do make mistaken identifications of individuals who look little like the actual culprit. Examples of this include the misidentification of James Newsome, who was later shown empirically to bear little resemblance to the actual murderer (*Newsome v. McCabe*, 2003). Another example is the DNA-exoneration case of John White, whose physical appearance was dramatically different from the actual rapist (see lineup photo in which White is in position three and the actual rapist in position five from the left; http://www.innocenceproject.org/Content/John_Jerome_White.php).

Generalizability of Memory Impairment Effects

There are reasons to believe that this work likely underestimated the magnitude of memory impairment that might be caused by confirming feedback in real cases of eyewitness identification. Real eyewitnesses who identify the suspect of a police investigation are typically exposed to repeated and multiple forms of postidentification feedback over the course of the criminal investigation. They might be exposed to pretrial publicity in which the identified person's image is depicted in local media sources. They might learn about other witnesses who identified the same person. They might be told of other evidence (e.g., an inconsistent alibi) suggesting that the identified person was the culprit. They might receive praise from police, prosecutors or others for helping to "solve the crime." In addition, witnesses will likely view the photo lineup from which they made their identification and be asked to recall details of the witnessed event on multiple occasions (e.g., in pretrial briefing sessions with a prosecutor; at pretrial hearings; at

trial). To the extent that confirming feedback grants witnesses permission to substitute the image of the identified person in their memory of the crime, these repeated recollections of the witnessed event and accompanying confirming feedback would presumably have cumulative effects that, in the case of an initial mistaken identification, make it increasingly unlikely that the witness would ever be able to recognize the actual culprit. In an interview with Jennifer Thompson after Cotton's exoneration, Jennifer recollected, "When I would have a nightmare, when I would relive the night in my head, Ronald Cotton's head, his face was right there for me to see for years" (Frontline, 1997). Little wonder that Jennifer failed to show any recognition memory for Bobby Poole even after her identification of Ronald Cotton had been proven false using DNA testing.

Limitations and Directions for Future Research

One potential limitation of this work is that we used a forced-choice memory test to assess impairment to participants' abilities to recognize the culprit. In real cases of eyewitness identification, however, "not sure" or "not there" are reasonable response options available to witnesses. Accordingly, it remains to be known how confirming feedback might influence eyewitness-identification behavior when witnesses are not forced to make an identification from the lineup. For example, perhaps confirming feedback following a mistaken identification influences witnesses' willingness to attempt an identification from a subsequent lineup. This is an interesting question, but it was not our purpose in the current work to study the effects of confirming feedback on willingness to attempt another identification. Instead, our purpose was to determine the fate of the original memory of the culprit after confirming feedback. As discussed in the introduction section, forcing a choice between the culprit and new fillers (i.e., the misinformation-absent test) is the appropriate way to get at the question of whether confirming feedback harms witnesses' *abilities* to later recognize the culprit.

Consistent with the misinformation-absent test of the misinformation effect, memory impairment in the current work was evidenced by fewer choices of the original item (the culprit) when the suggested item (the mistakenly identified individual) was not available to be chosen. Consequently, the performance decrements observed in this work can be attributed to memory being impaired rather than to other possibilities such as demand effects or commitment to a prior choice. In real-world cases of eyewitness identification, however, memory impairment often cannot be disentangled from commitment effects. For example, John White was mistakenly identified from a photo lineup six weeks after the occurrence of the crime. The witness later viewed a live lineup including White, and—by freak occurrence—James Parham, the true crime perpetrator, who was placed in the lineup as a filler. However, even when presented with a lineup that included Parham, the witness again identified White as the culprit (http://www.innocenceproject.org/Content/John_Jerome_White.php, 2012). In Jennifer Thompson's case, Jennifer viewed her rapist Bobby Poole while testifying at Cotton's second trial. As these examples illustrate, real cases might involve both commitment effects as well as memory-impairment effects, which together can lead to miscarriages of justice that might (in the absence of the additional influence of feedback) have been otherwise avoided. Future re-

search should examine the independent and cumulative effects of commitment and memory impairment that result from confirming a witness' mistaken identification.

Conclusion

Like physical trace evidence (e.g., blood, fingerprints), eyewitness memory is susceptible to contamination and deterioration. However, the problems associated with eyewitness memory are even worse than for most types of physical trace evidence because physical traces can be split and/or duplicated to allow for preservation, repeated testing, and independent assessment. Human memory, in contrast, does not afford such flexibility; as soon as it is tested, it is rendered vulnerable to contamination. The current research suggests that merely making a mistaken identification of someone who is dissimilar in appearance to the actual culprit impairs memory of the culprit, and that confirming a mistaken identification exacerbates memory impairment. This latter finding is particularly problematic because witnesses are likely to receive some form of feedback in virtually every case of eyewitness identification. Lineups administered in jurisdictions that use non-blind lineup procedures are particularly likely to involve feedback to the witness. However, even in jurisdictions that use the recommended double-blind administration procedure preventing feedback from being delivered immediately by the lineup administrator, witnesses will likely ascertain whether they identified the suspect or a filler based on whether the suspect is indicted for the crime. Because merely making a mistaken identification affects memory and feedback in one form or another is inevitable in real cases, caution should be taken before exposing witnesses to possible contamination associated with administering a lineup-identification test.

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