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Source Memory and Eyewitness Suggestibility in Older Adults

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ABSTRACT. The authors investigated the influence of test format on the source-memory performance of older adults (N = 128). Each participant viewed a picture and wrote a description of the scene. Then half of the participants (control group) read a text that accurately described the scene; the other half (misled group) read a text that contained misinformation. After writing another scene description, the participants were given a surprise memory test. Half were given a yes/no recognition test, and half were given a source-monitoring test. The misled yes/no participants mistakenly indicated more often than the control yes/no participants that misleading-text items were in the picture (suggestibility effect). There was no suggestibility effect for source-monitoring participants. The data are discussed in terms of the source monitoring framework.

HUMAN MEMORY IS often a reconstruction of past experiences as opposed to a retrieval of experienced events recorded exactly as they happened (e.g., Bartlett, 1932/1995; Bransford & Johnson, 1973; Carmichael, Hogan, & Walter, 1932). Although human memory performance is often remarkably accurate (see Alba & Hasher, 1983), predictable types of errors can result from the same processes that also produce accurate memories. This idea is at the heart of the source-monitoring framework (see Johnson, Hashtroudi, & Lindsay, 1993, for a review).

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The source-monitoring framework describes the processes involved in attributions about the origin of information (e.g., oneself, a friend, television, newspaper, a list of words in an experiment). According to one part of the source-monitoring framework, people use aspects of a memory (e.g., perceptual details, emotional details) to make source attributions—in effect, to reconstruct the source of information. For example, the memory of a speaker's distinctive laugh that kept interrupting his or her telling of a story may help a person to reconstruct that the story originated with a certain friend. Similarly, if the distinctive laugh came from a listener rather than from the speaker and if the person making the source attribution does not recollect that several people were present at the time of the story, the memory of the laugh may lead to an incorrect attribution of the listener rather than the speaker as the source of the story. Many source attributions seem to happen automatically; others may take conscious deliberation. Of particular interest in the present study is that across a variety of paradigms, older adults are particularly vulnerable to source-memory errors (e.g., Brown, Jones, & Davis, 1995; Cohen & Faulkner, 1989; Dywan & Jacoby, 1990; Erngrund, Mäntylä, & Nilson, 1996; Henkel, Johnson, & De Leonardis, 1998; Johnson et al., 1993; Norman & Schacter, 1997; Schacter, Koutstaal, Johnson, Gross, & Angell, 1997).

The eyewitness misinformation paradigm (e.g., Loftus, 1992) demonstrates predictable errors that illustrate the reconstructive attribution processes of memory. In this paradigm, participants are exposed to an event (e.g., a short film of a crime); then they read an account of the event. For half the participants (control participants), the account correctly describes the event; for the other half (mislead participants), the account includes information that was not in the original event (misinformation). Finally, all participants are questioned about the event, often with a recognition test containing items from both the original event and the misleading text; the participants are asked to indicate which items were part of the original event. The participants given misinformation typically indicate more often than the control participants that the misinformation was part of the original event. This pattern is called the *suggestibility effect* or the *misinformation effect.* The suggestibility effect has been found in numerous studies with both younger adults (e.g., Belli, 1989; Christiaansen & Ochalek, 1983; Lindsay, 1990; Loftus, 1992; Zaragoza & Lane, 1994) and older adults (e.g., Cohen & Faulkner, 1989; Karpel, Toglia, & Hoyer, 1993; Loftus, Levidow, & Duensing, 1992).

Under certain conditions, younger adults can reduce or avoid source mis-attributions like those in the suggestibility effect (Dodson & Johnson, 1993; Lindsay & Johnson, 1989; Ross, Ceci, Dunning, & Toglia, 1994, Experiment 2; Zaragoza & Lane, 1994). For example, Lindsay and Johnson used the misinformation paradigm with younger adults. Half the participants were given a yes/no recognition test for items in the original event. The other half received a source-monitoring test on which they were asked to identify the origin of each item as the picture, the text, both the picture and the text, or as neither the picture nor the text (i.e., a

new item). Lindsay and Johnson found the typical suggestibility effect for participants given the yes/no recognition test. The participants who read the misleading text attributed more items from the misleading text to the picture ($M = 3.91$) than did the participants who read the control text ($M = 2.30$). In contrast, this effect did not appear for the participants given the source-monitoring test (Ms = 1.39 and 1.36 for the misled group and the control group, respectively).

Lindsay and Johnson (1989) argued that the source-monitoring test reduces the suggestibility effect by encouraging participants to examine more carefully the information that they use to decide whether an item originated in the picture. In terms of the source-monitoring framework (Johnson et al., 1993), test format can affect the weights assigned to various types of information, as well as how much information is "enough" when a person is making a source attribution. Here, the term *decision criteria* refers to both the amount and kind of information that participants require before they are willing to assign an item to a particular source—in this case, the picture. Relatively loose decision criteria may involve relying on one type of information or relatively undifferentiated information (e.g., familiarity). By contrast, relatively strict decision criteria involve relying on multiple kinds of information, more specific kinds of information (e.g., perceptual details and spatial details), increased amounts of information, or some combination thereof. The source-monitoring test encourages relatively strict decision criteria because all possible sources of the information are listed, reminding participants to examine carefully various features or qualities of the information that they remember in order to assign source appropriately. In contrast, participants given the yes/no recognition test do not receive this reminder.

The question of interest for the current study was whether older adults would also show a reduced suggestibility effect under conditions encouraging the use of relatively strict decision criteria, namely, a source-monitoring test. Multhaup (1995) demonstrated a similar pattern with the false-fame paradigm (e.g., Jacoby, Kelley, Brown, & Jasechko, 1989). The participants pronounced a list of nonfamous names (e.g., Jack Anstead). Next they categorized names from a second list as famous or nonfamous, and they were reminded that the names that they had pronounced on the first list were nonfamous. The older adults were more likely than the younger adults to misidentify as famous nonfamous names that they had recently pronounced (a source-memory error called the *false-fame effect).* However, on a source-monitoring test in which participants had to identify each name as a famous name, a nonfamous name pronounced earlier, or a new nonfamous name, the older adults, like the younger adults, showed no false-fame effect. In other words, under conditions that encouraged relatively strict decision criteria—a source-monitoring test—older adults were able to reduce their source misattributions. We predicted that a similar pattern would hold for the suggestibility effect: Older adults would show a suggestibility effect on a yes/no recognition test and a reduced suggestibility effect on a source-monitoring test.

Method

Participants

We tested 132 older adults. They all indicated generally good health in response to an open-ended question. We dropped 4 from the analyses because they did not follow instructions (e.g., did not respond to 7 of 32 questions). Thus, we have presented data for 128 older adults ranging in age from 63 to 82 years. We randomly assigned the participants to conditions; however, there was a Narrative Type (control or misled) × Test Type (yes/no recognition or source-monitoring) interaction for age, $F(1, 124) = 4.09$, $p < .05$. For the group given the yes/no recognition test, the control participants ($n = 31$; mean age = 71.61 years) were slightly older than the misled participants ($n = 32$; mean age = 69.69 years). In contrast, for the group given the source-monitoring test, the misled participants were slightly older ($n = 32$; mean age = 70.94 years) than the control participants ($n = 33$; mean age = 70.03 years). It is important to note, however, that these age differences were very small and did not explain the pattern of results reported later. The groups were equated on years of education ($M = 16.06$, $SD = 2.59$) and vocabulary scores on the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981) ($M = 58.53$, $SD = 6.60$), all Fs < 1.

Materials

We used the complex office scene slide (originally published in the June 1985 issue of *Psychology Today*, pp. 56–57) and supporting materials from Lindsay and Johnson (1989). The color slide included two men at two different desks, each piled high with files and the like. Two women were talking in front of a set of shelves that were also filled with many objects. Both the accurate and misleading narrative descriptions of the slide were roughly 400 words long. Test booklets contained instructions for each step of the procedure for each condition. Both the yes/no recognition test and the source-monitoring test consisted of 32 items: Eight items were in both the picture and the text, 8 were in the misleading text only, 8 were in the picture only, and 8 were new. The appendix of Lindsay and Johnson (1989) contains the narratives and the test items.

Procedure

We tested the participants in groups of 1 to 4 and told them that they would see a slide, read a narrative description of that scene, and after each presentation, write a description of the scene in the slide. The participants viewed the slide for 20 s; then we distributed test booklets. Each participant had 2 min to read the instructions and to write a brief description of the slide. Next, they read a narrative description of the office scene. Half of the participants (control group) read a text that accurately described the office scene. The other half (misled group)

read a text that included misinformation, such as the mention of a coat rack and coffee pot that were not in the scene. Reading was self-paced; all participants completed the reading before the next step was begun. After reading the text, each participant again had 2 min to read instructions and to write a brief description of the slide. Next, the participants took a surprise memory test; each participant received a list of objects. Half of the control participants and half of the misled participants were given a yes/no recognition test; they were instructed to check yes if they had seen each listed object in the picture and no if they had not. The other half of the participants received a source-monitoring test; they were instructed to indicate by checking the appropriate box whether they had noticed each listed object in the picture, in the text, in both the picture and the text, or in neither the picture nor the text (a new item). In other words, these participants assigned each object on the list to one, both, or neither of the potential sources. All participants also rated their confidence in their response to each item by checking the appropriate box (guess, medium confidence, or high confidence); we did not report these data because they did not change or significantly add to the pattern in the memory-test data. Finally, we administered the WAIS-R vocabulary test to the participants individually.

In summary, there were four groups of participants: control participants given the yes/no recognition test, control participants given the source-monitoring test, misled participants given the yes/no recognition test, and misled participants given the source-monitoring test.

Scoring

We followed the scoring procedure of Lindsay and Johnson (1989). Items were scored as attributed to the picture (a) if a participant in the yes/no recognition condition responded yes to that item and (b) if a participant in the source-monitoring condition responded "picture" or "both picture and text" to that item. Thus in both conditions, the chance probability of attributing an item to the picture was .5.

Results

For each item type (misleading text only, picture only, both picture and text, new), we conducted a Narrative Type (control or misled) × Test Type (yes/no recognition or source-monitoring test) analysis of variance (ANOVA). Unless otherwise noted, the alpha level of the following effects was .05.

Responses to Misleading-Text-Only Items (Suggestibility Effect)

Our primary interests were (a) whether the yes/no participants would show the usual suggestibility effect and (b) whether this effect would be reduced for

the source-monitoring participants, as we had predicted. Although the Narrative Type × Test Type interaction for the misleading-text-only items was marginal, $F(1, 124) = 3.40$, $p < .07$, it was the expected pattern. Furthermore, planned comparisons revealed that the yes/no participants showed the suggestibility effect, whereas the source-monitoring participants did not (see Table 1 under Misleading Text Only). On the yes/no test, the misled participants attributed more misleading-text items to the picture ($M = 3.59$) than did the control participants ($M = 2.42$), $F(1, 62) = 4.68$. In contrast and as predicted, the suggestibility effect was reduced for source-monitoring participants: The misled participants attributed misleading-text items to the picture no more often ($M = 1.56$) than did the control participants ($M = 1.64$), $F < 1$.

Why did the source-monitoring participants not show the suggestibility effect that the yes/no recognition participants showed? One possibility is that the source-monitoring participants were less likely than the yes/no participants to indicate that the misleading-text items were from the study phase. If they marked many of the misleading-text items as new items, they would then have fewer opportunities for the source misattribution of indicating that those text items were picture items (suggestibility effect). Our data, however, did not support that possibility (see Table 2 under Misleading Text Only). In fact, the source-monitoring participants tended to mark fewer misleading-text items as new ($M = 4.23$ for control and misled conditions) than did yes/no participants ($M = 4.97$ for control and misled conditions), $F(1, 124) = 5.05$. Furthermore, there was a Narrative Type × Test Type interaction, $F(1, 124) = 5.39$ (see Table 2 under Misleading Text Only). The number of attributions of misleading-text items to *new* by control source-monitoring participants ($M = 5.61$) was indistinguishable from the number of such attributions by control yes/no participants ($M = 5.58$). In contrast, the misled source-monitoring participants showed *fewer* attributions of misleading-text items to the category *new* ($M = 2.81$) than did the misled yes/no participants ($M = 4.38$). Clearly, the

TABLE 1
Mean Number of Items of Each Type Attributed to *Picture*

Condition	Item type			
	Misleading text only	Picture only	Picture and text	New
Yes/no recognition test				
Control	2.42	5.71	5.42	1.71
Misled	3.59	6.00	5.25	1.66
Source-monitoring test				
Control	1.64	4.76	3.76	1.52
Misled	1.56	4.41	3.72	1.41

source-monitoring participants did not avoid the suggestibility effect by attributing misleading-text items to the new category.

If the misled source-monitoring participants did not attribute the majority of the misleading-text items to the picture or to *new*, to what source did they attribute those items? They tended to attribute them correctly to the text (M = 3.63; see Table 3 under Misleading Text Only).

Responses to Picture-Only, Both-Picture-and-Text, and New Items

The effect of the source-monitoring test format extended to other item types as well. In general, the source-monitoring participants were less likely than the yes/no recognition participants to attribute any item type to the picture (see Table 1). The effect was significant for the picture-only items and both-picture-and-text items, Fs(1, 124) > 24.13. This pattern might be expected if the source-monitoring participants required relatively more information before attributing the origin of an item to the picture (i.e., if they used relatively strict decision criteria).

TABLE 2
Mean Number of Items of Each Type Attributed to *New*

	Item type			
Condition	Misleading text only	Picture only	Picture and text	New
Yes/no recognition test				
Control	5.58	2.26	2.55	6.26
Misled	4.38	2.00	2.75	6.34
Source-monitoring test				
Control	5.61	2.64	1.36	6.03
Misled	2.81	2.34	1.47	5.16

TABLE 3
Mean Number of Items of Each Type Attributed to *Text* by the Participants Given the Source-Monitoring Test

	Item type			
Condition	Misleading text only	Picture only	Picture and text	New
Control	0.67	0.58	2.88	0.42
Misled	3.63	1.25	2.78	1.34

It is clear that the source-monitoring participants' miss rates (calling old items new) were not significantly greater than the miss rates of the yes/no recognition participants (see Table 2). In fact, they were significantly lower for both-picture-and-text items, $F(1, 124) = 22.56$. The source-monitoring participants did, however, call new items *new* less often than did the yes/no participants, $F(1, 124) = 5.84$. This pattern stemmed from the low correct rejection rate (i.e., calling new items *new*) of misled source-monitoring participants. The reason for that low rate is unclear; it is unlikely to be the source-monitoring test per se because the control source-monitoring participants showed correct rejection rates similar to those of the yes/no recognition participants (see Table 2).

Finally, the source-monitoring participants often correctly indicated that text items were from the text (see Table 3). This was true for the control source-monitoring participants (both-picture-and-text items) and for the misled source-monitoring participants (both-picture-and-text items, as well as the misleading-text-only items discussed earlier).

Discussion

Our data are consistent with the predictions of the source-monitoring framework (Johnson et al., 1993). The yes/no participants showed the suggestibility effect, whereas the source-monitoring participants did not show that source-memory error. This pattern could not be explained by the source-monitoring participants' overuse of the response *new*. Instead, we interpreted the data as demonstrating that source-memory errors that occur under conditions that encourage relatively lenient decision criteria can be reduced under conditions that encourage relatively strict decision criteria (see also Dodson & Johnson, 1993; Lindsay & Johnson, 1989; Multhaup, 1995; Zaragoza & Lane, 1994). A yes/no recognition test encourages the use of familiarity as the basis of a yes response. In contrast, a source-monitoring test, by its nature, reminds participants that there are multiple reasons that an item could be familiar—it could have been in the picture, the text, or both—and this reminder encourages them to demand more information before assigning an item to a particular source. For example, before indicating that an item was in the picture, participants may have demanded that they had some memory for what the item looked like or where it was in the scene.

In general, the source-monitoring participants were less likely than the yes/no participants to indicate that an item was from the picture (see Table 1). That effect was significant for all item types except new items. On the surface, the fact that *picture* responses to new items were not also lower in the source-monitoring condition might suggest that our decision-criteria interpretation of the data is problematic. There are, however, two important points regarding new items that must be kept in mind: First, the yes/no participants rarely produced an error by indicating that new items were from the picture. Thus, the effect of

increasing decision criteria on the source-monitoring test may be difficult to detect (i.e., the data are close to floor for this particular response). Second, the effect of increasing one's decision criteria may have the most impact when there is information to evaluate. New items, presumably, have fewer details associated with them (e.g., spatial information, semantic associations) because they were not encountered during encoding.

The practical implication of our work is that older adults may benefit from listing possible sources when they are trying to focus on information from a particular source. For example, in eyewitness memory accounts, it is important for the eyewitness to focus on the events as they happened and to edit out information that was only suggested in previous interviews and discussions about the event. Similarly, when a person is determining what advice a doctor provided, it is important for the person to edit out information from other sources such as tabloids (see Multhaup, 1995). Such a strategy does not eliminate source-memory errors completely; in fact, in the present study, source errors still existed (e.g., the source-monitoring participants responded *picture* to picture-only items less often than the yes/no participants did). Source attribution is a complex process that involves memory for information that was part of the target event, the discriminability of possible sources, as well as the weights given to different features, and the amount of information required before people are willing to assign a particular source (Johnson et al., 1993; Multhaup, 1995; Zaragoza & Lane, 1994). One strategy will not reduce all kinds of source-attribution errors. What our data suggest is that the test format affects the likelihood that people will make source errors that involve combining information (e.g., text and picture). With the source-monitoring test, the older adults were able to edit out text information and, thus, to avoid the suggestibility effect (indicating that text information was in the picture).

Future researchers could extend the effects reported here to field settings. For example, Yarmey (1993) had a research assistant interact with people on the street by stopping them to ask for directions or for help in finding some lost jewelry. This design was intended to simulate part of a swindle. A few seconds later, a different research assistant approached the same person and asked questions about the description of the confederate who had originally stopped him or her. Future researchers could follow this type of paradigm and introduce misleading information about the interaction in their questions to the participants (see also Zaragoza & Lane, 1994; Zaragoza & Mitchell, 1996). Later questions could be framed with or without source-monitoring instructions to determine whether the participants who received source-monitoring instructions could better edit out the misleading information. In addition, education level has been shown to affect performance in an eyewitness memory task (Adams-Price, 1992). Future researchers might consider whether individual-difference variables, such as education level or imagery ability, influence the extent to which participants respond to different test formats.

In summary, our data from older adults are remarkably consistent with Lindsay and Johnson's (1989) data from younger adults. These data suggest that older adults, like younger adults, may have available information that they can use to reduce some kinds of source-memory errors (e.g., the suggestibility effect) if they are provided with cues (like those provided by the test format) that encourage them to consider multiple sources (see also Multhaup, 1995). Although the use of relatively strict decision criteria will not ensure perfect memory performance, it may often decrease the likelihood that people will claim to have seen information that has only been suggested.

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