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Improving Memory for Source: The Effect of Various Training Methods Within a Reality Monitoring Paradigm

Brittan Ann Barker

IMPROVING MEMORY FOR SOURCE: THE EFFECT OF VARIOUS TRAINING METHODS WITHIN A REALITY MONITORING PARADIGM

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by

Brittan Ann Barker

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ABSTRACT

The present experiment addressed whether or not memory for source can be improved within a reality monitoring paradigm. Reality monitoring refers to "the processes involved in discriminating memories that originated from perception [external] from those that arose from thought, imagination, fantasy, dreams and other self-generated processes [internal]" (Johnson & Raye, 1981). The present experiment used an external versus internal reality monitoring task, following the methodology of Johnson, Foley, and Leach (1988, Experiment 2). The design was a multiple-independent-groups design. The independent variable was Type of Training Method and its 4 levels were: no training (control), repetition of task and test, contextual guidance, and reality monitoring guidance. Concrete nouns were used for stimuli. The participants were instructed either to listen to the word (external source) or imagine the word (internal source). A source discrimination test was used to assess participants' memory of the words' source. A one-way ANOVA revealed that there was no significant difference in participants' reality monitoring performance, illustrating that participants' memory for source was not improved.

IMPROVING MEMORY FOR SOURCE: THE EFFECT OF VARIOUS TRAINING METHODS WITHIN A REALITY MONITORING PARADIGM

Each day we encounter situations requiring us to remember where certain information was acquired. For example, when socializing with friends, it is advantageous if you remember that the joke you are about to tell Karen is the same joke she told you last week. Similarly, it is crucial for an eyewitness's testimony to be from his (or her) own memory of the event and not what he (or she) viewed on the evening news the night before. This ability to determine the source of information is most commonly referred to as source monitoring (Johnson, Hashtroudi, & Lindsay, 1993).

However, source monitoring is not a phenomenon that solely involves memory for events obtained through perceptual processes—external sources—but also can include memories generated from an internal source (Johnson & Raye, 1981). An example of an internal versus internal reality monitoring error, is when you cannot recall whether you fantasized during church service about asking your boss for a raise or had written him a memo the week before. This source monitoring process is termed reality monitoring and refers to the "process by which a person attributes a memory to an external or internal source" or discriminates between internal sources (Johnson & Raye, 1981).

Evolution of source monitoring

Both life experiences, like those mentioned, and empirical evidence (e.g., Bayen, Murnane, & Erdfelder, 1996; Bornstein & LeCompte, 1995; Dodson & Johnson, 1993; Intraub & Hoffman, 1992; Lindsay & Johnson, 1989; Marsh & Bower, 1993; Johnson, Foley, & Leach, 1988; Riefer, Hu, & Batchelder, 1994; Schooler, Gerhard, & Loftus, 1986) continue to illustrate the importance

of understanding the cognitive processes underlying people's ability to determine the source of information. In an attempt to gain a complete understanding of these cognitive processes, various paradigms have been utilized within the field. One of the first paradigms leading to the examination of memory for source was the misinformation paradigm developed by Loftus (e.g., Loftus, Miller, & Burns, 1978). Through use of their three-stage procedure, Loftus and her colleagues tested participants on their memories of a slide sequence and a verbal description of the sequence. By including misleading suggestions about details of the event within the verbal description, Loftus et al. (1978) were able to examine participants' memories for the details using forced-choice recognition tests. Analyses showed that participants' memories for the details were significantly impaired as a result of the misleading information. This phenomenon was termed the misinformation effect and indirectly advanced the study of source monitoring.

The aforementioned misinformation paradigm has motivated much of the subsequent research examining eyewitness testimony and source monitoring—in particular, that of D. S. Lindsay (e.g., 1990, 1993; Lindsay & Johnson, 1989a, 1989b), who incorporated the investigation of memory for source into Loftus et al.'s (1978) investigation of memory for details. Using both a yes/no (like that used in Loftus' misinformation paradigm) and a "source monitoring" recognition test they designed, Lindsay and Johnson (1989b) were able to show that the suggestibility effects obtained within the misinformation paradigm could be eliminated when participants focused on the detail's source. This external source monitoring paradigm, and similar alterations, continue to dominate literature in the domain of source monitoring (e.g., Dodson & Johnson, 1993; Intraub & Hoffman, 1992; Stern & Dunning, 1994). However, this paradigm may not be the ideal way to gain a complete understanding of the cognitive processes underlying the

phenomenon of source monitoring because it lacks a complete analysis of source monitoring—specifically, the paradigm excludes examination of internal source monitoring.

Reality monitoring

By utilizing both internal and external source origin stimuli, the reality monitoring paradigm gives a clearer understanding of the phenomenon of source monitoring. The literature shows that as two sources increase in similarity, source identification increases in difficulty (e.g., Bornstein and LeCompte, 1995). This is exemplified in an experiment by Bornstein and LeCompte (1995, Experiment 2). Their within-subject design required participants to make 3 types of judgments for various lists of words. Judgments consisted of: item recognition (determine if the word was presented or not), reality monitoring (determine whether participants generated the word as a word fragment or if it was presented externally), and external source monitoring (determine if the word was presented visually or auditorily). Results indicated that item recognition performance was the best of the 3 judgments, while performance on the reality monitoring test significantly exceeded that of the external source monitoring test.

Bornstein and LeCompte (1995) concluded that reality monitoring decreases source similarity—in that the comparison sources are one internally generated and one externally presented source—thereby making source discrimination easier. Source discrimination is made easier because external and internal memories differ with respect to characteristics such as sensory and contextual information, semantic detail, and information about cognitive processes (Johnson & Raye, 1981). Although the internal versus external reality monitoring task is less difficult (in comparison to an external-external source monitoring task), participants continued to make substantial errors in memory for source,

illustrating the robust phenomenon of source monitoring errors, even within the reality monitoring paradigm.

The results of a study by Johnson, et al. (1988) provide further support for memory source errors using a reality monitoring paradigm. Participants listened to or imagined a series of words, followed by a reality monitoring judgment task to determine which words they had heard and which they had imagined. Participants performed at their best when the experimenter said the word and participants proceeded either to listen to the experimenter or imagine the word in their own voice (external vs. internal source), compared to when they imagined in the experimenter's or another person's voice (external vs. external source), showing that external versus internal reality monitoring is not as difficult as external source monitoring. However, memory errors for source remained at a relatively high level (at a 50% rate of chance, 36% were incorrectly identified), showing that characteristic differences of internal and external sources do have an effect on memory for source but do not eliminate source errors entirely. It is for this reason that a reality monitoring task was used in the present experiment, as opposed to an external source monitoring task. The reality monitoring task enabled participants to perform above floor level in determining the source of the information, while at the same time it ensured that source errors would continue to be made, allowing for improvement of participants' source monitoring ability.

Improving source monitoring

Few studies have addressed the issue of reducing source errors. One attempt to improve memory for source is illustrated by Schooler et al. (1986, Experiments 3 and 4). Schooler and his colleagues realized that their misinformation textual descriptions, used in their preceding experiments, included various reality monitoring cues (i.e., those characteristics identified by

Johnson & Raye, 1981 such as: perceptual information, contextual information, meaningful detail, etc.). Using an external source monitoring paradigm, Schooler et al. provided participants with the cues to determine whether the misinformation text described suggested or real memory. Although participants were provided wtih the cues prior to the source monitoring task, they were not instructed on how to utilize the cues and showed no significant improvement of memory for source (Experiment 3). Alternatively, Schooler et al. also found that when the same stimuli and cues were used, but participants received guidance on how to utilize them, source identification improved. The improvement was only found for the classification of suggested memory text—not the real memory text (Experiment 4). Similarly, Stern and Dunning (1994, Study 2) used an external source monitoring paradigm and showed that when participants engaged in classifying accurate and inaccurate eyewitness protocols, participants who were given reality monitoring hints prior to the reality monitoring task, modeled after Johnson and Raye's (1981) characteristics, significantly improved their ability to classify the protocols correctly. Both Schooler et al.'s (1986) and Stern and Dunning's (1994) research give support to the idea that memory for source can be improved.

Summary and Conclusions

Through the years, research within the source monitoring paradigm has evolved. This evolution has resulted in a compilation of literature that adequately establishes the existence of the phenomenon of source monitoring (e.g., Bayen, Murnane, & Edfelder, 1996; Bornstein & LeCompte, 1995; Dodson & Johnson, 1993; Johnson, et al., 1988, 1993; Intraub & Hoffman, 1992). The development of the source monitoring paradigm provides us with a better understanding of memory as a whole and the cognitive processes utilized during source

monitoring. This empirical establishment also provides applications to both everyday life events, such as determining if it was your doctor or an info-mercial that recommended a product; and to more crucial, rare events, like the witnessing of a crime. Though the application of what has been discovered about the cognitive processes underlying memory for source is advantageous, the research lacks clear suggestions for the improvement of source monitoring and its applications.

Statement of Problem

Despite the literature's establishment of the phenomenon of source monitoring and the errors that may result when attempting to recall an item's source, research has failed in sufficiently addressing the improvement of memory for source. The discovery of a technique that can reliably improve memory for source would stimulate further research and subsequently increase our knowledge in the areas of: recognition, retrieval processes and cues, source quality, and the phenomenon of memory as a whole. A technique for improving memory for source could also be applied in various situations—specifically, during the questioning of a critical eyewitness. For these reasons, an important next step would be to devise a successful technique for improving memory for source. The present research attempted to follow through with this step.

Training Methods

In present research we developed 3 different training methods with the aim of identifying techniques that would significantly improve a participant's memory for source. The 3 training methods were developed in accordance with 3 principles of memory shown generally to improve cognitive processing. These adjusted techniques were adapted specifically to improve memory in a reality monitoring task. The 3 memory findings that the training methods were modeled after are practice (i.e., repeated internal/external source monitoring tasks condition), Fisher and

Geiselman's (1992) Cognitive Interview (i.e., contextual guidance condition), and Johnson and Raye's (1981) characteristic dimensions on which internal and external memories differ (i.e., reality monitoring guidance condition).

Practice

Since Ebbinghaus's ground-breaking research on memory, it has been well-established that practice improves item recall. However, effect of practice on recognition tasks still requires further research. For those subscribing to the continuity hypothesis of recall and recognition—i.e., the notion that retrieval for both processes is essentially the same—practice should also result in the improvement of recognition (Tulving & Watkins, 1973). Tulving and Watkins (1973) had participants engage in basic recall and recognition tasks using five-letter words as stimuli. Using between 2 and 5 letters of the target word as the retrieval cue, Tulving and Watkins (1973) found that the difference of recall for 3 versus 4 letter cues was of the same magnitude as the difference between 4 and 5 letter cues. These results imply that there is no point at which one can claim recognition ends and recall begins, giving support to a continuity view of recall and recognition.

By adopting the continuity view of recall and recognition, practice should significantly increase performance on recognition tasks as well as on recall tasks. It is for this reason that the condition of repetition of task and test was developed. Because reality monitoring is a type of recognition task, repetition of the task and test was predicted to act as practice for the participants, thereby increasing their general ability to identify the source of a memory.

Interference between lists was a concern for the condition of repetition of task and test in the present experiment. This interference is illustrated in Mandler and Rabinowitz's (1981) experiment examining the effect of a prior recognition test on subsequent recall and recognition

tests. They found that although exposure to a prior recognition test did significantly improve performance on the subsequent recognition tests, improvement occurred at the expense of intrusions from the words previously presented in the initial recognition task (Mandler & Rabinowitz, 1981). This empirical evidence supports the prediction that repetition of task and test would improve memory for source, while also giving evidence in favor of results in the opposite direction—memory for source could be hindered as a result of interference.

Because the literature lacks sufficient research in the area of practice effects and recognition testing, examining the effect of repetition of a reality monitoring task and test could fill a void in the research and possibly be a successful technique for improving memory for source. It is for these reasons that repetition of task and test was included as a training method.

Contextual Guidance

Within the field of law enforcement, police and lawyers alike are well aware of the importance of thorough police interviewing techniques. Because of this need for a dependable method of interviewing, Fisher and Geiselman developed an interview procedure based on what was known of the cognitive processes underlying memory (Fisher, McCauley, & Geiselman, 1994). This interview technique is known as the Cognitive Interview (CI). Through repeated examination of its effectiveness (e.g., Geiselman, Fisher, MacKinnon, & Holland, 1985), the CI (in comparison to the standard police interview) has reliably been shown to increase the number of items correctly remembered by an eyewitness.

The CI's success relies on the manner in which interview questions are asked and

the reinstatement of the crime's context. Questions promote extensive responses and are tailored to fit the witness's mental representation of the event (Fisher & Geiselman, 1992). The crime's context is reinstated by encouraging the use of mental imagery and explicitly requiring detailed responses from the eyewitness (Fisher & Geiselman, 1992).

Because of the empirical evidence supporting the CI's success (e.g., Geiselman et al., 1985), we predicted that the CI's basic technique of context reinstatement could also be applied to other memory tasks, in particular: reality monitoring. The contextual cues should prompt the participants to think back to each word's presentation and encourage the participants to recreate their thoughts, emotions, and physiological state at the time of presentation, just as in Fisher and Geiselman's CI (Fisher & Geiselman, 1992). It is for this reason that contextual guidance was included as a training method.

The contextual guidance condition consisted of the standard reality monitoring task and test. However, a "tip sheet" was included at the time of testing. This tip sheet was developed in accordance with the CI. Each tip guided the participant to reinstate the context of the stimulus' presentation to enable the participant to recognize the stimulus' source better. Because the interviewing of eyewitnesses draws heavily on recognition, we expected that the contextual guidance condition would aid in recognition of source in much the same way the CI works for an eyewitness. Therefore, contextual guidance was included as a technique believed to improve participants' memory for source.

Reality monitoring guidance

Johnson and Raye (1981), along with Johnson, Raye, Foley and Foley (1981), have established that internal and external memories vary on different dimensions. As previously

mentioned, research shows that when participants are equipped with information about these dimensions, memory for source improves (Schooler et al., 1986; Stern & Dunning, 1994).

Although Schooler et al. (1986) and Stern and Dunning (1994) did illustrate an improvement of memory for source, they did not show this improvement using a reality monitoring paradigm. Schooler et al.'s (1986) Experiment 4 was an outgrowth of an examination of the misinformation effect, while Stern and Dunning (Study 2, 1994) examined eyewitness identifications. Even though the paradigms used were not ideal, both experiments were still able to obtain significant improvements in source identification.

These improvements were a direct result of the characteristic cues which were presented to the participants before they engaged in the experimental task. These cues informed participants about the characteristic difference of internal and external memories. Thus, by providing participants with cues developed in accordance with Johnson and Raye's (1981) characteristic dimensions, participants' memories for source should improve significantly as well. For this reason we developed a tip sheet based on Johnson and Raye's (1981) dimensions to be used by the participants during the recognition test to help them better identify the source of the stimuli. We predicted that the reality monitoring guidance would illustrate a clearer improvement of memory for source than the past literature has shown (Schooler et al., 1986; Stern & Dunning, 1994). The improvement for source should be clearer because an easier source monitoring task is used—external versus internal.

Experimental overview

The present experiment had a multiple-independent-groups design. The independent variable was Type of Training Method and consisted of 4 levels: no training (control), repetition

of task and test, contextual guidance, and reality monitoring guidance. Stimuli consisted of 36 concrete nouns that were randomly assigned to one of the source conditions—i.e., external or internal source. The words assigned to the external source were stated by a male speaker, "Steve." The words assigned to the internal source condition were imagined in the participant's own voice. The recognition test took the form of a source discrimination test.

Using a reality monitoring paradigm, we predicted that the present research would provide evidence that memory for source could be significantly improved through the use of training methods. We hypothesized that reality monitoring guidance would significantly improve reality monitoring performance because of previous literature's basic establishment of this prediction in a different source monitoring paradigm (e.g., Schooler et al., 1986; Stern & Dunning, 1994). We also predicted that the condition of contextual guidance would significantly improve memory for source because of the success of the CI—the procedure on which this condition is based (e.g., Geiselman et al., 1985). It was also predicted that repetition of task and test would have an effect on memory for source. However, it was unclear as to which direction this effect would be in because of the novel experiment that was conducted. The continuity hypothesis predicted that repetition of task and test would improve memory for source, while research by Mandler and Rabinowitz (1981) suggested that repetition would improve memory for source at the expense of interference. Most importantly, we believed that the present research would demonstrate a significant improvement of memory for source when comparing no training method to the various training methods.

METHOD

Participants

The participants were 80 Louisiana State University undergraduates who earned extra credit in their psychology courses in exchange for their participation. Participants were randomly assigned to a training method condition upon their arrival to the experimental session.

Materials

Stimuli

Stimuli were modeled after concrete nouns used by Johnson et al.'s (Experiment 2, 1988) Thirty-six nouns were chosen from the Toronto Word Pool (Friendly, Franklin, Hoffman, & Rubin, 1982), each noun had between 5 and 6 letters, 2 syllables, and a printed-word frequency count between 9 and 51 (stimuli, along with frequency and concreteness ratings, are reported in Appendix A). The words were assigned to one of the two stimulus sources—imagine or listen. Counterbalancing was achieved through the use of 2 stimulus lists, so that each word appeared in both source conditions (imagine or listen). The word order of the list was random and remained constant.

Method of presentation

The materials and method used for word presentation were a direct replication of Johnson et al.'s (1988, Experiment 2) "listen to speaker A/imagine in your voice" condition. A female experimenter (E) and a male speaker were used to make 2 different cassette recordings of the word presentations. Remaining true to the Johnson et al. (1988) paradigm, a 5-s delay between presentation of words was used, along with their exact form of presentation: for words in the Listen presentation condition, E said "Steve, say _____." As in Johnson et al. (1988, p. 340), the

male speaker then said that word; for words in the Imagine presentation condition, E said "Imagine saying _____." Cassettes were made under the same recording conditions. All cassette recordings were played over a Sony CFS-1040 radio cassette player with bass-reflex, 2-way speaker system. A practice cassette, containing 2 Listen trials and 2 Imagine trials, was also recorded on a separate cassette. The 4 words for the practice cassette were used solely for practice but were chosen in the same manner as the experimental stimuli.

Recognition test

The recognition test procedure for source also was identical to the one used by Johnson et al. (1988, Experiment 2). The 36 words were randomly ordered, with the restriction that no more than 2 words from the same source could appear consecutively (Johnson et al., 1988). Recognition test lists were read aloud, at a 10-s rate, by the experimenter at the time of testing.[1] Participants recorded their answers to the recognition test on a response sheet modeled after Lindsay and Johnson (1989). The response sheet had a heading that read "Source ?" Two response columns were located below the heading and read "Imagine" and "Listen." The response sheet items were numbered 1 to 36. Participants responded to the source of each word by simply checking a box in one of the two columns (response sheet is presented as Appendix B).

Training methods

Training withheld (control)

The training withheld condition consisted solely of the source monitoring task and recognition test presented above. This level of the independent variable served as the control group for the training methods.

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[1] Since an experiment using training methods has not been previously conducted, 10-s was chosen as a reasonable rate to present the words during testing. This rate was based on pilot studies that were conducted using a 5-s interim. The new rate allowed more time for participants in the training conditions to utilize their tip sheets.

Repetition of task and test

The repetition condition also consisted of the source monitoring task and recognition test presented above. However, prior to being tested on the experimental stimuli, participants practiced on 3 other lists of novel stimulus, resulting in a repeat presentation of the source monitoring task and test that occurred a total of 4 times.[2] The experimental source monitoring task and test used in the other 3 conditions of training methods was always presented as the fourth task and test. Keeping the experimental task and test in position 4 allowed for comparison of training methods across conditions during analysis.

One-hundred-eight additional stimuli for the repetition condition were chosen. They were selected in the same manner as for the experimental source monitoring task and recognition test and had the same mean frequency but a greater range than the experimental stimuli (presented in Appendix C). Stimuli were counterbalanced for Listen/Imagine presentation across presentation cassettes and recorded in the voices of the female experimenter and the male speaker, just as in the experimental task and test. The recognition test also directly replicated the procedure used in the administration of the experimental recognition test.

Contextual guidance

Contextual guidance was given to participants during the interim between stimulus presentation and execution of the recognition test. The contextual guidance consisted of 5 tips developed in accordance with Fisher and Geiselman's (Fisher and Geiselman, 1992) Revised Cognitive Interview (CI). Each contextual tip was a conversion of a CI question into a statement which referred to the source monitoring task at hand—i.e.,

[2] An experiment exploring the question of repetition of both task and test has never—to my knowledge—been conducted in the source monitoring domain. Four was chosen as a feasible number of repetitions which could be conducted within one experimental session.

emphasizing the words' manner of presentation. An example of a contextual tip is as follows: "Think back to when the experimenter presented the word the first time, is she saying 'listen' or 'imagine'?" (the contextual guidance tip sheet is presented in Appendix D). The contextual tips were centered on a single sheet of paper and given to each participant following the stimulus presentation.

Reality monitoring guidance

Reality monitoring guidance was also given in the form of a tip sheet and presented during the same interim as the contextual guidance tip sheet. The reality monitoring tip sheet consisted of 5 tips developed in accordance with Johnson and Raye's (1981) dimensions of reality monitoring and Schooler, Gerhard, and Loftus's (1986) "qualities of the unreal." An example of a reality monitoring tip is: "Can you vividly remember the qualities of the voice: tone, volume, accent, etc.? If you can, classify the word as 'listen.'" (The reality monitoring guidance tip sheet is included in Appendix E.) The reality monitoring tips were centered on a single sheet of paper and given to each participant following the stimulus presentation.

Procedure

Source monitoring task

Participants were tested in groups of 10 or fewer. Participants in the same group were also in the same training condition. Group assignment was determined randomly once participants' arrived at the experimental session. All experimental sessions were conducted by the experimenter. Upon participants' arrival, an informed consent contract was read and signed. Participants were then seated at a table placed approximately 3 m in front of the cassette player and the experimenter. Participants were given the instructions for the word presentation task

orally. The instructions read as follows (modeled after Johnson et al., 1988, Experiment 2, p. 340):

> Now we are going to do a task that involves imagining. Part of this task involves imagining words in your voice. I am going to play a tape. On this tape you will hear my voice giving instructions. Some of the time you will hear me tell Steve to say the word of a common object like letter or pencil. This will be followed by Steve saying that word. Your task is simply to listen to Steve say the word. Some of the time you will hear my voice on the tape give the instruction to imagine saying the word of a common object such as coat. Your task is to imagine saying that word—that is, you think the word to yourself but do not say it out loud or move your lips. You will be given 5 s in which to do each task, and it will always be clear by the instruction on the tape whether you are to listen to Steve say a word, or imagine a word in your own voice. First, let's do a practice test.

Following the instructions, the practice cassette was played. After listening to the practice cassette, participants were encouraged to discuss any difficulties they may have had performing either the listening or imagining task; and they were then permitted to ask any questions, if desired. Participants were neither led to believe, nor discouraged from believing that a memory test would follow the words' presentation. As in Johnson et al.'s (1988) research, participants were told a cover story explaining that the study concerned various aspects of perception and imagination. At this point, participants were ready to begin the task. The appropriate cassette was then played.

Immediately following the stimulus presentation, participants engaged in a 90-s

distractor task based on the task used in Jacoby, Woloshyn, and Kelley's (1989) divided-attention condition. Participants were read a list of 180 random digits. Their task was to identify the 30 sequences of 3 odd digits. Participants received a blank piece of paper to record the number of digit sequences. This task had a duration of 3 minutes. Following the digit task, participants were required to list 50 of the U.S. states. Participants were allowed 5 minutes to complete this task. In keeping with Johnson et al.'s (1988) methodology, these distractor tasks were used as a step to prevent rehearsal.

Recognition test

No testing. In the control condition, the recognition test was given after the listening distractor task. Participants were presented with the recognition response sheet. The following instructions were read to the participants at this point in the experiment:

> You are now going to be tested on your memory for the origin of each of the words presented a few minutes ago. For example, did you listen to the word or imagine it? I am going to read you the list of words. The words are in no specific order. After I have read you a word, your task will be to check the box corresponding to that particular word's source. When I read a word, if you remember Steve saying the word, check the box in the column labeled 'listen.' If you remember yourself imagining the word, check the box in the column labeled 'imagine.'

After answering participants' questions, the test procedure will begin. The test procedure entailed the experimenter reading aloud the designated list of stimuli at a rate of 10 s between words.

Repetition of task and test. The procedure for all 4 of the recognition tests of the repetition condition was identical to that of the testing withheld condition. However, different digits were used with each repetition of the listening distractor task.

Contextual guidance and reality monitoring guidance. The recognition test procedure for both the contextual and reality monitoring guidance conditions was the same—using either the contextual guidance tip sheet or the reality monitoring guidance tip sheet, depending on the condition. Following the listening distractor task, participants were given both a recognition response sheet and a tip sheet. Upon their receipt, the following instructions were read aloud:

> You are now going to be tested on your memory for the origin of each of the words presented a few minutes ago. For example, did you listen to the word or did you imagine it? I am going to read you the list of words. The words are in no particular order. After I have read you a word, your task will be to check the box corresponding to that particular word's source. You have been given a 'tip sheet'. This is a list of hints that will help you identify the source of each word. We will go over it, in detail, in a moment. You may refer to your tip sheet throughout my reading of the words, and I encourage you to do so. You will be given 10-s between each of the words—allowing you to use your tip sheet and determine the word's source. When I read a word, if you remember Steve saying the word, check the box in the column labeled 'listen.' If you remember yourself imagining the word, check the box in the column labeled 'imagine.'

After hearing the instructions, participants had the opportunity to ask questions. The tip sheet was subsequently explained. The experimenter began by reading the 5 tips aloud. She then returned to the first tip, read it aloud again, and explained the tip. Participants were able to ask

questions about the particular tip in review at this time. The same procedure was used for the remaining 4 tips. Following the in-depth tip sheet explanation, the experimenter read the list of stimuli for the recognition test.

After hearing all 36 words, participants in all conditions returned their response sheets and then were debriefed.

RESULTS

The present experiment was multiple-independent-groups design with a single independent variable (Type of Training Method) having four levels: no training (control), repetition of task and test, contextual guidance, and reality monitoring guidance. Raye and Johnson's (1980) identification-of-origin score was used as the dependent variable. As in Johnson et al. (1988), the scores were defined as the proportion of words correctly identified as imagine (I) or listen (L):

$$[I|\ I+L|\ L]/[I|\ I+L|\ I+L\ |L+I\ |L].$$

A one-way-between-subjects ANOVA was used to analyze the identification-of-origin score data to compare the identification-of-origin scores for the control group to the identification-of-origin scores for the 3 training methods. However, participants in all training methods never scored above chance performance on the recognition test, thus resulting in no significant difference in participants' reality monitoring performance.[3]

The data from this analysis are shown in Figure 1. The bars on the graph represent the least squares mean identification-of-origin scores for no training (C) ($\underline{M}$=.286), repetition of task and test (P) ($\underline{M}$=.258), contextual guidance (X) ($\underline{M}$=.336), and reality monitoring guidance (RM) ($\underline{M}$=.254). Both the graph and the ANOVA clearly illustrate that there was no significant

[3] It is interesting to note that this trend was also obtained in the present experiment's pilot study, in which there were 10 participants per cell. These participants also demonstrated no significant improvement of memory for source while scoring below chance.

difference between the participants' performance with no training and those participants' performance with training, F(3, 76)=1.806, MSE=.03, p=.153. Following the ANOVA, a planned contrast was used to compare the collapsed mean identification-of-origin score obtained for the training methods and the mean identification-of-origin score obtained for the control. The planned contrast revealed that there was no significant improvement of reality monitoring for those participants who received training, F (1, 76)= .010, MSE=.016, p=.919. Both test results contradicted the predicted outcome that the 3 training methods would improve reality monitoring.

DISCUSSION

After data analysis, results indicate that the hypothesis—memory for source can be improved within a reality monitoring paradigm with the use of training methods—was not supported. No significant difference was found after performing analysis on mean identification-of-origin scores for the training conditions, resulting in a clear floor effect. These results contradicted both intuition and previous reality monitoring research—Johnson et al.'s experiment (Experiment 2, 1988) resulted in a mean identification-of-origin score of .750, illustrating a much higher tendency for participants to identify the source correctly.

Possible Arguments for Failing to Find an Improvement in Reality Monitoring

Lack of Internal Validity

Method of stimulus presentation

Although the materials and method of stimulus presentation were a direct replication of Johnson et al.'s (1988, Experiment 2) "listen to speaker A/imagine in your voice" condition, the present experiment was not conducted under ideal conditions. To begin with, the quality of the recorded stimuli was not of a professional standard. The recording equipment was not able to

produce flawless recordings, nor was the speaker prepared for the caliber of the recording task. The stimulus recording consequently varied in tone, volume, and rate. If one were to replicate this experiment, "speaker A's" voice should be digitized—allowing for complete control of both the recording quality and stimulus presentation.

A lack of internal validity could have resulted because of the inability of the experimenter to monitor the participants' participation in the listen/imagine task. The experimenter could not ensure that the participants were engaging in the task required of them (e.g., the experimenter noticed some participants falling asleep or reading during stimulus presentation). Therefore, the sole measurement of the participants' participation was the source recognition test. The source recognition test, which was given to participants following eight minutes of distractor tasks, was not measuring if the participants followed the initial instructions. Instead, the experiment had only one measurement (i.e., identification-of-origin score), that did not reflect participants' execution of the listen/imagine task, yet exclusively measured if the participants were capable of recalling the source of the stimuli. For the present experiment, it was important to determine if the participants were able to identify the origin of the stimuli presented; however, the initial step should be to determine if the participants are properly executing the listen/imagine task. Without knowing if the participants engaged in the experimental task properly, this experiment's internal validity was greatly decreased.

Misuse of Training Methods

Despite the fact that the training methods were developed with the motivation to improve a participant's ability to determine the source of information, it is possible that the training

methods actually hindered a participant's ability to monitor source. Misuse of the training methods could have contributed to the results of the present experiment.

Repetition of task and test

In the repetition of task and test, fatigue and interference may have produced sub-optimal performance. Although 4 repetitions were feasible to conduct within one experimental session, presenting 4 sets of stimuli and the corresponding source recognition tests within a one hour period was likely to be a cause of participants' fatigue. After 2 task/test sessions, many participants became restless and did not appear to be concentrating on the task at hand. This fatigue could have resulted in the poor performance of participants within this experimental group. Most importantly, interference could not be eliminated in this experimental condition of repetition of task and test. Therefore, as in the aforementioned research of Mandler and Rabinowitz (1981), interference appeared to hinder memory for source.

Contextual guidance and reality monitoring guidance

The most evident reason for failure to detect an improvement of memory for source within both the contextual and reality monitoring guidance conditions was the lack of "tip sheet" use. Of the 40 participants provided with tip sheets, only 32% claimed to have used the tip sheet. However, 75% of the participants did state that they used the concepts on the tip sheet. There are two possible reasons participants did not utilize their tip sheets—a lack of understanding and a lack of desire. It is possible that reality monitoring was not improved by the use of the tip sheets because the participants misunderstood how to use the tips properly. Although the participants were given full instructions on how to utilize the tip sheets and given a chance to ask questions about the tip sheets, the possibility remains that the participants lacked an understanding of how

to use the tip sheets properly as a memory aid. Lastly, there is a chance that participants simply had no desire to use the tip sheet and therefore did not. Either of these two possibilities could contribute to the lack of memory improvement in the present experiment.

Theoretical Implications

As a result of the lack of research exploring the improvement of reality monitoring, the present experiment is of importance. Although evidence for improvement of memory for source was not obtained, the present experiment was novel in the domain of source memory research. This experiment developed a methodology for testing the improvement of source monitoring and provided insight for future replications. However, because research of this kind has not been previously conducted, the theoretical implications of the present research remain unclear.

Although previous research, such as Schooler et al.'s (1986) and Stern and Dunning's (1994), illustrated that memory for source can be improved, the present research does not demonstrate such an improvement. This conflict of results could be attributed to the different paradigms (especially the order of stimulus and tip presentation) used to explore improvement of memory for source. If this were the case, further research would lead to new theoretical outlooks in the field of reality monitoring while providing insight into how reality monitoring can be improved.

Taken as a whole, the results of this study are inconsistent with previous studies that utilized a reality monitoring paradigm. Because of these inconsistent results, replication of the present study is the next, necessary step in examining whether or not memory for source can be improved.

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Appendix A

The 36 Stimuli, Mean Concreteness (MC), and Frequency (FREQ) Taken from Friendly, M., Franklin, P. E., Hoffman, D., & Rubin, D. C. (1982).

WORD	MC	FREQ	WORD	MC	FREQ
opera	6.0	47	insect	6.7	14
palace	6.2	38	apple	6.9	9
weapon	6.2	42	monkey	6.9	9
nephew	6.4	9	mayor	6.6	38
chapel	6.7	20	worker	6.2	30
candle	6.9	18	temple	5.9	38
powder	6.2	28	candy	6.7	16
bullet	6.9	28	needle	6.6	15
muscle	6.5	42	anchor	6.3	15
sunset	6.0	14	hammer	6.8	9
salad	6.5	9	marble	6.4	21
estate	6.0	51	pepper	6.8	13
orange	6.1	23	timber	6.5	19
handle	5.8	53	meadow	5.9	17
harbor	6.4	37	pilot	6.7	44
carbon	5.9	30	liquor	6.7	43
jacket	6.6	33	jersey	5.9	25
widow	6.3	26	collar	6.3	17

Appendix B

Recognition Test Sheet

Source?

	Imagine	**Listen**
1.	☐	☐
2.	☐	☐
3.	☐	☐
4.	☐	☐
5.	☐	☐
6.	☐	☐
7.	☐	☐
8.	☐	☐
9.	☐	☐
10.	☐	☐
11.	☐	☐
12.	☐	☐
13.	☐	☐
14.	☐	☐
15.	☐	☐
16.	☐	☐
17.	☐	☐
18.	☐	☐

Appendix continued

Source?

	Imagine	Listen
19.	☐	☐
20.	☐	☐
21.	☐	☐
22.	☐	☐
23.	☐	☐
24.	☐	☐
25.	☐	☐
26.	☐	☐
27.	☐	☐
28.	☐	☐
29.	☐	☐
30.	☐	☐
31.	☐	☐
32.	☐	☐
33.	☐	☐
34.	☐	☐
35.	☐	☐
36.	☐	☐

Appendix C

The 108 Additional Stimuli Used in the Repetition of Task and Test Condition Taken from Friendly, M., Franklin, P. E., Hoffman, D., & Rubin, D. C. (1982).

WORD	MC	FREQ	WORD	MC	FREQ
uncle	6.3	57	player	5.8	51
butter	6.6	27	model	5.5	77
column	5.6	71	berry	6.6	9
spider	7.0	2	tunnel	6.4	10
finger	6.9	40	dollar	6.6	46
kitten	7.0	5	closet	6.5	16
person	6.5	175	engine	6.6	16
police	6.6	155	button	6.8	10
robin	6.7	2	beggar	5.8	2
sugar	6.7	34	murder	5.7	75
circle	6.4	60	pillow	6.6	8
garden	6.5	60	saddle	6.5	25
summer	5.9	134	canoe	6.8	7
cherry	6.8	6	river	6.6	165
lawyer	6.7	43	beaver	6.9	3
valley	6.5	73	island	6.6	161
pocket	6.5	46	penny	6.8	25
barrel	6.8	24	rifle	6.7	63
cradle	6.4	7	liquid	6.1	48

Appendix continued

bureau	5.7	43	onion	6.7	15
dinner	6.3	91	author	5.9	46
mother	6.6	216	paper	6.9	157
arrow	6.8	14	cable	6.4	7
helmet	6.8	1	jewel	6.4	1
writer	6.2	73	ribbon	6.5	12
lumber	6.8	35	rider	6.2	16
parcel	6.5	1	armor	5.6	4
signal	6.9	63	dealer	5.7	25
supper	6.3	37	corner	6.1	115
wagon	6.7	55	cousin	6.3	51
women	6.5	195	fabric	6.4	15
party	5.7	216	hunter	6.3	18
forest	6.7	55	ocean	6.5	34
human	5.6	299	metal	6.6	61
bubble	6.2	12	mirror	6.7	27
hotel	6.8	126	sailor	6.6	5
salute	5.5	3	window	6.6	119
cotton	6.7	38	basket	6.7	17
banner	5.8	8	coffee	6.7	78
vessel	6.1	16	rabbit	7.0	11
cellar	6.5	26	money	6.3	265
novel	6.0	59	table	6.8	198
pistol	6.8	27	elbow	6.8	10
eagle	6.9	5	cattle	6.9	97

Appendix continued

olive	6.8	5	letter	6.2	145
market	6.1	155	bushel	6.4	1
cannon	6.4	7	movie	6.4	29
planet	6.1	21	color	5.5	141
organ	6.6	12	oyster	6.8	6
cabin	6.5	23	linen	6.6	6
lemon	6.8	18	winter	6.1	83
turkey	6.8	9	carpet	6.9	13
farmer	.6	23	parlor	6.0	18
honey	6.8	25	bottom	5.3	88

Appendix D

Cognitive Interview Guidance Condition Tip Sheet

Tip Sheet

- ❑ Think back to the first time the experimenter presented the word . . . is she telling you to "listen"or "imagine?"

- ❑ Think about the way you were seated in your desk when the experimenter intially presented the word. . . is she telling you to "listen" or "imagine?"

- ❑ Remember the first reaction you had when the experimenter presented this word . . . did she tell you to "listen" or "imagine?"

- ❑ Think back to when the experimenter presented this word and paused . . . are you looking at something particular in the room that reminds you of the word and whether you are instructed to imagine it?

- ❑ Think back to after the experimenter presented this word . . . are you thinking about the word and listening to Steve present the word or are you just imagining the word.

Appendix E

Reality Monitoring Guidance Condition Tip Sheet

Tip Sheet

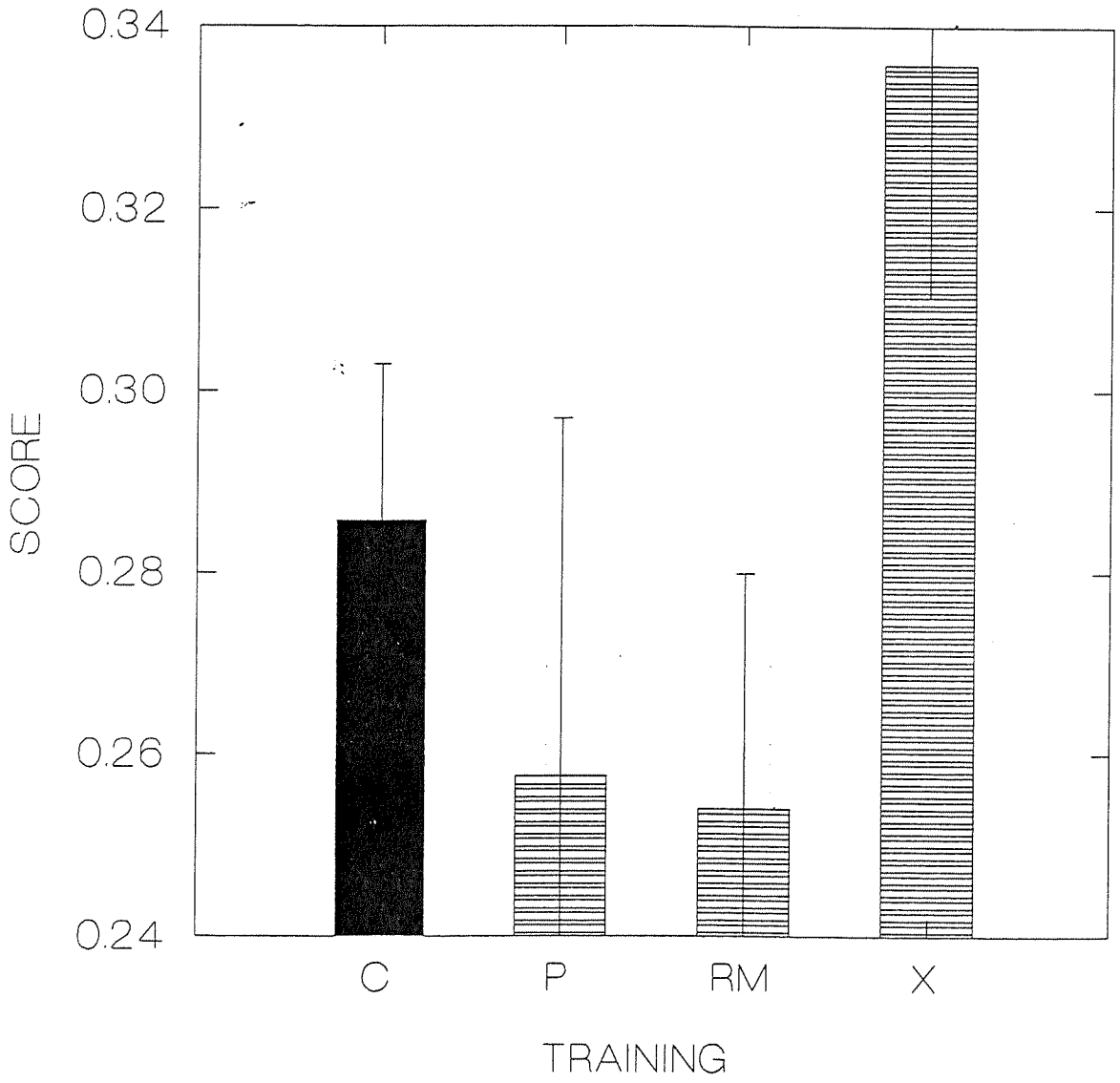
- ❑ Can you vividly remember the qualities of Steve's voice: tone, volume, accent, etc.? If you can, classify the word as "listen."

- ❑ Are you unsure of the word's source and using phrases like: "I think" or "I believe?" If you are, classify the word as "imagine."

- ❑ Can you remember the emotional connotation of the word? If you can, classify the word as "listen."

- ❑ Can you remember if Steve said the word quickly or slowly? If you can, classify the word as "listen."

- ❑ Can you remember a general category of the word but nothing specific about it, like its length or meaning? If you only remember the general, classify the word as "imagine."


0.34
0.32
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SCORE
C
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