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Emotional Focus and Source Monitoring

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Misattributions about the origin of mental experience underlie most memory distortions and the role that emotion plays in such source monitoring errors is a critical theoretical and practical issue. Three experiments explored the impact of the direction and target of listeners' emotional focus on their subsequent ability to identify the origin of memories for statements they had heard. Participants heard an audio tape (Experiment 1) or watched a video (Experiments 2 and 3) of two people making various statements (e.g., *Halloween is becoming a dangerous holiday*). Participants were given tasks that focused them either on how they felt about what was being said or on how they thought the speakers felt. Self-focus resulted in equal or better recognition for the content of the statements than did Other-focus, but poorer identification of the source of the statements (Experiments 1–3). However, the deficit of Self-focus relative to Other-focus was eliminated when participants focused on how they felt about the speakers rather than on how they felt about what was being said (Experiment 3). We suggest that whether emotional focus is likely to produce confusions among external sources of memories depends on whether it reduces the processing that binds content with the kinds of perceptual, contextual, and semantic features of external events that are important cues for source. © 1996 Academic Press, Inc.

Understanding memory distortion requires understanding how individuals come to misattribute the origin of mental experience. Virtually all memory distortions (other than those, perhaps, arising from errors of omission) involve source monitoring failures—that is, taking mental experiences to be something they are not. For example, people sometimes believe that something actually happened that they only inferred or imagined, think that they saw or read something that was only suggested to them, confuse what one person said with what was actually said by another, assume that they previously knew something that they only recently heard, claim that an idea is theirs that they heard from someone else, and are influenced by ''facts'' that are actually fictional (see Johnson, Hashtroudi, & Lindsay, 1993, and Ceci & Bruck, 1993, for reviews).

According to the source monitoring framework proposed by Johnson and colleagues (Johnson & Raye, 1981; Johnson, 1988a, 1991; Johnson et al., 1993), such source confusions arise because activated information is incomplete or ambiguous and because the evaluative processes responsible for attributing information to sources are imperfect. Memory distortions come about through the same mechanisms that give rise to veridical remembering. Both accurate and inaccurate source attributions result from heuristic processes that evaluate a mental experience for various qualities such as amount and type of perceptual, contextual, affective, semantic, and cognitive detail. In addition, both accurate and inaccurate source attributions also arise from more reflectively complex processes that

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retrieve additional supporting or disconfirming evidence and evaluate plausibility given general knowledge, schemas, assumptions, and biases. Furthermore, one can be induced to make source confusions by conditions that encourage lax criteria (e.g., responding on the basis of an undifferentiated feeling of familiarity) or set up strong demand characteristics (e.g., Ceci & Bruck, 1993; Dodson & Johnson, 1993; Lindsay & Johnson, 1989).

Much of our previous work within the source monitoring framework has been directed at clarifying the general mechanisms underlying source confusions at the time of remembering. More recently, we have been exploring the question of how complex memories get established in the first place (Johnson, 1992). That is, how do the various features that comprise a richly represented event become bound together in a way that later permits accurate source monitoring (e.g., Johnson, 1992; Johnson & Chalfonte, 1994; Chalfonte & Johnson, in press)? In addition to the binding that results from perceptual processing during encoding, feature binding critically depends on reflective processes such as those that keep particular features *refreshed* and *note* relations among them, and those that consolidate bound relations through *reactivating* and *retrieving* information (e.g., Johnson, 1992). Because reflectively induced activation is goal-driven and hence selective, some aspects of experience are processed at the expense of others.

A particularly interesting question about the formation of complex memories concerns the impact of emotion. This topic is both theoretically and practically important because some of the most contentious questions about the accuracy of source monitoring arise from remembering and misremembering emotionally charged events whose source becomes an issue. A number of emotional contexts have been examined where source monitoring is particularly important, such as in arguments between friends and family members (e.g., Ross & Holmberg, 1990) and in interactions between therapists and clients (e.g., Lindsay & Read, 1994) or between examiners and potential witnesses (e.g., Ceci & Bruck, 1993; Loftus, 1979) (see also recent special issues of *Applied Cognitive Psychology* or *Cognition and Consciousness*).

For example, the therapeutic practices used by some clinicians to help patients recover emotional memories that they may have repressed involve a number of factors that the source monitoring framework suggests could promote a belief in the veridicality of memories that are not accurate (e.g., Belli & Loftus, 1994; Lindsay & Read, 1994). Patients are sometimes encouraged to imagine events that might have happened to them or to read self-help books or join support groups in which abusive events are described—all practices that might introduce material into memory that could later be mistakenly attributed to a remembered autobiographical event. In addition, patients are sometimes encouraged to use lax criteria for evaluating their memories and, hence, the normal reservations that produce low confidence about vague memories are suspended. Similarly, the incorporation of suggested information in eyewitness testimony can be interpreted within the source monitoring framework (e.g., Zaragoza & Lane, 1994).

In all such cases, according to the source monitoring framework, false memories arise from the same types of memory qualities and cognitive processes that give rise to accurate memories. Like accurate memories, false memories vary in richness of detail, the confidence with which they are held, and the particular combination of factors that contribute to an individual's belief in them. Among these factors, the ways that emotion might interact with the processes important for establishing, reviving, and evaluating memories (i.e., the processes important for source monitoring) remain to be characterized (see, for example, chapters in Christianson, 1992, and Winograd & Neisser, 1992). The present article reports three studies conducted with this general goal in mind.

Some evidence indicates that, much as they use perceptual, contextual, and semantic information, individuals may use the presence of affect in their own or someone else's memory

to infer that an event really happened (Bush & Johnson, 1995; Johnson, Foley, Suengas, & Raye, 1988; Johnson & Suengas, 1989). While amount or type of emotional detail may often be a good cue to the source of one's own or other people's memories (''Dave must have told me that idea because I am really irritated that someone else had it first and nobody irritates me like Dave''), emotional involvement at encoding may not always be good for source monitoring if emotional processing occurs at the expense of processing other information that may provide better cues to source.

Much of the prior work on the relation between affect and memory has been concerned with whether emotion influences memory for content. For example, investigators have explored whether emotional information is more or less likely to be recalled or recognized than neutral information (e.g., Anooshian & Hertel, 1994) or whether it is more likely that one will remember an event if their mood at retrieval matches their mood at acquisition (e.g., Bower, 1992). Experimental work has largely taken the item or event as the unit of analysis, rather than attempting to assess the relative availability for complex events of various phenomenal qualities that are evaluated by source monitoring mechanisms. This distinction is particularly important because recall or recognition that something happened before can be quite good while memory for its source is quite poor (e.g., Kahan & Johnson, 1990).

There is, however, some evidence suggesting that source confusions might vary with level of affective involvement. After reviewing available studies on the relation between emotion and memory, Christianson (1992) concluded that affect tends to reduce memory for peripheral but not central aspects of an event (but see Heuer & Reisberg, 1992). Insofar as peripheral details are sometimes critical for identifying the source of information, this suggests that emotion might increase source confusions. Suengas and Johnson (1988) asked participants to engage in or imagine engaging in a number of activities such as writing a letter, meeting someone, and having coffee and cookies. Subsequently, participants were asked to think about either factual (how things looked) or affective (how they felt) aspects of the experiences. When participants subsequently rated their memories for various phenomenal characteristics, there was some evidence that thinking about affective aspects of events reduced the availability of perceptual aspects compared to thinking about more factual aspects of events. Suengas and Johnson speculated that such a trade-off between perceptual and affective characteristics might reduce source monitoring because perceptual characteristics typically provide better cues to source.

Evidence consistent with this idea comes from a study by Hashtroudi, Johnson, Vnek, and Ferguson (1994). Hashtroudi et al. asked pairs of participants to act in a short, two-person play. Participants spoke lines as directed by the experimenter. Immediately after the play, some were told to think about factual aspects of the play (what was said) and others were told to think about affective aspects of the play (what they were feeling during the play), and still others were asked to think about the play without any special focus suggested. A source memory test followed in which statements from the play were mixed with new statements that were not in the play. For each, participants indicated whether it was a line they said, one their acting partner said, or a new line that neither had said. Hashtroudi et al. found that older adults (mean age = 70 years) had a source monitoring deficit relative to younger adults (mean age = 20 years) in the control and affective focus conditions, but not in the factual focus condition. These results suggested that thinking about one's emotions leads to poorer source monitoring, at least for older adults.

Affective focus may hurt later source monitoring if, when people focus internally on themselves and what they are feeling, they do not process external, perceptual information as well. In order to later distinguish who said what, the fact or content of what was said has to have been associated or ''bound'' with the perceptual features of the person speaking, for example, features such as the speaker's voice

and expression. The results of the Hashtroudi et al. (1994) study suggest that older adults experience a trade-off. That is, if they focus on their own internal feelings it costs them in retrieving factual information as they think about events. In contrast, younger adults did not seem to experience such a trade-off.

However, it clearly would be incorrect to draw a general conclusion that the source monitoring of young adults is not affected by the type of focus in which they engage. Younger adults very likely would experience a trade-off between perceptual and affective processing under appropriate circumstances. For example, Hashtroudi et al. (1994) varied participants' focus after the initial encoding of the events to be tested, as participants thought about the play in retrospect. Perhaps younger adults already had well-encoded information that would help them later specify source and so the retrospective manipulation of focus was not particularly powerful. Young adults may be more likely to show the impact of different focus conditions when the critical information is initially encountered.

In summary, prior work suggests that young adults might show relatively low levels of source monitoring if they are induced to focus during initial encoding on how they feel. Affective Self-focus should have a negative impact on source monitoring because it reduces the chances that a listener will bind features of the speaker (e.g., voice quality, inferred attitudes, etc.) to the semantic content of what is being said. Connecting or binding such features together is critical for accurate complex, episodic memories. However, we also reasoned that affective focus may not inevitably produce poor source monitoring. Rather, affective focus should hurt source monitoring only when affective information is processed at the expense of other types of information that are potentially more useful later for identifying the origin of remembered information. If an affective focus did not detract from but rather promoted the binding of speaker features to the content of what is being said, then source monitoring should later be relatively accurate. For example, if listeners focused on how speakers seemed to feel about what they were saying, there should be a greater chance that listeners will bind features of the speaker to the semantic content of what is being said. Thus in Experiment 1 we contrasted a condition in which participants focused on how they themselves felt with a condition in which participants focused on how the speakers felt. If simply attending to emotional aspects of events is the critical factor, the two groups should perform similarly on a subsequent source memory test. If, on the other hand, the problem is created when the emotional focus is self-directed and hence reduces processing that binds speakers' features to content, source monitoring should be better when the emotional focus is directed at the speaker than when it is directed at the self.

Our primary interest was in determining whether the direction of affective focus (self or other) would affect source monitoring accuracy. However, we also had speakers make statements that varied in rated emotional intensity. Our expectation was that the source accuracy for more intensely emotional statements might suffer most from Self-focus because high intensity statements might be most likely to maintain participants' Self-focus.

Experiment 1

In Experiment 1, participants heard an auditory tape of two individuals, a man and a woman, making statements about a wide range of topics varying in the strength of the affective response they are likely to evoke, for example, *I like unusual food, Most holidays have become too commercialized, Affirmative action is an unfair policy.* In the Other-focus condition, participants were asked to rate how they thought the *speaker* felt about what he or she was saying. In the Self-focus condition, participants were asked to rate how *they* felt about what the speaker was saying. Thus, both of the tasks involved thinking about emotion, but they differed in whether the listener was focusing externally, on the speakers, or internally, on what they themselves were feeling. Participants then received a booklet in which the presented statements were intermixed ran-

domly with new statements and they were asked to indicate, for each one, whether it was an idea expressed by Person A, by Person B, or a new idea not expressed by either person. We expected source monitoring to be more accurate in the Other-focus condition than in the Self-focus condition. In the Other-focus condition, participants should be more likely to keep active (*refresh, note*) for longer durations various perceptual and assumed semantic features of the speakers, which should provide greater opportunity for the binding of speaker and content than in the Self-focus condition. On the other hand, we did not expect participants in the Self-focus condition to show overall poorer memory for what was said because Self-focus would not be expected to put them at a disadvantage with respect to remembering the semantic content of the statements (and, in fact, might put them at an advantage, Klein & Loftus, 1988; Higgins & Bargh, 1987; Rogers, Kuiper, & Kirker, 1977).

Method

Participants. Princeton University undergraduates (30 men and 15 women) participated as part of an introductory psychology classroom demonstration. The experimental booklets were passed out in such a fashion that participants were randomly assigned to conditions.

Materials. Ninety statements expressing opinions or proported factual knowledge were made up about a wide range of topics (e.g., preferences for different foods or drinks, performance of different politicians, or appropriate punishments for various crimes). The statements were selected to vary in the degree to which they would evoke emotional responses. This was confirmed by having 44 undergraduates (24 men and 20 women) who did not otherwise participate in these studies rate the 90 statements according to the following instructions:

> We would like you to read the following sentences and judge their emotional impact. In evaluating each sentence try to gauge the level of emotion which is evoked by the sentence. For example, the sentence *It is wrong for people to abuse animals* might be likely to result in a stronger emotional response than the sentence *Apple computers are better than IBM compatible computers.* Although people may have a strong opinion about both statements, the subject of animal abuse would be considered by many to be more emotionally charged than the subject of computers. Please rate each sentence on a scale from 1 (*no emotional impact*) to 7 (*high emotional impact*), writing your answer in the space provided to the left of the sentence.

The data from this norming study indicated that the 90 statements did vary in their emotional impact, from a mean rating of 1.36 for the statement *Florida is not one of the original thirteen colonies* to 5.75 for the statement *Any mother who kills her child should receive capital punishment.* The average rating across the 90 statements was 3.65.

Sixty statements were assigned to speakers A and B (30 each) so as to generally equate the topics and emotional level of the statements, as well as the potentially inferred political, religious, and social views of the speakers. The remaining 30 statements were used as new sentences for the subsequent source monitoring task (see Appendix A). The mean emotion level (i.e., as rated in the pilot study) of the three sets of statements (i.e., speaker A, speaker B, and the new sentences in the source monitoring test) were nearly identical (3.67, 3.62, and 3.66 respectively).

An audio tape was made in which two actors, a male and a female, read the statements for speakers A and B (e.g., the male actor read speaker A statements, and the female actor read speaker B statements). A second tape was made in which the sets of sentences assigned to the two speakers were switched. The order of the statements on the tapes was random with the restriction that one speaker did not say more than two statements before the other speaker said a statement. The same order was used for both tapes. The statements were read at approximately a 6-s rate.

Included at the beginning of each tape was a dialog between the two speakers (portrayed as participants in an earlier experiment) and a third actor (portrayed as an experimenter).

The experimenter on the tape told the two speakers that they would be asked to write responses to a series of questions. After the experimenter instructs them to begin, the tape shifted to the end of the task. At this point, the experimenter on the tape asked the speakers to read the statements that they had generated, and the two speakers began to read their (alleged) responses. Thus, from the (real) participants' point of view, the speakers were reading statements that expressed their knowledge, opinions, or autobiographical events.

Procedure. Three group testing sessions were conducted with the two audio tapes alternately used for each section (a total of 23 and 22 participants received the first order and second orders, respectively). At the beginning of the experiment, participants were given a booklet containing response sheets and instructions for the entire experiment. For the acquisition phase, the experimenter informed the participants that they would be listening to a tape made from an earlier study. The first portion of the tape, containing the dialog between the speakers and the experimenter, was then played. At the end of the dialog, the tape was paused, and participants were asked to read the instructions on the first page of their booklet. For both conditions, participants were asked to indicate their response to each statement by circling a number on a scale from 1 to 5. In the Self-focus condition ($N = 22$), participants were told that we were interested in the extent to which people agreed in their feelings about various topics. They were instructed to rate how they felt about what the person is saying and to indicate how much they agreed with each statement on a scale from 1 (*disagree strongly*) to 5 (*agree strongly*). In the Other-focus condition ($N = 23$), participants were told that we were interested in people's ability to perceive other people's emotions. They were instructed to rate how much they thought the speakers agreed with what they were saying on a scale from 1 (*does not feel very strongly*) to 5 (*does feel very strongly*). A separate scale was provided for each statement in the response sheets. After instructing the participants to respond as quickly and accurately as possible to each statement, the experimenter played the next section of the tape in which the speakers read the 60 sentences. The acquisition phase, including the instructions and the dialog, took approximately 15 min.

At the end of the tape, the participants were instructed to turn to the next section of the booklet consisting of a subset of the WAIS-R vocabulary test and three simple problems (e.g., the nine-dot problem). This section was included as a filler task between the acquisition and test phases of the experiment (i.e., it was unrelated to the experimental tasks). The participants were instructed to first complete the vocabulary test, and to then work on the three problems in the remaining period of time. The participants were given 10 min. to complete this section of the experiment.

For the test phase, the booklet included a section in which the 90 statements (60 old and 30 new) were printed in an intermixed order, with the restriction that no more than three statements from any one source (i.e., A, B, or New) be presented in a row. In addition, statements presented successively during acquisition were not presented successively during test, and the first and last statements presented during acquisition were not the first and last statements during test. Participants were asked to decide whether each statement was made by speaker A, speaker B, or was New. Responses were made by circling the appropriate letter (i.e., A, B, or N) at the right of each sentence. Participants were also asked to rate their confidence for each response on a scale from 1 (guessing) to 3 (highly confident). The test phase was self-paced and on average took approximately 15 min. to complete.

Results and Discussion

Corrected recognition scores were computed by obtaining, for each participant, the proportion of test items that were correct old responses to old items (hits), regardless of source accuracy, minus the proportion of incorrect old responses to new items (false positives). Source monitoring scores were com-

TABLE 1

CORRECTED RECOGNITION, SOURCE IDENTIFICATION, AND CONFIDENCE RATINGS FOR EXPERIMENT 1

	Hits	False positives	Corrected recognition	Source identification	Confidence	
					Source correct	Source incorrect
Other-focus	0.90	0.09	0.81	0.82	2.52	2.05
Self-focus	0.94	0.02	0.92	0.64	2.09	1.90

puted by obtaining, for each participant, the proportion of statements correctly recognized as old that were also attributed to the correct source (e.g., Foley, Johnson, & Raye, 1983). These scores are shown in Table 1, along with the mean confidence rating given to items identified as old that were correctly and incorrectly attributed to source. Recognition was greater in the Self-focus (.92) condition than in the Other-focus (.81) condition, $F(1,43) = 6.55$, $MSE = .02$. In contrast, and as predicted, source accuracy was lower in the Self-focus (.64) condition than in the Other-focus (.82) condition, $F(1,43) = 16.24$, $MSE = .02$.

A 2 (Response: Correct vs Incorrect) $\times$ 2 (Condition: Self-focus vs Other-focus) analysis of variance on the confidence ratings produced main effects for response, $F(1,39) = 47.78$, $MSE = .04$, and condition, $F(1,39) = 4.73$, $MSE = .36$, and an interaction of response $\times$ condition, $F(1,39) = 8.35$, $MSE = .04$.[1] Participants expressed higher confidence when they attributed a statement to the correct than to the incorrect source, and they expressed higher confidence in the Other-focus than the Self-focus conditions, especially for correct responses. We also found that participants' mean confidence was significantly correlated with their source accuracy scores both within the Other-focus ($r = .56$, $p < .01$) and the Self-focus ($r = .68$, $p < .01$) conditions.

We also calculated a source monitoring score for each statement by taking the proportion of individuals identifying it as old who had also correctly identified its source. These scores were then correlated with the mean emotion ratings for each statement collected from other participants in the norming study (see Method, above). There was a significant negative correlation between rated emotion and source monitoring accuracy in the Self-focus condition ($r = -.34$, $p < .01$) but not for these same sentences in the Other-focus condition ($r = -.09$, $p > .10$). This finding indicates that when participants focused on their own feelings, they were later most likely to make source monitoring errors for those items with higher emotional content.[2]

The results of Experiment 1 were straightforward and as predicted: Subjects were better able to discriminate statements that had been said from those that had not been said when they had focused on their own emotions than when they had focused on the speakers' emotions. In contrast, overall source accuracy was much better when listeners had focused on how the speakers might feel than when they had focused on how they, themselves, felt about what was being said. Furthermore, in the Self-focus condition, participants were least likely to correctly identify the origin of

[1] There are minor variations in degrees of freedom for the analyses within each experiment for the following reasons. Four of the 45 participants in Experiment 1 and 2 of the 87 participants in Experiment 3 did not complete the confidence ratings for each item, so were not included in the ANOVAs comparing confidence for correct and incorrect source attributions. In Experiment 3, two participants showed no variability in responding to one of the MCQ items (e.g., one gave a response of 1 on visual detail for all statements), and their data did not contribute to the correlations computed for the particular items.

[2] For New items, there was no significant correlation between emotion ratings and number of false alarms in any of the three experiments.

those statements with the highest emotional content. These results clearly demonstrate that focusing on one's own feelings may help make a statement memorable, but it will not necessarily allow one to identify later the origin of the information. Presumably, focusing on one's own emotions reduces the processing directed at perceptual and other features of the event that are needed to identify its source.

Experiment 2

It could be that focusing on one's own emotions results in poor source monitoring only under relatively impoverished conditions (i. e., cues restricted to one modality). For example, if speakers could be seen as well as heard, the resulting memory for visual cues might result in better source information; or, perhaps the source monitoring errors that are observed result from participants adopting a relatively lax criterion for source monitoring. Previous research indicates that tests vary in the extent to which they encourage participants to closely examine the qualities of their memories and that closer examination is associated with fewer source monitoring errors (Dodson & Johnson, 1993; Lindsay & Johnson, 1989). The purpose of Experiment 2 was to determine if the basic findings of Experiment 1 would generalize to a situation in which speakers had been seen as well as heard during acquisition. In addition, Experiment 2 served as a preliminary study for Experiment 3. In Experiment 3 we asked participants to rate their memories for several qualitative characteristics (e.g., visual detail) during the source test in order to induce relatively stringent criteria for source judgments and to assess their phenomenal experience while remembering.

Method

Eighty-seven Princeton undergraduates (45 men and 42 women) participated as part of an introductory psychology classroom demonstration in five group testing sessions. As in Experiment 1, they were randomly assigned to the Self-focus ($N = 43$) or Other-focus ($N = 44$) conditions within each testing session by handing out the booklets in random order. The cover story, materials, and counterbalancing of sentences across speakers were as in Experiment 1, with the exception that two female speakers were videotaped as they read the statements of speakers A and B. The speakers, although relatively similar in appearance (both in their mid-20s, white, casually dressed), were clearly distinguishable. As with Experiment 1, a second videotape was made in which the statements read by the speakers were switched and the two tapes were randomly assigned to groups (37 and 50 participants saw Tapes 1 and 2, respectively). The dialog between the speakers and the experimenter that set up the ''cover'' story was also videotaped.

The procedure for testing participants was as followed in Experiment 1. Participants performed the acquisition task according to their condition. Following the filler task (i.e., the subset of the WAIS-R and the three problems), participants performed the source-memory test (i.e., identified whether statements were made by speaker A, B, or were new statements). As in Experiment 1, participants rated their confidence in each response on a scale from 1 (guessing) to 3 (highly confident).

Results and Discussion

The data were scored as in Experiment 1 and mean recognition and source identification scores are shown in Table 2, along with confidence ratings for items correctly identified as old that were correctly and incorrectly attributed to source. As in Experiment 1, recognition was higher in the Self-focus than in the Other-focus condition, $F(1,85) = 37.83$, $MSE = .01$. Again, source accuracy was lower for Self-focus than for Other-focus, $F(1,85) = 85.01$, $MSE = .01$. Also replicating Experiment 1, participants were more confident about correct than incorrect source attributions, $F(1,83) = 96.54$, $MSE = .02$, and more confident in the Other-focus than in the Self-focus condition, $F(1,83) = 42.69$), $MSE = .39$. Also, the difference in confidence between the Other-focus and Self-focus conditions was

TABLE 2

RECOGNITION, SOURCE IDENTIFICATION, AND CONFIDENCE RATINGS FOR EXPERIMENT 2

					Confidence	
	Hits	False positives	Old/New recognition	Source identification	Source correct	Source incorrect
Other-focus	0.90	0.05	0.85	0.73	2.43	2.12
Self-focus	0.97	0.02	0.96	0.55	1.72	1.58

greater for correct than for incorrect source attributions, $F(1,83) = 15.08$, $MSE = .02$.[1] The correlation between confidence and source accuracy was .47 ($p < .002$) in the Other-focus condition and .54 ($p < .001$) in the Self-focus condition. The correlation between the rated emotional content of sentences and the source monitoring accuracy on the sentence across subjects was $-.08$ ($p < .53$) in the Other-focus condition and $-.23$ ($p < .07$) in the Self-focus condition.

The overall level of source monitoring in Experiment 2 was lower than that in Experiment 1, indicating that discriminating from memory between two female speakers on the video was more difficult than between the male and female speakers on the audio tape used in Experiment 1 under comparable orienting tasks (see also Johnson, De Leonardis, Hashtroudi, & Ferguson, 1995). Nevertheless, again, recognition benefited from Self-focus while source accuracy was poorer in the Self-focus than the Other-focus condition. Whereas the correlation between source accuracy and rated emotional content of the statements in the Other-focus condition was about the same in Experiments 1 and 2 ($-.09$ and $-.08$, respectively), in the Self-focus condition the correlation was somewhat lower in Experiment 2 ($-.23$, $p < .07$) than in Experiment 1 ($-.34$, $p < .01$). Nevertheless, the general pattern was similar. It appears that in the Self-focus, but not the Other-focus condition, participants tended to be less accurate in source attributions about sentences with higher emotional content.

EXPERIMENT 3

Experiments 1 and 2 suggest that focusing on one's own emotions increases confusion about who said what relative to focusing on the speaker's emotions. The results also suggest that emotional Self-focus makes it more likely that source accuracy will be negatively correlated with the intensity of the emotional content of statements. Thus, the results of Experiments 1 and 2 clearly demonstrate that focusing on one's own emotions may disrupt source monitoring relative to focusing on the speakers' emotions.

In Experiment 3, we investigated whether focusing on one's own emotions is always detrimental for source monitoring. We suspected that the effect of emotional Self-focus would depend on what the emotion is about (i.e., the target). That is, self-focused emotion is not simply a generalized orientation to the self, but rather potentially has reference to objects, events, individuals, ideas, and feelings from both the external and the internal worlds of the individual. Focusing on how one feels about the ideas someone expresses, for example, may lead to quite different perceptual and reflective activity than focusing on how one feels about the person who expresses those ideas. Thus, Experiment 3 varied the target of self-focused emotion.

All participants watched the same video used in Experiment 2. Some participants were told that they would later be asked to make some predictions about how these two people would feel in various new situations (Other-focus); others were told that they would later be asked how they felt about some of the same topics and issues mentioned on the video (Self-focus). These two conditions are, respectively, similar to the Other-focus and Self-focus conditions in Experiments 1 and 2 and

were expected to yield a similar pattern of findings. In a third condition (Self/speaker-focus), subjects were told they would later be asked how they felt about each of the two people on the video. Thus in this condition, participants were encouraged to think about how they, themselves, felt, but in relation to the speakers rather than in relation to the content of what was said. If focusing on one's own feelings is most critical, this group should have low source monitoring scores like the Self-focus group. If, on the other hand, emotional Self-focus is less critical than whether the emotion is consistent with processing information that might later be useful for source monitoring (in this case characteristics of the speakers), then the Self/speaker-focus group should look more like the Other-focus group.

Another purpose of Experiment 3 was to collect participants' ratings of phenomenal qualities of their experiences while remembering (e.g., Johnson et al., 1988; Suengas & Johnson, 1988). Previously, we have collected such ratings in investigations of reality monitoring—where subjects are asked to differentiate perceptually derived from reflectively generated events. Subjective ratings on a Memory Characteristics Questionnaire (MCQ) assessing various qualitative characteristics (including visual, auditory, and affective detail) tend to be greater for memories of actual than imagined events (see also Hashtroudi, Johnson, & Chrosniak, 1990; McGinnis & Roberts, in press). Also, participants' confidence in the accuracy of their memories tends to be correlated with amount of perceptual detail and, for older adults, amount of emotional detail (Hashtroudi et al., 1990); and participants generally express higher confidence for correct source attributions than for incorrect source attributions, although there are certainly high confident errors and low confident correct responses (Johnson, Raye, Foley, & Foley, 1981). These observations are generally consistent with the idea that people use qualitative characteristics of memories to make source attributions in reality monitoring situations. In the present Experiment 3, we collected ratings of memory characteristics in order to explore the relation between participants' subjective experience and their judgments about external sources of memories.

Finally, in Experiment 3 we manipulated the participants' focus by giving general orienting instructions before they viewed the video, but we did not require an overt response to each statement during the acquisition phase of the study. We were interested in seeing whether the general pattern from Experiments 1 and 2 would hold under these more natural viewing conditions.

Method

Participants. Fifty-three Princeton undergraduates (25 men and 28 women) participated in four group testing sessions as part of an introductory psychology classroom demonstration. As in Experiments 1 and 2, they were randomly assigned to conditions within each testing session by handing out the booklets in random order.

Materials and procedure. The materials, counterbalancing of sentences across speakers and procedures for testing were as in Experiment 2. Two female actors were videotaped reading the statements of speakers A and B. The same two videotapes were used in which the statements read by the actors were switched across tapes (28 and 25 participants saw tapes 1 and 2, respectively).

For the acquisition phase, participants in the three conditions were told that we were investigating the differences between information obtained from TV and information obtained from radio and that they were in the condition where they could both see and hear the speakers. Note that unlike Experiments 1 and 2, the participants were not required to make a responses to statements as they were read, but instead were directed to attend to the speakers and/or statements in order to answer questions following the acquisition phase. Depending upon the condition to which they were assigned, the participants were informed that following the video they would be asked a series of questions about either the speakers, their thoughts about the topics of the statements, or their impressions of the speakers.

Participants in the Other-focus condition (N = 17) were told that they would be asked to make predictions about each speaker based upon their overall impression formed from the video. They were instructed to think about how strongly each speaker felt about what she was saying as she read a statement. Participants in the Self-focus condition (N = 18) were told that they would be asked about their feelings on some of the same topics and issues mentioned in the video. They were instructed to think about the extent to which they agreed or disagreed with each statement as it was read. Finally, participants in the Self/speaker-focus condition (N = 18) were told that they would be asked to describe how they felt about each speaker in the video. They were instructed to think about how each statement contributed to their feelings about the speaker as she read the statement.

The materials for the test phase were similar to those used in Experiments 1 and 2. The 90 statements (60 old and 30 new) were printed in an intermixed order, with the same restrictions as described in Experiment 1. In addition to rating the confidence in their response to each statement, the participants were also given an abbreviated MCQ that asked them to rate the amount of visual detail, auditory detail, information about the speakers emotion, and information about their own emotion that was present for evaluation. All of these ratings (including confidence) were made on a scale from 1 (*little or none*) to 5 (*a lot*).

Results and Discussion

Corrected recognition and source monitoring scores were computed as in Experiments 1 and 2 and are shown in Table 3. A one-factor, between-groups ANOVA of recognition scores indicated that the three conditions did not differ significantly from each other, $F(2,50) < 1.00$. There were, however, differences among the conditions in source monitoring accuracy, $F(2,50) = 4.23$, $MSE = .007$. As shown in Table 3, the Self-focus group was less accurate than either the Other-focus or Self/speaker-focus groups, which did not differ significantly from each other. [Recogni-

TABLE 3

CORRECTED RECOGNITION, SOURCE IDENTIFICATION, AND MCQ RATINGS FOR EXPERIMENT 3

	Hits	False positives	Corrected recognition	Source identification	Source correct					Source incorrect				
					C	V	A	SE	PE	C	V	A	SE	PE
Other-focus	0.91	0.03	0.88	0.86	4.21	2.75	2.85	2.34	2.76	3.31	2.11	2.50	2.02	2.40
Self/speaker-focus	0.88	0.03	0.85	0.86	4.25	2.70	3.20	2.64	3.26	3.36	2.19	2.75	2.29	2.87
Self-focus	0.92	0.05	0.87	0.79	3.82	2.29	2.77	2.12	2.85	2.88	1.89	2.46	1.97	2.61
Mean					4.09	2.58	2.94	2.37	2.96	3.19	2.06	2.57	2.09	2.63

tion and source monitoring for Experiments 1, 2, and 3 were also analyzed using a multinomial-modeling approach. The major results, which agreed with those already reported, are shown in Appendix B.]

Table 3 also shows the mean MCQ ratings, separately for correct and incorrect source attributions for old items recognized as old, assessing overall confidence (C) in the memory, the amount of visual (V) and auditory (A) detail, and speaker's (SE) and participant's (PE) emotion. Several aspects of these ratings are worth noting. Confidence varied with condition, $F(2,50) = 3.97$, $MSE = .60$; the means paralleled the accuracy scores in that participants were generally more confident about their responses in the Other-focus (4.22) and Self/speaker-focus (4.25) conditions than in the Self-focus condition (3.81). Overall, participants were more confident, $F(1,50) = 158.30$, $MSE = .14$, and gave higher ratings on qualitative characteristics, $F(1,50) = 41.72$, $MSE = .35$, when they were correct than when they were incorrect in their source judgments (see also Johnson, et al., 1981). A Least Significant Difference (LSD) test indicated that correct source judgments had higher ratings than incorrect source judgments for each characteristic (V, A, SE, and PE) individually. In addition, response (correct or incorrect) interacted with type of characteristic, $F(3,150) = 5.33$, $MSE = .06$. From Table 3, this interaction reflects the fact that the difference between ratings of the qualitative characteristics of correctly and incorrectly attributed memories was greater for visual detail (.52) than for auditory detail (.37), speaker emotion (.28), or participant's emotion (.32). Finally, for correct source attributions, an LSD test indicated that the Other-focus group gave higher ratings than the Self-focus group for visual detail ($p < .02$). In addition, Self/speaker-focus produced more richly detailed memories than Self-focus on all characteristics ($ps < .05$) and more richly detailed memories than Other-focus on auditory detail ($p < .08$) and participant's emotion ($p < .05$).

As for the previous experiments, we examined the relation between the ratings of emotional content of the sentences made by other participants and source monitoring accuracy scores on the sentences for the participants in Experiment 3. The correlation was not significant for any of the three conditions: Other-focus ($r = .10$, $p < .43$), Self/speaker-focus ($r = .05$, $p < .71$), and Self-focus ($r = -.09$, $p < .48$). The negative correlation for Self-focus conditions between rated emotion and source accuracy found in Experiment 1 ($r = -.34$, $p < .01$) and Experiment 2 ($r = -.23$, $p < .07$) was not evident in Experiment 3. One interesting possibility is that requiring participants to rate qualitative characteristics of their memories at the time of the test increased the chances that participants take a wider range of attributes into account in making source attributions (cf. Dodson & Johnson, 1993). Another potentially relevant factor is that in Experiment 3, participants were not required to respond to each statement during acquisition but rather were instructed to think about the material with respect to potential questions they might be asked later. Thus, differences in the relative emotional impact of various statements on the type of processing engaged might have been less in Experiment 3 than in Experiments 1 and 2 where participants were induced to process each statement individually.

Table 4 shows correlations obtained between the mean rated qualitative characteristics of memories (visual and auditory detail and speaker's and participant's emotion) for each statement (averaged across participants and regardless of whether source was correct or incorrect) and two other variables: the mean confidence across participants assigned to responses and the preexperimentally rated emotional content of the sentences. There are two aspects of these data worth noting. First, participants' confidence was significantly positively correlated with all memory characteristics assessed ($ps < .05$). Second, the statements that were higher in emotional content yielded memories that were rated higher in both speaker and participant emotion for all conditions, but memories that were rated

TABLE 4

CORRELATION BETWEEN RATED QUALITATIVE CHARACTERISTICS OF MEMORIES OF STATEMENT AND OVERALL CONFIDENCE OR RATED EMOTIONAL CONTENT OF STATEMENTS, EXPERIMENT 3

	Characteristics			
	Visual detail	Auditory detail	Speaker's emotion	Participant's emotion
Confidence				
Other-focus	.78*	.62*	.54*	.52*
Self/Speaker-focus	.69*	.65*	.66*	.59*
Self-focus	.70*	.39*	.44*	.38*
Rated emotion				
Other-focus	.21	.36*	.71*	.74*
Self/Speaker-focus	.04	.17	.51*	.58*
Self-focus	.02	.05	.62*	.72*

* $p < .05$

higher in visual ($p < .10$) and auditory detail ($p < .05$) only in the Other-focus condition.[1]

For each participant, we also calculated the correlation between the MCQ rating given to a statement recognized as old and his or her source accuracy score (1, correct; 0, incorrect) for that statement. As shown in Table 5, the mean correlation between the MCQ ratings and source accuracy was significantly different from zero for all memory characteristics assessed in every group. A 3 (focus condition) $\times$ 4 (memory characteristic) ANOVA on these scores yielded a main effect of memory characteristic, $F(3,144) = 8.34$, $MSE = .01$. Subsequent LSD comparisons indicated that the correlation with source monitoring accuracy was higher for visual detail than either auditory detail or speaker's or participant's emotion ($ps < .01$). The correlation between source monitoring accuracy and auditory detail tended to be higher than speaker's ($p < .08$) or participant's ($p < .11$) emotion as well.

To summarize the results of Experiment 3, whereas in Experiments 1 and 2, Self-focus resulted in higher recognition than did Other-focus, in Experiment 3, recognition was not significantly affected by focus condition. Recognition may have been less sensitive to instructional manipulation in Experiment 3, in part, because participants were not required to

TABLE 5

MEAN OF INDIVIDUAL CORRELATIONS BETWEEN PARTICIPANTS' SOURCE MONITORING SCORES AND MEMORY CHARACTERISTICS RATINGS

	Characteristics			
	Visual detail	Auditory detail	Speaker's emotion	Participant's emotion
SM				
Other-focus	0.22*	0.12*	0.11*	0.10*
Self/Speaker-focus	0.19*	0.16*	0.14*	0.14*
Self-focus	0.17*	0.14*	0.06*	0.08*

* Mean correlation is significantly different from zero ($p < .05$).

respond to every item during acquisition. More important, as in Experiments 1 and 2, participants in the Self-focus condition performed more poorly than participants in the Other-focus condition on source identification. Furthermore, source accuracy in the Self/speaker-focus group looked more like the Other-focus group than like the Self-focus group. Thus the results demonstrate that some types of emotional focus yield fewer subsequent source confusions than other types of emotional focus. An emotional focus (either Other or Self) that promotes binding of potentially discriminating features of the speakers such as their expression, posture, and inferred personality with the semantic content of what they are saying produces better source monitoring than an emotional focus on how the listener is reacting to what is being said.

The subjective MCQ ratings were consistent with this picture. The confidence ratings yielded essentially the same picture as the accuracy scores, with participants more confident in the Other-focus and Self/speaker-focus conditions than in the Self-focus condition. Other-focus and Self/speaker-focus generally produced memories with more visual and auditory detail and speaker emotion than did the Self-focus condition. These qualitative characteristics, especially visual detail, were, presumably, the basis of participants' higher source accuracy in the Other-focus and Self/speaker-focus than in the Self-focus conditions. These qualitative characteristics would also, presumably, be the kinds of information assessed if participants were asked to decide whether or not they ''recollected'' a statement or simply knew it was on the acquisition list (e.g., Dewhurst & Conway, 1994; Gardiner & Java, 1993). As suggested by Table 3, recollection is not a discrete state, but rather a phenomenal experience related to the types and amounts of detail that are active. In this sense, even false memories (i.e., those involving source misattribution) might be ''recollected'' (e.g., see Dodson & Johnson, in press).

Further evidence that false memories arise from phenomenal qualities of mental experiences that induce source confusions is shown in Table 6, which presents the distribution of responses at varying levels of confidence for each of the three experiments. Given that confidence and each of the memory characteristics were positively related (see Table 4), confidence provides a rough composite index of overall detail. The left side of Table 6 shows the percentage of correct source attributions assigned each confidence value and the right side shows the percentage of incorrect source attributions assigned each confidence value. As noted previously, participants were generally more confident about correct than incorrect responses in all three experiments. In addition, participants in the Self-focus condition were generally less confident than participants in the Other-focus or the Self/speaker-focus conditions. Nevertheless, participants in all conditions made some source misattributions with high confidence. As is clear, only in the Self-focus condition of Experiment 2 were a majority (56%) of the incorrect source attributions given a rating of 1 (indicating guessing). Generally, most incorrect source attributions were made with medium to high confidence (a rating of 2 or 3 in Experiments 1 and 2 and a rating of 3, 4, or 5 in Experiment 3) and there were high confidence source confusions in all conditions. Presumably, the types of qualitative characteristics that yield high confidence for correct source attributions also yield high confidence for incorrect source attributions (e.g., Johnson & Raye, 1981).[3]

Another interesting aspect of these data is that although participants in the Other-focus condition made fewer source errors than parti-

[3] Although some uses of the term ''false memory'' imply that only inaccurate memories that are strongly held or held with high confidence qualify as false memories, this strikes us as curious. We do not generally count as a *true* memory only those accurate memories that are assigned high confidence. True and false have to do with the relation between the memory and what happened (a difficult conceptual problem in itself (Johnson & Sherman, 1990) and confidence has to do with the way that individuals assign belief to evidence. Thus it makes sense that both true and false memories would vary in confidence. From the source monitoring point of view, many intriguing questions arise about the relation between evidence and belief both within and across individuals.

TABLE 6

PERCENTAGE OF CORRECT AND INCORRECT SOURCE ATTRIBUTIONS ASSIGNED TO EACH CONFIDENCE RATING IN EXPERIMENTS 1–3

	Source correct					Source incorrect				
	1	2	3			1	2	3		
Exp. 1										
Other-focus	8	28	64			23	51	26		
Self-focus	22	40	38			40	44	16		
Exp. 2										
Other-focus	9	36	55			18	55	27		
Self-focus	43	37	20			56	35	9		
	1	2	3	4	5	1	2	3	4	5
Exp. 3										
Other focus	2	5	14	28	51	4	23	30	28	15
Self/Speaker-focus	1	6	15	22	56	6	23	33	20	17
Self-focus	3	11	23	26	37	9	27	31	24	8

cipants in the Self-focus condition, a higher proportion of the errors they did make were made with high confidence. This pattern suggests the intriguing possibility that high confidence about particular elements of memories for events may reflect, in part, a generalized confidence about the memory as a whole. For example, in the present case, the participants in the Other-focus condition were in general justified in their high confidence in that their source accuracy for the statements made by the two speakers in the event depicted on the tape was generally good. Thus, under some conditions, high confidence in inaccurate attributions about particular statements may reflect a misplaced confidence arising from a generally good memory for what the two speakers said on the occasion as a whole. Alternatively, the Other-focus participants might have had relatively good representations of what the speakers sounded or looked like as they spoke; conjoined with the right content such perceptual detail would induce high confidence in accurate memories but conjoined with the wrong content such detail would induce high confidence in false memories. The present design does not allow us to sort out these possibilities so they remain interesting potential directions for future research.

GENERAL DISCUSSION

The relation of emotion and memory is a classic problem and a number of general propositions have been suggested. Among these are the following: Memory should be better for emotionally charged information (e.g., Brown & Kulick, 1977); memory should be worse for emotionally charged information (at least for high levels of arousal (Deffenbacher, 1983)); emotion should improve memory for central information at the expense of peripheral information (Easterbrook, 1959). We would like to offer another general proposition: the relation between emotion and memory will depend on the specific nature of the perceptual and reflective processing that the emotion promotes and the nature of the memory tasks individuals later face (e.g., Johnson, 1983; 1992; Kolers & Roediger, 1984). This proposition, which we might call (after Morris, Bransford, & Franks, 1977; see also, Roediger & Blaxton, 1987; Tulving & Thomson, 1973) ''transfer appropriate emotional processing'' or TAEP, is illustrated by the present studies. Focusing on one's own feelings about various statements (e.g., *Affirmative action is an unfair policy*) made by two speakers either increased or did not affect old/new recognition

but consistently reduced source monitoring accuracy relative to focusing on the speakers' feelings. Focusing on how one feels about the topics presumably induces a self-focused consideration of one's opinions, beliefs, typical behaviors, and autobiographical memories. Such activity would embed the statements in a meaningful network of self-relevant information and should help recognition and recall of the information relative to, say, a task in which fewer meaningful relations are noted or discovered (cf. Craik & Lockhart, 1972; Klein & Loftus, 1988). On the other hand, focusing on how someone else feels about what they are saying presumably should induce perceptual examination of the person speaking for clues about how they feel, reflective reactivation of their demeanor during previous statements for comparison, and reference to evolving perceptual and personality schemas of the speaker. These types of activities should increase the chances that what is being said will become bound to perceptual features or a schematic representation of the speaker. Such bound item and feature information is critical for source monitoring but less so for recognition and recall of the content of what was said.

We also found, however, that source accuracy was not reduced by Self-focus relative to Other-focus if participants focused on their feelings about the speakers instead of their feelings about what the speakers said. Thus, a fairly subtle distinction between focusing on how one feels about the speaker and how one feels about what is said can markedly affect the likelihood of making source confusions in this situation. Again, we suggest that the difference reflects the specific nature of the processing induced in the two cases. Focusing on how one feels about the speaker presumably induces one to develop representations in which statements are bound to perceptual and inferred personality characteristics of the speakers rather than to one's own opinions, self-concept, and autobiographical memories.

The subjective MCQ ratings were generally consistent with the objective measures of source accuracy. Participants in the Other-focus condition reported higher confidence (Experiments 1, 2, and 3) and more detail (Experiment 3) than those in the Self-focus condition. More generally, correct source attributions had, on average, higher confidence and more rated detail. These data also demonstrate that neither true nor false memories are recollected ''all or none''—misattributions, like correct attributions, varied in confidence, with some high confident errors. Presumably, high confidence responses, whether correct or incorrect, reflect the subjective experience of specific detail associated with the semantic content of statements.

Taken together, these experiments begin to explore the potential consequences of emotional focus on memory for content and memory for source. It should be emphasized that we do not claim that affect is unique in its potential impact on source monitoring. That is, variations in the focus of processing that have nothing to do with emotion should have similar effects to what we have shown here, depending on whether the manipulation promotes or detracts from establishing connections among features of complex memories that can later be used to identify the origin of the remembered information. On the other hand, we do propose that variation in cognitive focus associated with emotion is a primary mechanism by which emotion has its impact on source memory and memory in general. That is, emotion may have no direct influence on memory but rather have its impact by influencing those perceptual and reflective processes which establish, revive and reconstruct, and evaluate memories (Johnson, 1983; Johnson & Hirst, 1993; Johnson & Chalfonte, 1994).

For example, when emotion induces perceptual or reflective processing directed at perceptual qualities, then tasks drawing on perceptual representations (Johnson, 1983) should show benefits. When emotion does not induce perceptual processing or detracts from it, then we should not expect benefits on tasks where perceptual information is useful. Thus, just as source monitoring should vary with the nature of the emotional processing, so might

other tasks that depend on perceptual records (e.g., face recognition (Schooler & Engstler-Schooler, 1990) or identifying stimuli under degraded conditions (Jacoby & Dallas, 1981)). When emotion induces reflective processing that produces elaborative organization of events, then tasks, such as recall and recognition, that draw on these reflectively generated representations should show benefits (Johnson, 1983; Johnson & Hirst, 1993). Source identification could be influenced in either positive or negative directions depending on the nature of the elaboration or organization. Particularly interesting, we think, are cases like the one illustrated here in which memory for content benefits from a given type of emotional focus but memory for source is hurt. This situation should be particularly conducive to the formation of false memories, for example, as one tries to imagine what the source of remembered information might have been.

It is also important to emphasize that when emotion induces reflective reactivations of events as they took place, emotion should promote veridical memory. When emotion induces embellishment or distortion of an event, especially combined with repeated rehearsal of the embellishments, imagined events may take on the perceptual and semantic characteristics of real events and result in reality monitoring failures, that is, false memories (e.g., Suengas & Johnson, 1988; Ceci, Crotteau Huffman, Smith, & Loftus, 1994). Likewise, if emotion induces one to avoid thinking about particular events, they should become harder to recover reflectively, less detailed, more dream-like, and more subject to source confusions (Hashtroudi, Johnson, & Chrosniak, 1990; Johnson, 1988b; Suengas & Johnson, 1988). Hence, just as richly detailed false memories may cause one to believe that something happened that was only imagined, poorly detailed or ambiguous real memories can cause a number of types of source misattributions as well. For example, depending on particular circumstances one might believe that something did not happen that actually did, or believe that a memory originated with source A when in fact it originated with source B. Because emotion fuels so much of our cognitive activity, we should not underestimate the extent to which it shapes our memories for events and our opinions and beliefs, both for good and for ill (cf., Johnson & Sherman, 1990).

APPENDIX A

Statements Used in Experiments 1–3 (Listed by Set in Increasing Order of Rated Emotional Intensity)

Speaker A	
Florida is not one of the original thirteen colonies.	1.36
Thomas Jefferson's face is carved into Mount Rushmore.	1.49
Da Vinci's Mona Lisa hangs in the Louvre.	1.52
The Secret Service is in charge of protecting the President.	1.57
Paul Newman is a popular actor.	1.66
I can speak two languages fluently.	1.98
I've never been to Yosemite.	2.16
I usually drink wine with my dinner.	2.16
I'd rather pay with cash than a credit card.	2.23
Classical music is soothing.	2.84
I have lived in only one house my entire life.	3.07
Halloween is becoming a dangerous holiday.	3.41
I love watching electrical storms.	3.73
Carter never got the respect he deserved.	3.77
I have an intense fear of flying.	3.80
I think the United States government has to try to help the situation in Haiti.	3.98
Interracial relationships do not bother me.	4.00
President Clinton has not kept his promises.	4.25
It upsets me when I see animals in cages.	4.55
All politicians are liars.	4.64
Homosexuals should be permitted to serve openly in the military.	4.70
Sometimes women provoke men to violence.	4.84
Everyone has the right to own a handgun.	5.07
Affirmative Action is an unfair policy.	5.14
Pornography should not be protected by the First Amendment.	5.16
Parents should be held accountable for their children's crimes.	5.23
I think executions should be televised.	5.35
Vulgar music should be censored.	5.36
Too many children are having babies.	5.39
Abused children who kill their parents should not be convicted of murder.	5.69
Average rated emotional impact	3.67

Speaker B	
Yogi Berra was a catcher for the New York Yankees.	1.55
The Sistine Chapel is in Rome.	1.73
Picasso painted Guernica.	1.77
Texas originally belonged to Mexico.	1.81
I prefer Coca-Cola over Pepsi.	2.16
President Lincoln was the first President to be assassinated.	2.32
My family income is about average.	2.34
Roller coasters make me nauseous.	2.66
Listening to piano music relaxes me.	2.74
Sad movies make me cry.	2.80
Skiing is a dangerous sport.	2.82
I like unusual foods.	2.84
I like to play with puppies.	3.12
I would like to drive across the country.	3.27
Most holidays have become too commercialized.	3.52
Reporters are harder on President Clinton than on other recent Presidents.	3.55
Congress should stay out of labor disputes in baseball.	3.61
Richard Nixon should have been impeached.	4.14
George Bush should have eliminated Sadam Hussein.	4.37
Dan Quayle will be our next President.	4.51
There is too much violence on T.V.	4.53
Children should never be physically disciplined.	4.80
There are not enough African Americans in management positions.	4.93
I don't see anything wrong with premarital sex.	4.93
Most husbands will forgive infidelity once.	5.07
Juvenile delinquents should be caned for some crimes.	5.16
A gay couple should be able to adopt a child.	5.30
Congress should pass a law prohibiting prayer in the class room.	5.32
I support the death penalty.	5.37
Child molesters should be imprisoned permanently.	5.59
Average rated emotional impact	3.62
New Items	
New York was the first capital of the United States.	1.64
Elizabeth Taylor has been married many times.	1.66
Monet was the Father of Impressionism.	1.77
The Renaissance began in Florence, Italy.	1.82
I grew up on the east coast.	2.18
Chocolate is my weakness.	2.25
I have travelled to Europe several times.	2.27
I'd rather read a good mystery than a romance novel.	2.44
Christmas is a hectic time of year.	2.66
President Kennedy was shot in Dallas.	2.82
I never learned how to swim.	3.09
Enclosed places make me uncomfortable.	3.36
Bill Clinton's health reform will not be passed by a Republican Congress.	3.39
Rock concerts irritate me.	3.59
It bothers me to see a younger man escorting an older woman.	3.67
I love surprises.	3.68
Ronald Reagan was smarter than most people think.	3.91
The President of the United States is the most powerful man in the world.	4.14
I'm against animal testing.	4.27
Family abuse laws should be stronger.	4.49
The United States has an obligation to defend democracy in the world.	4.59
We should only buy American made products.	4.61
The media's image of the ideal woman is too thin.	4.68
Any parent who kills their children must be emotionally unstable.	4.75
Political correctness leads to suppression of free speech.	4.86
Qualified minorities should get some preference in hiring decisions.	5.16
It is wrong for people to be attracted to members of the same sex.	5.20
Mothers should stay home and raise their children.	5.50
I am in favor of abortion.	5.55
Any mother who kills her child should receive capital punishment.	5.75
Average rated emotional impact	3.66

APPENDIX B

Multinomial Model Analyses of Experiments 1, 2, and 3

Because traditional measures of source and item memory have been noted to be confounded under certain circumstances (Murnane & Bayen, in press), a separate analysis of the data using the multinomial-modeling approach (Batchelder & Riefer, 1990; Hu & Batchelder, 1994) was conducted for each of the three experiments. In general, multinomial modeling provides separate and independent measures of source memory (i.e., discriminating between Speaker A or Speaker B statements) and item memory (i.e., discriminating between old and new statements), as well as several other parameters reflecting different response biases.

The data from each experiment were first sorted into 3×3 matrices containing the frequencies with which

TABLE 7

FREQUENCIES OF A, B, AND N RESPONSES TO SPEAKER A, SPEAKER B, AND NEW STATEMENTS BY CONDITION FOR EXPERIMENTS 1, 2, AND 3

	Source Response	Other-focus			Self-focus			Self/speaker-focus		
		A	B	N	A	B	N	A	B	N
Experiment 1	A	501	109	80	369	226	26			
	B	107	523	59	225	396	31			
	N	32	29	628	8	7	634			
Experiment 2	A	863	329	126	670	564	21			
	B	291	890	134	541	708	33			
	N	29	40	1248	12	13	1259			
Experiment 3	A	412	61	34	413	60	64	382	119	39
	B	72	386	39	72	402	51	94	404	36
	N	9	7	494	10	6	520	8	20	512

participants made each source-monitoring response (A, B, or N) to each test-item source (Speaker A, Speaker B, or New). The frequency matrices for each experiment are reported separately for each condition in Table 7.

The frequency matrices were subsequently analyzed using the two-high threshold multinomial model introduced by Bayen, Murnane, and Erdfelder (1996). The analyses were conducted using a computer program for statistical inference for multinomial binary tree models (Hu, 1993). Because source and item memory were not expected to differ with source, we used Model 4 (see Bayen et al., in press, Fig. 4) for all three experiments. In brief, Model 4 assumes that item memory is equivalent for all three sources (i.e., A, B, and N) and generates an overall estimate of item memory by setting the individual item recognition parameters for the three sources equal. Similarly, Model 4 assumes that source memory is equivalent for sources A and B and generates an overall estimate of source memory by setting the individual source memory parameter for both sources equal (see Bayen et al., 1996, for further detail). The goodness of fit of Model 4 for each frequency matrix reported in Table 7 was assessed with log-likelihood ratio tests; the test statistic G^2 is χ^2 distributed with 2 degrees of freedom. The G^2 values obtained for each frequency matrix (see Table 8) ranged between .49 and 3.78, indicating a good fit for Model 4 for each condition across the three experiments.

The parameter estimates of item and source memory for each condition in each of the three experiments are reported in Table 8. The parameter *D* estimates the probability of correctly discriminating old and new items such that higher values of *D* reflect superior old/new recognition. Similarly, the parameter *d* estimates the probability of correctly identifying the source for old items. Again, higher values of *d* reflect superior source memory.

As can be seen in Table 8, the general pattern of results obtained from the two-high threshold multinomial analysis of the frequency matrices is consistent with the results from the ANOVAs conducted on the corrected recognition and source identification measures discussed previously. For Experiments 1 and 2, the value of parameter *D* (old/new discrimination) was higher for the Self-focus condition, and for Experiment 3 there appeared to be no difference for *D* across conditions. In contrast, for Experiments 1 and 2, the value of parameter *d* (source discrimination) was higher for the Other-focus than for the Self-focus. Similarly, for Experiment 3, the value of parameter *d* was higher for the Other-focus and Self/speaker-focus than for the Self-focus condition.

A separate set of analyses were conducted to confirm whether or not the parameter differences identified above were significant. Within the multinomial modeling framework, comparisons between matrices are accomplished by

TABLE 8

ESTIMATES OF *D* (OLD/NEW RECOGNITION), *d* (SOURCE MEMORY), AND *G*2 (GOODNESS-OF-FIT) BY CONDITION FOR EXPERIMENTS 1, 2, AND 3

	Parameter		
	D	*d*	*G2*
Experiment 1			
Other-focus	.81	.72	3.78
Self-focus	.93	.28	.50
Experiment 2			
Other-focus	.85	.51	.97
Self-focus	.96	.11	2.50
Experiment 3			
Other-focus	.90	.74	.49
Self/speaker-focus	.86	.74	1.72
Self-focus	.88	.61	2.76

estimating the parameters for the matrices in a combined analysis. For each matrix, a separate set of parameter values, identical to those calculated in the individual matrix analyses, as well as a new G^2 (goodness-of-fit) are calculated using a combined (i.e., multiple matrix) model. Significant differences are identified by subtracting the G^2 (goodness-of-fit) calculated when the parameters are unrestricted from the G^2 calculated when the parameter of interest is restricted, by setting it equal across matrices (e.g., setting $d_{\text{other}} = d_{\text{self}}$ to contrast source memory parameters). If the difference between the unrestricted G^2 and the restricted G^2 exceeds a critical value, the parameter on which the combined analysis was restricted is significantly different across the matrices. The critical value for comparisons with Experiments 1 and 2 (i.e., across two matrices) is 3.84 (χ^2 (1)) and for Experiment 3 (i.e., across three matrices) is 5.99 (χ^2 (2)).

With respect to old/new item recognition (Table 8), the differences between conditions in *D* were significant for Experiments 1 and 2 (G^2 = 59.87 and 123.66, respectively), confirming that item memory was better with Self-focus than with Other-focus. As also found in our previous analysis of recognition scores, the conditions did not differ in *D* for Experiment 3 (G^2 = 4.22). With respect to source identification, *d* varied significantly as a function of condition for all three experiments (G^2 = 132.47, 191.32, and 17.21, respectively). This confirms that source memory was better with Other-focus than with Self-focus in Experiments 1 and 2 and that source memory was better with both Other-focus and Self/speaker-focus than with Self-focus in Experiment 3 (Table 8).

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