

Aging and the Effects of Affective and Factual Focus on Source Monitoring and Recall

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Pairs of young and elderly Ss participated in a short play and were then instructed to talk about factual or affective aspects of the play or to talk about the play without any particular focus suggested. In both the affective and control condition, older adults' ability to discriminate what they had said from what the other person had said was poorer than that of young adults. In contrast, when induced to focus on the factual content of the events, older Ss' source monitoring improved, and the age difference was reduced. The pattern was similar when Ss' ability to discriminate what they had said from what they had thought was examined. Furthermore, affective focus lowered the overall level of recall for both young and older Ss and led older Ss, in particular, to introduce more elaborations into their recall. The possibility that age differences in remembering content and source are related to type of focus is discussed.

It has been suggested that one characteristic of age-related changes in cognition is that older adults become more reflective and inner oriented (Labouvie-Vief, 1989; Labouvie-Vief & Blanchard-Fields, 1982; Neugarten, 1977). For example, reminiscence may be more frequent or important to the elderly, or their reminiscences may have a more evaluative quality (Butler, 1963; Lieberman & Falk, 1971; Molinari & Reichlin, 1984–1985; but see Romaniuk, 1981; Romaniuk & Romaniuk, 1982). In addition, as age advances, there may be an increase in the importance of personal values and goals (Hasher & Zacks, 1988; Labouvie-Vief, 1982), leading older adults to make greater use of their personal experiences and their thoughts and feelings when they are interpreting presented information. Of particular interest here is whether the type of focus older adults adopt affects memory functioning. The purpose of this article is to examine changes in memory that might result from a more inward-looking mode of thinking that focuses on thoughts and feelings rather than on the more objective aspects of events.

Increased focus on thoughts and emotions could affect both the amount of information remembered and the qualitative characteristics of memories. Hasher and Zacks (1988) suggested that during normal functioning inhibitory mechanisms

in working memory restrict the entrance of irrelevant, nongol-path thoughts and feelings into memory. With aging, however, there may be a breakdown in the efficiency of these inhibitory mechanisms. This inefficient functioning, combined with an increase in the importance of one's values and experiences, may allow entrance into working memory of irrelevant information that may then interfere with the retrieval of objective information. Consistent with this view, older adults are more likely to consider interpretations of prose material that are peripheral to the meaning of the material (Hamm & Hasher, 1992) and to have difficulty in suppressing words that are evoked in the context of a study task but quickly become irrelevant to that task (Hartman & Hasher, 1991). There also is evidence that older adults have trouble ignoring distracting material (Connelly, Hasher, & Zacks, 1991) and that the inability to suppress irrelevant thoughts makes older adults particularly susceptible to competition effects (Gerard, Zacks, Hasher, & Radvansky, 1991). These difficulties can lead to lower comprehension and memory performance in older adults than in young adults.

Differential focus on thoughts and emotions can also affect qualitative characteristics of memories. When recalling stories, young adults adopt a text-based, literal style, whereas older adults emphasize the personal importance of information and adopt a more interpretive and integrative style, which is manifested in elaborations, inferences, and comments about one's own cognitive activities (Adams, 1991; Adams, Labouvie-Vief, Hobart, & Dorosz, 1990; Gould, Trevithick, & Dixon, 1991; Labouvie-Vief & Schell, 1982; Opler, 1980). For example, Adams et al. (1990) demonstrated that under some conditions young subjects were more likely to produce a detailed reproduction of a narrative's content, whereas older adults were more likely to give interpretive responses or to be concerned with moral implications.

In an earlier study (Hashtroudi, Johnson, & Chrosniak, 1990), we investigated the possibility that differential focus on thoughts and feelings may not only affect memory for the content of information but that it may also have consequences for remembering the source of information. According to John-

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son, Hashtroudi, and Lindsay (1993; also see Johnson & Raye, 1981), source attributions are based on the phenomenal qualities of mental experiences. Especially important are the amount and type of perceptual information (e.g., color and sound), spatial-temporal information, meaningful details, information about affective reactions (e.g., feeling frustrated), and information about the cognitive operations by which the memory was established (such as operations involved in hearing or imagining a person speaking). Differences (on average) in qualitative characteristics between memories from different sources can be used as bases for discriminating the origin of a memory.

For example, assuming that memories for perceived events typically contain more thoughts and feelings than do memories for imagined events, the amount of affect in a memory could be used to help identify the origin of a remembered event. However, there is some evidence that focusing on the affective aspects of events in thinking or talking about them later makes external and internal events more alike in the amount of thoughts and feelings they contain (Suengas & Johnson, 1988), which could lead to difficulties in distinguishing between externally and internally derived memories (i.e., "reality monitoring;" Johnson & Raye, 1981). In addition, thinking about affective qualities of events seems to reduce access to perceptual aspects of events (Suengas & Johnson, 1988). Because perceptual information is a salient cue to source (Johnson, Foley, Suengas, & Raye, 1988), reduced access to perceptual information may also decrease source monitoring performance.

Hashtroudi et al. (1990) examined the qualitative characteristics of subjects' memories for perceived and imagined complex events and found evidence suggesting that focusing on thoughts and feelings decreases accuracy of reality monitoring. Subjects either actually engaged in some activities or were asked to imagine themselves engaging in others, guided by a script (activities such as packing a picnic basket and having coffee and cookies). They later rated their memory for the situations, using the Memory Characteristics Questionnaire (MCQ; see Johnson et al., 1988), which is designed to assess various qualitative characteristics of memory (e.g., "How well do you remember the spatial arrangement of objects?" and "How well do you remember how you felt at that time?"). On the MCQ, older subjects reported greater memory for thoughts and feelings experienced at the time of the event. In addition, in subsequent recall of the events, older adults reported more thoughts and feelings and evaluative statements (e.g., "I would have never packed such a sparse picnic basket" and "Everything looked cheap") than did young subjects. In contrast, young subjects reported more colors, spatial references, and actions than did older subjects. These findings support the idea that in remembering events, there may be a trade-off between more objective, or "factual", information and more subjective, evaluative, or affective information.

To examine whether an individual's focus on thoughts and feelings results in source monitoring difficulties, subjects were phoned after a 3-week retention interval and were asked to indicate whether each event (e.g., packing a picnic basket) was perceived or imagined. Older subjects had more difficulty identifying the source of their memories than did young subjects, which suggests that focusing on affective qualities of memories might reduce the accuracy of source monitoring. Additional ev-

idence for this point was provided by an exploratory analysis that we carried out after the data were published (reported in Johnson & Multhaup, 1992). In the rating data, the correlations between subjects' rating of their memories for clarity (a factor largely assessing visual qualities) and the subjects' certainty in the accuracy of their memories was about the same for young (.76) and older (.71) subjects. In contrast, the correlation between the ratings of memory for thoughts and feelings and certainty in accuracy of memory was significantly higher for older subjects (.51) than for young subjects (.35). This pattern suggests that older adults might give greater weight to thoughts and feelings when they are making source monitoring judgments.

The foregoing review suggests that older adults adopt a more evaluative and subjective mode of processing than do young subjects and that this difference in focus may affect the quantity and quality of recall as well as accuracy of performance on a source monitoring test. Furthermore, it suggests that a subjective mode of processing may be detrimental for certain types of memory tests because it decreases the amount of objective or factual processing. However, as has been pointed out by others (e.g., Light, 1991), the evidence reviewed so far is only suggestive, and a direct link between type of focus and quality and quantity of memory has yet to be established. In addition, our conclusions about the relation between focusing on thoughts and feelings and source monitoring performance in our earlier study were tentative, because the performances of both groups were near-perfect and because not all of the subjects were reached by phone. In the present experiment, we directly manipulated the type of focus that young and older subjects adopted when they thought about complex events that occurred earlier, and we examined the consequences of this manipulation on subsequent judgments about the source as well as recall of the content of information.

This study used a new "interactive simulated situations" paradigm. With this technique, pairs of subjects played roles in a short play. The play was about two people who lived together and who met on a subway platform, rode home, entered their apartment, and confronted a problem with the electricity. The director (experimenter) read subjects their lines, indicated whose line each was, and indicated whether the line was to be said aloud or only thought. The actors (subjects) said or thought the lines as indicated by the experimenter. Subjects were then assigned to one of three types of focus conditions: factual focus (talk about what was said during the play), affective focus (talk about your feelings at the time of the play), and no-focus, or control, condition (tell what happened).

We assumed that asking subjects to focus on what was said would induce them to focus on the factual content of the events that had transpired, and in reviewing that, they would be likely to reinstate not only the semantic content of individual statements but also perceptual and contextual features of the events (e.g., how their acting partner looked and sounded or where they were standing while they were speaking a particular line). The association of semantic content with perceptual and contextual detail should later help the subjects to identify the source of a statement. We expected the affective focus instructions to focus the subjects less on information that would allow them to later identify who was speaking various lines and more on the general meaning and affective qualities of the experiences (e.g., that they

had been uncomfortable in the subway or that they had argued with their roommate over the phone bill). Half of the subjects were then given a source monitoring test in which they indicated whether each statement was from the script or was new, and, if it was from the script, whose line it was and whether it had been said aloud or only thought. Another group of subjects recalled all they could from the script.

Our goal in this study was to hold initial encoding conditions constant within age groups and to manipulate how subjects thought about events after the fact. It is likely that one of the most important determinants of the probability and quality of autobiographical memories is the frequency and nature of the mental reviewing people do (cf. Johnson, 1992; Johnson & Chalfonte, in press; Linton, 1978; Rubin & Kozin, 1984; Suenegas & Johnson, 1988). We do not, of course, assume that younger and older subjects initially encode events in the same fashion. In fact, any age differences in the types of information that are most salient to younger and older adults are likely to be present during the encoding, mental review, and test phases of an experiment. Thus, in the present situation, any tendency for a particular rehearsal condition to reduce age differences in memory performance would be particularly persuasive, because it presumably must overcome whatever initial encoding differences there might be between age groups.

We made several predictions regarding the pattern of source monitoring results. If older adults do indeed focus more on feelings and less on objective aspects of events relative to young adults, and if source monitoring performance is related to type of focus, then older adults' performance in the control and affective conditions should be similar to each other. More important, when they are instructed to focus on factual aspects, older adults' performance should improve, and the age difference in source monitoring should be reduced. With respect to recall, as with other studies of recall of textual material (Adams, 1991; Adams et al., 1990), young adults' recall should be text based and literal, whereas older adults' recall should be more interpretive and elaborative. Also of interest is how type of focus affects recall performance. Focusing on affective aspects of the play should produce relatively poor recall of objective information, even by younger subjects. Also of interest was whether a factual focus would improve the amount recalled by older subjects.

Method

Design

The between-subjects design permitted two 2×3 comparisons, in which age (young and older adults) and type of focus (factual, affective, and control) were examined separately for subjects receiving the source monitoring and recall tests. There were 24 subjects in each condition.

Participants

One hundred forty-four young adults and 144 older adults participated in this experiment. The young adults were undergraduates at George Washington University, who received course credit or payment for their participation. The older adults were healthy community-dwelling residents of the Washington, DC area, who were paid for their participation. The subjects reported themselves as being in good health and were apparently free from perceptual difficulties or, if not, had corrected

vision and hearing. The mean age of the young adults was 19.9 years (range = 17–29 years), and the mean age of the older adults was 70.1 years (range = 64–77 years).

The mean number of years of education was 13.8 years ($SD = 0.91$) for the young adults and 15.9 years ($SD = 2.3$) for the older adults. A $2 \times 3 \times 2$ analysis of variance (ANOVA) with age and type of focus (factual, affective, and control) and type of test (source monitoring and recall) revealed a main effect of age, $F(1, 276) = 97.95$, $MS_e = 3.13$, but no effect of type of focus or test type and no interactions among these variables (all F s < 1). Therefore, older adults were more educated than young adults, but years of education did not differ across experimental conditions.

All subjects completed the Vocabulary subtest of the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981). The mean scores were 51.87 ($SD = 6.40$) for the young subjects and 60.67 ($SD = 6.74$) for the older subjects. A $2 \times 3 \times 2$ ANOVA with age, type of focus, and test type as variables revealed a main effect of age, $F(1, 276) = 127.33$, $MS_e = 43.78$, but no effect of type of focus ($F < 1$) or test type, $F(1, 276) = 1.01$. There also were no interactions among these variables. Thus, although the WAIS-R scores were higher for older adults, they were not different across the experimental conditions.

Materials

The experiment used a script of a four-scene play about two people who lived together and who underwent and attempted to resolve four minor conflict scenarios, one in each scene (see the Appendix).

Each scene was situated in a different location (metro [subway] platform, train, living room, and next to a fuse box). A minimal number of props was used, and stage directions were included in the script to establish the physical surroundings for the subjects. The stage directions also served to inform the subjects of factors necessary to maintain continuity of the play's plot. For instance, when the setting changed from the platform to the train, the stage directions informed the subjects of this change and any new arrangements in their respective positions in the testing room (e.g., "The roommates are now in a metro car, seated side by side."). The stage directions were read by the director (the experimenter).

The body of the script consisted of 24 pairs of lines; within each pair one line was said out loud by one of the actors (*said* line) and one was only thought about (*thought* line). The director read each line to the two actors (the subjects) and indicated whose line each was and whether it was to be said aloud or only thought. The line to be said and the line to be thought within each pair was determined in a random fashion. Half of the pairs were said by one actor and half were said by the other actor. Each actor initiated the sequence equally often, and occasionally each actor performed two pairs of lines consecutively. To counterbalance said and thought statements, two versions of the script were designed in which the said and thought statements were switched across subjects; thus, each statement in the script appeared as both a said and a thought line.

The script also contained buffer and filler lines. Both buffers and fillers consisted only of said lines rather than of said-thought pairs. The buffers appeared at the beginning of the script in Scene 1 and at the end of the script in Scene 4, and the fillers appeared at various points throughout the script. The buffers and fillers were not included in the source monitoring test. In each scene, each actor was given three pairs of script lines (said and thought pairs) and one filler statement (said line). In both versions of the script, several types of information were balanced in the body of the script (though not in the buffers, fillers, and stage directions), and these factors were equated across both said and thought lines so that there was an equal number of each factor in both types of lines. Each character made the following number of references to the following types of information in both said and thought lines: seven objects, one item of nonvisual perceptual (i.e., tactile and audi-

tory) information, two items of spatial information, one color, two temporal references, and four items of affective information (i.e., thoughts, feelings, and evaluative statements).

In the source monitoring test, the 48 lines from the script were intermingled with 24 distractors. The distractors were semantically similar to lines from the script (e.g., "We paid it! Here's the receipt!" as a distractor for "We did pay it! The yellow payment stub is missing!"), with 6 distractors constructed for each of the four scenes. The 48 lines and 24 distractors were randomly ordered throughout the test, with the restriction that no more than 3 statements from the script or 3 distractor statements appeared consecutively. We created two random orders of the test; half of the subjects in each condition received each order.

Procedure

Subjects were tested in pairs; both members of each pair were the same sex and of the same age group. All subjects first completed a personal information questionnaire concerning present occupation, education, and general health. They then participated in the play. The experimenter informed the subjects that she would read each line and indicate which person was to perform the line by pointing and that she would state whether it was to be spoken out loud or thought to oneself. The experimenter also stated that all stage directions would be read to the participants but that rather than acting them out the subjects were to merely imagine the changes in the play described by the directions. Subjects were told that the study was designed to examine the degree to which people are comfortable with role playing in small groups. They were not informed of the memory test. To familiarize the subjects with the format for performing in the experimental play, all of the subjects performed a brief practice play.

During the play, the experimenter read each line and waited for the subjects to say it out loud or think about it. The lines were read at a relatively slow rate of about 5 s each; for thought lines, a 5-s interval was provided. The first two scenes of the play (metro platform and train) were conducted in one room, and the next two scenes (living room and next to fuse box) were conducted in another room. Using two rooms allowed us to include some props in each scene without causing significant disruption of the play. For example, two chairs, representing the train seats on which the two roommates were seated, were located in the middle of one of the rooms.

Following the play, subjects were given two rehearsal trials. During the first rehearsal trial, an experimenter asked the subject to discuss various aspects of each scene in the play, and during the second trial the experimenter asked the subject to silently think about these aspects. Having the subjects rehearse aloud permitted us to determine that subjects were following instructions. A second, silent rehearsal was included both to increase the potential power of the focus manipulation (Suengas & Johnson, 1988, found similar effects when subjects talked or only thought about events) and because repeated mental review of recent events (either aloud or to oneself) probably is common in natural contexts. At this stage of the experiment, subjects were tested individually, so two experimenters were required. The second experimenter also was female. A period of 90 s was allotted for rehearsal of each scene for both "talk" and "thought" trials. On each rehearsal trial, subjects were prompted with the name of each scene and a particular aspect of that scene to rehearse.

There were three rehearsal focus conditions. Subjects in the factual focus group were asked to talk and think about what had been said by both actors in each scene (e.g., "Tell me about what you and the other person said during the first scene, when you were standing on the platform."). In the affective focus condition, subjects were prompted to talk about or think about how they felt (as a character) during each scene (e.g., "Tell me about how your character felt during the first scene, when you were standing on the platform."). Subjects in the control condition were asked to discuss or think about anything regarding the play that

they could remember, without being guided by any particular cues (e.g., "Tell me all that happened in the first scene, when you were standing on the platform."). The overt rehearsals of the first few subjects in all conditions were recorded and reviewed to verify that the instructions were clear and that subjects in the factual and apperceptive conditions were focusing on different aspects of the events, which they were. Because of a miscommunication with the assistant testing the subjects, the rehearsal protocols were not retained for most of the subjects. Although the subsequent source monitoring and recall data were the main interest of the study, it would have been interesting to examine the content of the rehearsals, especially in the control condition.

Immediately after rehearsal, half of the subjects received a surprise source monitoring test, in which individual statements from the play were presented as well as semantically related distractors. Under each item of the test, there appeared five alternatives from which subjects were asked to indicate the item's source: "I said," "I thought," "she/he said," "she/he thought," and "new." Subjects were told that some of the lines were taken directly from the script and that some were not from the script. They were asked to circle one of the five alternatives.

The other half of the subjects were given the name of each scene and were asked to rate their memory for that scene. Ratings were made with 36 questions from the MCQ used by Johnson et al. (1988). For all items on the MCQ, the subjects responded by circling a number on a 7-point scale (e.g., "My memory for this event involves: *little or no visual detail* [1] to *a lot of visual detail* [7], "I remember how I felt at the time the event took place: *not at all* [1] to *clearly* [7]). Subjects were then given a test booklet containing four blank pages, with the name of each scene (e.g., "In the Living Room") written at the top of each sheet and were instructed to write all they could remember about each scene. The rating data did not add any information beyond what can be seen in the recall data, so only the recall data are reported here.

Following the test phase, we administered the WAIS-R to the subjects.

Results

Source Monitoring Scores

Source monitoring scores are shown in Table 1. We computed two types of source monitoring scores: self-said versus other-said (self-other), and self-said versus self-thought (said-thought).¹ To obtain self-other scores for each subject, the total number of "I said" and "she or he said" statements attributed to the correct source was divided by the total number of the two types of statements correctly identified as old. These scores indicate whether subjects attributed to the correct source (self or other) items spoken aloud that they could identify as old. To obtain said-thought scores, the total number of "I said" and "I thought" statements attributed to the correct source was divided by the total number of the two types of statements correctly identified as old.

It should be noted that in addition to these two types of scores, one could obtain other types of source monitoring scores, such as correctly identifying what one actor (self) thought from what another actor thought or the total number of correct attributions for the four types of statements (i.e., I said, I thought, she or he said, and she or he thought). Here, however, we focus on two discriminations that were particularly interesting theoretically and that we and others have previously

¹ These are analogous to say-listen and say-think conditions, respectively, in other studies (Foley, Johnson, & Raye, 1983; Hashtroudi, Johnson, & Chrosniak, 1989).

Table 1
Source Monitoring Scores of Young and Older Adults for the Three Focus Conditions

Type of source monitoring	Young			Older		
	Control	Factual	Affective	Control	Factual	Affective
Self-other						
<i>M</i>	0.74	0.72	0.71	0.54	0.68	0.60
<i>SD</i>	0.10	0.12	0.16	0.22	0.13	0.14
Said-thought						
<i>M</i>	0.61	0.65	0.64	0.35	0.47	0.40
<i>SD</i>	0.16	0.12	0.14	0.14	0.13	0.14

investigated, using other paradigms.² The significance level was .05 for all the statistical tests reported in this article, unless otherwise specified.

Self-other. To examine whether there were any differences between Scripts 1 and 2, which counterbalanced said and thought statements, a 2 (age) \times 3 (type of focus) \times 2 (script) ANOVA was first conducted on the self-other source monitoring scores. There was no main effect of script, but there was a significant interaction of script and age, $F(1, 132) = 4.97$, $MS_e = 0.022$. Analysis of the simple effects of this interaction showed that for older adults, there was no difference in performance between the two scripts ($F < 1.00$), whereas for young subjects, performance was higher with Script 1 than with Script 2, $F(1, 132) = 8.74$. Because there were no interactions between script and type of focus, $F(2, 132) = 1.30$, and no three-way interaction ($F < 1.00$), we collapsed the data across the two scripts.

A 2 \times 3 ANOVA with age and type of focus revealed that there was no main effect of type of focus, $F(2, 138) = 2.27$, $MS_e = 0.022$, but that older adults' source monitoring performance was lower than that of young adults, $F(1, 138) = 21.35$. In addition, the interaction of age and type of focus was significant, $F(2, 138) = 3.90$. Subsequent analyses of each age group revealed no significant differences among the three focus groups for young subjects ($F < 1.00$); instructions to focus on either factual or affective aspects of events did not change young subjects' performance relative to the control condition. In contrast, type of focus significantly affected older subjects' performance, $F(2, 138) = 5.80$, $MS_e = .022$. Newman-Keuls tests showed that instructions to focus on factual aspects of events (.68) improved older adults' performance relative to the control condition (.54). The affective focus group (.60) did not differ significantly from either the factual or the control condition.

Further comparison of young and older subjects' performance at each focus condition showed that older adults' source monitoring performance was lower than that of the young adults in both the control condition (.74 and .54 for young and older subjects, respectively), $F(1, 138) = 21.35$, $MS_e = 0.024$, and the affective focus condition (.71 and .60 for young and older subjects, respectively), $F(1, 138) = 7.29$, $MS_e = 0.024$. However, the age difference in source monitoring was eliminated when older adults were instructed to talk about factual aspects of events (.68 for older subjects vs. .72 for young subjects), $F < 1.00$.

Taken together, these results suggest that young subjects' per-

formance was not affected by type of focus. In contrast, for older subjects, type of focus mattered. In the absence of instructions, older adults' source monitoring performance was lower than that of young subjects. However, focusing on factual aspects of events improved older subjects' source monitoring scores relative to the control condition and, in fact, eliminated the age difference in source monitoring. Furthermore, the finding that the scores of older subjects did not differ in the affective and control conditions is consistent with the idea that in the absence of instructions, under typical conditions, older adults may focus on subjective aspects of events.

Said-thought. These scores are also shown in Table 1. A 2 (age) \times 3 (type of focus) \times 2 (Script 1 vs. Script 2) ANOVA revealed no main effect of script and no interactions of script with age or with type of focus; therefore, we collapsed the data across the scripts. A 2 \times 3 ANOVA with age and type of focus showed a main effect of age, $F(1, 138) = 92.15$, $MS_e = 0.020$, and a main effect of type of focus, $F(2, 138) = 3.46$. Older adults had lower scores than young adults (this was the case for each condition individually as well); in addition, Newman-Keuls tests showed that, when the data were collapsed across the two age groups, performance was higher in the factual focus condition than in the control condition. There was no interaction between age and focus condition ($F < 1.00$). Nevertheless, further comparison of each age group's performance showed that, as in self-other source monitoring, type of focus did not affect young subjects' performance ($F < 1.00$), but for older subjects, the main effect of condition was significant, $F(2, 138) = 3.96$, $MS_e = 0.020$. Newman-Keuls tests showed that older adults' performance in the factual focus condition (.47) was significantly higher than performance in the control condition (.35). As with self-other source monitoring, the affective focus (.40) condition

² Although other people's thoughts are normally not available to us and source monitoring involving items thought by the other actor were not central to our main focus, there was one interesting finding worth noting. Across focus conditions, there was an interaction between speaker (self vs. other) and age, $F(1, 138) = 4.38$, $MS_e = 0.046$. Young subjects were about equally good at discriminating what they said from what they thought (.63) and at discriminating what the other actor said from what the other actor thought (.64), whereas older subjects were poorer at discriminating said items from thought items of their own (.41) than of the other actor (.46). This finding is consistent with the idea that older subjects may have particular difficulty discriminating what they say from what they think.

did not differ from either control or factual focus conditions. Unlike self-other source monitoring performance, although instructions to focus on factual aspects of events significantly improved older adults' performance relative to the control condition, it did not eliminate the age difference in said-thought source monitoring. These comparisons within each age group are only suggestive, because the interaction of age and condition was not significant; however, the general pattern was similar to that found for the self-other analysis.

Overall, the self-other and said-thought source monitoring results indicate that for older subjects, focusing on affective aspects of events produced source monitoring scores that were similar to those obtained when no particular focus was suggested. More important, focusing on factual aspects improved source monitoring in older adults. For young adults, type of focus did not affect source monitoring performance, suggesting that perhaps young subjects used the same basis for source decisions in all three conditions.

Old-New Recognition

Recognition scores refer to the subjects' ability to discriminate "old" items (statements in the script) from "new" items (distractors), without regard for correct identification of source. These scores include all four types of old statements (i.e., I said, I thought, she said, and she thought). Table 2 shows the proportion of hits, false positives (FP; new items mistakenly judged to be from one of the four types of old statements), corrected recognition scores (hits minus false positives), and d' scores. A 2×3 ANOVA on corrected recognition and on d' scores with age and type of focus as variables showed only a significant main effect of age, $F(1, 138) = 13.26$, $MS_e = 0.020$, and $F(1, 138) = 7.75$, $MS_e = 0.461$, for corrected recognition and d' , respectively. (There were no differences among conditions in d' or corrected recognition when each age group was analyzed separately.)

Overall, these results show that older adults had a lower level of recognition performance than did young adults. It is noteworthy that recognition performance seemed to be independent of source monitoring performance. The type of focus subjects

adopted had different effects on source monitoring performance of young and older adults but did not affect either group's recognition performance.

Recall

There were 288 protocols for older subjects (four scenes of the play for 72 subjects) and 288 protocols for young subjects. As with our earlier procedure (Hashtroudi et al., 1990), recall protocols were evaluated according to the following categories: how often subjects mentioned colors, objects, actions (e.g., "entered" and "turned on"), people (e.g., "he," "she," "Jamie," and "company"), nonvisual sensory information (e.g., "hot," "stifling"), spatial references (e.g., "next to" and "across"), places (e.g., Cleveland and Miami), temporal references (e.g., "tomorrow" and "a minute"), feelings (e.g., irritated), thoughts (e.g., "I bet the escalator on the right will be less crowded"), evaluative statements (e.g., "the electric company's record keeping is ridiculous"), and intrusions (e.g., referring to red apples instead of green apples).

To detect differences between young and older adults in the recall of text-based versus interpretive or elaborative information, recalled information was classified into two categories: information recalled directly from the script (script information) and "recalled" information that was not stated in the script but was clearly related to it (nonscript information). Information from the script did not necessarily have to be recalled word for word; close approximations were accepted. Examples of nonscript elaborations are "There was trust and friendship between the two" (thought), "I was relieved that she didn't scold me . . ." (feeling), "The grocery plans seemed ordinary and routine" (evaluative statement), and "A black box [nonscript color] opened to show two long vertical [nonscript spatial] rows of fuses."

To check the reliability of scoring, a second judge scored a random sample of data for 8 young and 8 older subjects, for a total of 64 protocols (four scenes for each subject). The reliability scores as measured by Cohen's K (Cohen, 1960) were computed separately for each scoring category and ranged from .67

Table 2
Recognition Scores of Young and Older Adults for the Three Focus Conditions

Measure	Young			Older		
	Control	Factual	Affective	Control	Factual	Affective
Hits (H)						
<i>M</i>	0.86	0.84	0.81	0.88	0.83	0.80
<i>SD</i>	0.07	0.07	0.10	0.07	0.11	0.10
False positives (FP)						
<i>M</i>	0.11	0.10	0.09	0.24	0.15	0.18
<i>SD</i>	0.09	0.07	0.07	0.17	0.14	0.12
H-FP						
<i>M</i>	0.74	0.73	0.72	0.63	0.68	0.63
<i>SD</i>	0.11	0.10	0.11	0.17	0.17	0.16
d'						
<i>M</i>	2.45	2.42	2.41	2.09	2.24	1.90
<i>SD</i>	0.53	0.58	0.57	0.73	0.77	0.63

(for nonscript temporal information) to 1.00 (for both script and nonscript colors, sensory information, and places).

The data were first analyzed separately for each coding category. Second, each subject was given two composite scores: one for recall of objective information and one for recall of subjective information. The objective score was the total of colors, objects, actions, people, sensory, spatial, temporal, and places, and the subjective score was the total of feelings, thoughts, and evaluative statements. Because the general pattern is clear from the second set of analyses using the composite scores (shown in Table 3), only the findings from these scores are described.

Recall of script information. The mean recall scores for objective and subjective information from the script are shown in Table 3. There was a main effect of age; young subjects recalled more script information than did older subjects, $F(1, 138) = 16.54$, $MS_e = 6.70$. There also was a main effect of condition, $F(2, 138) = 9.65$. A Newman-Keuls test showed that subjects' recall was lower in the affective condition (8.95) than in the control (11.84) or factual conditions (11.75). The finding that recall was lower in the affective condition than in the other two conditions constitutes the first direct evidence that focusing on affective information significantly reduces recall. There also was a significant Condition \times Type of Information interaction, $F(2, 138) = 10.62$, $MS_e = 3.24$; the decrement in recall from affective focus was larger for objective than for subjective information. In addition, there was a significant interaction of Age \times Type of Information, $F(1, 138) = 19.59$; the difference between older and young subjects was greater on objective than on subjective aspects of the script. In interpreting these two interactions, however, it should be kept in mind that the scripts contained much more objective than subjective information, thus there was less opportunity to observe age or condition differences on subjective information from the script.

"Recall" of nonscript-elaborative information. The mean number of items subjects produced that were not in the script but were inferences and elaborations from the script are shown in Table 3. There was a main effect of condition, $F(2, 138) = 12.22$, $MS_e = 7.64$, and a Condition \times Type of Information interaction, $F(2, 138) = 3.85$, $MS_e = 1.19$. In general, the affective condition produced more "recall" of nonscript information; and in the affective condition, subjects elaborated the

script information almost as much subjectively as they did objectively, whereas in the control and factual conditions, they tended to make relatively more objective than subjective elaborations. More important, there was an Age \times Condition interaction, $F(2, 138) = 3.09$, $MS_e = 7.64$. The increase in "recall" of nonscript information with affective focus was particularly true for older subjects. In fact, whereas the older subjects produced more nonscript ideas in the affective condition than did young subjects, $F(1, 138) = 6.87$, $MS_e = 7.64$, the two age groups did not differ in the control and factual focus conditions. This finding is a striking demonstration that when they focus on affective aspects of information, older subjects produce more items that they consider to be relevant to the presented information, or they do not distinguish this type of information from information that was actually presented.

Proportion of subjective and proportion of elaborative recall. Table 4 presents the recall data in Table 3 expressed as proportions of the total number of items produced. First, instructions affected the proportion of the total protocol that was subjective, $F(2, 138) = 29.38$, $MS_e = .005$; a higher proportion of the subjects' protocol was subjective in the affective condition than in the other two conditions, for both age groups. Interestingly, there was no overall main effect of age, although there was a tendency for the older subjects (.28) compared with the younger subjects (.23) to have a higher proportion of subjective information in the affective condition, $F(1, 46) = 2.89$, $MS_e = .009$, $p < .10$. The instructions also affected the proportion of the total protocol that consisted of elaborative information, $F(2, 138) = 26.24$, $MS_e = .023$; for both age groups, more elaborative information was given in the affective than in the other two conditions. There also was a main effect of age, $F(1, 138) = 6.53$; older subjects produced a higher proportion of elaborative information (.35 vs. .28). Although age did not interact with condition, as Table 4 shows, the difference between older and younger subjects was largest in the affective condition.

Overall, the results of the recall data produced several salient and interesting findings. First, older subjects recalled less script information than did young subjects. Second, it appears that focusing on affective information substantially reduced recall of script information for both age groups. Third, older adults produced more nonscript-elaborative information than did

Table 3
Recall of Objective and Subjective Information for Young and Older Adults

Type of information	Young				Older			
	Control	Factual	Affective	<i>M</i>	Control	Factual	Affective	<i>M</i>
Recall of script information								
Objective <i>M</i>	12.20	11.41	9.02	10.88	9.05	9.76	7.27	8.69
<i>SD</i>	3.28	2.01	3.23		2.84	2.56	4.06	
Subjective <i>M</i>	1.34	1.45	0.85	1.21	1.09	0.88	0.76	0.91
<i>SD</i>	0.91	0.78	0.53		0.67	0.65	0.82	
"Recall" of nonscript-elaborative information								
Objective <i>M</i>	2.92	2.78	3.26	2.99	2.43	2.53	4.75	3.24
<i>SD</i>	1.59	2.33	1.86		1.43	1.58	4.06	
Subjective <i>M</i>	1.65	1.35	2.79	1.93	1.51	1.31	4.26	2.36
<i>SD</i>	1.12	1.52	1.91		0.92	0.89	3.41	

Note. "Recalled" information was that information not stated in the script but clearly related to it.

Table 4
Proportion of Total Recall Protocol That Was Subjective or Nonscript-Elaborative

Protocol	Young			Older		
	Control	Factual	Affective	Control	Factual	Affective
Subjective						
<i>M</i>	0.16	0.16	0.23	0.18	0.15	0.28
<i>SD</i>	0.04	0.05	0.10	0.06	0.05	0.10
Elaborative						
<i>M</i>	0.25	0.22	0.38	0.28	0.26	0.51
<i>SD</i>	0.12	0.12	0.20	0.11	0.13	0.21

young adults as a proportion of their total recall, especially when they focused on affective aspects of the event. Together, the results demonstrate that type of focus affects the quantity as well as the quality of memories for young and older adults.

General Discussion

Subjects participated as actors in a short play and then reviewed events under either factual focus, affective focus, or control (no focus) conditions. The subjects were then asked either to identify the origin of statements from the play or to recall what they could about the four scenes in the play. The factual focus instructions were designed to induce subjects to revive memories of the statements as spoken by the actors (i.e., semantic content along with perceptual and contextual information). In contrast, the affective focus instructions were intended to produce a less externally based, more inward-directed orientation toward reviewing the events in the play.

We reasoned that there are at least two ways by which focusing on affective aspects of events might be less useful for later source decisions than focusing on factual aspects of events might be. First, affective reactions may not be as effective cues to source as are other aspects of an experience, such as perceptual or contextual detail (Johnson et al., 1988). For example, sometimes a person might be nearly as upset about an imagined or anticipated slight as about one that actually occurred or might be equally upset about the origin of an insulting remark, whether it was made by Bill or Joe, making source monitoring on the basis of the amount or type of affective information in a memory difficult. Alternatively, focusing on affective reactions could affect source monitoring performance if there were a trade-off between more objective, externally derived information and more subjective information; for example, focusing on affective information may reduce access to perceptual information (Suengas & Johnson, 1988). To the extent that perceptual information is an effective cue for source monitoring (Ferguson, Hashtroudi, & Johnson, 1992; Johnson et al., 1988), a trade-off between affective and perceptual information may reduce source monitoring accuracy.

We further reasoned that age differences in memory could arise from a change in the mode of information processing. Older subjects may make greater use of their personal experiences and feelings when processing information and may be less able than young adults to suppress this somewhat peripheral information in situations where it is not particularly relevant or

helpful (Hasher & Zacks, 1988). (Of course, they may be at some advantage in other situations; e.g., Labouvie-Vief, 1989.) The trade-off between more objective and more subjective information may lead to difficulties in remembering the source and content of information. In addition, if, as has been suggested by other researchers (Craik & McDowd, 1987; Craik & Simon, 1980; Hasher & Zacks, 1979), older adults also have more limited processing resources than young adults, a trade-off between, for example, perceptual and affective information would have a far greater impact on older subjects' source monitoring performance than on that of young subjects.

With respect to source monitoring, the main finding was that older adults' accuracy in identifying the origin of statements they said or that the other actor said improved when they were asked to think about the factual aspects of the play, reducing their deficit in source monitoring relative to young adults. A similar pattern was observed for scores reflecting subjects' ability to discriminate between what they had said and what they had thought. The results suggest that after an experience, older subjects may engage in less reactivation (e.g., Johnson, 1992; Johnson & Chalfonte, in press) of the factual or objective aspects of the experience, which may in turn account in part for their deficits in source monitoring. Presumably, a factual focus results in the retention of more perceptual and contextual as well as semantic information that can be used to identify the origin of memories.

Whether this relative lack of factual processing is caused by or accompanied by an increase in affective processing is not entirely clear from the present data. Because the source monitoring scores of older subjects did not differ significantly in control and affective conditions, and the control and factual conditions did differ, the results are (statistically speaking) consistent with the idea that older subjects' processing when no focus is suggested is more similar to the processing of the affective group than that of the factual group. However, this is not a strong conclusion. First, the source monitoring scores of the older subjects in the affective group fell between those of subjects in the control and factual conditions and did not differ significantly from either of those conditions. Second, the recall data provided only weak independent confirming evidence—older subjects did show a greater proportion of elaborative recall, but the difference between older and young adults was not significant in the control condition alone. In any event, the finding that the age difference in source monitoring was reduced in the factual focus

condition provides good evidence that the age deficit in source monitoring is related to the type of focus older subjects adopt.

In addition to source monitoring, this study allowed us to compare recall of older and young subjects for a complex event in which subjects were actively engaged. As with more standard word list and prose materials, older adults recalled less than did young adults. Our results also provide evidence that aging affects not only the quantity of memory but also its qualitative characteristics. In accordance with previous findings (Adams, 1991; Adams et al., 1990; Gould et al., 1991) young adults appeared to adopt a text-based focus, whereas older subjects adopted a more interpretive style. That is, young subjects recalled more script information than did older subjects, and older subjects tended to produce more nonscript information. This was particularly true when the subjects adopted an affective focus.

However, contrary to what we might have expected on the basis of findings discussed in the introduction (e.g., Hashtroudi et al., 1990), in the control condition, the protocols of older subjects included only a slightly greater proportion of subjective or elaborative information than did the protocols of younger subjects. Consistent with the control condition results, Multhaup (1992) found that the distribution of various types of information included in autobiographical reports (e.g., when subjects described a time with a friend or a vacation) were strikingly similar for older and young adults. Multhaup suggested that young and older adults may have similar ideas about what constitutes an appropriate report of an autobiographical experience to a stranger. In contrast, in our affective condition, older adults' protocols did have a higher proportion of subjective ($p < .10$) and elaborative (nonscript) information. Thus, whether differences in qualitative characteristics of the recall of older and young adults are observed may critically depend on features of the experimental situation that subtly or not so subtly communicate to subjects what is appropriate or expected.

Assuming that under some conditions, as in our affective group, older subjects do indeed show greater elaborative recall than do young subjects, affective or subjective processing may be a consequence rather than a cause of their poorer recall; that is, elaboration may be an adaptation to having difficulty with a task such as recall (Salthouse, 1991, p. 198). In the present experiment, instructions to focus on affective information "invited" subjects to elaborate during the rehearsal phase; older subjects may have been more likely to do so again at the test phase as well, perhaps because they remembered less information from the play itself. Alternatively, older subjects may typically process in a more subjective or elaborative manner but edit out the resulting elaborations under some circumstances but not others. Thus, inviting subjects to report affective responses may reveal a higher incidence of elaborative processing in older adults that is in fact characteristic of them but is not necessarily demonstrated under ordinary testing conditions, in which accurate recall is stressed.

The fact that relative to the control condition the factual focus instructions did not improve recognition or recall in either age group suggests that the benefit the older subjects derived from factual focus in source monitoring was not simply from greater attention to the semantic content of individual statements in the play. Simply rehearsing semantic content would be

expected to help subjects distinguish old from new statements in recognition tasks, and, perhaps, to help them recall statements from the play. However, memory for content is not sufficient to identify source. For example, old-new recognition can be quite high when source monitoring is very poor (e.g., Kahan & Johnson, 1990). Thus, it seems reasonable to assume that the benefit the older subjects derived from the factual focus was that in reviewing what was said, they also reactivated aspects of the event that would help them identify who said what. That is, reviewing the events may have helped them "bind" perceptual and contextual features to the semantic content of statements (e.g., Johnson & Chalfonte, in press). Evidently, the young subjects' processing resulted in about the same level of attribute binding in the control and affective conditions as in the factual focus condition.

Interestingly, relative to their respective controls, both age groups were hurt in recall by the affective focus instructions. One interpretation of this finding is that focusing on affective reactions disrupts the kind of organizational activity or relational processing that is beneficial for recall. Organization is critical for recall but typically is less important for recognition (e.g., McCormack, 1972). Given the type of script used here, where both speakers made similar statements relevant to any particular topic, organization by topic might actually hurt source monitoring as well. In principle, then, focusing on affect would be bad for source monitoring when it took processing away from the aspects of events that might specify source and would be bad for recall when it took processing away from aspects of events that allow one to set up organizational structures for subsequent retrieval of the events. Of course, sometimes the processing that is good for source monitoring and recall will be the same; for example, understanding the semantic structure of a debate would allow one to recall both the debate and to identify which speaker made a particular point. In other situations, the kind of semantic relations that would promote recall could be detrimental for source monitoring. For example, in recalling a conversation with a close collaborator, it is often easy to recreate the line of the argument developed but hard to specify who contributed which statements (e.g., see Johnson, Raye, Foley, & Foley, 1981; Lindsay, Johnson, & Kwon, 1991).

In summary, although we reserve judgment about the spontaneous incidence of affective and elaborative processing in older adults until a greater range of conditions is investigated (see also Multhaup, 1992), our results clearly show that an affective focus when reviewing events can reduce the absolute level of accurate recall in both younger and older adults and that older adults' deficit in source monitoring is lessened when they focus on factual aspects of events. Thus, our data are generally consistent with the idea that at least some of the deficit in recall and source monitoring in older adults may arise from the processing focus they adopt.

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(Appendix follows on next page)

Appendix

Script Used in Experiment

Paying the Bills

Scene 1: On the Platform

The two roommates, having met after work, are traveling home together. They are standing together, waiting for their train, a bit irritated from the summer's heat and a long work day.

P2 [say] I wonder how long the train will be.

P1 [say] It should be here soon. It's rush hour.

P1 [say] We need to go grocery shopping sometime soon.

[think] The green apples looked good last week. Let's get some.

P2 [think] We can stop at the supermarket on the way home.

[say] Maybe we should get some red peppers and tomatoes.

The conversation fades as they both stare down the tunnel in anticipation of their train. Something then catches one of the roommate's attention.

P2 [say] That looks like Jamie. I'll be right back.

P1 [say] All right, but make it quick.

One of the roommates goes off to talk with Jamie. The other remains alone at the platform for a little while. Then . . .

P1 [say] Where have you been?!

[think] We could have missed our train!

P2 [say] I was just talking to Jamie! Take it easy!

[think] Calm down! I was only gone a minute!

P1 [say] You're just in time, here it comes now!

[think] I hope this is our train.

P2 [say] But this isn't it.

[think] This train's going to Huntington.

Scene 2: On the Train

The roommates are now in a metro car, seated side by side.

P2 [think] It's so hot in here I can hardly breathe.

[say] I'm burning up. The air conditioning must be broken.

P1 [think] It's stifling in this car. I can't wait to get off.

[say] A few more stops in this heat and I'm going to melt.

P2 [say] I almost forgot, we got the phone bill today.

P1 [say] Let's just divide it in half.

P2 [think] I'm not paying for all those calls to Miami!

[say] Did you have to call Miami every other day?!

P1 [think] But what about the month before?!

[say] I didn't complain when you made all of those calls to Cleveland!

P1 [think] Why don't we discuss this at home?

[say] We're here. We need to change trains on the opposite platform.

P2 [say] Yes. I bet the escalator on the right will be less crowded.

[think] We'll get back to this later.

Scene 3: In the Living Room

The roommates enter the apartment they share. The first thing they do is try to turn on the television set, a habit they picked up long ago. To their surprise the television does not turn on. They then try to turn on the stereo, and it too does not turn on. They sit next to each other on the couch.

P1 [say] Didn't we leave the lamp next to the couch on?

[think] Nothing's working. The power's out.

P2 [say] That's strange, the lights across the street are working.

[think] It can't be a blackout.

P1 [say] Maybe we forgot to pay the electricity bill.

P2 [say] But I could have sworn the bill was paid.

They then look through a pile of bills that is lying on the coffee table and . . .

P2 [think] We did pay it! The yellow payment stub is missing!

[say] The electric company's record keeping is ridiculous!

P1 [say] They messed up again?!

[think] This day has been unbelievable!

The roommates take a moment to contemplate their predicament.

Then . . .

P2 [say] Wait a minute, let's not jump to conclusions.

[think] Maybe the power in the building is off.

P1 [think] We should check our fuses.

[say] Perhaps we blew a fuse today.

Scene 4: At the Fuse Box

The roommates carefully make their way to the fuse box, which is in the hallway. They are standing side by side, looking directly into the fuse box.

P2 [say] Let's see, which fuse is it?

[think] Is it this top one on the right?

P1 [think] It's the bottom one on the left.

[say] Let's label these things.

P1 [say] Ah . . . Here it is.

[think] I can't see any problems.

P2 [say] It's okay. Now what do we do?

[think] What's going on around here?

Once again, the roommates contemplate for a moment. Then . . .

P1 [think] We have company tomorrow and we can't even vacuum!

[say] The rug is so dirty you can't see the blue anymore!

P2 [say] This couldn't have happened at a worse time!

[think] We won't be able to clean this place up tonight!

P2 [say] And how are we going to cook dinner?

P1 [say] Maybe we should just eat out.

P2 [say] Let's do that. Let's have Italian food.

P1 [say] You know, this isn't so bad after all.

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