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Phenomenal characteristics of autobiographical memories for emotional and neutral events in older and younger adults.

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Abstract

We investigated age-related differences in phenomenal characteristics of autobiographical memories for positive, negative, and neutral events. Younger and older participants were asked to recall two specific memories of each type and then to rate their memories on several sensorial (e.g., visual, taste) and contextual (e.g., location, time) characteristics. We found that emotional (both positive and negative) memories contained more sensorial and contextual details than neutral memories in both age groups, whereas positive and negative memories did not differ on most dimensions. In addition, negative memories were associated with a higher intensity of positive feelings and a reduced complexity of storyline in older as compared to younger adults. These results suggest that the effect of emotion on phenomenal characteristics of autobiographical memories is similar in younger and older adults, but that older adults tend to reappraise negative events in a more positive light than younger adults.

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Certain types of events can be remembered with considerable detail whereas memories for other events are rather vague. These former events can be mentally "re-experienced" and the memories associated contain a substantial amount of contextual, sensorial, and affective details such as memories of the people who were present, the actions they did, the color of their clothes, the location of different objects, the feelings we had at the time, etc. These qualitative (or phenomenal) aspects of memory (e.g., the amount of sensorial details, the clarity of location and time memory) and the subjective experience that accompanies recollection are essential aspects of autobiographical memory and their importance have been increasingly emphasized in recent developments of memory research (Brewer, 1996; Gardiner & Richardson-Klavhen, 2000; Wheeler, Stuss, & Tulving, 1997). It is indeed these phenomenal details that give the rememberer the feeling that a particular mental representation is a memory for an event that belongs to her/his personal past instead of a mental representation of an event only imagined or other kind of representation such as semantic knowledge or beliefs (Johnson, Hashtroudi, & Lindsay, 1993).

Several findings indicate that the emotional meaning of the remembered events can influence the phenomenal characteristics of memories. For instance, we found in a recent study that autobiographical memories for positive events contained more sensorial (i.e., visual, odours, taste) and contextual (i.e., location, time) details than memories for negative and neutral events, whereas negative and neutral memories contained a similar level of details (D'Argembeau, Comblain, & Van der Linden, 2003).

Destun and Kuiper (1999) also found that memories for pleasant events were more detailed than memories for stressful events. Similarly, Larsen (1998) showed that the visual, auditory, olfactory-gustatory, tactile, and somato-kinaesthetic details were more vivid for positive than for negative memories and Raspotnig (1997) found that the imagery associated with positive memories was reported as being more colorful, sharper in focus, and more vivid than the imagery associated with negative memories. These differences in memory for positive as compared to negative events are consistent with the so-called Pollyanna principle, which states that people process pleasant information more accurately and efficiently than unpleasant information (Matlin & Stang, 1978). However, a recent study suggests that characteristics of autobiographical memories such as vividness and specificity are more consistently predicted by emotional intensity of the events rather than their valence (Talarico, LaBar, & Rubin, in press). Whatever it may be, the studies mentioned above indicate that the emotional meaning of an event (whether it is due to its emotional intensity or its valence) can influence the way this event will subsequently be experienced in memory.

Relatively little is known about age-related differences in phenomenal characteristics of autobiographical memories and, to the best of our knowledge, none of the studies that focused on qualitative components of memories in aging examined memories for emotional experiences. Hashtroudi, Johnson, and Chrosniak (1990) examined memory for perceived and imagined events in older and younger adults with a procedure in which everyday situations were simulated in the laboratory. Participants perceived some everyday situations in which they actually participated (e.g., to pack a picnic basket) or were asked to imagine these situations (e.g., imagine that you are preparing to go on a picnic). They were then unexpectedly asked to rate some characteristics of their memory for half of these situations with the Memory

Characteristics Questionnaire (MCQ; Johnson, Foley, Suengas, & Raye, 1988). The next day, participants were once again asked to rate their memories on the MCQ (this time for all the situations), and then they had to recall all they could remember about each situation. No age-differences were observed for the initial and the second ratings of both perceived and imagined events concerning the sensorial and contextual details. However, older subjects reported more thoughts and feelings than did the younger subjects during the second ratings. In contrast, on the recall test, contextual (such as color, objects and spatial references) and non-visual sensory information were less well remembered by older than younger participants. Therefore, older adults had some difficulty in remembering specific perceptual and contextual (i.e., spatial) information despite giving similar ratings for these aspects of their memories. This pattern of data is mirrored by older adults' impairment at retrieving contextual details associated with stimuli such as words or pictures (Chalfonte & Johnson, 1996; Spencer & Ratz, 1995) and at experiencing conscious remembering of these stimuli (Clarys, Insingrini, & Gana, 2002; Parkin & Walter, 1992; Perfect & Dasgupta, 1997). However, most of these studies dealt with neutral stimuli, leaving unresolved the issue of whether phenomenal characteristics of emotional memories are also affected by aging.

Contrary to most aspects of cognitive functioning, emotional processes appear rather unscathed by aging (see Isaacowitz, Charles, & Carstensen, 2000, for review). Emotional well-being remains stable or even is enhanced with age. Indeed, several studies have found that positive affect remains mostly constant across the lifespan whereas the frequency and duration of negative emotions decrease with age (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Charles, Reynolds, & Gatz, 2001). There is also evidence that the ability to regulate emotions improves with age. Older adults report being better able to control their emotions than younger adults (Carstensen

et al., 2000; Gross et al., 1997), and it seems that this increased ability to regulate emotions for older adults relies more on antecedent-focused strategies, such as reappraising an event to alter its emotional impact, than on response-focused strategies, such as suppressing the expression of an emotion (Carstensen, Gross, & Fung, 1998). According to socioemotional selectivity theory, the increasing effectiveness of emotion regulation results from the increasing salience of emotional goals as people approach the end of life (Carstensen, Isaacowitz, & Charles, 1999). This theory posits that changes in emotional goals influence information processing styles over the life span, with information-gathering being of higher priority for younger adults, and emotion regulation and the creation of emotional meaning being more important for older adults (Carstensen et al., 1999). For instance, older adults prefer to spend time with emotionally meaningful social partners (Fung, Carstensen, & Lutz, 1999) and they emphasize emotional dimensions more than other personal dimensions in their mental representations of social partners (Frederickson & Carstensen, 1990).

An enhanced motivation in older adults to process emotionally significant information could make the age-related decline in memory less pronounced or may even eliminate it for emotional as compared to neutral stimuli. Consistent with this proposition, Carstensen and Turk-Charles (1994) found, in a study of prose recall, that although older adults remembered less neutral content than young adults, both age groups recalled equivalent amounts of emotional material. More recently, Kensinger, Brierley, Medford, Growdon, and Corkin (2002) also found that young and older adults showed similar memory enhancement effects for emotional words or pictures, as compared to neutral items (see also Denburg, Buchanan, Tranel, & Adolphs, 2003). In addition, Rahhal, May, and Hasher (2002) reported two studies in which age differences in memory were robust for perceptual source material but were negligible for affective

or value-based source information. Taken together, these findings strongly suggest that age-related decline in memory may vary according to the emotional salience of the to-be-remembered information.

In addition, other studies suggest that memory may become more emotionally gratifying with age, with aging being associated with a shift toward favoring positive rather than negative information in memory (see Mather, 2004 for review). For instance, Charles, Mather, and Carstensen (2003) found that aging was associated with a higher decrease in memory for negative pictures, as compared to positive and neutral pictures. However, this effect has not been observed in other studies (Denburg et al., 2003; Kensinger et al., 2002). Recently, Kennedy, Mather, and Carstensen (2004) asked 300 nuns aged between 47 and 102 years to complete a questionnaire in which they had to remember their responses to a questionnaire they had completed 14 years earlier about their health practices and medical history. In accordance with the idea that older adults are more motivated than younger adults to remember their past in emotionally satisfying ways, the authors found that older adults showed a positive bias when remembering their past health practice and illnesses, whereas middle-aged adults showed a negative bias. Other studies also indicate that older adults recall negative emotions less intensely (Levine & Bluck, 1997) and remember past choices more positively (Mather & Johnson, 2000) than younger adults.

Reviewing these and other studies concerning emotional memory in aging, Mather (2004) identified two major hypotheses concerning how the impact of emotion on memory may differ between older and younger adults: the *emotional compensation hypothesis*, which states that well-maintained emotional processes can help older adults remember information they otherwise would have forgotten, and the *goal-directed emotional memory hypothesis*, which states that memory should become more

emotionally gratifying with age, as older adults focus on regulating emotion more than younger adults. As the studies we mentioned above indicate, there is evidence consistant with both hypotheses. However, the majority of these studies used experimental stimuli such as words or pictures, leaving unresolved the issue of whether these two hypotheses can account for age-related differences in memory for more personally meaningful events (i.e., autobiographical memory). This issue was examined in the present study by asking older and younger adults to retrieve memories for positive, negative, and neutral autobiographical events and to rate the sensorial and contextual characteristics of their memories.

Method

Participants

Forty younger participants (19 women and 21 men, *M* age = 22.1, range= 17-31) and forty older adults (19 women and 21 men, *M* age = 63.5, range = 59-71) participated in this experiment. The younger adults were undergraduate students at the University of Liège. Older adults were in good health and were free from sensory difficulties or had corrected vision or hearing. All subjects completed the Mill-Hill vocabulary test (French translation by Deltour, 1993) and the Beck Depression Inventory (BDI; Beck, Rush, Shaw, & Emery, 1979). Mill-Hill and BDI scores were slightly higher for older than for younger participants, $t(2, 78) = 2.87$, $p < .05$, and $t(2, 78) = 2.06$, $p < .05$, respectively. However, the scores obtained for the BDI reflected an absence of depression in both groups. The mean scores for age, years of education, BDI and Mill Hill for the total sample are presented in Table 1

-Table 1 about here-

Materials

Instructions

Participants filled in a questionnaire which asked them to recall six personal experiences that had occurred within the past 5 years and that were at least 6 months old: two that were positive or pleasant, two that were negative or unpleasant, and two that were neutral regarding their emotional content. The events recalled had to be specific (i.e., they had to have occurred in a specific place and time and they had to have lasted several minutes or hours but not more than a day). To illustrate what could be a positive, a negative, or a neutral event, the instructions provided some examples. However, the instructions clearly indicated that participants were not limited to using only these examples. For positive and negative events, participants had to choose the most intense if several events came to their mind. This was done in order to sample events that were highly contrasted with regard to their emotional meaning. For each event, participants were asked to think about that event for two or three minutes and to try remembering it as clearly as possible before going on to the next part of the questionnaire.

Ratings of memories

Participants were first invited to describe in a few words the content of the retrieved event. They were nonetheless free to skip this question. This was done in order to prevent a change of memory if participants judged it would have been embarrassing to report it. Participants then rated their memories on sixteen dimensions drawn from the Memory Characteristics Questionnaire (MCQ; Johnson et al., 1988). These ratings were made with 7-point scales. Memories were rated for vividness (1 = vague, 7 = very vivid), amount of details (1 = not at all detailed, 7 = very detailed), visual details (1 = none, 7 = a lot), odors (1 = none, 7 = a lot), taste (1 = none, 7 = a lot), clarity of location

memory (1 = not at all clear, 7 = very clear), clarity of spatial disposition of objects (1 = not at all clear, 7 = very clear) and persons (1 = not at all clear, 7 = very clear), clarity of memory for the moment when the event occurred (1 = not at all clear, 7 = very clear), familiarity of the general setting (1= not at all familiar, 7 = very familiar), complexity of storyline (1 = simple, 7 = complex), intensity of positive (1 = none, 7 = very intense) and negative (1 = none, 7 = very intense) feelings when the event occurred, personal importance of the event (1= not important at all, 7 = very important), amount of rehearsal by thinking (1 = not at all, 7 = very often) and talking (1 = not at all, 7 = very often) about the event. Participants were also asked to report the approximate age of the memories retrieved, by choosing among six different propositions (between six months and one year; between one year and eighteen months; between eighteen months and two years; between two and three years; between three and four years; between four and five years). Participants were debriefed concerning the purpose of the experiment at the end of the session.

Questionnaire construction

The first page of the questionnaire informed participants that the experiment concerned the recall of personal events, that it was anonymous, and that they were free to withdraw from the experiment at any time. The instructions for each event participants had to remember were given on one page, and the two pages following these instructions contained the sixteen memory characteristics ratings. Participants recalled one event of each type (positive, negative, neutral) first and then another event of each type. Thirty-six versions of the questionnaire were constructed by systematically varying the order of recall for positive, negative, and neutral events (six possibilities for the first three memories X six possibilities for the second three memories).

Results

Memory characteristics ratings

The mean ratings for each memory characteristic are presented in Table 2 as a function of age and event type. A 2 X 3 multivariate analysis of variance (MANOVA) was conducted to assess the effects of age (young, old) and event type (positive, negative, neutral) on memory characteristics ratings. Age was a between-subjects factor and event type a within-subject factor. This MANOVA revealed a number of significant multivariate and univariate effects.

-Table 2 about here-

The main effect of age was significant at the multivariate level, $\Lambda(16, 63) = 0.64$, $p < .05$, and was significant for four characteristics at the univariate level. Memories were rated as being more vivid ($M = 6.07$ vs $M = 5.44$), $F(1, 78) = 12.94$, $p < .01$, and as containing more details ($M = 5.25$ vs $M = 4.84$), $F(1, 78) = 9.52$, $p < .01$, for older as compared to younger participants. Memory for the moment when the events occurred was also clearer for older than for younger participants ($M = 5.87$ vs $M = 5.22$), $F(1, 78) = 10.22$, $p < .01$. In contrast, the events were rated as being more complex for younger than for older adults ($M = 2.77$ vs $M = 2.26$), $F(1, 78) = 3.85$, $p = .05$. There were no age differences for the other memory characteristics[1].

The main effect of event type was significant at the multivariate level, $\Lambda(32, 47) = 0.038$, $p < .0001$, and was significant for all the characteristics at the univariate level (all ps $< .05$), except for familiarity of the general setting ($p = .30$). To find differences among the three types of events, a series of planned comparisons was computed ($p < .05$). Memories of positive and negative events were more vivid and were more detailed than memories of neutral events, whereas positive and negative memories did not differ. With regard to sensorial details, positive and negative

memories contained more visual details than neutral ones. Positive and negative memories were not different. For odors, positive memories received higher ratings than did negative and neutral memories, and negative memories received equivalent ratings as neutral ones. For taste, positive memories received higher ratings than did negative and neutral ones, and negative memories received lower ratings than neutral ones.

With regard to clarity of location memory and clarity of time memory, there were no differences between positive and negative memories, and both of them received higher ratings than neutral ones. Spatial location of objects and people was more clearly remembered for positive and negative memories than for neutral ones, with no differences between positive and negative memories. The storyline was rated as more complex for negative than for positive and neutral events, and positive events were rated as more complex than neutral ones.

With regard to emotional feelings, positive events encompassed more intense positive feelings than both negative and neutral events, and neutral events encompassed more intense positive feelings than negative ones. Negative events encompassed more intense negative feelings than both positive and neutral events, and positive events encompassed less intense negative feelings than neutral ones. For personal importance of the events and the frequency with which participants thought about them, positive and negative events received higher ratings than neutral events, and negative events higher ratings than positive ones. Participants also rated that they talked more often about positive and negative events than about neutral ones, with no differences between positive and negative events.

Finally, the MANOVA indicated a significant group by event type interaction, $\Lambda(32, 47) = 0.38$, $p < .01$, and this interaction was significant for four characteristics at the univariate level (see Table 2 for F and p values). These characteristics were

vividness of the memory, clarity of memory for the moment when the event occurred, complexity of the storyline, and intensity of positive emotions. Planned comparisons ($p < .05$) indicated that older participants had more vivid memories than younger participants for negative and neutral but not for positive events. Older participants also gave higher ratings than younger participants for clarity of time memory of neutral but not of positive and negative events. Negative events contained more intense positive feelings for older than for younger participants whereas this was not the case for positive and neutral events. Finally, younger adults rated the storyline of negative, but not of positive or neutral, events as more complex than older adults.

Age of the memories

Because the age of the retrieved memories were distributed as a function of rank (see Table 3), nonparametric statistical procedures were used. Univariate analyses of variance (ANOVAs) were computed to rate the effect of event type and of age group on the age of the retrieved memories which encompassed six levels (between 6 months and one year; between one year and eighteen months; between eighteen months and two years; between two and three years; between three and four years; between four and five years). A Friedman test revealed that event type had a significant effect on rank means, $\chi^2(2, N = 80) = 33.93$ $p < .0001$. Post-hoc analyses indicated two significant effects ($p < .05$): positive and negative memories were both rated as older than neutral memories. Mann-Whitney *U* tests indicated that older and younger participants did not differ in the age of the memories they retrieved, $U = 766.5$, $p = .74$ for positive memories, $U = 769$, $p = .76$ for negative memories, and $U = 795$, $p = .96$ for neutral memories.

-Table 3 about here-

Discussion

The purpose of the present study was to explore age-related differences in phenomenal characteristics of memories for positive, negative, and neutral events. We found that memories for positive events were not qualitatively different between younger and older adults. In contrast, negative memories were associated with a higher intensity of positive feelings and a reduced complexity of storyline in older as compared to younger adults. These results could be seen as cues of better emotion regulation processes in the elderly. As a major goal in later years is to regulate emotions and to create an emotionally meaningful life story (Carstensen et al., 1999), older people may have a greater tendency to reappraise their past by focusing on the positive aspects of negative events. Gross et al.'s (1997) findings that older adults adopt increasingly effective antecedent-focused emotional regulation strategies (i.e., strategies that attempt to prevent the development of emotion, such as reappraisal of the stimuli) compared to younger adults are consistent with this assumption. Furthermore, a study reported by Folkman, Lazarus, Pimley, and Novacek (1987) indicates that, as compared to younger adults, older adults use more positive reappraisal of stressful events in order to neutralize their impact. The present finding that negative events were rated as containing more positive emotions in older adults further suggests that these kinds of reapprasail strategies may affect the way older people remember their past, with older adults reconstructing negative past experiences in a more positive light. This is consistent with Kennedy et al.'s (2004) finding that older adults have a positive biais when remembering their past health practice and illnesses, and both studies support the view that memory becomes more emotionally gratifying with age (i.e., the goal-directed emotional memory hypothesis; Mather, 2004). Contrary to older adults, a major goal of younger adults is to learn new information about the social and physical world

(Carstensen et al., 1999). The finding that younger adults' memories of negative events have more complex storylines may reflect these age-related differences in information processing. Indeed, younger adults may extract more information from negative events (including information that may be perceived as contradictory, as is often the case in events that involve complex social interactions) in order to handle these kinds of events better in the future, and consequently they may remember these events in a more complex manner than older adults.

The greater vividness for negative and neutral memories in older adults that was observed in the present study is an unexpected finding, although a greater vividness of autobiographical memories in aging has already been reported in a previous study by Cohen and Faulkner (1988). In that study, participants aged between 20 and 87 years had to retrieve six of their most vivid memories. They were asked to give a brief description of the remembered event and to rate it as a function of different dimensions such as importance, vividness, and emotionality. The results showed that older adults rated their memories as more vivid than the young and middle-aged participants. Furthermore, contrary to the younger participants, remote memories of older adults were not significantly less vivid than recent memories. Cohen (1998) argued that these results may be due to the fact that memories were self-selected (i.e., participants were allowed to choose which memories to report). When this is the case, the memories people select for report would tend to be those that are particularly accessible, vivid, and significant, thereby reducing age-related differences in memory vividness. By contrast, memories would be less detailed for older than younger adults when the events to be recalled are designated by the experimenter (i.e., when participants are asked to recall a specific event like the birth of a sibling for instance). In the present study, the memories recalled were self-selected by participants (i.e., participants could retrieve any memories

provided that they belonged to a specific life period and were associated with a particular emotional content). Thus, older adults may have selected personal memories that would have been highly accessible, vivid, and important for their self-concept, therefore masking an age-related decline in memory vividness that would have appeared for memories that are less important. Some studies investigated age-related differences in memory for emotional events that were designated by the experimenter (i.e., flashbulb memories; Brown & Kulik, 1977) but the results are equivocal. Cohen, Conway, and Maylor (1994) found that flashbulb memories of older adults were associated with a loss of detail and accuracy. By contrast, Davidson and Glisky (2002) reported that flashbulb memories were retained to an equivalent degree among younger and older adults over time. These divergent findings may be due to differences in the emotional meaning of the event for the rememberer. Emotional memories that are less important for the individual's life story may be more likely associated with a loss of details over time in older than in younger adults. In future studies, it would be interesting to vary the method that is used to elicit autobiographical memories (i.e., self-selected vs experimenter-designated) as well as the importance of these memories for the life story in order to clarify these issues.

The present finding that older adults reported a higher clarity for the memory of the moment when neutral events occurred could be due to differences in life experiences of both groups of participants. Given that older adults should have experienced more neutral events than younger adults because of their age, one could argue that the moment when the event took place is a more important reference mark for the elderly than for younger adults because of their longer life. Key questions such as the moment when the event occurred would be more likely to take place automatically in the reconstructive process of retrieving autobiographical memory in older adults because it

would allow to rapidly place the event within a certain period of their lifetime. Therefore, the memories for the moment when the events occurred may be more often accessed and hence rehearsed by older than by younger participants.

With regard to the influence of emotion on phenomenal characteristics of autobiographical memories, we found that emotional (positive and negative) memories received higher ratings than neutral ones for most of the characteristics and both for older and younger adults. These findings are consistent with the idea that emotional events tend to be more elaborated during encoding and subsequently more often rehearsed by social sharing and thoughts (Ochsner & Schacter, 2000), and they further indicates that this effect of emotion is similar in younger and older adults. Contrary to previous studies (D'Argembeau et al., 2003; Destun & Kuiper, 1999), positive memories were overall not more detailed than negative memories in the present study, except for taste and odors. A potential explanation for the failure to find some differences in phenomenal characteristics of positive and negative memories could come from the age of the retrieved memories. In previous studies focusing on autobiographical memories for positive and negative events, the remembered events were very recent: they had to have occurred within the last month (Destun & Kuiper, 1999) or within the last year (D'Argembeau et al., 2003). In contrast, the events recalled in the present study were more remote: they ranged from 6 months to 5 years. Ross and Wilson (2000) proposed that an essential function of the self is to evaluate past information in order to enhance current views of the self. According to these authors, retrospective evaluation of the self in the past depends on the perceived temporal distance between present and past selves. People should generally evaluate a temporally close past self favorably (especially on currently important attributes) because people experience close selves similarly to current ones. In contrast, people may be more

inclined to depreciate more distant selves because characteristics of these past selves are less important for current self-views and because people can see themselves as improving when evaluating themselves negatively in the distant past. This perceived temporal distance between present and past selves may have interacted with the retrieval of autobiographical memories for positive and negative events and this may explain contradictory findings between previous studies and the present one. Positive and negative events that were sampled in previous studies (D'Argembeau et al., 2003; Destun & Kuiper, 1999) were recent (involved a temporally close self) and consequently the negative events remembered in those studies tended to have important implications for the current self and risked tarnishing current self-views. Accordingly, it may be that autobiographical knowledge about these recent past negative events was inhibited by the self during retrieval, rendering memories for those events less detailed than memories for positive events (D'Argembeau et al., 2003). In contrast, negative events that were sampled in the present study were more distant and, consequently, were probably less threatening for current self-views. Accordingly, the construction of detailed memories for these negative events would not have been inhibited in the same way as more recent negative self-knowledge and this could explain why negative memories were not less detailed than positive memories in the present study. It would be interesting to test the influence of the remoteness of positive and negative memories on their phenomenal characteristics in order to clarify this issue.

In summary, the present study investigated phenomenal characteristics of autobiographical memories for positive, negative, and neutral events in older and younger adults. The influence of emotion on sensorial and contextual details of the memories was similar in both age groups, with emotional memories (both positive and negative) receiving higher ratings than neutral memories. For negative memories,

however, older adults rated the events as containing more positive feelings and as being less complex than younger adults. These latter findings may reflect age-related differences in processing goals, with older adults being more motivated to regulate their emotions thus making them reappraise negative events in a more positive light.

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Footnotes

[1] The power (1-beta) to detect a "medium" size difference (d = .50; Cohen, 1988) between younger and older adults was .72 with an alpha level of .05. When alpha was raised to .10, power was .83, which is satisfactory according to Cohen's suggestion to use beta = .20 (i.e., power of .80). Even in this case, there were no age differences (all ps > .11), suggesting that the absence of differences between younger and older adults was not due to a lack of power.

Table 1. *General Characteristics of Younger and Older Adults*

	Younger		Older	
Characteristic	*M*	*SD*	*M*	*SD*
Mean age (years)	22.1	3.36	63.5	2.76
Education	15.3	2.89	14.5	2.26
BDI	3.0	2.86	4.6	4.09
MILL HILL	24.9	4.58	27.6	4.04

Table 2. *Means for the MCQ ratings as a Function of Event Type (Positive, Negative, Neutral) and Age Group (Old, Young), and Fs values for the Interaction Between these Two Factors*

	Positive		Negative		Neutral		Univariate *F*s	
MCQ	Old	Young	Old	Young	Old	Young	*F*(2, 156)	*p* =
Vividness	6.27	6.00	6.45	5.97	5.48	4.36	5.25	**.006**
Amount of details	5.88	5.31	6.05	5.15	4.63	4.06	0.74	.48
Visual details	6.07	6.20	5.86	6.00	5.47	5.30	0.57	.56
Odors	3.21	3.27	2.17	2.13	2.41	2.38	0.03	.96
Taste	3.17	2.65	1.17	1.30	1.53	1.57	1.83	.16
Location	6.52	6.58	6.61	6.46	6.28	6.23	0.35	.70
Objects	5.51	5.31	5.45	4.92	4.78	4.60	0.48	.61
Persons	5.45	5.05	5.78	5.23	4.42	4.28	0.56	.56
Time	6.03	5.80	6.22	5.71	5.37	4.16	4.48	**.01**
Setting	4.20	4.35	4.73	4.60	4.81	4.23	1.02	.36
Storyline	2.08	2.50	2.66	4.13	2.03	1.66	11.67	**.0001**
Positive feelings	6.15	6.52	2.13	1.51	3.02	2.76	3.14	**.04**
Negative feelings	1.56	1.42	6.17	6.26	2.05	1.80	0.51	.59
Personal importance	6.00	6.06	6.56	6.13	3.03	2.60	1.21	.29
Thinking	5.25	5.27	5.96	5.80	2.42	1.92	1.14	.32
Talking	4.53	4.67	4.77	4.38	2.22	1.91	1.03	.35

Table 3. *Number of Memories Retrieved by Younger and Older Participants as a Function of Event Type (Positive, Negative, Neutral) and Age of the Memory*

	Older			Younger		
Age of the memories	Positive	Negative	Neutral	Positive	Negative	Neutral
Six month-one year	31	22	40	25	19	41
One year – eighteen months	9	10	14	17	15	15
Eighteen months - two years	11	11	8	16	6	7
Two years- three years	13	16	12	9	17	11
Three years-four years	8	7	2	6	9	5
Four years-five years	8	14	4	7	14	1