

CHARACTERISTICS OF POSITIVE AUTOBIOGRAPHICAL MEMORIES IN ADULTHOOD

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ABSTRACT

The characteristics of positive autobiographical memory narratives were examined in younger and older adults. Narratives were content-coded for the extent to which they contained indicators of affect, sensory imagery, and cognition. Affect was additionally assessed through self-report. Young adults expressed more positive affect and less sensory imagery in their memory narratives than did older adults. Age differences in cognitive characteristics also appeared: younger adults showed greater causation-insight, and greater tentativeness in retelling their autobiographical memories. Controlling for episodic memory ability eliminated age differences in positive affect but did not affect age differences on other memory characteristics. Results are discussed in terms of the role that positive autobiographical memories play in daily emotional life across adulthood.

INTRODUCTION

The primary aim of the study is to assess the characteristics of positive autobiographical memories in young and older adults. Most previous research has examined age differences in memory performance (i.e., completeness and

accuracy), but little research has focused on how the characteristics of older and younger adults' autobiographical memories differ. A secondary aim was to examine whether obtained differences in memory characteristics might be accounted for by age differences in vocabulary or episodic memory ability, as these may be important components of producing an autobiographical narrative. The importance of positive autobiographical memories across the lifespan is reviewed and the potential for adult age differences in characteristics of positive memories is outlined.

The Importance of Positive Autobiographical Memories Across the Lifespan

Positive life events and experiences are often fondly recalled across one's lifetime. Experiencing positive affect is a hallmark of well-being at any age (e.g., Diener, Suh, & Lucas, 1999) and has been linked to better mental and physical health (Danner, Snowdon, & Friesen, 2001) as well as to cognitive creativity and flexibility (Fredrickson & Losada, 2005). Reminiscing with others about positive events allows both older and younger adults to re-experience positive affect (Alea & Bluck, 2008). In fact, the autobiographical memory system appears to operate partially to maintain positive mood (Bluck & Alea, 2002; Wood & Conway, 2006). Recalling and sharing positive memories plays a role in guiding future plans (Levine & Safer, 2002) and regulating emotional well-being. For example, Pasupathi (2003) has shown that dyadic conversations about past events retain their original positive emotional qualities, but that negative emotion is less evident in retelling an event than in originally experiencing it. Note that this effect is, however, dependent on whether individuals have a goal of mood-regulation and are engaged with a supportive listener. Positive memories are more frequent when people look back across their entire lifespan (Rubin & Berntsen, 2003) and generally retain their emotional quality to a greater degree than negative memories (cf. Levine & Bluck, 2004; Walker, Skowronski, & Thompson, 2003). Thus, remembering and sharing memories of positive events is an integral part of everyday life that may contribute to well-being across the lifespan.

Though much of the memory literature focuses on performance, some research has examined experiential aspects (e.g., affect) of autobiographical memory through self-reports (D'Argembeau, Comblain, & Van der Linden, 2003; Larsen, 1998) or narrative content-coding (Alea, Bluck, & Semegon, 2004). Such studies have compared the characteristics of differently valenced autobiographical events, or autobiographical versus imagined events. As opposed to comparing the characteristics of various types of autobiographical events (e.g., positive versus negative events; see Talarico, LaBar, & Rubin, 2004), the present research focuses on mapping age differences in the affective, sensory, and cognitive characteristics of positive autobiographical memories.

Age Differences in the Characteristics of Positive Autobiographical Memories

Lawton's (2001) theory of emotion regulation postulates that in later life adults regulate affect toward minimizing the negative and maximizing the positive (even more so than younger adults). This has been labeled the *positivity effect* (e.g., Carstensen & Charles, 2003). For example, older adults self-report experiencing more positive affect than younger adults over the past month (Mroczek & Kolarz, 1998) and over the past year (Kunzmann, Little, & Smith, 2000). Other studies, however, have found no age differences in the self-reported frequency of positive affect (e.g., Pasupathi, 2003) and no age bias in recall of positive information (Alea et al., 2004; Grühn, Smith, & Baltes, 2005). Thus, while there is some evidence that older adults recall and experience positive affect with greater frequency, this positivity effect does not always manifest across tasks. Examining the extent of positive affect expressed in specific positive autobiographical memories is one avenue for exploring the generalizability of the positivity effect.

Some previous work has specifically explored autobiographical memories. For example, one study showed that older adults self-rate their negative memories as containing more positive affect but there were no age differences in affective ratings of positive events (Comblain, D'Argembeau, & Van der Linden, 2005; see Schlagman, Shulz, & Kvavilashvili, 2006 for a similar result). Studies specifically examining autobiographical memories do not show a clear positivity effect (see also Gross, Carstensen, Pasupathi, Tsai, Göttestam Skorpen, & Hsu, 1997). The positivity effect is sometimes found for memory for fictional stories (Carstensen & Charles, 2003), however, and recent work using the experience sampling method suggests that older adults self-report greater positive affect during mutual reminiscing with close others about positive events (Pasupathi & Carstensen, 2003). A large scale analysis found that age was related to more frequent use of positive emotion words and less use of negative emotion words when talking or writing generally about traumatic/emotional and everyday events (Pennebaker & Stone, 2003). In sum, though several studies have indeed found a positivity effect using a variety of methods, it remains unclear whether a positivity effect for older adults should be evident in recalling individual autobiographical episodes. Theorists have also provided alternative conceptualizations of affect in later life, suggesting that affective experience is qualitatively different, but not necessarily more positive in later life (Labouvie-Vief & Medler, 2002). The current study addresses the positivity effect by examining whether there are age differences in the levels of positive affect expressed in positive autobiographical memories, and also sensory imagery and cognitive characteristics.

Age differences in sensory imagery in autobiographical memory have been little studied (but see Comblain et al., 2005; no age differences). In terms of the cognitive characteristics of memories, the cognitive aging literature suggests that

older adults exhibit cognitive decrements when performing non-contextualized tasks (Zacks, Hasher, & Li, 2000). Older adults perform more poorly than younger adults in recalling fictional narrative texts (e.g., Holland & Rabbit, 1990), suggesting that their autobiographical narratives might also show decline. Though some research suggests that individuals in midlife and beyond (Pasupathi & Mansour, 2006) may engage in greater *autobiographical reasoning* (connecting events to one's life story; Bluck & Habermas, 2001), this would not necessarily result in greater cognitive language use in retelling an individual autobiographical event. Thus, in the current research we examined cognitive characteristics of older adults' positive autobiographical memory narratives with the expectation that older adults' memories would show fewer cognitive characteristics.

In order to follow up any differences identified in the characteristics of older and younger adults' positive memories, two cognitive abilities conceptually related to the production of autobiographical memories were assessed. The classic aging pattern (Schaie, 1994) suggests that older adults show better performance than younger adults on crystallized ability tasks such as vocabulary, and poorer performance on fluid ability tasks such as episodic recall. Note that these two specific abilities (i.e., verbal ability, episodic memory ability) are also crucial components in recall and production of an autobiographical narrative. The individual must first recall an event and then express it in words. Thus, while other cognitive abilities may also be related to production of autobiographical memory narratives (e.g., reasoning ability, executive functioning), episodic memory and verbal ability can be expected to play a clear and central role in memory narrative production. Thus, these two cognitive abilities were examined in the study because: (a) they are expected to vary with age, and (b) they should be related to production of autobiographical memory narratives.

The Current Study

Given the importance of positive autobiographical memories in maintaining well-being across the lifespan, and the lack of attention to the characteristics of such memories in the literature, the current study was designed to examine age differences in the characteristics of positive autobiographical memories. The specific memory characteristics to be investigated were chosen based on theory. Theoretical work outlining the components of autobiographical memory (e.g., Larsen, 1998; Pillemer, 1998) converges to suggest that affect, cognitive-structure, and sensory-imaginal quality are three important aspects of autobiographical memories. The study thus focuses on examining these three characteristics.

To avoid some of the biases inherent in self-ratings (Levine & Safer, 2002), and to increase ecological validity, the study relied largely on analysis of open-ended narratives. Older and younger participants shared autobiographical

memories of positive events to an interested listener. Standard measures of vocabulary and episodic memory ability were also administered.

Research Aims

The primary aim of the research was to examine age differences in the affective, sensory, and cognitive characteristics of positive autobiographical memory narratives. While some literature suggests that autobiographical memories should show a positivity effect (i.e., older adults memories will contain more reference to positive affect) previous data do not entirely support that claim. Thus, the current research extends the literature by examining whether the positivity effect is apparent in recall of individual episodic autobiographical memories.

Since little literature exists on sensory qualities, the examination of age differences in sensory characteristics of autobiographical memory is exploratory. In terms of the cognitive variables, older adults are hypothesized to show lower levels of cognitive structure (causation-insight, as well as tentativeness) in their autobiographical narratives due to the effortful nature of producing such memories and their declines on similar tasks.

The second aim of the research was to examine the role of vocabulary and episodic memory ability. To our knowledge, no research thus far has examined these cognitive abilities that may underpin the characteristics of positive autobiographical memory narratives. If any age differences are found with regard to the characteristics of positive autobiographical memories (as per Aim 1), we hypothesize that such differences will be eliminated when controlling for vocabulary and episodic memory ability. In particular, episodic memory ability is expected to be related to cognitive and sensory characteristics of autobiographical memories since expression of these characteristics may depend on being able to recall an event well and clearly. We also explored whether cognitive abilities such as vocabulary and episodic memory might be related to the level of positive affect expressed in the narrative.

METHOD

Participants

There were 65 young and old men and women in the study. Young adults ($n = 32$; 16 men and 16 women) ranged from 21 to 39 years old ($M = 27.81$; $SD = 4.49$), and older adults ($n = 33$; 17 men and 16 women) ranged from 64 to 86 years old ($M = 74.33$; $SD = 6.07$). Young adults had an average of 17.38 ($SD = 1.20$) years of education, and older adults 16.41 years ($SD = 3.79$), $t(62) = 1.28$, $p > .05$. On a Likert-scale ranging from 1 (*very good*) to 6 (*very poor*; Maddox, 1962), both age groups reported being in “good” to “very good” health in relation to their same-aged peers (young $M = 1.84$, $SD = .72$; old $M = 1.67$, $SD = .74$), $t(63) = .98$, $p > .05$. All participants spoke fluent English. Younger adults were graduate

students or the spouses of graduate students. If married, only one member of the couple was invited to participate. They were recruited through campus list serves for graduate programs and from on-campus graduate housing and were compensated with \$10 U.S. Older adults were recruited through fliers and talks at community organizations, such as the local senior centers, clubs, churches, and synagogues. They were all living independently in the community. Older participants were screened for cognitive impairment prior to participation with the Adult Lifestyles and Function Interview Mini-Mental State Examination (ALFI-MMSE; Roccafort, Burke, Bayer, & Wengel, 1992), and a list of medications associated with memory impairment was also used to exclude older adults from participation. Older adults with sensory deficits (e.g., vision or hearing) were asked to bring their aids to the research study. They were not compensated. As would be expected, there was a difference by age group in terms of age of participants at time of remembered events, $t(63) = 8.33, p < .05$. Young adults reported being on average 24.16 ($SD = 4.21$) years old and older adults' remembered event occurred when they were 46.07 ($SD = 14.29$) years old, on average.

Procedure

The sessions took place in a comfortable interview room and lasted about 90 minutes. To control for the possibility that characteristics of the listener would influence what was shared (Alea & Bluck, 2003), all interviewers were trained, young, females. Interviewers followed a script so that responsiveness was controlled across sessions: interviewers responded to participants with interested eye contact and facial expressions, but no verbal responses.

Participants answered background questionnaires, followed by the episodic memory and vocabulary tasks, and were then asked to remember and share autobiographical memories. Participants remembered two positive autobiographical events: a vacation and a romantic evening. The order of remembering events was counterbalanced: there were no order effects for the dependent variables (i.e., affective, sensory imagery, and cognitive characteristics), Wilks' Λ , $F(7, 59) = 1.46, p > .05$. There were also no differences in these characteristics across the two remembered events. Thus, the data for the two events were combined. The memory portion of the sessions was audio taped and transcribed verbatim.

Participants were given two minutes to recall and think about a positive memory about a vacation/romantic evening that they had experienced. Specifically, they were asked to "think about a vacation/romantic evening that you had. . . . During this time try to remember where you were, what you did, and what you were thinking and feeling." Two minutes was ample time for all participants to recall a memory. When they had identified a memory, they were asked to tell

the interviewer everything they could remember about the event. “Tell me about where you were, what you did, and what you were thinking and feeling.” Three standard probes for additional information were used to encourage participants to elaborate for 10 minutes. When participants finished recalling one event they repeated the entire procedure for the second event.

Measures

The characteristics of young and older adults’ memory narratives were examined using Linguistic Inquiry Word Count (LIWC; Pennebaker, Francis, & Booth, 2001) content-coding software (for a review of this and other word count strategies, see Pennebaker, Mehl, & Niederhoffer, 2003). LIWC has been used to measure affect, cognitive strategies, thematic content, and various language elements of both young and older adults’ memory narratives (e.g., Pennebaker & Seagal, 1999). The program uses a text analysis application by counting words that are representative of several reliable psychological and cognitive categories of written language and verbal disclosure. The words included in the LIWC dictionary were obtained by drawing on standard affect rating scales as well as by reviewing dictionaries and thesauri. These words were then reliably divided into categories by several judges (agreement ranged from 86% to 100% agreement; see Pennebaker et al., 2001). The current research used LIWC to examine affective, sensory imagery, and cognitive characteristic categories. Since affect is most commonly assessed through self-reports in the literature, self-report measures of positive and negative affect were also included.

Before LIWC content-coding began, a random 20% of the memory narratives were examined to ensure that the categories of interest were being appropriately coded by LIWC. Five words (i.e., like, see, kind, know, pretty) were incorrectly assigned. For example, the word “like” appears in the LIWC dictionary as a positive affect word but was used as a linguistic filler (e.g., “I went to, like, the store”) 60% of the time and as a simile (e.g., “She walked like a ballerina”) 31.42% of the time in the current data. Thus, “like” was removed from the LIWC dictionary. The dictionary was modified accordingly for each of the ambiguous words identified. In addition, the memory narratives were cleaned of all nonfluencies (e.g., “uhh,” “umm”). Memory narratives were then coded for affective, sensory imagery, and cognitive structure characteristics (see Table 1 for an example of a content-coded narrative).

LIWC counts the number of words relevant to a given characteristic and converts that raw number into a percentage of total words. Thus, content-coded variables in the current study are the percentages of words in a narrative that refer to: positive and negative affect, sensory imagery, causation-insight, and tentativeness.

Table 1. Examples of LIWC Coding for Each Memory Characteristic

Memory characteristic	Words coded by LIWC (in bold)
Positive Affect	It just felt very ideal . . . it was just a very happy time.
Negative Affect	I thought things were going bad and this was the worst possible scenario.
Sensory Imagery	They, well, first of all listened to some music and enjoyed that of course. They ended up walking over and watched the fireworks.
Causation and Insight	I definitely got more relaxed throughout . . . because I realized . . . that she was the one.
Tentativeness	They probably would have sat down with her if she were with someone else.

Note: Examples are from actual study narratives.

Affective Characteristics

Affective characteristics include positive and negative affect. Positive affect includes words that indicate positive feelings (e.g., happy) and optimism (e.g., pride). Negative affect words indicate anxiety or fear (e.g., nervous), anger (e.g., hate), and sadness or depression (e.g., grief). In addition, to reflect how affect is traditionally assessed, after recalling the memory, participants rated whether it made them feel positive (i.e., happy) and negative (i.e., sad) separately on 5-point Likert scales ranging from *not at all* (1) to *extremely* (5).

Sensory Imagery Characteristics

Sensory imagery characteristics include words that indicate recall of sensory experiences in participants' memory narratives. Sensory characteristics include categories of words that refer to the perception of sensory images, such as seeing (e.g., view) and hearing (e.g., listen).

Cognitive Characteristics

Cognitive characteristics refer to cognitive processes that organize the narrative, including words that indicate that causation and inferences are used in constructing it. These cognitive processes are represented by words in the LIWC dictionary relating to causation (e.g., because) and insight (e.g., consider),

constituting the variable *causation-insight*. An additional category, *tentativeness*, includes words that suggest that effortful processing is needed to link aspects of a remembered event, such as conditional reasoning while constructing the narrative (e.g., maybe).

Verbal and Episodic Memory Ability

Two cognitive abilities were assessed to examine whether typical age differences in cognitive functioning (Schaie, 1994) might influence the characteristics of young and older adults' memory narratives. Verbal ability was assessed with the vocabulary subscale of the Wechsler Adult Intelligence Scale-Revised (WAIS-R; Wechsler, 1981). Participants attempted to provide the definitions for 20 standard words. Two coders reached 90% agreement ($\kappa = .80$) on a subset of the sample ($n = 24$) on scoring of the WAIS-R. Episodic memory was assessed with a single immediate-recall trial of the Auditory Verbal Learning Task (AVLT; Rey, 1941). Participants were read a list of 15 words, spaced 2 seconds apart. After hearing the words, participants were asked to remember as many as possible, in any order. The number of words correctly remembered was the dependent variable. As is typical (Schaie, 1994), older adults ($M = 30.70$, $SD = 3.51$) had higher vocabulary scores than younger adults ($M = 26.72$, $SD = 4.95$), $t(63) = 3.74$, $p < .001$. Younger adults had higher recall scores ($M = 9.09$; $SD = 1.94$) than older adults ($M = 7.18$; $SD = 1.81$) on the episodic memory task, $t(63) = 4.11$, $p < .001$.

RESULTS

The first section of results provides preliminary analyses concerning age differences in the length of the memory narratives to assess the use of this variable as a covariate in the main analyses. In the second section, multivariate analysis of variance (MANCOVA) is used to examine whether the characteristics of the memory narratives differ by age. The third section examines whether obtained age effects maintain when controlling for vocabulary and episodic memory ability.¹

Length of Memory Narratives

An independent samples *t*-test suggested that there was no age effect, $t(63) = .93$, $p > .05$, for differences in narrative length. The memory characteristics (i.e., the dependent variables) are represented by the LIWC program as a percentage of total words spoken. This thereby controls for the varying number of words spoken by individuals across the age groups. However, if the length of the narrative within each age group is associated with certain types of memory

¹The data were examined for gender differences and none were found. Thus, gender effects are not reported here.

characteristics being expressed relatively more or less, then controlling by using percentages is inadequate. As such, correlational analyses were conducted for each age group examining relation of narrative length to the percent of each type of memory characteristic expressed. For younger adults, telling longer autobiographical memory narratives is related to expressing less positive, $r(32) = -.66$, and more negative affect, $r(32) = .36$, $ps < .05$. Narrative length is not associated with causation-insight, tentativeness, or sensory characteristics, $ps > .05$. The results are different for the older adults: there are no relations between narrative length and any of the memory characteristics. As narrative length is differentially related to particular memory characteristics within age groups, total number of words is used as a covariate in analyses. Note, however, that the pattern of results is the same if narrative length is not covaried.

Characteristics of Memory

A one-way multivariate analysis of variance (MANCOVA) was conducted to examine age differences in memory characteristics. The dependent variables were the percentages of words in the narrative for each of the five content-coded memory characteristics, and the self-report measures of positive and negative affect, with total words in the narrative as covariate. The multivariate age effect was significant, Wilks' Λ , $F(7, 56) = 9.00$, $p < .001$. Univariate results are reported for the memory characteristics: affect, sensory imagery, and cognitive.

Affect

As shown in the left side of Figure 1, young adults expressed more positive affect in their memory narratives than older adults, $F(1, 62) = 5.73$, $MSE = 5.00$, $p < .05$. This age main effect was replicated in self-reported positive affect, $F(1, 62) = 8.08$, $MSE = 2.56$, $p < .01$. Young adults ($M = 4.70$, $SD = .33$) self-reported more positive affect associated with their memories than older adults ($M = 4.33$, $SD = .74$). Negative affect expressed in participant's memory narratives did not differ by age, $F < 1.00$. In parallel, no significant effects were found for self-reported negative affect, $F < 1.00$.

Sensory Imagery

Age differences were found in words related to sensory imagery, $F(1, 62) = 11.69$, $MSE = 5.72$, $p < .01$. Older adults ($M = 1.69$, $SD = .87$) expressed more sensory imagery in their memory narratives than did younger adults ($M = 1.04$, $SD = .54$; see Figure 2).

Cognitive Characteristics

There were significant univariate effects for causation-insight, and tentativeness. As seen in Figure 2, young adults' memory narratives ($M = 4.24$, $SD = 1.14$)

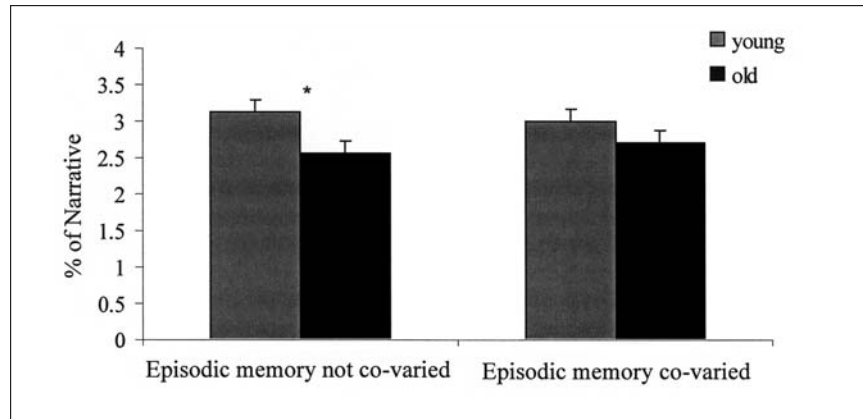


Figure 1. Positive affect expressed in young and older adults' autobiographical memory narratives without and with episodic memory as a covariate.
Note: Estimated marginal means are reported. Covariate in both models is word count, $M = 1429.51$; Episodic memory score, $M = 8.12$.
 * $p < .05$. Age effect becomes N.S. when controlling for episodic memory.

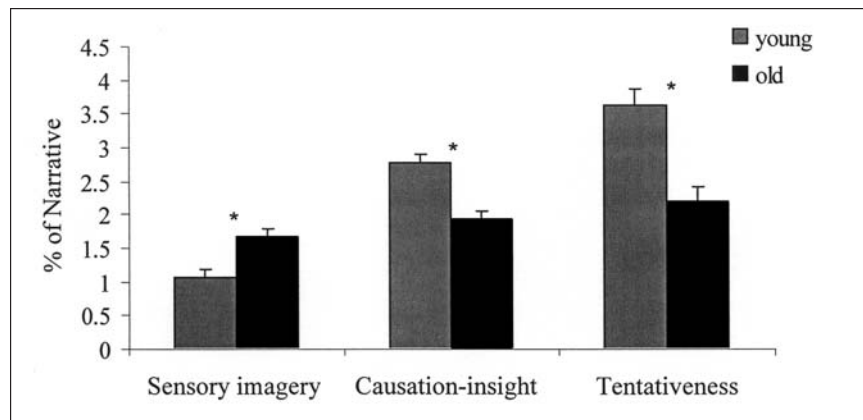


Figure 2. Sensory imagery, causation-insight, and tentativeness expressed in young and older adults' autobiographical memory narratives.
Note: Estimated marginal means are reported. Covariate in the models is word count, $M = 1429.51$. * $p < .05$. Age effects significant for all three variables.

contained more causation-insight words ($M = 3.27$, $SD = .84$) than older adults' memory narratives, $F(1, 62) = 20.77$, $MSE = 5.72$, $p < .001$. Young adults ($M = 3.66$, $SD = 1.59$) also had more words reflecting tentativeness in their

memory narratives than older adults ($M = 2.20$, $SD = .71$), $F(1, 62) = 21.83$, $MSE = 32.84$, $p < .001$.

Do Age Differences in Vocabulary and Episodic Memory Ability Affect Memory Characteristics?

To follow-up the analyses showing age differences on several memory narrative characteristics, two further analyses were conducted. The first analysis used episodic memory as a covariate to examine the extent to which obtained age differences in memory characteristics (i.e., for positive affect and cognitive characteristics) were due to younger adults' superior episodic memory ability. The second analyses examined whether older adults' better performance on sensory imagery could be accounted for by their better WAIS-R (Vocab) scores.

A one-way MANCOVA was conducted, controlling for word count and episodic memory to examine whether age differences in positive affect (expressed and self-reported), causation-insight, and tentativeness would be eliminated by controlling for episodic memory. The age effect was significant, Wilks' Λ , $F(7, 56) = 9.00$, $p < .001$. Controlling for episodic memory did not eliminate age differences in self-reported positive affect, $F(1, 61) = 6.38$, $MSE = 2.06$, $p < .05$, causation-insight, $F(1, 61) = 15.73$, $MSE = 8.98$, $p < .001$, or tentativeness, $F(1, 61) = 9.96$, $MSE = 13.81$, $p < .01$. Young adults still self-reported more positive affect and included more causation-insight and tentative words in the memory narratives than older adults. Controlling for episodic memory did, however, eliminate age effects for positive affect expressed in participant's autobiographical memory narratives, $F(1, 61) = 1.26$, $MSE = 1.03$, $p > .05$. As seen on the right side of Figure 1, younger adults no longer showed higher levels of positive affect in their memory narratives than older adults when controlling for episodic memory.

Next, a one-way analysis of covariance (ANCOVA) was conducted to examine whether age differences in sensory imagery would be eliminated by controlling for older adults' superior vocabulary ability (word count was also used as a covariate). The age effect remained, $F(1, 61) = 14.93$, $MSE = 7.09$, $p < .001$. Older adults showed higher levels of sensory imagery in their memory narratives than younger adults, even when controlling for vocabulary ability.

DISCUSSION

Experiencing positive affect through recall of autobiographical events is one way that people regulate mood in everyday life. The current study examined whether positive autobiographical memory narratives differ in older and younger adults. Affect expressed in the narratives was assessed and, based on multi-process models of autobiographical memory (e.g., Pillemer, 1998), sensory imagery and cognitive characteristics were also examined. The relation of episodic memory and vocabulary ability to memory narrative characteristics was analyzed.

Age Differences in Positive Autobiographical Memories: The Positivity Effect

One goal in examining the characteristics of positive autobiographical memories was to determine whether the age-related *positivity effect* (e.g., Carstensen & Charles, 2003) would appear in narrative recall of positive autobiographical events. That is, would older adults show more positive affect than younger adults? The current data did not find a positivity effect for older adults, and in fact found the opposite: younger adults expressed more positive affect in their memory narratives and self-reported greater positive affect while remembering these positive events. The positivity effect may be robust only in some areas (e.g., Kunzmann et al., 2000), and the specific situations in which it does not manifest need continued exploration. The current findings provide some direction for such investigations. Narrative autobiographical recall may be one type of activity in which the positivity effect is less prevalent (see also Comblain et al., 2005). Alternatively, it may be that when instructions focus all participants on recalling particularly positive memories, the positivity effect is ameliorated. Future research might examine whether an age-related positivity effect occurs when people recall neutral events as compared to life's happiest events, as well as everyday positive events, such as were recalled in the current study. This type of design would also shed light on the issue of whether any obtained positivity effect for autobiographical recall is largely due to differential selection of events or to age differences in the construction of the memory (see Pasupathi & Carstensen, 2003).

The current findings may be more in line with theorists who have provided alternative conceptualizations to the positivity effect in characterizing affect in late life. They suggest that the experience of affect is not simply more positive with age but is qualitatively different at various points in the life span (Labouvie-Vief & Medler, 2002). That is, aging does not only result in a positivity effect but affects the complexity with which emotions are expressed (Magai, 2001). This suggests that older adults should recall even positive events with a greater range and subtlety of emotion than younger adults, not just more pure positivity. Examining specific affective states (i.e., happiness, anger) expressed in autobiographical narratives may be a rich methodology for future research on affective complexity across adulthood (see Alea et al., 2004). One limitation of the current study was that, since the focus was on positive memories, negative affect occurred rarely. This made the examination of negative affect impossible due to floor effects. Further research might examine characteristics of negative events and events in which greater emotional complexity is expected to occur.

One explanation for younger adults showing higher levels of positive affect than older participants relates to differences in cognition. Controlling for young adults' better episodic memory ability eliminated the age effect for positive affect. Thus, younger adults' ability to better remember the event appears to account for

their relatively greater expression of positive affect. It may be that the positivity effect (i.e., older adults show greater positive affect) is more likely to manifest in tasks that do not draw on cognitive abilities such as episodic memory in which older adults show a deficit. One limitation in further investigating this intriguing idea with the current data is that we assessed only vocabulary and episodic memory. Future research might explore how a range of cognitive abilities (e.g., reasoning, executive functioning) are related to the production of positive autobiographical memories in older and younger adults.

Age Differences in Positive Autobiographical Memories: Sensory and Cognitive Characteristics

Age differences were also found for both sensory and cognitive characteristics. Older adults made more reference to sensory images in their narratives than younger adults and this was not driven simply by their better vocabulary ability. It is not the case, then, that older adults' recall is impoverished overall: older adults showed higher levels of sensory imagery than younger adults. Rubin (1998) has suggested that autobiographical memory relies on a novel integration of several memory systems (e.g., sensory memory, affective memory). Thus, older adults may show declines in one aspect of remembering (i.e., affective memory system) at the same time as gains in another area (i.e., sensory memory system). To construct distinct, memorable, autobiographical narratives it is important to focus largely on what happened, that is, on the basic actions and sub-events that make up the remembered event (Wagenaar, 1986). Fusing sensory imagery into the event, however, provides it with additional richness and color. Though sensory imagery occurs with a relatively low frequency, it can create a sense of reliving or re-experiencing the event. Memories that contain high levels of imagery and affect are often more memorable (e.g., Bluck & Li, 2001), and regarded as more interesting by the listener (Baron & Bluck, 2009).

In regards to the cognitive characteristics, as expected, younger adults showed higher levels of both causation-insight, and tentativeness. When a task provides contextual support, older adults perform just as well as younger adults (Zacks, Hasher, & Li, 2000). When the task is unstructured and open-ended (i.e., like the autobiographical memory recall task in the current research), older adults do not perform as well. To be clear, this is not to say that older adults produced off-target narratives. Older adults' narratives in the current study were clearly understandable but simply contained fewer references to causation and insight, and less tentative language. In keeping with this result, other researchers have found that older adults construct less complex storylines than younger adults when recalling emotional events (Comblain et al., 2005).

Younger adults also showed greater tentativeness in their narratives. Thus, at the same time as producing autobiographical memory narratives with a greater number of causation-insight words, they also used more tentative, conditional

words in these narratives than did older adults. Our previous research suggests that when older adults produce narratives they are cautious about going beyond what they actually remember. That is, they are more conservative in making inferences that may end up being incorrect. In order to fill in the gaps in memory it is normative to make inferences and assumptions based on schemas, scripts, world knowledge, and related events (e.g., Brewer, 1988). If older adults are less likely to do this, it may be one reason for their narratives containing fewer cognitive words relating to tentativeness. Note that, contrary to expectation, younger adults' greater use of cognitive words in their narratives was not related to their superior episodic memory ability. Further research might identify cognitive abilities that differ by age and are related to cognitive structure in memory narratives.

Limitations

The study had two limitations in relation to the participants. First, while most cross-sectional studies of age employ undergraduate students as participants, the current study drew on a broader sample of younger adults that was comprised of graduate students or their partners. The aim was to improve on the use of undergraduate samples by examining young adults who:

- i. have a higher mean age such that most are currently adults (i.e., not in late adolescence);
- ii. have a greater variety of life experiences than college undergraduates;
- iii. are more likely to be from a broader geographical range than college undergrads; and
- iv. have had romantic relationships that occurred when they were an adult.

Particularly due to the nature of the study (i.e., individuals are asked to recall autobiographical memories of a date and a vacation with a partner) it was crucial not to examine young undergraduate students who simply have not had such experiences. One concern, however, is that this sample of young adults had higher overall cognitive ability than the older adults who participated in the study. Thus, any age differences in autobiographical memories might be accounted for by these pre-existing age differences. Young adults in the current sample, however, showed the same pattern of age differences as in many previous studies that have used undergraduate participants. That is, these young adults scored higher than older adults on episodic memory and lower than older adults on the WAIS-R (Vocabulary). There were no educational differences between the younger and older adults. We cannot be sure, however, whether there were other cognitive differences between this sample of young and older adults that were unmeasured and confounded the obtained age differences.

An additional limitation is that older and younger adults received differential remuneration for study participation. This is never an optimal methodology. It is

unclear if and how this may have affected the obtained age effects. Since older adults were intrinsically motivated to participate (i.e., they participated without remuneration), one might expect their level of motivation to eliminate any age differences favoring younger adults. Age differences favoring younger adults were, however, still obtained. We cannot rule out the possibility that younger adults recalled more positive memories that contained more cognitive characteristics and less sensory information due to being paid \$10.00 (US) to participate in the study.

CONCLUSION

Positive autobiographical memories are salient across adulthood: they occur relatively frequently (Pasupathi & Carstensen, 2003) and maintain their affective valence across long periods of time. In line with multi-process models of autobiographical memory (e.g., Pillemer, 1998), findings from the current study suggest that everyday positive autobiographical memory narratives are a combination of rather moderate levels of positive affect, some sensory imagery, and a causally organized, partially inferential, cognitive structure. Are the characteristics of such memories the same in older and younger adults? Older adults showed more sensory imagery in their positive memory narratives, while younger adults produced narratives that were more affectively positive and had more cognitive characteristics. It appears that age declines in episodic memory may affect the extent to which older adults express positive affect in association with memories of their life experiences. Understanding how positive memories are maintained, and what factors lead to their demise, may prove useful in understanding how individuals regulate mood and create well-being through recalling their personal past at different points in the lifespan.

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