Younger, middle-aged, and older adults' memories for the 2008 U.S. Presidential Election

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Abstract

Adults, aged 18 to 88 years, recalled details about the 2008 U.S. Presidential Election shortly following the election and 6 months later. Individuals who felt positive about the election outcome reported a greater quantity of information at both time points. However, across the lifespan, individuals who felt negative about the election outcome demonstrated a greater proportion of detail consistency over time, a finding that had previously been shown only for younger adults. Individuals who felt positive about the outcome showed increased confidence in their ability to retain information accurately, as did individuals who felt emotionally intense about the election. These results indicate that for adults of all ages, positive emotion is associated with a reduced ability to retain details consistently over time; yet people may not recognize this tendency when recalling information, thereby retaining higher confidence in their ability to remember event details if they felt positive about the event.

Keywords

autobiographical memory; emotion; lifespan development; aging

Mnemonic benefits for emotional (vs. neutral) events are well-documented in young adults (reviewed by Holland & Kensinger, 2010; Buchanan, 2007). Emotional experiences are more likely to be remembered than neutral ones, and emotional events are often recalled more vividly (Talarico, LaBar, & Rubin, 2004). Yet even highly emotional information is not immune to reconstructive memory inconsistencies over time (e.g., Schmolck, Buffalo & Squire, 2000; McCloskey, Wible, & Cohen, 1988), despite individuals' confidence in these memories (e.g., Neisser & Harsch, 1992; Talarico & Rubin, 2003; 2007).

Although several aspects of an event, including its emotional intensity (Talarico et al., 2004) or personal importance (Muscatell, Addis, & Kensinger, 2010), can influence how consistently or accurately it is recalled, an event's valence (i.e., how negatively or positively it is perceived) may have an especially important relation to memory across the adult lifespan. For example, event valence has been associated with young adults' memory consistency, perhaps by affecting the type of information processing that is invoked at the time of encoding (reviewed by Kensinger, 2009). The "affect-as-information" approach hypothesizes that emotions provide critical information about one's environment and guide

perception and attention. In particular, negative emotions signal that something in the present environment requires one's attention and therefore invokes greater detail-oriented and analytical processing. On the other hand, positive emotions signal a benign environment and therefore allow for a greater reliance on heuristics and schemas (e.g., Clore et al., 2001; Clore & Storbeck, 2006; see also Levine & Pizarro, 2004).

It follows from the affect-as-information approach that if negative events are processed deeply and receive more attention at and after their occurrence, such information should be especially well-remembered at retrieval. Indeed, young adults demonstrate more accurate memory for stimuli that elicit negative emotion (e.g., Kensinger & Schacter, 2006a) or for stimuli presented while in a negative mood (Storbeck & Clore, 2005; Storbeck & Clore, 2011). These benefits also extend to autobiographical memory: Individuals who felt negative (vs. positive) about the outcome of the O.J. Simpson trial were less likely to endorse false statements about the trial (Levine & Bluck, 2004), and individuals who felt negative (vs. positive) about the outcome of a sporting event had more consistent memories for the details of the game (Kensinger & Schacter, 2006b; but see Breslin & Safer, 2011, for evidence of greater memory accuracy in sports fans who felt positive about the outcome of a game). For younger adults, an event's valence is also linked to differences in memory confidence, with positive emotion being associated with overconfidence in accuracy (Kensinger & Schacter, 2006b).

Although age does not appear to affect emotional memory enhancements on either laboratory (e.g., Denburg et al., 2003; Otani et al., 2007) or autobiographical (Comblain, D'Argembeau, & Van der Linden, 2005; St. Jacques & Levine, 2007) memory tasks, it is unclear whether older adults show the greatest mnemonic benefits for negative information in the same way that young adults do. There is some evidence that the memory boost associated with negative information occurs on the later end of the adult lifespan, in line with the affect-as-information approach (see Kensinger, 2008, for a review). Yet these laboratory findings have not been extended into the domain of autobiographical events; only one autobiographical memory study can potentially shed light on how these laboratory findings translate to real-life events across the lifespan. Bohn and Berntsen (2007) asked individuals to retrospectively rate their emotions and recall details regarding the fall of the Berlin Wall. In line with the suggestion that negative emotion might be linked to enhanced memory for details, those individuals who reported feeling negative (vs. positive) about the event had the highest memory accuracy. The sample from Bohn and Berntsen (2007) ranged from 29 to 82 years; although the authors did not consider age in their analyses, the outcome suggests that the mnemonic benefit associated with negative emotion might extend throughout the lifespan.

Although there is evidence that older adults demonstrate the greatest mnemonic benefit for negative (vs. positive) information, this claim is potentially contentious in light of the literature on emotional processing in aging. Socio-emotional selectivity theory predicts that when time is perceived as limited, as in aging, emotion regulation goals (i.e., diminishing negative affect) become dominant (Carstensen, Isaacowitz, & Charles, 1999). As such, older (vs. younger) adults may place a greater emphasis on positively-valenced information, for example in attention and memory (reviewed by Mather, 2006). Indeed, there are age-related changes in how quickly older adults forget negative events (Berntsen & Rubin, 2002) and in the proportion of negative versus positive images they recognize or recall (Charles, Mather, & Cartsensen, 2003).

Thus far, the reviewed literature has concerned individuals on either end of the adult lifespan. Far less work has considered the role of emotional valence in memory for middle-aged adults, and the extant data yield no consensus. One laboratory study found an overall

benefit for negative stimuli across the adult lifespan (Denburg et al., 2003), whereas another found evidence for a shift toward mnemonic benefits for positive stimuli in middle age (Carstensen & Mikels, 2005). Given that autobiographical events are inherently more emotional and personally meaningful than traditional laboratory stimuli (e.g., Cabeza et al., 2004), investigating memory for such events may further elucidate the role of emotional valence on memory in middle age.

The goal of the present study was to examine the relation between emotional valence and memory across the adult lifespan. We sought to distinguish between two alternatives: The mnemonic benefits associated with negative emotion that are evident in younger adults could be unaffected by age (i.e., in line with the affect-as-information approach), or adult development could result in greater mnemonic benefits of positive emotion (i.e., in line with socio-emotional selectivity theory). We probed adults' memories for the details of a real-life, emotional event: the 2008 U.S. Presidential Election. Political elections serve as a unique opportunity to examine how adults of all ages remember a publically and personally significant event whose outcome could either be viewed as highly positive or highly negative (e.g., Levine & Bluck, 1997)[1]. By examining an event that could be defined as negative or positive depending on individual preferences, extraneous variables such as amount of media coverage and the duration of the event are controlled (as in Bohn & Berntsen, 2007; Breslin & Safer, 2011; Kensinger & Schacter, 2006b; Levine & Bluck, 2004).

We assessed the link between valence and both memory quantity (the number of details reported about the election shortly after its outcome and again after a six-month delay) and memory consistency (the degree of overlap between the reported details across the six-month delay). A final exploratory goal was to examine the relation among aging, perceived event valence, and memory confidence.

Method

Participants

The numbers and characteristics of participants included in each survey and the present analyses are summarized in Table 1. We treated age and self-reported ratings of how negative or positive individuals found the outcome of the election [on a 1 (very negative) – 7 (very positive) scale] as continuous variables rather than arbitrarily dividing participants into discrete age or valence groups. However, for ease of reporting in Tables and Figures, demographic information and summaries of average scores for each dependent variable will be presented with participants divided into three age groups: younger adults (18–35 years), middle-aged adults (36–59 years), and older adults (60–88 years) and three valence groups: negative (responses of 1 – 3 on a 7-point valence scale), neutral (response of 4), and positive (responses of 5 – 7).

Time 1 Survey—Participants between the ages of 18–88 years were recruited nationally via Craigslist and locally via flyers at Boston College; these participants completed the Time 1 survey and a screening form that inquired about a history of depression, anxiety, or use of medications that affect the central nervous system. Older adults who were pre-screened for exclusionary criteria were further recruited from a database in our laboratory. A total of 395

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[1] In the present study, we probed individuals' memories and emotions regarding the details surrounding the outcome of the election on Election Day. Given that the election, like many real-world events, was prolonged and likely included a range of emotional experiences regarding the candidates in the debates and primaries leading up to and in the months following the election, it is possible that the effects in the present paper were mediated by emotional responses other than those that occurred during the encoding of the election outcome.

participants responded to the Time 1 survey. Informed consent was obtained from all participants in accordance with the Boston College Institutional Review Board.

Time 2 Survey—Only those participants who met the screening criteria for inclusion ($N =$ 346) were sent a copy of the Time 2 survey. Participants who completed both surveys (i.e., those summarized in the third column of Table 1; $N = 232$) were included in the present analyses.

Materials and Procedure

Participants completed a survey that probed their memory about the 2008 Presidential Election. Surveys were completed within 2 weeks after the election (Time 1) and after a 24–26 week delay (Time 2). Older adult participants recruited from our laboratory database completed a hard copy of the surveys mailed to their homes; participants recruited online completed electronic surveys, identical to the hard copies, via Survey Monkey (SurveyMonkey.com, LLC, Palo Alto, CA; www.surveymonkey.com). Each survey included questions meant to comprehensively probe the features of the election (e.g., who was involved, when the election took place, and the outcome in terms of the percentages of votes and victory/concession speeches; see the Appendix for a complete list of questions). The questions were designed to elicit specific, brief answers, and thus were typically answered with short phrases or sentences (e.g., "the winner received 55% of the votes"; see Table 2). Both surveys also asked participants to rate emotion and rehearsal variables on Likert scales.

Data Scoring

Quantity of recalled information—Time 1 and Time 2 surveys were scored separately for the number of details reported. A detail was defined as a unique piece of information; the number of details was summed for each survey (see Table 2 for example survey responses and detail scoring).

Consistency scoring of recalled information—Time 2 surveys were scored for the consistency of the responses in comparison to the information provided on the Time 1 surveys[2] (see Table 2). The consistency coding scheme was based on Kensinger and Schacter (2006b). Scoring was completed on a question-by-question basis. The consistency scores for each question were then averaged to form a single score; the coefficient alpha measure of reliability for these questions was .70. Each detail that was entirely different at Times 1 and 2 received a consistency score of 0. A detail that was recalled somewhat differently at each time point (e.g., Obama wearing a blue tie vs. a red tie) received a score of 0.5. A detail that was entirely consistent between both surveys received a score of 1. Questions with responses that indicated forgetting, such as, "I don't recall," were excluded from analysis. Participants were not penalized for additional information provided at Time 2 (e.g., if a person said Obama wore a blue tie at Time 1 and said he wore a blue tie and an American flag pin at Time 2, this would be scored as a fully consistent recall of one detail [blue tie]). The consistency score for each question was transformed into a proportion by dividing the number of consistency points awarded by the number of details provided at Time 1 (i.e., the highest number of possible details that could be scored for consistency). For

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[2]Because there was a delay between the announcement of the election results and the completion of the Time 1 survey, we cannot rule out the presence of memory distortions from the outset of the study (see Winningham, Hyman, & Dinnel, 2000). We consulted news articles and videos from Election Day and summed the number of accurate details that participants recalled at Time 1. Accuracy scores were high, with an overall average of 84% ($SD = 12\%$). Importantly, accuracy at Time 1 was unrelated to the number of days between the election and the completion of the Time 1 survey, $r = -.05$, $p = .45$. A multiple regression confirmed that neither age nor valence ratings significantly accounted for variance in Time 1 accuracy scores, $R^2 = .01$, $ts < 1.74$, $\beta s < .10$, $ps > .14$.

instance, if a participant recalled two details at Time 1, one of which was recalled in a consistent manner at Time 2 (= 1 point) and one of which was recalled in a slightly inconsistent manner at Time 2 (= 0.5 points), the consistency score for that question would be 1.5/2 = .75. Scoring was divided between two research assistants blind to the study hypotheses. Inter-rater reliability on a random subset of 20% of the surveys was high (r = .90).

Assessment of confidence—For each question answered at Time 2, participants rated their current confidence in the accuracy of the response on a 1 (not at all) −5 (very) scale. Confidence ratings made to answers such as "I don't recall" were excluded from the analysis. In addition, at both Times 1 and 2, participants rated how well they would be able to remember the overall details of the election in 6 months (this rating will be referred to as prospective confidence ratings).

Results

Multiple Regression Analyses

Because age and valence were considered as continuous variables in the present study, we used multiple regression analyses to determine whether age and/or valence were predictive of our variables of interest. Age and valence ratings were centered around their respective means; both variables were entered as simultaneous predictors in the first step of each regression model. In addition, because prior research has suggested that emotional intensity (a dimension of emotional experience that is separate from emotional valence; e.g., Russell, 1980) can influence memory qualities, such as confidence (Talarico et al., 2004), we controlled for participants' T1 emotional intensity ratings by centering them around their mean and entering them in the first step of each regression model.[3] Age X Valence and Age X Intensity interaction terms were created by multiplying the centered age and valence, and age and intensity variables, respectively; these interaction terms were entered in a second step of each regression model. The dependent variables in each model (described below) were also centered around their respective means.

Quantity of Information Recalled

The average number of details recalled at each time point is summarized in Table 3. The regression models including age, valence, and intensity scores as predictors were significant at both time points, R^2s > .09, ps < .001 (Table 4). The beta weights for valence revealed that increasing positivity was associated with an increase in the number of reported details on both the Time 1 [$t(228)$ = 4.87, β = .30, p < .001] and Time 2 surveys [$t(228)$ = 3.19, β = .21, p < .001] details. In addition, increasing ratings of emotional intensity were associated with an increase in the number of details on both surveys [Time 1: $t(228)$ = 3.96, β = .24, p < .001; Time 2: $t(228)$ = 2.97, β = .19, p = .003]. However, age did not account for a significant amount of variance in the number of details recalled at either time, ts < .37, βs < −.02, ps > .71. The Valence X Age and Intensity X Age interaction terms did not account for a significantly greater amount of variance in the quantity of information recalled at either time, R^2-changes < .01, ps > .24.

Consistency of Recall Between Time 1 and Time 2

Average consistency scores are presented in Table 3. The overall regression model including age, valence, and intensity ratings as predictors of consistency scores was significant, R^2 = .

[3]Although valence and intensity ratings were moderately correlated, r = .16, p = .02, they were at an acceptable level for collinearity (tolerance > .97, VIF < 1.5) in each reported model, and could therefore be included in the same regression models.

06, $p = .002$, with both valence and age accounting for a significant amount of variance (Table 3). Increasing positivity was associated with lower consistency scores, $t(228) = 2.98$, $\beta = -.19$, $p = .003$ (see Fig. 1). Similarly, increasing age was associated with lower consistency scores, $t(228) = 2.25$, $\beta = -.15$, $p = .03$. Intensity was not a significant predictor of detail consistency, $p = .80$, and neither the Age X Valence nor the Age X Intensity interaction terms accounted for any additional variance in consistency scores, R^2-change $< .001$, $p = .90$.

Confidence in Memory

Current confidence—We first considered the average confidence ratings made in response to Time 2 answers (Table 3). The regression model including valence, age, and emotional intensity as predictors was significant, $R^2 = .06$, $p = .002$ (Table 4). Age was a significant predictor of confidence ratings, such that increasing age was related to higher confidence in accuracy $t(228) = 3.05$, $\beta = .20$, $p = .003$. Increasing intensity was also a significant predictor of current confidence ratings, with increasing intensity predicting higher confidence, $t(228) = 2.14$, $\beta = .14$, $p = .03$. However, valence was not a significant predictor of current confidence ratings, $p = .92$. The model including the Valence X Age and Valence X Intensity interaction terms failed to account for a significantly greater proportion of the variance in confidence scores, R^2-change $= .002$, $p = .79$.

Prospective confidence—We next considered whether age, valence, and/or intensity were predictive of individuals' ratings of how well they would recall the overall election following a 6-month delay (Table 3). The overall regression model examining Time 1 prospective confidence ratings was significant, $R^2 = .09$, $p < .001$; higher intensity ratings were predictive of greater Time 1 prospective confidence, $t(228) = 4.29$, $\beta = .28$, $p < .001$. Age and valence did not account for a significant amount of variance in Time 1 prospective confidence ratings, $ps > .19$, and the model including the Age X Valence and Age X Intensity interaction terms did not account for a significantly greater proportion of the variance in the ratings, R^2-change $= .002$, $p = .73$. In addition, the regression model examining Time 2 prospective confidence ratings was also significant, $R^2 = .16$, $p < .001$; higher intensity ratings predicted greater Time 2 prospective ratings, $t(228) = 4.98$, $\beta = .31$, $p < .001$, as did more positive valence ratings, $t(228) = 3.54$, $\beta = .22$, $p < .001$. Age was once again not a significant predictor of Time 2 prospective confidence ratings, $p = .94$. The model including the Age X Valence and Age X Intensity interaction terms also were non-significant in predicting a greater amount of the variance in the prospective confidence ratings, R^2-changes $< .001$, $ps > .93$.

Rehearsal Variables

We also examined the ratings for rehearsal variables for the election (Table 5). The overall regression models including the age, valence, and intensity predictor variables were significant for the rehearsal variables, R^2's $> .10$, $ps < .001$. Both increasing positivity and increasing intensity predicted higher ratings of personal importance [Valence: $t(226) = 3.42$, $\beta = .19$, $p < .001$; Intensity: $t(226) = 8.13$, $\beta = .46$, $p < .001$], surprise upon learning the results [Valence: $t(226) = 3.34$, $B = .21$, $p = .001$; Intensity: $t(226) = 3.28$, $\beta = .21$, $p = .001$], and rehearsal via media coverage [Valence: $t(227) = 4.93$, $\beta = .30$, $p < .001$; Intensity: $t(227) = 3.12$, $\beta = .19$, $p = .002$] and speaking [Valence: $t(228) = 1.95$, $\beta = .12$, $p = .05$; Intensity: $t(228) = 4.03$, $\beta = .26$, $p < .001$] about the election results. Increasing intensity ratings were further associated with an increase in self-reported rehearsal via thinking about the election results, $t(228) = 5.88$, $\beta = .36$, $p < .001$. Age was a marginally significant predictor of personal importance [$t(226) = 1.86$, $\beta = .10$, $p = .07$] and a significant predictor of rehearsal via media coverage [$t(227) = 3.59$, $\beta = .21$, $p < .001$] and thinking [$t(228) = 2.52$, $\beta = .15$, $p = .01$] about the election results. The only model for which the interaction terms explained a

greater proportion of variance in any of the rehearsal variables was for the amount of surprise experienced upon learning the results of the election, R^2-change = .03, p = .03. In this model, the Age X Intensity interaction term was a significant predictor of surprise ratings, $t(224)$ = 2.65, β = .17, p = .01, such that with increasing age intensity was a stronger predictor of how surprised individuals felt about the election outcome. For all other models, the interaction terms did not provide any additional explanatory power in predicting responses on the rehearsal variables, R^2-changes < .01 ps > .19.

Discussion

The present study was the first to investigate the links between valence, age, and autobiographical memory—measured by both the quantity of details and consistency of those details—across the adult lifespan. Our analyses revealed a dissociation between the relation of valence with the quantity versus consistency of recalled information. Individuals who felt negative about the outcome of the election reported a lower quantity of information both immediately after the election and following a 6-month delay than those who felt positive, yet a greater proportion of the information was recalled consistently across the delay by those who felt negative.

The relation between valence and the quantity and consistency of information recalled was relatively well-preserved across the lifespan, and remained even when statistically controlling for emotional intensity ratings in the regression models. Individuals of all ages reported more information when they viewed the outcome of the election as positive. Even though aging was associated with a decline in overall memory consistency, the link between valence and memory consistency was stable across the lifespan: Feeling negative about the outcome of the election was associated with greater mnemonic consistency than feeling positive, and this effect of increasing positivity did not interact with increasing age. Even though older adults sometimes demonstrate enhanced attention toward and memory for positive information (Kennedy, Mather, & Carstensen, 2004; Mather, 2006), the present data suggest that having a positive focus is not associated with the consistent retention of event details (see Murphy & Isaacowitz, 2008; Kensinger, 2008, for similar discussion).

These results are consistent with the affect-as-information framework (Clore et al., 2001; Clore & Storbeck, 2006) suggesting that negative emotion is associated with mnemonic benefits due to the induction of a more analytical mode of information processing (see Kensinger, 2009) and are also largely consistent with prior investigations of the relation between valence and memory for public events (Bohn & Berntsen, 2007; Kensinger & Schacter, 2006; Levine & Bluck, 2004). Interestingly, a more recent study found that individuals who felt positive about the outcome of a sporting event had more accurate event memory than those who felt negative, possibly because sports fans were recruited from locations where frequent reminders of their team's loss were unlikely to be present and negative affect could presumably fade (Breslin & Safer, 2011), as it often does relative to positive affect related to autobiographical memories (i.e., the fading affect bias; e.g., Walker & Skowronski, 2009). Indeed, the continued presence of Barack Obama in the media during the delay between the two survey time points may have influenced post-election rehearsal and elaboration (see also Hirst et al., 2009), perhaps preventing affect from fading in individuals who felt negative about the outcome of the election and adding to the mnemonic benefits associated with feeling negative at the time of encoding. It is also possible that because individuals who felt negative about the election reported fewer details overall, it was relatively easier for them to recall the details they did report consistently over time.

It should be acknowledged that the age and valence groups showed some differences on reported rehearsal variables related to the election shortly after it occurred. Regardless of

age, individuals who found the election more positive and emotionally intense also found it more personally important and reported greater amounts of rehearsal[4]. In addition, increasing age was related to increases in ratings of personal importance and rehearsal. The finding that increasing age and positivity was associated with lower consistency over time despite greater rehearsal is somewhat surprising given that rehearsal has been associated with greater consistency (e.g., Conway et al., 2009; Schmolck et al., 2000) and accuracy (Breslin & Safer, 2011). This additional rehearsal in the positive group may have led to underestimating the relation between valence and memory consistency; if rehearsal time were equated (and positive events did not receive added rehearsal), negative valence may have an even greater advantage over positive valence. However, it is also plausible that new information learned via media coverage after the election and/or misinformation introduced through conversations about the election interfered with memory for details reported at Time 1, contributing to the valence differences seen here.

The present results add to the literature demonstrating discord between memory consistency and confidence (e.g., Kensinger & Schacter, 2006b; Talarico & Rubin, 2003; 2007). Increasing age was associated with increases in confidence ratings despite lower levels of consistency with age; this finding might fit with others' suggestions that older adults are more likely than younger adults to overestimate memory confidence even when misremembering (Shing et al., 2009). Similarly, increasing intensity ratings were associated with increases in both current and prospective confidence ratings made 6-months following the election, a finding that lends further support to findings that emotionally intense events are characterized by greater subjective confidence in memory regardless of objective mnemonic benefits (Talarico & Rubin, 2003; 2007).

Additionally, individuals who felt positive about the outcome of the election demonstrated greater prospective confidence ratings, despite their lower levels of memory consistency when compared to individuals who felt negative about the election outcome. This inverse relation between prospective memory confidence and memory consistency is in line with prior research that has demonstrated overconfidence in memory quality when individuals perceive information as positive (Levine & Bluck, 1997; Kensinger & Schacter, 2006b). Positive valence may induce more lenient criteria for deciding the accuracy of information (Levine & Bluck, 1997), leaving open the possibility that positive valence also induces more lenient criteria when individuals make metamemory judgments about their ability to recall information in the future. Alternatively, or in addition to this possibility, individuals who felt positive about the outcome of the election may have been more confident in their ability to accurately recall the election details in the future because they based their predictions on the relatively greater quantity of information that they reported compared to individuals who felt negative or because they reported more frequent rehearsal via attention to media coverage shortly after the election (see Hirst et al., 2009).

Practical Applications

Adults of all ages try to learn and retain information while experiencing strong emotions. We listen to a doctor's orders while upset about a diagnosis or while elated that a serious illness is in remission. We attend classes and meetings while under stress, and we try to remember every moment of a long-awaited celebration. The present results extend our

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[4]Because increased rehearsal of post-election coverage may have influenced the quantity of details recalled on each survey, we also ran regressions that included the self-reported ratings of rehearsal via media coverage as a predictor in the linear regressions examining the effect of valence and age on quantity of detail reported at each time point. For both surveys, self-reported rehearsal via media coverage immediately after the election was a significant predictor of the amount of information reported, $\beta s > ..21$, $ts > 2.33$, $ps < .003$. However, even when controlling for additional media coverage in this way, the effects of valence remained unchanged, such that increasing positivity was still associated with increasing quantity of information at each time point, $\beta s > .15$, $ts > 2.23$, $ps < .03$.

understanding of emotional valence's effects on young, middle-aged, and older adults' memory beyond the laboratory to these types of real-life, dynamic events. The results emphasize the need to ensure that individuals who feel strongly positive about an experience will be able to retain the details consistently over time. Although prior studies have emphasized that negative emotion can sometimes be associated with more memory distortions (e.g., Brainerd et al., 2008), the present results emphasize that in some situations – such as when trying to remember event-related details – it may be those who feel most positively about the event who are at greatest risk for remembering information in an inconsistent manner over time.

More work that bridges the emotional autobiographical memory and lifespan developmental perspectives is critical, as is work that further extends findings like the ones presented here into the clinical domain. Although terms like "memory inconsistency" tend to have a negative connotation, the ability to flexibly update memory based on new information and emotions can be quite functional (akin to "map updating"; Levine, Lench, & Safer, 2009) and may allow for the regulation of past emotions and higher levels of well-being. One implication of the present findings may be that events that are perceived as negative are less amenable to such flexible updating and regulation (see Novak & Mather, 2009). For individuals who are susceptible to clinical disorders like depression, a lack of flexibility may lead to increased rumination of negative details, which can in turn contribute to and sustain negative mood states. Applying research designs like the one used in the present experiment to clinical populations may elucidate the contributions of emotional valence and memory to affective disorders and shed light on possible therapeutic interventions.

Acknowledgments

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Appendix

Event-Related Questions

When was the election?

Who was the Democratic/Republican/Independent candidate of this election?

What percentage of votes did the Democratic/Republican/Independent candidate receive?

Who was the Democratic/Republican/Independent vice-presidential candidate?

What were the state ballot initiatives or propositions that were voted upon in this election?

What do you remember from the winning/losing candidate's speech?

Where was the winning/losing candidate when he gave his acceptance speech?

Who was with the winning/losing candidate when he gave his speech?

What were the winning/losing candidate and any family members who were present wearing?

Please give any other information that you remember about the candidates or news media, at the time it became clear who won the election.

Where was President Bush during election day?

Assessments of Emotional Importance

What was the intensity of your emotional reaction to the event? (1–7 scale)

Was your reaction positive or negative? (1–7 scale)

What was the personal importance of the event? (1–7 scale)

What was the broader importance of the event? (1–7 scale)

How surprising was the outcome of the event? (1–7 scale)

Assessments of Rehearsal

How frequently have you thought about this event since it occurred? (1–7 scale)

How frequently have you watched/read/listened to media coverage about this event? (1–7 scale)

How frequently have you spoken about this event? (1–7 scale)

Highlights

- Examined memory for the 2008 U.S. Presidential election across the adult lifespan

- Individuals who felt positive about the election outcome recalled a greater quantity of information

- Individuals who felt negative about the election recalled a greater proportion of details consistently after 6 months

- Older individuals and those who felt more emotionally intense about the election were more confident in their memories
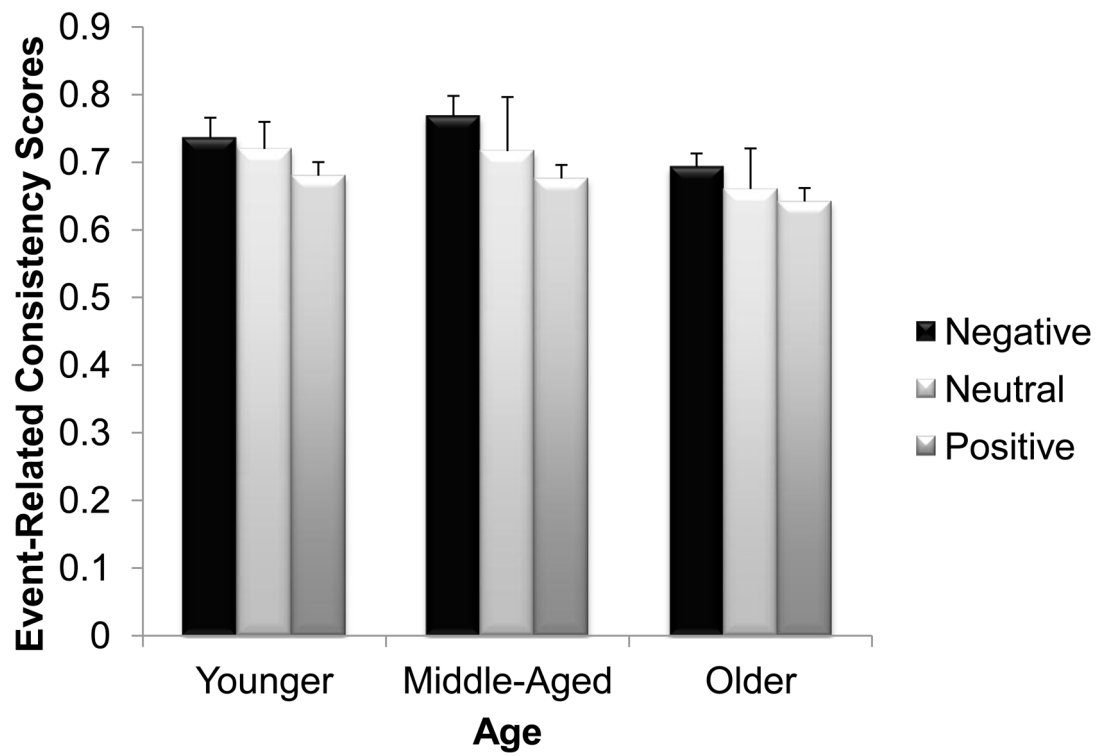
Figure 1.
Proportion of consistent event-related details recalled by younger, middle-aged, and older adults depending on whether they found the outcome of the election to be negative, neutral, or positive. Error bars represent the standard error of the mean.

Table 1

Number of participants in each age and valence group and characteristics of final sample. Note that participants who reported a history of depression, anxiety, or use of medications that affect the central nervous system were excluded after T1 and not sent the T2 survey.

	Time 1 Survey				Time 2 Survey (Final Sample)			
	T1 *N*	*N* Excluded	T2 *N*	Percentage of Eligible Time 1 Completed	*N* of Females	*M* (*SE*) Age	*M*(*SE*) Years of Education	*M*(*SE*) Number of Days Between Election and T1 Responses
Positive								
Younger	134	22	74	66%	54	25.85 (.52)	15.91 (.23)	5.49 (.17)
Middle	64	12	29	56%	23	44.52 (1.26)	15.41 (.36)	5.52 (.34)
Older	57	0	45	79%	38	74.39 (.85)	16.98 (.38)	5.40 (.40)
Negative								
Younger	43	7	26	72%	19	26.69 (.94)	14.96 (.39)	5.54 (.30)
Middle	37	6	19	61%	16	44.05 (1.22)	15.05 (.42)	5.47 (.26)
Older	18	1	14	82%	9	73.00 (2.09)	15.00 (.66)	4.64 (.96)
Neutral								
Younger	23	1	10	45%	3	27.00 (1.32)	15.90 (.89)	6.40 (.22)
Middle	11	0	7	63%	6	44.57 (2.68)	13.29 (.56)	5.29 (.61)
Older	8	0	8	100%	5	79.38 (.98)	17.38 (.38)	5.00 (1.21)

Table 2

Example survey questions and responses. Individual details are marked by brackets, and consistency score calculations are noted in the third column.

	Time 1	Time 2	Consistency
What percentage of votes did the Republican candidate win?	[30%] [1 detail]	[45%] [1 detail]	= 0/1 = 0
Who was the Independent candidate of this election?	[Ralph Nader] [1 detail]	I don't remember	Excluded
What were the state ballot initiatives or propositions that were voted upon in this election?	[1. dissolving the state tax] [2. Marijuana in small amounts would become a lesser charge] [3. no greyhound racing] [3 details]	[Sensible marijuana policy], [eliminate state tax], [greyhound protection] [3 details]	= 3/3 = 1
	[Death with Dignity Act], [Highway Funding for Washington state] [2 details]	[Washington-funding sources for highway improvements] [1 detail]	= 1/2 = 0.5
What were the winning candidate and any family members who were present wearing?	[Michelle was wearing this black dress] [with bright red on it]. [2 details]	[Michelle Obama was wearing a red dress] [with black on it] [2 details]	= (0.5 + 0.5)/2 = 0.5
Where was the winning candidate when he gave his acceptance speech?	[Chicago] [1 detail]	[Washington] [1 detail]	= 0/1 = 0
	[Chicago] [1 detail]	[Grant Park], [Chicago] [2 details]	= 1/1 = 1 [additional details recalled at T2 are not taken into account for consistency]

Table 3

Mean number and standard error values of details reported about the election at Times 1 and 2 and mean consistency, current confidence, and prospective confidence for details remembered about the election.

Emotion	Number of T1 Details M	SE	Number of T2 Details M	SE	Consistency M	SE	Current Confidence M	SE	T1 Prospective Confidence M	SE	T2 Prospective Confidence M	SE
Positive												
Younger	27.62	1.45	25.80	1.52	.68	.02	3.87	.05	4.88	.18	3.84	.16
Middle	26.54	1.97	26.23	2.28	.68	.02	4.01	.09	5.52	.26	4.10	.33
Older	27.82	1.73	28.42	2.90	.64	.02	4.12	.06	5.00	.25	4.12	.25
Negative												
Younger	17.88	1.58	20.46	2.47	.74	.03	3.91	.08	4.53	.31	3.04	.37
Middle	21.95	2.19	19.68	2.40	.77	.03	3.97	.12	4.89	.43	2.79	.42
Older	20.88	3.64	20.88	4.34	.69	.02	4.15	.11	5.29	.53	3.54	.33
Neutral												
Younger	22.40	2.21	24.90	3.28	.72	.04	3.65	.13	4.10	.50	3.56	.41
Middle	19.86	3.98	16.43	2.83	.72	.08	3.85	.27	4.29	.61	2.57	.48
Older	20.88	3.64	20.88	4.35	.66	.06	3.83	.15	3.50	.46	2.00	.46

Table 4

Multiple regression results for detail quantity, memory consistency and current and prospective confidence ratings

	R^2	Valence β	Age β	Intensity β	Valence X Age β	Valence X Intensity β
Details						
Event-Related T1	.17*	.30*	−.02	.24*	.00	.02
Event-Related T2	.09*	.20*	.01	.19*	.05	.08
Consistency						
Event-Related	.06*	−.19*	−.15*	−.02	−.02	.02
Confidence						
Current T2	.06*	.01	.20*	.14*	−.03	.04
Prospective T1	.09*	.09	.02	.28*	−.03	.05
Prospective T2	.16*	.22*	.00	.31*	.01	.02

*
$p < .05$

Table 5

Mean ratings and standard errors for rehearsal and emotion variables for the election.

Emotion	Rehearsal Variables								Emotion Variables					
	Media		Talk		Think		Personal Importance		Surprise		Arousal		Valence	
	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE	M	SE
Positive														
Younger (n = 74)	5.24	.18	5.26	.18	5.38	.17	5.82	.14	3.47	.20	4.43	.17	6.53	.08
Middle (n = 29)	5.48	.25	5.69	.22	5.66	.27	6.31	.15	3.10	.27	4.93	.28	6.62	.12
Older (n = 45)	6.26	.14	5.68	.16	6.10	.15	6.22	.15	3.44	.25	4.85	.20	6.74	.07
Negative														
Younger (n = 26)	3.85	.34	4.69	.32	5.00	.29	4.85	.30	2.23	.19	3.96	.30	1.81	.16
Middle (n = 19)	4.84	.37	5.47	.33	5.79	.28	5.95	.28	2.79	.42	4.84	.19	1.63	.17
Older (n = 14)	5.21	.54	5.14	.49	5.46	.35	6.00	.39	2.85	.50	4.85	.37	1.71	.24
Neutral														
Younger (n = 10)	4.70	.37	4.30	.42	4.70	.30	4.60	.22	2.10	.35	2.70	.42	4	0
Middle (n = 7)	3.57	.65	4.29	.57	3.86	.59	4.14	.59	3.29	.81	2.86	.55	4	0
Older (n = 8)	4.63	.60	5.00	.60	5.38	.46	4.63	.63	1.63	.26	2.13	.30	4	0