Emotional Expressivity in Older and Younger Adults' Descriptions of Personal Memories

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Background/Study Context: According to the socioemotional selectivity theory (SST; Mather & Carstensen, 2003, Psychological Sciences, 14, 409–415), aging is associated with greater motivation to regulate...
emotions. The authors propose that the language people use to describe personal memories provides an index of age differences in emotional self-regulation.

Methods: In the present article, the authors reanalyzed three previously published studies in which older (aged 60–88) and younger (aged 17–33) participants described emotional and neutral memories from their recent and distant pasts. The authors analyzed the language of the memories using Pennebaker, Booth, and Francis’s (2007) Linguistic Inquiry Word Count program (Austin, TX: LIWC Inc.), which calculates the percentage of positive and negative emotion words.

Results: In Studies 1 and 2, older adults used more positive emotion words than did younger adults to describe their autobiographical memories from the recent past, particularly when these were of a neutral valence. In Study 3, older adults used more positive emotion words when describing more recent memories (from the past 5 years) but not when describing distant childhood or adolescent memories.

Conclusion: The authors suggest that these age differences in emotional expressivity support SST, and represent an as-yet unreported age difference that may stem from differences in motivation to regulate emotion.

Older adults report experiencing higher levels of subjective well-being than do younger adults. Older adults report fewer negative emotional experiences (Carstensen, Pasupathi, Mayr, & Nesselroade, 2000; Gross et al., 1997; Mroczek & Kolarz, 1998) and as many or more positive emotional experiences (Carstensen et al., 2000; Schroots, 2003; Wagenaar & Groeneweg, 1990) as younger adults. Compared to younger adults, they also engage in more positive interpersonal interactions (Levensen, Carstensen, & Gottman, 1994) and experience less conflict (Birditt & Fingerman, 2005; Folkman, Lazarus, Pimley, & Novacek, 1987).

The subjective well-being findings are consistent with socio-emotional selectivity theory (SST), a motivational life span account of age-related changes in emotional functioning (Carstensen & Fredrickson, 1998; Carstensen, Fung, & Charles, 2003). As individuals age and become more aware that their time is limited, they shift from novelty seeking toward the pursuit of goals that enhance emotional well-being (Carstensen et al., 2003). This shift towards emotionally relevant goals is associated with an increase in the salience of positive information and a decrease in the salience of negative information (for a review, see Carstensen & Mikels, 2005).

The expression of emotions in language is an important indicator of psychological and physical well-being (Pennebaker & Graybeal, 2001; Pennebaker, Mayne, & Francis, 1997). Across a variety of studies,
Pennebaker and others have reported that individuals experience better psychological and health outcomes when they use more positive emotion words to describe traumatic experiences (Pennebaker et al., 1997; Sales & Fivush, 2005; Slatcher & Pennebaker, 2006). The language with which individuals express their memories seems to be one mechanism by which they regulate the emotions associated with them. In the current research, we used a text analysis tool to examine emotional expressivity in older and younger adults’ descriptions of different types of emotional autobiographical events.

It might be expected that a motivation to regulate emotions would be especially apparent in autobiographical memory. Autobiographical recall is a reconstructive process (Ross, 1989; Singer & Salovey, 1993) that can be affected by motivation (Kennedy, Mather, & Carstensen, 2004; Ross & Wilson, 2002; Wilson & Ross, 2001). Consistent with the hypothesis that the motivation to regulate emotions guides autobiographical remembering, there is evidence of age differences in the emotions that older and younger adults associate with their autobiographical memories (Comblain, D’Argembeau, & Van Der Linden, 2005; Kennedy et al., 2004; Levine & Bluck, 1997; Ready, Weinberger, & Jones, 2007; Schulkind & Woldorf, 2005). For example, in a daily diary, older adults rated their memories of recent events as containing more positive emotion than did their younger counterparts (Ready et al., 2007). Comblain et al. (2005) reported that older adults attributed more positive emotion to their negative personal memories (but not their neutral or positive memories) than did younger adults. Dijkstra and Kaup (2005) found that older adults reported a greater proportion of positively rated autobiographical memories and fewer negatively and neutrally rated autobiographical memories than did younger adults.

In the current research, we focus on a more subtle and novel indicant of the emotional valence of autobiographical memories, the language adults use to describe autobiographical events. As others suggest, expression of emotions in language is an important indicator of well-being (Pennebaker & Graybeal, 2001; Pennebaker et al., 1997). A shift in emotional language may represent one method by which older adults regulate emotions associated with autobiographical memories. In a meta-analysis of studies of emotional language, Pennebaker and Stone (2003) found that with advancing age, adults used more positive and fewer negative affect words to describe traumatic and emotional events.

In the current research, we examined older and younger adults’ emotional language in their descriptions of their autobiographical memories. Our research and analyses differ from those included in
Pennebaker and Stone’s (2003) meta-analysis in two important ways. First, Pennebaker and Stone (2003) did not examine the effects of the valence of the emotional events recalled (positive, negative, or neutral) on the language participants used to describe the memories. Most of the emotional events described by participants in the studies included in the paper were traumatic events. Consequently, there was limited variation across the sample in the valence of the events that participants were describing. In Studies 1 and 2 in the current paper, we examine the positive and negative emotion words participants used to describe positive, negative, and neutral autobiographical memories.

The impact of a motivation to self-regulate could depend, in part, on the valence of the memory. Older adults might, for example, describe positive, negative, and neutral memories using more positive emotion words (or fewer negative emotion words) than younger adults. A second possibility is that older adults may self-regulate primarily by using more positive emotional language to describe negative events. This result would be consistent with the findings of Comblain et al. (2005), and would suggest that older adults use language as a kind of positive reappraisal technique to deal with negative events. If older adults imbue negative events with more positive affect, then they may use more positive emotion words when describing their negative memories relative to their younger counterparts. A final possibility is that age differences in emotional expressivity could be especially evident in descriptions of neutral memories. The language people use to describe positive and negative autobiographical events may be constrained by the affective nature of the episodes. In contrast, neutral events either lack emotional content or are emotionally ambiguous. As a result, neutral events may be more susceptible to reconstruction. Relative to younger adults, older adults may use more positive or fewer negative emotional words when reporting neutral events.

Second, the studies analyzed by Pennebaker and Stone (2003), did not control for the age of the memory. The events described by older and younger participants may thus vary both in terms of how long ago the events took place, and the age of the participants at the time of the event (e.g., a childhood event is much more distant for older than younger adults, whereas a 10-year-old event may be a childhood memory for a younger adult and a memory from middle age for an older adult).

The age of a memory is important because the motive to self-regulate might vary in both impact and intensity with the temporal distance of the episode. When an event has just occurred, the
motive to self-regulate might have little impact on older adult’s recall because their memory is vivid. As the vividness of recall fades over time, there is more leeway for older adults’ motive to self-regulate to influence their reconstruction of past events. When the episode becomes even more distant (e.g., older adults’ childhood memories), however, older adults may experience little impetus to self-regulate because the memories—good or bad—have minimal impact on their current emotions (Ritchie et al., 2006). Although some very distant autobiographical memories can evoke strong emotion (e.g., some types of traumatic events), the affect associated with most memories fades over time (Ritchie et al., 2006; Skowronski, Walker, & Edlund, 2006).

In this paper, we report two studies that control the age of the memory, comparing older and younger respondents’ emotional memories from the previous 5 years (Study 1), and the past 2 weeks (Study 2). The third study investigates age differences in childhood and more recent memories to examine the relation between the age of the memory and the positivity of the emotional language.

We present a secondary analysis of three previously published studies on aging and autobiographical memories: St. Jacques and Levine, 2007 (Study 1), Fernandes, Ross, Wiegand, and Schryer, 2008 (Study 2), and Levine, Svoboda, Hay, Winocur, and Moscovitch, 2002 (Study 3). In each of these studies, younger and older adults described autobiographical memories. None of these studies was originally designed to examine emotional expressivity in descriptions of autobiographical memories by older and younger adults; however, each of them lends itself to that purpose.

For each of the studies included in this paper, we used Pennebaker, Booth, and Francis’s (2007) Linguistic Inquiry Word Count (LIWC) program, a text analysis program that can compute the percentage of positive and negative emotion words in autobiographical descriptions. LIWC has been used to measure emotional expressivity in a number of studies (e.g., Bohanek, Fivush, & Walker, 2005; Kahn, Tobin, Massey, & Anderson, 2007; Pennebaker & Graybeal, 2001). In the current research, we used this text analysis tool to examine emotional expressivity in older and younger adults’ descriptions of different types of emotional autobiographical events.

**STUDY 1 (St. Jacques & Levine, 2007)**

The original purpose of the St. Jacques and Levine (2007) study was to examine semantic and episodic details of autobiographical
memories from the past 5 years. For the purposes of this paper, we analyzed the language participants used to describe their positive, negative, and neutral memories.

**Methods**

**Participants**
Sixteen older (aged 69–88, \(M = 78\)) and 16 younger (aged 21–33, \(M = 26\)) adults participated in the study. Older adults were recruited from the volunteer database of the Rotman Research Institute and younger adults from classes at the University of Toronto. Eight male and eight female adults participated in each age group. Older and younger participants had similar levels of education (\(M_{\text{OLDER}} = 14.00, SD = 2.89\); \(M_{\text{YOUNGER}} = 15.60, SD = 2.53\)). None of the participants reported any psychological or neurological conditions that might affect cognitive performance.

**Procedure**
In the St. Jacques and Levine (2007) study, participants recalled aloud, in counterbalanced order, two positive, two negative, and two neutral specific events from their own lives over the past 5 years, not including the past 6 months. The memories were elicted using the Autobiographical Interview method (Levine et al., 2002). Participants were asked to describe personally experienced events that had occurred at a specific date and time. Participants were given a series of positive, negative, and neutral common life events as emotional cues (e.g., getting married, breaking a bone, feeding ducks) in counterbalanced order and asked to recall each memory in as much detail as possible. After recalling all of the events, participants rated each memory for valence (\(-6 = \text{negative}, 0 = \text{neutral}, \text{and} +6 = \text{positive}\)), and change in emotional state (the extent to which the event affected their emotions) at the time of the event (1 = no change, 6 = tremendous change). For more information on procedures, see St. Jacques and Levine (2007).

For the purposes of the present study, all memories were transcribed and experimenter comments and questions were removed. For all three studies reported in the current paper, we were interested primarily in positive (e.g., happy, good) and negative (e.g., hate, worthless) emotion word use. For each category, LIWC calculates the percentage of category words out of the total number of words used to describe the specific memory. We then calculated the mean of each word type, across each memory type, so that we had an index
of, for example, the average percentage of positive words used to describe positive events.

**Results and Discussion**

Older and younger adults were equally verbose. The average number of words (verbs, nouns, adjectives, etc.) that participants used to describe their memories did not differ significantly as a function of age, \( F(1, 30) = 1.64, p = .21, \eta^2_p = .10 \).

We analyzed the percentage of emotion words participants use to describe their memories with a 2 (word type: positive, negative) \( \times \) 2 (age group: younger, older) \( \times \) 3 (event type: positive, negative, neutral) multivariate analysis of variance (MANOVA). Age was a between-subjects factor; word type and event were within-subjects factors. The means are presented in Table 1.

Participants used more positive emotion words than negative emotion words to describe their memories, \( F(1, 30) = 122.03, p < .01, \eta^2_p = .80 \). This effect was qualified by an interaction between event type and word type, \( F(2, 29) = 26.46, p < .01, \eta^2_p = .65 \). Participants used more positive than negative emotion words when describing positive, \( F(1, 31) = 99.78, p < .01, \eta^2_p = .76 \), or neutral, \( F(1, 31) = 77.00, p < .01, \eta^2_p = .71 \), events and an equal percentage of positive and negative emotion words when describing negative events, \( F(1, 31) = 1.61, p = .21, \eta^2_p = .05 \). A main effect of event type, \( F(2, 29) = 4.24, p = .02, \eta^2_p = .51 \), indicated that participants used more emotion words in general when recalling positive rather than negative or neutral events. Most interestingly, the interaction between word type and age group was significant, \( F(1, 30) = 4.83, p = .04, \eta^2_p = .14 \). Relative to younger adults, older adults described their memories using a marginally greater percentage of positive emotion words, \( F(1, 30) = 3.57, p = .07, \eta^2_p = .11 \), and about the same

<table>
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<tr>
<th>Memory type</th>
<th>Positive emotion words</th>
<th>Negative emotion words</th>
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<tbody>
<tr>
<td></td>
<td>Younger (standard deviation)</td>
<td>Older (standard deviation)</td>
</tr>
<tr>
<td>Positive</td>
<td>3.68 (1.57)</td>
<td>4.26 (2.00)</td>
</tr>
<tr>
<td>Negative</td>
<td>1.94 (0.94)</td>
<td>2.11 (0.92)</td>
</tr>
<tr>
<td>Neutral</td>
<td>2.57 (1.37)</td>
<td>3.87 (1.42)</td>
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</table>

Table 1. Mean and standard deviation (in parentheses) of the percentage of positive emotion words and negative words used to describe positive, negative, and neutral autobiographical memories by younger and older adults in Study 1.
percentage of negative emotion words, $F(1, 30)=0.73$, $p = .40$, $\eta^2_p = .02$. The interaction between word type, event type, and age group was nonsignificant, $F(2, 29)=1.21$, $p = .31$, $\eta^2_p = .08$.

One hypothesis was that age differences in expressivity might be particularly evident in descriptions of neutral memories. Given that neutral events are, by definition, less emotional than positive or negative events, any such effects would likely be obscured by the inclusion of neutral and emotional events in the same analyses. Therefore, we also conducted planned contrasts, examining neutral memories separately from emotional (positive and negative) events. When we analyzed neutral events separately, the interaction between word type and age group was significant, $F(1, 30)=5.83$, $p = .02$, $\eta^2_p = .16$. Older adults used a higher percentage of positive emotion words than did younger adults, $F(1, 30)=6.90$, $p = .01$, $\eta^2_p = .19$. The two age groups did not differ in their use of negative emotion words, $F(1, 30)=0.02$, $p = .90$, $\eta^2_p = .00$. A separate analysis of descriptions of emotional (positive, negative) events revealed that the interaction between word type, age group, and event type was nonsignificant.

Valence Ratings
St. Jacques and Levine (2007) reported results from the valence rating scale; however, their analyses were collapsed across positive and negative events. For the purposes of the current paper, we reanalyzed the data from these scales so that we could report results for positive and negative events separately.

Participants rated the valence of each event on a scale from $-6$ (negative) to $+6$ (positive). The main effect of event type was significant. Participants rated positive events as more positive ($M=4.14$) than negative ($M=-2.66$) or neutral ($M=0.34$) events and negative events as more negative than other types of events, $F(2, 29)=126.12$, $p < .001$, $\eta^2_p = .90$. The main effect for age was nonsignificant, $F(1, 30)=2.98$, $p = .09$, $\eta^2_p = .09$. The interaction between age and event type was marginal, $F(2, 29)=2.92$, $p = .07$, $\eta^2_p = .17$. Younger adults were slightly more extreme in their valence ratings of positive and negative events than older adults; however, none of these simple effects reached significance (all $ps > .10$).

Overall the main finding of Study 1 supports the finding of Pennebaker and Stone (2003) that older adults use more positive emotion words when describing their autobiographical memories than do younger adults. The data reveal a more complex story, however. Relative to younger adults, older adults did not use a greater number of positive emotion words to describe negative or positive events or fewer negative emotion words to describe negative events.
Rather, relative to younger adults, older adults used a greater number of positive emotion words to report neutral events. The next study allowed us to assess the reliability of our findings using a very different procedure and a much larger sample.

**STUDY 2 (Fernandes, Ross, Wiegand, & Schryer, 2008)**

Study 1 used a time-demanding interview procedure and as a result the sample size was relatively small. In Fernandes et al. (2008), 48 older adults and 49 younger adults engaged in several recall tasks. We focused exclusively on the autobiographical memory task in our reanalysis, which participants completed in two sessions separated by 1 week.

In Study 2, we examined participants’ descriptions of autobiographical memories both when they reported the events in the first session and when they recalled those same events a week later. When individuals first experience an event, their memory for the details of that experience (both good and bad) may be quite vivid. A motive to self-regulate emotion may have less of an effect on vivid memories. In Study 2, we included session as a factor in our analyses in order to examine the effect of the passage of time on older and younger adults’ descriptions of their autobiographical events.

**Methods**

**Participants**

Forty-eight older adults (28 women and 20 men aged 60–84, \(M = 72.25\) years) and 49 younger adults (31 women and 18 men aged 17–29, \(M = 19.0\) years) participated in this study. Data from one older and one younger adult were omitted because they failed to follow instructions and reported more than four positive events. Younger adults were recruited from undergraduate psychology classes at the University of Waterloo and received partial course credit for their participation. Older participants were contacted through the Waterloo Research in Aging pool (WRAP). The WRAP pool consists of community-dwelling older adults (aged 60 to 85) who are recruited through advertisements in newspapers and flyers posted in community centers in the Kitchener-Waterloo area. All WRAP participants reported that they were in good physical and mental health.

Participants completed the Digit Span task (Wechsler, 1997), a measure of working memory capacity, and the Trail Making Task (Partington & Leiter, 1949), an assessment of cognitive flexibility.
Mean performance on both tasks was within the range of normal for both age groups (Strauss, Sherman, & Spreen, 2006). See Fernandes et al. (2008) for more details on these tasks. Education level was not assessed in this study; however, participants’ full-scale IQ scores were estimated based on their performance on the National Adult Reading test (NART-R; Blair & Spreen, 1989). Older adults scored higher than younger adults on this task, $F(1, 94) = 46.81, p = .001$.

Procedure
Participants completed the study in two sessions, 1 week apart. In the first session, participants were asked to describe four positive, four negative, and four neutral personal events that they had experienced in the previous 2 weeks. Participants could report these memories in any order that they wished. They were provided with a calendar to aid with their task and provided with examples of events of different valence as needed. Participants were told that they could take as long as they required to produce the events and could stop when they could not think of any further memories. After recalling the events, participants then rated the valence of each memory on a scale from $-3$ (very negative) to $+3$ (very positive). In the second session, which took place a week later, participants were instructed to recall the four positive, four negative, and four neutral memories that they had reported the week before. Participants were asked to recall as many of the Session 1 memories as possible, but to stop when they could recall no further events. Participants were again given as much time as they needed to complete the task. The autobiographical memory data in both Sessions 1 and 2 were collected as part of larger study, which also included measures of picture and word memory. For further details about the procedure and other findings, see Fernandes et al. (2008).

Results
Preliminary analyses on Session 1 data revealed no effects or interactions with gender. There were also no age differences in the average number of words used by participants to describe memories, $F(1, 66) = 1.0, p = .32, \eta_p^2 = .01$, and the interaction between age and memory type was not significant, $F(2, 65) = 0.37, p = .70, \eta_p^2 = .01$. Not every participant reported at least one example of a positive, negative, or neutral memory in Session 1, and not every participant correctly recalled at least one example of each type of memory in Session 2. In the first set of analyses below, we include only those participants who reported at least one positive, negative, and neutral
memory in Session 1 and recalled at least one of each type of memory in Session 2 (68 participants; 44 younger adults and 24 older adults). This age difference in sample size was driven primarily by the fact that older adults had difficulty remembering neutral events in Session 2. In our second set of analyses, we examined neutral events separately from emotional (positive and negative) events. Because the majority of older and younger participants were able to recall at least one positive and one negative event in Session 2, we were able to include a much larger percentage of the sample in our separate analysis of emotional events. As in Study 1, this secondary set of analyses also allowed us to test the hypothesis that age differences in expressivity would be particularly evident in neutral events.

The percentage of emotion words participants used to describe their memories was analyzed in a 2 (word type: positive, negative) × 2 (age group: younger, older) × 3 (event type: positive, negative, neutral) × 2 (session: week 1, week 2) MANOVA. Age was a between-subjects factor; event type, word type, and session were within-subjects factors. See Table 2 for means.

Main effects of event type, $F(2, 65) = 7.73, p = .001, \eta^2_p = .19$, and session, $F(1, 66) = 6.43, p = .01, \eta^2_p = .09$, were significant. Participants used more emotion words to describe positive and negative than neutral events and a greater percentage of emotion words in Session 2 than in Session 1. Similar to Study 1, there was a significant interaction between word type and age group, $F(1, 66) = 8.11, p = .01, \eta^2_p = .11$. The form of the interaction was identical to

<table>
<thead>
<tr>
<th>Event type</th>
<th>Positive emotion words</th>
<th>Negative emotion words</th>
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<tbody>
<tr>
<td></td>
<td>Younger</td>
<td>Older</td>
</tr>
<tr>
<td>Session 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>4.77 (4.30)</td>
<td>5.56 (4.62)</td>
</tr>
<tr>
<td>Negative</td>
<td>1.26 (1.47)</td>
<td>1.40 (1.38)</td>
</tr>
<tr>
<td>Neutral</td>
<td>1.44 (1.99)</td>
<td>2.57 (2.81)</td>
</tr>
<tr>
<td>Session 2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>5.12 (4.53)</td>
<td>6.58 (6.78)</td>
</tr>
<tr>
<td>Negative</td>
<td>1.97 (4.21)</td>
<td>1.72 (2.45)</td>
</tr>
<tr>
<td>Neutral</td>
<td>1.88 (2.67)</td>
<td>5.10 (8.19)</td>
</tr>
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</table>

*Note. Overall analyses: $N = 68$. 
Study 1: regardless of event type, older adults used a significantly greater number of positive emotion words than did younger adults, $F(1,66) = 4.17$, $p = .05$, $\eta_p^2 = .06$, and about the same number of negative emotion words, $F(1,66) = 0.88$, $p = .35$, $\eta_p^2 = .01$.

The three-way interaction between session, age, and event type was also significant, $F(2,65) = 3.49$, $p = .04$, $\eta_p^2 = .10$. Analyses of the simple effects revealed that this interaction was driven primarily by the fact that older adults used slightly more emotion words than younger adults to describe neutral events in Session 2, $F(1,66) = 2.58$, $p = .11$, $\eta_p^2 = .04$, and younger adults used slightly more emotion words than older adults to describe negative events in Session 2, $F(1,66) = 3.04$, $p = .08$, $\eta_p^2 = .05$. However, neither simple effect reached significance. Older adults may have used slightly more emotion words to describe neutral events in Session 2 because they were more likely to remember neutral events in Session 2 that were imbued with more emotion. In younger adults, the emotions associated with negative events may become more salient over time, leading them to describe such events with more emotion words. The four-way interaction between word type, event type, session, and age was nonsignificant, $F(2,65) = 0.64$, $p = .53$, $\eta_p^2 = .02$. No other effects were significant.

As in Study 1, we analyzed neutral events separately from emotional events. In these separate analyses, we were able to include 72 participants (27 older and 45 younger) in our analysis of neutral events and 87 participants (40 older and 47 younger) in our analyses of emotional (positive and negative) events. When we analyzed neutral events separately from emotional events, we obtained a significant interaction between word type and age, $F(1,70) = 5.50$, $p = .02$, $\eta_p^2 = .07$. Older adults ($M = 3.41$, $SD = 4.56$) used more positive emotion words when describing neutral events in both sessions than did younger adults ($M = 1.74$, $SD = 2.10$), $F(1,70) = 4.48$, $p = .04$, $\eta_p^2 = .06$. Older ($M = 0.90$, $SD = 1.71$) and younger ($M = 1.21$, $SD = 1.67$) adults did not differ in their use of negative emotion words, $F(1,70) = 0.25$, $p = .60$, $\eta_p^2 = .01$. We also found a main effect of week, $F(1,70) = 5.13$, $p = .03$, $\eta_p^2 = .07$. Participants used more emotion

\[\text{The following is a breakdown of older and younger participants' recall of positive, negative, and neutral events in the study: One older adult did not produce a single negative event in week 1. One older adult did not produce a single neutral event in week 1. One older adult was unable to recall either a single positive or negative event in week 2. Another older adult did not recall any negative or neutral events in week 2. Five older adults did not recall any negative events in week 2. Eighteen older adults did not recall any neutral events in week 2. One younger adult could not recall any negative events in the second week. Three younger adults could not produce a single neutral event in week 2.}\]
words in general to describe neutral events in week 2 ($M = 2.06, SD = 4.04$) than in week 1 ($M = 1.41, SD = 2.00$). A main effect of word type was also significant, $F(1, 70) = 12.01, p < .01, \eta^2_p = .16$. Participants also used more positive emotion words ($M = 2.37, SD = 3.88$) than negative emotion words ($M = 1.10, SD = 2.16$) to describe neutral events. No other effects were significant.

In separate analyses of the emotional (positive, negative) events, main effects of both week (participants used a greater percentage of emotion words in week 2 [$M = 3.82, SD = 5.05$] than in week 1 [$M = 2.59, SD = 2.58$]), $F(1, 85) = 6.26, p = .01, \eta^2_p = .07$, and word type (participants used more positive [$M = 3.47, SD = 4.03$] than negative [$M = 2.49, SD = 3.60$] emotion words in their descriptions), $F(1, 85) = 9.17, p < .01, \eta^2_p = .10$, were significant. Unsurprisingly, the interaction between word type and event type was also significant, $F(1, 85) = 88.22, p < .01, \eta^2_p = .51$. Participants used more positive ($M = 5.32, SD = 5.60$) than negative ($M = 0.45, SD = 1.58$) emotion words to describe positive events, $F(1, 86) = 79.56, p < .01, \eta^2_p = .48$, and more negative ($M = 4.53, SD = 5.61$) than positive ($M = 1.61, SD = 2.47$) emotion words to describe negative events, $F(1, 86) = 31.28, p < .01, \eta^2_p = .27$.

More interestingly, the three-way interaction between age group, week, and word type was significant, $F(1, 85) = 4.94, p = .03, \eta^2_p = .06$. Older and younger adults did not differ in the percentage of positive ($M = 3.13, SD = 2.20$ and $M = 3.00, SD = 2.11$, respectively), $F(1, 85) = 0.15, p = .70, \eta^2_p = .00$, or negative ($M = 2.08, SD = 2.37$ and $M = 2.10, SD = 1.20$, respectively), $F(1, 85) = 0.01, p = .95, \eta^2_p = .00$, emotion words that they used to describe emotional events in week 1. In week 2, younger adults ($M = 3.65, SD = 4.44$) used significantly more negative emotion words than older adults ($M = 2.00, SD = 2.79$), $F(1, 85) = 4.17, p = .04, \eta^2_p = .05$. Older ($M = 4.21, SD = 4.66$) and younger ($M = 3.54, SD = 3.35$) adults did not differ in the percentage of positive emotion words they used to describe their memories in week 2, $F(1, 85) = 0.60, p = .44, \eta^2_p = .01$. If we examine these simple effects from another perspective, older adults did not differ in the percentage of positive, $F(1, 39) = 2.56, p = .12, \eta^2_p = .06$, or negative, $F(1, 39) = 0.03, p = .87, \eta^2_p = .00$, emotion words they used to describe events from week 1 to week 2. Younger adults also used a similar percentage of positive emotion words across both sessions, $F(1, 46) = 1.59, p = .21, \eta^2_p = .03$; however, they used
significantly more negative emotion words in week 2 than in week 1, \( F(1, 46) = 6.25, p = .02, \eta^2_p = .12. \)

The three-way interaction between age group, word type, and event type was also significant, \( F(1, 85) = 8.91, p < .01, \eta^2_p = .10. \) In week 1, older and younger adults used the same percentage of emotion words to describe both positive (\( M = 2.66, SD = 1.96 \) and \( M = 2.56, SD = 2.21 \), respectively), \( F(1, 85) = 0.47, p = .83, \eta^2_p = .00, \) and negative (\( M = 2.60, SD = 2.29 \) and \( M = 2.54, SD = 1.33 \), respectively), \( F(1, 85) = 0.23, p = .88, \eta^2_p = .00, \) events. In week 2, older adults (\( M = 3.73, SD = 4.62 \)) were slightly (though nonsignificantly) more emotionally expressive than younger adults (\( M = 2.68, SD = 2.31 \)) when describing positive events, \( F(1, 85) = 1.89, p = .17, \eta^2_p = .02, \) and younger adults (\( M = 4.51, SD = 5.27 \)) were significantly more expressive than older adults (\( M = 2.47, SD = 2.68 \)) when describing negative events, \( F(1, 85) = 4.91, p = .03, \eta^2_p = .06. \) No other effects were significant.

Valence Ratings of Events
Participants rated the valence of each memory on a scale from −3 (very negative) to +3 (very positive). Participants rated positive events as more positive (\( M = 2.30 \)) than negative (\( M = −1.56 \)) or neutral (\( M = 0.20 \)) events, and negative events as more negative, \( F(2, 65) = 407.42, p < .001, \eta^2_p = .94. \) Older adults rated their memories in general as more positive (\( M = 0.42 \)) than did younger adults (\( M = 0.19 \)), \( F(1, 66) = 4.46, p = .04, \eta^2_p = .09. \)

Overall the results of Study 2 are in line with those of Study 1: older adults used more positive emotion words when describing their autobiographical memories than did younger adults. What is more, we found that older adults used a greater number of positive emotion words to report neutral events. When we analyzed emotional events separately, we found little evidence that older adults used more positive emotion words to describe positive or negative events. Rather, we found stronger evidence that younger adults were more emotionally expressive when describing negative events, and in particular used more negative emotion words than older adults when describing events in week 2. Older adults were more consistently positive in their descriptions of neutral events. Younger adults became more negatively expressive in their descriptions of their memories over time.

\(^2\)Findings from the valence rating scale were reported by Fernandes et al. (2008). However, Fernandes et al. (2008), examined a different aspect of the data (i.e., the proportion of events participants recalled) and therefore their sample size was different (\( N = 97 \)) from that reported in the current paper (\( N = 68 \)).
In Study 2, all participants used a greater proportion of emotion words to describe events in Session 2 than in Session 1. Younger adults used a greater proportion of negative words in their descriptions from week 1 to week 2. This finding supports research reporting a negativity effect among younger adults (Baumeister, Bratslavsky, Finkenauer, & Vohs, 2001). However, we found no indication that older adults became more positive in their descriptions of autobiographical events from the first to the second session.

One of the limitations of this study is that older adults were less likely to recall neutral events in Session 2, thus greatly reducing the number of older adults whose data could be included in the overall analysis. We addressed this issue in part by analyzing neutral events separately from emotional events. Nevertheless, it is possible that the neutral events older adults did remember were particularly emotional and therefore more likely to be remembered. However, even if the neutral memories that older adults recalled in Session 2 were remembered because they were more emotional, that does not explain why older adults were more likely than young to describe neutral events across both sessions using more positive emotion words.

**STUDY 3 (Levine, Svoboda, Hay, Winocur, & Moscovitch, 2002)**

The rationale for including the Levine et al. (2002) study in this paper was to determine whether factors other than event type influenced word usage. In their work, Levine et al. examined recall of semantic and episodic details from autobiographical memories across the life span. For our analysis, we examined whether older and younger adults differed in the emotional language they used to describe childhood and adolescent compared to more recent memories.

In the introduction, we had suggested two contrasting predictions for how temporal distance of the described event might influence word usage. On the one hand, distant episodes may be less vivid than recent ones and therefore offer more latitude for older adults to reconstruct the past using positive emotional language. We did not find support for this prediction in Study 2. Older adults used more

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3Research of memory across the life span has typically found evidence of a reminiscence bump in autobiographical memory such that individuals remember more experiences from their late teens and 20s compared to memories from other life span periods (Holmes & Conway, 1999; Jansari & Parkin, 1996; Rubin & Berntsen, 2003; Webster & Gould, 2007). In the current research, we are not suggesting that memories from late adulthood are more vivid than childhood or adolescent events. We merely suggest that more distant memories are less vivid than very recent memories (from the past year).
positive emotion words than younger adults and but the proportion of emotion words they used in their descriptions did not change over the course of a week.

Alternatively, older adults may have little motivation to describe distant memories using more positive emotion words. The emotions associated with autobiographical memories fade over time (Ritchie et al., 2006). Distant memories may have less impact on current emotions compared to memories of more recent life events. Moreover, when recalling distant life events, individuals will often identify those memories as belonging to a past self who has little connection to the person they are now (Ross & Wilson, 2002, 2003; Wilson & Ross, 2001). If older adults are more motivated to regulate the emotion associated with recent than distant past events, then we would expect older adults to use more positive emotion words to describe recent than distant past events. Younger adults should show no such increase in positive expressivity when describing distant and recent life events. If anything, based on the findings from Study 2, we might find that younger adults use more negative emotion words to describe distant past events. This would be consistent with findings of a negativity effect among younger adults (Baumeister et al., 2001). An analysis of the word usage in the Levine et al. (2002) study allowed us to test directly whether a temporal gradient also influences age differences in emotional word usage. We examined whether older adults described distant relative to recent memories using fewer positive emotional words.

Methods

Participants
Memories from 14 older (aged 66–89, $M = 73$) and 14 younger (aged 19–34, $M = 23.5$) adults were analyzed. Data from one older participant and one younger participant from the original study were unavailable at the time of analysis and therefore excluded from analyses reported in the current paper. Older adults were recruited from the volunteer database of the Rotman Research Institute and younger adults from undergraduate classes at the University of Toronto. All participants were screened for neurological or medical conditions that might interfere with memory. Older adults ($M = 28.14$, range 26–30) were well above the cutoff score on the Mini-Mental State Examination. Both age groups were similar in their number of years of education ($M_{\text{OLDER}} = 14.00$, $SD = 2.56$; $M_{\text{YOUNGER}} = 14.70$, $SD = 1.05$).
Procedure
As in the first study (St. Jacques & Levine, 2007), memories were elicited using the Autobiographical Interview method. Participants were asked to describe one specific event from each of five life span periods (early childhood, adolescence, early adulthood, middle age, and events from the past year). To help elicit the memories, participants were provided with a list of 100 typically life events and told that they could either select an event from the list or come up with their own. For the purposes of the current research, we were interested only in memories that could be matched either in actual time span (e.g., events from the past year) or life span period (e.g., childhood memories) across both age groups. We therefore only included memories from early childhood, adolescence, and the past year in our analyses. In the original study, the experimenters first asked participants to engage in free recall about the event and when they were done they were asked specific questions about details of the event. In the current analyses, we only analyzed participants’ free recall of the event. The valence of events was not specified in the original study; thus unlike the previous two studies we reported, we could not examine word usage for events of different valence. Instead, the purpose was to examine whether there was a temporal gradient in use of positive emotional words to describe remote compared to recent autobiographical memories.4

Participants began by describing their memories orally without interruption. After participants had described all of the memories, experimenters administered a specific memory probe for each event, asking questions designed to elicit details about the time, location, sensory information, etc., associated with the event (see Levine et al., 2002, for further details on procedures). For the present research, we were interested in participants’ spontaneous autobiographical recall; therefore, we analyzed only the text from their original recall.

Results
Participants did not differ in the percentage of positive, $F(1, 25) = 0.91$, $p = .76$, $\eta_p^2 = .04$, or negative, $F(1, 25) = 0.28$, $p = .60$, $\eta_p^2 = .01$, emotion words they used to describe childhood and adolescent memories;

4It is possible that in Study 3, age differences in language usage may represent in part the different kinds of memories (positive, negative, or neutral) that older and younger adults recalled for each lifetime period. It is not possible to disentangle recall and description in the current study.
thus we collapsed data across these two life span periods in our subsequent analyses. Data were analyzed using a 2 (word type: positive, negative words) × 2 (life span period: childhood/adolescent, recent event) × 2 (age group: younger, older) repeated-measures ANOVA, with word type and time period as within-subject factors and age as a between-subjects factor. See Table 3.

There was a main effect of word type. Participants generally used more positive than negative emotion words to describe their memories, $F(1, 25) = 34.51, p < .01, \eta_p^2 = .58$. The interaction between life span period and age group was also significant, $F(1, 25) = 6.51, p = .02, \eta_p^2 = .21$. Older adults used more emotion words in general than did younger adults to describe recent, $F(1, 25) = 5.15, p = .03, \eta_p^2 = .17$, but not distant, $F(1, 25) = 1.73, p = .20, \eta_p^2 = .07$, memories.

The three-way interaction between word type, life span period, and age group was not significant, $F(1, 25) = 2.22, p = .15, \eta_p^2 = .08$. This is perhaps unsurprising given the relatively small sample size in the study. Because we predicted a difference in the current study, we also analyzed participants’ use of positive and negative emotion words separately.

The interaction between the life span period of the memory and age group was significant for positive, $F(1, 25) = 4.78, p < .05, \eta_p^2 = .16$, but not negative, $F(1, 25) = 1.50, p = .23, \eta_p^2 = .06$, emotion words. Older and younger adults did not differ in the percentage of positive emotion words they used to describe childhood memories, $F(1, 25) = 0.86, p = .77, \eta_p^2 = .003$. Compared to younger adults, however, older adults described their more recent memories using a greater percentage of positive emotion words, $F(1, 25) = 4.84, p < .05, \eta_p^2 = .16$. The interaction between life span period and age group was not significant for negative emotion words, $F(1, 25) = 1.50, p = .23, \eta_p^2 = .06$.

The current study is consistent with the first two in its finding that older adults used more positive emotion words to describe their

<table>
<thead>
<tr>
<th>Time span</th>
<th>Positive emotion words</th>
<th>Negative emotion words</th>
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<tbody>
<tr>
<td></td>
<td>Younger</td>
<td>Older</td>
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<tr>
<td>Early childhood</td>
<td>2.29 (1.42)</td>
<td>2.35 (1.32)</td>
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<tr>
<td>Adolescent</td>
<td>2.95 (1.86)</td>
<td>2.76 (2.05)</td>
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<tr>
<td>Recent</td>
<td>2.22 (1.44)</td>
<td>4.00 (2.40)</td>
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memories than did younger adults. Interestingly, however, they only did so when describing more recent memories. This finding suggests that older adults do not describe distant memories using more positive emotional language. Younger adults, in contrast, did not differ in the proportion of positive or negative words they used to describe events in the recent or distant past.

**GENERAL DISCUSSION**

We reanalyzed autobiographical memories from three previously published papers, examining the emotional language that older and younger adults used to describe their memories. All three studies replicated the same basic finding: older adults used more positive emotion words to describe autobiographical memories, particularly neutral ones. We also found that this positivity effect was stronger for more recent memories. We discuss each of these findings in turn.

If older adults had used more positive emotion words to describe all types of events, this effect could reflect a cohort difference in how adults of different generations use language to express emotion. When we examined each type of event separately in Studies 1 and 2, however, it was clear that the age difference in language use occurred primarily for neutral memories. Older adults used significantly more positive emotion words in their descriptions of neutral events. It is unlikely that a cohort difference in language would be so selective.

This finding is open to several interpretations. One possibility is that the ambiguity of neutral memories provides greater latitude for emotional self-regulation. Neutral memories may be of mundane events, largely devoid of emotional relevance. Alternatively, events may be categorized as neutral because they elicit both positive and offsetting negative emotions. Regardless, the valence of neutral memories is ambiguous and it is perhaps this ambiguity that allows motivation its greatest scope (Balcetis & Dunning, 2006; Kensinger, 2008). Because there is probably no shortage of bland or ambiguous events in everyday life, the emotional impact of the motive to self-regulate could be considerable.

Another interpretation of this finding might be that older adults have more difficulty retrieving neutral events compared to emotional events (Fernandes et al., 2008), and therefore categorize events that have an emotional tone as neutral. This is quite plausible given that a disproportionate number of older adults could not remember even one neutral memory in the second session of Study 2. Regardless,
older adults consistently described neutral memories using more positive emotion words, not more negative emotion words, than younger adults. This finding suggests that the events that older adults classify as neutral are not simply more emotional, but rather, are associated with more positive affect.

Similar to other researchers (e.g., Tomaszczyk, Fernandes, & MacLeod, 2008) we found evidence of a negativity effect in younger adults. Younger participants used more emotion words than older adults to describe negative events, and more negative emotion words specifically to describe all types of events. This age difference in negative expressivity increased across sessions in Study 2. This did not seem to be an example of positive reappraisal by older adults. Older adults did not differ in the percentage of positive or negative emotion words that they used across Session 1 and Session 2. Rather, younger adults used more negative emotion words when describing memories in Week 2. This finding requires more empirical research; however, it does suggest that over time younger adults may become more negatively expressive than older adults in their descriptions of emotional events.

Another goal of this research was to examine how older and younger adults’ descriptions of autobiographical memories change over time. In Study 3, we compared older and younger adults’ descriptions of more recent (from the past 2 years) and distant (childhood and adolescent) memories. Older adults used more emotion words than young to describe recent but not distant events. In particular, older adults used more positive emotion words than younger adults to describe recent memories. We propose that distant memories may have less emotional impact and be less self-relevant to older adults. As a result, older adults may not be motivated to describe distant memories using more positive emotional language. There are alternative explanations for this finding, however, that cannot be ruled out on the basis of the present data. One possibility is that the distant memories reported by older adults were retrieved as encoded during childhood or young adulthood and were therefore unaffected by an age-related positivity bias. Alternatively, distant memories may be well rehearsed and offer little latitude for a self-regulation motivation to affect the language that an individual uses to describe them.

It is also possible that older adults, on some level, may be aware of age differences in use of emotional language and that this awareness is reflected in the language that they use to describe memories from a younger versus an older adult self. Sullivan, Mikels, and Carstensen (2010) asked older and younger adults to retell a story from the
perspective of an older versus a younger protagonist. Older participants used more positive emotional language when describing the story from the perspective of an older (75-year-old) than a younger (25-year-old) character. Younger adults’ use of language did not differ regardless of the age of the protagonist of the story. It is possible that older adults in the current story also used different conventions of language depending on which self (older or younger) was the focus of the memory. More research is needed to separate out these possibilities.

Across all three studies we found a difference in the percentage of positive emotion words older and younger adults used to describe their experiences. We did not find a reduction in the number of negative emotion words used by older compared with younger adults. This finding is somewhat contrary to research reporting a reduction in the number of negative stimuli recalled by older than younger adults (Grühn, Scheibe, & Baltes, 2007; also see Murphy & Isaacowitz, 2008, meta-analysis). It is possible that this discrepancy between the current studies and past research may be driven in part by differences between the tasks used (recall versus description). In the current research, we did not study recall. We examined participants’ descriptions of events that they remembered. Emotional self-regulation may occur at different stages of memory, and may take different forms.

We also examined autobiographical memories rather than pictures or words. Negative information may be particularly important in an autobiographical context. People learn from fear, embarrassment, and other negative emotions. The negative information associated with autobiographical experiences may be spared compared to stimuli such as pictures or words. It may be easier to regulate emotions associated with autobiographical memories by accentuating the positive rather than forgetting the negative.

In the current research, we used a text analysis program to examine age differences in language usage. Programs such as LIWC can be problematic because they are insensitive to subtleties of language such as sarcasm, irony, or negations. LIWC, for example, will categorize “not happy” as a positive emotion word. This is unlikely to represent a serious threat to the current analyses. Researchers have generally found that the LIWC categorization of emotion words has good concurrent validity with human raters (Alpers et al., 2005). Furthermore, the use of more positive emotion words in descriptions of emotional experiences is associated with better health outcomes even when the emotion words are negated (Pennebaker, Mayne, & Francis, 1997). Nevertheless, it would be helpful for future studies to investigate the frequency with which emotion words are
typically negated in descriptions of emotional experiences and to
determine whether there are age differences in the use of negations.

The current research was a reanalysis of three previously published
data sets on age differences in autobiographical memories. None of
these studies were originally designed to examine age differences in
emotional expressivity and each had design issues (e.g., small sample
size) that limited our secondary analysis. Nevertheless, all three stu-
dies replicated the same basic finding that older adults used more
positive emotion words to describe autobiographical memories. The
current examination suggests that there are clear differences in how
older and younger adults express the emotions associated with their
autobiographical memories, particularly neutral ones.

Our findings also suggest that the positivity effect is stronger for
more recent memories. We suggest that the motivation to self-
regulate emotion influences the language older adults use to describe
their recollections. These age differences in emotional expressivity
support SST but suggest that the age-related positivity effect is a
complex phenomenon. Future research needs to examine not just
whether adults of different ages recall positive and negative stimuli,
but also how they represent emotional information (particularly
autobiographical experiences) in memory. Further research is also
needed to understand how variables such ambiguity, time, and shifts
in motivation affect the relationship between age, memory, and
emotion.

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