

BRIEF REPORT

Age-Related Perspectives and Emotion Processing

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Emotion is processed differently in younger and older adults. Older adults show a positivity effect, whereas younger adults show a negativity effect. Socioemotional selectivity theory suggests that these effects can be elicited in any age group when age-related perspectives are manipulated. To examine this, younger and older adults were oriented to actual and age-contrasting possible selves. Emotion activations were assessed using lexical decision. In line with socioemotional selectivity theory, shifts in emotion orientation varied according to perspective, with both younger and older adults showing a negativity effect when a younger adult perspective was taken and a positivity effect when an older adult perspective was taken.

Keywords: aging, perspective taking, positivity effect, possible selves

One idea that has garnered a great deal of attention lately is that emotional information is processed differently as age increases. For example, there is the finding that older adults show an increase in the processing of positive emotional information, called the *positivity effect*, which has frequently been interpreted in terms of socioemotional selectivity theory (e.g., Charles, Mather, & Carstensen, 2003). The specific interest here was whether this age-related bias can be altered by the perspective one takes in a task for oneself, and whether such a perspective can influence processing at the level of implicit memory, as compared with more conscious, explicit decisions.

According to socioemotional selectivity theory, cognitive processing in aging is affected by changes in a person's goals as a function of their position in the life span. That is, although various goals are activated in processing throughout the life span, the saliency of these goals changes with age (e.g., Hoyle, 2006). Furthermore, as one ages, there is a perspective shift toward a realization that time is "running out." This limited-time perspective then redirects focus to immediate goals over long-term ones. This focus on emotional goals with increased age has led socioemotional selectivity theory to posit that there is a shift in the cognitive framework in which people are more likely to avoid negative emotional content (e.g., Carstensen & Mickels, 2005; Hoyle & Sherrill, 2006).

Although socioemotional selectivity theory suggests that the awareness of a limited life span with increasing age modifies goal-directed behavior and cognition (Carstensen, Fung, & Charles, 2003), the extent of the pliability of the resulting positivity effect for one's self is unknown, as is the extent to which altered perspectives can influence basic, unconscious processes, such as those found in implicit memory. The aim of the current project was to determine whether an increased emphasis on positive emotional information associated with old age is a function of chronological age, or whether can it be found in any age group depending on the perspective for oneself taken at the time.

One possibility is that the positivity effect is largely driven by chronological age. As such, it should be present only in older adults and would not be much altered by the perspective one takes. Alternatively, it may be that the processing bias can be altered by changing one's working self-concept. This can be done by having people think of themselves at different points in their lives, regardless of their actual, chronological age. Although there has been some research showing that different perspectives can alter the explicit decisions that individuals make, there is no clear evidence that such perspectives would have an influence on more implicit and unconscious processes, such as those found in implicit memory.

In terms of altered perspectives, it has been found that the positivity effect can emerge in younger adults with serious illness (Fung, Phillina, & Ng, 2001). Here, because of the limited lifetime perspective, there is a shift in processing that is not strongly tied to age. Moreover, younger adults who are encouraged to focus on emotional states may also show a positivity effect (Kennedy, Mather, & Carstensen, 2004; Löckenhoff & Carstensen, 2007), although there is not a shift in perspective per se. Also, older adults who make explicit decisions for a younger adult show a reduced positivity effect, although younger adults who are asked to make decisions for an older adult do not show a positivity effect (Löckenhoff & Carstensen, 2007). Finally, Sullivan, Mikels, and Carstensen (2010) explored perspective-taking in younger and

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older adults as they retold stories from different aged characters' perspectives. They found a decline in positive emotion words for older adults when the stories were recalled from a younger character's perspective. This suggests that the positive effect is pliable and can vary depending on the perspective one takes.

However, at this point, it is unclear how pervasive a positivity effect would be in healthy younger adults who are encouraged to take an older adult perspective, or, conversely, how pervasive the reduction or elimination of the positivity effect would be in older adults who take a younger adult perspective. Such perspective-taking is possible in that people can draw on their self-knowledge and various semantic and episodic memories to create different self-representations (e.g., Higgins, 1987; Markus & Nurius, 1986). There is evidence that possible selves can become relevant when they are recruited into a working self-concept (e.g., Hoyle & Sherrill, 2006; Stein, Roeser, & Markus, 1998). This working self-concept may then activate complexes of knowledge in memory that are consistent with them, such as an older adult perspective putting a person in a frame of mind where there is going to be greater activation of emotionally positive information.

Many studies have used possible selves as an orienting device (Hoyle & Sherrill, 2006) to influence behavior associated with academic achievement (e.g., Clements & Seidman, 2002), delinquency (e.g., Oyserman & Markus, 1990), career choices (e.g., Chalk, Meara, & Day, 1994), and exercise (e.g., Ouellette, Heskling, Gibbons, Reis-Bergan, & Gerrard, 2005). In terms of age-focused studies, Hooker (1992) used possible selves to determine the nature of self-regulatory processes in health-related behaviors in younger and older adults suffering from terminal illness. Here, a positivity effect was found in both younger and older adults. However, the nature of the positivity effect as it relates to healthy younger adult populations is unknown.

To further explore the extent to which perspective-taking can influence cognition with regard to age-related positivity and negativity effects, and to reduce the influence of any expectancy bias, our measures focused more on implicit memory. As such, we used a lexical decision task. If the perspective-taking influence is extensive, then it would be expected that there would be an influence on even implicit memory processes, such as priming. However, if it is more confined to conscious biases, then priming would be unaffected by the perspective one took. Focusing on implicit memory processes is also favored because it is relatively spared by aging (Graf, 1990; Light & LaVoie, 1993). For example, semantic memory shows some stability as well as improvement with age (e.g., Nyberg et al., 2003; Radvansky, Lynchard, & von Hippel, 2009).

In the current study, age-related possible selves were used to assess the extent to which the positivity effect is elicited in younger adults by orienting them to an old-age possible self and the extent to which the positivity effect could be reversed in older adults by orienting them to a younger age. To determine this, we used a lexical decision task that taps more into unconscious, implicit processes. Essentially, a positivity effect would be manifest in greater priming of positive words, whereas a negativity effect would be the opposite. The first lexical decision was preceded by an actual-age perspective control and the second followed a different-age perspective orientation.

Method

Participants

Sixty-one younger adults and 54 older adults participated in this experiment. The demographic information is shown in Table 1. The younger adults were recruited from the University of Notre Dame and received partial course credit. The older adults, all community-dwelling individuals, were recruited from a local senior citizen organization, and were paid \$25 each for their time. The older adults had more years of education, $t(113) = 2.12, p = .04$, and scored higher on the Shipley Vocabulary Test (Zachary, 1986), $t(113) = 5.88, p < .001$. Also, the younger adults scored higher on the speeded comparison test (Salthouse & Babcock, 1991), $t(113) = 4.81, p < .001$, and had higher digit span scores than the older adults, $t(113) = 6.24, p < .001$. All of the older adults scored 26 of 30 or better on the Mini-Mental State Exam (Folstein et al., 1975).

Materials

For the lexical decision tasks, items were divided into two lists, one for each task. Each list contained 80 items, and was presented in white with black background in 36-point Times New Roman font on a 17-in. computer screen. Of the 80 items, four conditions were created: positive emotion, negative emotion, neutral emotion, and nonword. For each task, 10 probes were positive (e.g., *happy*), 10 were negative (e.g., *sad*), 20 were neutral (e.g., *stereo*), and 40 were nonwords. Number of letters (4–11), syllables (1–5), and Kučera–Francis word frequencies (1–98) were counterbalanced within emotion type between lists. There were no significant differences on any of these dimensions ($ps > .10$).

A possible selves orienting task was used to orient people to a particular aged self: older, younger, or neutral (i.e., the participant's current age). Each task involved describing an event as the person imagined him- or herself experiencing it at a particular age. Descriptions included the setting of the event, the actions within the event, and the feelings associated with experiencing the event (see the Appendix).

Procedure

People were tested individually. Consent forms were completed followed by the collection of demographic information and the speeded comparison test. At this point, older adults were given the

Table 1
Demographic Information for the Two Age Groups

| Age group | Younger adults | Older adults |
|---|-------------------|-------------------|
| Mean (<i>SD</i> ; range) age (years) | 19.2 (1.1; 18–23) | 74.5 (7.7; 60–84) |
| Female (%) | 57 | 74 |
| Caucasian (%) | 54 | 96 |
| Mean (<i>SD</i>) education (years) | 14.4 (0.9) | 15.1 (2.3) |
| Mean (<i>SD</i>) Shipley vocabulary score | 29.7 (3.5) | 34.0 (4.3) |
| Mean (<i>SD</i>) speeded comparison score | 6.8 (3.7) | 4.1 (1.9) |
| Mean (<i>SD</i>) digit span score | 119.8 (107.2) | 24.2 (35.6) |

Mini-Mental State Exam (Folstein et al., 1975) by the experimenter (younger adults did not complete this task). The neutral orienting task, which involved describing a typical morning routine in 10 sentences, was then completed. Responses were made by typing descriptions into a computer. After this, the first of two lexical decision tasks was given.

For each lexical decision task and for each person, probe order was randomized. The first 10 trials were practice to familiarize participants with the task. Responses were made using a computer mouse to indicate whether the letter string presented (in the center of the computer screen) was an English word. The index and middle fingers of a participant's right hand were kept on the left and right mouse buttons labeled *yes* and *no*. Response time and accuracy were recorded.

After the first lexical decision task, participants were given the vocabulary test. Next, the possible selves orienting task in contrast to the participant's age was completed (i.e., older adults did the younger possible selves orienting task, and younger adults did the older orienting task). Responses were typed into the computer. Following this, the second lexical decision task was given using the same procedure as the first. After this, as a final measure, people were given the digit span test.

Results

The response time data excluded any responses that were errors. Also, these data were trimmed using a method outlined by Van Selst and Jolicoeur (1994) that removes response times based on a moving criterion adjusted relative to the number of observations per cell. This trimming procedure resulted 3% and 5% of the data being dropped for the younger and older adults, respectively. After trimming, mean response times were computed such that each participant had a positive, negative, and neutral mean response time for the lexical decision task in both the age-actual and age-contrasting orientation conditions.

The response time data, summarized in Table 2, were submitted to a 2 (age group) \times 2 (perspective) \times 3 (emotion) mixed analysis of variance (ANOVA), with the first factor being between-subjects and the rest within. There was a main effect of age, $F(1, 113) = 55.82$, $MSE = 21700000$, $\eta^2 = .33$, $p < .001$, with the older adults responding more slowly ($M = 1,200$ ms) than the younger adults ($M = 845$ ms). There was also a main effect of emotion, $F(2, 226) = 8.78$, $MSE = 236044$, $\eta^2 = .07$, $p < .001$, with neutral words being responded to slower ($M = 1,059$ ms) than either positive ($M = 995$ ms), $F(1, 113) = 12.05$, $MSE = 3115622$, $\eta^2 =$

.05, $p = .001$, or negative words ($M = 991$ ms), $F(1, 113) = 11.39$, $MSE = 3716780$, $\eta^2 = .05$, $p = .001$, which did not differ from one another, $F < 1$. This reflects the emotion bias effect (e.g., Blanchard-Fields, 2005; Mather & Carstensen, 2003). There was no main effect of perspective, $F < 1$.

Whereas the Age Group \times Perspective, Age Group \times Emotion, and Perspective \times Emotion interactions were not significant, $F < 1$, $F(2, 226) = 1.51$, $MSE = 2360454$, $\eta^2 = .01$, $p = .22$, and $F(2, 226) = 1.28$, $MSE = 29242$, $\eta^2 = .01$, $p = .28$, respectively, the three-way interaction was, $F(2, 226) = 23.34$, $MSE = 534279$, $\eta^2 = .17$, $p < .001$. Breaking the data down by age group, significant Perspective \times Emotion interactions were found for both the younger, $F(2, 120) = 16.18$, $MSE = 183956$, $\eta^2 = .21$, $p < .001$, and older adults, $F(2, 106) = 10.25$, $MSE = 368342$, $\eta^2 = .16$, $p < .001$. Thus, perspective orientation affected emotion processing for both age groups.

Younger adults showed a negativity effect in the control condition, with negative emotion words being responded to faster than positive, $F(1, 113) = 13.81$, $MSE = 18260$, $\eta^2 = .27$, $p < .001$, and neutral words, $F(1, 113) = 16.13$, $MSE = 20111$, $\eta^2 = .30$, $p < .001$. This is the classic negativity effect found with younger adults. Response times for positive and neutral emotion words were similar, $F < 1$. An important finding was that after the age-contrasting perspective orientation, younger adults showed a positivity effect, with positive words being responded to faster than negative, $F(1, 113) = 5.12$, $MSE = 24632$, $\eta^2 = .11$, $p = .03$, and neutral words, $F(1, 113) = 4.32$, $MSE = 29027$, $\eta^2 = .16$, $p = .04$. Response times for negative and neutral words were similar, $F < 1$. This is a reversal of the negativity effect to a positivity effect such as that observed with older adults.

In comparison, the older adults showed a positivity effect in the control condition, with positive emotion words being responded to faster than negative, $F(1, 113) = 21.01$, $MSE = 18260$, $\eta^2 = .22$, $p < .001$, and neutral words, $F(1, 113) = 8.51$, $MSE = 23936$, $\eta^2 = .16$, $p = .004$. This is the classic positivity effect found with older adults. Response times for negative and neutral words were similar, $F < 1$. After the age-contrasting perspective orientation, the older adults showed a negativity effect, responding faster to negative than positive words, $F(1, 113) = 12.31$, $MSE = 24632$, $\eta^2 = .15$, $p < .001$, and neutral words, $F(1, 113) = 19.88$, $MSE = 33394$, $\eta^2 = .18$, $p < .001$. Response times for positive and neutral words were similar, $F(1, 113) = 2.4$, $MSE = 29026$, $\eta^2 = .03$, $p = .12$. This is a reversal of the positivity effect to a negativity effect such as that observed with younger adults. Note that these patterns of data are inconsistent with age-related stereotypes, and support the idea that the positivity effect is driven by perspective of one's self rather than cultural expectations.

Given that there was a difference in the observed pattern of results of both the younger and older adults, we examined the content of the passages written during the orientation phases to evaluate the degree to which these related to the pattern of results on the lexical decision task. To assess this, we used the Linguistic Inquiry and Word Count (LIWC) software (<http://www.liwc.net/>) to gather information about the lexical, grammatical, and emotional content of the written responses of our participants. In terms of emotional content, the LIWC software reports an index of positive and negative content. As a measure of emotional content, negative were subtracted from positive content scores to produce an overall emotion index. For example, if a passage received a

Table 2
Lexical Decision Task: Mean Response Times (in ms)

| Age group | Age actual (control) | Age contrast |
|----------------|----------------------|--------------|
| Younger adults | | |
| Positive | 888 (243) | 800 (213) |
| Negative | 797 (193) | 854 (252) |
| Neutral | 879 (198) | 854 (178) |
| Older adults | | |
| Positive | 1,134 (345) | 1,208 (437) |
| Negative | 1,253 (337) | 1,102 (312) |
| Neutral | 1,244 (349) | 1,259 (517) |

Note. Standard deviations appear in parentheses.

positive score of 1.55 and a negative score of 2.00, the emotion index would be -0.45 .

Two emotion indices were derived for each participant, one for the neutral and one for the age-contrast possible self passages. These indices, summarized in Table 3, were submitted to a 2 (age group) \times 2 (perspective) mixed ANOVA with the first factor being between-subjects and the other within. Whereas there was no significant main effect of age group, $F < 1$, or perspective, $F < 1$, the two-way interaction was significant, $F(1, 113) = 35.05$, $MSE = 3.00$, $\eta^2 = .24$, $p < .001$. For the neutral control condition, both younger and older adults showed a positivity effect, although it was smaller for the younger adults ($M = 0.45$, $SD = 1.16$), $t(60) = 3.03$, $\eta^2 = .13$, $p = .004$, than the older adults ($M = 1.84$, $SD = 1.48$), $t(54) = 8.94$, $\eta^2 = .60$, $p < .001$. This is consistent with the idea that older adults show greater positivity than younger adults (e.g., Carstensen et al., 2003). It is important to note that, in the age-contrasting perspective condition, again both younger and older adults showed a positivity effect, but the age difference was reversed, paralleling the lexical decision data, with the effect being larger for the younger adults ($M = 1.95$, $SD = 2.22$), $t(60) = 6.87$, $\eta^2 = .44$, $p < .001$, than the older adults ($M = 0.59$, $SD = 2.00$), $t(54) = 2.18$, $\eta^2 = .08$, $p = .03$.

Looking more closely at the change in emotional content from the neutral to the age-contrasting conditions, the younger adults showed a significant increase in the positivity effect, $F(1, 60) = 24.37$, $MSE = 2.81$, $\eta^2 = .29$, $p < .001$, whereas older adults showed a significant decrease, $F(1, 53) = 12.31$, $MSE = 3.21$, $\eta^2 = .19$, $p < .001$. Finally, as expected, in the neutral condition, older adults wrote more positive passages than younger adults, $F(1, 113) = 30.05$, $MSE = 1.75$, $\eta^2 = .21$, $p < .001$. Conversely, in the age-contrasting condition, younger adults wrote more positive passages than older adults, $F(1, 113) = 11.71$, $MSE = 4.49$, $\eta^2 = .09$, $p < .001$. Again, these basic patterns of the size of the positivity effect and the reversal with the age-contrasting self-manipulation parallels those found with the lexical decision task.

Discussion

The present study examined whether age-related shifts in emotion processing could be altered by the perspective taken by a person. This was done using possible self-orientations and then tested using an implicit memory task, namely lexical decision, to explore the extent of any shifts in memory processing as a function of one's perspective. Consistent perspective-based emotion processing was found across age groups. In a standard control condition, younger adults showed a negativity effect and older adults showed a positivity effect, consistent with socioemotional selectivity theory. An important result was that, after the age-

contrasting perspective orientation, both younger and older adults showed opposing perspective-based shifts in emotion processing and took on the characteristics of the other age group. That said, it is also possible that some other age-related attitudes may have contributed to this. However, this explanation is less plausible given the observed consistency of shifts in emotion processing when taking an age-contrasting perspective for both younger and older adults. That is, either perspective-taking shifted emotion as we report or some set of unknown, yet consistent, age-related attitudes contributed to this effect in both younger and older adults. Regardless, this pattern of data illustrates, quite clearly, that the impact of perspective-taking is extensive, even altering more implicit memory processes such as priming. Thus, the positivity effect observed with aging is not necessarily a function of one's chronological age, but is more a function of the perspective one adopts at the time.

Thus, this research suggests that opinions and ideas one has about one's self, either personally inferred or derived from cultural expectations, have a broad impact on memory and cognition. In this case, the perspective one has on one's life influences the degree to which different types of information are available in memory. In the present case, this was the availability of different classes of emotional concepts in memory. This is similar to other research that has shown that although older adults may have some baseline bias to have certain types of information more available in memory, such as moral evaluations (Narvaez, Radvansky, Lynchard, & Copeland, 2011) or social stereotypes (e.g., Radvansky, Copeland, & von Hippel, 2010; Stewart, von Hippel, & Radvansky, 2009), this can be overcome by taking different perspectives (e.g., Radvansky et al., 2009). On the whole, these sorts of findings support more general efforts to emphasize the more successful aspects of aging (e.g., Rowe & Kahn, 1987), such as the preservation of some comprehension processes (e.g., Narvaez et al., 2011), and de-emphasize aspects of cognitive decline associated with aging, such as difficulties retrieving information from memory (e.g., Gerard, Zacks, Hasher, & Radvansky, 1991). Taking different perspectives on one's self can make different types of information more or less available at an unconscious level, which can then meaningfully impact the performance of more consciously directed activities.

In summary, in the present research, the impact of perspective on emotion processing was assessed in younger and older adults. The results provide clarity about the pliable nature of implicit emotion concept processing and aging. These results are consistent with socioemotional selectivity theory in that the changes in emotion processing related to age are, in part, a result of a perspective associated with age. At an implicit level, and regardless of chronological age, the perspective taken prior to memory assessment influenced the type of emotion emphasized in processing. Ultimately, the results discussed here are consistent with and extend those of Sullivan et al. (2010) by suggesting that not only can the age-related perspectives of characters in a story influence emotion processing, but also a person's own perspective, if activated and examined with implicit measures, can shift around to produce either a positivity or negativity effect. In other words, at least some age-related biases in the processing of emotional information are quite flexible and plastic.

Table 3

Possible Selves Orienting Task: Mean Composite Emotion Scores

| Age group | Age actual (neutral) | Age contrast |
|----------------|----------------------|--------------|
| Younger adults | 0.45 (1.16) | 1.95 (2.22) |
| Older adults | 1.84 (1.48) | 0.59 (2.00) |

Note. Standard deviations appear in parentheses. Higher scores indicate more positive emotion content.

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(Appendix follows)

Appendix

Possible Selves Orienting Task

For this part of the experiment, please imagine a hypothetical experience and describe it in a few sentences. In your description, concentrate as much as possible on how you would feel if you were actually experiencing the event you are describing.

Neutral Condition

Please describe your typical morning routine. Visualize the sorts of steps you might take or decisions you might have to make when you first get out of bed on any given day. If today was an average day for you, it might be helpful to describe this morning. When describing your chosen event, be sure to describe the way you imagine yourself feeling during the event. Take a moment to write about this event using at least 10 sentences in the box provided below. Please do not worry about spelling or grammatical errors; rather, concentrate on describing the event and how you feel.

Older Self Condition

Imagine yourself as an elderly person. If you are an elderly person, bring to mind your own personality characteristics, and think of the way you feel at this point in your life. Visualize an experience you might have during that time period in your life. Instead of remembering an actual experience, take a moment to put yourself in the mindset of an elderly person. Imagine you are thinking, feeling and acting as an older person than you are now, and picture a specific event that you think might actually happen

to you. When describing the event, be sure to describe the way you imagine yourself feeling during the event. Take a moment to type about this event using at least 10 sentences in the text box provided below. Please do not worry about spelling or grammatical errors; rather, concentrate on describing the event and how you think you would feel as an older person.

Younger Self Condition

Imagine yourself as a young adult. If you are a young adult, bring to mind your own personality characteristics, and think of the way you feel at this point in your life. Visualize an experience you might have during that time period in your life. Instead of remembering an actual experience, take a moment to put yourself in the mindset of a younger adult. Imagine you are thinking, feeling and acting as a young adult, and picture a specific event that you think might actually happen to you. When describing the event, be sure to describe the way you imagine yourself feeling during the event. Take a moment to write about this event using at least 10 sentences in the text box provided below. Please do not worry about spelling or grammatical errors; rather, concentrate on describing the event and how you think you might feel as a young adult.

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