Original Research Report

Affective Influences on Older Adults' Attention to Self-Relevant Negative Information

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Abstract

Objectives: Some research suggests that older adults have a tendency to be biased toward positive information, but may be more willing to attend to potentially beneficial negative information in certain situations. Following the mood-as-resource framework, one possibility is that older adults may be more willing to consider negative information when in a positive mood, with positive affect serving as a buffer to the adverse emotional consequences that may follow.

Method: Young ($n = 62$) and older ($n = 65$) adults completed a difficult cognitive task before completing either a positive or negative experience recall task, depending upon assigned condition. Afterwards, they rated their interest in viewing their strengths and weaknesses on the previously completed task, and then selected and viewed different types of feedback (i.e., strengths or weaknesses).

Results: Older adults in the positive condition selected more weaknesses to view and spent more time viewing weaknesses than older adults in the negative condition. There were no differences across conditions in behavioral results for young adults. Ratings of interest in viewing different types of feedback did not correspond with actual feedback viewing behavior.

Discussion: Results highlight the importance of considering older adults' pre-existing mood before addressing self-relevant information that may be negative but important.

Keywords: Decision making, Emotion, Mood-as-resource, Positivity

In everyday life, people often encounter situations in which they must attend to valence information in order to solve problems. Research suggests that individuals in later adulthood tend to disproportionately focus on positive information in order to maintain a positive affective state (Carstensen & Mikels, 2005; Reed, Chan, & Mikels, 2014). Unfortunately, this focus on the positive may not always be beneficial. Negative information and emotions are important because they motivate change in behavior that might lead to dysfunctional outcomes if left ignored (e.g., Labouvie-Vief, 2003). Therefore, attending to negative information or being able to handle the experience of negative emotions is advantageous in achieving personal growth. Given that older adults are often faced with situations in which consideration of negative information is pertinent

(e.g., side effects of medications; risk associated with retirement investments), gaining a better understanding of contexts that facilitate such consideration would be useful. One possibility—and the focus of this study—is that older adults may be able to utilize positive mood as a resource for the processing of negative information.

Older Adults and Emotional Goals

Socioemotional Selectivity Theory (SST; Carstensen, Isaacowitz, & Charles, 1999) posits that with aging comes a greater propensity to focus on emotional well-being due to reductions in future time perspective, resulting in older adults being more likely than younger adults to attend to

relationships and stimuli that are more emotionally gratifying. This shift has been used to explain the “positivity effect,” which refers to an age-related increase in preference for positive over negative information (Carstensen & Mikels, 2005). Importantly, positivity is not evident in all cases involving valenced information, with the effect being moderated by various situational factors. A number of studies have demonstrated that older adults do not always focus more on positive mood or stimuli (e.g., Chung, 2010; English & Carstensen, 2015; Hess, Popham, Dennis, & Emery, 2013; Knight et al., 2007; Löckenhoff & Carstensen, 2008). A recent meta-analysis (Reed et al., 2014) compared studies with and without constraints on individuals’ processing and found less positivity in the former. Note, however, that there is no theoretical consistency in the nature of the processing constraints that may be responsible for these situational effects.

From both a theoretical and practical perspective, it should be a priority to further understand the conditions under which older adults pursue goals that are likely to have long-lasting positive effects, which in many cases requires attending to negative information. One possibility is that if their presumed emotional goals have already been met, older adults may be more willing to put resources toward considering negative information.

Mood as a Resource

A useful theoretical framework, mood-as-resource (e.g., Trope, Ferguson, & Raghunathan, 2001), argues that positive mood may buffer the negative emotional reactions that often come with exposure to negative information. Avoiding negative information becomes unnecessary when individuals have reached an adequate level of self-esteem or positive affect (e.g., Aspinwall, 1998; Higgins, 1987; Trope & Neter, 1994; Weiner, 1986). In the absence of pre-existing issues, more resources can go toward goals such as enhancing the self or accurately assessing one’s abilities. Positive mood may alter the cost-benefit ratio, that is, the assessments of the immediate costs of attending to negative information versus the long-term gains that may come as a result (Trope & Pomerantz, 1998). Moreover, it may influence appraisals of available resources for handling negative information (Schwarz & Bohner, 1996) and encourage self-improvement motivation (e.g., Fishbach, Eyal, & Finkelstein, 2010; Fishbach & Labroo, 2007) and systematic processing of self-relevant messages (Das, Vonkeman, & Hartmann, 2012).

Positive affect, beliefs, and experiences may facilitate functioning and raise interest in viewing negative information, whereas negative states demand more resources for coping, leaving less for dealing with negative information (Trope, Igou, & Burke, 2006). Studies with younger adults suggest that mood can be used as a resource in feedback-seeking behavior (e.g., test results: Gasper & Zawadzki, 2013; Trope & Gervy, 2000; health information: Schuettler & Kiviniemi, 2006). However, mood is more likely to be a goal than a resource when subject matter is

not self-relevant or feedback is not diagnostic, meaningful, or helpful to the learning process (e.g., Trope & Gervy, 2000). In these types of situations, the hedonic contingency hypothesis posits that attending to negative self-relevant information may result in a costly negative shift in affect, motivating individuals to attempt to maintain positive or improve negative states (Wegener & Petty, 1994).

Mood as a Resource and Age Considerations

Some research suggests that older adults pay attention to positive stimuli in order to increase their positive affect. For example, when feeling negative, older (but not young) adults tend to gaze toward positive and away from negative stimuli (Isaacowitz, Toner, Goren, & Wilson, 2008), which may assist them in improving their mood (Isaacowitz, Toner, & Neupert, 2009). If relative to young adults, older adults have stronger chronic affective goals, potential conflicts between emotional and self-improvement goals should be exacerbated when they encounter negative self-relevant information. In such situations, older adults should be motivated to feel good and seek out positive information. However, if already feeling good, they may be willing to attend to negative information if it is self-relevant. Young adults may show a similar but weaker trend given the presumed absence of a chronic emotional goal. Alternatively, if emotional goals have primacy in later life, they may overwhelm information goals—even in self-relevant contexts when older adults are in positive moods—leading to older adults exhibiting a consistent hedonic focus (e.g., bias toward positive information).

The current study investigates age differences in information-gathering behaviors when affective goals have or have not been met. Young and older adults completed a difficult cognitive test, and then recalled memories of either previous cognitive successes or failures. By having participants focus on either positive or negative information about the self, we hoped to alter older adults’ supposed tendency to focus on emotion. Participants then viewed feedback pertaining to the strengths or weaknesses on the test they completed previously.

We hypothesized that individuals in the positive condition would be more likely to select a weakness to view first, select more weaknesses to view, spend more time viewing weaknesses, and be more interested in viewing feedback about their weaknesses than those in the negative condition. We expected that, relative to young adults, older adults’ tendency to strive for positive emotional states would lead them to be disproportionately affected by a negative mood manipulation. That is, younger adults might be less inclined than older adults to view their strengths in an attempt to make themselves feel better because this is less of a chronic goal for young adults. We also examined the degree to which an increased focus on negative information in the positive condition related to a shift in the salience of information goals.

Methods

Participants

The sample comprised 62 younger adults (ages 18–28, 32 women) and 65 older adults (age 65–89, 32 women). Ideal sample size was calculated to be 128 using G*Power 3.1 (Faul, Erdfelder, Buchner, & Lang, 2009), and was based upon a medium effect size at $\alpha = .05$ with power of .08. Younger adults were recruited from introductory psychology classes, fulfilling a course option through participation. Older adults were recruited from the Raleigh, NC, community through newspaper and on-line ads, and received a \$24 honorarium. Participant characteristics are displayed in Table 1. We observed age differences in the expected directions for all demographic and cognitive measures.

Design

We used a 2 (age: young/old) $\times$ 2 (valence of recalled experience: positive/negative) between-subjects factorial design.

Materials

Cognitive task

A computerized task consisting of questions from the Everyday Cognition Battery (ECB; Allaire & Marsiske, 1999) was created for this study. This was intended to serve as a task that would be viewed as meaningful and relatively difficult to all participants, rather than a measure of ability. The ECB was divided into four subtests, based on the abilities thought to underlie performance (knowledge, inductive reasoning, declarative memory, and working memory). On each subtest, we selected three questions pertaining to each of three domains (nutrition, finances, and medication), for a total of 36 questions. Each section had a practice question at the beginning to allow participants to familiarize themselves with the question formats.

Mood assessment

As a manipulation check, Self-Assessment Manikins (SAM; Lang, 1980) were used to capture the valence and intensity of the respondent's current mood state. SAM uses a series of manikins depicting varying degrees of valence (positive-negative) and intensity (calm-excited), and has been validated for use in both younger and older adults with acceptable internal consistency for valence ($\alpha = .63$ for young adults and $\alpha = .82$ for older adults) and intensity ($\alpha = .98$ for both young and older adults) (Backs, da Silva, & Han, 2005).

Goal assessment

Because there is currently no scale that measures the prioritization of emotion goals versus information-seeking goals, we developed the Goal Prioritization Inventory (GPI; see Supplementary Appendix) for the current study. The scale lists eight goals and asks respondents to rate the degree to which each goal is important to them at the moment using a 7-point Likert scale. Half of the goals are related to emotion regulation and half are related to information gathering, and the scale yields a score for each. Cronbach's α for the overall scale was .75, and the subscales (Emotion Regulation and Information Gain) resulted in identical reliabilities ($\alpha = .66$). These values suggest that reliability is acceptable for exploratory purposes, although further refinement of this scale may be needed if future use is desired.

Feedback matrix

Using E-Prime, a 2 (Feedback valence: Strengths, Weaknesses) $\times$ 3 (ECB domain: Nutrition, Finances, & Medication) matrix was constructed to present feedback about performance to participants. Feedback valence was labeled at the top of the matrix, and ECB domains were listed along the left side of the matrix, with the order of content in rows and columns counterbalanced across participants. After

Table 1. Mean (SD) Participant Characteristics

Measure	Young		Older	
	Positive condition	Negative condition	Positive condition	Negative condition
N	31	31	35	30
Age*	19.13 (1.12)	19.32 (1.90)	73.86 (6.69)	73.63 (5.83)
Education*	12.94 (0.93)	12.94 (0.72)	16.77 (2.29)	16.03 (2.82)
SF36 Physical health	48.05 (4.35)	46.93 (5.19)	47.85 (4.78) ^a	45.07 (5.86) ^a
SF36 Mental health*	47.67 (9.95)	50.11 (2.39)	55.58 (6.69) ^b	59.11 (4.62) ^b
GDS*	2.16 (2.35)	2.39 (2.65)	1.06 (1.46)	1.07 (1.31)
Short Blessed*	1.74 (2.62)	1.19 (1.40)	2.49 (2.38)	2.90 (2.98)
Letter-Number Sequencing*	11.32 (2.46)	11.45 (2.84)	9.74 (2.16)	10.00 (2.27)
Digit-Symbol Substitution*	85.13(16.30)	82.61 (12.87)	61.62 (13.65)	58.69 (14.20)
Vocabulary*	17.82 (0.95)	19.98 (0.95)	25.45 (0.89)	24.83 (0.96)
Future Time Perspective*	5.30 (0.93)	5.60 (0.86)	4.04 (1.30)	4.11 (1.26)

Note: A 2 $\times$ 2 (Age Group $\times$ Condition) analysis of variance was performed on each measure. Values with the same superscript letters indicate significant differences between means. GDS = Geriatric Depression Scale.

*Age group difference significant at $p < .05$.

^a $p = .049$

^b $p = .028$

selecting a cell to view, participants were presented with two percentile scores relating to different subtests/cognitive abilities, accompanied by two sentences about the meaning of the scores (see Figure 1). Each cell contained a set of standard positive or negative feedback to ensure that participants viewed the same information when selecting a particular cell. However, participants were under the impression that the feedback was indicative of their performance on the test.

Procedure

Prior to beginning the test session, participants completed a demographics form, the SF-36 health survey (Ware, 1993), Geriatric Depression Scale (GDS; Sheikh & Yesavage, 1986), and Future Time Perspective scale (FTP; Carstensen & Lang, 1996). The Short Blessed Orientation-Memory-Concentration test (Katzman et al., 1983) was administered

to the older adults to screen for cognitive impairment (indicated by a score of 7 or higher).

After completing tasks for an unrelated experiment, participants were given a cognitive assessment battery, including the WAIS III Letter-Number Sequencing and Digit-Symbol Substitution tasks (Wechsler, 1997) and vocabulary test V-2 from the Kit of Factor-Referenced Cognitive Tests (Ekstrom, French, Harman, & Dermen, 1976). Participants then reported their current mood for the first time by completing the SAM before completing the modified ECB on the computer. To maximize self-relevance and perceived value of the task, the instructions explained that the task is diagnostic of cognitive abilities, and those who perform well in each domain are more likely to have positive future outcomes in that particular area. After completing the ECB, participants reported their current mood a second time.

Participants were randomly assigned to either a positive or negative experience prime condition, and given the following instructions, based on condition: "Think of a recent situation in which you were (un)successful in using your brain power or mental capabilities, and were particularly (dis)pleased with the result. Please spend at least 5 min writing about this situation in great detail, including information about who was involved, what the impact was on you and others, how you felt, and why you felt this way." Participants spent a minimum of 5 min writing their responses in pen and paper, and had the option to take them home at the end of the session if they wanted their responses kept private. Three young adults (two in the positive and one in the negative condition) and seven older adults (four in the positive and three in the negative condition) opted to keep their responses private.

Next, participants provided another mood report and completed the GPI and feedback interest questionnaire. They then viewed the feedback screen on the computer and were told that they were to select three different cells to view individually, each for an unlimited amount of time. Participants were not allowed to return to a previously viewed cell. The computer recorded which cells were selected and how long participants spent viewing each one. Participants reported mood again after receiving feedback and rated the relevance of each domain tested in the ECB in their life using a 7-point Likert scale. Finally, participants were debriefed and compensated.

Figure 1. Feedback matrix with examples of feedback: participants selected three out of six feedback cells to view.

Results

Preliminary Analyses

ECB performance

Success of our study was predicated on the cognitive task being of moderate difficulty so that participants would experience both success and failure, making the offer of receiving feedback about each seem valid. As can be seen in Table 2, this did appear to be the case, with mean scores for both age groups falling around the middle of the possible range of variation. In addition, it was important to demonstrate

Table 2. Young and Older Adults' Mean (SD) Scores on ECB Tests and Mean (SD) Ratings of Relevance of Areas Included on ECB

	Young	Older
ECB performance		
Knowledge*	3.55 (1.25)	5.01 (1.51)
Reasoning*	4.37 (1.67)	3.71 (1.61)
Memory*	5.18 (1.78)	4.26 (1.51)
Working Memory*	7.72 (1.53)	5.02 (1.98)
ECB relevance ratings		
Financial Management	5.52 (1.53)	5.83 (1.65)
Medication Use*	3.82 (1.77)	5.09 (1.95)
Nutrition*	5.39 (1.31)	5.86 (1.36)

Note: ECB scores range between 0 and 9 with higher scores indicating better performance. Relevance ratings range between 1 and 7 with higher values indicating higher relevance. ECB = Everyday Cognition Battery.

*Age group difference significant at $p < .05$.

that individuals in the positive and negative conditions did not differ in their performance so that differences in task performance could not explain subsequent feedback viewing behavior. Because we had no expectations about variations in performance across the task and were more interested in between-age and condition differences, we examined ECB performance using 2 (Age Group) $\times$ 2 (Condition) multivariate analysis of variance (MANOVA), with performance scores in each of the four ECB subtests as dependent variables. This analysis yielded only a significant effect of age group, $F(4, 120) = 25.46, p < .001, \eta^2_{\text{partial}} = .50$. Subsequent univariate ANOVAs revealed that younger adults performed significantly better— $F_s(1,125) > 5.20, p_s < .02$ —on all tests except knowledge, where the age difference was reversed, $F(1,125) = 35.52, p < .001$ (Table 2). Critically, there were no significant effects associated with condition ($p_s > .13$).

Manipulation check

We next examined affective responses to see if our manipulation of mood had the intended effect. Ratings of both valence and intensity of mood were combined into a single measure at each time point by rescaling the valence scores so that 0 was the middle and scores ranged from -4 to $+4$, and then multiplying these values by the intensity scores (Figure 2). A 2 (Age Group) $\times$ 2 (Condition) $\times$ 4 (Time Point [time 1 vs time 2 vs time 3 vs time 4]) mixed analysis of variance (ANOVA) was then conducted on these scores. There was a significant main effect of time, $F(1, 123) = 14.56, p < .001, \eta^2_{\text{partial}} = .11$, as well as a significant interaction between condition and time, $F(1, 123) = 8.44, p < .001, \eta^2_{\text{partial}} = .06$. Follow-up univariate ANOVAs revealed a significant difference between the negative ($M = 6.82, SE = 1.49$) and positive ($M = 11.64, SE = 1.44$) conditions only at Time 3 (i.e., immediately after the manipulation), $F(1, 123) = 5.41, p = .02, \eta^2_{\text{partial}} = .04$. A significant Age $\times$ Time interaction was also observed, $F(1, 123) = 4.49, p = .004, \eta^2_{\text{partial}} = .04$, attributable to differences in initial reports of baseline mood

Figure 2. Change in mood over time for participants in the positive and negative conditions across age groups. Error bars represent 95% confidence intervals.

between the two young groups. Importantly, the three-way interaction was not significant, $F(1, 123) = .53, p = .66, \eta^2_{\text{partial}} = .004$, indicating that the manipulation was not only successful, but that it had similar effects across age groups.

One potential concern is based on the fact that there was more variability in the writing content produced by younger adults than by older adults. Specifically, younger adults tended to write about academic experiences (57% and 67% in the positive and negative conditions wrote about school-related successes and failures, respectively), whereas older adults' writing samples were more varied in content. Nevertheless, mood ratings following the experience recall were indicative of an equally successful mood induction for all age group/condition combinations.

Relevance

Given that the importance attached to the assessment context influences the use of mood as a resource, we next examined participants' ratings of relevance (Table 2) by conducting a 2 (Age Group) $\times$ 2 (Condition) $\times$ 3 (Relevance Category) Mixed ANOVA. There was a significant main effect of age, $F(3, 123) = 12.50, p = .001, \eta^2_{\text{partial}} = .09$, indicating that older adults rated the topics as more relevant than did young adults. There were no significant effects involving condition ($p > .12$). After noting that the quadratic function of relevance category was significant, $F(3, 123) = 47.25, p < .001, \eta^2_{\text{partial}} = .29$, as was the quadratic function of the interaction between relevance category and age group, $F(3, 123) = 6.60, p = .01, \eta^2_{\text{partial}} = .05$, we decided to follow up with univariate ANOVAs. This revealed significant age effects in two of the three categories (Table 2). Importantly, when a mean relevance score was included in our analyses below as a covariate, it was not significant in any case, and the results were not affected by its inclusion.

Feedback-Associated Responses

Number of weaknesses viewed

We first examined participants' specific feedback selections. We conducted a 2 (Age Group) $\times$ 2 (Condition) ANOVA on the total number of weaknesses viewed, which could range

from zero to three. There was a significant main effect of age group, indicating that younger adults ($M = 1.86$; $SD = 0.11$) selected more weaknesses to view than did older adults ($M = 1.53$; $SD = 0.11$), $F(1,123) = 4.28$, $p < .05$, $\eta^2_{\text{partial}} = .03$. There was also a near-significant main effect of Condition, $F(1,123) = 3.93$, $p = .05$, $\eta^2_{\text{partial}} = .03$, whereby those in the positive condition ($M = 1.85$; $SD = 0.11$) tended to view more weaknesses than those in the negative condition ($M = 1.54$; $SD = 0.11$). Most importantly, there was a significant Age $\times$ Condition interaction, $F(1,123) = 4.78$, $p < .05$, $\eta^2_{\text{partial}} = .04$.

Further examination of this interaction through Bonferroni pairwise post-hoc comparisons revealed results consistent with expectations. Older adults in the negative condition ($M = 1.20$; $SD = 0.96$) viewed significantly ($p = .003$) fewer weaknesses than older adults in the positive condition ($M = 1.86$; $SD = 0.94$), whereas there was no difference ($p = .89$) in the number of weaknesses viewed by young adults in the positive ($M = 1.84$; $SD = 0.85$) and negative ($M = 1.87$; $SD = 0.85$) conditions. Within the negative condition, older adults viewed significantly fewer weaknesses than younger adults ($p = .004$), but the age difference was not significant in the positive condition ($p = .93$) (Figure 3A, Table 3).

First feedback selection

We next examined the number of times a weakness was chosen first during the feedback session as a function of age group and condition. Unexpectedly, there were no significant differences among the values involved in this analysis, $\chi^2(1, 127) = 1.67$; $p = .21$. Further analysis to test specific predictions revealed that whereas young adults in the positive and negative conditions did not differ in their frequency of choosing either a weakness or a strength, $\chi^2(1, 62) = .07$, $p = 1.00$, there was a significant difference between conditions among older adults, $\chi^2(1, 65) = 4.43$, $p = .04$. Specifically, 37% of older adults in the negative condition selected a weakness first compared to 63% older adults in the positive condition. In contrast, 61% of the young adults in the negative condition and 58% in the positive condition chose to view a weakness first (Figure 3B, Table 3).

Viewing time

Next, we examined attention to weaknesses by dividing the total time spent viewing weaknesses by the total viewing time for all three selections in order to control for both age and individual variability in reading speed. A 2 (Age Group) $\times$ 2 (Condition) ANOVA on these proportions revealed a main effect of condition, $F(1,123) = 5.44$, $p = .02$, $\eta^2_{\text{partial}} = .04$, whereby those in the positive condition ($M = 0.64$; $SD = 0.04$) spent a significantly greater proportion of time viewing weakness-related feedback than those in the negative condition ($M = 0.52$; $SD = 0.04$). There was no effect of age group, $F(1,123) = 1.97$, $p = .16$, $\eta^2_{\text{partial}} = .02$, but the Age $\times$ Condition interaction was

Figure 3. Feedback viewing behavior as a function of age group and condition: number of weaknesses viewed (A), likelihood of viewing a weakness first (B), and proportion of time spent viewing weaknesses (C).

significant, $F(1,123) = 6.56$, $p = .01$, $\eta^2_{\text{partial}} = .05$. Younger adults in the positive condition ($M = 0.61$; $SD = 0.28$) and negative condition ($M = 0.62$; $SD = 0.29$) viewed negative feedback for similar proportions of total viewing time. In contrast, older adults in the positive condition ($M = 0.67$; $SD = 0.31$) spent a significantly greater proportion of time viewing their weaknesses than did older adults in the negative condition ($M = 0.41$; $SD = 0.32$) (Figure 3C, Table 3).

Self-reported interest in viewing different types of feedback

Before participants actually selected feedback to view, they rated their interest in viewing both their strengths and their weaknesses (Table 3). We conducted a 2 (Age Group) $\times$ 2

Table 3. Mean (SD) Scores for Goal Priorities and Interest in Viewing Feedback

Measure	Young		Older	
	Positive condition	Negative condition	Positive condition	Negative condition
GPI (Goal Priorities)				
Emotion subscale	4.93 (0.86)	4.90 (1.03)	4.95 (0.96)	4.69 (1.28)
Information subscale	5.46 (0.75)	5.33 (0.88)	5.49 (1.04)	5.33 (1.15)
Feedback Interest				
Strengths*	5.77 (1.45)	6.23 (1.02)	6.71 (0.57)	6.27 (1.44)
Weaknesses*	5.74 (1.51)	6.35 (1.11)	6.63 (0.73)	6.40 (1.19)
Feedback viewing behavior				
Total number of weaknesses viewed*	1.84 (0.85)	1.87 (0.85)	1.86 (0.94) ^a	1.20 (0.96) ^a
Probability of viewing Weakness first	0.58 (0.50)	0.61 (0.50)	0.62 (0.49) ^b	0.37 (0.49) ^b
Weakness view time/total view time	0.61 (0.28)	0.62 (0.29)	0.67 (0.31) ^c	0.41 (0.32) ^c

Note: Values with the same superscript letters indicate significant differences between means. GPI = Goal Prioritization Inventory.

* Age group difference significant at $p < .05$.

^a $p = .007$

^b $p = .036$

^c $p = .001$

(Condition) $\times$ 2 (Type of feedback [strengths vs weaknesses]) repeated measures ANOVA on these ratings. The only significant finding was a main effect of age group, $F(1,123) = 5.99$, $p = .02$, $\eta^2_{\text{partial}} = .05$, indicating that older adults were overall more interested in feedback than younger adults.

Goal Prioritization

To examine whether those in the positive condition prioritized information and those in the negative condition prioritized emotion goals, we examined the mean differences in these subscores. There were no significant group or condition differences ($ps > .37$; Table 3). We then examined the relationship between goal prioritization and performance within individuals, with the expectation that prioritizing information over emotion would be positively associated with attention to negative information. To examine this, we divided the GPI information subscale score by the GPI emotion subscale score. We then calculated correlations between the resulting scores and the previously described dependent variables within each age $\times$ condition category. Significant associations were only observed for older adults in the positive condition, where positive associations with prioritizing information over emotion were obtained for both number of weaknesses viewed ($r = .43$, $p < .01$) and the proportion of time spent viewing weaknesses ($r = .40$, $p < .05$).

Discussion

The present study was designed to identify conditions under which older adults willingly consider negative information in a self-relevant context. Based on the mood-as-resource perspective, we primed individuals to feel good or bad about their cognitive abilities, and then had them view positive or negative feedback about a previously completed test. Behavioral results suggested that compared with the young

adults, older adults more effectively used positive mood as a resource, or were more affected by being in a negative mood. Specifically, older adults in the negative condition viewed fewer weaknesses, were less likely to view a weakness first, and spent less time viewing weaknesses than older adults in the positive condition, as well as both groups of young adults. There were no differences in these behaviors between young adults in the positive and negative conditions. The pattern of results suggests that a negative mood state may have greater implications for older than younger adults, in line with the idea that older adults tend to prioritize mood repair.

Unexpectedly, and in contrast with previous studies, reports of interest in feedback, which occurred prior to receipt of feedback, were not related to our manipulation. Furthermore, feedback interest was not in agreement with actual viewing behaviors. Older adults reported more interest in all types of feedback, compared with young adults, with ratings of interest near ceiling. The lack of congruency in the effects associated with self-reported preferences and actual viewing behaviors is in contrast with some of the previous research using mood-as-resource and suggests that further investigation of the relationship between interest and behavior is necessary. Previous research has not always investigated behavior that would occur after receipt of feedback (e.g., Gervy, Igou, & Trope, 2005, Study 3; Schuettler & Kiviniemi, 2006), and one study that did investigate both interest and behaviors found a correlation (Gervy et al., 2005, Study 1). Here, we argue that interest ratings may have limited validity in terms of predicting actual behavior. However, we acknowledge that interest is different from intention. Additionally, we may have found less of a discrepancy between interest and behavior if participants were allowed to view an unlimited number of feedback cells, but limiting choices allowed us to achieve our goal of examining prioritization of information. At the very least, our findings point to the importance of assessing

behavioral outcomes in testing the validity of a framework such as mood-as-resource.

With respect to hypothesized changes in goal orientations proposed by SST, we obtained little support for the operation of associated mechanisms in our study. We had hypothesized that older adults would be able to use positive mood as a resource, and that this would happen because their presumed chronic affective goal would be satisfied by the positive experience recall task. However, we did not find any evidence that their goals changed as a function of condition and in concert with evidence of positivity. Furthermore, there were no differences between young and older adults regarding goal priorities, suggesting that they had similar amounts of emotional resources available. Relatedly, there was also no evidence that mood itself was associated with our experimental conditions was associated with the obtained effects.

We also looked at relevance as a potential factor in explaining the results of the present study. The mood-as-resource framework suggests that individuals will most likely use positive mood as a resource in dealing with negative information when it is particularly relevant (e.g., Raghunathan & Trope, 2002), and previous research in the area of SST suggests that the positivity effect in older adults should be diminished in situations where relevance is high (e.g., English & Carstensen, 2015). However, self-reported relevance was not associated with feedback seeking behavior in either young or older adults, nor did controlling for this factor alter the obtained age effects.

These null findings suggest that there is perhaps a different mechanism other than mood or mood-related goals that is responsible for the effects of the positive and negative primes found in older adults. One possibility is that the nature of the discrete emotions brought about by the mood manipulation varied across age groups. Recalling a cognitive failure may bring about feelings of fear and anxiety specifically in older adults, for whom concerns regarding dementia may be salient. It is also possible that the mechanism through which individuals use mood as a resource is something that cannot easily be self-reported, and therefore behavioral results are the most suggestive of the process. There is unfortunately a lack of specificity regarding mechanisms in the mood-as-resource framework.

Compensatory or defensive self-enhancement theory offers an additional line of reasoning to explain our findings. This theory suggests that people with generally negative views of themselves should be motivated to seek out self-enhancing, positive feedback (Hull, 1943). Furthermore, whether or not people self-enhance may depend upon their self-concept within the particular domain being examined (e.g., Swann, Krull, & Pelham, 1989). In the present study, which examined self-concept in the domain of cognitive ability, we might assume that older adults have a more negative view of their cognitive abilities than younger adults, and therefore would be more likely to behave so as to self-enhance. Our negative manipulation may have

exaggerated older adults' pre-existing negative self-concept of their cognitive abilities, whereas our positive manipulation may have led to improvements in this area of their self-concept. The lack of condition effects for young adults may be attributed to a strong pre-existing positive self-concept in the domain of cognitive ability.

A number of caveats should be considered in the interpretation of the present study's results. One limitation is that we did not include an explicit measure of whether or not participants viewed the feedback as meaningful or diagnostic of abilities. Participants were told that performance on the ECB was indicative of everyday problem-solving abilities, but were not explicitly asked about their perception of the value of receiving feedback. Thus, while we were able to control for self-reported relevance of the specific topics covered on the ECB, we were not able to control for perception of the feedback's value.

A major concern of ours is the vagueness with which the locus of the Mood-as-Resource framework has been defined in the literature. The data seem to suggest that a general positive state (which may include high self-esteem, ego strength, and control beliefs along with positive mood) serves as a resource in past studies as well as in ours, but the absence of associations between mood and behavior suggest that mood itself is not the driving force. In our study, we suggest that mood may be a byproduct of the way that people feel about themselves, and that any covariation observed in mood and behavior is epiphenomenal. We believe that the connectedness of our manipulation to the outcome measure (i.e., both pertained to the participant's cognitive skills) is a strength of our study, as it allows for us to imagine a real-world application in which exposure to initial positive ideas/information leads to more willingness to explore the topic in greater depth. However, we also acknowledge that many real-world situations involve emotional experiences followed by information gathering that is unrelated to the mood elicitor. For example, prior to receiving test results, a person might listen to sad or happy music, have an argument with a family member, or attend an exciting event. It would be important to consider whether the mood-eliciting events could affect subsequent receipt of seemingly unrelated information independent of changes in feelings about self. Future research may investigate the effect of a more traditional mood induction, including a neutral condition, on information gathering behavior in older adults to further test our hypothesis that mood enhancement by itself may not be sufficient to induce the types of behavior patterns observed in our study.

In conclusion, our results indicate that preferences for viewing valenced information are dependent on older adults' affective states, with willingness to view negative information enhanced by positive mood. More research is needed to further identify the mechanisms through which positive primes make individuals more willing to attend to negative information. However, the results of this study have potentially important implication for situations in

which older adults' functioning would be enhanced through consideration of negative information. For example, being in a positive mood might increase the probability that older adults will systematically process potentially important negative information, such as risk factors associated with medications or treatments. From a theoretical standpoint, the results also add to a growing literature suggesting that positivity biases in older adults are moderated by situational factors, with the current study demonstrating that affective state is important in influencing the processing of self-relevant valenced information.

Supplementary Material

Supplementary data is available at *The Journals of Gerontology, Series B: Psychological Sciences and Social Sciences* online.

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Conflict of Interest

None reported.

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