

Memory Selectivity of Younger and Older Adults: The Interactive Effects of Valence and Subjective Value

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Whereas the ability to prioritize important information in memory remains preserved with age, it is still unclear how subjective value may interact with emotional valence to impact memory. The present study examined the interaction of value and valence in memory selectivity among younger and older adults. A sample of 24 younger (aged 17–29; 20.13 ± 2.54) and 24 older adults (aged 65–79, 70.13 ± 4.47) ranked valenced (positive and negative) and neutral words based on their subjectively perceived value/importance for memory. They then completed a value-directed remembering task, studying the same set of words paired with their assigned values, with a goal to maximize value points accrued in a subsequent word free recall task. Next, they completed a cued recall for values assigned to the words. Mixed-model analyses of variance were conducted on value assignment, word free recall, and cued value recall performance. Positive words were assigned a higher value/importance than negative or neutral words. Items assigned a higher value were better recalled and likely to be recalled first, an effect that tends to be larger for older than younger adults. Older adults generally face specific challenges recalling schema-inconsistent high values originally assigned to negative words, an effect absent in younger adults. The results suggested that valence can direct value assignment and, in turn, interact with the assigned value to guide memory selectivity. Relative to younger adults, older adults appear more likely to rely on a “positive is more valuable than negative” schema to guide value retrieval.

Public Significance Statement

The results suggest that emotional valence can direct and interact with subjectively perceived value to further guide memory selectivity to prioritize more valuable information among younger and older adults. Importantly, the results suggest that older adults’ memory representation is shaped by such a schema as “positive is more valuable than negative.” Goal-directed memory may inform the development of age-appropriate learning/memory strategies.

Keywords: value-directed remembering, memory monitoring, aging, emotional valence, value perception

The age-related decline in episodic memory has been thoroughly documented (Park et al., 2002; Zacks et al., 2000), and this decline facilitates greater selectivity in directing increasingly limited cognitive resources (Hess, 2014). Given the vast amount of information we encounter in everyday life, it is both crucial and adaptive, particularly for older adults, to allocate their more limited cognitive resources towards selectively attending to and remembering the most meaningful or valuable information.

According to the socioemotional selectivity theory, older adults tend to engage valence-based cognitive selection. Specifically, the perception of limited time left in life shifts older adults’ focus away from information-seeking to emotional gratification goals such as maintaining happiness and emotional well-being (Carstensen, 2021; Carstensen et al., 1999). As a result, they tend to selectively attend to and remember more positive over negative information, compared to younger adults, and this phenomenon is referred to as the

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The project is not preregistered, but all the final data and data analysis files can be retrieved from https://osf.io/3cevf/?view_only=ab953d08078447d4b9d5e69769702393 (Lab, 2025).

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positivity effect (Carstensen, 2021; Kennedy et al., 2004; Reed et al., 2014).

On the other hand, older adults tend to engage in value-directed cognitive selectivity to prioritize high- over low-value information (Castel, 2007, 2024; Knowlton & Castel, 2022; Murphy, 2025). This value-directed cognitive selectivity has been demonstrated in value-directed remembering (VDR) paradigms in which participants study word-point pairs with the goal to remember as many words as possible to maximize their accrued value points of correct recalls. Overall, older adults performed similarly or better than younger adults in selectively recalling high- over low-value items (Castel et al., 2002, 2011, 2013; Siegel & Castel, 2019).

Past studies on the relationships between value, valence, and memory selectivity suggest that value-based memory selectivity is preserved in older adults and may even overwrite the valence effect (Eich & Castel, 2016; Gallant et al., 2019). Both age groups recalled more high-value neutral than low-value positive or negative words (Eich & Castel, 2016). Similarly, value has shown to be a more powerful cue than valence or other perceptual features (e.g., font size; Murphy et al., 2022; Murphy, Rhodes, & Castel, 2024). Despite an age-equivalent value- or valence-based memory prediction during encoding, only older adults tended to correctly attribute or misattribute higher values (i.e., to-be-remembered) to positive than negative words (Gallant & Yang, 2014; Gallant et al., 2019). The well-maintained value-directed cognitive boost in older adults could be generalized to subjectively perceived value/importance. In fact, meaningful elements putatively draw stronger attention (Fung et al., 2019). Regardless of valence of facial expressions, older adults gazed more at faces perceived as socially close (i.e., sharing similar vs. distinct daily activities, Fung et al., 2019). Moreover, McGillivray and Castel (2017) found an age-equivalent memory for items with higher assigned values. Finally, Yang et al. (2024) suggested that self-perceived social importance, combined with schematic support, attenuated age-related memory deficits.

The preserved value-based memory selectivity in older adults can be understood in light of the dual-mechanism framework (Knowlton & Castel, 2022). This framework posits that value enhances memory through two distinct mechanisms: (a) strategic processes that rely on metacognitive awareness and deep encoding strategies and (b) automatic processes that allow a reflexive enhancement of high-value information encoding without an intention to remember. Recent work has demonstrated that the automatic reward-driven “value boost” of memory is notably weakened in older adults. Younger, but not older, adults continue to show value enhanced memory regardless of whether value was relevant to task performance (Murphy et al., 2025). In contrast, strategic processes are typically preserved with aging as memory selectivity remains intact or even improves in older adults to prioritize more valuable information despite their general memory decline (e.g., Castel et al., 2009, 2011). These results suggest that older adults can deliberately deploy strategies to selectively remember important information, particularly in the presence of explicit value cues. For example, when attending an social event, older adults may not be able to engage automatic memory processes to remember those in official uniform, but they may employ strategic processing to remember those described as socially meaningful (i.e., valuable) to them. Furthermore, positive versus negative facial expressions might also shape older adults’ perceived value (or impression) of a new person. Nevertheless, it is unclear whether their memory would be optimal for those who are perceived as both pleasant and important. It is thus

critical to capture the mechanisms by which younger and older adults selectively process and memorize valenced items perceived as important.

While the importance of meaning/value in memory selectivity has been thoroughly explored, it remains unclear whether valence impacts older adults’ subjective value perception and how valence and value interact to optimize memory selectivity. The present study fills a gap in literature by examining the effects of self-perceived value and how it works with valence to shape memory selectivity of younger and older adults. Different from Yang et al. (2024) in which self-perceived value was generated after retrieval and thus likely contaminated by each item’s recall status, the present study assessed subjectively perceived values before encoding.

The Present Study

The present study investigated the following three research questions: (1) Does valence guide perceived value/importance for memory among younger and older adults? (2) Does subjectively perceived value affect subsequent memory performance? and (3) Do younger and older adults differ in value and valence effects on memory selectivity? To address these questions, younger and older adults were asked to first complete a value attribution task that required them to rank a list of mixed positive, negative, and neutral words by assigning each word a unique value point based on their subjectively perceived memory value/importance. Following this task, they completed a VDR task that included four study-recall blocks for the words paired with their uniquely assigned values to maximize the value points. At the end, they completed a cued value recall task that required them to recall the originally assigned value point for each word.

Considering the observed positivity effect in older adults (Reed et al., 2014), we predicted that in the value attribution task, older adults would be more likely than younger adults to assign higher values to positive than negative/neutral items. Considering the “positive is more valuable than negative” schema (e.g., Gallant et al., 2019) and the positivity effect in older adults, we hypothesized that in the word recall task, high-value and positive words would yield differentially stronger memory selectivity (i.e., better recalled and/or likely to be first recalled), particularly among older adults. Furthermore, for the cued value recall, we expected that older adults would recall or mis-recall lower values as originally assigned to negative than positive words given their “positive is more valuable than negative” schema.

Method

Participants

The present study included 24 younger (aged 17–29; $M = 20.13$, $SD = 2.54$) and 24 older adults (aged 65–79, $M = 70.13$, $SD = 4.47$) who met inclusion criteria. All participants in the final sample reported normal or corrected-to-normal vision, with at least 10 years of education, learned English before the age of 6, and were without history of psychiatric or neurological disorders. Younger adults were recruited from the undergraduate participant pool at the Toronto Metropolitan University and earned 1% course credit. Older adults were recruited from the Toronto Metropolitan Senior Participant Pool and received \$18 Canadian dollars for their participation. This sample size allows a power of 85% to detect a

medium-effect interaction ($f = 0.20$) in a 2 (age) $\times$ 3 (valence) model, a small-to-medium effect ($f = 0.16$) in a 2 (age) $\times$ 2 (value: high vs. low) $\times$ 3 (valence) design, at $\alpha = .05$.

Participants were further screened and excluded for low vocabulary (i.e., lower than 20 on the Shipley Institute of Living Vocabulary test; Shipley, 1940) or extremely severe depression (scored over 28) or anxiety (scored over 20) on the 21-item Depression Anxiety Stress Scale (Lovibond & Lovibond, 1995). These criteria minimized confounds due to the linguistic testing stimuli and cognitive bias of depression/anxiety indicators (Dalgleish et al., 2003; MacLeod & McLaughlin, 1995). Older adults were also screened for dementia-related cognitive impairment signalled with a score of 7 or higher on the Short Blessed Test (Katzman et al., 1983), and the scores on this test ranged 1–4 in the final sample of older adults ($M = 0.58$, $SD = 1.25$).

Table 1 displays sample characteristics. Consistent with previous work (Gallant & Yang, 2014; Yang & Ornstein, 2011), older adults had more years of education, higher positive affect based on the Positive and Negative Affect Schedule (Watson et al., 1988), higher vocabulary, lower depression and anxiety, and slower processing speed assessed with the Digit Symbol Substitution Test (Wechsler, 1981), compared to younger adults.

Materials

A total of 48 words, equally split across valence conditions (positive, negative, and neutral) were selected from the Affective Norms for English Words database (Bradley & Lang, 1999), based on valence (1 = negative to 9 = positive) and arousal (1 = not arousing to 9 = very arousing) norms. Table 2 displays the average valence and arousal norms, as well as value points assigned to each word across the three valence categories. The valence rating differed between any two valence conditions ($t_s \geq 10.94$, $p_s \leq .001$). The three valence conditions were matched on arousal rating ($t_s \leq .68$, $p_s \geq .50$), word length (6.13 ± 1.45 for negative, 5.94 ± 1.39 for positive, and 5.81 ± 1.05 for neutral words; $t_s \leq .69$, $p_s \geq .49$), and word frequency (23.31 ± 22.84 for negative, 24.63 ± 16.34 for positive, and 21.53 ± 18.71 for neutral words; $t_s \leq .49$, $p_s \geq .63$). The words were divided into four lists of 12, each containing four

words of each valence category. An additional three neutral words were selected to serve as practice trials.

Procedure

Participants provided informed consent followed by a self-paced *value attribution task* built in Qualtrics. In this task, they viewed four lists of 12 words presented in counterbalanced order across participants. For each list, they were asked to assign a unique value (1–12) to each word based on subjectively perceived importance for the word to be remembered. Participants were informed that a word recall task would follow but not about the value recall task. After the *value attribution task*, participants took approximately 10 min to complete the Digit Symbol Substitution Test (for 2 min), the Positive and Negative Affect Schedule, and the 21-item Depression Anxiety Stress Scale, while the experimenter customized the subsequent VDR task for each participant by integrating the subjective values they attributed to the corresponding words.

Afterwards, they completed four study-recall VDR blocks, programmed in E-Prime 2.0, each with a word list in the same list order as in the value attribution task. Individual words were presented sequentially in black size-16 Arial font against a white background on a 17" laptop computer, each paired with the participant's uniquely assigned point value. Participants were then instructed to remember the words to maximize their value points. Each study trial started with a fixation cross for 5,000 ms, followed by a word–value pair for 3,000 ms, and then a blank screen for 1,000 ms before proceeding to the next trial. Following each study list, participants completed a word free recall task in which they were instructed to write down as many words as possible on a response sheet within 2 min.

Following the four VDR task blocks, a cued value recall task was given in which participants viewed all 48 studied words as cues and recall the value they originally assigned to each word. Each trial began with a fixation cross for 500 ms, followed by a cue word without a time constraint until a response was made, and then by an intertrial interval of 1,000 ms. Responses were recorded using the number keys at the top of the keyboard (with the “0,” “-,” “=” keys labelled as 10, 11, 12, respectively). At the end, the Shipley Institute of Living Vocabulary test, the Short Blessed Test (for older adults only), and a background questionnaire were administered before participants were debriefed and compensated.

Table 1

Sample Characteristics

Characteristic variable	Younger adults	Older adults	Group difference
	<i>M (SD)</i>	<i>M (SD)</i>	
Age	20.13 (2.54)	70.13 (4.47)	$p < .001$
Sex ratio (female/male)	14/10	19/5	$p = .212$
Years of formal education	13.91 (1.90)	17.08 (3.23)	$p < .001$
Shipley	28.29 (3.80)	36.04 (2.84)	$p < .001$
DSST	75.63 (16.19)	61.38 (14.54)	$p = .002$
PANAS: Positive affect	26.79 (7.27)	38.50 (6.55)	$p < .001$
PANAS: Negative affect	13.08 (4.00)	12.04 (3.22)	$p = .326$
DASS-21: Depression	9.50 (6.91)	4.17 (3.95)	$p = .002$
DASS-21: Anxiety	6.75 (4.75)	3.50 (3.97)	$p = .013$
SBT		0.58 (1.25)	

Note. The group difference p values were based on the independent samples t tests. DSST = Digit Symbol Substitution Test; PANAS = Positive and Negative Affect Schedule; DASS-21 = 21-item Depression Anxiety Stress Scales; SBT = Short Blessed Test.

Results

The data were analyzed in SPSS 24 and R Version 1.2.5033. Subjectively attributed value points in the value attribution task were analyzed with a 2 (age: younger vs. older) $\times$ 3 (valence: positive, negative, neutral) mixed-model analysis of variance (ANOVA). For memory selectivity (word recall and value recall) analysis, words were categorized as low value (1–6 points) or high value (7–12 points). A 2 (age) $\times$ 3 (valence) $\times$ 2 (value: high, low) mixed-model ANOVA was conducted for each recall score. Word recall was indexed by the proportion of correctly recalled words out of the total words in each condition. In the cued value recall task, to avoid the effects being marked by a potential floor level accuracy, we considered both exact values (e.g., 5 recalled as 5) and 1-point off values (e.g., 5 recalled as 4 or 6) as accurate recalls. Bonferroni correction was applied only in explorative post hoc multiple pairwise comparisons but not hypothesis-driven planned pairwise comparisons.

Table 2*Arousal and Valence Norms as Well as Assigned Values of the Positive, Neutral, and Negative Testing Stimuli*

List	Negative				Positive				Neutral			
	Word	Arousal	Valence	Value	Word	Arousal	Valence	Value	Word	Arousal	Valence	Value
1	Immature	4.20	3.40	6.65	Angel	4.80	7.50	7.67	Coarse	4.21	4.55	4.92
1	Neglect	4.80	2.60	7.25	Elegant	4.50	7.40	7.79	Passage	4.40	5.30	5.71
1	Sick	4.30	1.90	7.83	Sunset	4.20	7.70	7.71	Quart	3.60	5.40	3.79
1	Stupid	4.70	2.30	5.27	Useful	4.30	7.10	8.60	Stiff	4.02	4.70	4.75
2	Coward	4.10	2.70	5.67	Cake	5.00	7.26	6.06	Custom	4.66	5.85	6.60
2	Failure	5.00	1.70	6.94	Pillow	3.00	7.90	6.21	Excuse	4.50	4.10	7.15
2	Inferior	3.80	3.10	7.33	Protected	4.10	7.30	9.00	Lump	4.80	4.20	4.71
2	Slum	4.80	2.40	4.90	Soft	4.63	7.12	6.88	Stomach	3.90	4.80	6.56
3	Illness	4.70	2.50	7.08	Bath	4.20	7.30	4.65	Alley	4.90	4.50	2.94
3	Messy	3.30	3.20	4.38	Grateful	4.58	7.37	9.73	Gender	4.40	5.70	5.54
3	Unhappy	4.20	1.60	6.46	Reward	4.95	7.53	8.25	Privacy	4.10	5.90	8.40
3	Waste	4.10	2.90	5.08	Secure	3.10	7.60	8.94	Writer	4.30	5.50	6.56
4	Blind	4.40	3.10	6.65	Luxury	4.75	7.88	6.48	Habit	4.00	4.10	7.13
4	Handicap	3.80	3.30	6.98	Ocean	4.95	7.12	6.23	Medicine	4.40	5.70	9.25
4	Poverty	4.90	1.70	7.60	Snuggle	4.20	7.90	6.23	Spray	4.10	5.50	3.29
4	Scar	4.80	3.40	5.00	Warmth	3.70	7.40	8.75	Tower	4.00	5.50	4.44
<i>M</i>		4.37	2.61	6.32		4.31	7.46	7.45		4.27	5.08	5.73
<i>SD</i>		0.48	0.63	1.10		0.61	0.27	1.40		0.35	0.65	1.78

embedded in the ANOVA syntax in SPSS. Greenhouse–Geisser corrections were applied when variance sphericity assumption was violated.

To further probe the relationship between subjectively assigned values and subsequent memory performance, we conducted the Generalized Linear Mixed Models (GLMM; Murayama et al., 2014) in R using the lme4 (Bates et al., 2015) package. This approach can account for random variance associated with individual participants and items (Meteyard & Davies, 2020; Murayama et al., 2014). Separate analyses were conducted for word and value recall (1 = recalled, 0 = not recalled) as dependent variables. Age (1 = younger, 0 = older) and value were modelled as fixed effects, while participant and item intercepts were modelled as random effects.

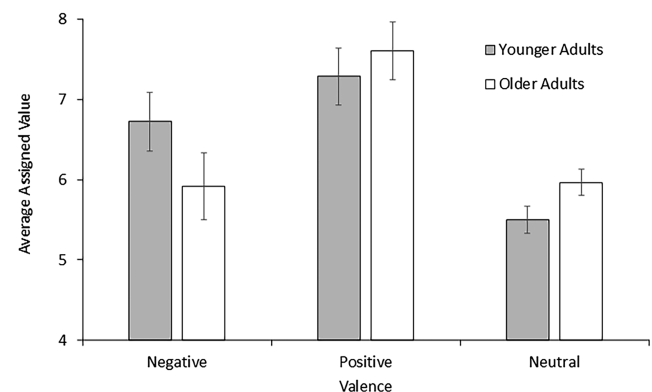
Value Attribution Task Performance

The Age $\times$ Valence ANOVA on subjective value attribution scores (see Figure 1) showed a main effect of valence, $F(1.28, 59.06) = 9.97, p < .001, \eta_p^2 = .18$. Greenhouse–Geisser correction was applied due to a violation of the sphericity assumption signalled by a significant Mauchly's Test ($p < .001$). The planned multiple pairwise comparisons revealed that positive words ($M = 7.45, SD = 1.72$) were assigned higher values than negative ($M = 6.32, SD = 1.93$), $p = .033$, 95% confidence interval, CI [0.094, 2.161], or neutral words ($M = 5.73, SD = 0.84$), $p < .001$, 95% CI [1.161, 2.268], but the negative–neutral comparison was not significant ($p = .094$). The Age $\times$ Valence interaction was not significant ($ps = .214$). Guided by the positivity effect hypothesis in older adults, we conducted the planned pairwise comparisons for valence within each age group. Both age groups assigned higher values to positive than neutral words (younger: $p < .001$, 95% CI [1.004, 2.569]; older: $p < .001$, 95% CI [0.860, 2.426]). However, positive words were assigned a higher value than negative words by older adults ($p = .024$, 95% CI [0.231, 3.154]) but not younger adults ($p = .442$). Similarly, negative words were assigned a higher value than neutral

words by younger adults ($p = .015$, 95% CI [0.246, 2.202]) but not older adults ($p = .919$).

Free Recall of Words

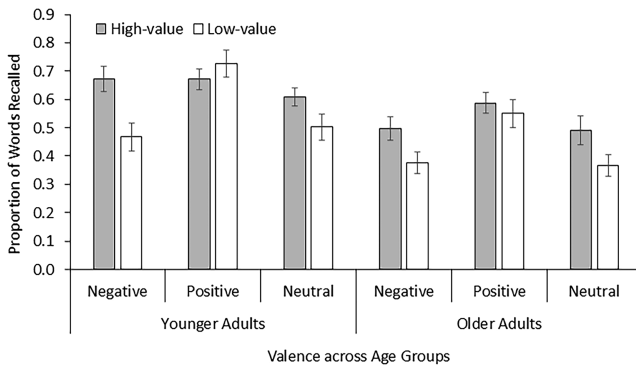
Figure 2 displays the proportional word recall performance. The Age $\times$ Valence $\times$ Value ANOVA on the word recall performance showed a main effect of age, $F(1, 40) = 21.04, p < .001, \eta_p^2 = .35$, with a better recall by younger ($M = .61, SD = 0.11$) than older adults ($M = .47, SD = 0.10$). The main effect of valence, $F(2, 80) = 13.95, p < .001, \eta_p^2 = .26$, indicated a better recall of positive ($M = .63, SD = 0.15$) than negative ($M = .51, SD = 0.17$), $p < .001$, 95% CI [0.062, 0.178], or neutral words ($M = .48, SD = 0.16$), $p < .001$, 95% CI [0.088, 0.189], while the latter two did not differ ($p = 1.00$) in the planned pairwise comparisons. The main effect of

Figure 1*Value Attributions Across Valence and Age Groups*

Note. It captures average values assigned to words by younger (grey bar) and older adults (white bar) as a function of valence. Error bars represent standard error of the mean.

Figure 2

Word Recall Across Value, Valence, and Age Groups



Note. It captures average word recall performance (i.e., proportion of recalled words) for high-value (grey bar) and low-value (white bar) words as a function of valence for younger and older adults. Error bars represent standard error of the mean.

value, $F(1, 40) = 9.65, p = .003, \eta_p^2 = .19$, indicated a better recall of high- ($M = .60, SD = 0.15$) than low-value words ($M = .48, SD = 0.16$). These effects were qualified by a significant Value $\times$ Valence interaction, $F(2, 80) = 5.11, p = .008, \eta_p^2 = .11$. The post hoc pairwise comparisons (with Bonferroni correction) showed a significant value effect (high > low) for negative ($p = .001, \eta_p^2 = 0.26$) and neutral ($p = .004, \eta_p^2 = 0.19$) but not positive words ($p = .838$) and a significant valence effect ($\eta_p^2 = .42$) for low-value (positive > negative, $p = .001, 95\% \text{ CI } [0.083, 0.336]$; positive > neutral, $p < .001, 95\% \text{ CI } [0.109, 0.3.8]$) but not high-value words ($p = .191; = .08$). All other effects were not significant ($ps \geq .153$).

To assess the effect of value and valence on memory accessibility, indexed by the first correctly recalled word, we calculated the probability of each participant's first correctly recalled word falling in each of the six Valence $\times$ Value categories out of the four testing blocks. The Age $\times$ Valence $\times$ Value ANOVA revealed significant main effects of valence, $F(2, 92) = 10.76, p < .001, \eta_p^2 = .19$, and value, $F(2, 46) = 57.10, p < .001, \eta_p^2 = .55$, with the first recalled word being more likely to be a high-value ($M = .25, SD = 0.08$) than a low-value word ($M = .08, SD = 0.08$). The planned pairwise comparisons on valence effect suggested that the first recalled word was more likely to be positive ($M = .25, SD = 0.08$) than negative ($M = .12, SD = 0.12$), $p < .001, 95\% \text{ CI } [0.061, 0.189]$, or neutral ($M = .13, SD = 0.11$), $p < .001, 95\% \text{ CI } [0.055, 0.180]$, with the latter two did not differ from each other ($p = .777$). Additionally, the Age $\times$ Value interaction was also significant, $F(1, 46) = 6.35, p = .015, \eta_p^2 = .12$. The planned pairwise comparisons yielded a stronger value effect in older ($p < .001; \eta_p^2 = .53$) than younger adults ($p = .001; \eta_p^2 = .22$). Compared to younger adults, older adults first recalled more high-value words but fewer low-value words ($ps = .015, \eta_p^2 = .12$). This interaction was illustrated in Figure 3.

Cued Value Recall

The Age $\times$ Valence $\times$ Value ANOVA on cued value recall accuracy (as captured in Figure 4) revealed significant main effects of value, $F(1, 40) = 10.08, p = .003, \eta_p^2 = .20$, and valence, $F(2, 80) = 4.15,$

$p = .019, \eta_p^2 = .09$, qualified by a three-way interaction, $F(1.73, 69.37) = 4.32, p = .021, \eta_p^2 = .10$. Greenhouse–Geisser correction was applied due to a violation of the sphericity assumption signalled by a significant Mauchly's Test ($p < .001$). Values were better recalled for low-value ($M = 0.58, SD = 0.17$) than high-value ($M = 0.49, SD = 0.18$) words. The planned pairwise comparison showed that values were better recalled for positive ($M = 0.56, SD = 0.17$) than negative ($M = 0.50, SD = 0.19$) words ($p = .012, 95\% \text{ CI } [0.019, 0.146]$) and better recalled for neutral ($M = 0.54, SD = 0.20$) than negative words ($p = .049, 95\% \text{ CI } [0.000, 0.145]$), but the positive–neutral comparison was not significant ($p = .713$). All the other effects were not significant ($ps \geq .198$).

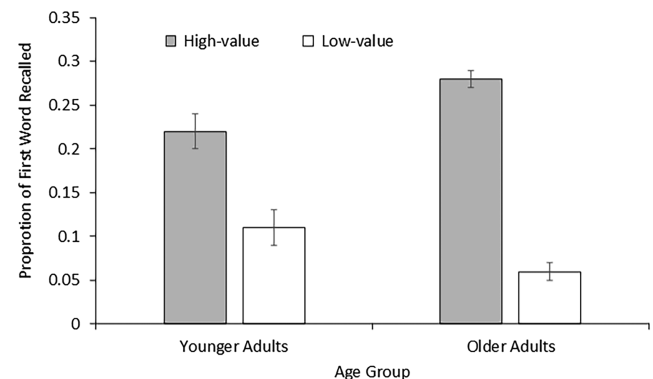
To follow up the three-way interaction and in light of the hypothesis, we conducted an Age $\times$ Valence ANOVA for each value level. The results revealed a significant Age $\times$ Valence interaction for high-value, $F(2, 84) = 6.04, p = .004, \eta_p^2 = .13$, but not low-value words ($p = .865$). For high-value words, the planned pairwise comparisons showed a valence effect for older ($p < .001, \eta_p^2 = .316$) but not younger adults ($p = .868$). Older adults showed a better value recall for positive ($p < .001, 95\% \text{ CI } [0.153, 0.412]$) or neutral ($p = .015, 95\% \text{ CI } [0.035, 0.311]$) than negative words, but the positive–neutral comparison was not significant ($p = .082$).

Relationship Between Subjective Value Attribution and Memory

GLMM (Murayama et al., 2014) for each age group (Table 3) revealed that higher subjective values were associated with a better word recall ($\beta = 0.11$ for both age groups) but a poorer value recall ($\beta = -0.04$ to -0.07) in both age groups ($ps \leq .028$). For older adults, the value prediction for word recall applied across all valence conditions ($\beta = 0.07$ – $0.13, ps \leq .040$). For younger adults, this relationship was absent for positive words ($\beta = 0.07, p = .089$). For value recall, older adults showed an inverse relationship between value attribution and value recall for negative and neutral ($\beta = -0.10$ to $-0.19, ps \leq .002$) but not for positive words ($\beta = 0.04, p = .283$). These relationships were not significant in younger adults ($\beta = -0.07$ to $0.11, ps \geq .056$).

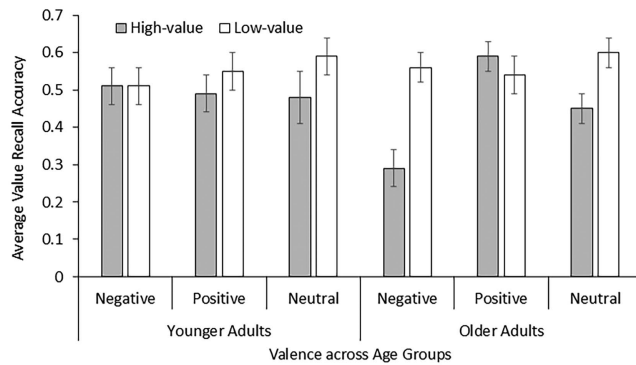
Figure 3

First Word Recalled by Value and Age Groups



Note. It captures the proportion of first recalled word from high-value (grey bar) and low-value (white bar) words out of the four testing blocks for younger and older adults. Error bars represent standard error of the mean.

Figure 4
Value Recall Across Value, Valence, and Age Groups



Note. It captures average cued value recall accuracy for high-value (grey bar) and low-value (white bar) words as a function of valence for younger and older adults. Error bars represent standard error of the mean.

Discussion

The present study takes a novel approach to assess how subjectively perceived value interacts with valence of testing stimuli to maximize the goal-directed cognition, particularly for older adults. Different from previous value-directed remembering research in which values were largely externally determined by experimenters (e.g., Eich & Castel, 2016), the present study allows participants to freely assign values to valenced word stimuli.

Taken together, the results indicate that valence plays a significant role in value assignment. In support of the first hypothesis of a positivity effect among older adults, the value attribution performance indicated that positive words were perceived as more valuable than negative or neutral words, with the positive–negative

comparison only significant for older adults and a negative–neutral comparison only significant for younger adults. Largely consistent with the second hypothesis of a stronger value or valence-based memory selectivity, we found both high-value and positive words were selectively prioritized in word recall, with the value effect absent for positive words and the valence effect absent for high-value words. Furthermore, the first recalled word was likely to be a positive or high-value word, with a stronger value-based effect for older than younger adults. Finally, the cued value recall results supported the third hypothesis with older adults showing a poorest recall of high values originally assigned to negative words, presumably driven by their “positive is more valuable than negative” schema (e.g., Gallant et al., 2019). Furthermore, value enhances word recall but disrupts value recall.

Subjective Value Attribution

Overall, the results indicate that valence guides value perception, with higher values assigned to positive than neutral words. Additionally, younger adults also valued negative over neutral words, whereas older adults valued positive over negative words. The negativity bias in younger adults replicated a robust finding in literature (e.g., Baumeister et al., 2001; Bebbington et al., 2017; Yang & Ormstein, 2011). The presence of a positivity bias and absence of a negativity bias in older adults well support the positivity effect postulated in the socioemotional selectivity theory (Carstensen, 2021). The results are also consistent with previous findings that older adults attributed higher importance to positive over negative items during retroactive source monitoring (Gallant et al., 2019; Gallant & Yang, 2014). In light of the dual-mechanism framework (Knowlton & Castel, 2022), younger adults are able to flexibly engage in both mechanisms of automatic bias towards negative items and strategic enhancement of processing positive

Table 3

Generalized Linear Mixed-Effects Model Analysis of the Relationship Between Subjective Value Assignments and the Subsequent Memory Performance

Performance variable	β	<i>SE</i>	Wald's 95% CI	<i>z</i>	<i>p</i>
Younger adults					
Overall word recall	0.11	0.02	[0.06, 0.15]	4.69	<.001
Negative word recall	0.14	0.04	[0.07, 0.22]	3.58	<.001
Positive word recall	0.07	0.04	[−0.01, 0.16]	1.70	.089
Neutral word recall	0.09	0.04	[0.01, 0.18]	2.10	.035
Overall cued value recall	−0.04	0.02	[−0.07, −0.004]	−2.20	.028
Negative cued value recall	0.11	0.03	[−0.06, 0.08]	0.31	.755
Positive cued value recall	−0.06	0.03	[−0.12, 0.005]	−1.81	.070
Neutral cued value recall	−0.07	0.03	[−0.14, 0.001]	−1.91	.056
Older adults					
Overall word recall	0.11	0.02	[0.07, 0.15]	5.39	<.001
Negative word recall	0.12	0.04	[0.05, 0.19]	3.22	.001
Positive word recall	0.07	0.03	[0.003, 0.14]	2.05	.040
Neutral word recall	0.13	0.04	[0.06, 0.21]	3.39	<.001
Overall cued value recall	−0.07	0.02	[−0.11, −0.04]	−3.84	<.001
Negative cued value recall	−0.19	0.04	[−0.27, −0.12]	−5.16	<.001
Positive cued value recall	0.04	0.03	[−0.03, 0.10]	1.07	.283
Neutral cued value recall	−0.10	0.03	[−0.17, −0.04]	−3.02	.002

Note. Wald's 95% CI were computed using `confint.merMod` function from the `lme4` library in R. Age (coded as 1 = younger, 0 = older) and subjective values were modelled as fixed effects. Participant and item intercepts were modelled as random effects. CI = confidence interval; *SE* = standard error.

over neutral items, but older adults may be restricted only to strategic processes by selectively prioritizing positive items.

Word and Value Recall

Taken together, our results suggest that both subjective value and valence serve as salient cues for memory selectivity in younger and older adults. Younger adults outperformed older adults in word recall, corroborating the decline of episodic memory in older adults (e.g., Nyberg et al., 2012; Shing et al., 2010). Positive or high-value words were given priority as they were better recalled and more likely to be first recalled. The valence-based memory selectivity supports the emotional enhancement (i.e., emotional stimuli are better remembered than neutral stimuli) in both younger and older adults and positivity effect (i.e., positive information is given priority over negative information in attention and memory) in older adults (Carstensen & Charles, 1994; Reed et al., 2014; Truong & Yang, 2014). The results extended the findings of a preserved value-directed memory in older adults (e.g., Castel, 2024; Knowlton & Castel, 2022; Murphy, 2025) to subjectively perceived values.

The present study design captures a unique interactive effect of valence and subjectively perceived value on memory selectivity. Specifically, the valence-based memory boost was absent for words perceived as highly valuable, whereas the value-based memory selectivity was absent for positive words. This pattern extended previous findings of equivalent value-directed memory across different valence conditions (Eich & Castel, 2016; Gallant & Yang, 2014; Gallant et al., 2019). Past studies suggest that positivity effect likely occurs in open encoding instruction, allowing participants strategically deploy their cognitive resources to prioritize positive information (Reed et al., 2014). It is possible that the task instructions in the present study, with a focus on value-based encoding, may constrain valence-based selective encoding. It therefore may disrupt emotion-regulation goals and overshadow the valence effect, especially for salient high-value items. Alternatively, it is also possible that positive or high-value words were both best prioritized, leaving little room for additional benefits in recall. Taken together, valence and value may compensate for each other in memory selectivity.

Of note, positive or high-value words are differentially prioritized in memory output order as they are more likely to be the first recalled. This effect was more profound for older than younger adults. These results expand the existing literature on value-directed memory selectivity to retrieval output order (Murphy, 2025; Murphy, Schwartz, & Castel, 2024). Moreover, item accessibility in memory may be signalled by importance, as indexed by factors such as valence or value. Highly important items (e.g., positive or high-value) might be encoded with deep strategic processing, which would lower activation threshold and thus facilitate memory retrieval. Relative to younger adults, older adults appear to be particularly sensitive to salient memory cues to prioritize items of higher values in their word recall performance. Our results are in line with previous work demonstrating that value is more powerful than valence in older adults' memory selectivity (e.g., Eich & Castel, 2016; Fung et al., 2019).

The novel design of this study provides insight into previous findings of a positivity bias in older adults who correctly recalled higher value positive/neutral over negative words compared to younger adults (Gallant & Yang, 2014; Gallant et al., 2019). The

cued value recall results suggest a tendency among older adults to devalue negative words and reconstruct their memory for values to be largely consistent with their default belief/schema of "positive is more valuable than negative" given the importance of schematic support in episodic memory (Whatley & Castel, 2022). This negativity devaluing tendency of older adults also supported the dual-mechanism framework (Knowlton & Castel, 2022). Compared to younger adults, who engage in both strategic processing of positive information and automatic processing of negative information to guide memory, older adults may ignore negative information and treat it as less important (Gallant et al., 2019; Knowlton & Castel, 2022).

This study is the first to elucidate the conditions underpinning the elevated recall of low versus high values. Putatively, low-value words, given their inconsistency with the memory goal, may be encoded with vivid connections to prompt a low-value assignment (e.g., some unfavourable experience/knowledge associated with the word) and accordingly induce heightened recollection-based memory retrieval. In contrast, high-value words do not necessitate elaboration as they tend to be largely consistent with the goal of the memory task and therefore more likely to be retrieved based on a general sense of familiarity. Nevertheless, we acknowledge the speculative nature of this interpretation, which requires further verification in future studies.

Does Value Assignment Predict Memory?

The GLMM results showed that perceived value enhances word recall but disrupts value recall in both age groups. The positive prediction of value for word recall was present across all valence conditions for older adults but was absent for positive items in younger adults. Generally, older adults tend to be consistent in using perceived values to guide their memory, supporting the robust literature denoting the preserved or even enhanced value-directed memory in older adults (McGillivray & Castel, 2017; Siegel & Castel, 2019; Whatley & Castel, 2022). The inverse prediction of subjective value for value recall was present only in older adults and specific to negative and neutral words. This reflects a habituated tendency in older adults to devalue negative or neutral words in their memory, which may be driven by their "positive is more valuable than negative" schema to guide retrieval (e.g., Gallant et al., 2019).

Limitations and Future Directions

The current work has a few limitations. Whereas ecological validity was optimized by allowing participants to freely assign values to words, the value attribution task constrained participants to ranking the words to unique set of values. This forced value assignment may not fully emulate real-life settings and thus restrict the generalizability and practical implications of the results. Future research may benefit from providing greater flexibility in value assignments to more accurately simulate real-world scenarios. Furthermore, the value recall task may largely capture a natural value assignment process that likely relies on a familiarity-based process that tends to be intact in older adults. Therefore, this aspect of the design might have masked any age-related effects. It should be noted, however, this possibility is not supported by the cued value recall performance. Deviating from the word recall and the expected natural value attribution patterns, the value recall showed a value

disruption effect (i.e., a better value recall for low-value than high-value items). Nevertheless, future studies will take into account the potential generalizability limitations and consider alternative task designs to better control for the aforementioned potential confounds.

Conclusions and Implications

To conclude, the results of the present study suggest that valence could inform our value perception of positive information as more valuable for memory. In both younger and older adults, positive items are prioritized in word recall, word recall order, and value recall. High-value items are better recalled and more likely to be recalled first. The value effect is generally more profound in older adults, suggesting that older adults are more likely to use perceived values to guide, monitor, or predict their subsequent memory processing. Similarly, older adults face specific challenges recalling high values assigned to negative words, supporting previous findings of older adults' memory monitoring through a value-based "positive is more valuable than negative" schema (Gallant & Yang, 2014; Gallant et al., 2019).

This study directly examines memory selectivity for information varying in emotional valence and subjective value. The results expanded the existing theoretical approaches such as the dual-mechanism framework (Knowlton & Castel, 2022) through an interactive memory selectivity boost from both valence and subjective value. The results explicate our understanding of human cognition and the key role of goal-directed memory. The findings offer important insights into the conditions under which memory is preserved in aging which in turn inform the development of age-appropriate learning/memory strategies or programs for older adults. This is important in the context of the rapid aging of the global population.

Résumé

Si la capacité à hiérarchiser les informations importantes en mémoire semble préservée avec l'âge, le rôle de la valeur subjective et de sa possible interaction avec la valence émotionnelle sur la mémoire reste à clarifier. La présente étude a examiné l'interaction de la valeur et de la valence dans la sélectivité de la mémoire chez des adultes plus jeunes et plus âgés. Un échantillon de 24 adultes plus jeunes (âgés de 17 à 29 ans; $20,13 \pm 2,54$) et de 24 adultes plus âgés (âgés de 65 à 79 ans, $70,13 \pm 4,47$) ont classé des mots à valence positive, négative et neutre selon la valeur ou l'importance qu'ils leur attribuaient subjectivement pour la mémoire. Ils ont ensuite effectué une tâche de mémorisation axée sur la valeur, en étudiant la même série de mots associés à leur valeur, dans le but de maximiser les points de valeur accumulés lors d'une tâche ultérieure de rappel libre de mots. Ensuite, ils ont effectué un rappel indicé des valeurs attribuées aux mots. Des analyses de variance à modèle mixte ont été réalisées sur les performances en matière d'attribution de valeurs, de rappel libre de mots et de rappel de valeurs. Des mots à connotation positive se voyaient attribuer une valeur/importance supérieure à celle des mots négatifs ou neutres. Les éléments ayant une valeur plus élevée étaient mieux retenus et rappelés plus tôt, un effet qui se manifeste davantage chez les adultes plus âgés que chez les plus jeunes. Les adultes plus âgés rencontrent généralement des difficultés particulières à se souvenir des valeurs élevées incohérentes avec le schéma, initialement attribuées aux mots à

connotation négative, un effet qui était absent chez les adultes plus jeunes. Les résultats suggèrent que la valence peut orienter l'attribution de valeur et, à son tour, interagir avec la valeur attribuée pour guider la sélectivité de la mémoire. Par rapport aux adultes plus jeunes, les adultes plus âgés semblent plus susceptibles de s'appuyer sur un schéma selon lequel « le positif est plus précieux que le négatif » pour orienter la récupération des valeurs.

Mots-clés : mémorisation axée sur la valeur, surveillance de la mémoire, vieillissement, valence émotionnelle, perception de la valeur

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