Do older adults inhibit falsely predicted words?
Evidence from the Cross-Modal Lexical Priming paradigm

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Introduction: Younger readers or listeners often predict upcoming words based on prior linguistic input. When these predictions fail, they quickly inhibit falsely predicted words[1]. While the predictive and inhibitory mechanisms of younger adults have been extensively studied, findings on predictive language processing in older adults remain mixed, with some studies suggesting weaker predictions and others reporting comparable or stronger predictions. Further, older adults are less capable of inhibiting irrelevant information due to cognitive aging[2]. Less explored is how they predict upcoming words and handle prediction failures in sentence comprehension. We address this using the *Cross-Modal Lexical Priming* (CLMP) [3] paradigm.
Method: 42 older adults (OA; M_{age} = 72, SD = 5.5) and 49 younger adults (YA; M_{age} = 20, SD = 2.6) completed the CMLP task, consisting of 360 trials across three steps: (1) Sentence Listening: Ps *listened* to either prediction-violated or non-violated sentences (Table 1). In the prediction-violated condition, the predicted word (e.g., dog) was replaced with an unexpected but semantically congruent word (e.g., monkey). In the non-violated condition, the final word of the sentence was replaced by a silent pause matching the duration of the final word in the prediction-violated condition. (2) Lexical Decision Task (LDT): Ps responded to *visually* presented words–either predicted (e.g., *dog*) or unrelated (e.g., *ring*)–following the sentence. (3) Comprehension Question: Ps answered yes/no questions on one-third of trials.
Analysis and Prediction: The dependent variable was LDT reaction times (RTs). The regression model included group (OA vs. YA), sentence condition (non-violated vs. violated), and LDT word type (predicted vs. unrelated) as fixed effects. Analyses were conducted using the R packages *gls* and *emmeans*. If OA engage in lexical prediction during sentence comprehension, faster RTs for predicted words vs. unrelated words were expected, leading to a significant main effect of LDT word type. Further, if OA are less likely to predict than YA, a *group X LDT word type* interaction was anticipated. For inhibition, if OA inhibit falsely predicted words, RTs for predicted words should be delayed in the violated condition vs. non-violated condition while RTs for unrelated words should remain consistent across sentence conditions. This would result in a significant *LDT word type X sentence condition* interaction. If the magnitude of inhibition differs between groups, a three-way interaction was expected.
Results: For prediction, the model revealed no significant *group × LDT word type* interaction ($\chi^2(1, 92)=0.18$, $p=.673$), indicating no differences between groups in RTs for predicted vs. unrelated words (Fig 1). Pre-planned pairwise comparisons showed that RTs to predicted words were significantly faster than unrelated words for both OA ($t=-15.11$, $p<.001$) and YA ($t=-19.24$, $p<.001$). For inhibition**,** the significant *sentence condition × LDT word type* interaction ($\chi^2(1, 92)=114.99$, $p<.001$) indicated that both groups engaged in inhibition. Notably, a three-way interaction (*group × sentence condition × LDT word type*; $\chi^2(1, 92)=4.06$, $p=.044$) was found (Fig 2). In the violated sentence condition, younger adults' RTs for predicted words remained significantly faster than unrelated words ($t=-5.09$, $p<.001$), suggesting partial inhibition, whereas older adults' RTs between predicted words and unrelated words were not different (($t=0.11$, $p=1.000$), indicating complete inhibition of violated prediction.
Conclusion: The study demonstrates that older adults engage in predictive processing for upcoming words during sentence comprehension at a level comparable to younger adults. Furthermore, older adults fully inhibit falsely predicted lexical information, whereas younger adults only partially suppress it. Older adults' complete inhibition may represent a compensatory strategy to manage cross-modal linguistic inputs given their limited processing capacity. This strategy likely prioritizes current linguistic input by fully deactivating irrelevant predictions. Younger adults, by contrast, maintain some activation of predicted words, allowing flexibility in adapting to discourse context. These findings highlight the adaptive nature of older adults'

language processing in accommodating cognitive aging and underscore the unique contributions of the CMLP paradigm in studying language prediction and inhibition.

Table 1. Example Stimuli in the Cross-Modal Lexical Priming task.

Sentence Type (Listening)		**(Visual) Lexical Decision Task**	
Non-violated	On sunny days, Jake visits the park to walk his [pause].	Predicted word	Dog
Violated	On sunny days, Jake visits the park to walk his monkey.	Unrelated word	Ring

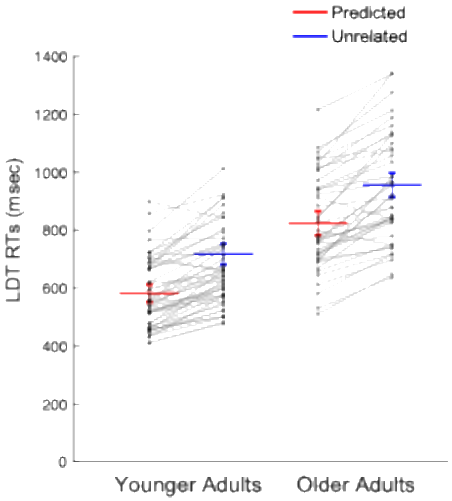

Figure 1. LDT RTs (msec) in non-violated sentence by group

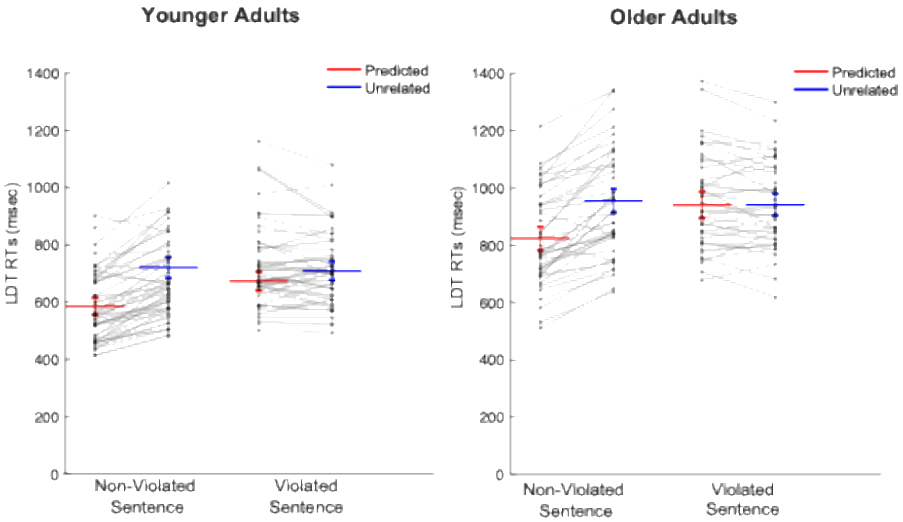

Figure 2. LDT RTs (msec) by group

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