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Priming Younger and Older Adults' Sentence Comprehension: Insights from Dynamic Emotional Facial Expressions and Pupil Size Measures

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SUPPLEMENTARY INFORMATION

ANOVA Results on the Pre-NP1 Region

The pre-NP1 region comprised the picture-neutral initial part of the sentence (cf. *Ich meine dass* in Fig. (1), in both negative and positive sentence) and the 1500 ms picture preview preceding it (total duration of pre-NP1 region: 3000 ms, see Table S2). Because picture disambiguation only occurred after the onset of NP1, in the pre-NP1 region a sentence effect and an interaction of face with sentence cannot obviously be expected. Instead, one can establish whether looks to the pictures vary as a function of face valence (the face that listeners had just seen in Display 1, see Fig. (1), *i.e.* whether there is face-picture priming, and whether this priming is modulated by age. Mean log probabilities ratios ($\ln(p(\text{negative picture})/p(\text{positive picture}))$) were computed for this region and submitted to ANOVAs by participants and items. In these ANOVAs Face (positive vs. negative) was a within participants and items variable and Age was between in the ANOVA by participants and within in the ANOVA by items. The ANOVA results are given in the table below.

As one can see from Table S1, the only significant effect (*) was the intercept in the analysis by participants, indicating that the grand mean, corresponding to the positive log ratio of .077 ($SE = .026$), is significantly different from zero, which confirms an overall preference to look at the negative picture irrespective of age and face valence. This result replicates that of the static face study, where the grand mean was positive and the intercept reliable in the analysis by items, too.

Table S1. Summary of ANOVA results on pre_NP1 region. Degrees of freedom: F1(1,30), F2 (1,27). P values are under the corresponding F-values. P-values not given if $F < 1$. The asterisk (*) denotes significance at $p < .05$. The symbol § indicates significance at $p < .05$ in the static-face study.

Effects and interactions	Pre-NP1 region	
	F1	F2
	p1	p2
Age	<1	<1
Face (face-picture priming)	1.6 .216§	2.09 .16§
Face x age	< 1	1.13 .30
Intercept	8.5 .007*§	2.16 .15§

In the static face study the face-picture priming effect was also significant. Although this effect did not achieve

significance in the current study, there was a clear numerical trend in its direction: For young and older participants the mean log ratio after a negative face prime (young: .13, SE .066, old: .12, SE=.066) was higher than the log ratio after a positive prime (young: -.006, SE= .059, old: .07, SE=.059), indicating that after a negative face prime the participants were more likely to look at the negative picture than after a positive face. Thus, although only one of the significant effects of the static face study was replicated with dynamic faces in the pre-NP1 region, the direction and pattern of results are the same in both studies. The fewer significances found in the dynamic face study are likely due to reduced power, *i.e.*, the fact that this study used half the number of participants (16 vs. 32 per age group). In this respect, it is noteworthy that in the post-NP1 region even with the smaller population sample the face-sentence priming effects of the current experiment matched in significance those of the static face study – another confirmation of the robustness and replicability of such effects.

Supplementary Analyses of the Pupil Size Data

Table S2. Linear mixed effect model results with nonnormalized mean pupil size as dependent variable.

	<i>Coefficient</i>	<i>SE</i>	<i>t-value</i>
<i>Intercept</i>	1115.18	32.54	34.37
<i>Picture</i>	-12.65	3.64	- 3.47 *
<i>Age</i>	149.26	32.11	4.65 *
<i>Region</i>	10.36	1.42	7.28 *
<i>Picture x Age</i>	-4.25	2.66	-1.60
<i>Picture x Region</i>	-1.49	1.43	-1.04
<i>Age x Region</i>	3.52	1.44	2.43 *
<i>Picture x Age x Region</i>	-1.40	1.46	- 0.95

*p < .05

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