

EFFECTS OF LOCAL PREDICTABILITY ON EYE FIXATION BEHAVIOR IN SILENT AND ORAL READING FOR YOUNGER AND OLDER ADULTS

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This study investigates effects of word predictability in reading. The question is whether older adults benefit from local predictability to the same extent as do younger adults and whether predictability differentially affects silent reading vs. oral reading, the latter involving an additional speech planning and articulation stage.

One way to operationalize predictability is Transitional Probability (TP) which indicates how likely a word is conditioned by its left or right neighboring word. TPs are computed via frequency counts from large language corpora and reflect probabilistic knowledge on how likely a particular word is to come next. Several reading studies (e.g., McDonald & Shillcock, 2003, *PsychScience*) have shown that frequent word combinations (such as 'to give advice') can be processed faster than less frequent combinations (such as 'to give ideas'). Furthermore, frequent and predictable words are articulated with less effort in speech production (e.g., Bell et al., 2009, *JML*). Given that frequency and predictability effects are based on language experience, they are prime candidates for age-related changes. However, evidence is mixed on whether frequency and predictability effects generally decrease or increase with age in adulthood. In a corpus study on read aloud speech we found that older adults show slightly smaller-sized (TP) predictability benefits in their spoken word durations than young adolescents. Predictability in reading aloud may exert its effect either on the comprehension level, or the speech planning and pronunciation level, or both. The aim of the present study was to separate these various levels by studying whether TP affects eye fixation behavior differently in silent and oral reading, and to compare TP effects on eye fixations to TP effects on spoken word duration data.

In the present study 30 younger and 30 older participants read full sentences both silently and aloud. These 240 sentences included critical verb-noun combinations in which transitional probabilities and word frequencies varied continuously from high to low values. The analysis of the fixation durations shows clear predictability (TP) effects, that were of equal size in oral vs. silent reading. Second, the fixation data do not show a predictability by age group interaction, indicating that older and younger adults predict upcoming words to the same extent in both reading modalities. We further analyze skipping rates and refixation rates for the target verbs. Older adults have been shown to employ a different reading strategy than younger adults with higher skipping rates, but also higher refixation rates (Rayner et. al., 2006, *Psych&Aging*). Our data confirm these effects, with older adults skipping target verbs more frequently while at the same time regressing to the verb area more often than younger adults. High-predictable verbs are skipped more often than low-predictable words, especially in the younger adults' sample. However, skipping occurs rarely (less than 6 % of the total sample) and the age by predictability interaction in our sample is thus a marginal effect. Analysis of the spoken word durations from the oral reading condition is in progress and will be discussed.

We conclude that local predictability influences reading behavior and speech planning. Older adults use probabilistic knowledge as much as younger adults in order to process immediately upcoming words. Our data thus differ from findings of age-related differences in contextual prediction reported in the aging literature (e.g., Federmeier et al., 2010, *Brain&Lang*). This difference in results may relate to whether predictability effects are local (as in TPs), or whether the cues that predictions are based on need to be integrated over a sentence (as for instance in cloze tasks).