

Gaze cue versus recent event preference in spoken sentence comprehension: Evidence from eye tracking

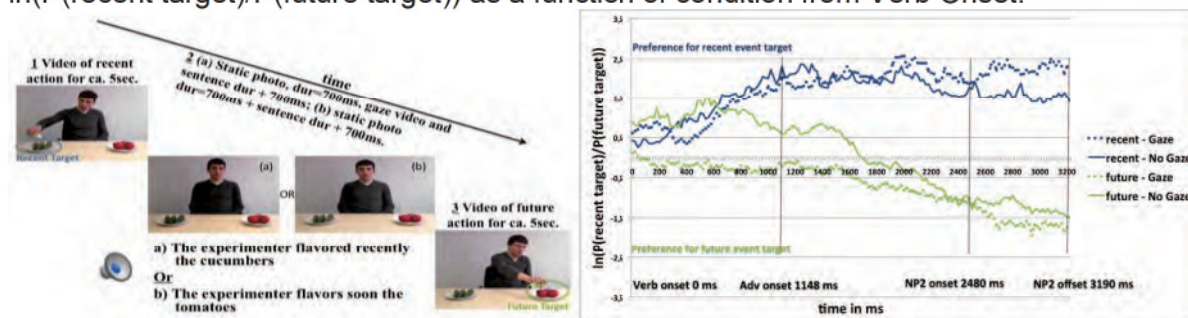
Dato Abashidze & Pia Knoeferle (CITEC, Bielefeld University)
dabashidze@cit-ec.uni-bielefeld.de

Visual-world eye-tracking studies have shown rapid visual context effects on spoken sentence comprehension. Among these is a preference to relate a sentential verb to a recent rather than future action [1]. Previous studies have tested the recent-event preference by manipulating the relative frequency with which participants see the future vs the past event performed. When future events were much more frequent (75 of the trials showed future events) than past ones (25 %), people shifted their gaze to the future event target earlier [2] than when these two event types were balanced [1, Exp2]. Crucially, even with highly frequent future events, people initially preferred to inspect the target of the recent (vs. future) event until sentence end [2].

In the current visual world eye tracking study ($N=32$) the recent-event preference was pitted against gaze, a cue that has been shown to be very effective in directing visual attention [3, 4]. Participants saw a videotaped actor performing an action (Fig. 1A, flavoring cucumbers), and then they heard a German sentence *Der Versuchsleiter würzte kürzlich die Gurken* referring to that recently performed action or *Der Versuchsleiter würzt demnächst die Tomaten*, (lit. in Fig. 1, A) referring to an equally plausible action that the actor would perform next (Fig. 1A, flavoring tomatoes). In half of the trials the actor gazed at the target object from VERB onset until sentence end, while in the other half he looked straight ahead. The second (future) action was shown 700 ms after sentence end. Thus, there were 2 factors: sentence tense (past vs future) and gaze to target object (gaze vs no gaze). Recent and future events were shown equally often. Eye movements to the recent and future object were analyzed from Verb onset, Fig. 1B.

When the actor looked straight ahead (no gaze), we replicated the recent event preference as in experiments by [2], see solid lines Figure 1B. By contrast, in the gaze condition in the future tense (the dotted green line), participants shifted their gaze to the future target object earlier than in the other conditions. Importantly, the actor's gaze more strongly affected participants' looks to the future than to the recent object. In the future tense gaze condition, the log ratio became negative (showing a preference for the future target) about 1600ms *earlier* than without gaze (100 vs. 1700ms). In sum, by triggering more and earlier looks to the future target, gaze mitigated the recent event preference (in the future tense sentences); however, it did not completely override it (see the past tense sentences). We propose that what underlies the recent event preference is an epistemic preference for assertions about past events [5,6].

Figure 1. A) Sequence of events in an experimental trail; B) Mean log gaze probability ratios $\ln(P(\text{recent target})/P(\text{future target}))$ as a function of condition from Verb Onset.



References: [1] Knoeferle, et al., 2011, *Front.Ps*; [2] Abashidze et al., 2014, *CogSci*; [3] Hanna & Brennan, 2007, *M&L*; [4] Knoeferle & Kreysa, 2011, *Front.Ps*; [5] McFarlane 2003, *Phil*; [6] Staub & Clifton, 2001, *Proc.Ling*