The effect of plausibility on eye movements in reading: Does number matter?
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Recent eyetracking studies (Rayner, Warren, Juhasz, & Liversedge, 2004; Warren & McConnell, in press) have examined the time course with which readers’ eye-movements are affected by plausibility violations. These studies have found reliable increases in gaze duration (the sum of fixation durations on the reader’s first encounter with a word) on a noun that is highly implausible with respect to the preceding context compared to when this word is plausible in context (as in sentences 1-2 below).

We performed two eyetracking studies that tested whether noun number affects the time-course of plausibility effects. When a noun is singular, it could in principle be interpreted as the first constituent of a noun-noun compound (e.g., carrot in (1) below could be part of the compound carrot balloon). However, a regular plural noun generally cannot be the first constituent of a compound in English. If readers easily adopt a modifier analysis of a singular noun that is implausible as a phrasal head, then disruption due to implausibility would be delayed until it is confirmed that this noun is not, in fact, a modifier (Kennison, 2005).

In the Rayner et al. (2004) and Warren & McConnell (in press) experiments, target noun number was not controlled, and varied between items.

Experiment 1 (N = 32) used variants of Rayner et al.’s materials, while also manipulating target noun number, as in (1-4) below. The experiment closely replicated the effects of the plausibility manipulation, with significant increases appearing in gaze duration on an implausible target noun. Though there was a trend toward reduced effects of implausibility on the early measures of processing difficulty when the noun was singular, the interaction of plausibility and number did not approach significance on any measure.

As a stronger test of the hypothesis that plausibility effects are delayed when the target noun is singular, Experiment 2 (N = 42) tested sentences in which a singular target noun was, in fact, the first constituent of a compound. The preceding context either rendered this noun implausible (5) or plausible (6) as a head noun. In addition, the compound was either relatively novel (e.g., cafeteria manager in 5-6 below) or lexicalized (e.g., dinner table). Again, significant plausibility effects appeared on the initial noun; in fact, the plausibility of the head noun analysis had a significant effect on the duration of the first fixation on this noun, as well as on later measures. The effect of plausibility was never significantly modulated by compound type. These results were obtained despite the fact that the head noun immediately followed the target word, confirming that information in the parafovea does not strongly influence reading times on the currently fixated word.

These experiments suggest that noun number does not have a substantial effect on the time-course of plausibility effects in normal reading. Furthermore, they support an account of the processing of nominals according to which the parser initially analyzes a noun as the phrasal head, rather than as a modifier; implausibility does not undermine this initial structural preference.

(1) John used the pump to inflate the large carrot for dinner last night.
(2) John used the knife to chop the large carrot for dinner last night.
(3) John used the pump to inflate the large carrots for dinner last night.
(4) John used the knife to chop the large carrots for dinner last night.

(5) The new principal talked to the cafeteria manager at the end of the school day.
(6) The new principal visited the cafeteria manager at the end of the school day.

