Text Segmentation Affects Oculomotor Reading Behavior and Reading Comprehension

Objectives. Modern digital reading applications incorporate text segmentation features, presenting content in smaller linguistic units such as phrases or sentences. These tools are designed to enhance attention and improve comprehension, yet existing data on their effectiveness are controversial. On the one hand, segmentation may facilitate more focused processing. On the other hand, it may disrupt discourse coherence. The study aims to investigate the impact of text segmentation on oculomotor reading behavior and text comprehension which is not only important for educational and informational applications, but also can contribute to a deeper understanding of meaning construction in reading.

Material. 12 encyclopedic-style passages 120-170 words long from the Russian subcorpus of Multilingual Eye-movement Corpus (Siegelmann et al. 2022). Each text was followed by 8 true-or-false questions (inferential questions were used to assess comprehension rather than memorization).

Design. We compared three reading conditions: full text on the screen, paragraph-by-paragraph presentation, and sentence-by-sentence presentation. The text was presented on the screen until the participant pressed a button to proceed. The eye-movements of the readers were recorded. Comprehension questions were asked after each text. We used between-subject design to avoid participants' confusion between different types of text segmentation: each participant was randomly assigned to one of the experimental lists.

Subjects. 81 native speakers of Russian (54 female) aged 18–61 with normal or corrected-to-normal vision and no reported reading disorders volunteered to take part in the study. The experiment was carried out in accordance with the Declaration of Helsinki, all the participants provided informed consent.

Apparatus. The EyeLink 1000+ desktop mount eyetracker (1000 Hz).

Results. Comprehension rates were analyzed, as well as saccadic activity, regression rates and reading time. Mixed linear models were used for statistical analysis, in cases where linear models could not be used, non-parametric statistical tests (Mann-Whithey U-test and Kruskal-Wallis test) were applied. Comprehension accuracy was highest in the sentence condition, suggesting that segmentation may enhance local integration and reduce distractions, thereby supporting more effective processing of textual information. Reading times were significantly longer in the full-text condition compared to segmented formats, with the sentence condition showing only a slight, non-significant increase over paragraphs. Eye-tracking data revealed format-dependent differences in cognitive load: the sentence condition elicited the strongest local wrap-up effects (longer fixations on final words), while the full-text condition showed the most pronounced global wrap-up, reflecting discourse-level integration. Readers in the full-text condition made more regressions, whereas sentence-level segmentation led to more constrained ones.

Discussion. Our findings demonstrate that text presentation format reshapes reading strategies and underlying cognitive processes. Sentence-level segmentation increased local processing effort but supported better comprehension, possibly by facilitating incremental integration and reducing interference from upcoming content. Full-text formats encouraged globally coherent reading but at a cost of longer processing time and more regressive eye movements.