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Predicting Reading Comprehension From Eye Gaze

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Abstract

We know that reading involves a coordination between textual characteristics and visual attention, but what does eye gaze during reading tell us about comprehension? We addressed this question by training random forest models (a machine learning technique) to predict reading comprehension from ensembles of interacting global gaze features in a person-generalizable manner. We used data from two prior studies in which readers (Ns = 104, 130) answered multiple-choice comprehension questions during and/or shortly after (30 mins) reading a 6500-word text. The models were highly accurate at predicting reading comprehension assessed during reading at both the page- (AUROC = .882) and participant- level (r = .671; computed by aggregating page-level predictions). Accuracy for the post-reading models was lower (AUROCs between .538 and .552; rs between .343 and .373), but significantly above chance baselines. Collectively, these findings confirm a link between global eye movement behavior and higher-order outcomes of reading.