

Towards standardization of eye movement-derived biomarkers for Alzheimer’s disease and related dementias: A comprehensive comparison of eye measurement protocols by the PIA “Eye as a biomarker for AD”

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Eye-movement measures are promising scalable biomarkers for ADRD, but lack of protocol standardization currently limits reproducibility and clinical translation.

INTRODUCTION

- Alzheimer’s disease and related dementias (ADRD) imposes a growing burden on healthcare systems.
- This highlights the need for scalable, non-invasive biomarkers for early detection and risk stratification beyond specialty clinics.
- Eye-movement (EM) measures capture cognitive processes that are disrupted early in ADRD and can be acquired using accessible digital technologies.

METHODS

- Systematic review: Screened PubMed to identify studies evaluating EM tasks in ADRD.
- Data extraction: Compared protocols across stimulus, timing, device, calibration, and outcome parameters.

RESULTS

- 70 total studies, saccade paradigms were most frequently studied (n > 40) (Fig. 1).
- Protocols were heterogeneous (Fig. 2).
- Reporting was incomplete (Fig. 3)

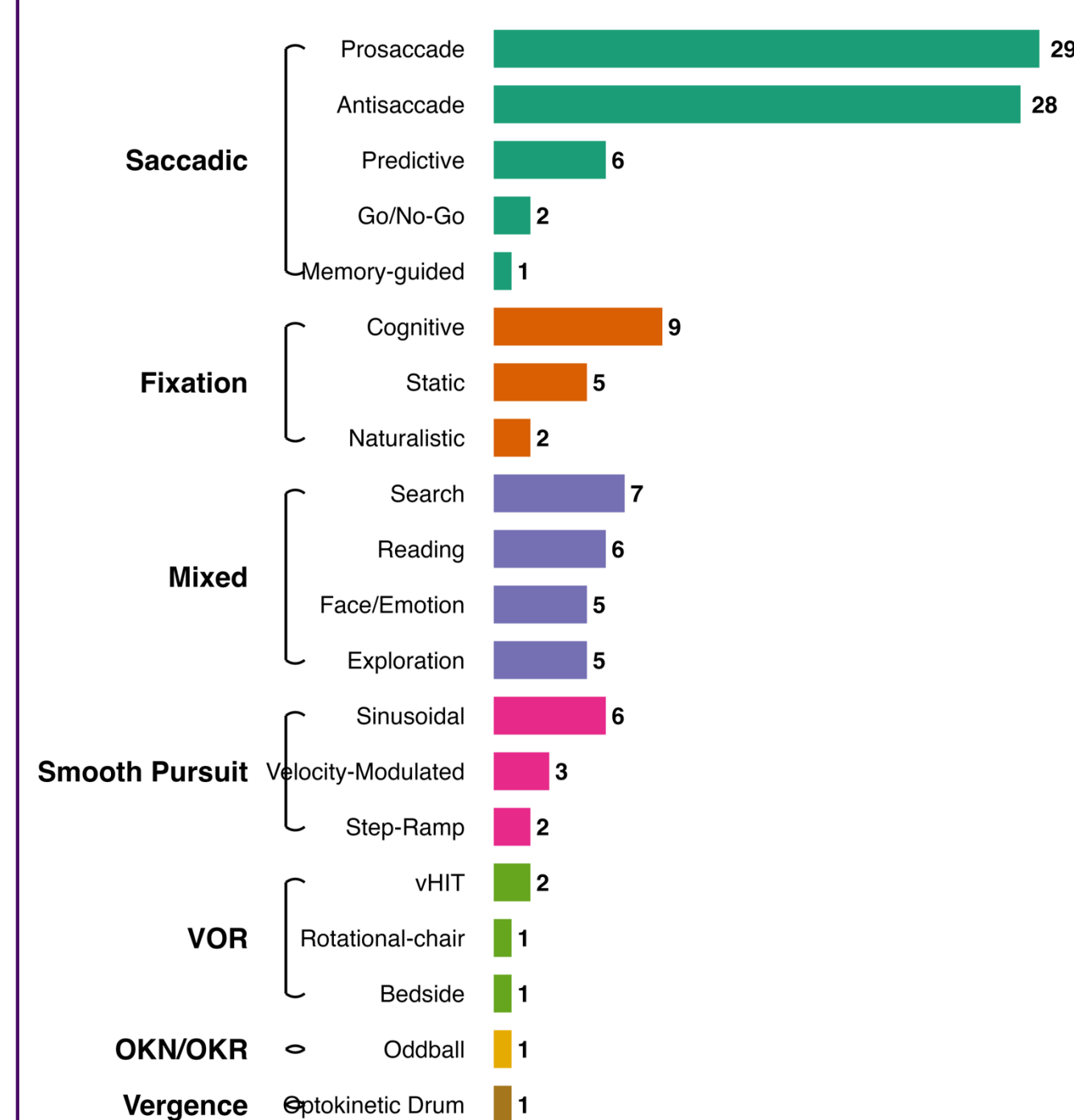


Figure 1. Distribution of eye-movement paradigms across studies.

RESULTS

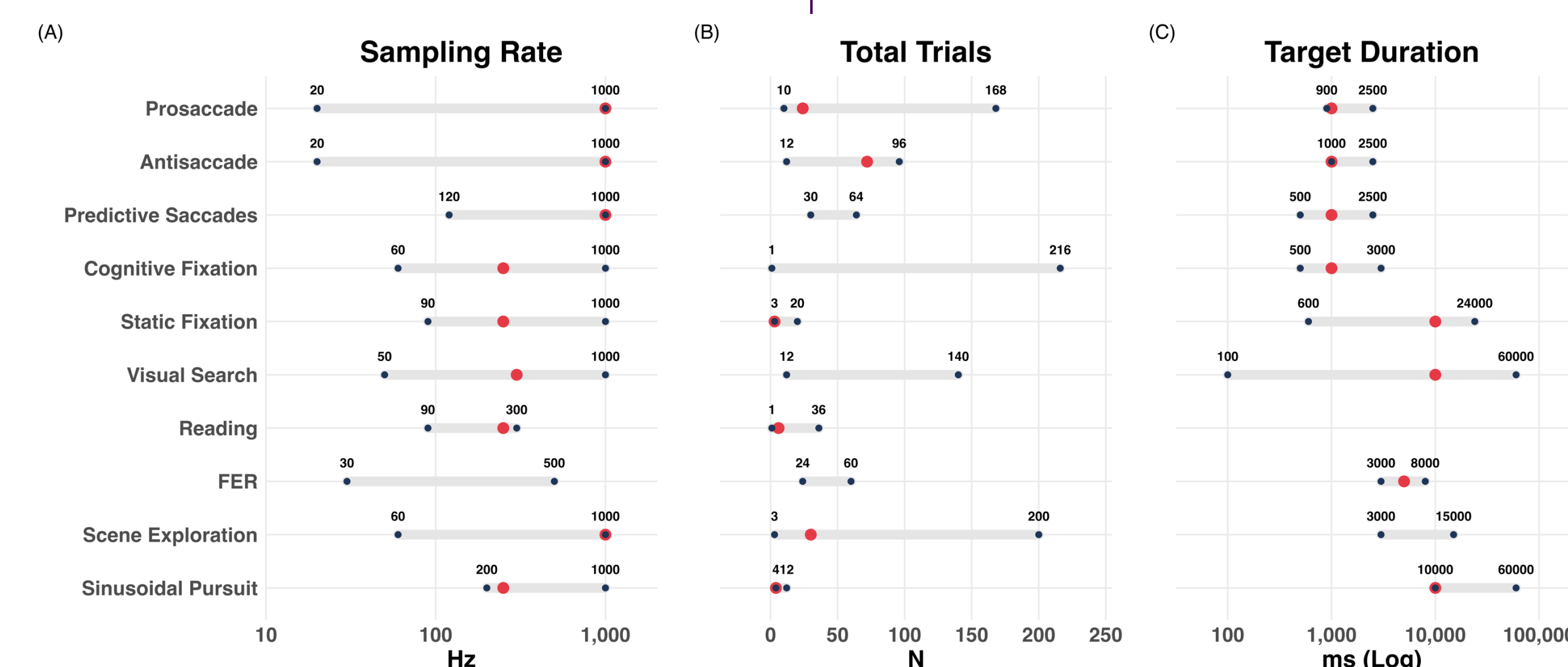


Figure 2. Device and task parameters across ten commonly used tasks

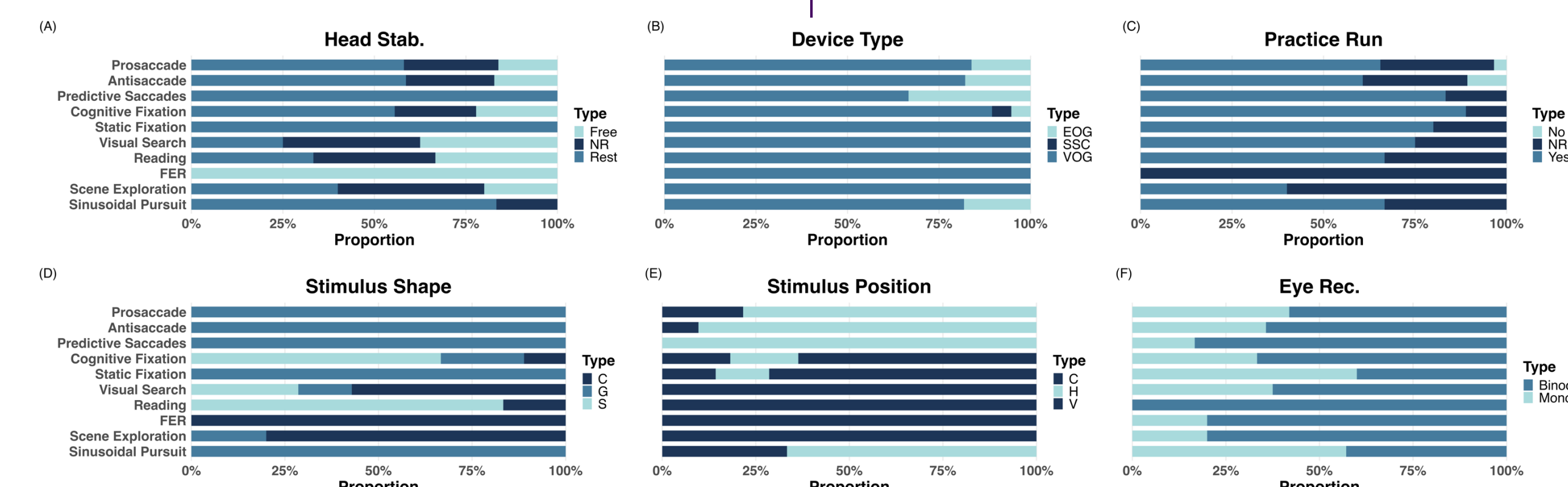


Figure 3. Overview of the reporting of assessment parameters across eye movement paradigms.

CONCLUSIONS

- Limited task diversity with dominance of saccadic paradigms.
- Substantial methodological heterogeneity across studies.
- Incomplete reporting impedes reproducibility and translation.

CONTACT



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This work is conducted within the PIA “Eye as a Biomarker for AD” Harmonization and Stratification Working Group.