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A new method to generate automatically highly standardized reading chart text in multiple languages: the case of MNREAD

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A new method to generate automatically highly standardized reading chart text in multiple languages: the case of MNREAD

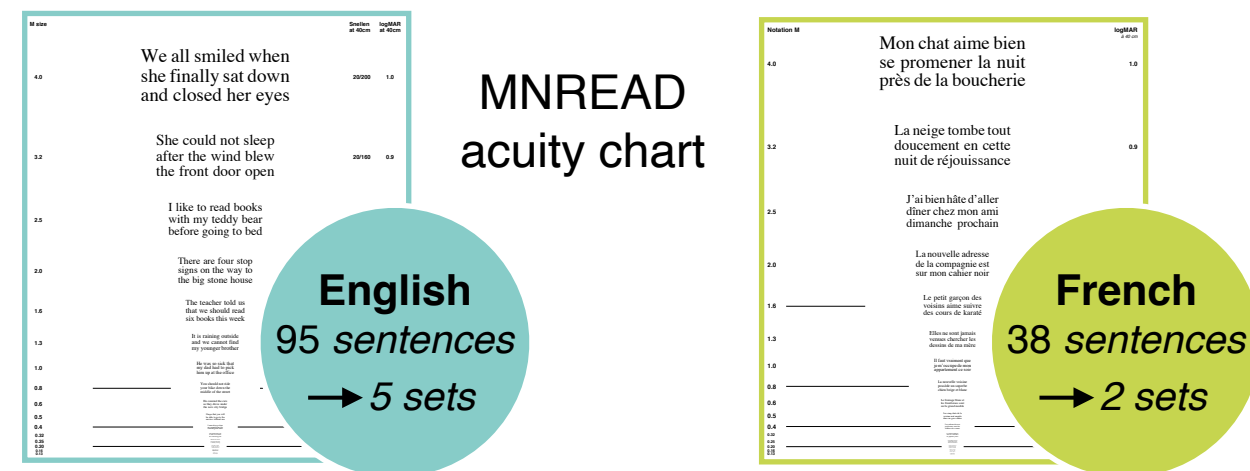
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poster #A0288

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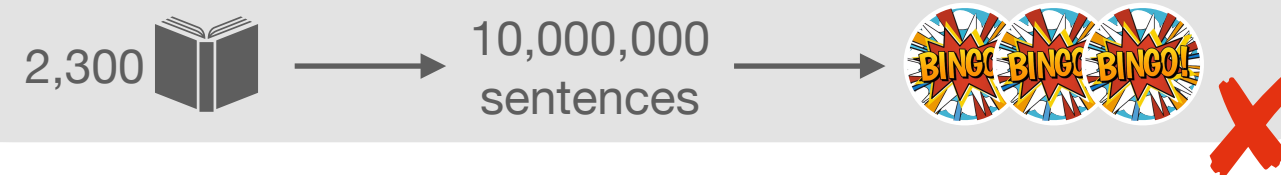
Background

- Measuring reading performance using reading charts requires highly standardized reading material.
- Such material is hard to produce and most charts are limited by their relatively small number of texts or sentences.

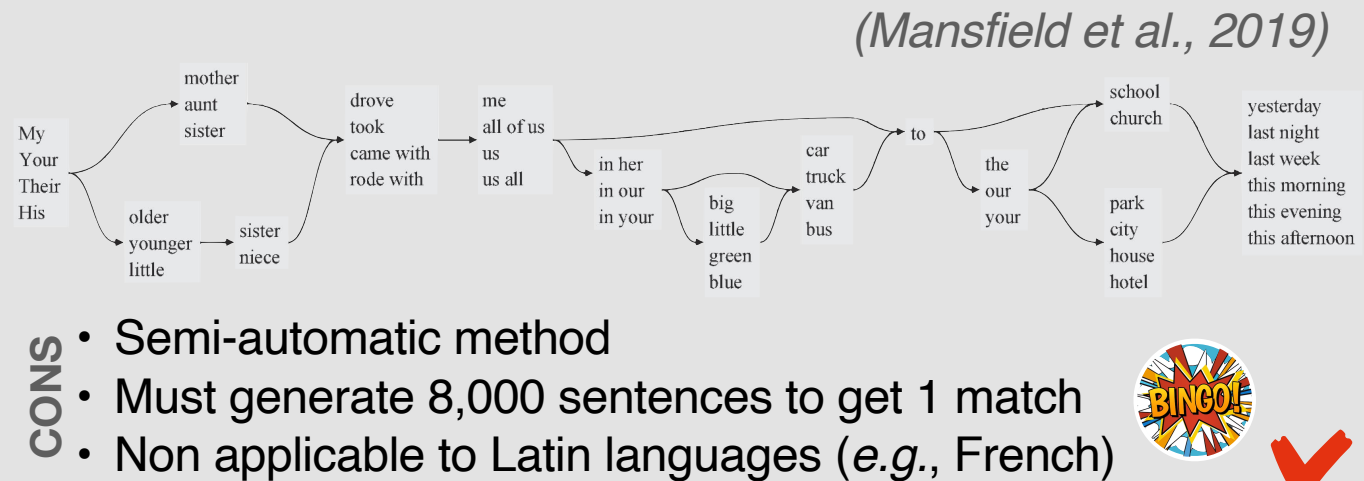


How to generate a large number of standardized sentences?

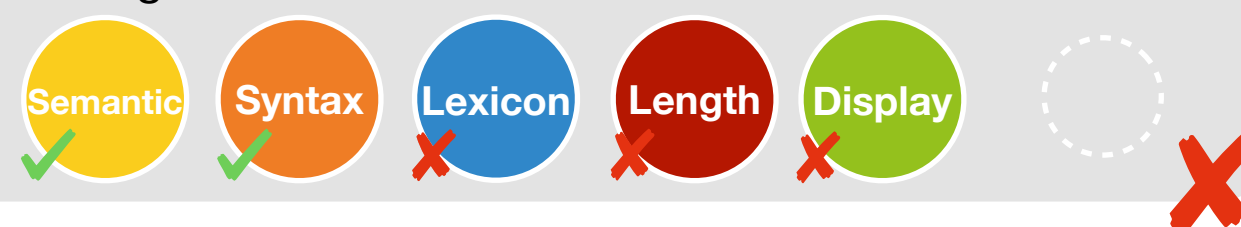
1 - Naïve method: search for MNREAD-like sentences in a corpus



2 - Ad-hoc method, based on hand-defined templates (Mansfield et al., 2019)

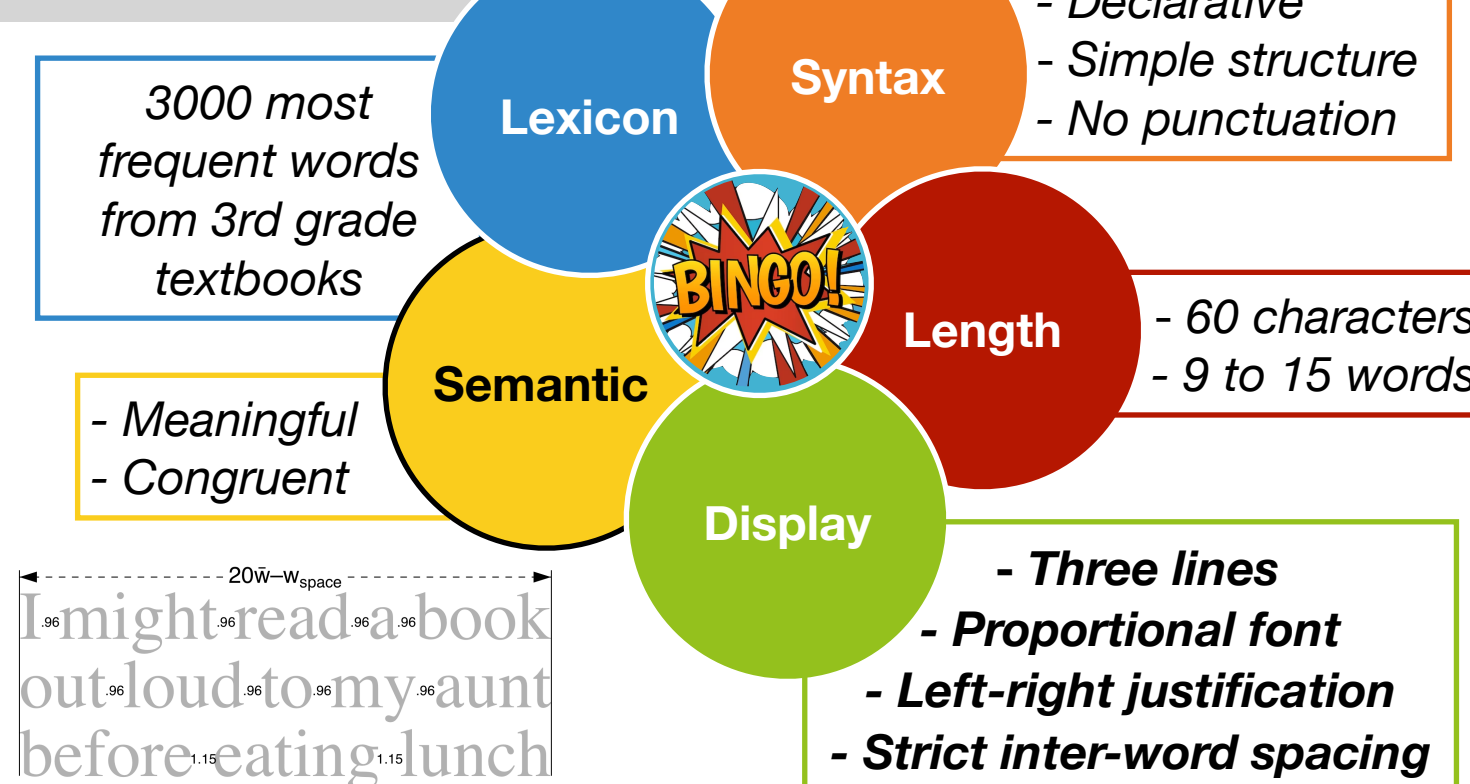


3 - Trending method... ask chatGPT

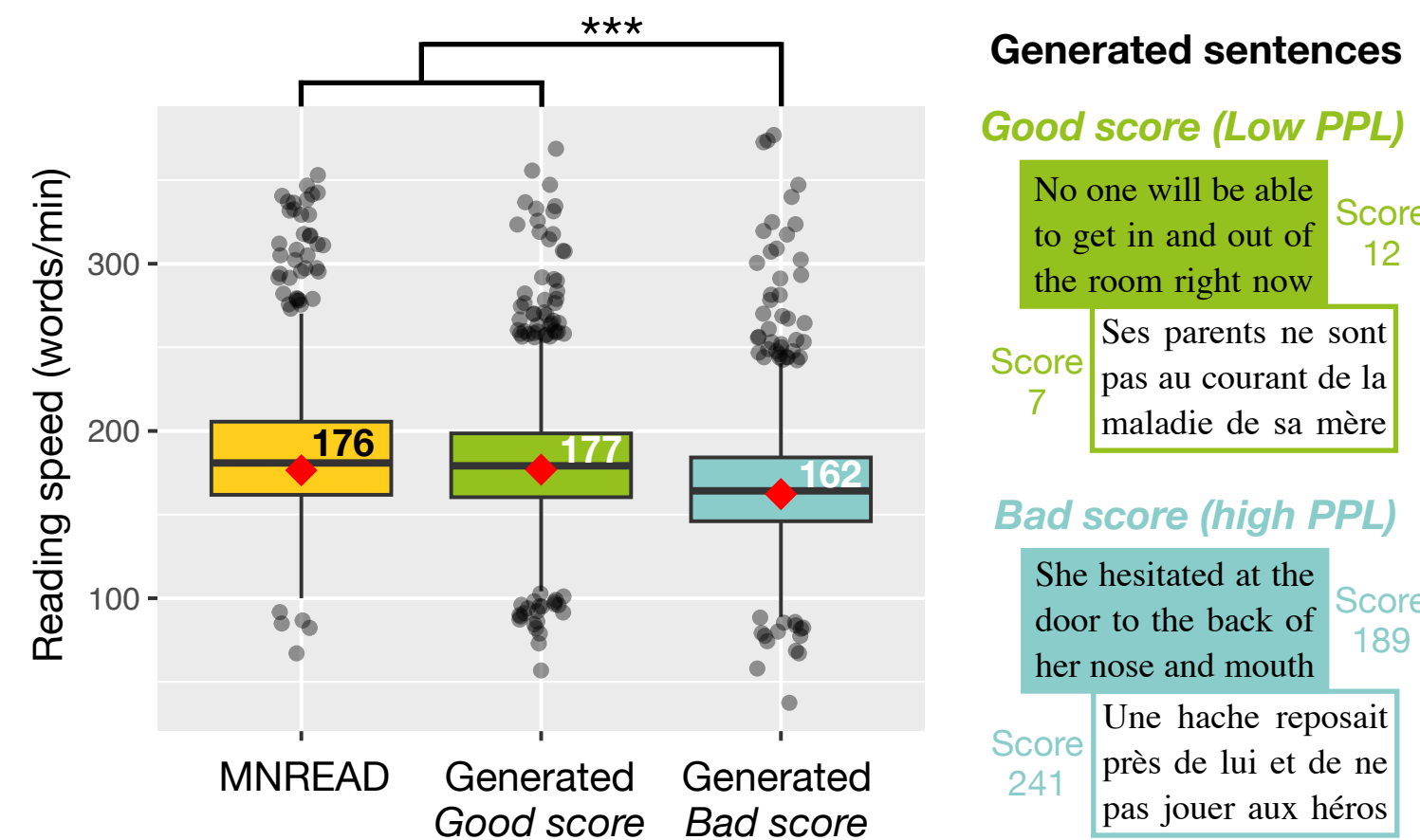


Mansfield JS, Atilgan N, Lewis AM, Legge GE. Extending the MNREAD sentence corpus: Computer-generated sentences for measuring visual performance in reading. *Vision Res.* 2019 May;158:11-18.

MNREAD rules



Results



Conclusions

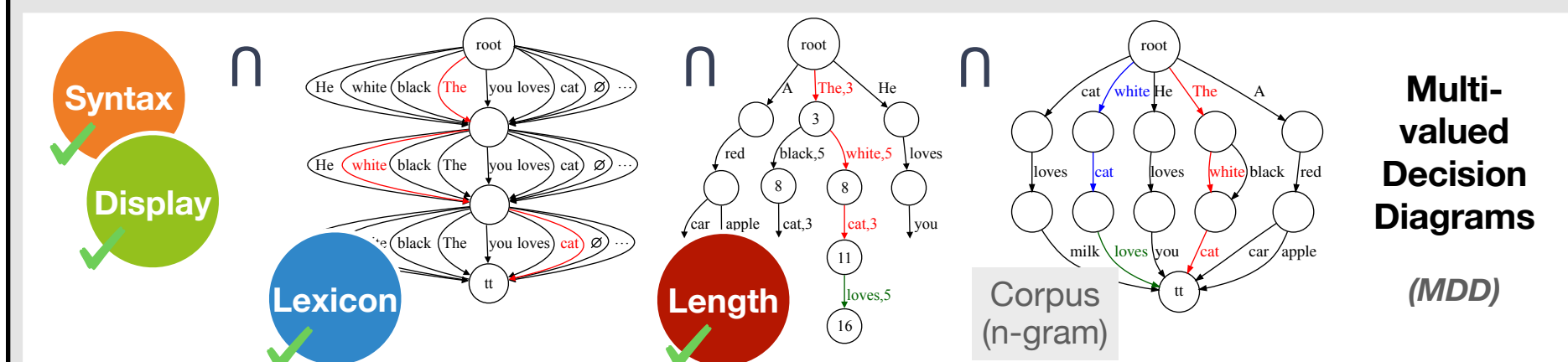
- Our method provides valid standardized sentences that follow the MNREAD rules and yield similar performance, at least in French.
- This method is flexible and allows to customise the rules easily.
- This method is applicable to other languages and remains to be validated in English, Spanish, Italian, etc.

Objective

Using the MNREAD as a proof-of-concept, we propose a new automated method to generate highly constrained short sentences, following the strict rules of MNREAD and applicable to different languages.

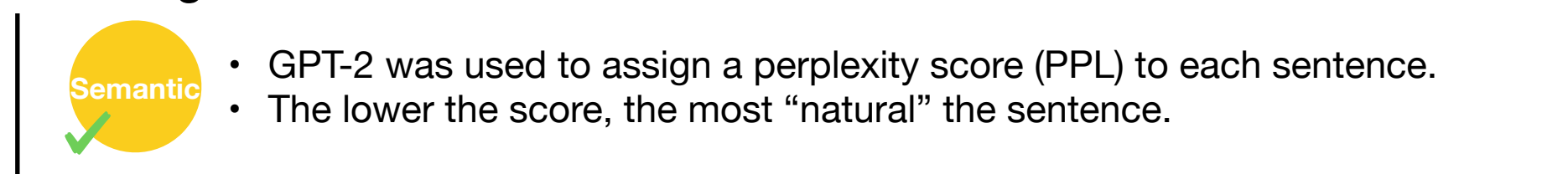
Methods

1- Creating the sentences



- Each MNREAD rule is modeled using a Multi-valued Decision Diagram (MDD).
- The intersection of all diagrams results in MNREAD-like sentences → 7,000 in 72 sec.

2- Scoring the sentences



3- Validating the sentences

→ Normally sighted subject read French sentences at fixed print size (1.2 logMAR at 40 cm)

| Experiment 1 | Experiment 2 | Experiment 3 |
|--------------------|--------------------|---------------------------------|
| • N = 14 | • N = 24 | • N = 12 |
| • Mean age = 33±14 | • Mean age = 40±14 | • Mean age = 24±6 |
| • VR headset | • Computer screen | • Computer screen + eye tracker |
| • 38 + 30 + 30 | • 38 + 30 + 30 | • 38 + 100 + 100 |