

A novel test battery to diagnose a specific learning disorder in reading/writing in Luxembourg's multilingual education setting

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Background

Two thirds of the children attending grade 3 in Luxembourgish public schools do not speak the language of instruction (German) at home. [1]

The diagnostic process for a reading/writing disorder is typically conducted in the language of school instruction.

Diagnostic tests currently employed in Luxembourg are developed in neighbouring countries and do not account for the linguistic diversity of the country.

A test battery is needed with separate reference norms based on language spoken at home to avoid under-identification of children who speak the language of instruction at home and over-identification of children who do not. [2]

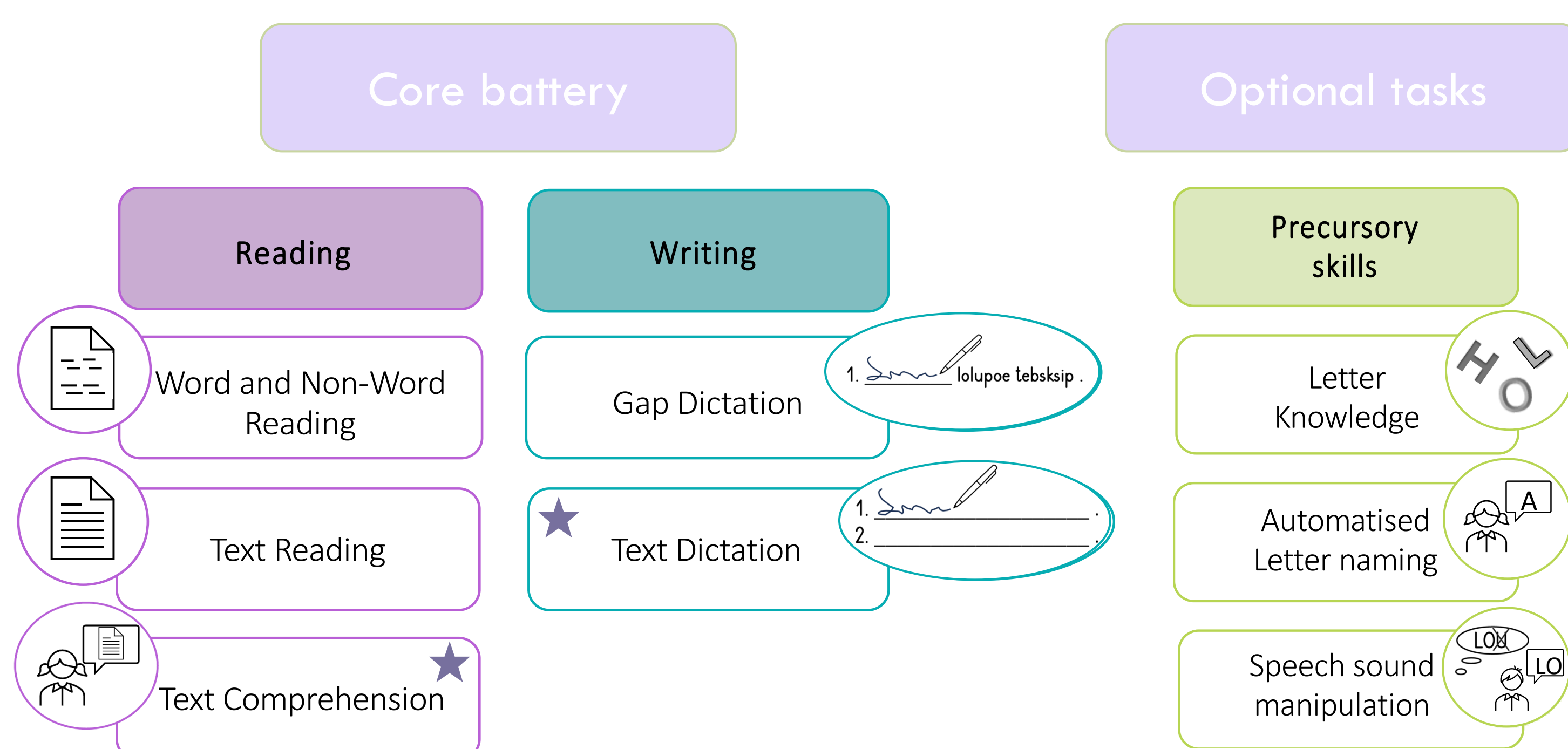
Characteristics of the test battery

- Target population = **third-grade** children (age \approx 8-10)
- Experimental approach (i.e., systematic manipulation of targets)
- Content in line with national school curriculum
- Reduced language and visual load
- Test instructions: possibility for standardized language switching
- Example and practice items
- Reference norms based on language spoken at home

Test Battery Structure



- Use of non-words to account for German language proficiency effects
- Qualitative observations (★)
- Core battery tests specific reading and writing skills (experimental approach)
- Optional tasks allow for further assessment of underlying difficulties
- Fonts used in schoolbooks (familiarity)
- Possibility to develop a profile of a child's strengths and weaknesses



Psychometric criteria

Objectivity

- Standardised test administration, scoring, and possibility to switch languages during test instruction reduces heterogeneity of test administration

Reliability

- High internal consistency values within sub-tests indicate measurement reliability

| Sub-Test | McDonald's Omega (ω) |
|--------------------------|-------------------------------|
| Word reading Fluency | 0.94 |
| Non-Word reading Fluency | 0.88 |
| Text reading Fluency | 0.97 |
| Gap Dictation Accuracy | 0.92 |

Validity

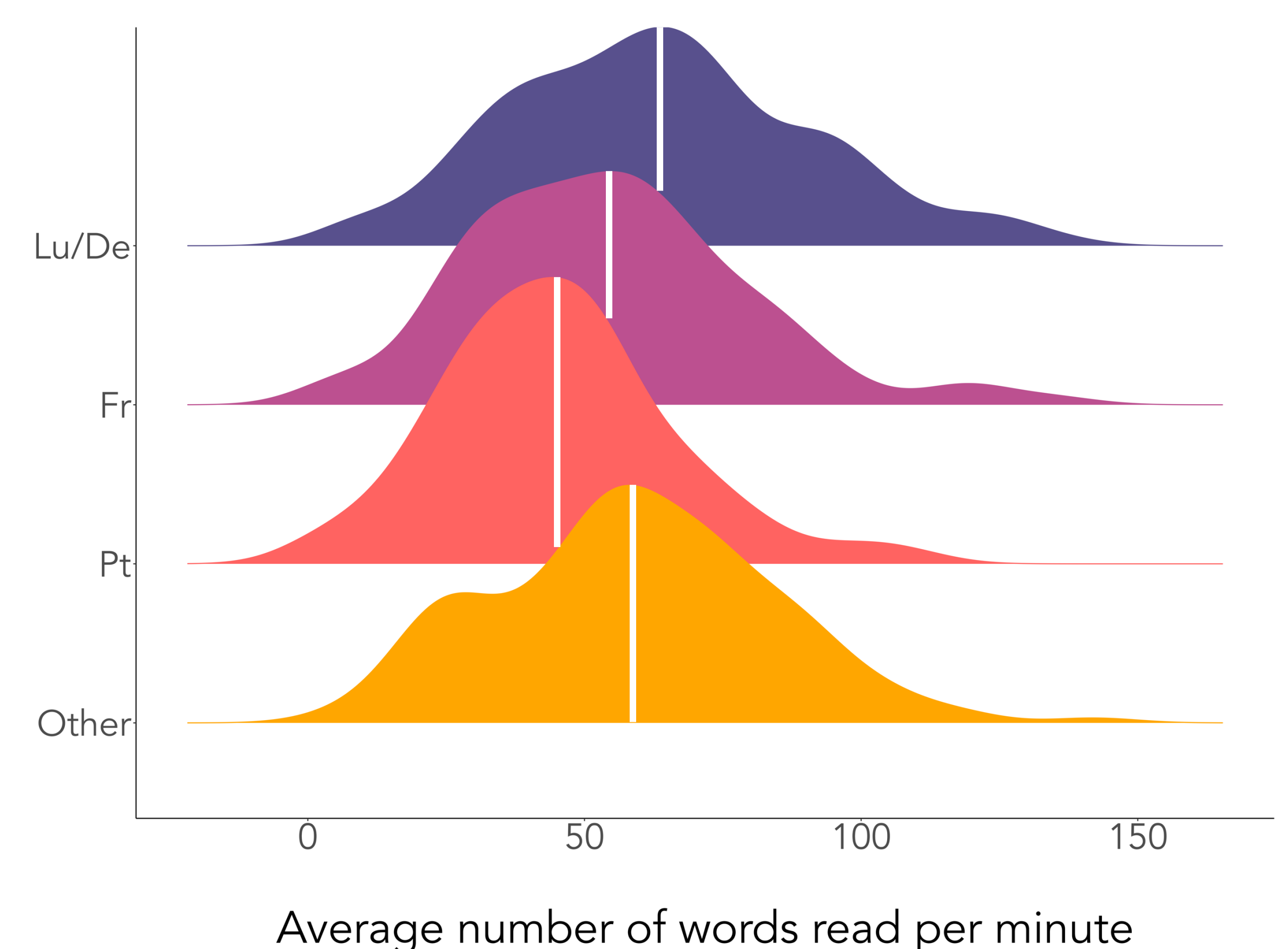
- Construct validity reflected by significant Spearman correlations with children's ÉpStan [3] performance

| ÉpStan sub-test | Word Reading Fluency | Non-Word Reading Fluency | Text Reading Fluency | Gap Dictation Accuracy |
|--------------------------------|----------------------|--------------------------|----------------------|------------------------|
| German Listening comprehension | 0.30 | 0.11 | 0.37 | 0.52 |
| German Reading comprehension | 0.60 | 0.45 | 0.62 | 0.68 |

All $p < .001$ following a Bonferroni correction for multiple comparisons; grey coefficient = n.s.

Discussion and Example Results

- Four reference language groups formed based on:
 - data of the **test validation study** (N = 750 children across all 15 school regions of the country)
 - most frequently spoken languages** in Luxembourg
- Performance differences based on home language** observed for all Sub-Tests of the core test battery, for example:
 - Word reading more impacted by home language than non-word reading
 - Highlights the impact of language proficiency on reading performance
 - Illustrates the relevance of using non-words when assessing reading performance, particularly in a multi-lingual environment
- Findings show the relevance of considering language (proficiency) in the diagnostic process; thus, our test battery provides:
 - Percentile **reference norms per language group** for each sub-test in the core battery
 - Performance distribution tables per language group for the optional tasks



Significant influence of home language on German word reading performance $F(680, 632.37) = 16.90, p < .001$; white lines represent the means per language group

References

- [1] MENIE & SCRIPT. (2022). Education system in Luxembourg Key Figures 2021-2022.
- [2] Ugen, S., Schiltz, C., Fischbach, A., & Pit-ten Cate, I. M. (2021). *Lernstörungen im multilingualen Kontext. Diagnose und Hilfestellungen.*
- [3] Épreuves Standardisées. <https://epstan.lu>