The Danish Dyslexia Test
Validity of a wide-range, web-based test for dyslexia
Poulsen, Mads; Elbro, Carsten; Møller, Helene Lykke; Juul, Holger; Petersen, Dorthe Klint; Arnbak, Elisabeth

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The Danish National dyslexia test. Validity of a wide-range, web-based test for dyslexia

Mads Poulsen, University of Copenhagen
Dorthe Klint Petersen, University of Aarhus
Holger Juul, University of Copenhagen
Carsten Elbro, University of Copenhagen
Helene Lykke Møller, University of Copenhagen
Elisabeth Arnbak, University of Aarhus
Is dyslexia characterized by the same core phonological difficulty across all educational levels?

• The Danish Ministry of Education wanted a national procedure for determining whether students qualify as dyslexic,
• applicable to students from Grade 3 onwards.
• Problems to address:
  • Transitions: information did not follow the student.
  • Lack of standardized test at many levels.
  • Divergence definition of dyslexia.
Definition of dyslexia

“Dyslexia is a specific learning disability that is neurobiological in origin. It is characterized by difficulties with accurate and/or fluent word recognition and by poor spelling and decoding abilities. These difficulties typically result from a deficit in the phonological component of language that is often unexpected in relation to other cognitive abilities and the provision of effective classroom instruction.”

IDA, 2002

Core phonological decoding
Same operational definition at all levels

• Benefits
  • Simplify transitions for dyslexics.
  • Consistent operational definition of dyslexia makes dyslexia easier to understand for all.

• Challenge: Validity across levels
  • Concern that dyslexia manifests itself in different ways at different levels.
    • How persistent are phonological coding difficulties?
Questions addressed

• Applied wording
  • Is it possible to assess dyslexia reliably with a wide-range test across all educational levels?

• General insights wording
  • Are students who receive special support in reading characterized by the same phonological coding difficulties across all educational levels?
Criteria for external validation

• Fit with current provision of remedial teaching
  • Will the test score differentiate those who already receive support from those that do not?

• Fit with reading difficulties with actual course materials
Method - Participants

Participants from 10 different educational groups

**Primary/secondary school**
- Grade 3, 5, 7, 9

**Upper secondary education**
- Vocational education
- Technical/commercial upper secondary
- Upper secondary school

**Higher education**
- Short-cycle higher education (e.g. IT professional)
- Medium-cycle higher education (e.g. teacher, BSc engineering)
- Long-cycle higher education (e.g. biology, economics)
Method - Participants

Randomly sampled participants (total) 1264

Of which received special support in reading 78

Oversampled participants who received special support in reading 300

Total number of participants 1564
Procedure and measures

• The same computerized test for all.
• Self-explanatory (supervision is necessary).
• Two different tests of phonological coding.
• Time limited.
Non-word spelling
Find the appropriate spelling

obilm
Pseudo-homophone reading
Find the non-word, that sounds like a real word

Nemlig ("namely")
The Dyslexia Test score

• Scores from the two phonological coding tests:
  • Number of correct per minute.
  • Correction for wrong answers.

• The dyslexia test score:
  • Scaled: Grade 9 mean = 100 (SD = 15)
  • The mean of the two phonological coding scores.
Results: Grade 9 (with oversampling)

Phonological coding score

No special support  |  Special support in reading

Number of students

Phonological coding score
Results Grade 9 (with oversampling)

- No special support
- Special support in reading

Graph showing the distribution of phonological coding scores for students with or without special support in reading.
Results across educational levels (with oversampling)

Special support in reading?

- Yes
- No

Box plots showing dyslexia scores across different educational levels, with green and blue bars indicating different responses to the special support question.
Results across educational levels (with oversampling)

Special support in reading?

Yes
No
Validity and reliability across levels

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Area under the curve</th>
</tr>
</thead>
<tbody>
<tr>
<td>G3</td>
<td>.85</td>
</tr>
<tr>
<td>G5</td>
<td>.93</td>
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<tr>
<td>G7</td>
<td>.97</td>
</tr>
<tr>
<td>G9</td>
<td>.97</td>
</tr>
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<td>.89</td>
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<tr>
<td>Medium-cycle HE</td>
<td>.95</td>
</tr>
<tr>
<td>Long-cycle HE</td>
<td>.96</td>
</tr>
</tbody>
</table>
Is the dyslexia score relevant for educational outcome?

Follow-up study: Vocational students (basic commercial program)

- Correlation between dyslexia score and comprehension of written course materials:
  - $r = .57$
- All (except one) students qualifying as dyslexic had unsatisfactory comprehension of course material texts.
Conclusions

• A wide-range measure of decoding can be a valid marker of dyslexia across many educational levels.
  • The dyslexia scale differentiated between those who receive special support and those that did not.

• Dyslexia was characterized by the same decoding difficulties from G3 and up.
  • This allows a simple definition of dyslexia, that is easy to explain.