Text simplification and its effects on young poor readers

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Reading is important

- Developing the capabilities to comprehend written texts is a key achievement for children.

- Text comprehension skills develop enormously from the age of 7-8 until the age of 11, when children develop as independent readers.
The problem

- Approximately 5% - 10% of our school children demonstrate significant text comprehension difficulties (Catts et al., 2006; Lyon, Fletcher, and Barnes, 2003). Such incidence increases dramatically in children with language learning problems (Arfé, 2015).

- The fruition of (school-)age appropriate texts is extremely hard for these young readers.

- Reading is for them an unfruitful activity.
Text simplification

- The logic of text simplification is to supply students with material which is at an appropriate level of difficulty.

- Current systems of text simplification offer a single level of text simplification, that is achieved by a linguistic and systematic simplification of the text.
Linguistic text simplification

- Syntactic constructions involving subordination can be replaced by coordinative sentences
- Conjunctions and anaphors can be removed

...→ Texts can become longer and more fragmented

- Are these simplified texts easier to read??
Poor readers and their reading needs

- PRs represent an extremely heterogeneous group (Catts et al, 2006; Cain & Oakhill, 2006).

- May show problems in:
  
  - inference-making skills and the ability to integrate information distant in the text
  
  - understanding of coherence markers, which signal relations between adjacent information in the texts
  
  - grammatical and vocabulary skills.
The TERENCE text simplification system

- TERENCE simplification system consists of graded, cumulative, simplifications of texts (→ address the needs of different kind of readers)

- Simplifications at cognitive level are necessary to improve coherence
Three cumulative levels of text simplification


- Level 3. Global coherence: the global coherence of the original story is increased, making explicit the information necessary to understand the general meaning of the story, the sequence of events, their location or moral;

- Level 2. Local coherence: the text is further simplified at the local level, establishing more clear and explicit relations between its sentences

- Level 1. Lexicon-grammar: the text is also simplified in terms of its lexicon and grammar, by using more common and concrete words, reducing idiomatic or metaphoric expressions and simplifying syntactically complex sentences.
Some preliminary data

Effects of TERENCE text simplification system

(1) on readers with different levels of reading comprehension skills

(2) in relation to different reading abilities
Participants

Mean age 9.2 (range 7-11); Girls (109); L2/bilingual n=38; certified n=22

<table>
<thead>
<tr>
<th>RC group</th>
<th>N</th>
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<tbody>
<tr>
<td>Very good</td>
<td>26</td>
</tr>
<tr>
<td>Good</td>
<td>102</td>
</tr>
<tr>
<td>Poor</td>
<td>39</td>
</tr>
<tr>
<td>Very poor</td>
<td>27</td>
</tr>
<tr>
<td>Tot.</td>
<td>194</td>
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<table>
<thead>
<tr>
<th>Text level</th>
<th>Participants</th>
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</thead>
<tbody>
<tr>
<td>Original</td>
<td>102</td>
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<tr>
<td>Global coherence</td>
<td>101</td>
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<tr>
<td>Local coherence</td>
<td>104</td>
</tr>
<tr>
<td>Lexicon + grammar</td>
<td>94</td>
</tr>
</tbody>
</table>

Each participant received two stories
Note: two stories per each story level
Method

- Two reading sessions, at one week distance:

- **Materials**: two stories appropriate to the age of the participants

- Each child received one story (A) at one level of text simplification and a second story (B) at another level of text simplification (e.g. Story A L2- Story B L4, Story B L3- Story A L1)

After reading the story the child answered 12 comprehension questions.
12 comprehension questions

- (1) fill in gaps in the text at a global level (4 inferential questions),
- (2) link sentences or information that was adjacent in the text (4 inferential questions),
- (3) retrieve information that was explicitly given in the text (4 literal questions).
L2 readers
In sum

- Children’s comprehension of the texts improved significantly from level 4 (original) to level 2 (local coherence);

- Differences between readers in RC skills were maintained even when the texts were simplified.

- Story level and RC group interacted:
  - Significant improvement in comprehension for very good readers between level 4 (original) and level 3 (global coherence), and significant decrease from level 3 and level 2 (local coherence).
  - Significant improvement in RC for the very poor readers from level 3 (global coherence) to level 1.
  - A decrease in RC in poor readers from level 2 to level 1 (linguistic simplification).
Global inferences

- Cognitive simplification of the text at the global and local level affected positively the readers’ RC skills.

- Linguistic text simplification (from level 2 to level 1) had negative effects on the RC skills of poor comprehenders.

- For all groups (except the poor readers) the cumulative text simplification (from level 3 to 1) produced gains in reading.
Local inferences

- Both cognitive simplifications at global and local level had effects on the readers’ local inferences.

- The very poor comprehenders were less affected by the text simplification.

- The very good readers benefitted from the global (level 3) but not from the local (level 2) text simplification. Simplifications at level 2 were detrimental.

- Also in this case, linguistic simplification impacted negatively on the poor readers’ skills.
Retrieve explicit information

- Text simplification had little effect on readers’ ability to identify and retrieve information from the text.

- Cognitive simplifications at global level improved very good readers’ retrieval skills (level 3 > level 4); but simplification at local level affected negatively even the ability to retrieve textual information (level 2 < level 3).
Conclusions

- Cumulative text simplification is effective in promoting RC in readers with different needs.

- Text simplification interacts with the characteristics of the readers.

- In general, texts that are too explicit are comprehended less well by very good readers. Very good readers benefit more from cognitive text simplification at global level.

- However, in very poor readers, making texts more explicit produces gains in reading.

- Differences emerge also between poor readers: very poor readers benefit from linguistic text simplification, while poor readers benefit more from cognitive text simplification at local level.
In line with prior research..

- Poor knowledge-reader benefits from texts in which connection between sentences are made more explicit.

- High-knowledgelge readers need some gaps and challenges in the text to be more actively engaged in reading and thus process the text at a deeper level (McNamara et al., 1996)

→ Different levels or kinds of text complexity can be necessary to provide the readers with the appropriate challenges for their cognitive and linguistic skills and their knowledge of the topic.
Thanks!

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