

Communicating Text Structure to Blind People with Text-to-Speech

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Université Paris 8 Vincennes-Saint-Denis; Saint-Denis; France

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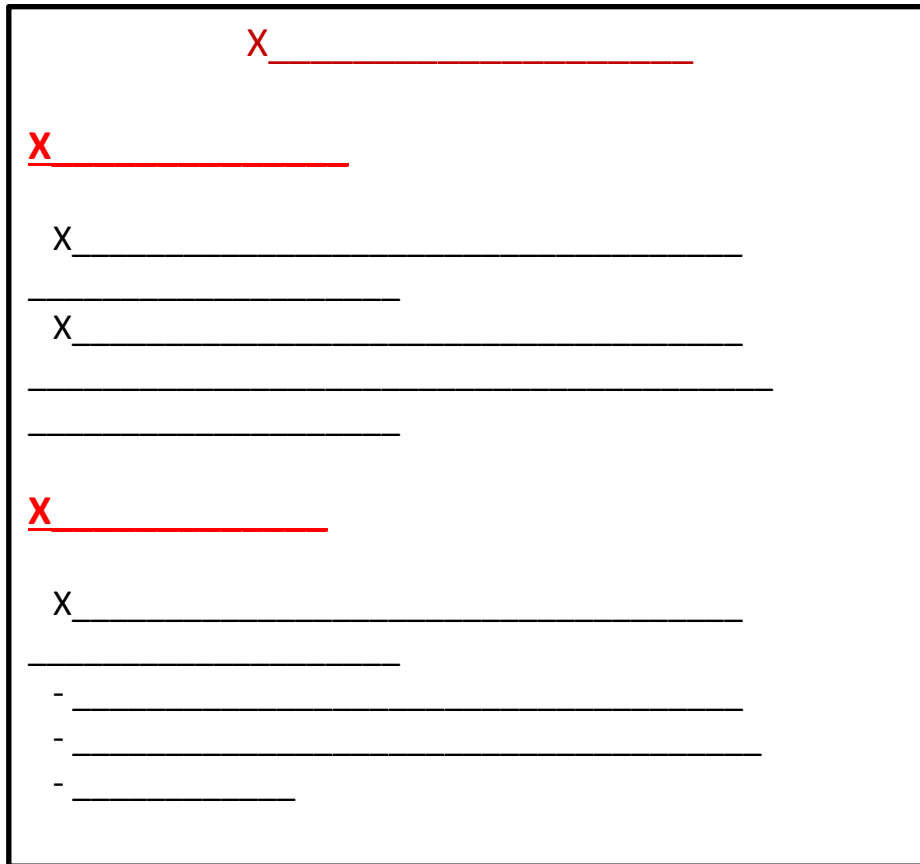
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Text structure(s)



[Lemarié, 2012] Understanding How Headings Influence Text Processing

Headings restitution using Text-To-Speech

- Why Text-To-Speech (over braille terminals) ?
 - Widely used
- With current documents readers a signaling sentence is added: « *heading level <1/2/3...>* »

(TTS) “*Heading Level 1, My Heading*”

vs.

(Visual) ***I. My Heading***



Headings restitution using Text-To-Speech

→ Hypothesis : when a text is read with TTS, signaling headings in non-verbal ways can improve their perception and therefore global comprehension



Experimental Design

- Two non-verbal ways of increasing titles salience for documents reading

- A different voice



- (simulated) Spatialized audio



➔ Three conditions tested, including a control condition

➔ Task : passive listening



Population & materials

- 9 participants
 - Legally blind
 - Familiar with synthetic voices
- 3 expository texts
 - Topics : energy problems, energy solutions, fire-safety
 - Two levels of headings



Procedure

- Steps:

1. Instructions
2. Passive listening of one document under one condition (possibility of pausing) [5 min]
3. Outline Recall & Questions
4. *Passive listening of one distractor* [2 min]
5. *Questions about details of the distracting document*

Final Questionnaire

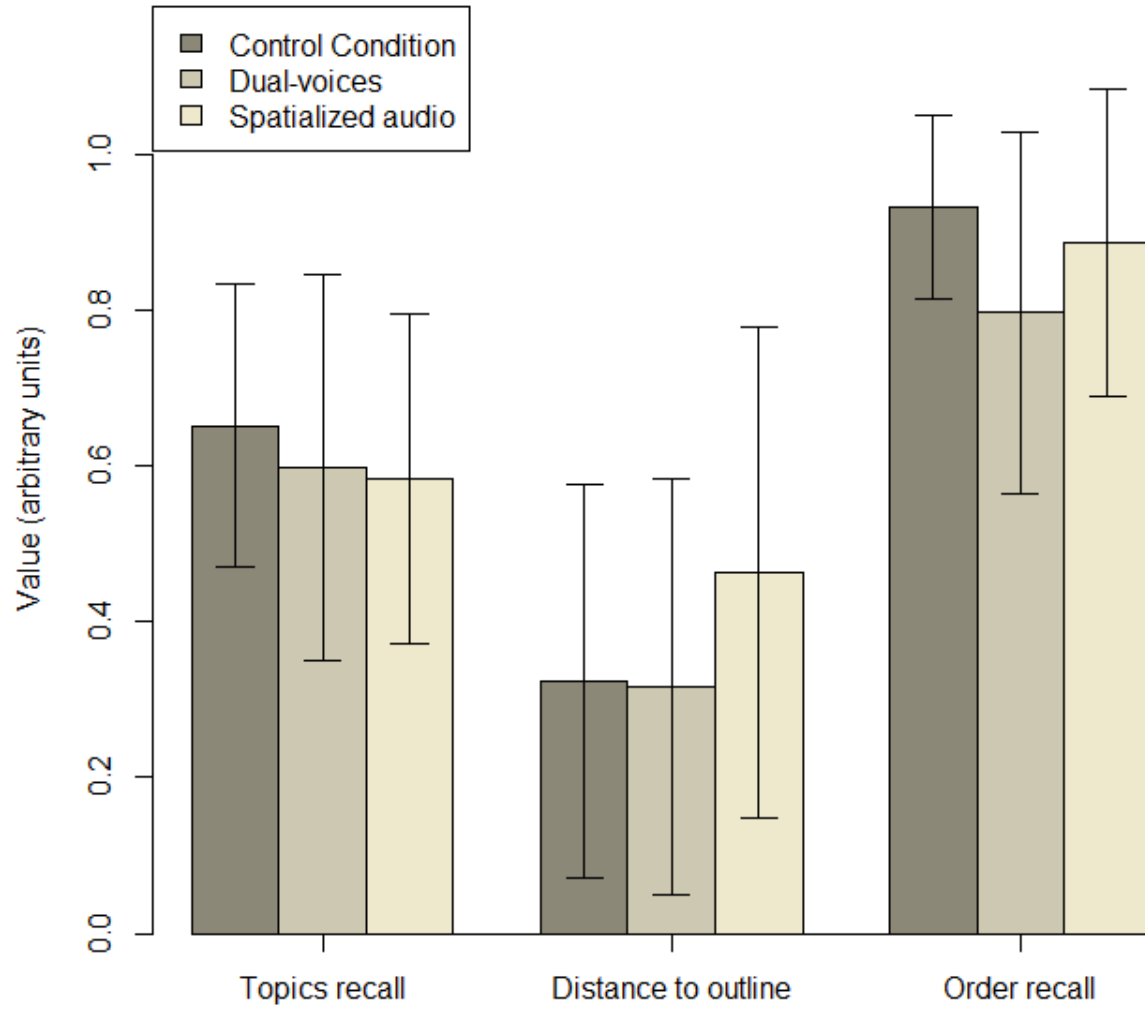


Measurements

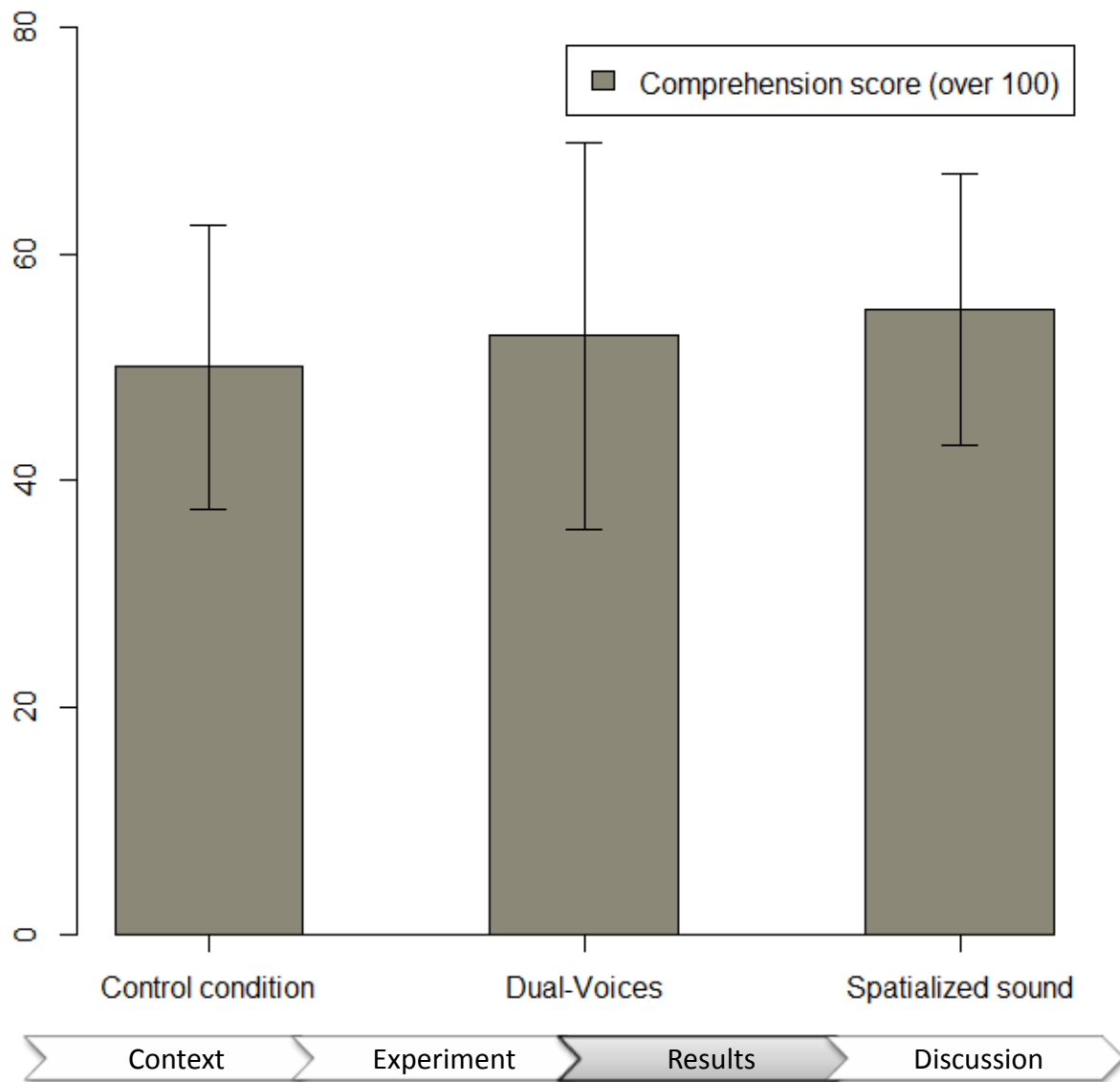
- Outline recall
 - Topics recall : 1 heading = 1 topic
 - Distance to plan
 - Order recall
- Comprehension score
 - 5 questions per document
 - Each answer rated from 0 to 4



Results



Results



Discussion

- Lack of cognitive load to see a benefit of the tested methods. May be due to :
 - documents complexity
 - task design
 - Reading speed (~170 wpm)
- One document has a better overall performance which induces variability in data
- Lack of statistical power due to the sample size



Individual analyses

- (trend) preference correlates with performance
- 3 groups :
 - Neutral
 - 3DS > control
 - 2 voices > control



Feedback from the participants

- *S4 : it's good logic...*
- *S3 : I felt a difference, I felt the demarcation*
- *S7 : I knew what the nextcoming content will be about when I heard the headings on the left*
- *S2 : It's a good system...*



Conclusion & perspectives

- Experimental design issues
- Individual preferences could be important
- Future of the project : restitution of other texts visual properties
 - Paragraph (semantic) breaks
 - Multi-level access





Thank you for your attention

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