

Towards the Prediction of Dyslexia by a Web-based Game with Musical Elements



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Motivation

- Is a **specific learning disorder** & people with dyslexia have difficulties **spelling** and reading words. Dyslexia is frequent: around **5% to 15%** of the population [1].
- **Prediction** of dyslexia depends on a minimum knowledge of phonological awareness, grammar, and vocabulary.
- **Late detection & then a disadvantage for children with dyslexia!**

Why Musical Elements?



- Prosodic structure in language is like phonological grammar [2] of music.
- Four acoustic parameters are used to generate the different musical elements: Frequency, Length, Rise Time & Rhythm (Figure 1)

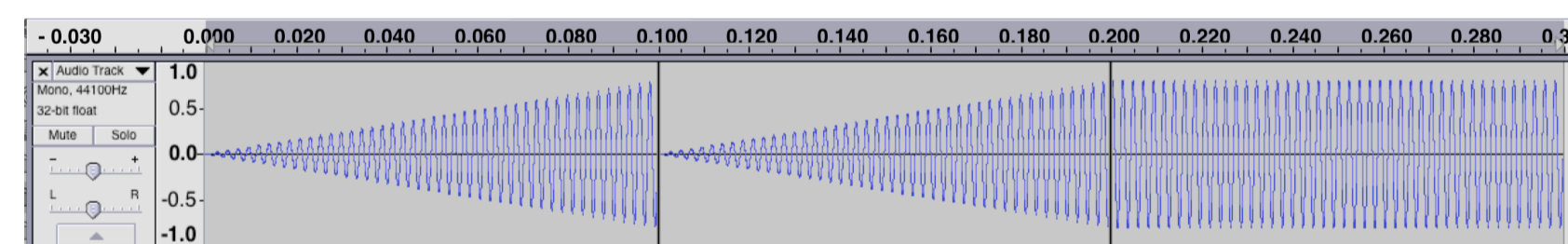


Figure 1: Example of one musical element rhythm.

Contribution

- New indicators for predicting dyslexia while playing a Game called DysMusic (Figure 2).
- Improvements to the first version of the game.

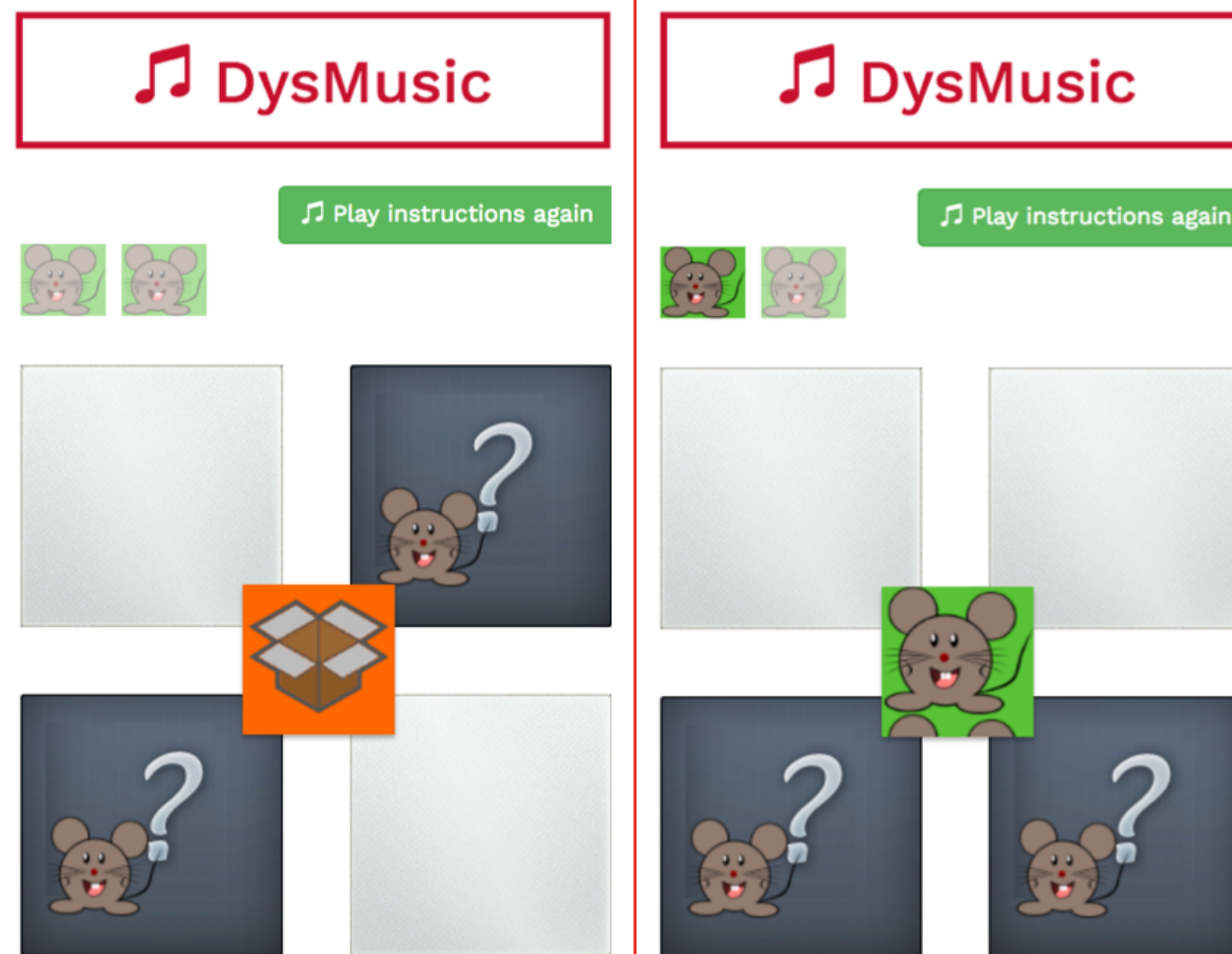


Figure 2: Example of the game DysMusic for finding the **incorrect (left)** and **correct (right)** pair of equal sounds.

Usability Study

- 5 users study (five children -users- and five parents) within-subject design, counter-balanced.

Results

- Participants had different perceptions on how difficult it was to distinguish the sounds and finding the card pairs, depending on the musical elements.
- But all participants mentioned that the first musical element of the first subtask was always more difficult, independently of the musical element.

Future Work

- Experiments with 30 participants: Do musical and visual elements distinguish a person with or without dyslexia?

Demo



<http://bit.ly/DysMus>

References:
[1] American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. American Psychiatric Association, may 2013.
[2] R. F. Port. Meter and speech. Journal of Phonetics, 31:599–611, 2003.