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

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Dyslexia
• Dyslexia is a specific learning disorder & people with dyslexia have difficulties spelling and reading words.
• Dyslexia is frequent: around 5% to 15% of the population has this learning disorder [1].

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

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).

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.

Motivation
• Prediction of dyslexia is depending on a minimum knowledge of phonological awareness, grammar, and vocabulary.
⇒ Late detection & then a disadvantage for children with dyslexia!

Conclusion
• Regarding the user test, all participants understood the game easily and played with no interruptions.

Future Work
• Include visual indicators into the prototype.
• Set of experiments with 300 participants: Do musical and visual elements distinguish a person with or without dyslexia?
• Test the language independency of the indicators.

References: