**INTRODUCTION**

- Amplitude rise times (RT) in the acoustic speech signal provide important cues for successful speech perception and in turn, the development of phonological awareness:
  - RTs facilitate the speech parsing process [1]
  - RTs are important for perceiving certain phonetic contrasts [1]

- Atypical RT detection might cause speech perception and in turn phonological processing problems, possibly resulting in an atypical reading development.

- Indeed, RT detection deficits have been widely discovered in adults and children with dyslexia [2] and in pre-readers at risk for dyslexia [3]

- Dyslexia interventions are usually most effective when they are preventive (in the pre-reading stage) and phonics-based (e.g. GraphoGame/ GG) [4]

**PROBLEM STATEMENT**

- As GG heavily assumes intact speech perception, an atypical RT sensitivity, presumably experienced by a subsample of children at risk for dyslexia, might limit an optimal GG-driven intervention response.

- A recent study showed a behavioral boosting effect on RT detection of a game-based auditory RT-based speech perception training (i.e., envelope enhancement/EE training) on top of GG [5].

- Objective of current study: to investigate the presence of a boosting effect of the EE training on top of GG on speech in noise (SPIN), phonological awareness and letter knowledge (LK)

**METHOD**

- Participants: 119 pre-reading kindergartners at cognitive risk for dyslexia

- 12-week intervention: 4 groups (~30 participants per group) based on whether they played GraphoGame (GG) with/without envelope enhancement training (EE). The active control group (AC) played Lego-games and no EE-training (NE).

- The EE/NE training comprised listening to stories with/without envelope enhancement (EE/NE) respectively.

**RESULTS (LINEAR MIXED MODEL ANALYSIS)**

- Pre- and post-intervention assessments at school (p-values on the graphs represent the overall Group*Time interaction)

  ![Graph showing SPIN growth and production](image)

  - Post-hoc consecutive contrasts for SPIN show significant growth differences between the no intervention and AC-NE group (p = .007), but not between the AC-NE and GG-NE (p = .318) and between the GG-NE and GG-EE group (p = .301)

- Intermediate assessments at home at timepoint 1-7 (T1-T7) (p-values on the graphs represent the overall Group*Time interaction)

  ![Graph showing performance](image)

  - No establishment of a short-term boosting effect of EE-training on top of GG regarding LK and PA

**TAKE HOME**

- Significant SPIN growth difference between AC-NE and the no intervention group suggests:
  - Active-control game driven effect?
  - Effect of story listening?

- Optimized study design needed to draw more solid conclusions

- Despite the short-term effect of GG on LK and reading [4] and a boosting effect of EE on RT detection [5], we found no benefit of GG nor EE-training regarding short-term SPIN improvement

- EE-training was provided too late in development to yield boosting effect?