Rhythmic abilities in prereaders predict future reading skills

Zugarramurdi, C.[1,2], Carreiras, M.[1],Valle-Lisboa, J.C.[2]

[1] Basque Center on Cognition Brain and Language (BCBL), Spain

[2] Instituto de Fundamentos y Métodos, & Centro de Investigación Básica en Psicología (CIBPsi), Facultad de Psicología, Universidad de la República, Uruguay

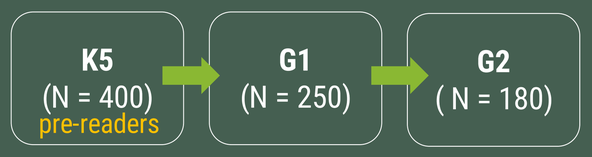
Background

- Rhythmic abilities have been related to speech segmentation and phonological processing. As a consequence, they may also support early reading skills.
- In young children, rhythmic abilities can be measured as *auditory-motor synchronization* (AMS) in a tapping to a beat task.
- It is currently unclear how the rhythm-reading relation develops and whether it is universal or language-specific.

Goals:

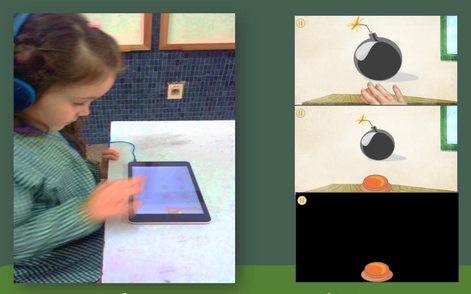
- Assess the contribution of rhythmic abilities for future reading acquisition
- Investigate the role of phonological processing in the rhythm-reading relation
- Contribute to estabilishing the universality of the rhythm-reading relation by studying it in Spanish, a transparent, syllable-timed language

LONGITUDINAL DESIGN



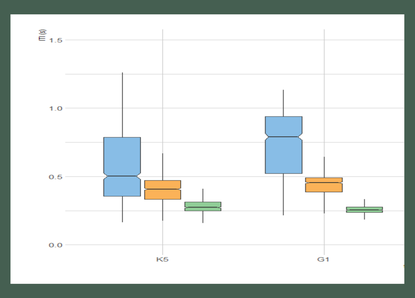
$$AMS_{freq} = \sum_{i=1}^{n\,trials} \frac{time_{dif} * 2 * pi}{time\ period}$$

TASK: AUDITORY-MOTOR SYNCHRONIZATION (AMS)

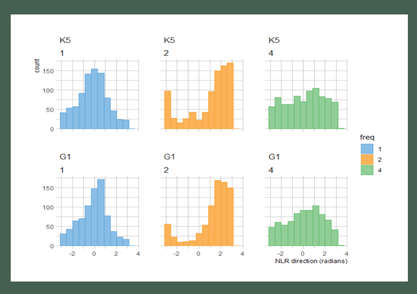


3 frequency conditions:
1, 2 and 4 Hz

AMS PERFORMANCE



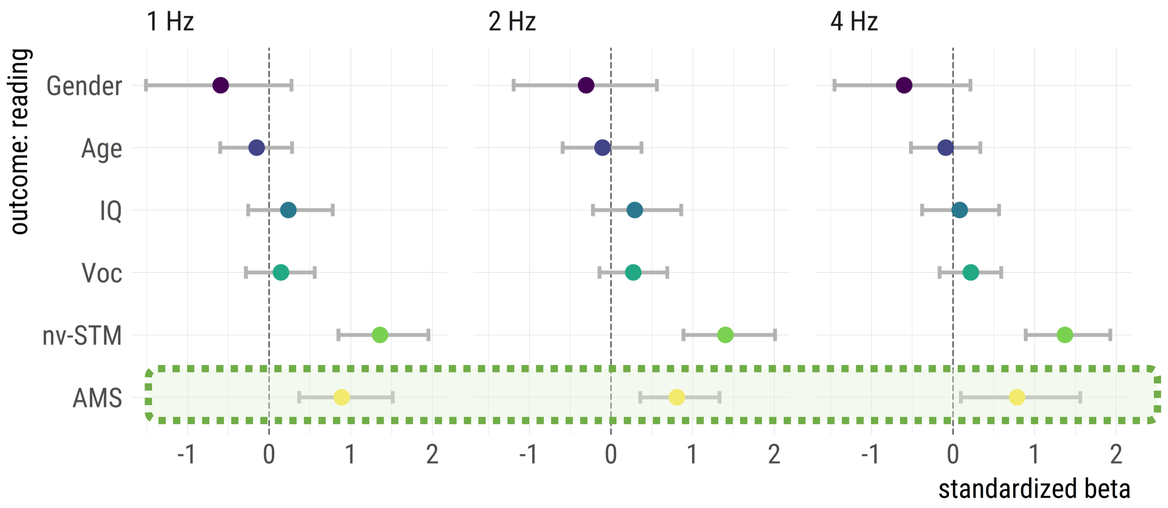
A. Inter-tap intervals. Improved timing over time and distinct responses to each frequency



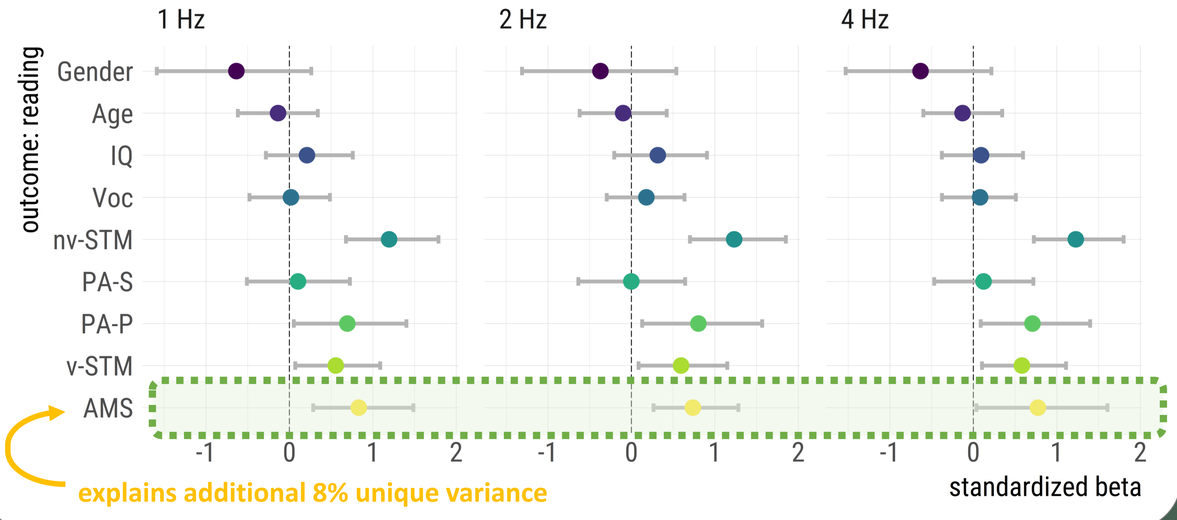
B. AMS phase distributions. Average in-phase at 1 Hz, counter-phase at 2 Hz , uniform at 4 Hz

K5 TO G1:
AMS predicts reading above PP at all frequencies

Voc: vocabulary
STM: short-term memory (non-verbal, verbal)
AMS: auditory-motor synchronization
PA: phonological awareness (syllables, phonemes)
Reading: decoding accuracy for words and pseudowords

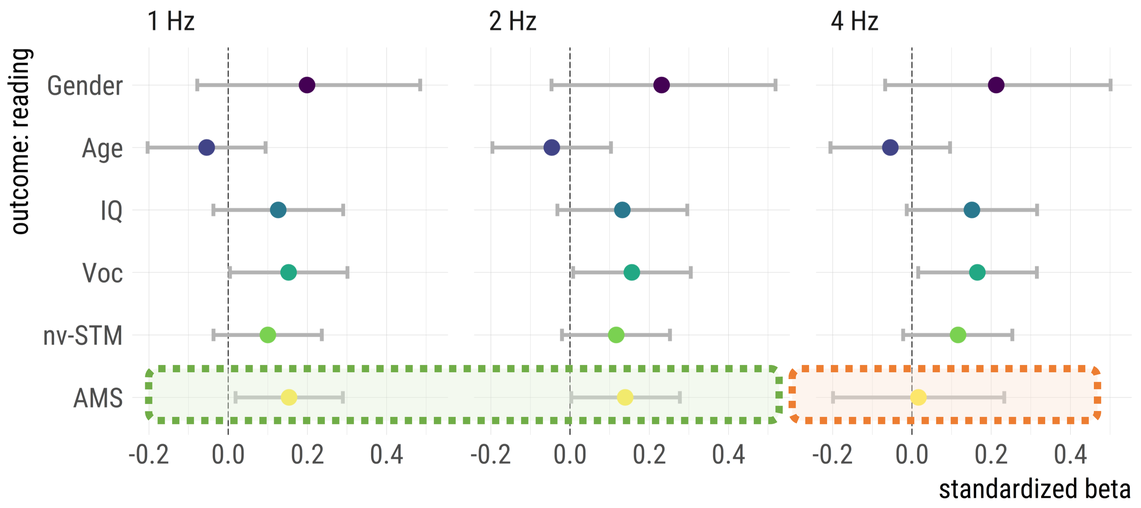


with PP

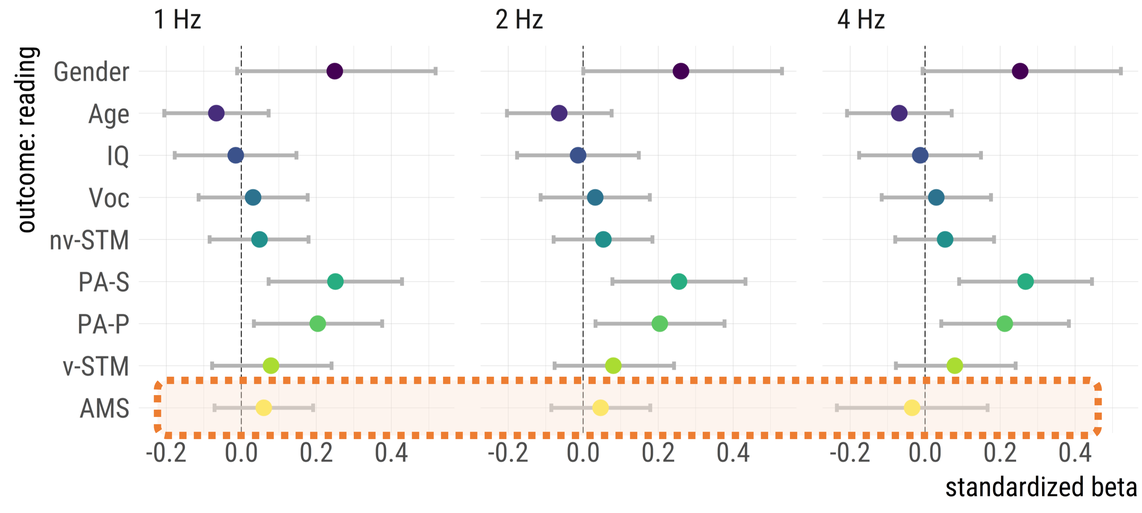


G1 TO G2:
AMS predicts reading not above PP, only for 1 and 2 Hz

MODELLING details:
linear mixed effects models
school as random intercept
left: K5 to G1, logistic
right: G1 to G2, continuous
top: in absence of PP
bottom: in presence of PP

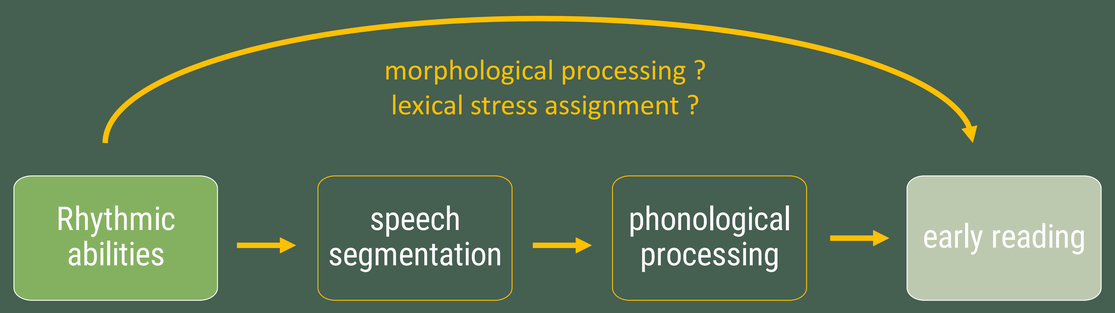


with PP



Conclusions and discussion

- Rhythmic abilities assessed before reading onset predict future reading skills
- The rhythm-reading relation:
  - is mediated by phonological processing abilitites
  - goes beyond phonological processing abilities
  - becomes less relevant through time
- Different tapping frequencies show distinct behaviours, should therefore be studied independently
- In Spanish, rhythm may play a role in lexical stress assignment and, through it, to reading, beyond phonological processing



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contact: czugarramurdi@psico.edu.uy