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## Introduction

Pausing when reading aloud is essential to comprehension of both listeners and readers. This skill evolves from the early stage of reading acquisition to reading expertise. The placement and duration of respiratory pauses tell us about the breath-voice coordination and so the planning when reading aloud.

## Method

**Participants** : 61 2<sup>nd</sup> graders (age : 7y11m, 27 girls), 63 5<sup>th</sup> graders (age : 10y11m, 23 girls), 20 adults (age : 29y5m, 10 women)

**Protocol** : Recording voice and breathing while reading a 174 words narrative text .  
 Control for fluency, comprehension, vocabulary, non verbal reasoning

### Analysis :

number, duration and placement of pauses  
 number of breathing pauses, their placement and the inhalation-to-phonation delay.  
 Pauses classification as grammatical or ungrammatical, and linked to punctuation or not.

## Results

### Breathing

- 2<sup>nd</sup> graders breathed more often and longer than 5<sup>th</sup> graders and adults
- Children planned less their breathing, 2<sup>nd</sup> graders less than 5<sup>th</sup> graders

### Pausing

- 2<sup>nd</sup> graders pause made more frequent and longer pauses than 5<sup>th</sup> graders and adults.
- Children relied less on punctuation than adults.

## Discussion

Learning to breath while reading is mostly implicitly acquired. Young children need to breath often and don't plan their pauses, they make more hesitation pauses. Then they tend to choose speed over phrasing, and comprehension and have less, shorter pause, even if more grammatical. We suggest that interventions to train reading-breathing coordination would be beneficial for poor readers /poor comprehenders.

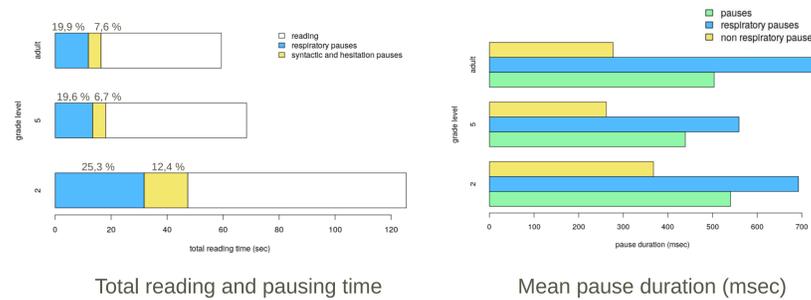
## Objectives

**Describing pausing acquisition from the beginning of reading acquisition to expertise, including breath-voice coordination while reading aloud**

## Conclusion

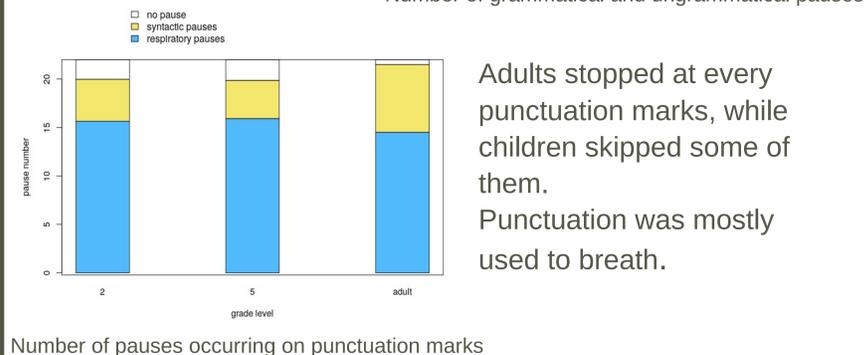
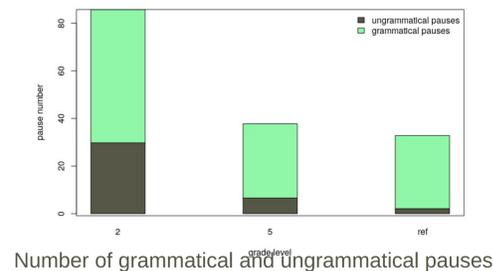
**2<sup>nd</sup> graders spent more time pausing, with more breathing and hesitations. Breathing-reading coordination was not acquired**  
**5<sup>th</sup> graders paused less and shorter than adults, relying less on punctuation marks, planning their respiratory pauses**

### Pausing



2<sup>nd</sup> graders made longer pauses, more often.  
 5<sup>th</sup> graders made less and shorter pauses than adults.

2<sup>nd</sup> graders made more ungrammatical pauses.



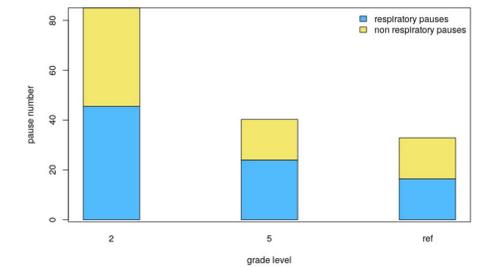
Number of pauses occurring on punctuation marks

Adults stopped at every punctuation marks, while children skipped some of them.  
 Punctuation was mostly used to breath.

### Breathing coordination

Adults had longer respiratory pauses. They occurred mostly on punctuation marks and were used to emphasize expressivity.

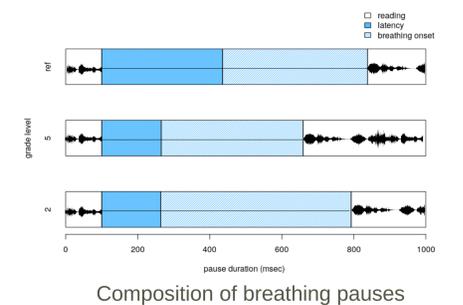
2<sup>nd</sup> graders breathed more than 5<sup>th</sup> graders.  
 2<sup>nd</sup> graders made more non respiratory pauses.  
 5<sup>th</sup> graders made less.



2<sup>nd</sup> grader made more ungrammatical breathing pauses than 5<sup>th</sup> grader.  
 Adults made none.

Number of grammatical and ungrammatical respiratory pauses

Inhalation to phonation delay was longer in 2<sup>nd</sup> graders.  
 They tended to breath more when out of air.



Composition of breathing pauses