

Orthographic learning by self-teaching in children with hearing impairment: focus on the nature of spelling errors

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INTRODUCTION

Self-teaching hypothesis (Share, 1995): prominent role of phonological decoding in reading in the acquisition of accurate orthographic representations in typical hearing (TH) children.

- Method reused many times leading to the same findings, but **only recently with children with hearing impairment (HI) by Wass et al. (2019).**

In most of previous studies using the same method, the authors evaluated the rate of word learning (correct/incorrect), without considering the type of errors made by children. However, **a more detailed analysis of spelling errors** can lead to a better understanding of new word orthographic acquisition and associated children's strategies (Treiman & Bourassa, 2000), **especially in children with hearing loss (Simon et al., 2019).**

METHODE

Participants:

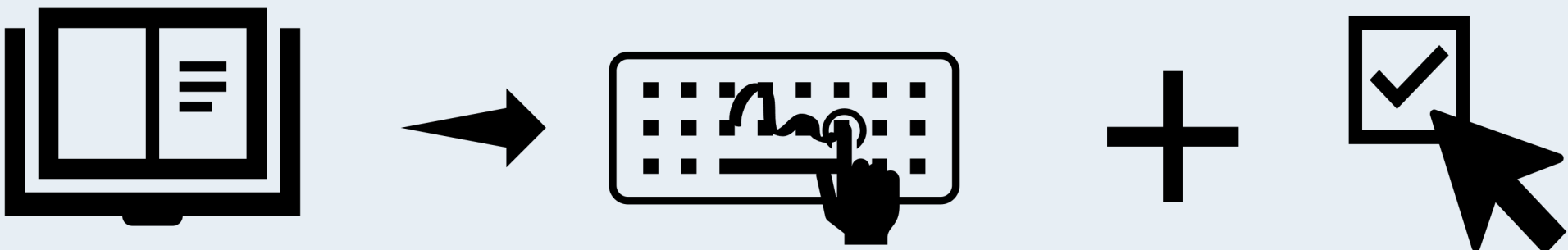
- 29 children with HI (7.8-13.5 y-old, 13F, 16M)
- 29 children with TH (7.9-13.6 y-old, 14F, 15M)
- Matched on their accuracy score (%) and reaction time (s) in a lexical decision task

Material:

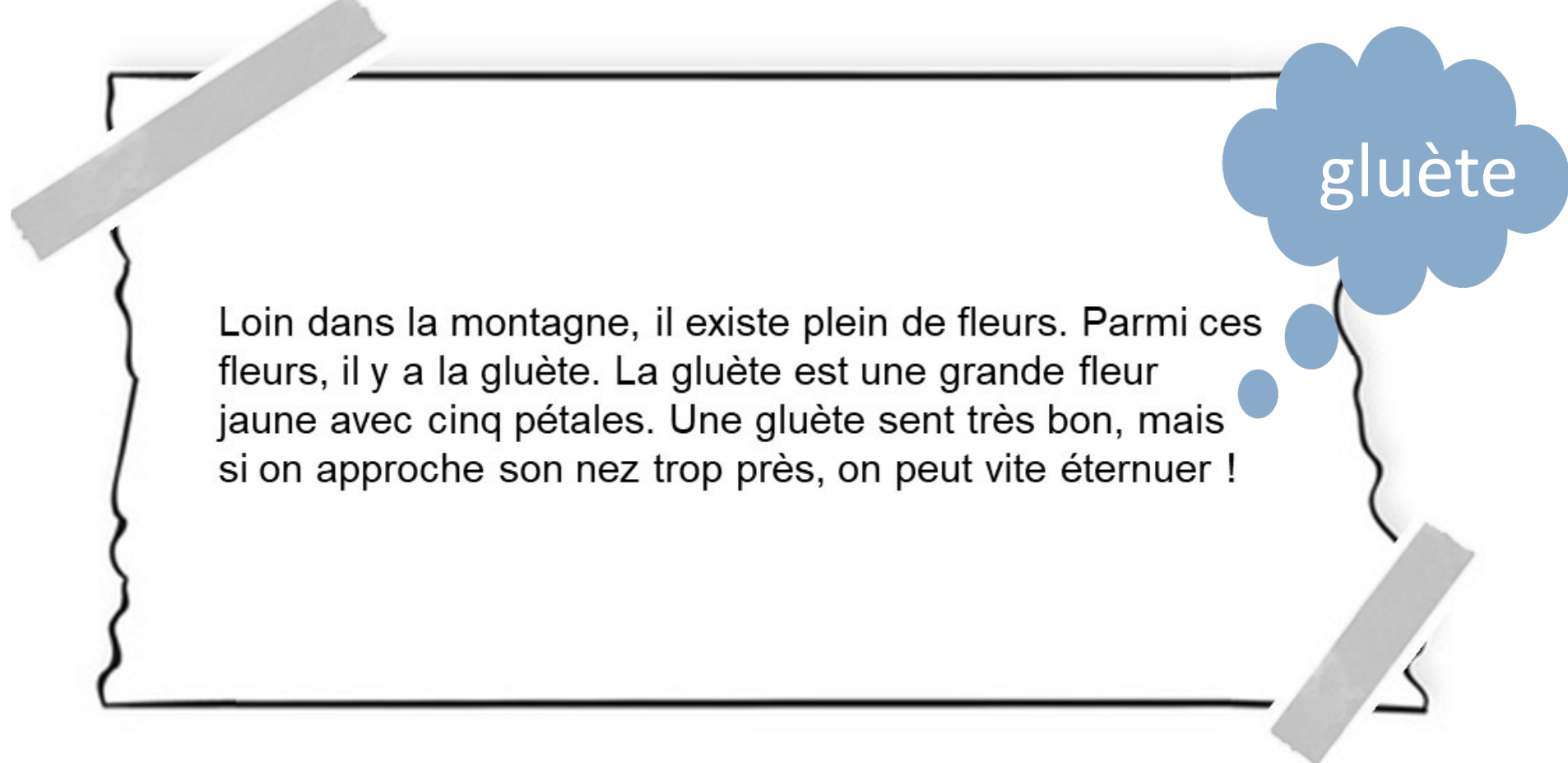
- 10 target non-words (new words)
- 10 short stories
- 3 occurrences

Self-teaching method (online) : reading, spelling task & orthographic choice task.

- Implicite learning phase:** Children are exposed to new words by reading short stories
- Orthographic learning assessment:** **Spelling task + Orthographic choice task**, where the child need to choose among four items the one encountered in the story



I. Example of a short story with the embedded new word 'gluète' appearing three times.



II. Example taken from the orthographic choice task and explanation of the distractors' design

Among these words, which one did you read in the story?



For each **target-item** (e.g., *gluète*), the following distractors were built:

- Phonological distractor:** (e.g., *gluette*) = pseudo-homophone of the target
- Orthographic distractor:** (e.g., *gulète*) = visually close to the target
- Foil distractor:** (e.g., *gulette*) = more distant phonologically & orthographically from the target

HYPOTHESES

On global performances (%):

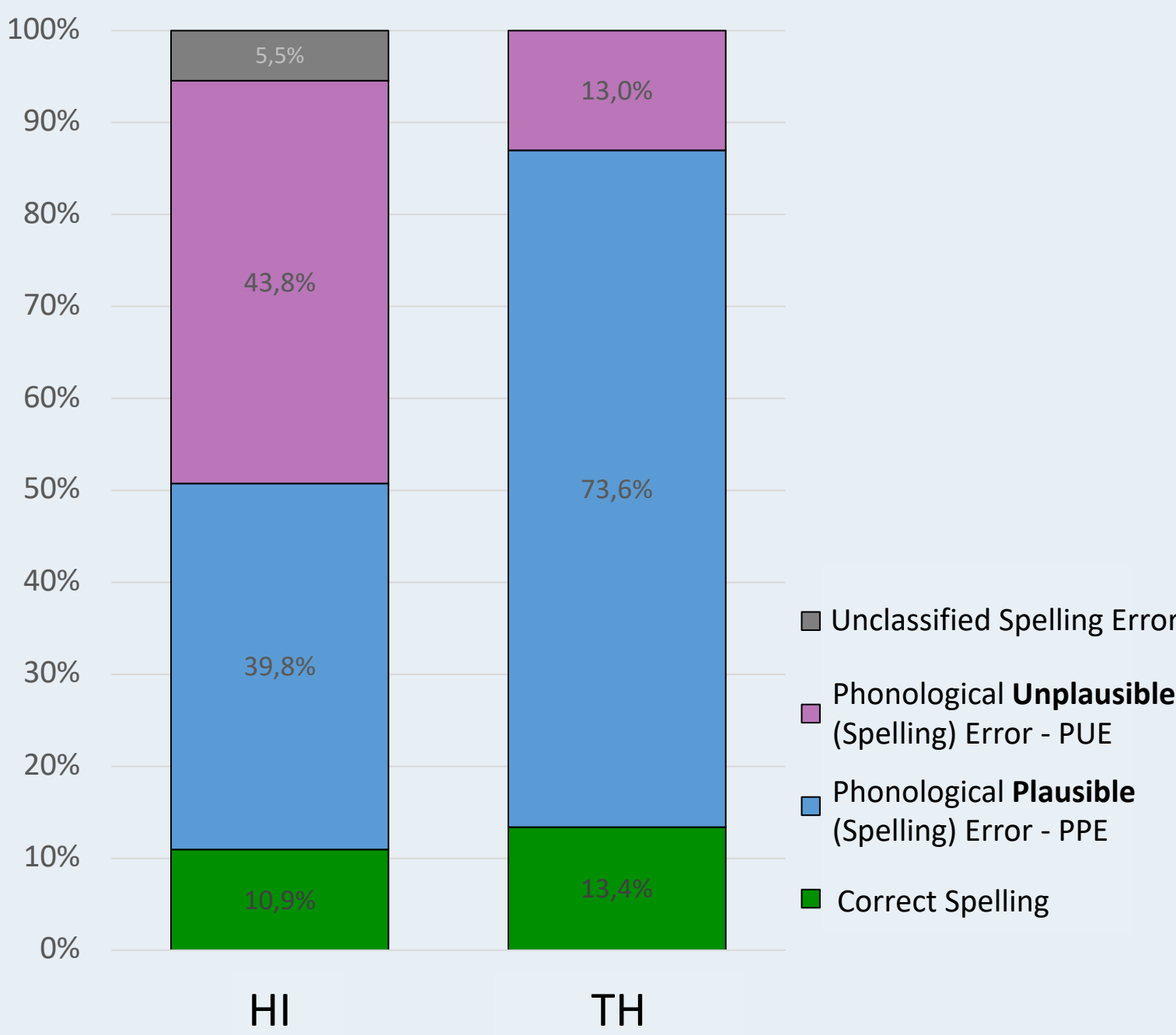
- Spelling task:** HI << TH
- Orthographic choice task:** HI < TH

On the type of spelling errors:

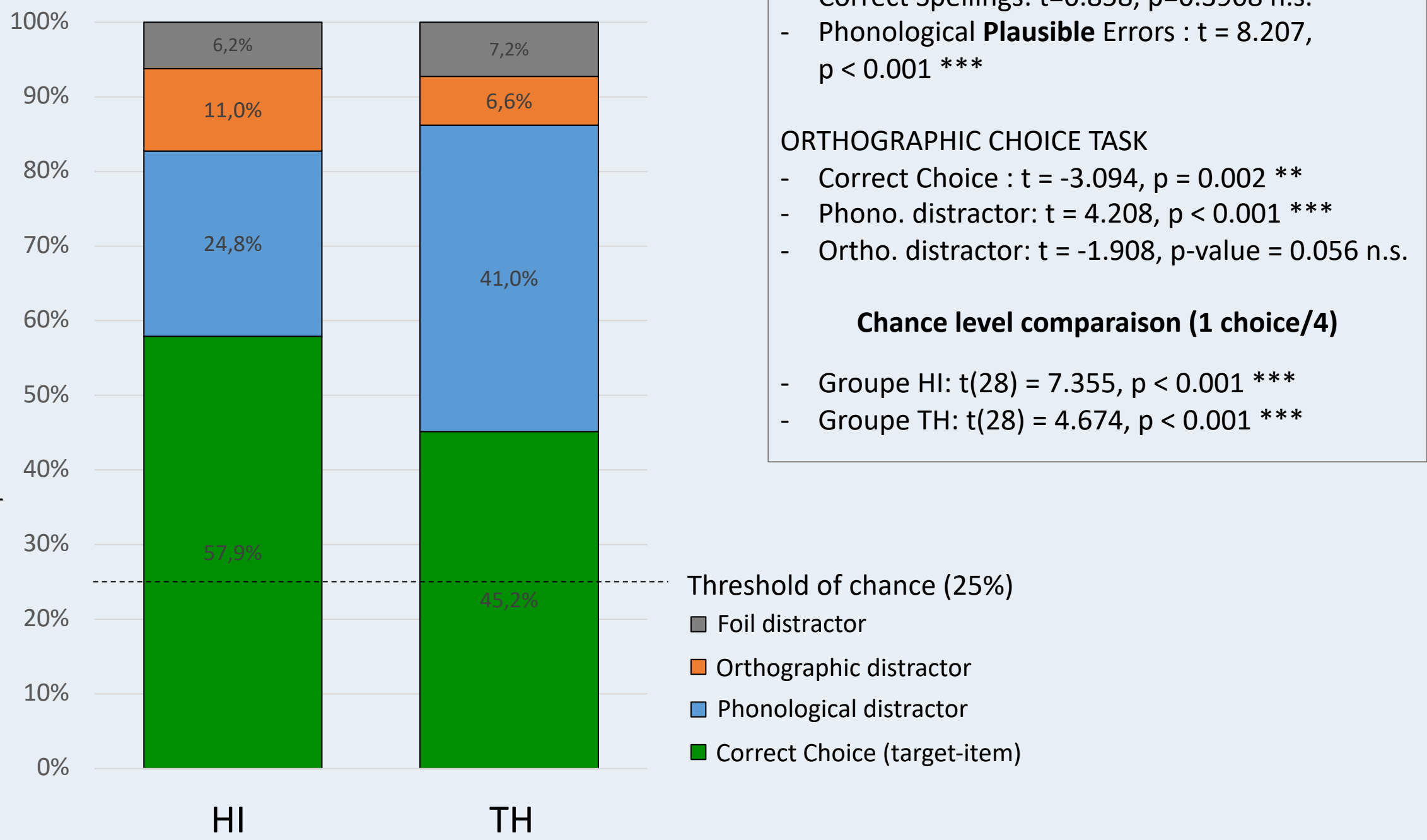
- Phonological Plausible Errors :** HI < TH (e.g., **gluette*)
- Phonological Unplausible Errors :** HI > TH (e.g., **gruète* or **gulète*)

RESULTS

SPELLING TASK: Distribution (%) of the spellings



ORTHOGRAPHIC CHOICE TASK: Distribution (%) of responses



Independent sample T-test Means comparisons HI vs. TH	
SPELLING TASK	- Correct Spellings: t=0.858, p=0.3908 n.s.
	- Phonological Plausible Errors : t = 8.207, p < 0.001 ***
	- Orthographic distractor: t = -1.908, p-value = 0.056 n.s.
ORTHOGRAPHIC CHOICE TASK	- Correct Choice : t = -3.094, p = 0.002 **
	- Phono. distractor: t = 4.208, p < 0.001 ***
	- Ortho. distractor: t = -1.908, p-value = 0.056 n.s.
Chance level comparaison (1 choice/4)	
- Groupe HI: t(28) = 7.355, p < 0.001 ***	
- Groupe TH: t(28) = 4.674, p < 0.001 ***	

CONCLUSIONS

SPELLING TASK (DICTATION)

- Both groups scored low compared to other studies** → maybe story contexts, word and pseudo-homophone's exposure lead to an overestimation in their scores? (e.g., Cunningham et al., 2002 and Share, 1999)
- Children with HI made more non-plausible phonological errors** → Some inaccuracies in the perception of the sound source are reflected in the spellings: tendencies to confuse /t~/s/ and /t~/k/ and /p~/b/ phonemes.

ORTHOGRAPHIC CHOICE TASK

- For both groups: acquisition of detailed enough orthographic representations to recognize the new word** → Results in line with the self-learning hypothesis through reading (Share, 1995)
- Moreover, even if **children with HI** are poorer phonological decoders than TH children, **they were better in recognizing the new words they have read before.**

FURTHER EXPLORATIONS: The role of phonologic, orthographic, morphologic cues in real words acquisition. E.g., here: tendency of children with HI to choose more often the orthographic distractor than children with TH.

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