Sublexical phonological representations in young readers: Evidence from priming paradigm
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The aim of this study was to examine the contribution and the nature of phonological representations involved during silent reading in French second graders.

Background
To date, a few information on phonological contribution during familiar word recognition in young readers is available. Two visual masked priming studies displayed opposed results. Booth, Perfetti, and MacWhinney’s (1999) study using backward masked paradigm revealed a quick and automatic activation of phonology during naming task in Grades 2, 4 and 6. By contrast, Davis, Castles, and Lakovides (1998) failed to evidence an activation of phonological information in the lexical decision task in Grade 4 in their visual masked pseudohomophone priming experiment.

Given these results and to ensure a phonological preactivation, we performed a cross-modal fragment priming experiment (auditory prime followed by visual target) associated with a go/no-go task in Grade 2 (Experiment 1).

Furthermore, there is a lack of evidence on nature of phonological representations involved in visual word recognition in children.

Hypothesis: If phonological representations are involved in visual word recognition, target recognition should benefit from phonological priming.

Method
Participants: 44 (Experiment 1) and 42 (Experiment 2) children of Grade 2

Material: Targets were 39 words, 39 pseudowords and 188 fillers; only 16% of prime-target pairs were related

Phonemes can be characterized by three subphonemic features as place of articulation (specifies where in the vocal tract the constriction is), manner of articulation (specifies how narrow the constriction is) and voicing (specifies whether the vocal folds are vibrating).

4 types of auditory fragment primes (pseudowords) were used:
- In "Identical" condition (ID), the prime shared the onset of the target (e.g., /bRə/-BREBIS; ‘we’).
- In "Close-Variation" condition (CV), the fragment prime was close to the onset of the target, the first phoneme was different by one subphonemic feature (e.g., /bRə/-BREBIS).
- In "Distant-Variation" condition (DV), first phoneme was different by more than one subphonemic feature (e.g., /bRə/-BREBIS).
- In "UnRelated" condition (UR), all phonemes were different to those of the onset of the target (e.g., (/nAtlRə/-BREBIS).

Procedure: A cross-modal and auditory priming procedures were used.

Results

The ANOVA revealed a main effect of condition on latencies by participants (F(3,129) = 5.05, p = .002, η² = .12) and by items (F(3,114) = 5.32, p = .002, η² = .12).

Cross modality priming in Grade 2 (Experiment 1)

Auditory priming in Grade 2 (Experiment 2)

Discussion

First, the main result was the facilitation effect observed when spoken fragment and written word shared the first phonemes compared to an unrelated condition. This suggests that familiar visual word recognition process engaged sublexical spoken phonological representations in automatic manner.

Second, results showed that subphonemic feature was relevant unit for speech processing and that written word processing was sensitive to phoneme. These results suggest that written word processing necessitated more abstract phonological representations (phoneme) than spoken processing (subphonemic feature).

It is likely that written processing uses phonemic unit because letter corresponds precisely to a phoneme. By contrast, speech processing must be flexible because speech cue is subjected to an important variability (voices, accent, coarticulation). The use of subphonemic units would allow more flexibility in speech processing.

Références

The ANOVA revealed a main effect of condition on latencies by participants (F(3,129) = 5.05, p = .002, η² = .11) and by items (F(3,114) = 5.32, p = .002, η² = .12). Planned comparisons revealed:
- Visual word recognition benefited from ID condition as compared to CV and DV conditions considered together (F(1,43) = 17.33, p < .001, η² = .29; F(1,38) = 11.53, p < .001, η² = .23)
- No difference between the CV and DV conditions (F(1,43) = 0.73, p = .20; F(1,38) = 2.69, p = .05)

The ANOVA revealed a main effect of Condition on latencies by participants (F(3,129) = 4.46, p = .005, η² = .10) and by items (F(3,120) = 5.58, p = .001, η² = .14). Planned comparisons revealed:
- Auditory word recognition benefited from ID condition as compared to CV and DV conditions considered together (F(1,43) = 5.60, p = .011, η² = .12; F(1,34) = 6.14, p = .009, η² = .15)
- Auditory word recognition benefited from CV condition but not DV condition (F(1,43) = 4.11, p = .025, η² = .09; F(1,34) = 5.85, p = .011, η² = .15)

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