An ERP Letter Name Rhyming Effect as a Measure of Phonological Processing in Children
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Letter name rhyming tasks (e.g., B and C rhyme, but B and A do not) provide a simultaneous index of two of the best predictors of ease of learning to read: letter name knowledge and phonological awareness in terms of rhyme (e.g., Adams, 1990). Recent event-related potential (ERP) studies have reported that single letter stimuli can elicit a typical ERP rhyming effect in adults, such that nonrhyming targets elicit more negative-going waveforms than rhyming targets in the N400 time window (Coch, George, & Berger, 2008; Coch, Hart, & Mitra, 2008). Here, we investigated the letter name rhyming effect in beginning readers.

METHODS

Participants. 8 (5 female) right-handed, monolingual English-speaking 6- to 8-year-old children (mean 7;10, SD 8.7 months, range 6;7-8;8). Here, we investigated the letter name rhyming effect in beginning readers.

Behavioral measures. Phonological Awareness and Phonological Memory composites of the CTOPP (Wagner et al., 1999); Word ID and Word Attack subtests of the Woodcock (WRMT-R, Woodcock, 1987)

ERP recording.  
• 32 channels  
• bandpass: 0.1-100 Hz  
• sampling rate 4 ms

ERP task.  
• 60 rhyming, 60 nonrhyming letter pairs  
• button-press judgment each pair (rhyme/not rhyme)

Data analyses. ANOVAs on mean amplitude (400-600 ms; HF correction); Pearson correlations

RESULTS

Accuracy (% correct). 84.2% rhymes, 94.8% nonrhymes (t(7) = -2.29, p = .056)

ERP rhyming effect.  
• condition (p = .07)  
• condition x lateral/medial (p < .05)  
• condition x anterior/posterior x lateral/medial (p < .05)

Correlations.  
• amplitude of the rhyming effect overall and behavioral measures: all p’s ns  
• amplitude of the rhyming effect at P3/P4 and behavioral measures: all p’s ns

CONCLUSIONS

• Single letters can elicit an ERP rhyming effect in young children, as observed in adults  
• The ERP letter rhyming effect in children is largest at posterior and medial sites  
• Size of the ERP letter rhyming effect is not correlated with scores on standardized behavioral tests of phonology and reading (CTOPP, WRMT-R)  
• The ERP letter rhyme task provides another index of phonological processing separate from these standardized behavioral tests

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