



DARTMOUTH

# When two vowels go walking: an ERP study of the vowel team rule

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## INTRODUCTION

The vowel team rule in American English teaches that two vowels together are pronounced like the name of the first vowel (e.g., *ai* in *braid* sounds like “A”). But this rule is not always generalizable (e.g., *ou* in *cloud* does not sound like “O”). In a lexical decision task, we explored whether word-processing, as measured by N400 amplitude, is similar for words with vowel digraphs that do and do not follow the rule, and whether a similar pattern extends to nonwords.

## METHODS

### Participants

32 college students (19;7, *SD* 1;2); 16 F; right-handed, monolingual English speakers, no history of language or reading disorders, self-reported learning to read with phonics/learning reading and spelling rules

### Stimuli

90 each (60 for word/nonword analyses, without *ea*)

- rule-following words (*bloat, braid, beach*)
- rule-breaking words (*cloud, caught, bread*)
- rule-following nonwords (*cloat, braip, meach*)
- rule-breaking nonwords (*cloup, maught, breap*)
- controlled for multiple linguistic variables (e.g., length, frequency, N, bigram frequency and count)

### ERP recording

32 channels, bandpass .01-100 Hz, sampling rate 4 ms

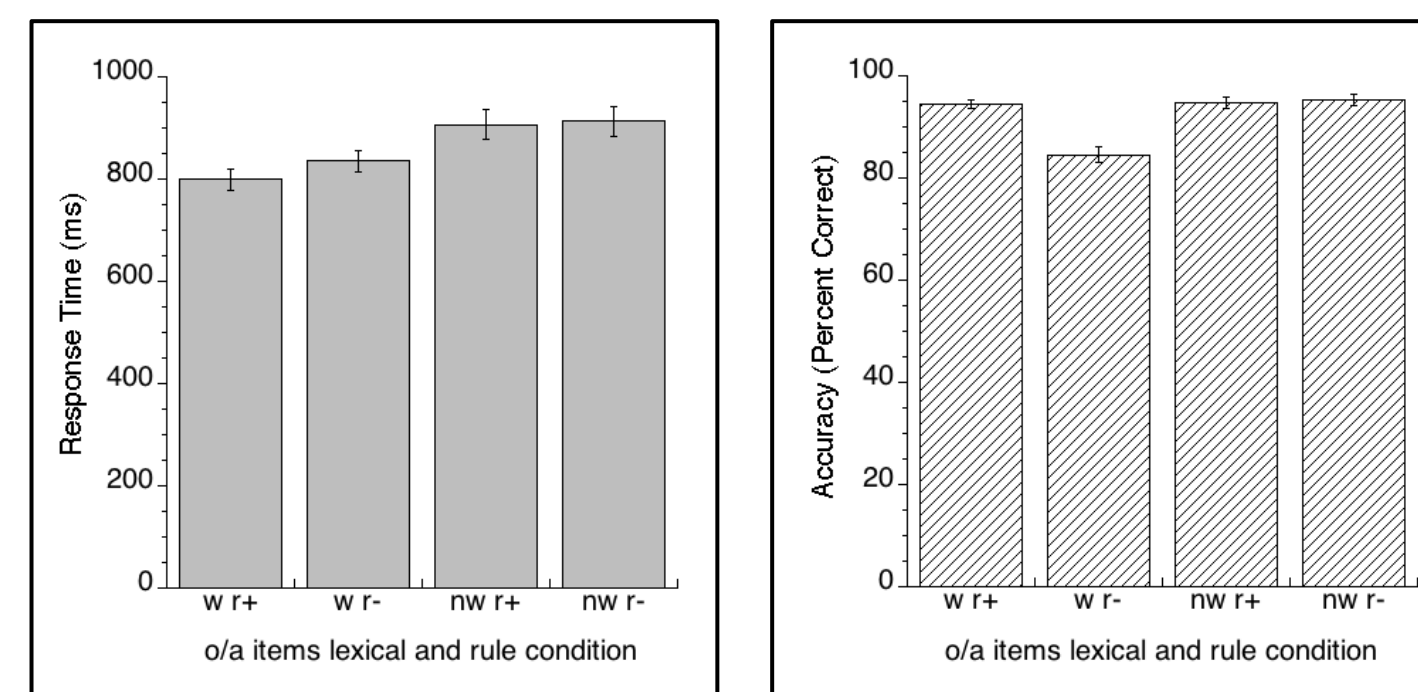
## Data analysis

- lexical decision task: response times (RTs) and accuracy
- ERP rule effect for words: ANOVA, N400 mean amplitude, 300-600 ms, rule-following vs. rule-breaking
- similar ERP rule effect for nonwords: ANOVA, difference waves (rule-following – rule-breaking), words vs. nonwords, N400 mean amplitude, 300-600 ms

## RESULTS

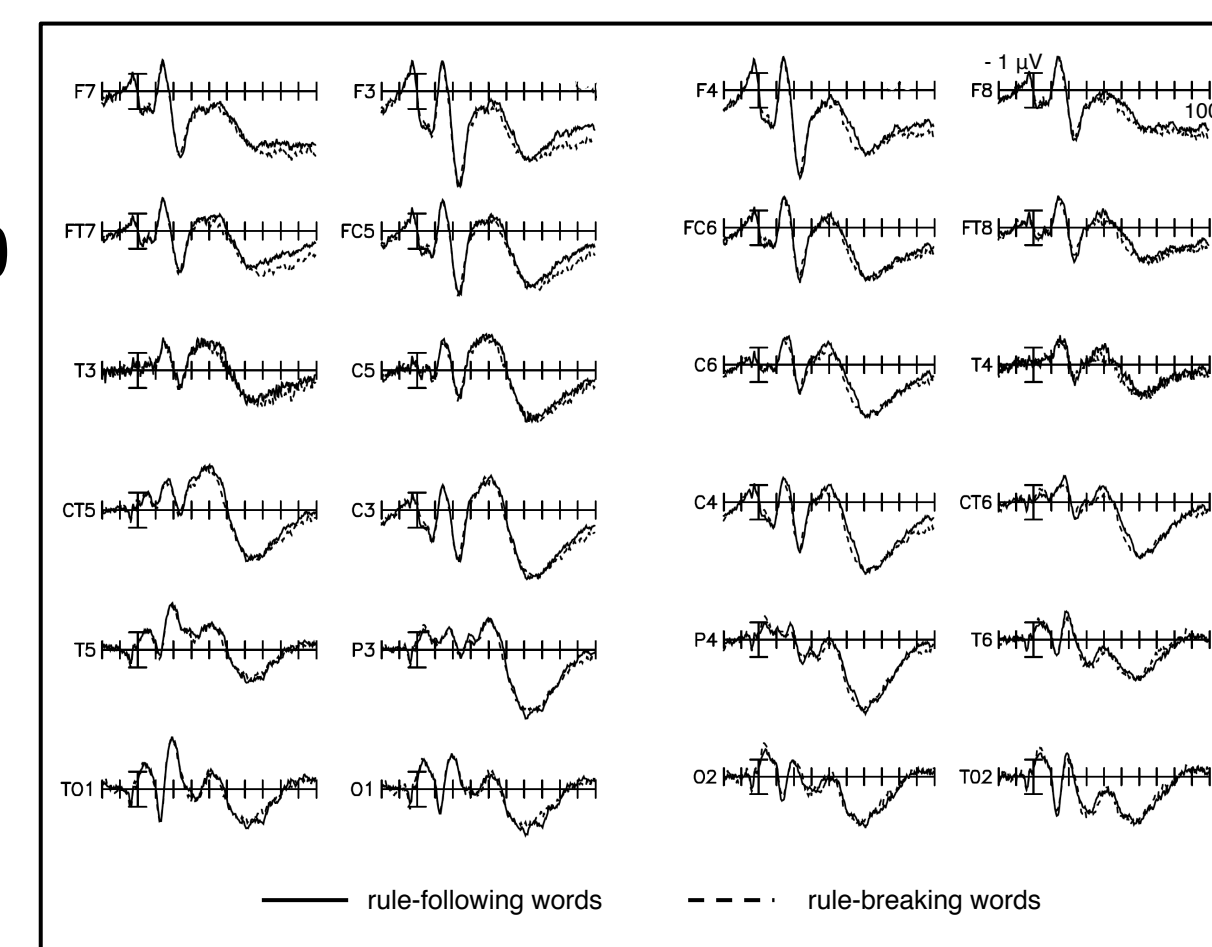
### Lexical Decision Task

- RT faster ( $p < .01$ )
- accuracy better ( $p < .001$ ) for rule-following (r+) than rule-breaking (r-) words (w), but not nonwords (nw)



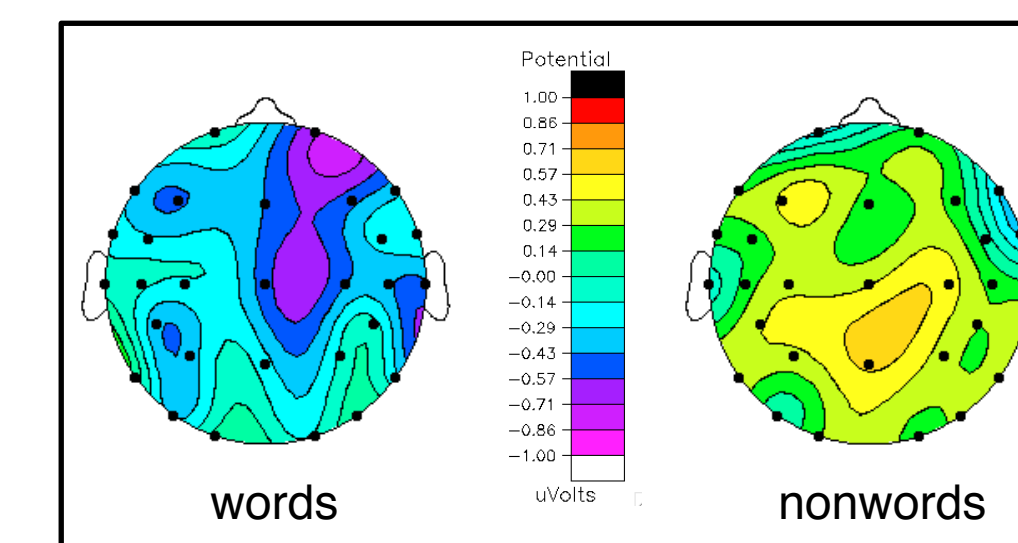
### N400 rule effect for words?

- No significant difference in 400 amplitude for rule-following and rule-breaking words



## Similar N400 rule effect for words and nonwords?

- No significant effects involving lexicality in difference wave analyses



## CONCLUSIONS

- Vowel team rule adherence does not affect N400 processing of words or nonwords in fluent readers
- Facilitation (measured behaviorally by RT and accuracy) for rule-following words, but not nonwords, likely occurs at a late decision stage in the lexical decision task
- Findings challenge the utility of teaching the vowel team rule, consistent with calls to teach vowel digraphs in terms of flexible pattern recognition in context rather than rules (e.g., Johnston, 2001, p. 140)

## REFERENCE

Johnston, F.P. (2001). The utility of phonics generalizations: let's take another look at Clymer's conclusions. *The Reading Teacher*, 55(2), 132-143.

## ACKNOWLEDGEMENTS

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