



ORTHOGRAPHIC EFFECTS ON RHYME DETECTION AND PHONEME COUNTING IN FRENCH, ENGLISH, AND ITALIAN

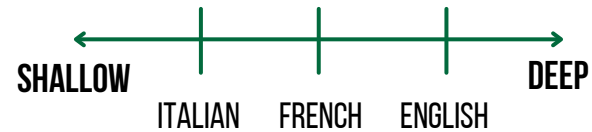
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1. Introduction

This study investigates the effects of orthography on speakers' ability to detect rhymes and count phonemes in response to written stimuli in French, English, and Italian. It examines variation across differing orthographic conditions within a single language, as well as variation across the differing orthographic depths of the three languages studied.

2. Orthographic Systems

Orthographic depth: the degree to which an orthography deviates from a one-to-one grapheme-to-phoneme correspondence, i.e. the degree to which one can predict pronunciation from spelling and vice versa.



English has the deepest orthographic system of the three languages studied, and Italian has the shallowest.

Systematic digraph: a two-letter symbol that represents a single phoneme, and that phoneme is nearly always represented with the two letters. For example, SH is a systematic digraph in English, representing /ʃ/.

Silent letter: a letter that is not required to indicate the correct pronunciation. For example, the "B" in English *dumb* is silent, because the word could be spelled "dum" and still be pronounced the same.

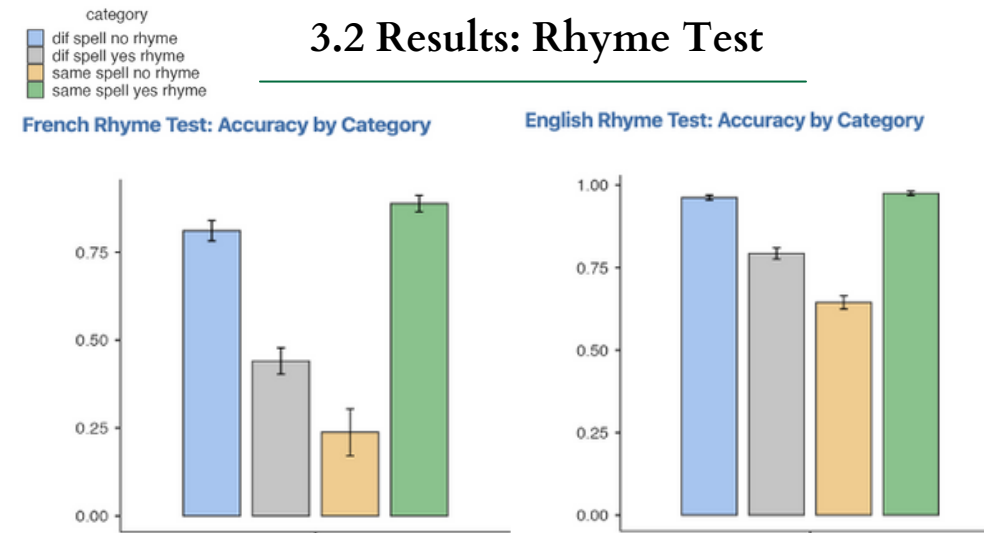
3.1 Experiment 1: Rhyme Test

Participants in each language were shown pairs of words and asked to judge whether they rhyme. Word pairs each fell into one of four categories:

1. *dif spell no rhyme* = words are spelled with different endings and do not rhyme (e.g. went, three)
2. *dif spell yes rhyme* = words are spelled with different endings but do rhyme (e.g. four, more)
3. *same spell no rhyme* = words are spelled with the same ending but do not rhyme (e.g. rough, through)
4. *same spell yes rhyme* = words are spelled with the same ending and do rhyme (e.g. part, tart)

Categories 1 and 4 are "congruous," and 2 and 3 are "incongruous." Accuracy (correct/incorrect) and reaction time were recorded.

3.2 Results: Rhyme Test

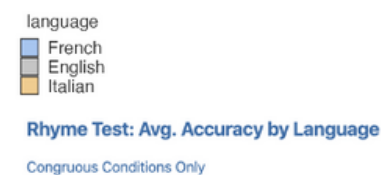


Accuracy

- Both French and English: *same spell no rhyme* had worst accuracy
- Italian: worse accuracy for rhyming condition than non-rhyming condition
- Average accuracy, both overall and in each respective category, was worse in French than in English and Italian

Reaction Time

- French: longest reaction time was for *dif spell yes rhyme*
- English: longest reaction time was for *same spell no rhyme*
- Average reaction time was longer in French than in English and Italian (exception: *same spell no rhyme* category, for which French reaction time was faster than English)



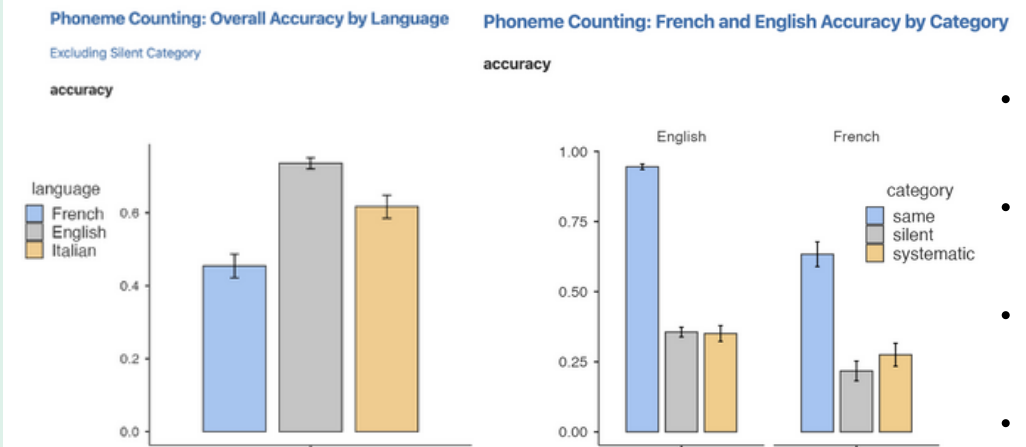
4.1 Experiment 2: Phoneme Counting

Participants were shown individual words and asked to type how many "sounds" were in the word. The spelling of the words could be classified in one of three categories:

1. *same* = same number of phonemes as letters in the word
2. *systematic* = spelling includes a systematic digraph
3. *silent* = spelling includes a silent letter

Accuracy (correct/incorrect), participant answer, and reaction time were recorded.

4.2 Results: Phoneme Counting



Reaction Time

- French had fastest reaction time in every category, and English had slowest
- English reaction times (from fastest to slowest): *same*, *systematic*, *silent*

Accuracy

- All languages: accuracy better in the *same* category than in all other categories
- Both English and French: accuracy better for *systematic* category than for *silent* category
- Average accuracy in every category was worse in French than in English and Italian
- *Same* accuracy was better in English than in Italian, and *systematic* accuracy was slightly better in English than in Italian

5. Overall Results and Discussion

Rhyme Test

- Incongruous conditions had significantly lower accuracy and slower reaction times than congruous conditions.
- Within the incongruous conditions, accuracy was significantly lower in the *same spell no rhyme* category than in the *dif spell yes rhyme* category.
- Across all languages, within the congruous conditions, accuracy was highest for English and lowest for French.
 - surprising, given that Italian has the shallowest orthography
- Why was there any difference in the two conditions in Italian?

Phoneme Counting

- *Silent* category had lower accuracy than *systematic* category.
- Across all languages, (if we lump *silent* and *systematic* together into one *non-same* category), accuracy was best in English and worst in French.
 - surprising, given orthographic depth of English vs. Italian
- In Italian and English, reaction times were significantly different across all categories, with *same* being fastest, then *systematic*, then *silent*.
 - French reaction times were fastest across all categories and were not significantly different across categories.
- In French, the possible effect of the liaison and varying pronunciation of word-final schwa should be considered.

*One-Way ANOVA tests were performed on the data, and all results mentioned here are statistically significant with $p < .05$