Reading Vowels: Chinese and Arabic learners

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English pronunciation

- Read
- They read the book...
English pronunciation

- Read

- They read the book... every day.
Read

They read the book... yesterday.
Lead

They lead the students today to see the...
Lead

They lead the students today to see the lead.
Ghoti

= “fish”

gh from ‘enough’
o from ‘women’
ti from ‘action’
Why do we care?

- These pronunciations can be difficult but...

What does it actually mean for students?
Phonology in Reading

- Phonological awareness = knowledge of the sound system of one’s language and the ability to manipulate those sounds
  (Blachman, 1991; Wagner & Torgeson, 1987)

- Decoding = ability to match written symbols to spoken sounds and blend them together to form words
Phonological awareness and decoding are critical for children learning to read (Adams, 1990; Snowling, 1995)

Reading comprehension is crucially dependent on decoding ability (Perfetti & Lesgold, 1977)

Reading instruction with a focus on phonology is effective for improving poor readers’ reading skills (Hatcher, Hulme, & Ellis, 1994)
Comparing L1 Chinese and L1 Korean learners of ESL

- Chinese readers relied more on orthography (written forms, spelling) than phonology (pronunciation)

- Korean readers relied more on phonology than orthography
- Korean readers also have more difficulty with “exception” words (Hamada & Koda, 2008)
Anecdotal evidence from ESL teachers indicates that native Arabic speakers have exceptional difficulties learning to read in English (Thompson-Panos & Thomas-Ružić, 1983)

Errors in reading words aloud usually preserve the consonant structure of a word but not always its vowel structure (Alsulaimani, 1990)

<table>
<thead>
<tr>
<th>Target</th>
<th>Production</th>
</tr>
</thead>
<tbody>
<tr>
<td>biscuit</td>
<td>basket</td>
</tr>
<tr>
<td>circuit</td>
<td>cricket</td>
</tr>
<tr>
<td>stupid</td>
<td>stopped</td>
</tr>
<tr>
<td>president</td>
<td>presented</td>
</tr>
<tr>
<td>spade</td>
<td>speed</td>
</tr>
</tbody>
</table>
L1 Arabic Learners

- Significantly worse at detecting missing vowels than native English speakers or non-Arabic speaking English language learners (ELLs) (Ryan & Meara, 1991; Hayes-Harb, 2006)
- Significantly slower English word recognition than native Japanese ELLs, possibly the result of less developed phonological decoding ability (Fender, 2003)
- Why do native Arabic speakers behave this way while reading in English?
Arabic Orthography

- Long vowels are always written, but short vowels are usually not included in written text for mature readers.
- Short vowels often provide grammatical information such as case (nouns) or tense (verbs).
- Sentence context and knowledge of Arabic literature and discourse are used to deduce the vowels (and hence the particular meaning and grammatical function) of a word.
هي تدرس ولد صغير.
هي تدرس ولد صغير.
Abu-Rabia (1999): Reading in Arabic “may be called ‘reading consonants and guessing vowels’” (p. 95)

L1 reading strategies develop that focus on consonants rather than vowels, and this may influence L2 reading.

Current study: Are native Arabic speakers sensitive to vowel information while reading in English?
1. Are native Arabic speakers sensitive to vowel information while reading in English?
   ▪ Specifically, are they sensitive to orthographic vowel ambiguity?
   ▪ ( = Does the written sequence have more than one common pronunciation, like ‘read’, or just one, like ‘reed’?)

2. How do native Arabic speakers compare to native English speakers?

3. Are the reading patterns found for Arabic speakers unique to them, or are they L2 learner-general?
Materials

- 60 target words:
  - 20 base words (BW; unambiguous orthographic vowel sequence) Ex: greet
  - 20 control words (CC; unambiguous) Ex: green
  - 20 ambiguous words (AMB; ambiguous) Ex: great

- Embedded in sentence context for eye-tracking
  - Natural reading task
  - Assumption: overt attention (eye gaze) reflects covert attention and processing
  - Higher numbers of fixations and regressions and longer gaze times indicate that something is more difficult to process
Participants

- 33 native English speakers
- 35 native Arabic speakers
  - 8.4 months in U.S.
  - 9.5 years studying English
  - Self-rated English reading at 6.1/10
- 28 native Chinese speakers
  - 6.1 months in U.S.
  - 9.1 years studying English
  - Self-rated English reading at 5.3/10
Presenting results from:
- First-pass fixation count
- Total fixation count
- Gaze duration (first-pass)
- Target dwell time (total)

Initial word-level processing:
- First-pass fixation count
- Gaze duration (first-pass)

Global processing:
- Total fixation count
- Target dwell time (total)
Number of First-Pass Fixations
Number of First-Pass Fixations

η² = 0.07
Number of First-Pass Fixations

η² = .07

η² = .05
Number of First-Pass Fixations

<table>
<thead>
<tr>
<th>Language</th>
<th>BW</th>
<th>AMB</th>
<th>CC</th>
</tr>
</thead>
<tbody>
<tr>
<td>English</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arabic</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Chinese</td>
<td></td>
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</tbody>
</table>

η² = .07
η² = .05
η² = .17

η² = .07
η² = .05
η² = .17
Gaze Duration
Gaze Duration

\[ \eta^2 = .21 \]
Gaze Duration

English

\[ \eta^2 = .21 \]

Arabic

\[ \eta^2 = .06 \]
Gaze Duration

Gaze Duration (in ms)

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<th>AMB</th>
<th>CC</th>
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</thead>
<tbody>
<tr>
<td>English</td>
<td>200</td>
<td>300</td>
<td>400</td>
</tr>
<tr>
<td>Arabic</td>
<td>500</td>
<td>600</td>
<td>700</td>
</tr>
<tr>
<td>Chinese</td>
<td>400</td>
<td>500</td>
<td>600</td>
</tr>
</tbody>
</table>

η² = .21

η² = .06

η² = .08
Total Number of Fixations

$\eta^2 = .15$
Total Number of Fixations

English
\( \eta^2 = .15 \)

Arabic
\( \eta^2 = .01 \)
Total Number of Fixations

η² = .15
η² = .01
η² = .15

English
Arabic
Chinese
Target Dwell Time
Target Dwell Time

η² = .28
Target Dwell Time

English: η² = .28
Arabic: η² = .002
Chinese: η² = .09
English speakers are affected by ambiguity of letter-sound mappings for vowels
  • Small differences, but reliable across a number of measures
  • Evidence that they access and process phonology during fluent reading

Arabic speakers are less sensitive to the ambiguity of these vowels
  • Differences not statistically reliable, and with small effect sizes
  • Processing phonology, in some way, but not as deeply or efficiently as native speakers

Chinese speakers are in the middle
  • Less sensitive than native speakers – ambiguity effects not as wide-spread
  • Much more sensitive than Arabic speakers, and with larger effect sizes
What can explain these differences?

Influence from L1 orthographic and language experiences

Arabic speakers:
- Alphabetic L1
- Learned inattention to vowel information
- Consonants bear primary word meaning

Chinese speakers:
- Logographic L1, but experience with alphabetic system (pinyin)
- No learned inattention to vowel information
- Vowels (and tone) bear primary word meaning
What does this mean for teaching?

- Particular difficulties will be faced by students from different L1 backgrounds.

- Students whose L1 uses an alphabetic writing system will have an easier time with reading in general than students whose L1 uses a non-alphabetic writing system.
  - They are more accustomed to decoding and the “alphabetic principle”.
1. The importance of connecting written forms to spoken forms
   • When students ask about a word, write it on the board as well as pronouncing it
   • Encourage students to say the word with you and to write it with you, as well
   • Connect pronunciation to spelling as often as possible

2. Focus on the importance of spelling as students learn new words
3. Draw students’ attention to and make explicit connections between written letters and words and pronunciation

- Spend extra time on target words focusing on the spelling and the patterns of connections between the written and spoken forms
- Target words = class vocabulary, reading vocabulary, core vocabulary words
4. Activate students’ knowledge of spelling-sound correspondences and demonstrate their importance by spending time on them

- Ask students to try working out on their own how to pronounce new words
- Work together as a class on this, in small amounts, perhaps with target words
5. Make connections to other words that are spelled and pronounced similarly
   - Help students see the patterns that do exist
   - Help students remember common pronunciations (ee) and memorize exceptions (been)
   - Ex: Sweet
     (greet, meet, feed, bee, see, knee, teen, etc.)
   - Sweat
     (meant, ahead, heavy, dealt, dead, bread, etc.)
6. Actual pronunciation and sound discrimination abilities probably matter a lot, too

- English has approximately 12 vowels and 6 diphthongs, many more than most languages
- If students cannot distinguish these sounds in speech, they will likely have more problems with the differences in writing, as well
- When focusing on spelling-sound correspondences, help students distinguish the different sounds as maximally as possible
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References


Decoding:

- Arabic
- Chinese
- Japanese
- Korean
- Spanish
- French

Note: This ordering is approximate, based on a number of widely varying studies, and still needs further research.
Word Recognition:

Most difficult

Arabic

Chinese, Japanese

Korean

French, Spanish

Easiest

Note: This ordering is approximate, based on a number of widely varying studies, and still needs further research.
Difficulties with vowels:

Most difficulties: Arabic

Chinese, Japanese

Fewest difficulties: French, Korean, Spanish

Note: This ordering is approximate, based on a number of widely varying studies, and still needs further research.