

# Is phonotactic repair of onset clusters modulated by listener expectations?

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### Background.

- Non-native sound sequences often systematically misheard in ways governed by native phonotactics [1][2][3][4]
  - Process called *phonotactic repair*
  - May be modulated by task-related expectations in addition to language experience [1]
- Not all sounds sequences are made equal... [Davidson]
- Native English & French listeners typically mishear illicit coronal-plus- lateral \*[tɫ-] & \*[dɫ-] syllable onsets as velar-initial [kɫ-] & [gɫ-] [5]
  - Due to spectral similarity [6]
  - In French listeners, shown to be modulated by amount of stimulus signal heard: *less* post-burst information led to greater accuracy [4]
    - *Is syllable structure only projected once the nucleus is reached?*
    - *Or do*
- EEG evidence: listeners form unconscious abstract representations of illegal sequences in early speech processing [7]
  - Unclear if “unrepaired” representations can be active in *conscious* linguistic behavior
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### Hypotheses.

#### Rate of repair

- will be **greatest** at **later gates** (after vowel onset)
- will show a **cline by condition**, from unguided transcription (most repair) to forced choice (least)

### Methods.

#### Materials & Participants

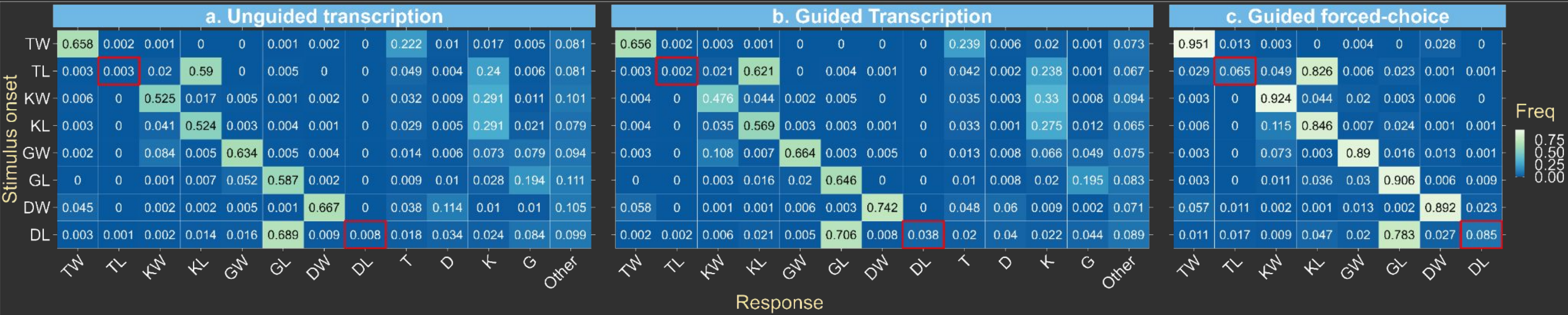
- Native English listeners (N=63), no childhood experience with languages identified as having [tɫ] or [dɫ] onsets
- Stimuli: Syllables (from [7]) beginning with
  - Lateral clusters \*[tɫa], \*[dɫa], [kɫa], [gɫa], and
  - Glide clusters [twa], [dwa], [kwa], [gwa]
  - **Gated** in 20 ms intervals to include between 30-170 ms following release burst

#### Procedure

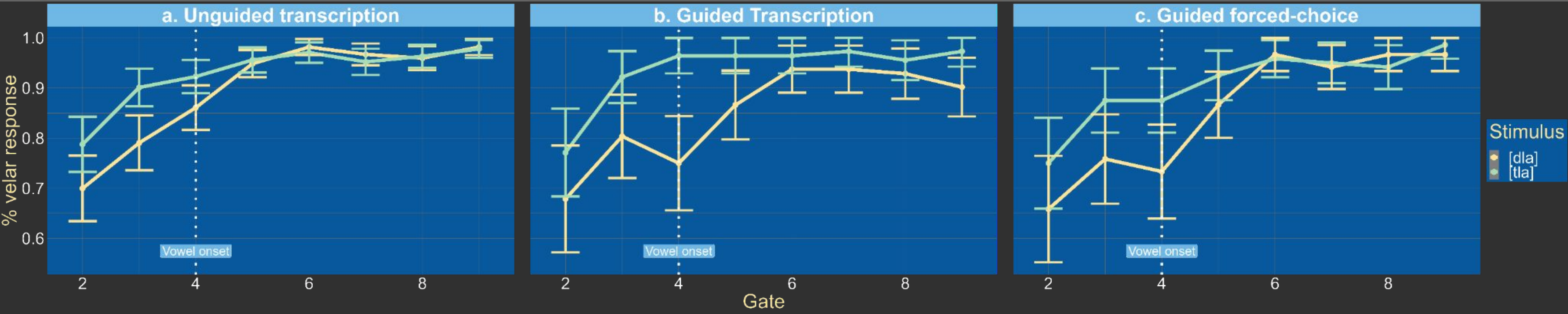
- Online participation with PCIBex [CITE]
- Three task between-subjects conditions:
  - Free transcription
    - Unguided (N=34): Listeners not told that stimuli would included non-native sequences
    - Guided (N=14): Listeners told that stimuli would included non-native sequences
  - Forced-choice button press (N=15)
    - Mouse-click; all 8 possible onsets presented in writing
    - Listeners told they would hear all 8 sequences
- Practice block with gated [pw] & [bw] stimuli
- No feedback in any condition

### Results.

- Very low overall accuracy for illicit coronal \*[tɫ-] & \*[dɫ-] stimuli
  - Nearly all illicit coronal stimuli reported as velar, indicating phonotactic repair
  - Asymmetric confusability: velar rarely reported as coronal
- Accuracy increased somewhat when participants were told they would hear non-English sequences (**P VAL**)
- \*[tɫ-] response accuracy was greatest at earlier gates (**P VAL**)



**Figure 1.** Confusion matrices showing proportion of response onset (x-axis) to each stimulus onset (y-axis), collapsed across all gates, by task condition. Note the diagonal “identity line” for all but the illicit stimuli (outlined in red), which are instead typically misidentified as their velar counterparts. Overall rates of repair were lower in (b) guided transcription & (c) forced choice tasks vs. (a) unguided transcription, & in (b) vs. (c).



**Figure 2.** Rates of repair - i.e., proportion velar-initial responses to illicit \*[tɫ-] & \*[dɫ-] stimuli - by gate & condition. Rates in all conditions were lowest up to the vowel onset ( $\leq 70$  ms). Rates of repair were at floor for licit [tw-] & [dw-] stimuli across all conditions. Y-axis begins at 55%.

### Discussion.

- Additional auditory information or phonological structure may be detrimental to the activation of illicit representations (supports [HALLE])
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### Future Directions.

- In-laboratory replication
- Expansion to other Ls
- On-line processing
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