

# Refining Representations for L2 Phonology

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Main Idea: Segments are widely accepted as the appropriate descriptive units for defining cross-language phonological similarity, yet there is no theoretical consensus on the mechanisms involved in their emergence, or their representation in relation to both smaller and larger entities

## 1. Introduction

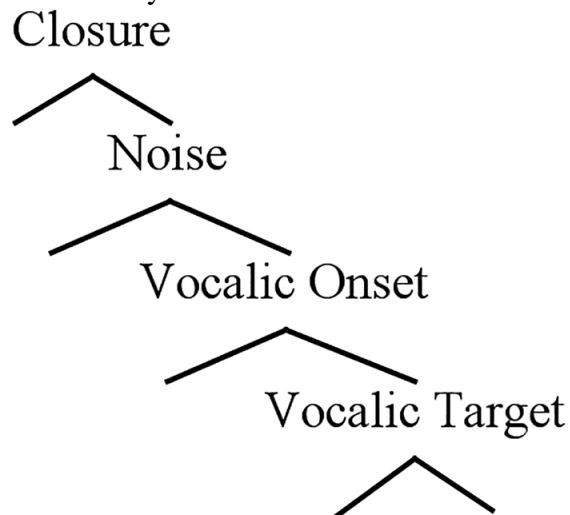
- Majority of studies on second language phonological acquisition focus on segments and segmental contrasts.
  - Effects of cross-language differences in segmental inventories
  - Realization of phonological categories that are presumed to be similar across languages
- Another popular area is Voice Onset Time
  - Studies typically compare VOT of stops in speakers whose L1 and L2 differ in this parameter
- Research into the perception and production of L2 segments has been instrumental in the formation of the more influential theoretical models of L2 speech acquisition
  - Flege's Speech Learning Model
    - Sufficient acoustic distance between an L2 sound and its nearest L1 neighbor is conducive to the formation of a new perceptual category, paving the way to successful acquisition
  - Best's Perceptual Assimilation Model
    - Focus on L2 contrasts, predicting that when an L2 contrast is phonetically similar to an L1 contrast, learners will be successful in its discrimination
  - Escudero's Second Language Perception Model
    - Also focuses on L2 contrasts
    - Offers an enhanced environment in which other factors such as lexical competition and meaning may influence the acquisition of L2 speech
- All of these models focus on difficulties in acquisition of L2 segments and contrasts are predicted on the basis of how similar they are to those found in the L1
- One big question that still remains is, should cross linguistic similarity be defined in terms of phonetics or phonology?

## 2. A New Representational Perspective for L2 Speech

- Schwartz proposes that we use the Onset Prominence Representational model environment to understand the cross-linguistics interaction in the course of L2 acquisition and other language contact situations

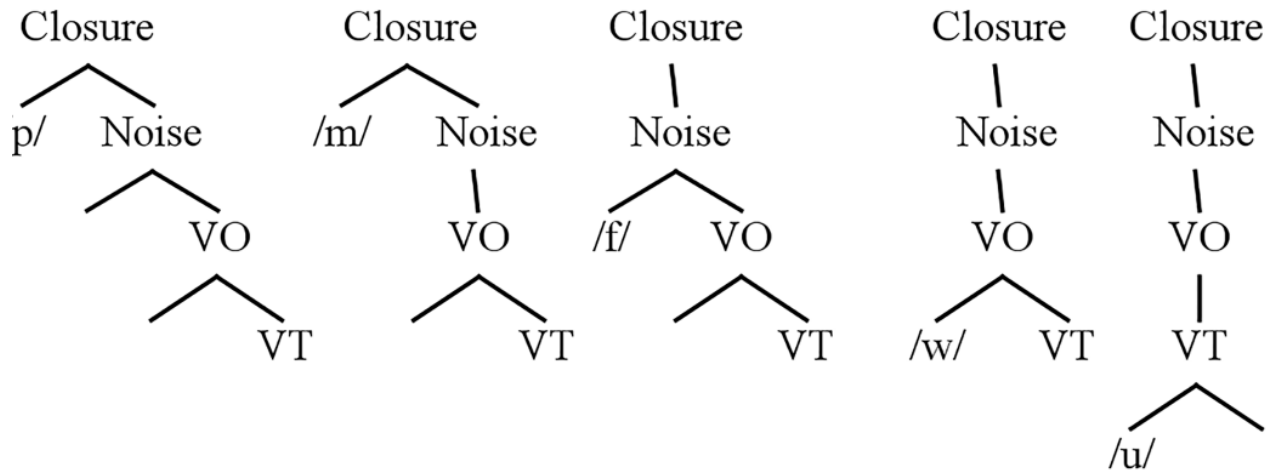
- Onset Prominence representations are built from a hierarchy of phonetic events associated with a stop-vowel sequence.
  - The stop-vowel CV is the most commonly encountered ‘syllable’ type across languages.
  - Each layer of the OP hierarchy is derived from a specific phonetic entity associated with the realization of the stop-vowel sequence, which is treated as a single unit CV.
    - Closure, encodes the closure phase of the stop consonants
    - Noise, encoded the release bursts/aspiration of stops as well as friction in fricatives
    - Vocalic Onset node reflects periodicity and format structure associated with approximate consonants, as well as CV formant transitions
    - Vocalic Target, houses formant frequencies that define vowel quality

(1) The OP hierarchy



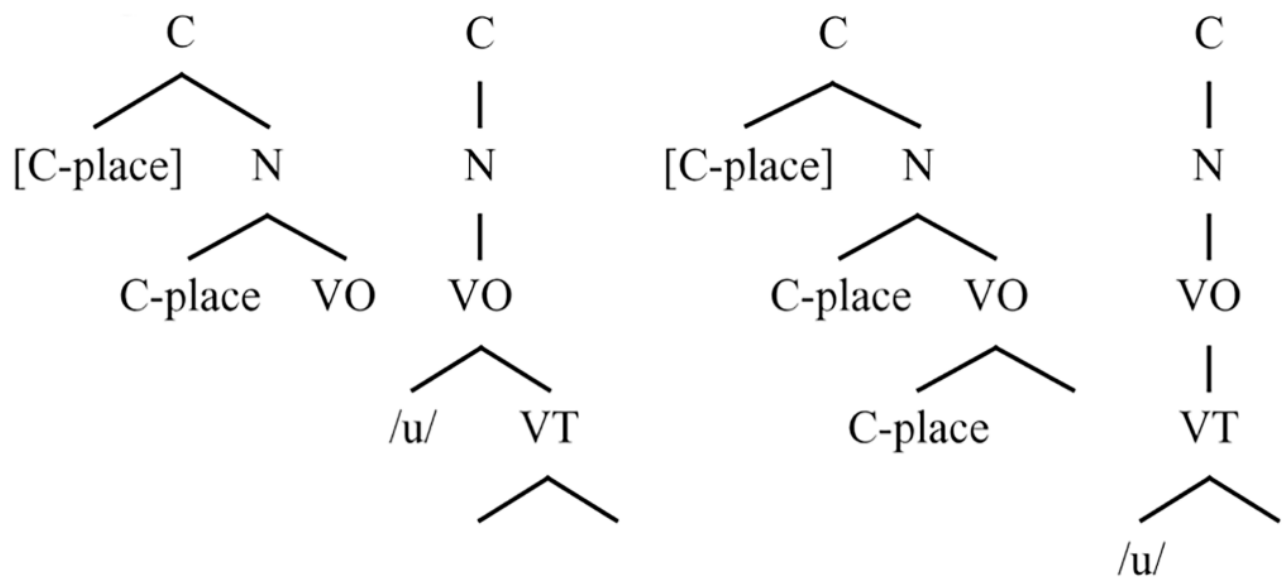
- Hierarchical arrangement of OP representations encodes casual relationships between articulation and acoustics
  - Assuming for example that the place of articulation of a stop is aligned with its Closure node, the hierarchical structure ensures that the acoustic effects of this place specification will also be present in the noise spectrum at closure release (the Noise node) and in CV formant transitions at vowel onset (the VO node).
- In OP, each segment is its own tree structure that includes parts of the basic hierarchy from (1) as seen in (2)

(2) OP manner categories



- Binary nodes correspond to entities that are present in the phonetic realization of a given manner category, while unary nodes indicate that a given phonetic event is absent.
  - Fricatives – the central tree in (2) – lack full closure, so their Closure node is unary. Nasals lack noise bursts, so their Noise node is unary. Approximants have unary Closure and Noise nodes, since they lack both these properties.
- There are two ways in which you can parse the stop-vowel sequence of CV as show in (3)
  - C-place are generic place of articulation for consonants
  - /u/ symbol is shorthand for features specifying vowel quality

(3) Parses of the OP hierarchy according to VO affiliation



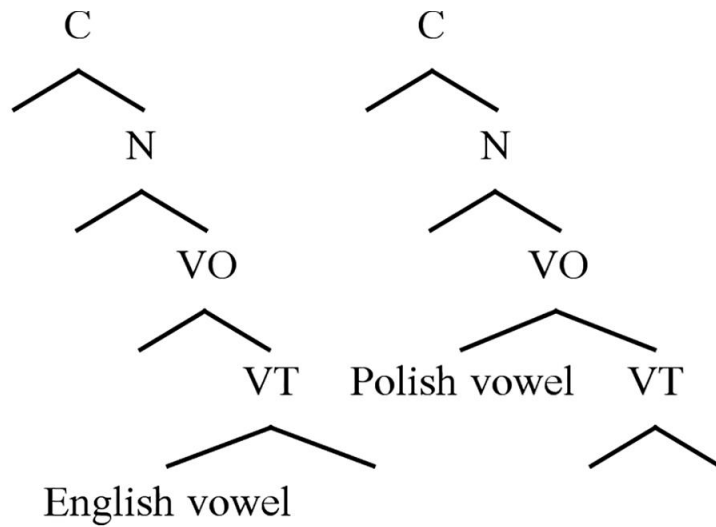
### 3. Word Boundaries in L2 Speech

- Cerbani (2000) studied the speech of L1 Catalan learners of English and observed that they transferred L1 final obstruent devoicing into L2 but did not transfer a regressive voicing assimilation process that takes place across word boundaries.
  - To explain this, he proposed an inter-language prosodic constraint that restricts the application of rules to the level of the phonological word. In other words, they can't cross word boundaries
- Demarcating languages – processes preserve or reinforce word boundaries (or even syllable boundaries)
- Grouping languages – processes weaken segments at word boundaries.
  - In word initial vowels, grouping languages show a tendency to link them with the preceding word
- The grouping demarcating distinction suggests that the prosodic structure of a 'word' is different in different languages.
- Prosodic well-formedness in the OP model is described in terms of a Minimal Constituent Constraint
  - Minimal Constituent (MC): A minimal prosodic constituent must contain a binary VT node and at least one additional binary higher-level node.

### 4. Vowel Dynamics in L2 Speech

- English vowels are classified most successfully on the basis of formant samples from two points in the vowel's duration
- Did a study where naturally produced stimuli were altered by silencing various parts of a vowel's duration.
  - They silenced the quasi-steady-state portion of the vowel and had listeners identify vowels on the basis of CV and VC transitions
  - These tokens were identified more accurately than items containing the central portion of the vowel.
- Just because these CV VC transitions are important to identifying vowels in English does not mean this transfers to other languages
- Looking at Polish and English, Polish speakers seem to base their identification of a vowel on the earlier formants in the vowels, while English speakers delay perceptual decisions.
- (5) shows the proposed temporal anchor points within English and Polish vowels that help listeners identify them

(4) Vowel 'target' alignment in English (left) and Polish (right)



### Final Remarks

- Most research into second language phonology is still centered on traditional phonological models based on segmental transcription.
- L2 research heavily relies on similarity, but needs to be more explicit on defining what is similar to what.