

# Phonological Relationships: Beyond Contrast and Allophony



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## The Big Research Questions:

There are numerous heuristics to establish whether two sounds are contrastive or allophonic: e.g., ability to distinguish lexical items, phonetic similarity, predictability of distribution, etc.

1. What are the goals of distinguishing “contrast” and “allophony” in phonological systems?
2. To what extent do current heuristics allow us to accomplish these goals?
3. Can we change the ways in which we define phonological relationships in order to better achieve these goals, and if so, how?

## Today’s Question:

To what extent does the heuristic of “predictability of distribution” capture the phonological relationship between two segments?

## Traditional Approach--

How “predictability of distribution” relates to contrast and allophony:

N.B.: “Distribution” = the environments in which a segment can appear.

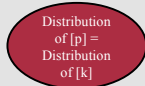
Allophony: Two segments are allophonic iff it is possible to predict which of the two segments will occur in any given phonological context.

Example: [æ]/[ə] in English



Contrast: Two segments are contrastive iff there is at least one phonological context in which it is impossible to predict which of the two segments will occur.

Example: [p]/[k] in English



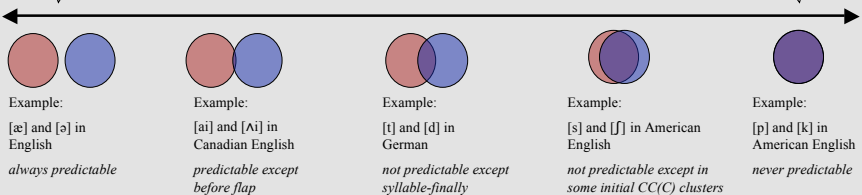
See, e.g., Steriade (2007).

## Problems:

- **Asymmetry of definition**: Allophonic sounds are “always” predictable, whereas contrastive ones are unpredictable in “at least one” instance.
- Asymmetry leads to **missed generalizations**: e.g., if two segments are unpredictable in only one environment, they are labelled “contrastive” even though they are mostly predictable (cf. debate about status of [ai] and [ɛi] in Canadian Raising -- see case study, next column).
- **Perception**: There is evidence that language users are aware of intermediate relationships between contrast and allophony (e.g., Hume & Johnson 2003): pairs of segments whose contrast is neutralized in certain environments are perceptually less distinct than fully contrastive segments and perceptually more distinct than fully allophonic segments. The current dichotomous system cannot capture such intermediate relationships.

## Proposal:

- Define the predictability of distributions in terms of a continuum.
- One end: the distributions of two segments are entirely non-overlapping and it is possible to predict which of the two segments will occur in any context. This is analogous to **allophony**.
- The other end: the distributions of two segments are completely overlapping, and it is impossible to predict which of the two segments will occur in any context. This is analogous to **contrast**.
- In the middle: varying degrees of overlap in distributions; varying ability to predict which of two segments will occur.
- cf. Goldsmith (1995): a “cline” of contrast, defined by how much pressure is applied by the grammar vs. the lexicon.



## A Case Study: Canadian Raising

The debate about the relationship between [ai] and [ɛi]:

Allophonic?	Contrastive?	A Probabilistic Approach:
<ul style="list-style-type: none"> <li>• [ai] and [ɛi] are generally predictably distributed</li> <li>• nonsense-word tasks reveal active generalization</li> <li>• /ai/ → [ɛi] / ____ [-voice] ]<sub>o</sub></li> <li>• see Chambers (1973)</li> </ul>	<ul style="list-style-type: none"> <li>• before flap, [ai] and [ɛi] are not predictable</li> <li>• minimal pairs such as <i>writer</i> vs. <i>riider</i></li> <li>• see Mielke, Armstrong, &amp; Hume (2003)</li> <li>• see Chambers (1973)</li> </ul>	<ul style="list-style-type: none"> <li>• [ai] and [ɛi] occur before approximately 66 following segments</li> <li>• only one (“before flap”) shows unpredictability</li> <li>• hence, [ai] and [ɛi] are 98.5% predictable in terms of distribution</li> </ul>

## Consequences of the Probabilistic Approach:

- descriptively **more precise**: both the “allophonic” and the “contrastive” characteristics are captured
- psychologically **realistic**: there is evidence that language users are sensitive to probabilistic distributions of segments, regardless of categorical labels that phonologists attach to such distributions (e.g., Ernestus 2006)
- gives insight into **diachronic changes**, especially “phonemic splits” (see Janda 1999): instances where two segments are initially predictably distributed but at some later point are fully contrastive
  - Hall (2005): for at least one set of Canadian English speakers, rules of Canadian Raising allophony fail in ~31% of cases (e.g., *like* and *Michael* have [ai]; *nine* and *gigantic* have [ɛi])
  - Why? Having contrast in one environment (before [flap] in words like *writing* / *riding*) opened the door for new generalizations to emerge: e.g., speakers could generalize that [ɛi] is possible before voiced segments . . . and extend that to other words like *gigantic*.
  - Change in progress: prediction is that eventually, [ai] and [ɛi] could become fully contrastive.

## Summary:

- The current definitions of “contrast” and “allophony” are not satisfactory in describing the full range of relationships between two segments based on their distributions.
- Adopting a continuous view of the predictability of distributions is more descriptively precise and allows us to make new predictions about the behavior of phonological relationships.

## Questions for Future Research:

- How should predictability of distribution be quantified? How should environments be counted?
- Are there testable differences between different places along the continuum (e.g. in perception)? Is it really continuous, or are there quantal regions?
- Do we see movement of distributions along the continuum? Does change happen in both directions?

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