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Contrast Shift as a Type of Diachronic Change

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Introduction

We propose that contrast shift, a change in the contrastive organization of a phonemic inventory, is an important type of phonological change.

This insight goes back to Jakobson (1931), but we argue that the true dimensions of contrast shift are revealed when we assume the following hypotheses:

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Introduction

The Contrastivist Hypothesis (Hall 2007)

The phonological component of a language L operates only on those features which are necessary to distinguish the phonemes of L from one another.

The Contrastive Feature Hierarchy (Dresher 2009)

Contrastive features are assigned by language-particular feature hierarchies.

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The contrastive hierarchy

The contrastive feature hierarchy determines contrastive features using a method that was called ‘branching trees’ in the literature of the 1950s and 1960s.

We call it the Successive Division Algorithm (Dresher 1998, 2003, 2009):

Assign contrastive features by successively dividing the inventory until every phoneme has been distinguished.

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How the contrastive hierarchy works

For the hypothetical inventory /i u a/, here are two possible contrastive hierarchies and the feature specifications that they produce:

<p>[back] > [low]</p> <pre> graph TD A["[syllabic]"] --> B["[back]"] A --> C["(non-back)"] B --> D["[low]"] B --> E["(non-low)"] C --> F["/i/"] D --> G["/a/"] E --> H["/u/"] </pre>	<p>[low] > [back]</p> <pre> graph TD A["[syllabic]"] --> B["[low]"] A --> C["(non-low)"] B --> D["/a/"] C --> E["[back]"] C --> F["(non-back)"] E --> G["/u/"] F --> H["/i/"] </pre>
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What does the hierarchy do?

1. The hierarchy constrains phonological activity:
Only contrastive features can be phonologically active.

Which phonemes can trigger backing?

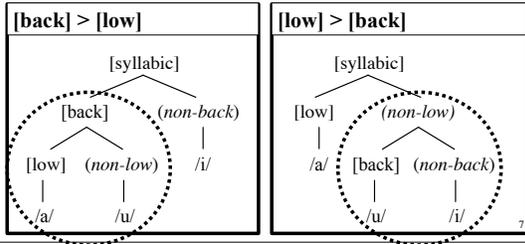
<p>[back] > [low]</p> <pre> graph TD A["[syllabic]"] --> B["[back]"] A --> C["(non-back)"] B --> D["[low]"] B --> E["(non-low)"] C --> F["/i/"] D --> G["/a/"] E --> H["/u/"] </pre>	<p>[low] > [back]</p> <pre> graph TD A["[syllabic]"] --> B["[low]"] A --> C["(non-low)"] B --> D["/a/"] C --> E["[back]"] C --> F["(non-back)"] E --> G["/u/"] F --> H["/i/"] </pre>
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What does the hierarchy do?

2. The hierarchy constrains neutralization and merger:
Mergers affect phonemes that are contrastive sisters.

Which phoneme can /u/ merge with?



Change and the contrastive hierarchy

Since the contrastive hierarchy has an important role in phonological patterning, we propose that a change in the contrastive hierarchy—a contrast shift—can have far-reaching effects on the phonology of a language.

That is, contrast shift itself is an important type of diachronic phonological change.

Further, a contrast shift can only be understood with reference to a particular feature hierarchy.

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Goals of this talk

We will present two case studies of change in vowel systems that illustrate the importance of contrast shift:

1. Algonquian
A shift in the Eastern and Western Algonquian languages from Proto-Algonquian, as represented by the Central Algonquian languages
2. Ob-Ugric
Shifts in the Khanty and Mansi languages as they developed from Proto-Ob-Ugric

Contrast shift will be shown to provide significant new insights into the patterning of sound change.

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CASE STUDY 1

From Proto-Algonquian to the modern Algonquian languages

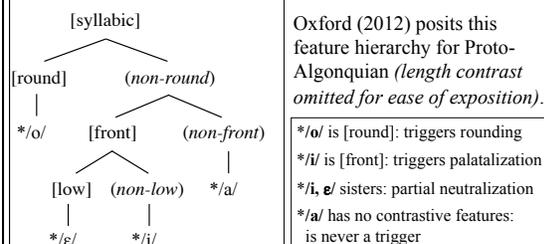
In a survey of the historical development of Algonquian vowel systems, Oxford (2012) identifies persistent patterns in vowel changes.

The patterning of this large set of separate changes can be understood if we posit a single contrast shift.

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Contrastive hierarchy for Proto-Algonquian vowels (Oxford 2012)

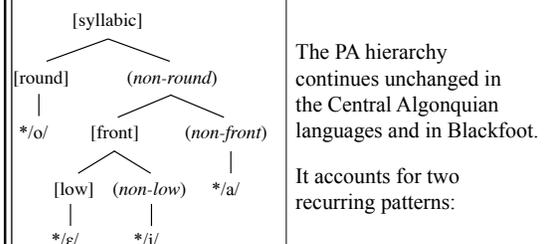
[round] > [front] > [low]



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Contrastive hierarchy for Proto-Algonquian vowels (Oxford 2012)

[round] > [front] > [low]



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**Contrastive hierarchy for
Central Algonquian and Blackfoot**
[round] > [front] > [low]

	<p>1. Palatalization always includes */i/ as a trigger</p> <p>PA */t, θ/-palatalization is triggered by */i, i:/</p> <p>Innu */k/-palatalization is triggered by */i, i:, ε:/</p> <p>Betsiamites Innu /t/-palatalization is triggered by /i:/</p>
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**Contrastive hierarchy for
Central Algonquian and Blackfoot**
[round] > [front] > [low]

	<p>1. Palatalization always includes */i/ as a trigger</p> <p>Blackfoot */k/-assibilant is triggered by PA */i, i:/</p> <p>Blackfoot /t/-assibilant is triggered by Blackfoot /i, i:/</p>
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**Contrastive hierarchy for
Central Algonquian and Blackfoot**
[round] > [front] > [low]

	<p>1. Palatalization always includes */i/ as a trigger</p> <p>These patterns support the view that palatalization is triggered by a contrastive [front] feature (and favours vowels that are [non-low])</p>
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**Contrastive hierarchy for
Central Algonquian and Blackfoot**
[round] > [front] > [low]

	<p>2. */ε/ regularly merges with */i/</p> <p>Partial or complete mergers of short */ε/ > /i/ occur in Fox, Shawnee, Miami-Illinois, Cree-Innu, Ojibwe, and Blackfoot</p> <p>Long */ε:/ > /i:/ in Woods Cree, Northern Plains Cree, and Blackfoot</p>
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**Contrastive hierarchy for
Central Algonquian and Blackfoot**
[round] > [front] > [low]

	<p>2. */ε/ regularly merges with */i/</p> <p>These mergers are consistent with the idea that merger will tend to involve terminal nodes in the feature tree.</p>
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Eastern and Western Algonquian
[round] > [front] > [low]

	<p>On the eastern and western edges of the Algonquian area, developments diverge from the predictions of the PA hierarchy.</p>
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Eastern and Western proto-languages

[round] > [front] > [low]

<p>[syllabic]</p> <pre> graph TD S[syllabic] --> R[round] S --> NR[non-round] R --> RO[*o/] NR --> FR[front] NR --> NFR[non-front] FR --> FL[low] FR --> FNFR[non-low] FL --> FE[*ε/] FNFR --> FI[*i/] NFR --> NA[*a/] </pre>	<p>The high vowels begin to pattern together</p> <p>In the east: Proto-Eastern Algonquian lost the length contrast only in the high vowels (reflexes of <i>*o/</i>, <i>*i/</i>)</p> <p>In the west: Proto-Arapaho-Atsina and Pre-Cheyenne merge <i>*o</i>, <i>o:/</i> with <i>*i</i>, <i>i:/</i></p>
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Eastern and Western proto-languages

[round] > [front] > [low]

<p>[syllabic]</p> <pre> graph TD S[syllabic] --> R[round] S --> NR[non-round] R --> RO[*o/] NR --> FR[front] NR --> NFR[non-front] FR --> FL[low] FR --> FNFR[non-low] FL --> FE[*ε/] FNFR --> FI[*i/] NFR --> NA[*a/] </pre>	<p>The high vowels begin to pattern together</p> <p>But under the hierarchy inherited from PA, the high vowels are not a natural class!</p>
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Eastern and Western proto-languages

[round] > [front] > [high]

<p>[syllabic]</p> <pre> graph TD S[syllabic] --> R[round] S --> NR[non-round] R --> RO[*o/] NR --> FR[front] NR --> NFR[non-front] FR --> FL[low] FR --> FNFR[non-high] FL --> FE[*ε/] FNFR --> FI[*i/] NFR --> NA[*a/] </pre>	<p>If the hierarchy constrains patterning, then the height contrast (reinterpreted as [high]) must have come to outrank place contrasts</p>
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Eastern and Western proto-languages

[high] > [round] > [front]

<p>[syllabic]</p> <pre> graph TD S[syllabic] --> H[high] S --> NH[non-high] H --> RH[round] H --> RND[non-rnd] RH --> RO[*o/] RND --> RI[*i/] NH --> FR[front] NH --> NFR[non-frnt] FR --> FE[*ε/] NFR --> FA[*a/] </pre>	<p>If the hierarchy constrains patterning, then the height contrast (reinterpreted as [high]) must have come to outrank place contrasts</p> <p>That is, the feature [high] moves to the top of the hierarchy.</p>
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Eastern and Western daughter languages

[high] > [round] > [front]

<p>[syllabic]</p> <pre> graph TD S[syllabic] --> H[high] S --> NH[non-high] H --> RH[round] H --> RND[non-rnd] RH --> RO[*o/] RND --> RI[*i/] NH --> FR[front] NH --> NFR[non-frnt] FR --> FE[*ε/] NFR --> FA[*a/] </pre>	<p>Subsequent developments in the eastern and western daughter languages follow the predictions of the new hierarchy.</p> <p>The patterns consistently differ from those of Central Algonquian:</p>
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Eastern and Western daughter languages

[high] > [round] > [front]

<p>[syllabic]</p> <pre> graph TD S[syllabic] --> H[high] S --> NH[non-high] H --> RH[round] H --> RND[non-rnd] RH --> RO[*o/] RND --> RI[*i/] NH --> FR[front] NH --> NFR[non-frnt] FR --> FE[*ε/] NFR --> FA[*a/] </pre>	<p>1. Palatalization is triggered by <i>*ε/</i> but excludes <i>*i/</i></p> <p>Massachusetts <i>*k/-</i>palatalization is triggered by PEA <i>*ε/</i> but not <i>i:/</i></p> <p>Cheyenne “yodation”, where <i>*k/</i> > <i>/kj/</i>, is triggered by <i>*ε(:)</i> only</p>
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Eastern and Western daughter languages

[high] > [round] > [front]

	<p>1. Palatalization is triggered by */ε/ but excludes */i/</p> <p>Again, these patterns support the view that palatalization is triggered by a contrastive [front] feature.</p> <p>Only /ε/ is contrastively [front] in these languages. <small>25</small></p>
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Eastern and Western daughter languages

[high] > [round] > [front]

	<p>2. */ε/ merges with or shifts to */a/</p> <p>Partial or complete mergers of PA short */ε/ with */a/ occur in Abenaki, Mahican, Mi'kmaq, and Maliseet-Passamaquoddy</p> <p>PEA long */ε:/ shifts to /a:/ in Massachusetts and merges with */a/ in Western Abenaki <small>26</small></p>
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Eastern and Western daughter languages

[high] > [round] > [front]

	<p>2. */ε/ merges with or shifts to */a/</p> <p>Long and short */ε(:) shift to /a(:) in Cheyenne</p> <p>Vowel harmony involves */ε(:) and */a(:) in Arapaho <small>27</small></p>
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Eastern and Western daughter languages

[high] > [round] > [front]

	<p>2. */ε/ merges with or shifts to */a/</p> <p>Follows from the sisterhood of */ε/ and */a/ under the new hierarchy. <small>28</small></p>
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A single contrast shift thus accounts for the patterning of a large number of phonological changes across the Algonquian family.

PA and Central languages Eastern and Western languages

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CASE STUDY 2

Contrast shifts in the Ob-Ugric Mansi and Khanty languages

Harvey (2012)

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Contrast shift in Ob-Ugric

- Use the principles of contrast shift to examine the historical sound changes in the Ob-Ugric family of languages
 - Mergers, hierarchical reordering
 - Allophone reanalysis
- Historical sound changes are understood as contrast shifts
- Time-scale: From Proto-Ob-Ugric (~3400 ybp) to the nine modern languages 31

Focus on Proto Mansi (~2400 ybp)

- Complex: 15 reconstructed vowels
 - Vowel harmony governed by [±front]
 - jāṃ-ḡām ‘I will go’ : wēr-ēm ‘I will make’ (SM)
 - Root vowel alternations [+long] > [-long]
 - /ū/ > /ü/ : kūrəm ‘three’ > kūrmt ‘third’
 - /ṛ/ > /ä/ : wṛṣym ‘I see’ > wäj ‘he/she sees’ (WM)
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Contrast shift in Ob-Ugric: Goal

- Find a series of contrast shifts to account for the sound changes leading from Proto Ob-Ugric to the modern languages.
 - Be sure that no contrast shifts upset root vowel alternations or vowel harmony in those languages where it is productive.
 - The features active in harmony and vowel alternation *must remain contrastive*.
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Questions

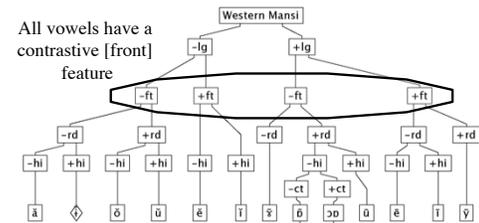
- Is there a pattern to these contrastive changes?
 - Are the contrastive changes describing a “real thing”?
 - Do any patterns match earlier observations about which dialects are conservative or innovative? Which are more similar to each other?
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Early Western Mansi (~600 ybp)

- Snapshot of a sound change:
 - Early Western Mansi > Modern Western Mansi
 - *oṃ > /øœ/ *oṃmp > /øœmp/ ‘dog’
 - *ō > /ō̄/ *ōtar > /ō̄tar/ ‘prince’
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Early Western Mansi hierarchy

[lg] > [ft] > [rd] > [hi] > [ct]



[front] is dropped

[lg] > [rd] > [hi] > [ct] > [ft]

* \bar{o} and * $o\bar{o}$ are not contrastive for [front]
They can have front allophones
The / $o\bar{o}$ / allophone is reanalyzed as / $\emptyset\bar{o}$ /

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Result of [front] dropping in Western Mansi

- Sound Changes
 - * \bar{o} → \bar{o} (fronted * \bar{o})
 - * $o\bar{o}$ → $\emptyset\bar{o}$ (front diphthong)
- Consequences for vowel harmony
 - Harmony is possible up to Early Western Mansi as all vowels have contrastive [front]
 - Prediction: Harmony is lost in Modern Western Mansi as 1/3 of the vowels don't have contrastive [front]. True.

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Early Northern Mansi (~600 ybp)

- Snapshot of a sound change:
 - Early Northern Mansi > Modern Northern Mansi
 - * $\bar{a}\bar{e}$ > / \bar{a} / * $\bar{a}\bar{e}mp$ > / $\bar{a}mp$ / 'dog'
 - * \bar{y} > / \bar{u} / * $\bar{k}\bar{y}r$ > / $\bar{k}\bar{u}r$ / 'oven'

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Early Northern Mansi

[ft] > [hi] > [rd] > [lg]

All vowels have a contrastive [front] feature

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[front] is dropped

[hi] > [rd] > [lg] > [ft]

{* \bar{e} , * \bar{o} , * \bar{i} , * \bar{u} } are not contrastive for [front]

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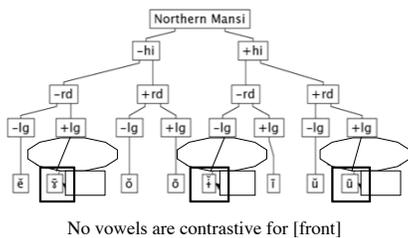
Mergers after [front] is dropped

[hi] > [rd] > [lg] > [ft]

Terminal merger from [+front] towards [-front]

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Mergers complete [hi] > [rd] > [lg]



Result of [front] dropping in Northern Mansi

- Sound changes
 - * æ → / ɤ /, * ɨ → / ʏ /, * y → / ü / (backing)
- Consequences for vowel harmony
 - Prediction: Harmony is lost as no vowels have contrastive [front]. True.
- Consequences for root vowel alternation
 - Prediction: Productive RVA is lost. True.
 - Surface / ü / has two sources, * ü and * y .
 - Only * ü could alternate with / ü / (← * ü)

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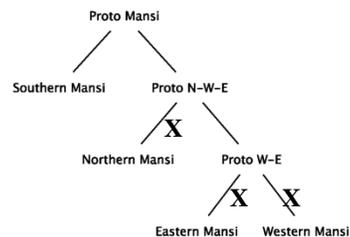
Cross-Mansi results of [front] dropping

- Western Mansi FRONTWARD REANALYSIS
 - * ō → * ō̄
 - * oo → * oō
- Northern Mansi BACKWARD MERGER
 - * æ → ɤ
 - * ɨ → ʏ
 - * y → ü

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Genetic or areal?

[front] dropping did not occur early on in the genetic history of Proto Mansi. The shift occurred later in the daughter languages.



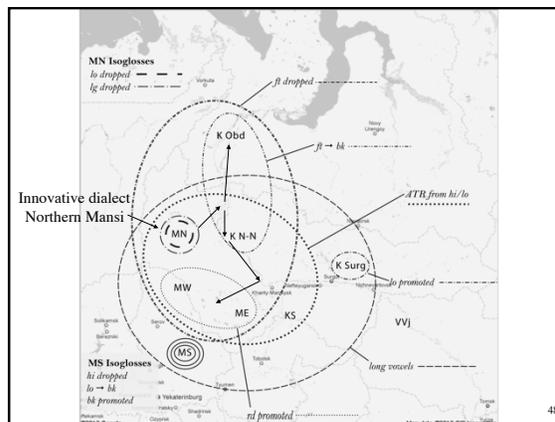
The red X indicates when the [front]-dropping shift occurred.

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The status of contrast shift

- What is contrast shift?
 - Is it something real in the minds of speakers?
 - Is it instead a theoretical method for describing sound change?
- Cross-language patterns?
 - If contrastive shift is “real”, does it show any kind of areal patterning?

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- Is there a pattern to the contrastive changes?
 - Yes. They follow routes of cultural contact.
- Are the contrastive changes describing a “real thing”?
 - Yes. Contrastive Shifts show clear isoglosses and are borrowed between languages.
- Do patterns match earlier observations about which dialects are conservative or innovative?
 - Yes. The contrastive analysis of Ob-Ugric languages confirms earlier dialect studies (Honti 1998, Steinitz 1955)

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Conclusions

As the Algonquian and Ob-Ugric examples show, viewing phonological change in terms of contrast shift accounts for large-scale phonological patterns that are hard to explain any other way.

These developments in turn lend support to language-particular contrastive feature hierarchies as an organizing principle of individual phonological systems.

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THANK YOU!

We are grateful to members of the project on *Markedness and the Contrastive Hierarchy in Phonology* at the University of Toronto (Dresher and Rice 2007):

<http://homes.chass.utoronto.ca/~contrast/>

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