A Contrastive Hierarchy for Vowels in Southern Tati: Takestani Dialect
NACIL 3

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Stony Brook University
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1. Describe vowel alternations in Takestani verbal inflectional morphology.

Dresher (2009) argues that contrastive features are ordered hierarchically. The vowel alternations determine the core system of vowel contrasts in Tati.
Contributions

1. Describe vowel alternations in Takestani verbal inflectional morphology.

2. Answer the questions: How are vowels represented in Takestani? Which features are contrastive?
1. Describe vowel alternations in Takestani verbal inflectional morphology.

2. Answer the questions: How are vowels represented in Takestani? Which features are contrastive?
   - Dresher (2009) argues that contrastive features are ordered hierarchically.
   - The vowel alternations determine the core system of vowel contrasts in Tati.
Southern Tati: Takestani

- Indo-European
- Indo-Iranian
- Categorized as “Definitely Endangered” by UNESCO: The number of children speaking it as their 1st language is dropping quickly.
- SOV word order
- No written form
- Rich verb morphology
Takestan, Iran

- Population of nearly 100,000 people.
- Surrounded by Persian and Azari speakers.
- The city of Takestan is known as “Siyaden” by its residents.
- The Takestani dialect of Tati is known as “Siyadiniji” by local people.
# Vowel Phonemes in Takestani

<table>
<thead>
<tr>
<th>Vowel</th>
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<th>Gloss</th>
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<tr>
<td>i</td>
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<td>/fer/</td>
<td>son</td>
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<td>/pɛj/</td>
<td>back</td>
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<td>ø</td>
<td>/pør/</td>
<td>full</td>
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<td>/par/</td>
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<td>/pur/</td>
<td>powder</td>
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<td>o</td>
<td>/bor/</td>
<td>bring.IMP</td>
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<tr>
<td>ʌ</td>
<td>/bʌr/</td>
<td>load</td>
</tr>
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![Diagram of vowel phonemes](image)
## Vowel Phonemes in Takestani

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![Diagram of vowel phonemes]
Evidence for /e/ being Takestani’s neutral vowel comes from epenthesis in loan words.

▶ *plan* ~ [peˈlaːn]
▶ *stand* ~ [eˈstaːnd]
Evidence for /e/ being Takestani’s neutral vowel comes from epenthesis in loan words.

- plan ~ [peˈlaːn]
- stand ~ [eˈstaːnd]

Having phonemic /ø/ but no high-front rounded vowel is incredibly rare.

- “/ø/ and /œ/ do not occur (separately or together) unless /y/ also occurs...” (Maddieson and Disner, 1984; pp. 13-14)
- 55/2916 (1.9%) of the languages in PHOIBLE have a mid-front rounded vowel but no high-front rounded vowel (Moran and McCloy, 2019).
### Verbal Morphology

<table>
<thead>
<tr>
<th>PV</th>
<th>IPFV</th>
<th>NEG</th>
<th>STEM</th>
<th>CAUS</th>
<th>PSV</th>
<th>PST</th>
<th>AGR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>λ-</td>
<td>me-</td>
<td>ne-</td>
<td>χʌɾ</td>
<td>-den</td>
<td>-i</td>
<td>-ast</td>
<td>-∅</td>
<td>‘It was not being drunk’</td>
</tr>
<tr>
<td>be-</td>
<td></td>
<td></td>
<td>zand</td>
<td></td>
<td></td>
<td></td>
<td>-avij</td>
<td>‘S/he had beaten’</td>
</tr>
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</table>

‘It was not being drunk’
‘S/he had beaten’
The imperfective marker is pronounced as [me], [mi], [mø], [mu].

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<tr>
<td>[me-χen-e]</td>
<td>IPF-read-3SM.IND.ITU</td>
<td>‘He reads’</td>
</tr>
<tr>
<td>[me-zan-e]</td>
<td>IPF-hit-3SM.IND.TR</td>
<td>‘He hits’</td>
</tr>
<tr>
<td>[me-sʌːz-em]</td>
<td>IPF-endure-1S.IND.TR</td>
<td>‘I endure’</td>
</tr>
<tr>
<td>[mi-vin-e]</td>
<td>IPF-see-3SM.IND.ITU</td>
<td>‘He sees’</td>
</tr>
<tr>
<td>[mø-tʰøn-astʰ-em]</td>
<td>IPF-can-PST-1S.IND.TR</td>
<td>‘I could’</td>
</tr>
<tr>
<td>[mu-guz-i]</td>
<td>IPF-flatulate-2S.IND.ITU</td>
<td>‘You flatulate’</td>
</tr>
</tbody>
</table>
The negative marker is pronounced as [ne], [ni], [nø], [no].

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<tr>
<td>[me-ne-χen-e]</td>
<td>IPF-NEG-read-3SM.IND.ITR</td>
<td>‘He reads’</td>
</tr>
<tr>
<td>[me-ne-[kas-om]</td>
<td>IPF-NEG-look-1P.IND.ITR</td>
<td>‘We do not look’</td>
</tr>
<tr>
<td>[me-ne-χard-em]</td>
<td>IPF-NEG-eat-1S.IND.TR</td>
<td>‘I was not eating’</td>
</tr>
<tr>
<td>[mi-ni-nis-e]</td>
<td>IPF-NEG-write-3SM.IND.TR</td>
<td>‘He does not write’</td>
</tr>
<tr>
<td>[mø-nø-zøn-i]</td>
<td>PV-NEG-know-2S.IND.TR</td>
<td>‘You do not know’</td>
</tr>
<tr>
<td>[ʌ-no-χos-e]</td>
<td>PV-NEG-sleep-3SM.IND.ITR</td>
<td>‘He does not sleep’</td>
</tr>
</tbody>
</table>
Alternations

In both morphemes, the forms with [e] appear in the largest variety of contexts.
   Hypothesis: underlying forms are /me/ and /ne/.

Consequently:

/e/ → [i]/ ???(raising)
/e/ → [ø]/ ???(rounding)
/e/ → [o]/ ???(backing)
/e/ → [u]/ ???(backing + raising)
Raising: /e/ → [i] / _ C₀ i

- The raising process is regressive assimilation.
- Stems block the spreading process.

- Compare:
  - [mi-ni-nis-e] IPF-NEG-write-3SM.IND.TR ‘he does not write’
  - [me-ne-χen-i] IPF-NEG-read-2S.IND.TR ‘you do not read’

- More evidence comes from causative alternations:
  - [me-ne-χes-tin-i] IPF-NEG-soak-CAU-2S.IND.TR ‘You do not soak’
  - [me-ne-χes-ten-e] IPF-NEG-soak-CAU-3SM.IND.TR ‘He does not soak’
The backing process is regressive assimilation.

Stems block the spreading process.

Only a limited number of verbs have /o/ stems.

Examples:

[ʌ-no-χos-e]  PV-NEG-sleep-3SM.IND.ITR  ‘he does not sleep’

Contrast:

[me-ker-om]  IPF-plant-1P.IND.TR  ‘We plant’
Rounding: /e/ → [ø] / {ø C₀ _ , _ C₀ ø}

- The rounding process is bi-directional assimilation.
- Local spreading is blocked by non-/e/ vowels

Examples:

- [mø-nø-zøn-i]  IPF-NEG-know-2S.IND.ITR  ‘You do not know’
- [mø-nø-zøn-ø]  IPF-NEG-know-3SM.IND.ITR  ‘He does not know’
- [mø-nø-tʰøn-astʰ-em]  IPF-NEG-can-PST-1S.IND.ITR  ‘I was not able to’
The backing + raising process is bi-directional assimilation.

Raising process blocks backing + raising.

Examples:

- [u-nu-tʃʌr-e] PV-NEG-open-3SM.IND.TR ‘He does not open’
- [ʌ-nu-kun-e] PV-NEG-pound-3SM.IND.TR ‘He does not pound’
- [mu-nu-guz-i] IPF-NEG-flatulate-2S.IND.1TR ‘You do not flatulate’

Blocking:

- [u-ni-tʃin-e] PV-NEG-collect-3SM.IND.TR ‘He does not collect’
- [u-ni-lis-i] PV-NEG-lieck-2S.IND.1TR ‘You do not lick’
A second raising process: /a/ → [ɛ]

- /a/ in stems undergoes raising.
  - /a/ → [ɛ]/__C₀i

- Compare:
  
  [u-nu-var-den-e]  PV-NEG-show-CAU-3SM.IND.TR  ‘He does not show’
  [u-nu-vɛr-din-i]  PV-NEG-show-CAU-2S.IND.TR  ‘You do not show’
A second raising process: /a/ → [ɛ]

- Past tense morpheme also shows alternations.
- Update process to be long distance (blocked by /ʌ/, /o/)
  - /a/ → [ɛ] /__C,V\_0i

- Compare:
  - [ʌ-gɛr-den-ɛst-i] PV-return-CAU-2S.IND.TR ‘you returned’
  - [ʌ-gar-den-ast-em] PV-return-CAU-1S.IND.TR ‘you returned’
  - [b-andʌt-i] PV-hang.PST-2S.IND.TR ‘You hung’
  - [b-aʃon-i] PV-hear-2S.SB.TR ‘(You) to hear’
Summary of Vowel Alternations

\[
\begin{align*}
/e/ &\rightarrow [i] / \_ \ C_0 \ i & \text{(raising 1)} \\
/e/ &\rightarrow [o] / \_ \ C_0 \ o & \text{(backing)} \\
/e/ &\rightarrow [\theta] / \{\theta \ C_0 \_ \ , \ _ \ C_0 \ \varnothing\} & \text{(rounding)} \\
/e/ &\rightarrow [u] / \{uC_0\_ \ , \ _\ C_0 u\} & \text{(backing + raising)} \\
/a/ &\rightarrow [\varepsilon] / \_ \ \{C,V\}_0 \ i & \text{(raising 2)}
\end{align*}
\]
What are the mental representations of vowels?
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Which features are contrastive and therefore minimally required to be present?
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Analyses using the Contrastive Hierarchy (Dresher 2009) tell us which features are redundant and which are not.
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It identifies core aspects of the mental representations.
What are the mental representations of vowels?

Which features are contrastive and therefore minimally required to be present?

Analyses using the Contrastive Hierarchy (Dresher 2009) tell us which features are redundant and which are not.

It identifies core aspects of the mental representations.

Any analysis using fully specified featural representations will have to revolve around the core system regardless.
A contrastive hierarchy for Takestani vowels

[low] > [tense] > [back] > [high] > [round]

[+low]  [-low]

[+tense]  [-tense]

[+back]  [-back]

[+high]  [-high]

[u]  [o]  [i]

[+round]  [-round]

[ø]  [e]
Contrastive features for Takestani vowels

- [front] is not contrastive.
- [high] is only contrastive for [+ tense] vowels.
- [round] is only contrastive for /e/ and /ø/.

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<th>[high]</th>
<th>[low]</th>
<th>[tense]</th>
<th>[round]</th>
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<tbody>
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Feature ordering rationale

- $n$ features $\rightarrow n!$ possible orderings.
- 5 features $\rightarrow 120$ possible orderings.
- Only [+tense] vowels target /e/, and /e/ changes only to [+tense] vowels.
- Should the top-most division based be based on [tense]?
**Must-have features**

- Triggers of assimilation processes must be specified for the feature assimilating and for features necessary for triggering to take place (Dresher, 2009)

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<td>/i/</td>
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Southern Tati Vowels
April 22, 2023 22 / 29
If [tense] was highest

- /a/ would be [-tense].
- [+tense] vowels /i, u, e, ø, o/ could not divide for [low]. So, /i/ would be unspecified for [low].
- Since /i/ triggers /a/ raising /i/ must be specified for [-low].
- Therefore [low] > [tense]
If [round] was ordered above [tense]

- The [+round] vowels /u, o, ø/ would not be specified for [tense].
- They must be specified though for tense because that is necessary to trigger the alternation.
- Therefore we order it next: [low] > [tense] > [back] > [high] > [round]

- [round] is not necessary to distinguish /e, o/ & /i, u/.
Two plausible options..

[low] > [tense] > [high] > [back] > [round]

[+low]  a  [-low]

[+tense]  [-tense]

[+high]  [-high]  [+back]  [-back]

[+back]  [-back]  [u]  [i]  [o]

[+round]  [-round]  [ø]  [ø]  [e]  [e]
Cube visualizes the feature space.

Solid lines indicate alternations.

Dashed lines indicate non-alternating contrasts.
Other observations

1. Tense vs. Lax
   - If we have [lax] instead of tense, then /e/ is specified as [-] for every feature.

2. Privative vs. Binary
   - If the features become privative, then /e/ is the featureless vowel, which corresponds with it being the neutral vowel.
   - Since every rule spreads [+] and not [-], each rule is viable in a privative system.
   - Privativity can also help explain why /e/ is the target of assimilation (cf. Search and Copy, Nevins 2010).
Takestani is an understudied language with a rich system of morpho-phonology in its verbal inflectional system.

There are several vowel alternations and an unusual phonemic system with a /e, ø/ contrast without a /i, y/ contrast.

With the lens of the contrastive hierarchy, the minimally necessary featural contrasts are revealed.
Thank you!

`dast-i dard ne-ijar-e`
`dēs-i dar n-ijar-e`
`hand-2S pain NEG-do-3SM`

- 'No pain to your hand’
- = Thank you!

Questions/comments?
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