Contrast emergence, preservation, and loss:
A case study of Initial Geminates

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Introduction
Pattani Malay
Malayic, Austronesian

\[
\omega \\
\sigma \quad \sigma \\
\wedge \quad \wedge \\
s \quad i \quad k \quad u \\
\text{‘elbow’}
\]
Pattani Malay
Malayic, Austronesian

\[
\begin{align*}
\omega & \quad \omega \\
\sigma & \quad \sigma \\
\hat{\sigma} & \quad \hat{\sigma} \\
\text{'elbow'} & \quad \text{'hand-tool'}
\end{align*}
\]
Salentino
Romance, Indo-European

ω

σ

σ

n a t a

‘born-F.SG.’
Salentino
Romance, Indo-European

\[
\begin{array}{c}
\omega \\
\sigma \quad \sigma \\
\text{n} \quad \text{a} \quad \text{t} \quad \text{a} \\
\text{‘born-F.SG.’}
\end{array}
\quad \quad
\begin{array}{c}
\omega \\
\sigma \quad \sigma \\
	ext{nn} \quad \text{a} \quad \text{t} \quad \text{a} \\
\text{‘year’}
\end{array}
\]
Figure 1: Typological distribution of IGs
We focus on two claims involving IGs.
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1 Moraic Status of IGs (e.g. Topintzi and Davis 2017)
We focus on two claims involving IGs

1. Moraic Status of IGs (e.g. Topintzi and Davis 2017)

2. Phonetic Instability (e.g. Blevins 2004)
Moraic status of IGs is problematic because...

- Onsets effects on weight are probabilistic (e.g. Ryan 2014)
- IGs, however, have categorical effects on weight computation, but only in some languages
- Why are IGs moraic in some languages but non-moraic in others?
- Is this a language-specific property? How do we model it in either moraic (Topintzi, 2008) or gestural terms (Shaw, 2006)?
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Phonetic instability of IGs is problematic because...

- IGs assumed to be rare because prone to Hyper-transphonologization or Hypo-articulation (degemination) (Blevins, 2004)
- There are languages where IGs are "stable" (Bertinetto and Loporcaro, 1999) in both synchronic and diachronic terms
- How are stable and unstable initial geminates different?
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- How are stable and unstable initial geminates different?
Our take on these problems

• Derive synchronic properties of IGs from their diachrony (a la Evolutionary Phonology)
• Acoustic study of two languages that can represent stable and unstable IGs (preliminary)
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Diachrony and the Moraic Status of IGs
One caveat
One caveat

- In 28/44 (64%) languages of our database the moraic status of IGs cannot be determined

Figure 2: Frequency of (non-)moraic IGs in the database
This is because

• Lack of phonological processes sensitive to moraic structure
• Lack of phonetic data
• No consensus on the phonetic correlates of moraic structure (acoustic e.g. Cohn 2003, Gordon et al. 2008, articulatory, e.g. Nam 2007, Tilsen 2016, etc.)
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Moraic status of IGs seems to correlate with language family
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<th>Non-Moraic IGs</th>
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<tbody>
<tr>
<td>Austronesian</td>
<td>Trukese</td>
<td>Leti</td>
</tr>
<tr>
<td></td>
<td>Ponapean</td>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>Piro</td>
<td></td>
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<tr>
<td>Indo-European</td>
<td></td>
<td>Thurgovian Swiss German</td>
</tr>
<tr>
<td>Afro-Asiatic</td>
<td></td>
<td>Tashlhiyt Berber</td>
</tr>
<tr>
<td>Semitic</td>
<td></td>
<td>Arabic (Moroccan, Levantine, Gulf)</td>
</tr>
<tr>
<td>Japonic</td>
<td>Okinawan (Tedumuni, Shuri, Antoh)</td>
<td></td>
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<tr>
<td></td>
<td>Hatoma</td>
<td></td>
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<tr>
<td></td>
<td>Ikema Ryukyuan</td>
<td></td>
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<tr>
<td>Niger-Congo</td>
<td>LuGanda</td>
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2. **Moraic IGs** continue initial moraic elements
Non-moraic IGs (1): reinterpreted voicing contrast

Thurgovian Swiss German IGs continue voiceless stops in loanwords and they are not moraic (Kraehenmann, 2001).

/\pa\=\o/ 'pair' cf. Fr. /\p\Ek/

/\t\u\=\@/ 'layered cake' cf. Fr. /\tu\Kt/

/\k\=\m\fi/ 'confiture' cf. Fr. /\k\=\O\fi/

UR Gloss Pl. Sg. /\h\a\=\s/ 'hare'

/\t\a\=\k/ 'day' /\t\a\=\k/

/w\l\=\t/ 'forest' /\w\l\=\t/

/f\E\t/ 'fat' /f\E\t/
Non-moraic IGs (1): reinterpreted voicing contrast

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/ppaar/ ‘pair’ cf. Fr. [pεʁ]
/tturttə/ ‘layered cake’ cf. Fr. [tuʁt]
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<tr>
<td>/has/</td>
<td>‘hare’</td>
<td>has-e</td>
<td>h(\text{aː})s</td>
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Non-moraic IGs (2): templatic morphology

Tashlhiyt Berber: IGs are the result of templatic morphology and they are not moraic (Ridouane, 2007).

Perfective Imperfective

krz kkrz ‘to plough’

xng xxng ‘to strangle’

zlm zzlm ‘to peel’

tk "ks ‘you took off’

ta.zn "k ‘female gazelle’

tttsx "xan ‘dip (in sauce)’
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Moraic IGs derive from the loss of initial moraic material

Ryukyuan languages (e.g. Antoh Okinawan) have moraic IGs deriving from the diachronic loss of a syllable (Nitta, 2016)

* Standard Jap Antoh Okinawan
  - kura 'store house'
  - huro 'portable stove'
  - saroi 'white'
  - s:oi

There is a ban on *CV word

- kusi 'back'
- mi: 'eye'
- f:a 'child'
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2 Luganda, has moraic IGs resulting from CV(C) prefix deletions (Clements, 1986)

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<td>li-kubo</td>
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<td>‘path’</td>
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<td>li-tabi</td>
<td>ttabi</td>
<td>‘branch’</td>
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<td>ku-gula</td>
<td>kugula or ggula</td>
<td>‘to buy’</td>
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<td>ku-mu-gulila</td>
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• Unaccented words have LH(H)... tonal pattern

mùgó ‘rim of pot’  màtà ‘milk’
mùlímí ‘farmer’  kìmúlí ‘flower’
mùlámúzí ‘judge’  lùpápílá ‘paper’
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• Unaccented words with IGs have H(H)... tonal pattern, L is “absorbed” on the IG
  
  bbégá    ‘back’    *bbègá
  ggúlú    ‘sky’    *ggùlú
  ddágálá    ‘medicine’    *ddàgálá
Trukese’s IGs is also the result of the loss of initial syllable (Davis, 2017)

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</tr>
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<td>nnis</td>
</tr>
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<td>kkɯ-</td>
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| /emosu/           | [emos]  | ‘turban shell’ |
| /maa/             | [maa]   | ‘behavior’    |
| /ttoo/            | [tto]   | ‘clam’        |
Moraic IGs can be reduced to ...
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- Cases where a vowel/syllable has been lost ...
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- Cases where a vowel/syllable has been lost ...
- and no changes happened
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- Forms in the lexicon are learned anyway
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- Forms in the lexicon are learned anyway
- What we need is synchronic evidence of C:\V productively manipulated as H syllables
A possible example of such evidence is a Trukese lullaby.
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- Trukese has a lullaby where each of the 5 lines has a fixed number of trochees (6-5-4-4-5) of shape (H) or (LL)

```
  a)  aa  li  ko  li  ko  saan  tei  roo  
       (H) (L) (L) (L) (L) (H) (H) (H)

  b)  i   se  i   se  iist  taa  roo  
       (L) (L) (L) (L) (H) (H) (H)

  c)  ma  ra  ma  ra  kii  Nei  
       (L) (L) (L) (L) (H) (H)

  d)  ma  ra  ma  ra  kaa  Nei  
       (L) (L) (L) (L) (H) (H)

  e)  mart  tei  nii  yaa  nii  
       (H) (H) (H) (H) (H)
```

Figure 3: Trukese lullaby derived from names (Alexander, Isttaro, Marki, Marka, and Martenia) (Shaw, 2007)
• A CVCV word, e.g. *sipa*, fit into the lullaby yields:

```
sii sii sii sii paa
H H H H H
```

• A CVC word, e.g. *ssim*, fit into the lullaby yields:

```
ssi ssi ssi ssi iim
H H H H H
```

• If this is the scansion, C:V is heavy without further vowel lengthening.

• However, the vowels may be long, but shortened by the following IGs.

• More evidence is necessary to assess phonological knowledge of speakers.
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\end{array}
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\text{ssi} & \text{ssi} & \text{ssi} & \text{ssi} & \text{iim} \\
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H    H    H    ssi  H    H
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- Hume et al. (1997) proposed that IGs in Leti are non-moraic based on secondary stress assignment.

  - *ri.'mc.ta* kind of turtle
  - *ma.'tru.ma* ‘master of the house’
  - *kɔk.'kɔ.i* ‘child’
  - *'rɔ.'ne.nu* ‘they eat turtle’
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Contra Hume et al. (1997), Curtis (2003) points out that secondary stress, and word-minimality, can be reanalyzed in quantity-insensitive terms.
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• However, that moraic IGs may become non-moraic is to be expected

• IGs would simply be losing their affiliation in the lexicon with CV syllable, becoming C or C-clusters

• Their status in the phonology is simply being ’updated’
Putting it all together
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Figure 4: Life cycle of IGs
Take-aways from the phonology

• The moraic status of IGs seem to be a diachronic epiphenomenon more than a synchronic reality
• Diagnostics for moraic IGs only show that they still pattern in the lexicon as if they had not lost a vowel
• In other words we observe pertinacity of the moraic status
• One final note: what happens at the end of the life cycle of IGs?
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Phonetic Instability of IGs (preliminary)
Are IGs really rare and phonetically ‘unstable’?

According to Blevins (2004), IGs are rare due to their phonetic instability.

But is it true that IGs are doomed to disappear?

Are there cases of IGs that are stable synchronically and diachronically?
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Are IGs really rare and phonetically ‘unstable’?

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• But is it true that IGs are doomed to disappear?
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- But is it true that IGs are doomed to disappear?

- Are there cases of IGs that are stable synchronically and diachronically?
Salentino and Pattani Malay are examples of languages with ‘stable’ and ‘unstable’ IGs.

Salentino is a Romance variety with word-initial and word-medial geminates. Salentino’s IGs are ‘stable’ (Bertinetto and Loporcaro 1999) and can be productively created via Raddoppiamento Sintattico.

In contrast, Pattani Malay only has IGs and no active process creating them. Pattani Malay data looks much different from what Abramson (1987) described.
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Figure 5: Durational distribution of singletons and geminates in Salentino and Pattani Malay
What does the overlap of geminates and singletons in Malay tell us?

- Pattani Malay shows more overlap of singletons and geminates than Salentino
- Contra Abramson (1987) IGs are (no) 3x the singletons in Pattani Malay
- The durational differences is not as large (30 msec).
- This may suggest that closure duration differences are being reduced (and other cues are coming into play Abramson 1986; 1992)
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Salentino seems to have stable durational distinction of IGs and singletons.

In Salentino IGs and singletons overlap less than the case in Pattani Malay (80ms).

This suggests synchronic ‘stability’ of IGs in Salentino.

Salentino IGs go back a long way (early Romance times) and are still synchronically cued in terms of closure duration.

Similar example of diachronically ‘stable’ IGs can be found in Tashlhiyt Berber, for which IGs can be reconstructed for the proto-language.
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Morpho-phonology as a stabilizing agent of phonological systems

A shared feature of Salentino and Tashlhiyt Berber is that the IGs can be derived productively through phono-morphological processes. These could be one (among many reasons) why a poorly cued phonetic contrast remains stable.
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Sound change goes beyond phonetics

• Sound change cannot be expected to follow from simplistic expectations on perception, for two reasons:
  • Phonetic implementation is more multidimensional than phonological representation.
  • Stability in the phonological system depends not only on phonetics, but also phonological process, phonotactics, morphology, etc.

• Synchrony and diachrony, i.e. lexical distributions, are both necessary for a more nuanced understanding of IGs and linguistic knowledge at large.
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References


References IV


Bonus slides
Luganda: Unaccented words have an unmarked H tone which spreads leftward, but leaves the initial syllable as a ‘buffer’

Figure 6: Tonal spreading in unaccented words in Luganda (Muller, 2001)
Ponapean has a reduplication process that relies on the moraic structure of the stem

- Monomoraic stems: $\mu\mu$ - L

  - pa  ‘weave’   ppa-pa
  - dod ‘frequent’ don-dod
  - tep ‘begin’   tepi-tep
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  - duup ‘dive’ du-duup
  - pei ‘fight’ pe-pei
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- **Bimoraic stems:** $\mu$ - H
  - duup ‘dive’ du-duup
  - pei ‘fight’ pe-pei

- **Stems with two monomoraic syllables:** $\mu \mu$ - LL
  - dune ‘attach in a sequence’ dun-dune
  - siped ‘shake out’ sipi-siped
• Stems with IGs pattern with stems with two monomoraic syllables

\[
\begin{align*}
\text{mm\text{med}} & \quad \text{‘full’} & \quad \text{mm\text{mi-}mm\text{med}} \\
\text{η\text{j}j\text{ar}} & \quad \text{‘to see’} & \quad \text{η\text{j}ji-η\text{j}j\text{ar}} \\
\text{mm\text{w}u\text{us}} & \quad \text{‘frequent’} & \quad \text{mm\text{w}u-mm\text{w}u\text{us}}
\end{align*}
\]

\[
\begin{align*}
\mu & \mu \\
\mu & \mu \\
\mu & \mu & \mu & \mu \\
\text{med} & \text{med} & \text{i} - \text{med}
\end{align*}
\]

**Figure 7**: Moraic representation of words with an IG (Kennedy, 2003)
• Stems with IGs pattern with stems with two monomoraic syllables

\[ \text{mmed} \quad \text{‘full’} \quad \text{mmi-mmed} \]
\[ \text{ŋŋar} \quad \text{‘to see’} \quad \text{ŋŋi-ŋŋar} \]
\[ \text{mm}^w\text{us} \quad \text{‘frequent’} \quad \text{mm}^w\text{u-mm}^w\text{us} \]

\[ \mu \mu \]
\[ \mu \mu \]
\[ \mu \mu \mu \mu \]
\[ \text{mmmed} \quad \text{mmi-mmed} \quad \text{mm}^w\text{u-mm}^w\text{us} \]

Figure 7: Moraic representation of words with an IG (Kennedy, 2003)

• Diachronically, IGs in Ponapean also derived from the loss of a syllable. This can explain why they are patterned with disyllabic stems.
5 Pattani Malay is claimed to display stress shift (from final) to initial syllables whose onset is geminate.

- This is not correct, stress remains final.
- No difference in duration, F0, or intensity in final in CV.CV vs CCV.CV disyllabic forms (Pittayaporn et al. *in prep*)
Figure 8: Durational distribution of vowel following geminates and singletons in Salentino and Pattani Malay