Intensification via gemination: Support for indirect infixation

Alex Chabot, Anna Grabovac, Malhaar Shah

University of Maryland, College Park

Linguistic Society of America Annual Meeting

Philadelphia, Pennsylvania

January 9-12, 2025

UNIVERSITY OF
MARYLAND

Overview

- Gujarati (Indo-Aryan) exhibits an interesting interaction between morphology and phonology
- A morpheme of "intensification" is realized as an apparent infix
- This morpheme seems to have no segmental content, instead it causes an underlying singleton to be realized as a geminate
- The interaction between morphology and phonology in this infix can help us understand the interface between the two modules of the grammar

Goals

- Draw attention to this phenomenon and establish structure for cross-linguistic study
- Demonstrate that this infix is consistent with a certain order of operations at the morphosyntax-phonology interface (Kalin 2022)
    - Syntax manipulates syntactic atoms which are spelled out as abstract phonological structure–not as phonetic content
    - Morphemes free of segmental content are subject to phonological restrictions

In this talk...

- Present the empirical situation
- Provide a morphosyntactic analysis of the infix
- Provide an account of the phonological representation
- Discuss some implications for morpho-phonological interactions

The empirical situation

Infixal gemination in Gujarati functions as a mechanism for the intensification of adjectives and adverbs (Mistry 1997: 664):
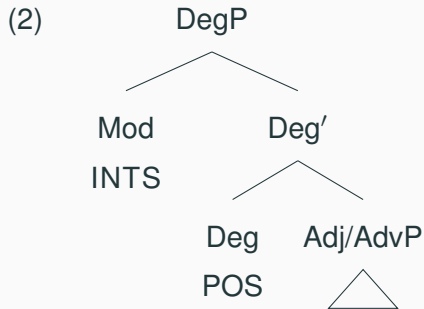
(1) kʰaʈũ   'sour'   kʰaʈʈũ   'very sour'
     saʧũ   'true'   saʧʧũ   'completely true'
     nəʋũ   'new'   nəʋʋũ   'quite new'
     pɑkũ   'ripe'   pɑkkũ   'extremely ripe'
     sɑme   'in front'   sɑmme   'just in front'

This is an understudied phenomenon in the literature, which we seek to elucidate.

The empirical situation

- **Distribution**: this infix is only possible with adjectives and adverbs
- **Semantics**: it serves as a kind of intensifier of qualities
- **Phonological restrictions**: infixal gemination is not possible in some phonological contexts, in which case a periphrastic phrase must be used instead

Analysis: Morphosyntactic representation

Morphosyntactic analysis

(2)

```
            DegP
           /    \
        Mod      Deg′
        INTS    /    \
              Deg    Adj/AdvP
              POS      △
```

(Abney 1987; Kennedy 1999; Kennedy & McNally 2005)

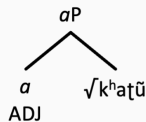**Order of operations**: linear concatenation < exponent choice < infixation < morphophonology (Kalin 2022: 39)

(3) Cycle 1

    a. Linear concatenation: —

    b. Exponent choice: $\sqrt{}$sour $\rightarrow k^{h}a\underline{t}\tilde{u}$

    c. Exponent insertion: —

    d. Morphophonology: —
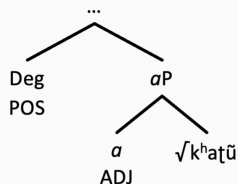
Analysis: Cyclic infixation

(4) Cycle 2

    a. Linear concatenation: ADJ-kʰaʈũ

    b. Exponent choice: ADJ- $\rightarrow \varnothing$

    c. Exponent insertion: $\varnothing$-kʰaʈũ

    d. Morphophonology: —

```
        aP
       /  \
      /    \
     a     √kʰaʈũ
    ADJ
```

(5) Cycle 3

    a. Linear concatenation: POS-$\varnothing$-kʰaʈũ

    b. Exponent choice: POS $\rightarrow \varnothing$

    c. Exponent insertion: $\varnothing$-$\varnothing$-kʰaʈũ

    d. Morphophonology: —

Analysis: Cyclic infixation

(6) Cycle 4

    a. Linear concatenation:
INTS-∅-∅-kʰaʈũ

    b. Exponent choice: INTS → X

    c. Exponent insertion:
∅-∅-kʰa<X>ʈũ
X's pivot is the stressed syllable (Kalin & Rolle 2024)

    d. Morphophonology:
∅-∅-kʰa-<ʈ>ʈu

    e. Surface realization: [kʰaʈʈũ]

```
            DegP
          /      \
       Mod        Deg'
       INTS      /    \
              Deg      aP
              POS     /   \
                     a    √kʰaʈũ
                    ADJ
```

Analysis: Phonological representation
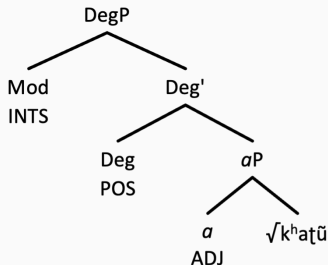
Analysis: Phonological representation

Claims:

- The vocabulary item is realized as an empty timing position: X
- Segmental material comes from the UR of the lexical root
- Phonology spreads segmental material into the empty timing position
- The surface form is realized with a geminate

Morpho-phonological interactions

Infixal gemination always targets the first word-internal obstruent, independently of morpheme boundaries:

(7) a. fət-fət 'rapidly'
        fə**tt**-fət 'extremely rapidly'

                                   (gemination morpheme-finally)

    b. nɑ-kɑːm-u (NEG-work-NEUT) 'useless'
        nɑ-**kk**ɑːm-u 'extremely useless'

                                   (gemination morpheme-initially)

Morpho-phonological interactions

The pivot is a stressed syllable, falling within Yu's (2007) typology

- Edge pivots: first consonant, first vowel, final syllable, final vowel
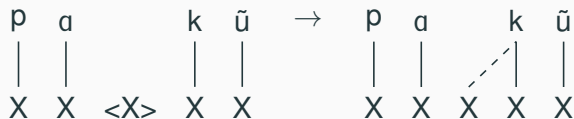- Prominence pivots: **stressed syllable**, stressed foot, stressed vowel

Morpho-phonological interactions

- Phonetically, stress is barely perceptible in Gujarati (Campbell 1995: 209)
- Gujarati has vowel reduction, but the first syllable hosts the entire inventory of vocalic contrasts (see Vyas 1978: 33)
- We interpret non-reduction as a phonological correlate of stress
- Thus, the infix "pivots" at the stressed syllable (Yu 2007)

Surface gemination is the product of a phonological process which spreads underlying segmental material into the empty timing position provided by the morphological exponent:

(8)   /pɑkũ/ → [pɑkkũ]

$$
\begin{array}{cccccc}
\text{p} & \text{ɑ} & & \text{k} & \text{ũ} & \rightarrow \\
| & | & & | & | & \\
\text{X} & \text{X} & \text{<X>} & \text{X} & \text{X} &
\end{array}
\qquad
\begin{array}{ccccc}
\text{p} & \text{ɑ} & & \text{k} & \text{ũ} \\
| & | & & | & | \\
\text{X} & \text{X} & \text{X} & \text{X} & \text{X}
\end{array}
$$

Blocking contexts

Phonologically-conditioned blocking of gemination

Infixal gemination is impossible in certain phonological contexts:

(9) a. When the pivot position follows a nasal vowel:

[ʋãː.ku] 'crooked'

b. When the pivot position follows a murmured vowel:
[pe̤ː.lu] 'first'

c. When the pivot position is a voiced aspirate: [ɑ.gʱrə]
'difficult'

Phonologically-conditioned blocking of gemination

In these cases, a periphrastic is used:

(10)   a.   ʋidʰʋɑn 'learned'

        b.   ∗ʋidʰːʋɑn 'very learned'

        c.   bəuʰ ʋidʰʋɑn 'very learned'

Phonologically-conditioned blocking of gemination

Closed syllables alone do not block gemination:

(11)   a.   [hoʃ.jɑːr] 'clever'
              [potʃ.kũ] 'soft'

        b.   [hoʃʃ.jɑːr] 'very clever'
              [pottʃ.kũ] 'very soft'

What is the natural class of blocking contexts?

The length of the vocalic nucleus is key:

Possible pivot syllables	Impossible pivot syllables
Short nucleus	Long nucleus
open syllable: V.C	nasal-vowel nucleus: Ṽː.**C**
closed syllable: VC.C	murmured-vowel nucleus: V̤ː.**C**
	followed by voiced aspirated stop: V.**Dʱ**

Blocking contexts revisited

Analytical claims:

1. Nasal vowels [Ṽː] are underlying vowel and nasal consonant sequences, /VN/: or *two timing positions*

2. Murmured vowels [V̤ː] are underlying sequences of /V/ and a "murmur feature" which floats, or *two timing positions*

3. Voiced aspirated stops [V.Dʱ] are underlyingly murmured vowels interacting with voice and stops on the surface /V̤ː.D/, or *two timing positions*

Unified context: A vocalic nucleus linked to two timing positions prevents infixation of <X> (cf. Italian *faato*, *fatto*, but **faatto*, see Chierchia 1986 and Larsen 1998)

Conclusion and outlook

- Intensification via gemination can be analyzed with a cyclic account of indirect infixation (Kalin 2022)
- The infix is realized as an empty timing slot which is manipulated in phonology
- A larger question concerns the interaction between infixation and other processes

- The distribution of INTS is limited in some contexts
- In addition to phonologically-conditioned blocking, it is not available with comparatives and superlatives

(12) a. ʋədʱɑr-e sɑr-u
increase-AGR good-AGR
'better'

b. səu-tʰi sɑr-u
all-than good-AGR
'best'

DegP
- Mod / Deg′
- INTS
- Deg / Adj/AdvP
- POS
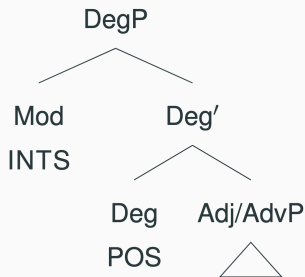
- Selection offers a possible explanation of this restriction

Infixal gemination is not limited to Gujarati

- Choctaw: intensification via gemination is available with verbs (Ulrich 1994)
- Arabic: the causative is marked by an infixed geminate (Benmamoun 1991)
- Tashlhiyt Berber: infixal gemination forms the imperfective (Dell & Elmedlaoui 2013)

The distribution of infixal gemination can further inform the underlying representation of infixes and order of operations at the interfaces

Thank you!

Selected references

Abney, Steven. 1987. *The english noun phrase in its sentential aspect*: MIT dissertation.

Benmamoun, Elabbas. 1991. Causatives in Moroccan Arabic. In Bernard Comrie & Mushira Eid (eds.), *Perspectives on Arabic linguistics: Papers from the Annual Symposium on Arabic Linguistics volume III*, 173–193. Amsterdam & Philadelphia: John Benjamins.

Campbell, George L. 1995. *Concise compendium of the World's languages*. London & New York: Routledge.

Chierchia, Gennaro. 1986. Length, syllabification, and the phonological cycle in Italian. *Journal of Italian Linguistics* 8. 5–34.

Dell, François & Mohamed Elmedlaoui. 2013. Syllables and gemination in imperfective stems in Tashlhiyt Berber. *Brill's Annual of Afroasiatic Languages and Linguistics* 5. 1–29.

Kalin, Laura. 2022. Infixes really are (underlyingly) prefixes/suffixes: Evidence from allomorphy on the fine timing of infixation. *Language* 98(4). 641–682.

Kalin, Laura & Nicholas Rolle. 2024. Deconstructing subcategorization: Conditions on insertion vs. conditions on position. *Linguistic Inquiry* 55. 197–218.

Kennedy, Christopher. 1999. *Projecting the adjective: The syntax and semantics of gradability and comparison*. New York: Garland.

Kennedy, Christopher & Louise McNally. 2005. Scale structure, degree modification, and the semantics of gradable predicates. *Language* 81. 345–381.

Larsen, Bergeton Uffe. 1998. Vowel length, *raddoppiamento sintattico* and the selection of the definite article in Italian. In Patrick Sauzet (ed.), *Langues et grammaire II-III, phonologie*, 87–102. Paris: Université Paris 8.

Mistry, P.J. 1997. Gujarati phonology. In Alan S. Kaye (ed.), *Phonologies of Asia and Africa*, 653–673. Winona Lake, Indiana: Eisenbrauns.

Ulrich, Charles H. 1994. A unified account of Choctaw intensives. *Phonology* 11. 325–339.

Vyas, Monaorama. 1978. *Phonation types in Gujarati*. University of London MA thesis.

Yu, Alan C. 2007. *A natural history of infixation*. Oxford: Oxford University Press.

Appendices

Appendix 1: how does aspiration+voice = long syllable?

The argument is distributional:

- Aspiration and murmur do not co-occur in the same syllable (Vyas 1978: 98)
- Voiced aspirates and murmured vowels alternate, i.e. [vagʰ] and [va̤ːg] 'tiger'
- murmured vowels are always long
- murmur and nasal do not co-occur in the same vowel (some rare exceptions to this)

Claim: final voiced aspirates are not just aspirate stops, they are complexes of murmur and occlusion where murmur is a feature which occupies two timing positions and it is associated to the consonant

Appendix 2: phonological representation

This is just one more kind of phonological exponent of a morphosyntactic vocabulary item post vocabulary-insertion:

- Segmental material: Italian PL ⇔ /i/
- Floating tones: Gã PERFECTIVE ⇔ L tone (Paster 2003), (Uspanteko: Bennett & Henderson 2013)
- Timing positions: Gujarati, Choctaw (Ulrich 1994), Jingpho (Maddieson 1978), Moroccan Arabic (Benmamoun 1991), Tashlhyit (Dell and Elmedlaoui 2013)

Vocabulary items can be realized as any sort of phonological vocabulary, segmental material is not privileged for morphosyntactic exponence.

Appendix 3: Semantic generalizations

- There is a semantic generalization about where GEM can go: **it attaches to adjectives whose scales have no maxima**.
- Whether a scale has a maximum can be diagnosed with *sao* 'totally'. It is not quite perfect, but overwhelmingly, *sao* and GEM are in complementary distribution.
- Words like *adu* 'crooked' cannot be geminated.

Appendix 3: Semantic generalizations

Phonological restrictions are required.

(13) a. *motu* 'big', can be geminated

    b. *naanu* 'small', cannot be geminated (as predicted)

Cross-polar anomaly shows these are on one scale (Kennedy 1999):

(14) a. darvaj-o jetl-o lamb-o chh-e, e-na karta table pod-u chhe
       door-M as-M tall-M be-3, that-GEN than table wide-N be-3
       'The door is taller than the table is wide.'

    b. #darvaj-o jetl-o mot-o chh-e, e-na karta table nan-u chhe
       door-M as-M big-M be.-3, that-GEN than table small-N be-3
       #'The door is bigger than the table is small.'

Despite being on the same scale, only one of the adjectives – the one with the right phonological form – can be geminated.