Class drop in Isu: A case for cyclic morphology

Leonel Fongang[1], Mariia Privizentseva[2]
([1]Universität Leipzig, [2]Universität Potsdam)

1 Introduction

- This talk is on the nominal classes and noun phrase in Isu, a Grassfields Bantu, Ring group language. The data come from the previous descriptions of the language (mostly Kießling 2010, 2018) as well as from elicitation with native speakers.

- First, we will focus on the system of nominal classes and non-trivial class correspondences between singular and plural.

- Second, we will introduce class drop and show that CV- class markers are deleted in the context of certain modifiers.

- We show that both phenomena are derived if

  - Classes are not represented as primitives, but are **decomposed into binary features** (cf. Wiese 2004, Wunderlich 2004, Müller 2004, Alexiadou & Müller 2008).

  - **Morphology is cyclic**: There are rule orderings, but no modules (pace Halle & Marantz 1993, Arregi & Nevins 2012, Hewett 2023).

  - Morphology processes the structure supplied from syntax from bottom to top (cf. Bobaljik 2000, Myler 2017, Kalin & Weisser 2022), so that Impoverishment may counterfeed Vocabulary Insertion.
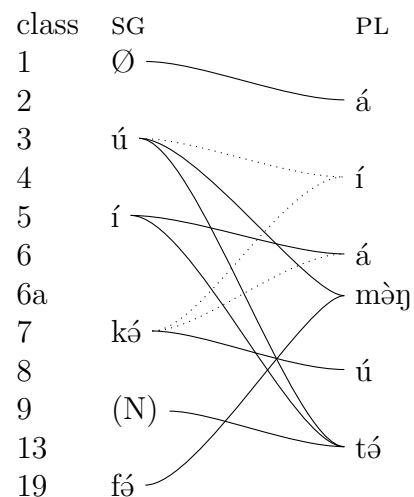
2 Class system in Isu

2.1 Data

- The description follows the standard Bantu system of numbering (see Maho 1999 for an overview)

(1) Isu nominal prefixes
(adopted from Kießling 2010:153)

Class	Nominal prefix
1	*ø-wá(n)* 'child'
2	*á-wá* 'children'
3	*ú-sʊ́m* 'farm'
4	*í-sʊ́m* 'farms'
5	*í-lɔ́m* 'yam'
6	*á-lɔ́m* 'yams'
7	*kɘ́-fú* 'rat'
8	*ú-fú* 'rats'
9	*ø-bvʊ́* 'dog'
13	*tɘ́-bvʊ́* 'dogs'
19	*fɘ́-ŋwɘ̀ꜜní* 'bird'
	fɘ́-kâʔ 'tree'
6a	*mɘ̀-ŋwɘ̀ní* 'birds'
6b	*ɲ̀-kàʔ* 'trees'

(2) SG/PL correspondences
(adopted from Kießling 2018)

- Some correspondences are robust:
  - 1/2: person, wife, co-wife, husband, child, infant, friend, father, chief
  - 3/6a: neck, belly/abdomen, fire/gun, medicine, bed, bridge, boundary [...]
  - 3/13: hill, mountain, quarter, plot of ground [some trees] [...]
  - 5/6: bean, pumpkin, breast, eye, tooth, mouth, knee, spear, egg, stone, name, matter, palm tree, maize plant, cola nut, crab (globular seeds / fruits) [...]
  - 5/13: feather, wing, root, leaf, axe, charcoal, locust, he-goat, fish, plain (non-globular parts of plants) [...]
  - 7/8: head, bone, ear, tongue, jaw, pan, rat, ram, cocoyam, hoe, rope, cap, compound, slave, witch/wizard/witchcraft (< owl), place, forest, (some trees) (augmentative) [...]
  - 9/13: animal/meat, buffalo, cow, goat, sheep; skin; pot, wind, ground (< loanwords) [...]
  - 19/6a: tree/wood, mat, knife, bird, banana, belt, cutlass [...] [+DIM]
  - 6a: water, oil, raffia palm wine, (pus), spittle, corn beer [...]
- Others are rather marginal
  - 3/4: leg, arm, tail, buttock, body, farm, mortar, bamboo
  - 7/4: thigh
  - 7/6: hand, foot
  - 3=8: money, ashes, marrow/fat, laziness
  - 5: rust, clay, death
  - 13: blood, soot, honey
- There is a complication with classes 6a, 6b, 6ab:

(3)   a.   ŋ̀-ɣàm (6b) 'mats, wickerwork, frames' < sg fə́-ɣâm (19)
       b.   m-nîə (6a) 'bellies, wombs, pregnancies' <sg ú-nîə (3)
       c.   mə̀m-vʌ́lə̀ (6ab) 'fires; guns' < sg ú-vʌ́lə́ (3)

(4)   ŋ̀-kwɔ̀ʔ (6b) 'bridges' < sg ú-kwɔ́ʔ (3): DIM mə̀-ŋ-kwɔ́ʔ (6ab) 'little bridges'

- For now, we will focus on robust SG-PL correspondences and assume that $m\grave{\partial}$ is the diminutive marker and attaches on top of class 6b.

To sum up:
- Isu has a system of nominal classes that are vaguely related, but not directly deducible from the meaning of the noun.
- SG - PL correspondences are not straightforward:
  - Nouns of one class in singular can belong to different classes in plural.
  - Nouns of one class in plural can belong to different classes in singular.

2.2 Analysis

Proposal:
- There is always a one-to-one correspondence between class in SG and PL, but some classes have the same exponent and this creates an illusion of one-to-many relation.
- Classes are not primitive features, but are formed by a combination of binary, purely formal features. This allows to capture syncretisms between them (cf. Wiese 2004, Wunderlich 2004, Müller 2004, Alexiadou & Müller 2008).

2

(5) Isu classes – new system (numbering of classes deviates from standard Bantu)

class	I	II	III	IV	V	VI	VII	VIII
SG	Ø (1)	u (3)	u (3)	i (5)	i	kə (7)	N (9)	fə (19)
PL	a (2)	ŋ (6a)	tə (13)	a (6)	tə (13)	u (8)	tə (13)	ŋ (6a)

(6) Isu class specifications

	VIII $[-\gamma, -\alpha, -\beta]$	II $[-\gamma, +\alpha, -\beta]$	VI $[-\gamma, -\alpha, +\beta]$	III $[+\gamma, +\alpha, -\beta]$	VII $[+\gamma, -\alpha, -\beta]$	V $[+\gamma, -\alpha, +\beta]$	IV $[+\gamma, +\alpha, +\beta]$	I $[-\gamma, +\alpha, +\beta]$
SG	fə	u	kə	u	N	i	i	Ø
PL	ŋ	ŋ	u	tə	tə	tə	a	a

- The classes are composed from three binary features: $[\pm\alpha]$, $[\pm\beta]$, $[\pm\gamma]$. This gives exactly 12 classes.
- We assume that class features are positioned on n (cf. Kramer 2015, Fuchs & van der Wal 2022).
- Number information comes from the Num head, but appears on n via agreement.

(7) Subset Principle (based on Halle 1997)

a. Compatibility condition: For a vocabulary item with feature set F_1 inserted in a terminal with feature set F_2, $F_1 \subseteq F_2$.

b. Specificity condition: There is no vocabulary item with feature set F_3 so that (i) $F_1 \subset F_3 \subseteq F_2$ or (ii) F_1 has the same number of features as F_3, but features of F_3 are more specific.

- Features are organized in a hierarchy (see Noyer 1992).

(8) Feature hierarchy
$\gamma > \beta > \alpha$

(9) Vocabulary items – pl

a. ŋ ↔ $[-\beta, \text{pl}]$
b. u ↔ $[-\alpha, \text{pl}]$
c. tə ↔ $[+\gamma, \text{pl}]$
d. a ↔ $[+\alpha, +\beta, \text{pl}]$

(10) Vocabulary items – sg

a. fə ↔ $[-\gamma, -\alpha, -\beta, \text{sg}]$
b. kə ↔ $[-\gamma, -\alpha, +\beta, \text{sg}]$
c. u ↔ $[+\alpha, -\beta, \text{sg}]$
d. N ↔ $[-\alpha, -\beta, \text{sg}]$
e. i ↔ $[+\beta, \text{sg}]$
f. ø ↔ $[-\gamma, +\alpha, +\beta, \text{sg}]$

(11) Exponent compatibility

class	features	SG	PL
VIII	$[-\gamma, -\alpha, -\beta]$	fə ↔ $[-\gamma, -\alpha, -\beta, \text{sg}]$ N ↔ $[-\alpha, -\beta, \text{sg}]$	ŋ ↔ $[-\beta, \text{pl}]$ u ↔ $[-\alpha, \text{pl}]$
II	$[-\gamma, +\alpha, -\beta]$	u ↔ $[+\alpha, -\beta, \text{sg}]$	ŋ ↔ $[-\beta, \text{pl}]$ u ↔ $[-\alpha, \text{pl}]$
VI	$[-\gamma, -\alpha, +\beta]$	kə ↔ $[-\gamma, -\alpha, +\beta, \text{sg}]$ i ↔ $[+\beta, \text{sg}]$	u ↔ $[-\alpha, \text{pl}]$
III	$[+\gamma, +\alpha, -\beta]$	u ↔ $[+\alpha, -\beta, \text{sg}]$	tə ↔ $[+\gamma, \text{pl}]$ ŋ ↔ $[-\beta, \text{pl}]$
VII	$[+\gamma, -\alpha, -\beta]$	N ↔ $[-\alpha, -\beta, \text{sg}]$	tə ↔ $[+\gamma, \text{pl}]$ u ↔ $[-\alpha, \text{pl}]$, ŋ ↔ $[-\beta, \text{pl}]$
V	$[+\gamma, -\alpha, +\beta]$	i ↔ $[+\beta, \text{sg}]$	tə ↔ $[+\gamma, \text{pl}]$ u ↔ $[-\alpha, \text{pl}]$
IV	$[+\gamma, +\alpha, +\beta]$	i ↔ $[+\beta, \text{sg}]$	a ↔ $[+\alpha, +\beta, \text{pl}]$ tə ↔ $[+\gamma, \text{pl}]$
I	$[-\gamma, +\alpha, +\beta]$	ø ↔ $[-\gamma, +\alpha, +\beta, \text{sg}]$ i ↔ $[+\beta, \text{sg}]$	a ↔ $[+\alpha, +\beta, \text{pl}]$

To sum up:

- Isu has 8 classes that are formed by three binary features.
- There is a one-to-one correspondence between singular and plural. Syncretisms between classes follow from underspecification of Vocabulary items.
- Vocabulary Insertion follows the Subset Principle, plus feature hierarchy determines specificity of features.

3 Class drop in Isu

3.1 Data

- Nouns in isolation obligatorily have the class prefix.

(12)   a. *(kə́)-bá
          7-fufu
          'fufu'

      b. *(ú)-bá
          8-fufu
          'fufus'

(13)   a. *(í)-fú
          5-axe
          'axe'

      b. *(tə́)-fú
          13-axe
          'axes'

- CV class prefixes are absent in the presence of some modifiers: possessive pronouns

(14)   a. (*kə́)-bá k-ám
          7-fufu   7-POSS.1SG
          'my fufu'

      b. *(ú)-bá w-ám
          8-fufu 8-POSS.1SG
          'my fufus'

(15)   a. *(í)-fú y-ám
          5-axe 5-POSS.1SG
          'my axe'

      b. (*tə́)-fú t-ám
          13-axe 13-POSS.1SG
          'my axes'

- Determiner: CV classes are deleted.

(16)   a. (*kə́)-bá k-íy
          7-fufu   7-ENC
          'the fufu'

      b. *(ú)-bá w-íy
          8-fufu 8-ENC
          'the fufus'

(17)   a. *(í)-fú y-íy
          5-axe 5-ENC
          'the axe'

      b. (*tə́)-fú t-íy
          13-axe 13-ENC
          'the axes'

- Adjectives: CV classes are deleted.

(18)   a. (*kə́)-bá kə̀-ně k-íy
          7-fufu   7-big 7-ENC
          'big fufu'

      b. *(ú)-bá ù-ně w-íy
          8-fufu 8-big 8-ENC
          'big fufus'

(19)   a. *(í)-fú ì-ně y-íy
          5-axe 5-big 5-ENC
          'big axe'

      b. (*tə́)-fú tə̀-ně t-íy
          13-axe 13-big 13-ENC
          'big axes'

- Numerals differ from other modifiers: All class markers are obligatorily present.

(20) a. *(kə́)-bá kə́-mɔ̀ʔ
      7-fufu 7-one
      'one fufu'

      b. *(ú)-bá ú-bə̀ghà
      8-fufu 8-two
      'two fufus'

(21) a. *(fə́)-kwáp fə́-mɔ̀ʔ
      19-knife 19-one
      'one knife'

      b. *(ŋ̀)-kwáp ŋ̀-bə̀ghà
      6b-knife 6b-two
      'two knives'

- When a possessive pronoun, for example, and a numeral combine to modify the same noun, Poss > Numeral, and CV classes are dropped

(22) a. (*kə́)-bá k-ám   kə́-mɔ̀ʔ
      7-fufu   7-POSS.1SG 7-one
      'my one fufu'

      b. *(ú)-bá w-ám   ú-bə̀ghà
      8-fufu 8-POSS.1SG 8-two
      'my two fufus'

(23) a. (*fə́)-kwáp f-ám   fə́-mɔ̀ʔ
      19-knife   19-POSS.1SG 19-one
      'my one knife'

      b. *(ŋ̀)-kwáp m-ám   ŋ̀-bə̀ghà
      6b-knife 6b-POSS.1SG 6b-two
      'my two knives'

To sum up: CV, but not V or C class markers are absent in the presence of possessive pronouns, adjectives, and determiners. Numerals (and some quantifiers) do not trigger class drop.

- Similar class marker drop is attested in a number of other Grassfields languages, most notably in Aghem.
- Existing research often associates class drop with focus and the position of the noun phrase with respect to the verb; see Hyman (2010), Kießling (2010).
- In (24a-c), the direct object is in the postverbal position and the presence or absence of the modifier determines the class drop.

(24) a. John mə́ wí [*(kə́)-fú]$_{OBJ}$
      John PST kill 7-rat
      'John has killed a rat'

      b. John mə́ wí [(*kə́)-fú k-ám]$_{OBJ}$
      John PST kill 7-rat   7-POSS.1SG
      'John has killed my rat'

      c. John mə́ wí [*(kə́)-fú kə́-mɔ̀ʔ]$_{OBJ}$
      John PST kill 7-rat   7-one
      'John has killed one rat'

3.2 Analysis

3.2.1 Noun phrase structure

- Numerals behave different from other modifiers: They do not trigger the drop of the class exponents.
- Modifiers in Isu appear after the noun and the numerals take the outermost position.

(25) a. (*kə́)-fú k-ám   kə̀-gháʔá k-ə́   kə́-mɔ̀ʔ
      7-rat   7-POSS.1SG 7-big   7-DEM 7-one
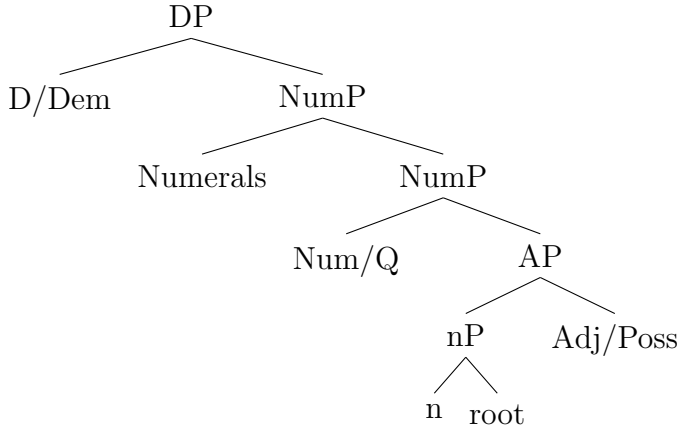   'that my one big rat'

b. *(ú)-fú w-ám   ù-gháʔá w-ɔ́   ú-tàà
   8-rat 8-POSS.1SG 8-big   8-DEM 8-three
   'those my three big rats'

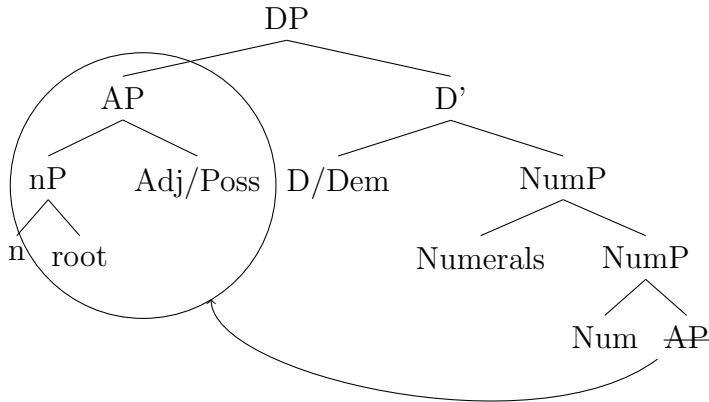- The order of modifiers is summarized in (26).

(26)   N > Poss > Adj > Det > Numeral

- We assume the base structure of Isu noun phrase in (27). The surface order is derived by movement of the AP to Spec,DP as shown in (28) (based on Fongang 2024).

(27)   DP base structure

(28)   Movement

- Modifiers of the noun show class concord. We assume that it is derived by Agree in syntax (see Carstens 2001, Baker 2008, Toosarvandani & van Urk 2014, Landau 2016, and Puškar 2017, 2018).
- Under the final structure, all modifiers but the numerals c-command the noun. We would like to suggest that this c-command relation between the modifier and the n head where the class features are located is a pre-condition for the exponent drop.

3.2.2 Class drop

- Under the feature hierarchy in (29), γ is most specific and most marked feature. We suggest that impoverishment in Isu deletes only this feature.

(29)   Impoverishment rule
   $n[\gamma] \rightarrow n[\emptyset]$ / if c-commanded by $[\gamma]$

- The rule in (29) is modelled on the notion of c-command; see also Kallulli & Trommer (2011), Božič (2020) as well as Kouneli (2021) who relies on the notion of dominance.
- Notably all CV exponents have $[\pm\gamma]$ and are thus affected by the impoverishment rule.
- Feature specifications of C and V exponents do not contain $[\pm\gamma]$ and are thus not subject for impoverishment.

(30) Feature hierarchy
$$\gamma > \beta > \alpha$$

(31) Vocabulary items – pl
   a. ŋ $\leftrightarrow$ $[-\beta,\ \text{pl}\ ]$
   b. u $\leftrightarrow$ $[-\alpha,\ \text{pl}\ ]$
   c. tə $\leftrightarrow$ $[+\gamma,\ \text{pl}\ ]$
   d. a $\leftrightarrow$ $[+\alpha, +\beta,\ \text{pl}\ ]$

(32) Vocabulary items – sg
   a. fə $\leftrightarrow$ $[-\gamma, -\alpha, -\beta,\ \text{sg}\ ]$
   b. kə $\leftrightarrow$ $[-\gamma, -\alpha, +\beta,\ \text{sg}\ ]$
   c. u $\leftrightarrow$ $[+\alpha, -\beta,\ \text{sg}\ ]$
   d. N $\leftrightarrow$ $[-\alpha, -\beta,\ \text{sg}\ ]$
   e. i $\leftrightarrow$ $[+\beta,\ \text{sg}\ ]$
   f. ø $\leftrightarrow$ $[-\gamma, +\alpha, +\beta,\ \text{sg}\ ]$
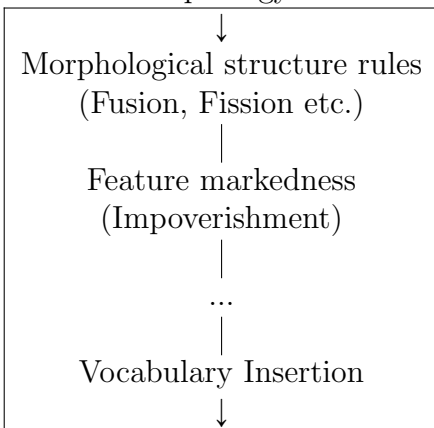
- Remaining issue:
  If only $[\pm\gamma]$ feature is deleted by impoverishment, why the less specific exponent cannot be inserted instead?

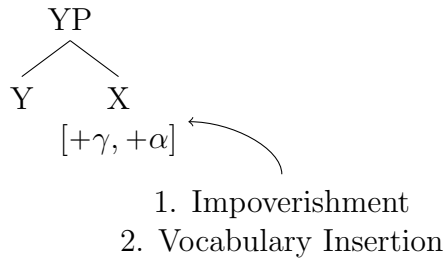**Proposal: Cyclic morphology**

- According to the standard view morphology is modular: The whole structure or a sizable part of it is subject to rules from one block (e.g, morphological structure rules), and only after operations from this block have applied to the top-most node can operations from the next block (e.g., Vocabulary Insertion) start applying (see Halle & Marantz 1993, Arregi & Nevins 2012).

(33) Modular morphology

```
              ↓
  Morphological structure rules
      (Fusion, Fission etc.)
              |
     Feature markedness
       (Impoverishment)
              |
             ...
              |
     Vocabulary Insertion
              ↓
```

- Here we would like to pursue an alternative approach: **Morphology is cyclic. There are no modules in morphology.**
- Morphology processes the structure from bottom to top (cf. Bobaljik 2000, Myler 2017, Kalin & Weisser 2022), so that Vocabulary Insertion may apply before Impoverishment, if Impoverishment is triggered by higher nodes.
  - Some predecessors for interleaving: Noyer (1992), Halle (1997), and González-Poot & McGinnis (2006) on interleaving Vocabulary Insertion and Fission, Chung (2009) on Vocabulary Insertion and Fusion, and also Dobler et al. (2011) and Piggott & Travis (2017) on Vocabulary Insertion and head movement, Privizentseva (2024) on Vocabulary Insertion and Lowering.

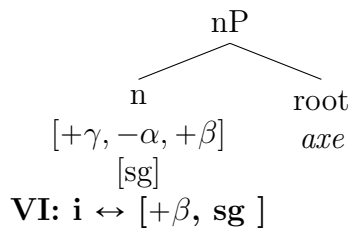(34)   Imp. triggered locally   (35)   Imp. triggered non-locally
       Impoverishment > VI   VI > Impoverishment

YP

Y   X
     $[+\gamma, +\alpha]$

      1. Impoverishment
      2. Vocabulary Insertion

WP

W   ZP

    Z   YP

        Y   X
           $[+\gamma, +\alpha]$

2. Impoverishment

      1. Vocabulary Insertion
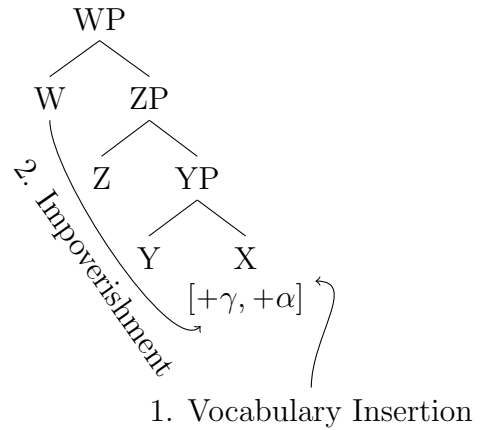
- Note that the approach does not exclude extrinsic rule orderings: If a context for both Impoverishment and Vocabulary Insertion are met at the same point, Impoverishment will precede Vocabulary Insertion.
- Thus, the vast majority of evidence for modularity in morphology is still accounted for (see Halle & Marantz 1993, Arregi & Nevins 2012, Hewett 2023 among others) and counterfeeding occurs if the context for impoverishment is met only later in the derivation.
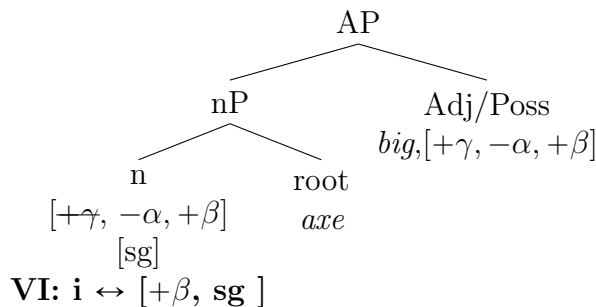
Derivations

- V-class: No drop

(36)   *(í)-fú ì-ně   y-íy
     5-axe 5-big 5-ENC
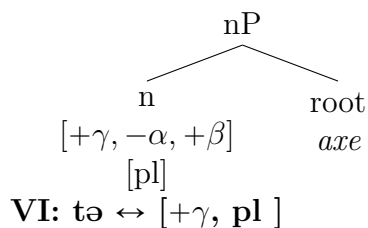   'big axe'

(37)   Vocabulary insertion – V class

nP

n   root
$[+\gamma, -\alpha, +\beta]$ *axe*
  [sg]
VI: i $\leftrightarrow$ $[+\beta,$ sg $]$

(38)   Impoverishment has no effect

AP

   nP   Adj/Poss
             big,$[+\gamma, -\alpha, +\beta]$
n   root
$[+\bcancel{\gamma}, -\alpha, +\beta]$ *axe*
  [sg]
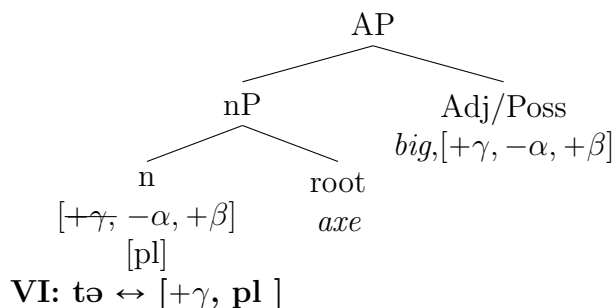**VI: i $\leftrightarrow$ $[+\beta,$ sg $]$**

- CV classes are specified for $[\pm\gamma]$, so they are deleted.

(39)   (*tə́)-fú tə̀-ně   t-íy
     13-axe   13-big 13-ENC
     'big axes'

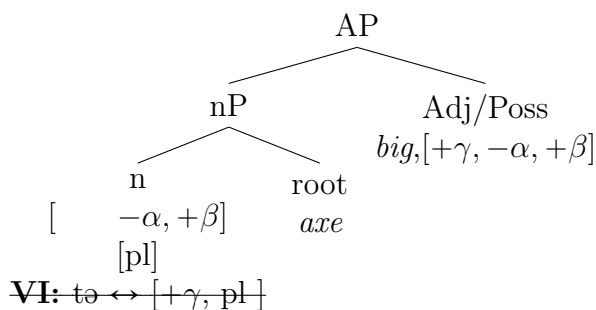(40)   Vocabulary insertion – CV class

```
              nP
            /    \
          n       root
   [+γ, −α, +β]    axe
       [pl]
  VI: tə ↔ [+γ, pl ]
```

(41)   Impoverishment

```
                     AP
                   /    \
                nP        Adj/Poss
              /    \      big,[+γ, −α, +β]
            n       root
   [+γ̶, −α, +β]     axe
       [pl]
  VI: tə ↔ [+γ, pl ]
```

- If the inserted Vocabulary item is not compatible after Impoverishment, it has to be deleted.

(42)   Violation of the Subset Principle: Class deletion

```
                     AP
                   /    \
                nP        Adj/Poss
              /    \      big,[+γ, −α, +β]
            n       root
     [    −α, +β]    axe
       [pl]
  VI: t̶ə̶ ↔ [+γ, pl ]
```

- Vocabulary Insertion cannot apply to the *n* again, after Impoverishmant, because it will then apply to a proper subpart of the derivation and thus violates the Strict Cycle Condition (see Chomsky 1973, 1995, 2019).

4   Summary

- Classes are not represented as primitives, but are **decomposed into binary features**. CV-classes are specified for the $[\pm\gamma]$.
- This feature is impoverished in the presence of c-commanding modifiers: adjectives, possessive pronouns, and determiners.
- Impoverishment leads to deletion of full exponent, not retreat to a more general exponent, because **morphology is cyclic**. It processes the structure supplied from syntax from bottom to top, so that Impoverishment counterfeeds Vocabulary Insertion in this case.

References

Alexiadou, A. & G. Müller. 2008. Class features as probes. In *Inflectional identity*, eds. A. Bachrach & A. Nevins, 101–155. Oxford: Oxford University Press.

Arregi, K. & A. Nevins. 2012. *Morphotactics: Basque Auxiliaries and the Structure of Spellout.* Dordrecht: Springer Netherlands.

Baker, M. 2008. *The Syntax of Agreement and Concord.* New York: Cambrige University Press.

Bobaljik, J. D. 2000. The Ins and Outs of contextual allomorphy. In *University of Maryland working papers in linguistics*, 35–71.

Božič, J. 2020. Strictly local impoverishment: An intervention effect. *Linguistic Inquiry* 51:395–409.

Carstens, V. 2001. Multiple agreement and case deletion: Against ϕ-incompleteness. *Syntax* 4:147–163.

Chomsky, N. 1973. Conditions on transformations. In *A Festschrift for Morris Halle*, eds. S. Anderson & P. Kiparsky, 232–286. New York: Academic Press.

Chomsky, N. 1995. *The Minimalist Program.* Cambridge: MIT Press.

Chomsky, N. 2019. Lectures. Paper presented at University of California, Los Angeles, April 29 – May 2.

Chung, I. 2009. Suppletive verbal morphology in Korean and the mechanism of vocabulary insertion. *Journal of Linguistics* 45:533–567.

Dobler, E., H. Newell, M. Noonan, G. Piggott, M. Sugimura, L. Travis & T. Skinner. 2011. Narrow syntactic movement after spell-out. Ms. McGill University.

Fongang, L. 2024. Exponent drop in Aghem: Agree and strictly local Impoverishment. Ms., Leipzig University.

Fuchs, Z. & J. van der Wal. 2022. The locus of parametric variation in bantu gender and nominal derivation. *Linguistic Variation* 22:268–324.

González-Poot, A. & M. McGinnis. 2006. Local versus long-distance fission in Distributed Morphology. In *Proceedings of the 2005 Annual Conference of the Canadian Linguistic Association*, ed. C. Gurski, 1–20.

Halle, M. 1997. Distributed Morphology: Impoverishment and Fission. In *PF: Papers at the Interface*, eds. B. Bruening, Y. Kang & M. McGinnis, 425–449. Cambridge, MA: MITWPIL.

Halle, M. & A. Marantz. 1993. Distributed Morphology and the Pieces of Inflection. In *The View from Building 20: Essays in Linguistics in Honor of Sylvain Bromberger*, eds. K. Hale & S. J. Keyser, 111–176. Cambridge, MA: MIT Press.

Hewett, M. 2023. Allomorphy in semitic discontinuous agreement: Evidence for a modular approach to postsyntax. *Natural Language & Linguistic Theory* 41:1091–1145.

Hyman, L. M. 2010. Focus marking in Aghem: Syntax or semantics? In *The Expression of Information Structure: A documentation of its diversity across Africa*, 95–116.

Kalin, L. & P. Weisser. 2022. Minimalism and morphology. Ms. Princeton University and Leipzig University.

Kallulli, D. & J. Trommer. 2011. Closest c-command, agree and impoverishment: The morphosyntax of non-active voice in Albanian. *Acta Linguistica Hungarica* 58:277–296.

Kießling, R. 2010. Focalisation and defocalisation in Isu. In *The Expression of Information Structure: A Documentation of its Diversity across Africa*, eds. F. Ines & S. Anne, 145–163. Number 91 in Typological Studies in Language, John Benjamins Publishing Company.

Kießling, R. 2018. Noun classes, genders, declensions in Grassfields Bantu–preliminary generalisations on their dynamics (with a focus on the Ring subgroup). *Colloquium talk, Humboldt-Universität, Berlin* .

Kouneli, M. 2021. Number-based noun classification. *Natural Language & Linguistic Theory* 39:1195–1251.

Kramer, R. 2015. *The Morphosyntax of Gender.* Oxford: Oxford University Press.

Landau, I. 2016. DP-internal semantic agreement: A configurational analysis. *Natural Language & Linguistic Theory* 34:975–1020.

Maho, J. F. 1999. A typological survey of noun classes in Bantu. Ph.D. thesis, Doctoral dissertation, Göteborg University.

Müller, G. 2004. On Decomposing Inflection Class Features: Syncretism in Russian Noun Inflection. In *Explorations in Nominal Inflection*, eds. G. Müller, L. Gunkel & G. Zifonun, 189–227. Berlin: Mouton.

Myler, N. 2017. Exceptions to the Mirror Principle and morphophonological 'Action at a distance'. In *The structure of words at the interfaces*, eds. H. Newell, M. Noonan, G. Piggott & L. Travis, 100–125. Oxford: Oxford University Press.

Noyer, R. 1992. Features, Positions and Affixes in Autonomous Morphological Structure. Doctoral thesis,

Massachusetts Institute of Technology, Cambridge, MA.

Piggott, G. & L. d. Travis. 2017. Wordhood and word-internal domains. In *The Structure of Words at the Interfaces*, eds. H. Newell, M. Noonan, G. Piggott & L. d. Travis, 41–74. New York: Oxford University Press.

Privizentseva, M. 2024. Semantic agreement in russian: Gender, declension, and morphological ineffability. *Natural language and Linguistic Theory* 42:767–814.

Puškar, Z. 2017. Hybrid agreement: modelling variation, hierarchy effects and phi-feature mismatches. Doctoral thesis, Universität Leipzig, Leipzig.

Puškar, Z. 2018. Interactions of Gender and Number Agreement: Evidence from Bosnian/Croatian/Serbian. *Syntax* 21:275–318.

Toosarvandani, M. & C. van Urk. 2014. Agreement in Zazaki and the nature of nominal concord. Ms. Univercity of California, Santa Cruz and Massachusetts Institute of Technology, Boston.

Wiese, B. 2004. Categories and Paradigms. On Underspecification in Russian Declension. In *Explorations in Nominal Inflection*, eds. G. Müller, L. Gunkel & G. Zifonun, 321–372. Berlin: Mouton.

Wunderlich, D. 2004. Is There Any Need for the Concept of Directional Syncretism? In *Explorations in Nominal Inflection*, eds. G. Müller, L. Gunkel & G. Zifonun, 373–396. Berlin: Mouton.