1 Introduction

- So called infinitives in Bantu languages are (vP/TP) nominalizations
- Northern Ndebele (Zimbabwe, S44, Nguni group): "infinitive" = nominalization of class 15

Nominalizations in Ndebele can be targeted (in their entirety) by agreement (1) and raising (2):

\[(1)\] Abafana ba-za-[ku]-phinda uku-pheka.
2boy 2s-FUT-15o-repeat 15-cook
'\(\text{The boys will cook again.}\)'

\[(2)\] Uku-pheka, ku-za-phinda i-\(t_i\) ngabafana.
15-cook 15s-FUT-repeat.PSV by.boys
lit. Cooking will be repeated by the boys.

At the same time, they are permeable to agreement (3) and raising (4):

\[(3)\] Ba-a-yi-phinda \([\text{DP} uku-yi-pheka i-nyama]\)
2s-PST-9o-repeat 15-9o-cook 9-meat
'\(\text{They will cook the meat again}\)'

\[(4)\] U-Zodwa; u-qala \([\text{DP uku-pheka} t_i]\).
1-Zodwa 1s-be.first 15-cook
'\(\text{Zodwa first cooks}\)'

Since nominalizations are possible targets themselves, (3)-(4) violate locality/minimality (A-over-A type)

**Claim I:** The violations are only apparent

In every apparent violation, the operation targets both the nominalization and a DP inside of it:

\[
\begin{array}{c}
\text{probe} \\
[\text{DP-15} \quad \text{DP}] \\
\end{array}
\]

**Claim II:** Class 15 is featurally underspecified, compared to other classes

\[(5)\]

<table>
<thead>
<tr>
<th></th>
<th>&quot;Class 1&quot;</th>
<th>&quot;Class 2&quot;</th>
<th>&quot;Class 15&quot;</th>
</tr>
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<tbody>
<tr>
<td>(\phi)</td>
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<td>PL</td>
<td>1</td>
</tr>
</tbody>
</table>
| CNJ= conjoint form, DSJ = disjoint form

Outline

§2-3 Raising out of class 15 DPs

§4 Agreement across class 15 DPs

§5 The elsewhere distribution of class 15 agreement/raising

§6 Conclusion and implications for \(\phi\)-geometry in Bantu

1 \(1s = \text{class 1 subject agr, } 1o = \text{class 1 object agr, } 1 = \text{class 1 nominal prefix, CNJ= conjoint form, DSJ = disjoint form}\)
2 Raising out of class 15 DPs

- *qala* ‘do/be first’ is an unaccusative verb selecting a nominalization (6-a)
- The entire nominalization can optionally raise to subject (6-b)

\[(6)\]

a. Ku-∅-qala [DP uku-banda ]
   15s-CNJ-first 15-be.cold
   ‘First, it is cold’

b. [DP Uku-banda], ku-ya-qala \[t_i\]
   15-be.cold 15s-DSJ-first
   ‘First, it is cold’

Conjoint form (∅) → some phrase inside VP

Disjoint form (ya) → no VP-internal phrase

- In the same construction, a DP may raise from inside the nominalization

\[(7)\]

a. Ku-∅-qala [DP uku-phaeka uZodwa ]
   15s-CNJ-first 15-cook 1Zodwa
   ‘Zodwa first cooks’

b. UZodwa, u-∅-qala [DP uku-phaeka \[t_i\] ]
   1Zodwa 1s-CNJ-first 15-cook
   ‘Zodwa first cooks’

- (7-b) is not a control structure: active–passive synonymy

\[(8)\]

UZodwa u-qala [uku-phaeka inyama.]
1Zodwa 1s-first 15-cook 9meat
‘Zodwa first cooks meat.’

\[(9)\]

Inyama, i-qala [uku-phaeka \[t_i\] ] nguZodwa.
9meat 9s-first 15-cook, PSV by.Zodwa
‘The meat is cooked first by Zodwa’ ≈ (8)
### 3 Analysis

**Class 15 is featurally underspecified, compared to other classes**

- φ-features represented as feature geometries (Harley & Ritter 2002; Béjar & Rezac 2009)
- Class combines gender and number: e.g. class 2 = class 1+pl (cf. Carstens 1991)
- **What we call "Class 15" is a φ-geometry with no dependents**

\[
\begin{array}{ccc}
(10) & a. & "Class 1" \\
& \phi & \\
& \downarrow & \\
& 1 & \\
& 1 & \\
\end{array}
\begin{array}{ccc}
& b. & "Class 2" \\
& \phi & \\
& \downarrow & \\
& \text{PL} & \\
& 1 & \\
\end{array}
\begin{array}{ccc}
& c. & "Class 15" \\
& \phi & \\
\end{array}
\]

**Raising out of nominalization: φ-probe finds two DPs**

- φ-probes are themselves geometries and may be specified to search for a specific kind of φ-geometry (Béjar 2003; Rezac 2003; Nevins 2011; Preminger 2011)
- A probe may be satisfied using multiple DPs; partially matched probe remains active (Béjar 2003; Béjar & Rezac 2009; Deal 2015; Coon & Keine 2018)
- **Ndebele φ-probes are fully matched (satisfied) by a φ-geometry with at least one dependent:**

\[
\begin{array}{ccc}
(11) & \text{Step 1} & \rightarrow & \text{Step 2} & \rightarrow & \text{Step 3}
\end{array}
\]

- Valuation implemented as feature-geometric union: a valued probe is the union of the probe’s and the goal’s geometries (Preminger 2017)
- Since class 15 is a proper subgeometry of class 1, the final result of valuation is identical to agreement with class 1 only.
• Raising to subject linked to \( \phi \)-agreement: raised subject must control agreement; in-situ subject cannot — the \( \phi \)-probe and EPP on T must be satisfied by the same DP (Baker 2003; Carstens 2005)

• EPP is satisfied by the DP that fully matches the probe (Best Match, Coon & Bale 2014; van Urk 2015) → raising out of a nominalization

\[
(12) \begin{align*}
\text{a. } & \quad \text{UZodwa} \_ u-∅-qala [DP uku-pheka } t_i] \\
& \quad \text{IZodwa} \_ 15s-CNJ-first 15-cook \\
& \quad \text{‘Zodwa first cooks’}
\end{align*}
\]

\[
\text{b. } \quad \text{TP} \quad \text{VP} \\
\quad \text{T} \quad \text{V} \quad \text{DP} \quad \text{vP} \\
\quad \text{first.CNJ} \quad \text{D} \quad \text{vP} \\
\quad \text{full match} \quad \text{v} \quad \text{VP} \\
\quad \text{cook} \\
\]

\[
\text{b. } \quad \text{TP} \quad \text{VP} \\
\quad \text{T} \quad \text{V} \quad \text{DP} \quad \text{vP} \\
\quad \text{first.CNJ} \quad \text{D} \quad \text{vP} \\
\quad \text{full match} \quad \text{v} \quad \text{VP} \\
\quad \text{cook} \\
\]

(See Halpert 2012, 2015 for a similar analysis of hyperraising in Zulu, a closely related language.)

4 Agreement across class 15

• As in many Bantu lgs, object agreement in Ndebele is optional (marks definiteness/discourse salience)

• Little v optionally has an object-agreement probe\(^2\)

\[
(13) \quad \text{Optionality of object agreement}
\]

\[
\text{a. } \quad \text{UZodwa} \_ u-Za-pheka i-nyama. \\
\quad \text{Zodwa} \_ 1s-FUT-cook 9-meat \\
\quad \text{‘Zodwa will cook meat’}
\]

\[
\text{b. } \quad \text{UZodwa} \_ u-Za-zi-pheka i-nyama. \\
\quad \text{Zodwa} \_ 1s-FUT-9o-cooks 9-meat \\
\quad \text{‘Zodwa will cook the meat.’}
\]

---

\(^2\) Additionally, agreed-with objects are dislocated or null (i.a. Bresnan & Mchombo 1987; Van der Spuy 1993; Baker 2003). This, however, will not be relevant here, and is not represented in the trees for simplicity.
Object agreement across a nominalization

a. Ngi-za-yi-phinda [DP uku- yi]-pheka i-nyama.
   1sg.s-FUT-9o-again 15-9o-cook 9-meat
   ‘I will cook the meat again’

b. TP
   T vP
   v [φ] VP DP
   repeat D [φ] vP

   partial match

c. TP
   T vP
   v [φ] VP DP
   repeat D [φ] vP
   cook [φ] 9

   full match

• Long distance object agreement is contingent on embedded object agreement

(15) *Ngi-za- yi-phinda [DP uku-pheka i-nyama. ]
   1sg.s-FUT-9o-repeat 15-cook 9-meat
   ‘I will cook the meat again’

• v in (15) has no φ-features

• Assuming phasal vP, the object itself is inaccessible to the matrix probe

• Stipulation: DP is not phasal in Ndebele – the nominalization itself does not block agreement.3

5 The predicted elsewhere distribution of class 15 agreement/raising

Class 15 agreement:
– is always the realization a partially satisfied probe4
– is possible only when there is no other accessible DP (with a more specified geometry)
  i. Probe [DP-15 DP [phase/vP ] ] → agreement with the nominalization-internal DP
  ii. Probe [DP-15 [phase/vP ] ] → agreement with the entire nominalization

3 If necessary, this stipulation may be avoided by adopting Rackowski & Richards’s (2005) view of the PIC as intervention that may be obviated by agreement with the phasal category (here, the class 15 DP). See Halpert 2012, 2015 for extending this theory to A-movement to derive hyperraising in Zulu.

4 By assumption, partially matched probes are tolerated by the grammar – they do not cause a derivational "crash" (Preminger 2011, 2014). They are found whenever a fully matching agreement controller is not accessible.
5.1 Embedded object agreement bleeds agreement with the nominalization

   1sg.s-15o-repeat 15-cook 7-porridge
   ‘I cooked porridge again’

   b. Ngi-si-phindile [DP-15 uku-[si]-pheka isi-tshwala ]
   1sg.s-7o-repeat 15-7o-cook 7-porridge
   ‘I cooked porridge again’

   c. *Ngi-ku-phindile [DP-15 uku-[si]-pheka isi-tshwala ]
   1sg.s-15o-repeat 15-7o-cook 7-porridge
   ‘I cooked porridge again’

• (16-c): the matrix probe inescapably finds the valued probe on embedded v, giving (16-b)

   (17) [vP(repeat) \( \phi \) [DP-15 \( \phi \) [vP \( \phi \) [vP[cook] [DP-7 \( \phi \) [7 7]]]]]]

• (16-a): lack of embedded object agreement \( \rightarrow \) the nominalization is the only accessible goal

   (18) [vP(repeat) \( \phi \) [DP-15 \( \phi \) [vP \( \phi \) [vP[cook] [DP-7 \( \phi \) [7 7]]]]]]

Class 15 agreement can only surface if no other DP is available \( \rightarrow \) elsewhere distribution

5.2 Raising of the entire nominalization is impossible when it contains a bare DP external argument

(19) a. Ku-∅-qala [DP uku-pheka uZodwa ]
    15s-CNJ-first 15-cook 1Zodwa
    ‘Zodwa first cooks’

   b. UZodwa u-∅-qala [DP uku-pheka ti]
    1Zodwa 1s-CNJ-first 15-cook
    ‘Zodwa first cooks’

   c. *[DP Uku-pheka uZodwa ]i ku/-u-yu-qala ti
    15-cook 1Zodwa 15s/1s-DSJ-first
    ‘Zodwa first cooks’

• The nominalization’s external argument is at the edge of embedded vP
• The edge is accessible to matrix T
• After finding class-15 DP, the probe inescapably finds the embedded subject
5.3 A nominalization can be raised when the external argument is absent or oblique

A control nominalization can undergo raising:

(20) a. Ku-∅-qala [DP uku-pheka inyama]
    15s-CNJ-first 15-cook 9meat
    ‘Cooking meat happens first’

b. *Inyama i-∅-qala [DP uku-pheka t₁]
    9meat 9s-CNJ-first 15-cook
    ‘Cooking meat happens first’

c. [DP Uku-pheka inyama]₁₁ ku-ya-qala t₁
    15-cook 9meat 15s-DSJ-first
    ‘Cooking meat happens first’

- The nominalization’s external argument is an arbitrary PRO (no φ-features)
- The embedded object is inside VP → inaccessible to matrix T
- The nominalization is the only goal → only the entire nominalization can undergo raising

Nominalized weather-predicates can undergo raising:

(21) a. Ku-∅-qala [DP uku-banda]
    15s-CNJ-first 15-be.cold
    ‘First, it is cold’

b. [DP Uku-banda]₁₁ ku-ya-qala t₁
    15-be.cold 15s-DSJ-first
    ‘First, it is cold’

Nominalizations with oblique external arguments can undergo raising:

(22) a. Ku-a-zizwa [DP₁₁ uku-khala ko-sana]
    15s-PST-heard 15-cry OBL-1child
    ‘A child’s crying was heard’

b. *Ko-sana₁₁ u-/ku-a-zizwa [DP₁₁ uku-khala t₁]
    OBL-1child 1s/15s-PST-heard 15-cry
    (‘A child’s crying was heard/A child was heard crying’)

c. [DP₁₁ Uku-khala ko-sana]₁₁ ku-a-zizwa t₁
    15-cry OBL-1child 15s-PST-heard
    ‘A child’s crying was heard’

- Oblique DPs are not possible targets for agreement/raising (22-b)
- This allows for raising of the entire nominalization (22-c)
5.4 A passivized nominalization cannot undergo raising

(23) **Matrix passive: the nominalization becomes the subject**

a. Abafana ba-za-phinda $[\text{DP uku-pheka isi-tshwala.}]$
   
   2boys 2s-FUT-repeat 15-cook 7-porridge
   ‘The boys will cook porridge again’

b. $[\text{DP Uku-pheka isi-tshwala}]$ ku-za-phindwa $t_i$ (ngabafana).
   15-cook 7-porridge 15s-FUT-repeat. $[\text{PSV}]$ by.boys
   ‘The boys will cook porridge again’
   (lit. ‘Cooking porridge will be repeated by the boys’)

c. *Isi-tshwala si-za-phindwa $[\text{DP uku-pheka } t_i]$ (ngabafana).
   7-porridge 7s-FUT-repeat. $[\text{PSV}]$ 15-cook by.boys
   (‘Porridge will be cooked by the boys again’)

(24) **Structure of (23-b): the nominalization is the only accessible goal → it can undergo raising**

![Diagram of sentence structure]

(25) **Matrix + embedded passive: embedded object becomes matrix subject**

Isi-tshwala si-za-phindwa $[\text{DP uku-phekwa } t_i]$ (ngabafana).
7-porridge 7s-FUT-repeat. $[\text{PSV}]$ 15-cook $[\text{PSV}]$ by.boys

‘The porridge will be cooked by the boys again.’ (lit. The porridge will be repeated to be cooked.)
• Unlike active vP, passive vP is permeable for raising – by assumption, not phasal

(26) A nominalization of a passive vP → internal argument accessible (25)

   15-cook.7-porridge 15s-FUT-repeat.by.boys
   (‘Cooking porridge will be done by the boys again’)

• The accessibility of the embedded object bleeds raising of the entire nominalization ...

(28) [DP Uku-pheka isi-tshwala]i, ku-za-phindwa ti (ngabafana).
   15-cook 7-porridge 15s-FUT-repeat.by.boys
   (repeated from (23-b))
   (lit. ‘Cooking porridge will be repeated by the boys’)

6 Conclusion and implications for \( \phi \)-feature geometry in Bantu languages

Summary

• Class 15 is geometrically underspecified

• A probe may be satisfied partially, and using multiple DPs
  
  – Apparent A-over-A violations
  
  – Bleeding of agreement with nominalization by nominalization-internal agreement
  
  – Constraints on raising of a nominalization based on material contained in it
  
  – Asymmetry between active and passive nominalizations with respect to raising
Implications

- Typological research has reveal a structured organization of φ-features (Harley & Ritter, 2002)

(29) φ-geometry (Harley & Ritter 2002, simplified)

\[ \phi \]

\[ \text{Participant} \quad \text{Pl} \quad \text{Gender} \]

\[ \text{Spk} \quad \text{Addr} \]

- A more complex geometry available in a language implies the availability of its less specified versions

(30) \[ a \rightarrow a, a, a \]

\[ b \quad c \quad b \quad c \]

- Contrastive underspecification is used in defining pronominal paradigms, e.g.

(31) \[
\begin{array}{c|c|c|c}
1\text{PI} & 1\text{Sg} & 3\text{Pl} & 3\text{Sg} \\
\phi & \phi & \phi & \phi \\
\text{Part} & \text{Pl} & \text{Part} & \text{Pl} \\
\end{array}
\]

- Bantu DPs are traditionally described as always having either person or class features:

(32) \[
\begin{array}{cc}
\text{SG} & \text{PL} \\
1\text{st} & \phi & \phi \\
\text{Part} & \text{Part} & \text{Pl} \\
2\text{nd} & \phi & \phi \\
\text{Part} & \text{Part} & \text{Pl} \\
\text{Addr} & \text{Addr} \\
3\text{rd} & \text{Class 1:} & \text{Class 2:} \\
\phi & \phi \\
1 & \text{Pl} & 1 \\
\text{Class 3:} & \text{Class 4:} \\
\phi & \phi \\
3 & \text{Pl} & 3 \\
\end{array}
\]
**Implied geometries in Bantu**

<table>
<thead>
<tr>
<th>Most specified geometries:</th>
<th>Implied geometries</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\phi$, $\phi \rightarrow \phi$, $\phi$, $\phi$, $\phi$, $\phi$</td>
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</tr>
<tr>
<td>Part</td>
<td>Pl</td>
</tr>
<tr>
<td>Addr</td>
<td>✓</td>
</tr>
</tbody>
</table>

- Class 15 is the counterpart of the 3sg (neuter/inanimate) geometry – they are the most underspecified geometries in their respective systems.

- Crosslinguistically, the underspecification of 3sg(Neut) is manifested by the appearance of 3sg(Neut) agreement when no agreement controller is available (Preminger 2014). For example:

  (34) haya kar (Hebrew)
  
  was.3sg(M) cold
  
  ‘It was cold.’

  $\Rightarrow$ 3sg.N is as unspecified as the probe itself. No valuation $\rightarrow$ 3sg.N agreement exponent

- In Ndebele, the lack of a controller gives rise to the appearance of class 15 agreement:

  (35) Ku-ya-banda.
  
  15s-DSJ-cold
  
  ‘It’s cold’

Remaining question:

Is there evidence, in Ndebele or related languages, for the existence $\phi$ (the plural of class 15)?

| Pl |

**References**


