Quantifier unification: Bipartite universal quantification in Tswefap
Erik Hans Maier
UC Berkeley

1 Overview

Universal quantification in Tswefap is bipartite, involving the contribution of two independent words ndöhk and awagha:

- Unlike other bipartite quantification systems described for St´át’imcets (Matthewson, 2001) or Mandarin (Cheng, 2009), both parts are quantifiers with (nearly) identical semantics, that share a restrictor.

- In order for this structure to be interpretable, I propose a new compositional argument-sharing operation, Quantifier Unification, akin to Predicate Modification (Heim & Kratzer, 1998) or Event Identification (Kratzer, 1996), that unifies the quantificational operators and shares arguments between them.

- The apparent redundancy of using two near-identical quantifiers is necessitated by the fact that neither ndöhk or awagha are ideal for use as the single quantifier in a clause, while their co-occurrence ameliorates the issues they have independently.

2 Language background

- Tswefap is a Bamileke(<Grassfields Bantu) language of Cameroon, spoken by around 20,000 people mainly in the village of Batoufam (Tsw: Pa’ Tswefap), but also in larger cities of Cameroon.

- There’s a grammar written by a native speaker (Gueche Fotso, 2013), though it includes very little discussion of quantification.

- The data in this handout come from my 2016-2017 elicitations with Guy Tchatchouang, a native speaker from Douala, Cameroon who lives now in the San Francisco Bay Area.

2.1 Linguistic facts

- Like other Grassfields languages: Highly isolating morphology

- Grammatical tone. In the realm of quantification though, tone does not co-vary with any semantic variables as far as I can tell (unlike, say, in tense/aspect where tone changes co-vary with tense changes)

- Basic word order: S Aux V O Adv

2.2 Quantifiers

<table>
<thead>
<tr>
<th>D-quantifiers</th>
<th>Adverbial(?) Quantifiers</th>
<th>Verbal Quantifiers</th>
</tr>
</thead>
<tbody>
<tr>
<td>ndöhk ‘all’</td>
<td>awagha ‘all’</td>
<td></td>
</tr>
<tr>
<td>mbeh wie ... loh ‘every’</td>
<td>tchoh’seh ‘many, a lot’</td>
<td>njop ‘a lot’</td>
</tr>
<tr>
<td>ncheh ‘some’</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sop ‘no’</td>
<td></td>
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</tr>
</tbody>
</table>

3 Universal quantification in Tswefap

The basic pattern of universal quantification in Tswefap is shown in (1).

(1) ndöhk mveuk awagha à kéu
    all dog all ASP run
    ‘All the dogs ran.’ (GT, 9/7/2016)

Though generally ndöhk and awagha co-occur, it is possible to have each occur on its own. Awagha can do this freely, though sentences with just awagha are dispreferred compared to ones with both ndöhk and awagha:

(2) #mveuk awagha à kéu
    dog all ASP run
    ‘All the dogs ran.’ (GT, 9/7/2016)

ndöhk, if alone, requires its complement to be modified in some way:

(3) *ndöhk mveuk à kéu
    all dog ASP run
    Intended: ‘All the dogs ran.’ (GT, 9/7/2016)

(4) ndöhk tehtu pfwoh à yoh mveuk
    all short children ASP see dog
    ‘All the short children saw the dog.’ (GT, 9/29/2016)

3.1 Properties of ndöhk

- Always at left edge of NP
3.2 Properties of \textit{awagha}

- Generally appears at right edge of NP:
  (14) a. \textit{ndöhk pfwoh nuw a ghehtse zhwetseuk all child all ASP share food}
  \textquoteleft All the children and the child shared food.\textquoteright{} (5/5/2017)
  b. \textit{ndöhk pfwoh nuw a ghehtse zhwetseuk all chief all ASP share food}
  \textquoteleft All the chiefs and child shared food.\textquoteright{} (5/5/2017)
  c. \textit{ndöhk pfwoh pu pflokhkheu awagha a jhehtse zhwetseuk all chief and child all ASP share food}
  \textquoteleft All the chiefs and children shared the food.\textquoteright{} (5/5/2017)

- \ldots but can also float:
  (15) \textit{pfwoh pu pflokhkheu awagha a ghehtse zhwetseuk all chief and child all ASP run}
  \textquoteleft All the chiefs and children ran.\textquoteright{} (GT, 11/23/2016)

- \textquoteleft Adverbial\textquoteright{} interpretations (though not unselective! cf. Lewis 1975):
  (16) a. \textit{pfwoh pu pflokhkheu awagha zhuge dog ASP run all yesterday}
  \textquoteleft The dog ran all the distance yesterday.\textquoteright{} (GT, 9/7/2016)
b. ndôhk mveuk à keundeuk awagha zhuge
dog all ASP run all yesterday
‘All the dogs ran yesterday.’ (GT, 9/7/2016)

(17) pfohnkheu à keundeuk awagha
children ASP run all
‘All the children ran.’ (GT, 11/23/2016)

‘The children ran the entire distance.’
‘The children ran the entire time.’

• Can take singleton-denoting nouns as restrictor:

(18) Erik à yoh San Francisco awagha
E. ASP see S. F. all
‘Erik saw San Francisco completely’

(19) Idiom: yoh NAME awagha
see NAME all
‘see NAME naked.’

3.3 Proposed structure

(20) DP
    D  NP
    ndôhk  NP  Q
    mveuk  awagha
dog

• ndôhk as D: ndôhk imposes plural requirement on the noun, indicating the
  noun is its complement.

• Assuming that the mechanism for licensing by modification is syntactic in
  nature, awagha should be a constituent with the noun like the other modifiers
  that license ndôhk. (Though see Dayal 2004)

• Note: In adverbial uses like in (16) and (17), awagha would not be a con-
  stituent with the noun unless it is quantifying over it.

4 Truth conditions and scope

In each condition (both ndôhk and awagha, just awagha, and just ndôhk), the
scopal possibilities and truth conditions are the same (in the relevant respects):

(21) ncheh pfvoºh à tseuk ndôhk mangulu awagha
some children ASP eat all mango all
‘Some children ate all the mangos.’ (GT, 2/23/2016)
✓ ∃ > ∀ = One group of children eats all the mangos.
✓ ∀ > ∃ = Each mango eaten by a different group of children.

(22) ncheh pfvoºh à tseuk mangulu awagha
some children ASP eat mango all
‘Some children ate all the mangos.’ (GT, 2/23/2017)
✓ ∃ > ∀ = One group of children eats all the mangos.
✓ ∀ > ∃ = Each mango eaten by a different group of children.

(23) ncheh pfvoºh à tseuk ndôhk mangulu n-khoh’oh
some children ASP all mango CNS-be.small
‘Some children ate all the small mangos.’ (GT, 2/23/2017)
✓ ∃ > ∀ = One group of children eats all the mangos.
✓ ∀ > ∃ = Each mango eaten by a different group of children.

5 Quantifier unification

• Based on the scopal facts, it appears that ndohk and awagha both have the
  standard denotation for a universal quantifier:

(24) a. [ndohk]: λP.λQ.∀x.P(x)→Q(x)
b. [awagha]: λP.λQ.∀x.P(x)→Q(x)

• Furthermore, it appears that the construction with both of them has this
  standard semantics as well. How do we get from two denotations like (24) to
  one?

(25) Quantifier Unification: If α is a branching node and {β,γ} the
the set of its daughters, and [β] is of type <<<<e,t>,t>,<e,t>,t>> and
has a denotation of the form λP.λQ.δx.P(x) ... Q(x) and [γ] is of type
<<<<e,t>,t>> and has a denotation of the type λG.δx.F(x) ... G(x).
In this case, [α] = λQ.δx.F(x) ... Q(x)
7 Why the redundancy?

- Say you’re a Tswefap speaker, and you want to say something equivalent to “I ate all the mangos.”
  - You can’t just say *ndoḥk*, since it has this extra restriction that you would then need to modify *mangulu* ‘mango.’ But, you don’t want to modify it; you ate all the mangos, not just the small ones (for example)
  - There’s also *awagha*, but it has issues too. What if your listener thinks you only ate a single mango entirely, or for the entire time? It’s too ambiguous.
  - But wait! *Awagha* is a modifier. If you use it with the noun, you can use then *ndoḥk*, and in fact, using *ndoḥk* will also disambiguate *awagha* (16b), and you also don’t have to add in any extra meaning than you originally wanted.

References


Fox, Danny & Kyle Johnson. 2016. Qr is restrictor sharing. In *Proceedings of the 33rd west coast conference on formal linguistics*.


