Radical non-configurationality and semantic composition

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Wambaya grammar development

- Developed against a test suite consisting of 804 examples from Nordlinger's (1998) descriptive grammar

- 5.5 weeks:
  - Assigns "appropriate" semantic representations to 91% of these examples; (mostly) without quantifiers
  - Low ambiguity (11.89 analyses/item)

- More recently: ~1 week of grammar development time adding in quantifiers introduced by noun-selecting heads for their dependents

Why Wambaya?

- Exploring typological range of the Grammar Matrix
- Applications for language documentation
- Applications for language revitalization
- Connections to descriptive linguistics community
- My own research on grammar engineering for linguistic hypothesis testing

Wambaya

- Non-Pama-Nyungan language of the Barkly Tablelands region of Austraila
- Subject of a fantastic descriptive grammar by Nordlinger (1998)
- Recently extinct; last fluent speakers have passed away (Nordlinger pc)
- Nonetheless, a language that was spoken in a real place by real people

Typological characteristics

- Radical non-configurationality
  - Head nouns may be separated from their modifiers (within clause)
  - Head nouns may be missing all together
- Second position auxiliary/clitic cluster
- No evidence for VP constituent
- Rich case-marking and case/number/gender agreement
- Split ergative (pronouns follow nom-acc, others erg-abs)

Nominal modifiers separated from head N

Ngaragana-nguja ngiy-a gujinganjanga-ni
grog-PROP.IV.ACC 3.SG.NM.A-PST mother.II.ERG
jiyawu ngabulu.
give milk.IV.ACC

‘(His) mother gave (him) milk with grog in it.’

Not extraction targeting left periphery

Babagayi	nyin	jundurra	mirnda
sister.II-LOC	2.SG.A(PR)-PROG	dust.IV(ACC)	1.DU.INC.OBL
bajbaga	yardi.		
big.IV(ACC)	put		

‘Sister you’re making lots of dust for us.’

Non-verbal predicates

Buguwama mamiyaga burnaringma.
big.III(NOM) that.III.SG.NOM wild.orange.III(NOM)
‘That’s a big orange.’

‘All’ appears as an affix on nouns & nominal modifiers

Garnguji-rdarra	injani=miji	alaji-rdarra
many.I-GROUP(NOM)	where=INFER	boy.I-GROUP(NOM)

The kids are somewhere, I don’t know where.

Can appear on adj only (if no noun) or noun only (even if there's an adj)

Garnguji-rdarra	irrin	mirra	narungujinka.
many.I-GROUP(NOM)	3.PL.S(NP)-PROG	sit	car.IV-DAT

A big group of people are sitting (waiting) for the bus.

Garngunya	ginaji	yabu	garirda-rdarra
many.II(ACC)	3.SG.M.A-HAB.PST	have	wife.II-GROUP(ACC)

garndawuginini.
one.I-LOC

'One (man) used to have many wives.'

‘No’ appears as specifier of nouns

Jiyawu	irra	manganyma	guyala.
give	3.PL.A-PST	tucker.III(ACC)	NEG

‘They didn’t give her any breakfast.’
(lit. They gave her no breakfast)

Nominal heads are not required

Yandu	ngin	murluwajanganka.
wait	1.SG.S(PR)-PROG	eye-PRIV.II-DAT

I'm waiting for the blind woman.

Modification of 1st/2nd person arguments

Gannga	ngirr-iba	banjani	Wambaya-rdarra.
return(FUT)	1.PL.EXC.S-NP.AWY	back	wambaya-GROUP(NOM)

‘All of us Wambaya people are going to go back (home).’

Modified head-complement phrase

head-2nd-comp-phrase:

$$\left[\begin{array}{l}
\textsc{synsem} \mid \textsc{comps} \left\langle \boxed{1}, \left[\begin{array}{ll} \textsc{opt} & + \\ \textsc{inst} & + \\ \textsc{local} & \boxed{3} \\ \textsc{non-loc} & \boxed{4} \end{array}\right] \right\rangle \oplus \boxed{A} \\
\textsc{hd-dtr} \mid \textsc{comps} \left\langle \boxed{1}, \boxed{2}\left[\begin{array}{ll} \textsc{inst} & - \\ \textsc{local} & \boxed{3} \\ \textsc{non-loc} & \boxed{4} \end{array}\right] \right\rangle \oplus \boxed{A} \\
\textsc{non-hd-dtr} \mid \textsc{synsem} \boxed{2}
\end{array}\right]$$

Rules for attaching modifiers

head-2nd-comp-mod-phrase:

$$\left[\begin{array}{l}\textsc{synsem} \mid \textsc{comps} \left\langle \boxed{1}, \left[\begin{array}{ll}\textsc{opt} & + \\ \textsc{inst} & \boxed{5} \\ \textsc{local} & \boxed{3} \\ \textsc{non-loc} & \boxed{4}\end{array}\right] \right\rangle \oplus \boxed{A} \\ \\ \textsc{hd-dtr} \mid \textsc{comps} \left\langle \boxed{1}, \boxed{2}\left[\begin{array}{ll}\textsc{inst} & \boxed{5} \\ \textsc{local} & \boxed{3} \\ \textsc{non-loc} & \boxed{4}\end{array}\right] \right\rangle \oplus \boxed{A} \\ \\ \textsc{non-hd-dtr} \mid \textsc{mod} \left\langle \left[\textsc{local} \quad \boxed{3}\right] \right\rangle\end{array}\right]$$

Argument composition auxiliaries

- Provide access to COMPS information to support object agreement, reflexive marking on auxiliary
- Support aux-second order

$$
\textit{arg-comp-aux:}
\begin{bmatrix}
\textsc{head} & \begin{bmatrix} \textit{verb}, & \textsc{aux} & + \end{bmatrix} \\
\textsc{val} & \begin{bmatrix}
\textsc{subj} & \langle\ \boxed{1}\ \rangle \\
\textsc{comps} & \langle\ \begin{bmatrix}
\textsc{opt} & - \\
\textsc{head} & \begin{bmatrix} \textit{verb} \\ \textsc{form} \quad \textit{fin} \end{bmatrix} \\
\textsc{subj} & \langle\ \boxed{1}\ \rangle \\
\textsc{comps} & \boxed{A}
\end{bmatrix} \rangle \oplus \boxed{A}
\end{bmatrix}
\end{bmatrix}
$$

Word order

- head-arg and head-arg-mod rules all come in head-initial and head-final varieties
- *aux-head-initial* and *aux-head-final* types use the feature MC ('main clause') to enforce aux-second order with right attachment first

$$
\textit{aux-head-init:}\quad
\begin{bmatrix}
\text{CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{AUX} & + \end{bmatrix} \\ \text{MC} & \boxed{1}\textit{na} \end{bmatrix} \\
\text{HD-DTR}\ \boxed{2}\begin{bmatrix}\text{CAT} \mid \text{MC}\ \boxed{1}\end{bmatrix} \\
\text{NON-HD-DTR}\ \boxed{3} \\
\text{ARGS}\ \langle\ \boxed{2}, \boxed{3}\ \rangle
\end{bmatrix}
\qquad
\textit{aux-head-final:}\quad
\begin{bmatrix}
\text{CAT} & \begin{bmatrix} \text{HEAD} & \begin{bmatrix} \textit{verb} \\ \text{AUX} & + \end{bmatrix} \\ \text{MC} & \textit{bool} \end{bmatrix} \\
\text{HD-DTR}\ \boxed{2}\begin{bmatrix}\text{CAT} \mid \text{MC}\ \textit{na}\end{bmatrix} \\
\text{NON-HD-DTR}\ \boxed{3} \\
\text{ARGS}\ \langle\ \boxed{3}, \boxed{2}\ \rangle
\end{bmatrix}
$$

Introduction of quantifiers

- Can’t have non-branching rule over N
    - What to do if there’s only an A?
    - What to do if the A attaches later?
- Instead, have the selecting head pre-insert; other -rdarra and ‘no’ can specialize the PRED value.
- Various constructions also introduce: predicate-nominal, cxs deriving modifiers from nouns, ...

Introduction of quantifiers

$$
\left[\begin{array}{l}
\textit{verb-lex} \\
\\
\textsc{synsem.local.cont} \quad \left[\begin{array}{ll}
\textsc{rels} & \left\langle\, !\ \boxed{}, \left[\begin{array}{ll}
\textit{quant-relation} & \\
\textsc{pred} & \boxed{1}\textit{unspec\_q\_rel} \\
\textsc{arg0} & \boxed{2} \\
\textsc{rstr} & \boxed{3}
\end{array}\right], \ldots ! \,\right\rangle \\
\textsc{hcons} & \left\langle\, !\ \boxed{3}\ \textsc{qeq}\ \boxed{4}, \ldots ! \,\right\rangle
\end{array}\right] \\
\\
\textsc{arg-st} \quad \left\langle \left[\begin{array}{ll}
\textsc{local} & \left[\begin{array}{ll}
\textsc{cat.head.keys.sprkey} & \boxed{1} \\
\textsc{cont.hook} & \left[\begin{array}{ll}
\textsc{ltop} & \boxed{4} \\
\textsc{index} & \boxed{2}
\end{array}\right]
\end{array}\right]
\end{array}\right], \ldots \right\rangle
\end{array}\right]
$$

Resolving PRED values of quantifiers

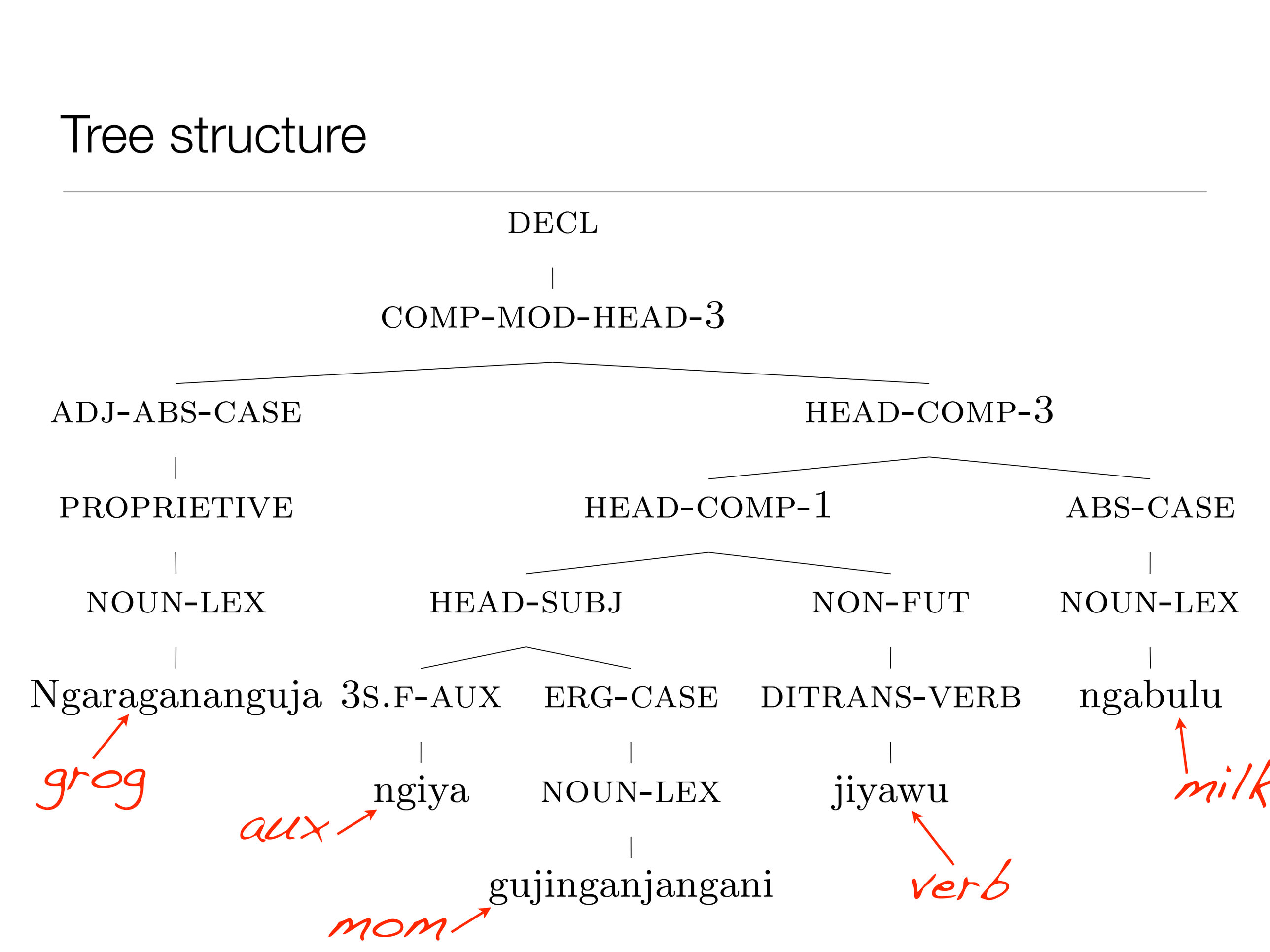
$$\left[\begin{array}{ll} \textit{rdarra-adj-lex-rule} & \\ \textsc{synsem.local.cat.head.mod} & \left\langle \left[\textsc{local.cat.head.keys.sprkey} \ \text{all\_q\_rel} \right] \right\rangle \\ \textsc{dtr} & \textit{rdarra-adj-dtr} \end{array}\right]$$

Example 1 (repeat)

Ngaragana-nguja ngiy-a gujinganjanga-ni
grog-PROP.IV.ACC 3.SG.NM.A-PST mother.II.ERG
jiyawu ngabulu.
give milk.IV.ACC

‘(His) mother gave (him) milk with grog in it.’

Tree structure



MRS

$$
\begin{bmatrix}
\textit{mrs} & \\
\text{TOP} & \boxed{1} \\
\text{INDEX} & \boxed{2} \\
\text{RELS} & \left\langle
\begin{bmatrix} \textbf{\_give\_v\_rel} \\ \text{LBL} \quad \boxed{13} \\ \text{ARG0} \quad \boxed{2} \\ \text{ARG1} \quad \boxed{12} \\ \text{ARG2} \quad \boxed{14} \\ \text{ARG3} \quad \boxed{6} \end{bmatrix},
\begin{bmatrix} \textbf{unspec\_q\_rel} \\ \text{LBL} \quad \boxed{15} \\ \text{ARG0} \quad \boxed{12} \\ \text{RSTR} \quad \boxed{16} \\ \text{BODY} \quad \boxed{17} \end{bmatrix},
\begin{bmatrix} \textbf{\_mother\_n\_rel} \\ \text{LBL} \quad \boxed{11} \\ \text{ARG0} \quad \boxed{12} \end{bmatrix},
\begin{bmatrix} \textbf{unspec\_q\_rel} \\ \text{LBL} \quad \boxed{18} \\ \text{ARG0} \quad \boxed{14} \\ \text{RSTR} \quad \boxed{19} \\ \text{BODY} \quad \boxed{20} \end{bmatrix}, \\
& \quad \begin{bmatrix} \textbf{unspec\_q\_rel} \\ \text{LBL} \quad \boxed{21} \\ \text{ARG0} \quad \boxed{6} \\ \text{RSTR} \quad \boxed{22} \\ \text{BODY} \quad \boxed{23} \end{bmatrix},
\begin{bmatrix} \textbf{\_milk\_n\_rel} \\ \text{LBL} \quad \boxed{5} \\ \text{ARG0} \quad \boxed{6} \end{bmatrix},
\begin{bmatrix} \textbf{proprietive\_a\_rel} \\ \text{LBL} \quad \boxed{5} \\ \text{ARG0} \quad \boxed{7} \\ \text{ARG1} \quad \boxed{6} \\ \text{ARG2} \quad \boxed{4} \end{bmatrix},
\begin{bmatrix} \textbf{unspec\_q\_rel} \\ \text{LBL} \quad \boxed{8} \\ \text{ARG0} \quad \boxed{4} \\ \text{RSTR} \quad \boxed{9} \\ \text{BODY} \quad \boxed{10} \end{bmatrix},
\begin{bmatrix} \textbf{\_grog\_n\_rel} \\ \text{LBL} \quad \boxed{3} \\ \text{ARG0} \quad \boxed{4} \end{bmatrix}
\right\rangle \\
\text{HCONS} & \left\langle
\begin{bmatrix} \textit{qeq} \\ \text{HARG} \quad \boxed{9} \\ \text{LARG} \quad \boxed{3} \end{bmatrix},
\begin{bmatrix} \textit{qeq} \\ \text{HARG} \quad \boxed{16} \\ \text{LARG} \quad \boxed{11} \end{bmatrix},
\begin{bmatrix} \textit{qeq} \\ \text{HARG} \quad \boxed{19} \\ \text{LARG} \quad \boxed{24} \end{bmatrix},
\begin{bmatrix} \textit{qeq} \\ \text{HARG} \quad \boxed{22} \\ \text{LARG} \quad \boxed{5} \end{bmatrix}
\right\rangle
\end{bmatrix}
$$

MRS algebra (Copestake et al 2001)

- Grammars that conform to the algebra can be shown to be compositional
- The algebra requires that each constituent corresponds to a sement, with a hook, a set of holes, and a list of eps.
- When two constituents combine, the hook of one used to fill a hole in the other
- ... and then the hole stays filled.

How ferocious an ATV do we need?

- Wambaya analysis is off-road... but how far into the bush?
- Head-arg: hook, eps, and holes, but the holes don’t stay filled
- Head-arg-mod: what’s used to fill the hole in the modifier daughter is not the hook of the head daughter, but info about one of its arguments
- Another analysis of Wambaya might be possible, but I think it would have the same problems... cf. Kiss 2005 on relative clause extraposition

And one more thing...

- End up with quantifiers with unbound RSTR
    - when there's nothing overt corresponding to the argument
    - can't suppress the quantifier in that case (non-monotonic)
    - not obvious how to only introduce the quantifiers in the other case (given analysis of discontinuous NPs)

So what do we do now?

- It seems that Wambaya + tdl = not consistent with MRS algebra
- Change the algebra?
- Come up with an alternative algebra (different languages use different ones?)
- Change the formalism?
- Not worry about it, if the MRSs coming out the other end look okay?

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