Plan

1. Review typological evidence supporting the assumption that government and agreement are based on the same sense of "argument selection":

   select subsets of arguments and subject them to some morphosyntactic treatment: case, agreement

2. Contrast this with the finding of strong differences in the worldwide distribution of government and agreement

3. Explain this by the proposal that the distribution of linguistic structures is defined through fine-grained and highly specific variables, and not through interlocked 'systems'

Based on results from two projects

1. Typological variation in the processing of grammatical relations (DFG, 2006-2012), co-directed with Ina Bornkessel-Schlesewsky (U. Marburg)

2. EuroBABEL project on referential hierarchies in morphosyntax: differential agreement in Chintang (DFG, 2009-2012)

Cross-project team and contributors:

- Alena Witzlack-Makarevich
- Taras Zakharko
- Robert Schikowski
- Lennart Bierkandt

Argument selection by case and agreement

Key assumption in this work:

- Government and agreement always operate on subsets of arguments, e.g.
  - a case may only apply to {S, A} or only by {S_{exp}, A_{pass}, G}
  - an agreement form may only be triggered by {S, A} or only by {$ARG_{[1/2]}$}
  - Let's call this subsetting effect 'selection'
- Typological question: any fundamental difference between the **kinds of selections** attested?
- Roles? Conditions of reference? Predicate class?

  → Look at 'non-canonical' patterns of agreement and case to explore this

Exhibit #1: 'hierarchical agreement vs. case'

- Agreement with whatever is the highest argument

Icari Dargwa (Nakh-Daghestanian; Sumbatova & Mulatov 2003)

a. *du-l Murad uc-ib=**da**.*
1s-ERG M.[NOM] catch.m.PFV-PST=**1s**
'I caught Murat.'

b. *Murad du uc-ib=**da**.*
M.[NOM] 1s[NOM] catch.m.PFV-PST=**1s**
'Murad caught me.'

Exhibit #1: 'hierarchical agreement vs. case'

- Hierarchical case: NOM in Philippine languages?

a. *bumili **ang**=**lalake** ng=isda sa=tindahan.*
PFV.A.buy **NOM**=man OBL=fish LOC=store
'The **man** bought fish at the/a store.'

b. *binili ng=lalake **ang**=**isda** sa=tindahan.*
PFV.P.buy OBL=man **NOM**=fish LOC=store
'The/a man bought the **fish** at the/a store.'

But perhaps case is assigned by the verb morphology, not the other way round.

Exhibit #1: 'hierarchical agreement' and 'hierarchical case'

- A language just like Tagalog, but without the relevant verb morphology:
- Nusa Tenggara (a.k.a. Lesser Sunda Islands):

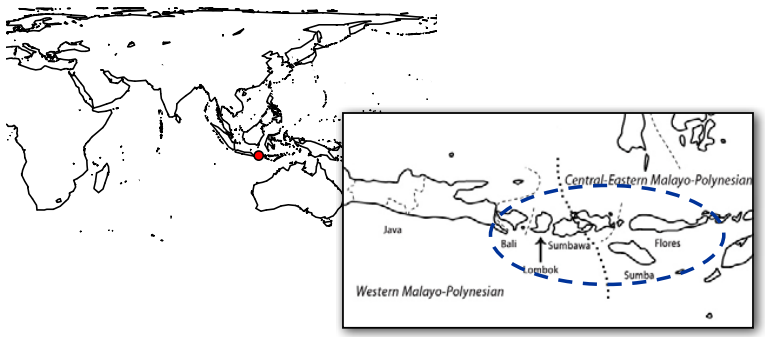


Exhibit #1: 'hierarchical agreement' and 'hierarchical case'

Meno-Mené Sasak, Puyung variety (Austronesian; Shibatani 2008, 2009)

a. ***Alii** wah=en kirim-an aku surat*
Ali[-**NOM**] PERF**=3** send-APPL I[-**ABS**] letter
'**Ali** sent me a letter.'

b. ***Aku** wah=en kirim-an surat isiq Alii*
I[-**NOM**] PERF**=3** send-APPL letter **ERG** Ali
'Ali sent **me** a letter.'

Exhibit #1: 'hierarchical agreement' and 'hierarchical case'

- Only NOM can be relativized on (like Tagalog *ang*):

(1) a. *Inaq* *mu=n* *kelor* [*sebie odaq*]
mother.**NOM** PAST=3 eat [chili green].**ABS**

b. *Mu=n* *kelor* [*sebie odaq*] *isiq* *inaq*
PAST=3 eat [chili green].**NOM** **ERG** mother

Both: 'Mother ate green chili.'

(2) a. *Sebie odaq* [*saq mu=n Ø* *kelor isiq* *inaq*] *besar*
chili green [REL PAST=3 (**NOM**) eat **ERG** mother] big

b. * *Sebie odaq* [*saq inaq* *mu=n* *kelor Ø*] *besar*
chili green [REL mother.**NOM** PAST=3 eat **(ABS)**] big

Both: 'The green chili which mother ate was big.'

(3) a. *dengan nine* [*saq Ø* *kelor* [*sebie odaq*]]=*no* *inaq=k*
person female [REL (**NOM**) eat [chili green]]=that mother=1

b. * *dengan nine* [*saq mu=n* *kelor* [*sebie odaq*] *(isiq) Ø*]=*no* *inaq=ku*
person female [REL PAST=3 eat [chili green].**NOM** (**ERG** A)]=that mother=1

Both: 'The woman who ate green chili is my mother.'

Exhibit #1: 'hierarchical agreement' and 'hierarchical case'

- Why is this case?
  - dependent marker on arguments
  - represents the most prominent argument in syntax
  - does not add to, but replaces other case (ERG, ABS)
- Why is it hierarchical?
  - no diathesis, nor any other verb features matter; only argumenthood!

Exhibit #1: 'hierarchical agreement' and 'hierarchical case'

- Contrast with passives:

a. ***Aku*** *wah=k* *te-empuk* *isiq* *Ali*
I.**NOM** PERF**=1** **PASS**-hit **BY** Ali

b. * ***Aku*** *wah=en* *te-empuk* *isiq* *Ali*
I.**NOM** PERF**=3** **PASS**-hit **BY** Ali

Both: '**I** got hit by Ali.'

c. ***Aku*** *wah=en* *kirim-an* *surat* *isiq* *Alii*
I[-**NOM**] PERF**=3** send-APPL letter **ERG** Ali

'Ali sent **me** a letter.'

Exhibit #1: 'hierarchical agreement' and 'hierarchical case'

Conclusion:

- No fundamental difference between agreement and case: both can be sensitive to referential hierarchies rather than (or in addition to) argument roles

Exhibit #2: ‘direct vs. inverse’ systems and argument scenarios

- Well-known from agreement systems, e.g.

Central Ojibwa (Algic; Rhodes 1976)

a. *n-waabam-**aa**-Ø.*
1-see-**DIR**-3
‘I see him.’

b. *n-wābam-**igw**-Ø.*
1-see-**INV**-3
‘He sees me.’

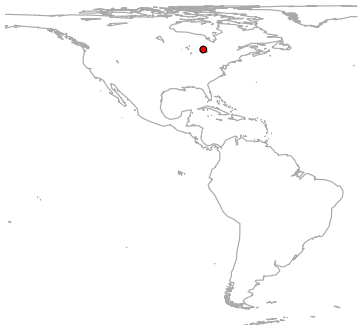


Exhibit #2: ‘direct vs. inverse’ systems and argument scenarios

- But also attest in case systems, though less commonly:

Yurok (Algic; Robins 1958:21)

a. *keʔl yoʔ ki newo-ʔm.*
2sNOM 3s[**NOM**] FUT see-2s>3s
‘You will see him.’

b. *keʔl nek ki newoh-paʔ.*
2sNOM 1s[**NOM**] FUT see-2>1s
‘You will see me.’

c. *yoʔ nek-**ac** ki newoh-peʔn.*
3sNOM 1s-**ACC** FUT see-3s>1s
‘He will see me.’

Exhibit #2: ‘direct vs. inverse’ systems and argument scenarios

- or on the A argument:

Umatilla Sahaptin (Plateau; Rigsby & Rude 1996)

a. *ɬwínš i-tu.xnana yáamaš-na.*
man[-**NOM**] 3sSBJ-shot mule.deer-OBJ
‘The man shot a mule deer.’

b. *ɬwínš-**nɬm**=nam i-q’ínu-ša.*
man-**ERG**=2s 3sSBJ-see-IPFV
‘The man sees you.’

Exhibit #2: ‘direct vs. inverse’ systems and argument scenarios

- general pattern where case assignment depends on the complete argument scenario (found in only 5 out of 423 languages surveyed)

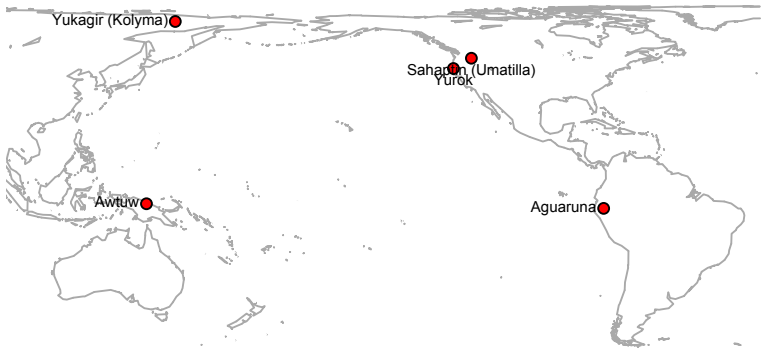


Exhibit #2: ‘direct vs. inverse’ systems and argument scenarios

- Kolyma Yukaghir (Maslova 2003)

		P		
		1	2	3
A	1		ANOM PACC	ANOM PNOM
	2	ANOM PACC		ANOM PNOM
	3	ANOM PACC	ANOM PACC	ANOM PACC

a. *met* *tolow* *kudede*
I[NOM] deer[**NOM**] kill.TR.1s
‘I killed a deer.’

b. *met es’ie* *tet* *pulut-**kele*** *kudede-m*
my father[NOM] your husband-**ACC** kill-TR.3s
‘My father has killed your husband.’

Exhibit #2: ‘direct vs. inverse’ systems and argument scenarios

- Aguaruna (Jivaroan; Overall 2009)

		P				
		1s	1p	2s	2p	3
A	1s			ANOM PACC	ANOM PACC	ANOM PACC
	1p			ANOM PACC	ANOM PNOM	ANOM PNOM
	2	ANOM PACC	ANOM PNOM			ANOM PNOM
	3	ANOM PACC	ANOM PACC	ANOM PACC	ANOM PACC	ANOM PACC

a. *hutii* *ainau-ti* *atumɨ* *wai-hatu-ina-humɨ-i.*
1pNOM p-SAP 2pNOM see-1pP-p:IPFV-2p-DECL
‘You (pl.) see us.’

b. *nĩ* *iina* *antu-hu-tama-ka-aha-tata-wa-i.*
3sNOM **1pACC** listen-APPL-1pP-INTS-p-FUT-3-DECL
‘He will listen to us.’

Exhibit #2: ‘direct vs. inverse’ systems and argument scenarios

Conclusion:

- No fundamental difference between case and agreement: both can be sensitive to the properties of co-arguments

Exhibit #3: Split-S

- Split-S (“semantic alignment”, “stative/active type”)is often hypothesized to be a feature of agreement much more than case (Klimov 1983, Nichols 1992)
- But common in case as well, e.g. Hindi:

a. *Rām* *āy-ā.*
R-**[NOM]** come-PP.MASC
S
‘Ram came.’

b. *Rām-ne* *nahā-yā.*
R.-**ERG** bathe-PP.MASC.
S
‘Ram bathed.’

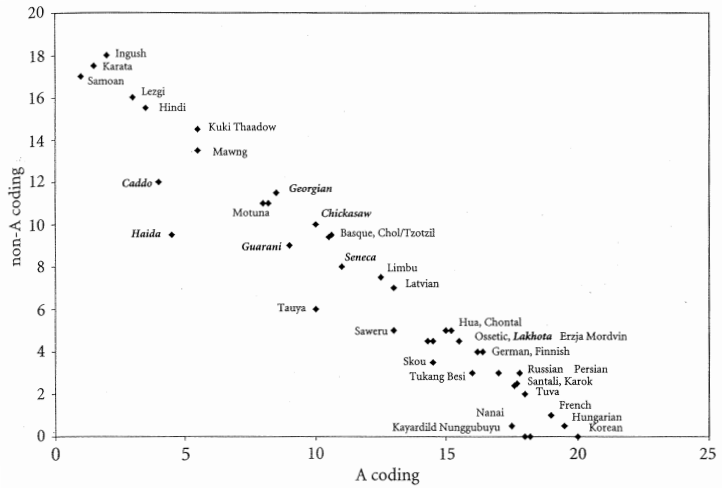
c. *Dīpak-ko* *ṭhaṇḍī lag-rah-i.*
Deepak-**ACC** cold(F) feel-IPFV-PP.FEM
S
‘Deepak feels cold.’

A question of semantics (experience vs. agency) or class sizes?

Exhibit #3: Split-S

- Walsh 1987, Bickel 2004, Evans 2004 etc.: experience a relevant factor in split-S agreement as well
- Nichols (2008): typological survey on 20 verb meanings:
  - see
  - forget
  - remember
  - hungry
  - thirsty
  - cold
  - glad/happy
  - sorry/regret
  - like
  - afraid/fear
  - angry
  - sneeze
  - breath
  - stand (up)
  - jump
  - fly (off)
  - fall (down)
  - shout/yell
  - weep/cry
  - laugh

Exhibit #3: Split-S



- No clear types, certainly not in terms of CASE vs AGREEMENT

Nichols 2008:131

Exhibit #3: Split-S

Conclusion:

- No fundamental difference between case and agreement: both can be sensitive to lexical predicate classes

Exhibit #4: extension to non-arguments

- Cases frequently extend to non-arguments, e.g. datives of interest, accusatives of extension etc. (Vincent & Börjars 2011)
- Also in agreement, e.g. Maithili (Indo-Aryan; Bickel et al. 1999)

a. *ham hunkā dekh-l-i-ainh.*
1NOM 3hREM.DAT see-PST-1NOM-3hNONNOM
'I saw him^{h}.'

b. *ham okrā dekh-l-i-auk.*
1NOM 3nhDAT see-PST-1NOM-2nhNONNOM
'I saw him^{nh} (who is related to you^{nh}, cares about you^{nh}, thinks about you^{nh} etc...)'

- Again, no fundamental difference between case and agreement

Getting extreme: Indo-European

- Some languages go so far as to totally (or near-totally) identify the argument sets selected by agreement and case:
- An Indo-Euroversal (Bickel 1999, 2004):

  "The Indo-European Integrativity Principle:

  If a construction is constrained by a syntactic pivot, this pivot is likely to be identified with an element listed in predicate-level valence frames (rather than directly in semantic argument structures)" (Bickel 2004:104)

  i.e. sensitive to governed cases

  (probably also valid for Nakh-Dagestanian)

Getting extreme: Indo-European

Case-based agreement in Maithili (IE)

a. *(**tũ**)* *bimār* *ch-**æ**?*
2nh**NOM** sick be-2nh**NOM**
'Are you sick?'

b. *(**torā**)* *khuśi* *ch-**au**?*
2nh**DAT** happy 2nh-**NONNOM**
'Are you happy?'

Non-case-based agreement in Belhare (ST)

a. *(han)* *khar-e-**ga*** *i?*
2s**NOM** go-PST-**2sS** Q
'Did you go?'

b. *(han-**na**)* *un* *lur-he-**ga*** *i?*
2s-**ERG** 3sNOM [3sA-]tell-PST-**2sA** Q
'Did you tell him/her?'

c. *ciya* *(han-**naha**)* *n-niũa* *tis-e-**ga*** *i?*
tea.NOM 2s-**GEN** 2sPOSS-mind please-PST-**2sA** Q
'Did you like the tea?'

Getting extreme: Indo-European

- Effect often so strong that one needs to define agreement in terms of case, e.g. Hindi:

  "The verb agrees with the highest ARG associated with NOM case." (Mohanan 1994: 105)

a. *Ravī* *roṭī* *khā-e-gā.*
R.(**M**)[NOM] bread(sF)[NOM] eat-3s-FUTs**M**
'Ravi will eat some bread.'

b. *Ravī=ne* *roṭī* *khā-yī.*
R.(M)=ERG bread(s**F**)[NOM] eat-PST.PTCPs**F**
'Ravi ate some roti.'

c. *Ravī=ne* *roṭī=ko* *khā-yā.*
R.(M)=ERG bread(sF)=ACC eat-PST.PTCPs**M**
'Ravi ate the roti.'

Getting extreme: Indo-European

- or define all grammatical relations in terms of case (e.g. Pāṇinī; or in modern linguistics, e.g. Reis 1982 on German)

Hindi (Kachru et al. 1976, Bickel & Yādava 2000)

a. *un=ko*$_i$ *maĩ=ne* [∅$_i$ *ḍar-ā* *hu-ā*] *pā-yā.*
3SG.OBL=DAT 1SG.OBL=ERG NOM fear-P.SG.M AUX-P.SG.M find-PT.SG.M

b. * *un=ko*$_i$ *maĩ=ne* [∅$_i$ *ḍar* *lag-ā* *hu-ā*] *pā-yā.*
3SG.OBL=DAT 1SG.OBL=ERG DAT fear[NOM] feel-P.SG.M AUX-P.SG.M find-PT.SG.M
'I found him afraid.'

German

a. *Sie* *sah* *ihn*$_i$ [∅$_i$ *müde werd-en*].
3SG.F:NOM see:3SG.PT 3SG.M:ACC NOM tired become-INF
'She saw him getting tired.'

b. * *Sie* *sah* *ihn*$_i$ [∅$_i$ *schwindel-n*].
3SG.F:NOM see:3SG.PT 3SG.M:ACC DAT feel.dizzy-INF
Intended: 'She saw him feeling dizzy.'

▸ A trend with exceptions (cf. Bickel 2004 for Indo-Aryan exceptions; Barðdal & Eythórsson 2011 for Germanic exceptions)

Contrast with other families, e.g. Sino-Tibetan

Belhare (Bickel 2004)

a. [∅ *khoŋ-ma*] *n-nui-ʔ-ni-ga.*
NOM play-INF NEG-be.permitted-NPT-NEG-2[SG.S]
'You shouldn't play.'

b. [∅ ∅ *kit-ma*] *n-nui-ʔ-ni-ga.*
ERG NOM fear-INF NEG-be.permitted-NPT-NEG-2[SG.S]
'You shouldn't be feared.' ('[s/he/they/I] shouldn't fear you.')
Not: 'You shouldn't fear [him/her/it/them]'

c. [*ŋka* ∅ *su-ma*] *nu-yu.*
1SG.NOM NOM sour-INF [3SG.S-]be.permitted-NPT
'I like [the beer] sour.' (literally, '[the beer] may be sour to me.')

d. *[∅ *iŋa* *su-ma*] *nui-ʔ-ŋa.*
NOM beer.NOM sour-INF may-NPT-1SG.S
Intended: 'I like [the beer] sour.' (literally, 'to me, [the beer] may be sour.')

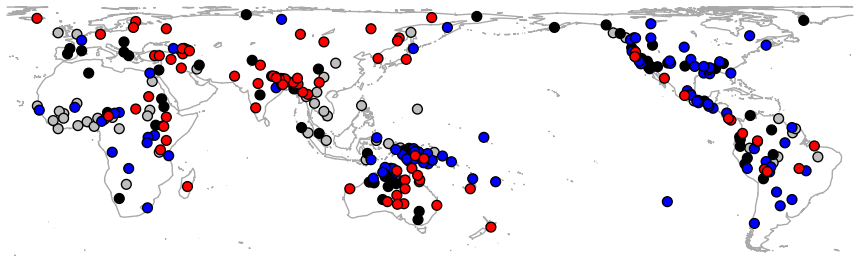
Interim summary

- No evidence that there is a fundamental difference in the kinds of sets selected by government vs. agreement
- Reasonable assumption that it's argument subsets throughout,
  - constrained by reference (e.g. $A_{[1/2]}$ vs. A) of arguments and co-arguments
  - split by clause, TAM, lexical predicate classes
  - etc.
- Moreover, in some languages (Indo-European, Nakh-Daghestanian), agreement is sensitive to case government
  - ▸ expect government and case to show related distributions

BUT:

Distributional difference #1: presence of case and agreement

- Nichols 1992: head-marking vs. dependent-marking is distributed (macro-)areally, e.g.
- Any kind of A and P agreement (including pronominal agreement) and any kind of A≠P distinction of NPs (including DOM, DAM), *N*=303:



- ▸ some trend towards complementary distribution?

Own data (AUTOTYP), plus data from Siewierska 2005/WALS and Dryer 2005/WALS

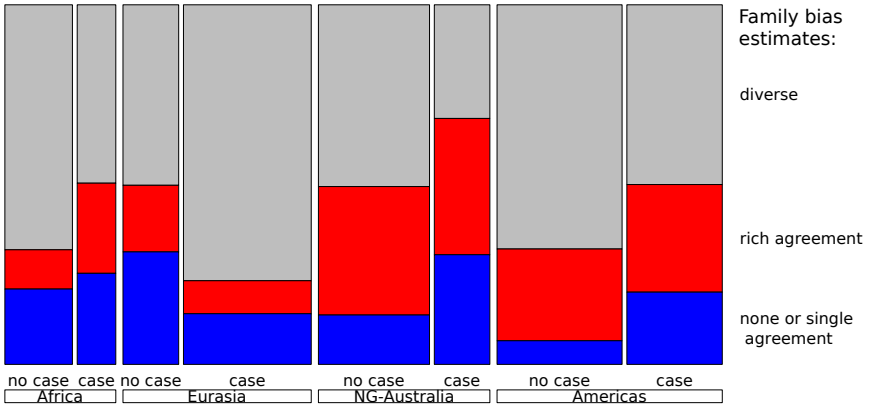
Distributional difference #1: presence of case and agreement

- A complementary distribution would support the "DuPonceau tradition" of analyzing
  - "rich" agreement as absorbing argument positions and
  - thereby shielding NPs off from case government
- If so, expect that
  - languages with rich agreement preferentially loose/don't develop case, and
  - languages with rich case preferentially loose/don't develop rich agreement
- Test this.

Methodological intermezzo: the Family Bias Method

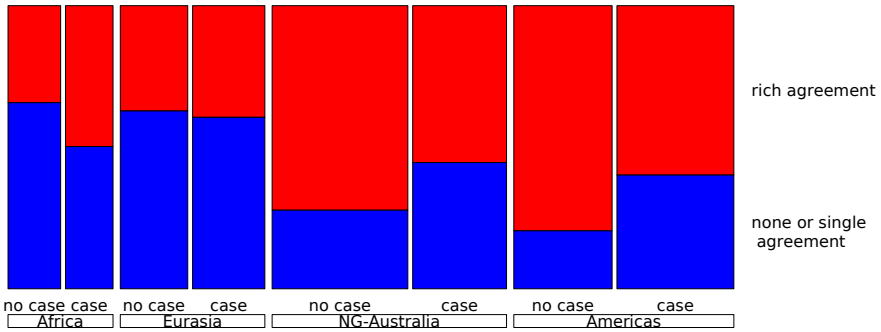
- Typological distributions are the product of diachronic developments
- Test whether diachronic developments are influenced by AREAS or UNIVERSALS or both
- Estimate these developments via the extent of distributional biases within language families, given some condition:
  - if X is subject to a developmental trend in a family (because of AREAS or UNIVERSALS), the family will show a distributional bias in X; if not, no trend!
  - estimate family biases statistically within (sufficiently large) families
  - extrapolate estimates to smaller families and isolates (using fairly standard Baysian techniques from other disciplines)

Distributional difference #1: presence of case and agreement



- "diverse" can result from an imperfect bias in either direction, depending on the proto-language
- ▸ no evidence on hypotheses about diachronic trends

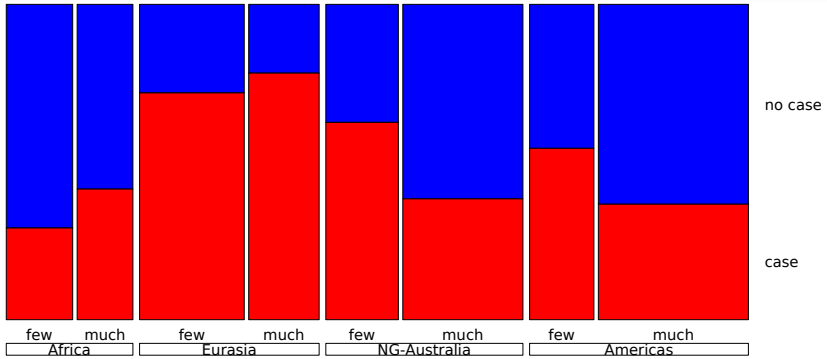
Distributional difference #1: presence of case and agreement



Results (via AIC reduction of loglinear models):

- no significant interactions between anything
- no evidence for a diachronic bias in rich agreement depending on the presence of rich case or on the macroarea

Distributional difference #1: presence of case and agreement



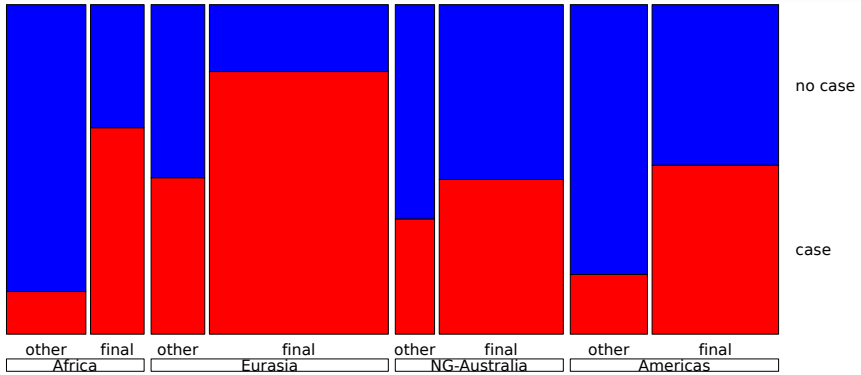
Results (via AIC reduction of loglinear models):

- no evidence for a diachronic bias in case dependent on the presence of rich agreement
- CASE ×AREA is borderline significant (G^2=6.88, p=.076): **Eurasia**! (cf. Bickel & Nichols 2006)

Distributional difference #1: presence of case and agreement

- Conclusion: no evidence for any universal diachronic interaction between rich case (A≠P) and rich agreement (multiple agreement).
- Bad news for the DuPonceau tradition
- But perhaps both are conditioned by a third variable: word order, as per Hawkins's theory (2004):
  - rich case is favored by V-final order
  - rich agreement is disfavored by V-final order
  - this would suggest partial, but not complete complementarity
  - test this, again controling for macroareas

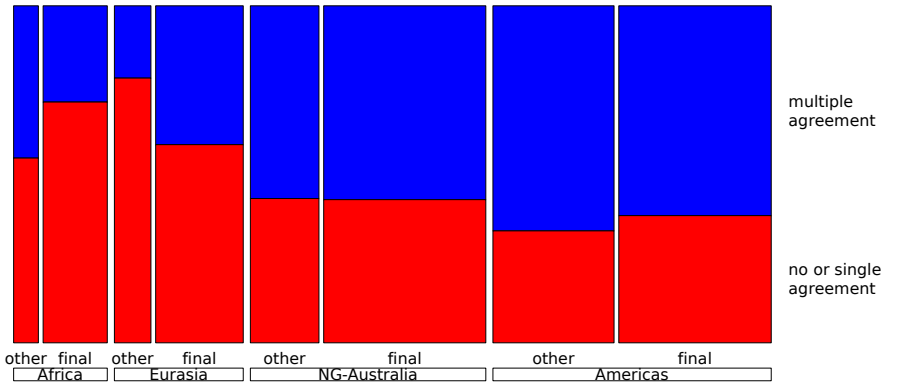
Distributional difference #1: presence of case and agreement



Results (via AIC reduction of loglinear models):

- no three-way interaction
- diachronic bias towards case in V-final groups (G^2=6.63, p<.001)
- and also dependent on macro-areas (G^2=9.39, p=.02): **Eurasia!**

Distributional difference #1: presence of case and agreement



Results (via AIC reduction of loglinear models):

- no evidence for a bias against rich agreement in V-final groups (G^2=.27, p=.60)
- perhaps diachronic bias in rich agreement dependent on macro-areas (G^2=7.15, p=.067): **Circum-Pacific!** (Nichols 1992)

Distributional difference #1: presence of case and agreement

Conclusion:

- While both the presence of agreement and case depends on areal processes,
  - the presence of case diachronically also depends on word order, but
  - the presence of rich agreement seems independent of word order (*pace* Hawkins 2004)
- Suggests that the distribution of case and agreement is subject to different processes, despite their structural similarity!

Discussion

- This finding has a natural interpretation from a processing perspective:
  - the presence of case is a plausible facilitator when processing NP argument roles of initial NPs

    NP NP V vs. **V NP NP**
  - but agreement is of much less help when processing argument roles and it doesn't make a difference whether the agreement markers occur early or late:

    V-agr NP NP vs. **NP NP V-agr**

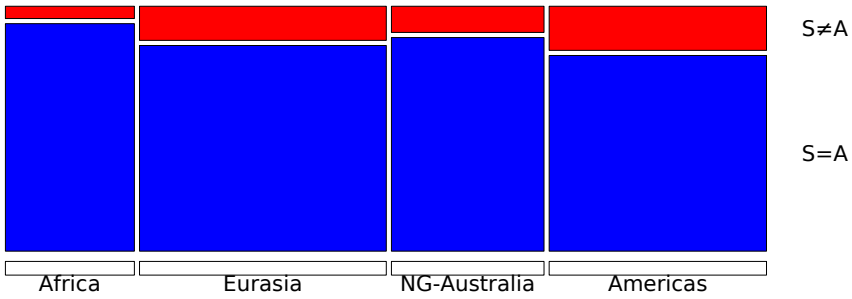
Discussion

- The finding also fits with independent evidence on different principles underlying the development of agreement and case.
- A plausible principle underlying the development of rich agreement (Givón 1976 and many others since):

  cliticization of highly topical arguments (or: old information exponents, i.e. pronouns)

Discussion

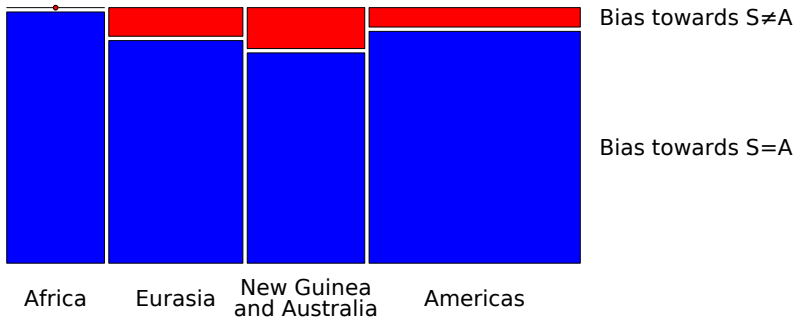
- Prediction from this: to the extent that highly topical arguments tend to be in S or A role (DuBois 1987, 2003), expect high proportion of S=A alignment:



Results:
no interaction and no area effect, but significant effect of S=A > S≠A bias (G^2=23.08, p<.001)

Discussion

- Now, we also find a preference for S=A in case:



Results:

again no evidence for an interaction, but significant S=A > S≠A bias (G^2=95.10, p<.001) and significant area (G^2=9.71, p<.021) effect

Discussion

- But this is unlikely to be due to the same topicality effect as the S=A bias in agreement
- If the S=A bias in case would be motivated by topicality (or: old information), we'd make the wrong predictions (under Zipfian assumptions):
  - Topical NPs are often (mostly) dropped, so an overt NP in A function should receive special marking: {A}
  - Overt (non-topical, new information) NPs occur mostly in S or P function, and so should prefer zero-marking for {S,P}
- together, this would lead to {A} ≠ {S,P}!

Discussion

An alternative theory (Bornkessel-Schlesewsky & Bickel 2010):

- Small anti-P effects from processing initial unmarked NPs lead to
  - preservation of S=A alignment of NPs (if it's already in place) or
  - development of S=A alignment of NPs (if it's not there yet)

Discussion

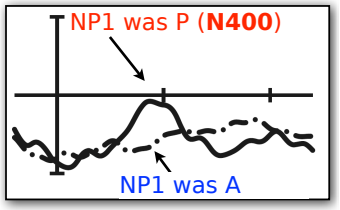
- Processing local ambiguities:

dass Peter (that Peter: ~~A~~/P?) *Lehrerinnen* (teachers: A/P?) { ***mögen*** [NP1 was P!] (like) / ***mag*** [NP1 was A!] (likes) }

- The brain tends to first assume that an unmarked (lexically unconstrained) NP1 is S or A, but not P
- If NP1 later (e.g. at the verb) turns out to be P, this costs something

▶ **Anti-P effect in the ERP signal**
minimizing depency expectations (Bornkessel-Schlesewsky et al. 2009)

ERP:



Case Study 2: biases in case alignment

- Anti-P effect demonstrated also in
  - English (Frazier 1987)
  - Dutch (Frazier 1987)
  - Italian (de Vincenzi 1991)
  - Mandarin Chinese (Wang et al. 2009, 2010/CUNY)
  - Turkish (Demiral et al. 2008/Cogn.)
  - Hindi (Choudhary et al. 2010/CUNY)

\+ various experimental techniques: behavioural and neuroscientific measures
\+ independent of animacy, frequency, topicality

Discussion

- Supports the proposal that the development of agreement is driven by different principles than the development of case
  - grammaticalization in the case of agreement
  - (re)analysis in processing in the case of case

Conclusions

- Case and agreement doesn't develop as an interlocked system, as IE (and much modeling based on IE) would let us expect
- Instead, case and agreement develop independently, through independent processes that affect always just specific aspects of these phenomena.

Conclusions

- This requires analysis in terms of a **Multivariate Typology**:
  - selector type: case, various types of agreement, raising, conjunction reduction etc. (all that matters for GRs)
  - set of roles that is selected (i.e. alignment)
  - referential properties
  - co-argument conditions
  - lexical predicate classes
  - clause type (main, dependent)
  - etc.