Workshop: Semantic maps:
Where do we stand and where are we going?
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Semantic maps, attractor networks and typological hierarchies

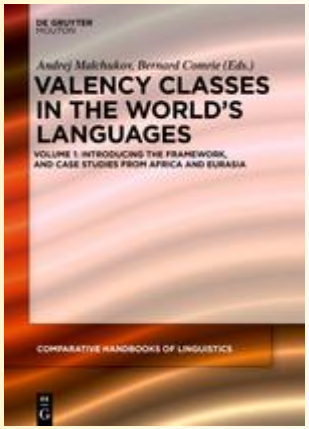
Introduction

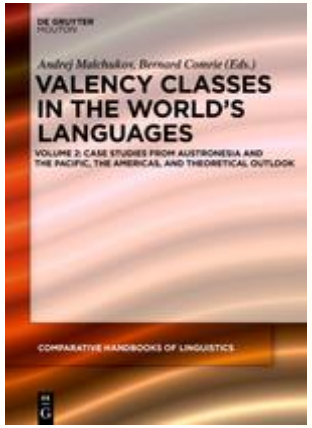
- Discussion of semantic maps and typological hierarchies, especially those related to local markedness
- Argue that LM-hierarchies share certain features both with typological hierarchies and semantic maps
- Illustrate it for two domains
  - Voice, valency and transitivity (based on the results of the Leipzig Valency Classes Project)
  - Tense/aspect and actionality (an ongoing joint project with V.S. Xrakovskij and his colleagues in St.Petersburg)

Leipzig Valency Classes Project (2010-2015)

- Systematic cross-linguistic investigation of valency patterns in 30 languages, based on the Leipzig Valency Questionnaire
- http://www.eva.mpg.de/lingua/valency/files/database_manual.php

- publication of the volume "Valency Classes: a comparative Handbook" (Malchukov & Comrie, eds. 2015; 2 vols), which including general chapters, as well as chapters on 30 individual languages





- publication of the database (ValPaL, Hartmann, Haspelmath & Taylor eds. 2013) with contributions on individual languages based on the Database Questionnaire http://www.valpal.info/

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Goals of the Leipzig Valency Project

- How universal are valency classes
  - Typological relevance of language-particular studies, such as (Levin 1993) on English, is not clear (i.e., not clear which aspects of the classification are universal and which are language particular)
- Universality of valency classes
  - As identified by coding frames
  - By alternations (unmarked or verb-marked)
- How to capture cross-linguistic variation in valency classes in terms of hierarchies/semantic maps
- 80 verb list as a toy lexicon: which verbs cluster together in terms of coding and alternations across languages

Valency

Meanings

Form | Meanings | Examples | Alternations | Languages

Back | Verbs | References | Coding frames | People

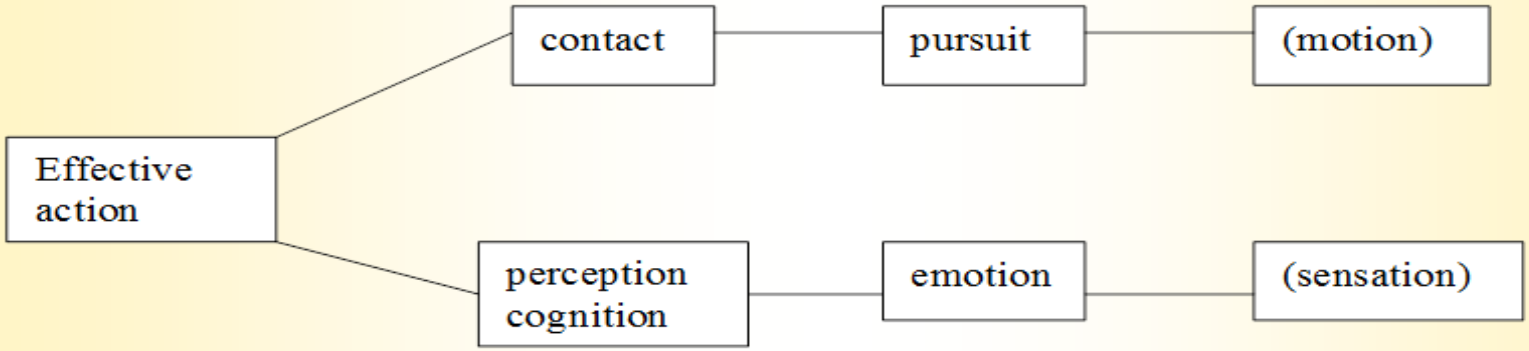
	Meaning label	#	Role frame	Typical context
go	EAT	1	A eats P	The boy ate the fruit.
go	HUG	2	A hugs P	The mother hugged her little boy.
go	LOOK AT	3	A looks at P	The boy looked at the girl.
go	SEE	4	E sees M	The man saw the bear.
go	SMELL	5	E smells M	The bear smelled the boy.
go	FEAR	6	E fears M	The man feared the bear.
go	FRIGHTEN	7	A frightens P	The bear frightened the man.
go	LIKE	8	E likes M	The boy liked his new toy.
go	KNOW	9	A knows P	The girl knew the boy.
go	THINK	10	A thinks about X	The girl thought about her grandmother
go	SEARCH FOR	11	A searches for X	The men searched for the women.
go	WASH	12	A washes P	The mother washed the baby.
go	DRESS	13	A dresses P	The mother dressed her daughter
go	SHAVE	14	A shaves (his beard/hair)	The man shaved his beard/cut his hair
go	HELP	15	A helps X	I helped the boys.
go	FOLLOW	16	A follows X	The boys followed the girls.
go	MEET	17	A meets X	The men met the boys.
go	TALK	18	A talks (to X) (about Y)	The girl talked to the boy about her dog.
go	ASK FOR	19	A asks (X) for Y	The boy asked his parents for money.
go	SHOUT AT	20	A shouts at X	The woman shouted at the children.
go	TELL	21	A tells (X) Y	The girl told the boy a funny story.
go	SAY	22	A says "..."(to X)	They said "no" to me.
go	NAME	23	A name X (a) Y	The parents called the baby Anna.
go	BUILD	24	A builds P (out of X)	The men built a house out of wood.
go	BREAK	25	A breaks P (with I)	The boy broke the window with a stone.
go	KILL	26	A kills P (with I)	The man killed his enemy with a club.
go	BEAT	27	A beats P (with I)	The boy beat the snake with a stick.
go	HIT	28	A hits P (with I)	The boy hit the snake with a stick.
go	TOUCH	29	A touches P (with I)	The boy touched the snake with a stick.
go	CUT	30	A cuts P (with I)	The woman cut the bread with a sharp

Variation in coding frames: Transitivity hierarchies

- **Tsunoda's (1981) transitivity Hierarchy**

Effective action>> Perception >> Pursuit >>Knowledge >>Feeling >> Relation

- **Malchukov's (2005) semantic map for two-argument events**
  - The Transitive-Motion route (decrease in affectedness)
  - The Transitive - Psych-verbs route additionally decrease in agentivity

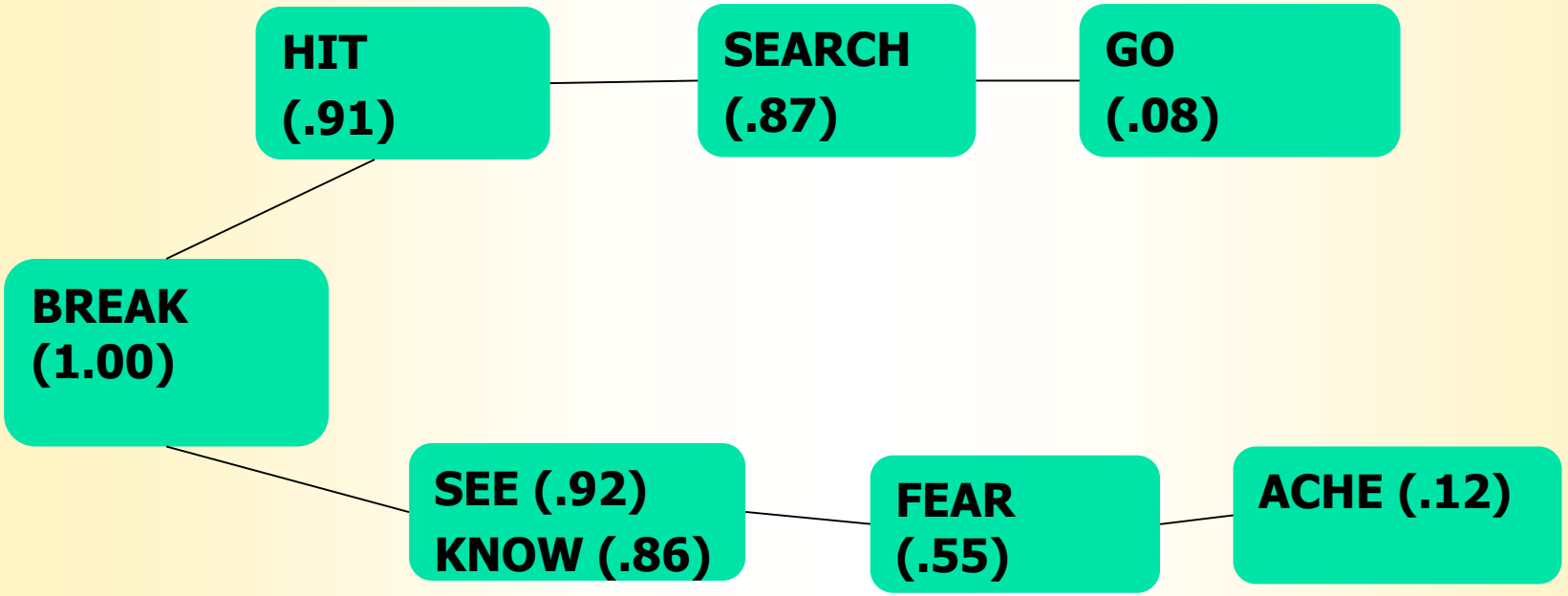


Transitivity prominence in ValPal database (Haspelmath 2015)

Tab. 4: ValPaL verb meanings ranked by transitivity-prominence.
(= percentage of transitively encoded verbs among all counterpart verbs)

BREAK	**1.00**	**LIKE**	**.78**
TEAR	1.00	TELL	.78
SHOW	1.00	FOLLOW	.74
BEAT	1.00	**LOOK AT**	**.73**
CUT	1.00	MEET	.70
TAKE	1.00	FEAR	.53
KILL	1.00	THINK	.52
HIT	**1.00**	CLIMB	.49
FRIGHTEN	.98	SHOUT AT	.45
GIVE	.98	LEAVE	.42
THROW	.98	SAY	.41
TIE	.98	TALK	.40
PUT	.98	SING	.38
FILL	.98	FEEL PAIN	.12
HIDE	.97	BLINK	.11
LOAD	.96	PLAY	.10
PEEL	.96	RUN	.05
ASK FOR	.95	SIT	.05

Transitivity hierarchies (Haspelmath 2015)

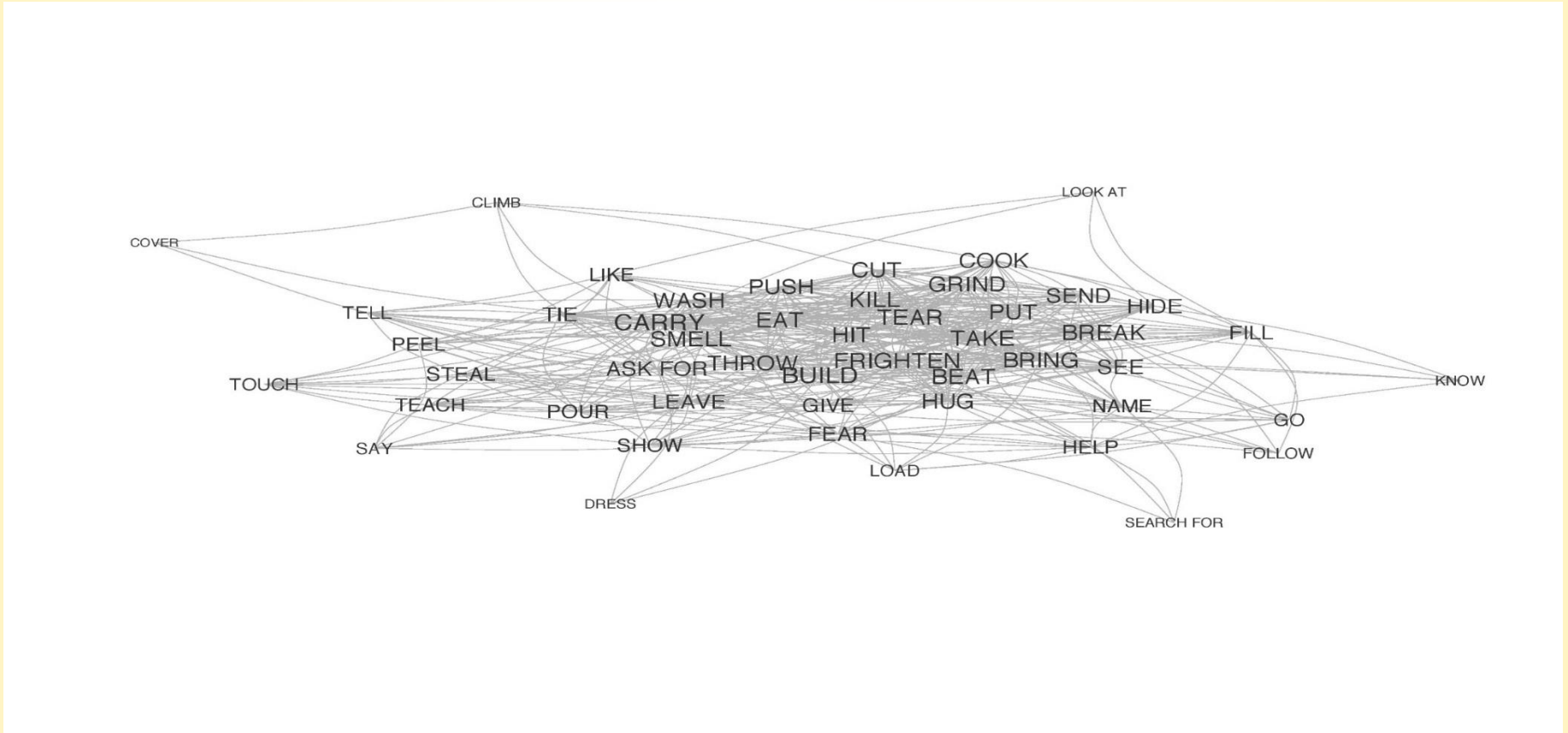


- Semantic map with percentages of the transitive pattern appended (percentages from ValPaL reported in Haspelmath 2015)
- Motion and Sensation predicates show a clear intransitive preference, but the former can be ambitransitive in some languages

Coding patterns: NeighbourNet plots

- The two–dimensional Transitivity hierarchy can be conceived as a semantic map (see Malchukov 2005), as imposes contiguity restrictions (w.r.t. availability of transitive/intransitive coding)
- Yet is different from conventional maps in that involves directionality
  - On conventional maps directionalities usually have diachronic interpretation
  - It is also less form-bound, as involves rather sharing of an abstract pattern (transitivity)
- Can also be implemented through clustering techniques used for computational generation of semantic maps
  - See Blasi (2015) for clustering verbs with respect to transitivity, and Hartmann, Haspelmath & Cysouw (2014) for clustering of micro-roles beyond the transitive/intransitive distinction

Coding patterns: clustering frames (Blasi 2015)



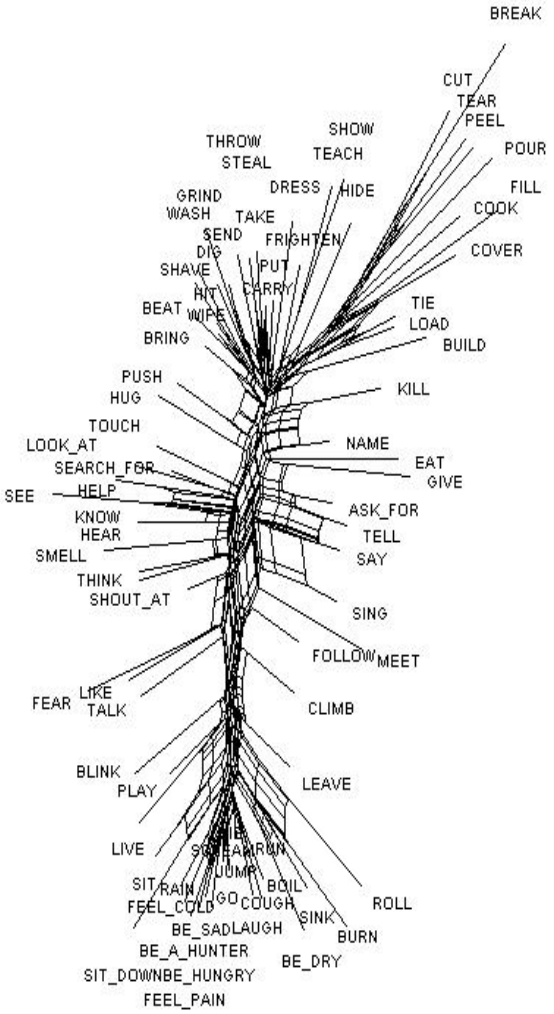
- The graph (from Blasi 2015) above shows clustering of certain verbs (from the ValPaL sample with respect to transitivity coding
- This graph was constructed by displaying links between pairs of verbs at least 90% similar – that is, verbs that have the same pattern for 90% or more of the languages in which they both occur (Blasi 2015)

Valency classes by alternations

- The same approach can be applied to capturing preferences in alternations
  - In the literature this question has been only addressed with respect to the inchoative-causative alternation (Nedjalkov, Haspelmath, Comrie, Nichols and others)
- Alternation Hierarchies (Wichmann 2015)
- Statistical analysis of the data in ValPal
  - Through NeighbourNets (visualizing) clustering of verbs sharing certain behavior (here: availability of alternations) across languages
  - Guttmann Scales: a unidimensional representation of alternations reflecting the number of matching behavior of verbs with respect to certain general alternations (Subject-demoting, etc)
- Illustrated below for a few alternations (Subject-demoting/deleting, Object-demoting/deleting), other alternations follow separate hierarchies

Hierarchies for alternations: SubjectDem/Del

- Similar hierarchies can be established for alternations, including voice alternations (Wichmann 2015)



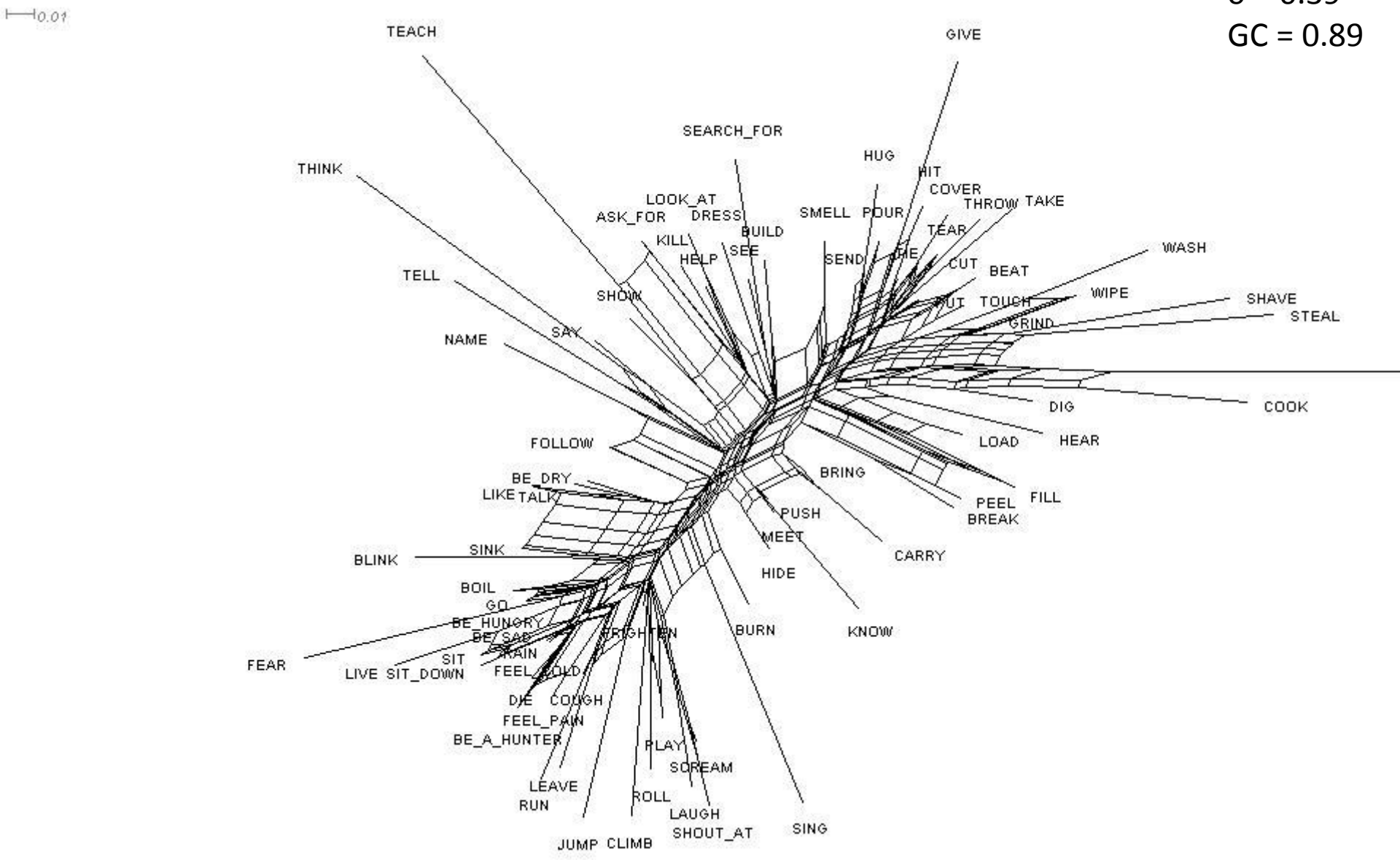
Here a NeighbourNet plot for Subject demoting/deleting alternations (passives and the like) (Wichmann 2015)

Hierarchies for alternations: SubjectDem/Del

- **Hierarchy** (Guttmann–Scale) for Subject-demoting/deleting (Wichmann 2015)
- CUT > BREAK, TEAR, POUR > FILL > PEEL > COVER, BUILD > COOK, TAKE > HIDE, LOAD > SHOW > TIE > WASH, KILL, SHAVE, SEND > THROW > GRIND, BEAT, TEACH > CARRY, PUT > DRESS, FRIGHTEN, WIPE > STEAL, GIVE > HIT, HUG > EAT > BRING > LOOK AT, PUSH, TELL > DIG, ASK FOR > SEE, NAME, THINK > SMELL > HELP, SAY, TOUCH, SING > BLINK > SEARCH FOR, BURN > KNOW > HEAR, SHOUT AT, CLIMB, LIVE > LIKE > MEET, FEAR, ROLL, TALK > FOLLOW, SIT > SIT DOWN > LEAVE, PLAY > RUN, COUGH, SINK, JUMP, FEEL COLD > BE DRY, LAUGH, BE HUNGRY > FEEL PAIN > DIE, BOIL > GO > BE SAD > SCREAM > RAIN, BE A HUNTER.
- **Interpretation**
- Semantic transitives (the Effective Action verbs of Tsunoda 1985) tend to occur towards the top of hierarchy, followed by two argument verbs, which do not conform to the transitivity prototype and monovalent verbs cluster at the bottom of the hierarchy
- The hierarchy shows also the effect of the verb's actionality, since accomplishments rank on balance higher than activities on the hierarchy

Object-demoting/deleting (Wichmann 2015)

δ = 0.39
GC = 0.89



Hierarchy for Object-demoting/deleting

- **Hierarchy (Guttmann–Scale)** (Wichmann 2015)
- EAT, SHAVE, GIVE, THINK, STEAL > WASH, CUT, TAKE, COVER, WIPE, SEE, SEARCH FOR, HIT, THROW, HEAR > COOK, KNOW, ASK FOR, TELL > BEAT, TEAR > POUR > FILL, CLIMB, HUG, LOOK AT, HELP, NAME > BREAK, KILL, TOUCH, LOAD, TEACH, SMELL > FEAR, DRESS (1) > SHOW, SEND, CARRY, TIE, PUT > SING, GRIND, DIG > FOLLOW, SAY, BUILD, PEEL > JUMP, LIKE, SHOUT AT, LEAVE, LIVE, PLAY, MEET, TALK, HIDE > BLINK, LAUGH, ROLL, BURN, FRIGHTEN, RUN, BE DRY, PUSH, BRING > COUGH, SIT, GO, SCREAM, FEEL PAIN, SINK, BE A HUNTER, BOIL, SIT DOWN, DIE, BE SAD, FEEL COLD, BE HUNGRY, RAIN
- **Interpretation**
- **Starts from "natural antipassives" (with an inherent or cognate object), extends to bivalent "manner-verbs" (Levin 2015), then to bivalent result-verbs, with monovalent verbs at another pole**

Alternation Hierarchies: conclusions

- The profiles for alternation hierarchies is different but all hierarchies show certain functionally motivated preferences, and have certain verb classes as a natural domain of application
  - For the Object-demoting/deleting hierarchy, one starts with events with natural antipassives like EAT, which are grammaticalized first
- In other languages it can be extended to other verb types, including canonical transitives, and possibly intransitives
- Importantly, when a certain voice alternations are extended beyond the domain (verb type) of its (most) natural application, it can be reinterpreted leading to a phenomenon of voice ambivalence
  - Thus the reflexive marker can be reinterpreted as anticausative with verbs like BREAK (cf. Russian *slomatj-sja*), and as antipassive with verbs like EAT (cf. Russian *naestj-sja* 'have a fill')

Ambivalent alternations

- Voice forms (or broader, a valency-changing markers) are often **"ambivalent"**, i.e. perform different functions when applied to different valency classes of verbs.
- Some relevant observations in the typological literature concerning polysemy of individual valency categories (see, e.g., Shibatani 1985 on passives), still the general picture is lacking.
- Yet ambivalency of voice markers is commonplace:
  - Causatives may be used as passives when applied to transitives (V.P. Nedjalkov 1964 and subsequent work)
  - Applicatives may be used as antipassives when applied t9o transitives
  - For more examples of voice ambivalence see Malchukov 2015; 2016

Passive-causative ambivalence

- Types of causative-passive polysemy
  - One common pattern is that basically a causative marker is interpreted as a passive marker (as in some Turkic languages).
  - Another case, when a basically a passive marker is used as a causative (in this case frequently called adversative passive), as in Japanese, or Even (Tungusic)

(1) Even (Malchukov 1993)

Bej (udan-du) udala-w-ra-n

man (rain-DAT) rain-INCH-ADV-NFUT-3SG

'The man was caught by the rain'

The polysemy of the voice category performing both valency-increasing and valency decreasing function is puzzling, but can be accounted for if we assume that the common denominator of both processes is A-demotion (cf. A-defocusing as a central function of passives in Shibatani 1985).

Causative-applicative ambivalence

- The same marker performs two different functions (A-adding or O-adding) functions, which both result in valency increase
- Eskimo (Central Alaskan Yupik; Miyaoka 2015) features a peculiar category of adversative, which performs both a causative and applicative functions.

(2) Eskimo (Central Alaskan Yupik; Miyaoka 2015)

a. *Kic-i-aqa* *kicaq.*
sink-E_{ADV}-IND.1SG.3SG anchor.ABS.SG
'I had the anchor sunk (me negatively affected)'

b. *Ner-i-anga* *neqe-m* *neqca-mnek*.
eat-E_{ADV}-IND.3SG.1SG fish-REL.SG bait-ABM.1SG.SG
'The fish ate my bait *(on me)*.'

- Thus, the adversative category has the function of the adversative causative when derived from intransitives (see (2a)), but of adversative applicative when derived from transitives (see 2b)).

Applicative-antipassive ambivalence

- Also this polysemy is attested in Eskimo, where the applicative is used as a Benefactive applicative (in (3a)) but also as an antipassive (in (3b)).

(3) Eskimo (Central Alaskan Yupik; Miyaoka 2015)

a. Nalaq-ut-aanga *irnia-ma* *sass'a-mek*.
find-APPL-IND.3SG.1SG child-REL.1SG.SG watch-ABM.SG
'My child found *a* watch *for me*.'

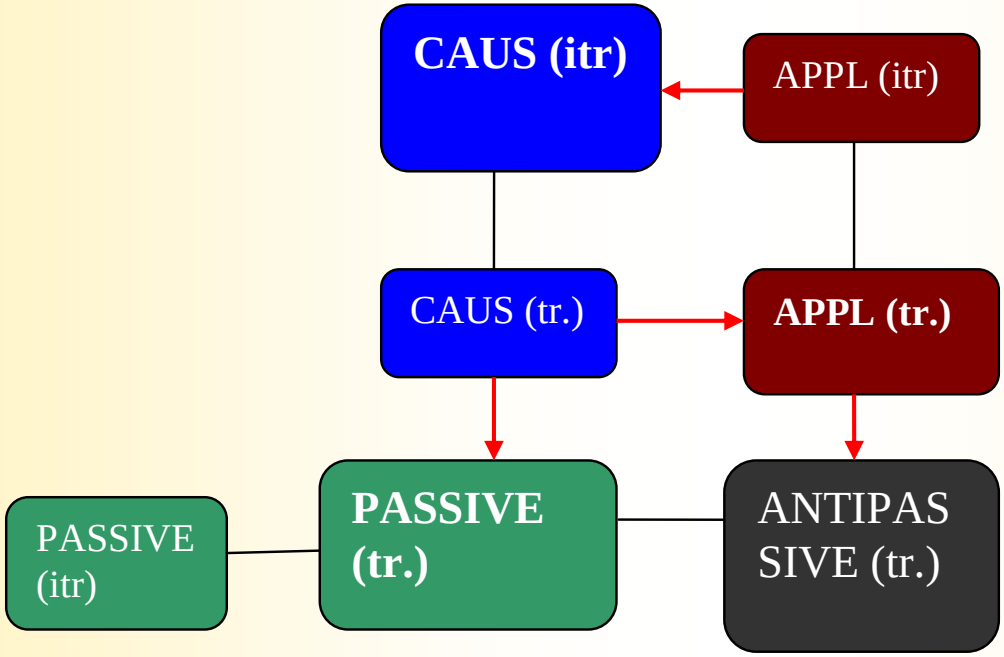
- b. Nalaq-ut-uq sass'a-mek.
find-APAS-IND.3SG watch-ABM.SG
'He found the watch.'

- This ambivalence has seemingly opposite effects (valency-increasing or decreasing), but can be accounted by the fact that both applicatives of transitives and antipassives share the same function of P-demotion.

Ambivalent voice markers: a semantic map

- Polyfunctionality on the part of „ambivalent" markers can be captured by a semantic map (Malchukov 2015), based on shared (syntactic) features:
  - Causative-passive polysemy: share the property of A-demotion:
    - holds only for causatives of transitives (A demoted to an Oblique)
  - Applicatives-antipassives: share the property of P-demotion
    - holds only for applicatives of transitives
  - Causative-Applicative polysemy:
    - for transitives: both demote a term to an oblique
    - for intransitives: both are transitivizers
  - Passive-antipassive polysemy: both are detransitivizer
- But this approach shall be enriched through the dimension of (local) markedness (preferential use with certain verb types)

Semantic map for polyfunctional voice markers



Directions of shift indicated; preferential uses indicated by the cell size

Semantic map/transition network for voice

- The map above, was called ‚transition network' (in Malchukov 2015), as it shows some unusual features:
- It is based on shared syntactic rather than semantic components
- More importantly, it includes directionalities, which go beyond conventional diachronic relations (as on ‚dynamicized' semantic maps; van der Auwera & Plungian 1998), as they also cover cases when categories develop differentially from a third source
- Thus, methodologically, the most novel feature of the transition diagram above is that it tries to capture both the iconicity of linguistic signs (the underlying semantic map representation) and (local) markedness.
- Iconicity restricts possible transitions in a network (through categories sharing certain features), while local markedness determines the direction of a transition.
- The unmarked combinations function as "attractors" in a dynamic system conditioning a meaning shift on the part of the marked combinations, which, being less stable, will tend to be either absent or reinterpreted.

Hierarchies vs. semantic maps

- Thus, a semantic map (attractor network) for voice can also be viewed as a Markedness Hierarchy
- Yet, markedness hierarchies as used in typology (Greenberg 1966; Croft 1990) differ significantly from semantic maps
  - They capture availability of a particular category, rather than distribution of the same forms
  - They are necessarily directional (from less marked to more marked)
  - They do not have be semantically coherent (monotonous).
- Cf., e.g., **Number Hierarchy**:

  SG > PL > DU
- Yet, a particular type of hierarchy, which is based on **local markedness** rather than general markedness is closer to classical semantic maps
  - (see Tiersma 1982; Croft 1990 on local markedness, that is markedness relations capturing markedness relation between linguistic categories)

Local Markedness (LM)-Hierarchies: Imperatives

Person hierarchy for imperatives (van der Auwera, Dobrushina & Gusev 2005)

2SG > 2PL > 1PL > 3SG,PL > 1SG

Imperative

- Availability of an imperative form implies availability of all forms higher on the hierarchy
- Availability of forms does not presuppose form identity
- If the imperative is extended from most natural to the least natural combination, the latter is likely to be reinterpreted
  - In Even (Tungusic), the infelicitous 1st person singular imperative combination is reinterpreted as intentional/future:
  - Even (Malchukov 2001)

(4) Hör-de-ku

Go-IMP.FUT-1SG

'May I go?'

LM-Hierarchies: tense and aspect

- **Tense Hierarchy for the (perfective) aspect**
  (Malchukov 2009, 2011)

Perfective

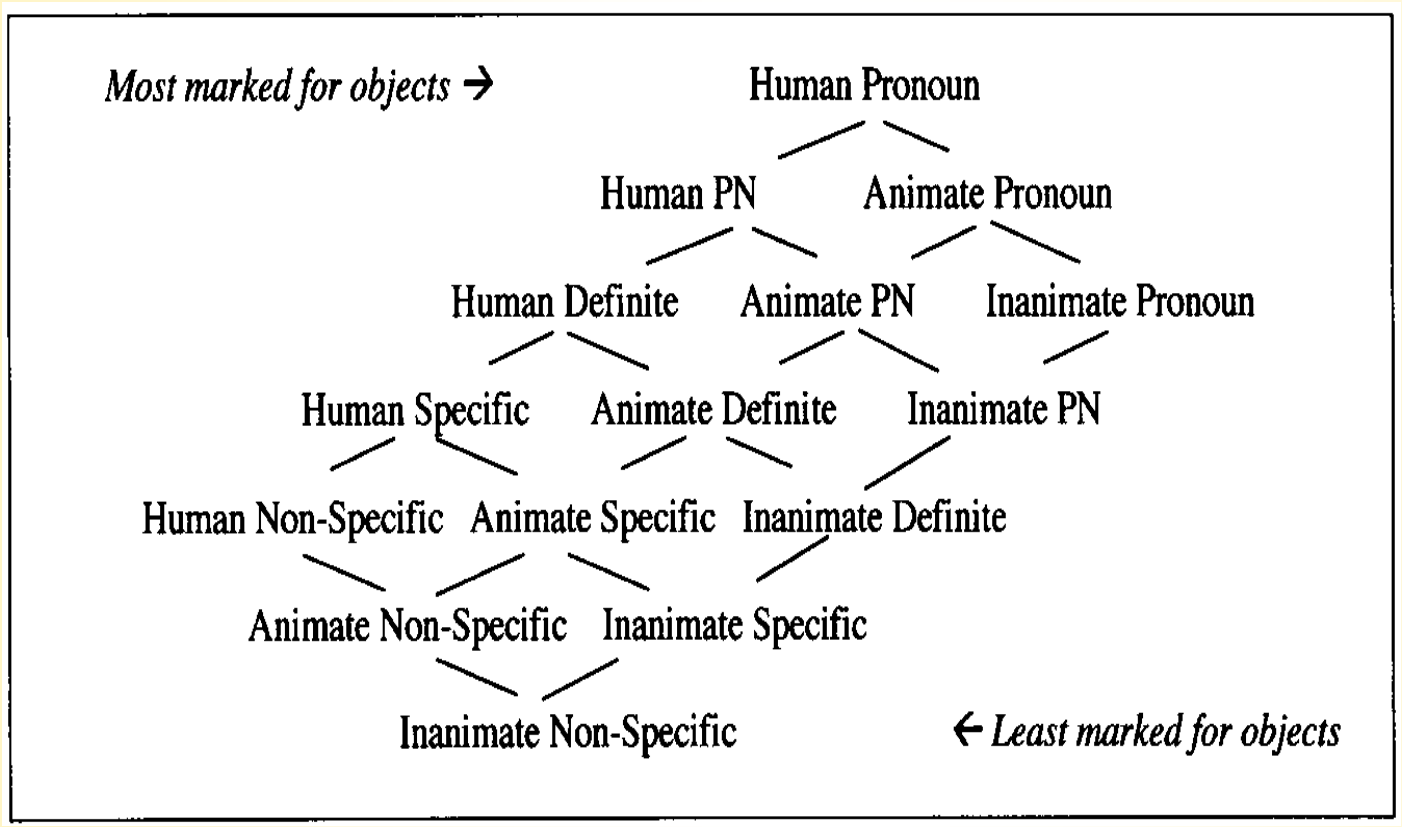
- Examples from European languages (cf. Comrie 1976)
  - Romance languages the aspectual opposition obtains only in the past,
  - in Greek it is found in past and future, but not in the present.
  - In Slavic languages it is extended to the present as well but the present perfective combination is reinterpreted
    - Shift to habitual meaning in South Slavic, and to future meaning in east Slavic (Breu 1996; Malchukov 2011; De Wit 2017)

LM-Hierarchies: tense and aspect

- Note that in the examples above, LM-markedness hierarchies are:
- Directional
  - In semantic maps directionality is usually understood diachronically (dynamicized semantic maps), less often in other ways (cf. ‚coding maps' in Mauri 2010 which in addition to iconicity capture coding complexity)
- not (strictly) form-based (but involve sharing of more abstract categories/pattern)
- May lack semantic coherence (non-monotonic)
  - This is a feature shared with markedness hierarchies which need not be semantically coherent either (cf. Croft 1990 on non-reconstructability of Number Hierarchy in terms of features)
- The latter feature, however, is not a defining property of LM-maps/hierarchies, since other LM-hierarchies are semantically coherent (monotonic), being supported by shared semantic features

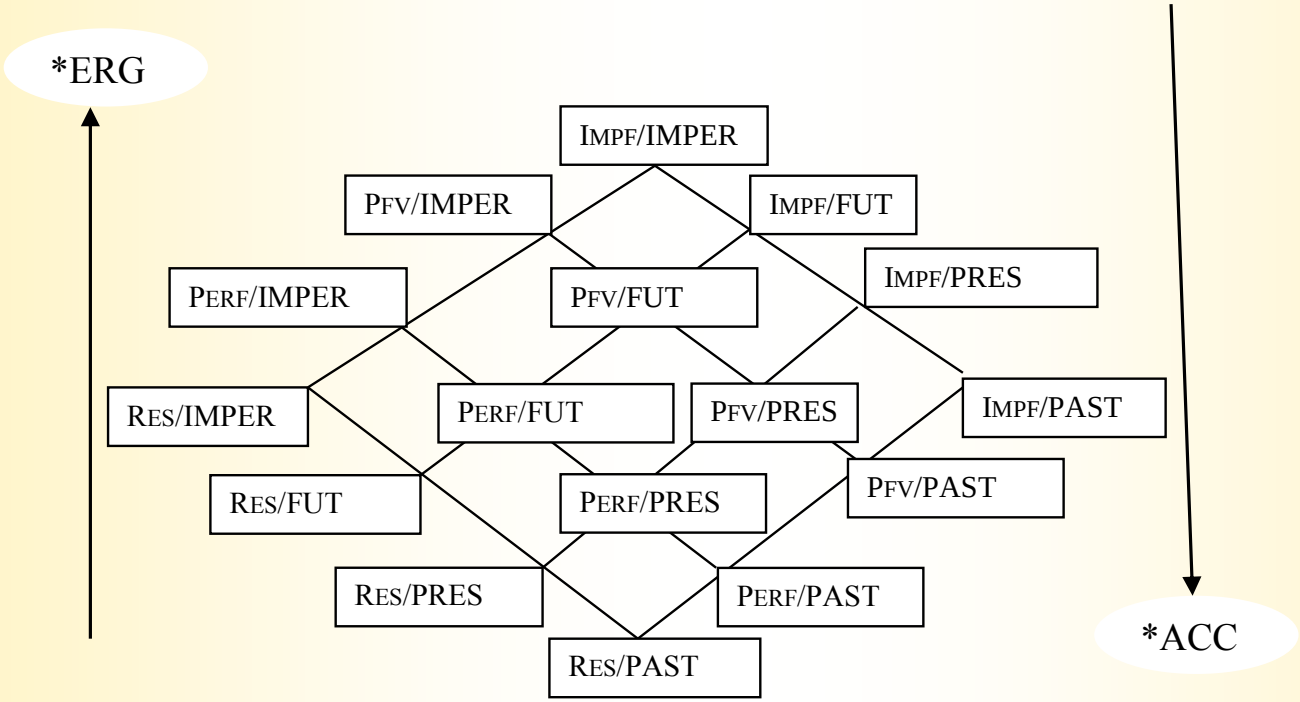
LM-Hierarchies: DOM marking

- Aissen's (2003) two-dimensional hierarchy for DOM splits
  - Differential Object Marking (DOM) prefers nominals higher on the animacy/prominence scales
- Can be viewed as two-dimensional semantic map



LM-Hierarchies: TAM-based ergativity splits

- Or my own hierarchy for TAM-splits (Malchukov 2015b)
  - TAM forms higher on the hierarchy prefer ACC marking (alignment), those lower on the hierarchy prefer ERG marking
- Again can be viewed as two-dimensional semantic map



LM-Hierarchy for actionality and aspect

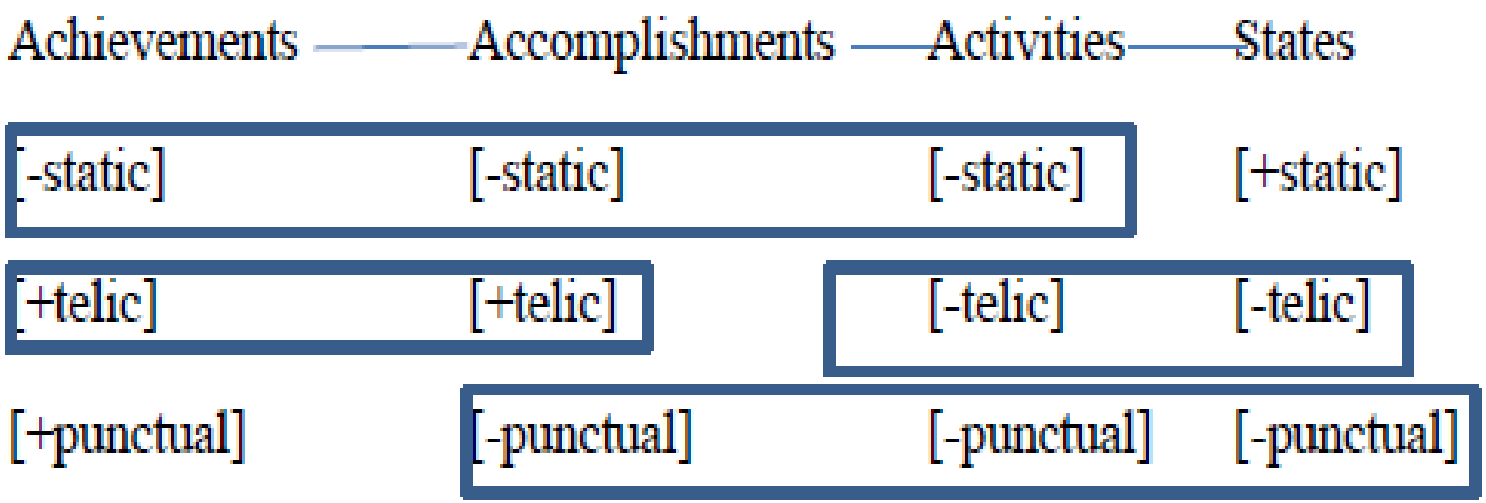
- The following hierarchy (from Xrakovskij & Malchukov 2016), can be used to predict/constrain appearence of aspectual operators with different actional classes (Vendlerian classes)
  - Perfective grams are less marked and most felicitous with perfectives, imperfective grams with states
  - Conversely, infelicitous combinations imperfective with achievements, perfective with states will be either unavailable or coerce the verb class into another interpretation (imperfective achievements coerced into iteratives, perfective states into inchoatives)

Figure 2. Actionality markedness scale for aspect

LM-Hierarchy for actionality and aspect

- This hierarchy can be viewed as a semantic map, as is supported by shared semantic compenents
  - A representation of verb classes (adopted from Van Valin 2005)
  - The boxed regions indicate intersectiion of features between individual verb classes
  - Intersecting features support the view of verb classes as a hierarchy or semantic map supported by overlapping features

Figure 3. Semantic map for actionality types



Actional types and aspectual marking

Same preferences can be detected in interpretation (Bohnemeyer & Swift 2004), (Xrakovskij & Malchukov 2016)
If a perfective interpretation is available for a less natural combination (e,g, perfective of activities, it will be found with more natural, perfectives of achievements)

Figure 3. Default perfective and actionality classes in 3 languages

Legend:

default perfective in Inuktikut: .....

default perfective in Even: - - - - - -

default perfective in Evenki: ———

Illustrated for Even (Tungusic):

5 (a) *nulge-re-n*
nomadize-AOR-3SG
‚he nomadizes'

(b) *em-re-n*
arrive-AOR-3SG
‚he just arrived'

With activities, „aorist" has a present interpretation (see (5a)), with achievements and accomplishments, it refers to recent past (see (5b))

Conclusions: semantic maps and LM-Hierachies

- LM hierarchies are „hybrid structures" sharing features with typological hierarchies based on general markedness, on the one hand, and semantic maps shaped by iconicity, on the other hand
- LM-hierarchies are
  - Directional as markedness hierarchies
    - Directionality going beyond diachronic dimension as in conventional semantic maps
  - Less strictly form-bound than semantic maps, but likewise involve pattern sharing which involves formal similarities (sharing of passives, perfective, etc)
  - May be semantically incoherent, although this is not a defining feature of LM-hierarchies
- From another perspective, LM-Hierarchies may be seen as complementory to semantic maps, specifying contextual conditions for nodes (semantic functions) on the map

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