## Implicational complementation hierarchies: Containment and the freedom of syntax

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### This talk

- Are there universal properties of complementation?
  - $\hookrightarrow$  Yes, an implicational semantic hierarchy.
- Are there predictable mappings between (morpho-)syntax and semantics?

 $\hookrightarrow$  Yes, but only in a relative way (no absolute mapping universals).

- Along the way...
  - $\hookrightarrow$  the extent of cartography
  - $\hookrightarrow$  the autonomy of syntax
  - $\hookrightarrow$  facts and myths about restructuring

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### Typological approaches

- Typological approaches to complementation yield a heterogeneous picture, depending on focus, theoretical setting, methodologies employed, and goals of an account.
- Nevertheless, some similarities can be singled out in the different classifications (Lohninger and Wurmbrand, Under revision):
  - (in)dependencies in TMA-marking
  - (in)dependence of the embedded subject
  - degree of clausehood

### Noonan (2007)

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Complement types	Time refer-	Matrix predicates
	ence	
S-like	independent	utterance, propositional attitude, pretence, commentative
Reduced	dependent	manipulative, modal, achieve- ment, phasal, immediate percep- tion
Both s-like and reduced	(in)dependent	knowledge, fearing, desiderative

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## Cristofaro (2005)

Predicates	Level
Knowledge, attitude, utterance	Proposition-level
Perception, manipulative	Predication-level
Modal, phasal, desiderative	${\rm Predicate}/{\rm Term}/{\rm Predication-level}$

"Deranking" (see also Stassen (1985)):

- degree to which the complement clause has predetermined values
- degree of erosion of boundaries between the matrix and embedded clause (semantic integration).
- left: most predetermination and highest semantic integration
- (1) Hierarchy of Complement Clause Deranking: Phasals/Modals » Manipulatives/Desideratives/Perception » Knowledge/Propositional Attitude/Utterance

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### Givón (1980)



Implicational complementation hierarchy (ICH) Mapping between ICH and morphosyntax From typology to the ICH Illustration of the ICH signature Universals and variation

EPISTEMIC ATTITUDE EMOTIVE EMOTIVE-HIGH STRONG SUCCESS (WEAK) (STRONG) (LOWER) ATTEMPT (IMPLICATIVE) self-inducement hope plan begin intend finish fear expect try succeed fail hate love avoid refuse agree ------**Binding Hierarchy** remote attitude want decide like sau know tell think agree hope believe fear suspect expect other-manipulation guess love doubt hate be sure want order tell make insist learn expect let have like discover demand cause ask force allow prevent permit Syntactic Coding Scale: Form of complement clause free clause with restrictions free clause subjunctives of infinitive nominalized lexicalized various kinds

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### Wurmbrand and Lohninger (2019)

- The distribution of complementation across languages typically groups semantic classes in three broad groups in terms of the interaction of semantics and morphosyntax.
- Implicational complementation hierarchy [ICH]



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Pı	oposition	Situation				Event	
					self-iı	nducement	
Binding	Hierarchy]	remote i	attitude	hope fear expect hate love refuse agree want		plan intend try	begin finish succeed fail avoid
say tell	know think believe suspect guess doubt be sure learn discover	decide agree	like hope fear expect love hate	want expect like	other-m order insist demand ask	tell let	make have cause force
					permit		prevent

Wurmbrand and Lohninger 2019

(3)

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#### Illustration: Polish (Łukasz Jędrzejowski, p.c.)

- (2) a. Nova twierdzi, że zjadła surówkę. Nova claims that eat.*l*-PTCP.F.SG salad.ACC 'Nova claimed that she ate salad.'
  - b. \**Nova twierdzi, mieć zjedzoną surówkę.* Nova claim have.INF eaten salad.ACC 'Nova claimed to have eaten salad.'
  - a. \*Nova próbowała, że zje surówkę. Nova try.l-PTCP.F.SG that eat.3.SG salad.ACC 'Nova tried that she eats salad.'
    - b. Nova próbowała, zjeść surówkę. Nova try.*l*-PTCP.F.SG eat.INF salad.ACC 'Nova tried to eat salad.'

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- (4) a. Nova zdecydowała, że zje surówkę. Nova decide.l-PTCP.F.SG that eat.3.SG salad.ACC 'Nova decided that she would eat salad.'
  - b. Nova zdecydowała zjeść surówkę. Nova decide.*l*-PTCP.F.SG eat.INF salad.ACC 'Nova decided to eat salad.'

(5)

- a. ?Nova twierdzi, żeby zjadła surówkę. Nova claims that eat.*l*-PTCP.F.SG salad.ACC 'Nova claimed that she ate salad.' only if volitional
  - b. Nova zdecydowała, żeby zjeść surówkę. Nova decide.l-PTCP.F.SG that eat.INF salad.ACC 'Nova decided to eat salad.'
  - c. \**Nova próbowała, żeby zjeść surówkę.* Nova try.*l*-PTCP.F.SG that eat.INF salad.ACC 'Nova tried to eat salad.'

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### Polish: Summary

Construction	Proposition	Situation	Event	$\mathbf{I}/\mathbf{D}$
finite	$\checkmark$	$\checkmark$	*	Ι
non-finite	*	$\checkmark$	$\checkmark$	D
$\dot{z}eby$ + non-finite	*	$\checkmark$	*	I + D

 $I = Independence property \mid D = Dependence property$ 

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## (In)dependence properties

- Morphosyntactic coding: finiteness, subjunctive, infinitive, converbs, incorporation...
- Subject interpretation: free, partially dependent, fully dependent; possibly obviation
- TMA interpretation: free value, pre-specified value, absent (note: all embedded tenses in complement clauses are dependent)
- Transparency, restructuring, integration:
  - Upwards: topicalization to matrix (dependence), embedded topicalization (independence), scrambling, clitic placement, A-movement (raising, passive)
  - Downwards: case, agreement, control, binding, NPI-licensing, SOT, tense copying
- Presence/absence of clausal material: indexical shift, operators, tense, agreement, case...

Implicational complementation hierarchy (ICH)	From typology to the ICH
Mapping between ICH and morphosyntax	Illustration of the ICH signature
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Universal	Variation
I/D operate along the ICH.	I/D may be neutralized.
I/D cannot go against the	I/D can have different cut-off points on
hierarchy.	the hierarchy.
Classes are defined by the	Verbs may change meaning based on
meaning of the complemen-	the morphosyntax of the complement.
tation configuration.	

 $I = Independence \ property \ | \ D = Dependence \ property$ 

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### Another example



- (6) Proposition meaning: only finite (for these verbs)
  - a. I forgot that I watered the plant.
  - b. \*I forgot to have watered the plant.
  - c. I told him that I watered the plant.
  - d. \*I told him to have watered the plant.
- (7) Situation meaning: finite or non-finite
  - a. I told him to water the plant.
  - b. I told him that he should water the plant.
- (8) Event meaning: only non-finite
  - a. I forgot to water the plant.
  - b. \*I forgot that ...

no watering happened

watering happened

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### Absolute vs. implicational universals

- Temptation: factive, propositional verbs "select" a finite complement.
- Neither true in English (for other Proposition predicates), nor cross-linguistically (for *forget*)
- (9) a. I am glad to have come to Amherst.
  - b. I claim to be the Queen of Catan.
- (10) Ich habe vergessen, die Pflanze schon gegossen zu haben.
  I have forgotten the plant already watered to have.
  'I forgot that I watered the plant already.' German

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#### Hypothetical Finiteness Universal

• If a language {allows/requires} finiteness in a type of complement, all types of complements further to the left on ICH also {allow/require} finiteness. [(Wurmbrand et al., 2020]

Language	Proposition	Situation	Event
Bulgarian, Macedonian	finite	finite	finite
Serbian, Bosnian?	finite	(non-)finite	(non-)finite
Slovenian	finite	(non-)finite	non-finite
Croatian	finite	non-finite	non-finite

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Universal	Variation
Certain degree of vagueness of the categories.	"Fuzzy" edges (e.g., Bryant 2021 for strong epistemic verbs in Oromo) Multiple class membership: <i>promise</i> (Proposition, Situation); <i>try</i> (Situa- tion Event)
Broad semantic hierarchy	Ordering within these domains may show variation

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### Containment (simple clause structure)

- Ramchand and Svenonius, 2014 (see also Rochette (1988, 1990): Three sortal domains which are in a containment configuration
  - Events: argument structure, subevents, Aktionsart
  - Situations: include and elaborate Events (combine time/world parameters with existentially closed Event)
  - Propositions: include and elaborate Situations (combine speaker-oriented/discourse-linking parameters with existentially closed Situation).



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#### Containment and structure



[Ramchand and Svenonius, 2014: 164, (35)]

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#### Broad domains in clause structure

- Abstracting away from labels and specific instantiations, a three-way split is widely assumed.
  - Extended V-projection, labels: Voice, v, I, Mod, Asp, C...
  - Clausal domain with specific functions: operator (A'), A-properties, argument structure (Grohmann, 2003)



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### Finer grained structure

- Can/should the detailed structures of the broad clausal domains also be defined via containment?
  - Maybe: for structures that are stable across languages.
  - No: for structures that can vary within or across languages.
  - $\hookrightarrow$  Event domain: some containment configurations
  - $\hookrightarrow$  Situation domain: no containment configurations??
  - $\hookrightarrow$  Proposition domain: some containment configurations

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### Events

- Decomposition of verbs (verb phrase) in sub-events (Hale and Keyser, 1993; Kratzer, 1996)
- Syntactically spread-out argument structure (Agent, Caus, Result)
- Converging evidence: modification differences, e.g., *again* (Stechow, 1996)



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### Truncation

- Truncation of Agent-layer, yields predictable syntax (unaccusativity) and semantics (no agentivity, UTAH).
- See, among others, Bowers, 2002; Pylkkänen, 2002, 2008; Folli and Harley, 2005; Alexiadou et al., 2006; Marantz, 2008; Schäfer, 2008; Harley, 2009, 2017; Pitteroff and Alexiadou, 2012; Pitteroff, 2014.



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### Situations

- TMA projections: not clear whether there are containment relations.
- Some orders may be stable across languages (e.g, tense » aspect)
- But others can vary, even within single languages.
- No containment: free ordering within and variation across languages may be possible.
- (14) Sie hat essen müssen. she has essen must 'She had to eat.' perfect » modal
- (15) Sie muss bis 12 Uhr gegessen haben. she must by 12 o'clcok eaten have 'She must have eaten by 12 o'clock.' modal » perfect

- The containment of the broad clausal domains can be directly employed to derive the implicational relations in complementation.
- The three different types of complements differ in their minimal structures:

Proposition	Situation	Event
CP		
TP (or similar)	TP (or similar)	
Voice domain	Voice domain	Voice domain

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- English: NPI licensing does not show transparency effects
- (16) a. Nova didn't try to like any of the parrots.
  - b. Nova didn't plan to like any of the parrots.
  - c. Nova didn't claim to like any of the parrots.

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- Croatian: ni licensing can only cross Situations and Events.
- (17) Viktor ni-je pokušao / uspio [ razumjeti Viktor NEG-AUX.3SG try.PTCP / manage.PTCP [ understand ništa ].
  nothing ]
  'Viktor didn't try/manage to understand anything.'
- (18) Viktor ni-je obećao / planirao [ nacrtati Viktor NEG-AUX.3SG promise.PTCP / plan.PTCP [ draw.INF.PFV ništa ]. nothing ]
  'Viktor didn't promise/plan to draw anything.'
- (19) \* Viktor ni-je tvrdio [ da je čitao ništa ]. Viktor NEG-AUX.3SG claims [ that AUX.3SG read.PTCP nothing ] Int. 'Viktor doesn't claim to have read anything.'

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- Brazilian Portuguese: NC licensing can only cross Events.
- (20) A Lina não tenta [ajudar nunca à sua mãe]. The Lina not tries [help.INF never to her mother]
  'Lina never tries to help her mother.' [Modesto, 2016: 168, (17a)]
- (21) \*A Lina (não) decidiu [ sair nunca (mais) ]. The Lina (not) decided [ leave.INF never (more) ]
  'Lina decided/didn't decide never to leave.' [Modesto, 2016: 168, (16a,b)]
- (22) A Lina decidiu [ não sair nunca (mais) ]. The Lina decided [ not leave.INF never (more) ]
  'Lina decided never to leave.' [Modesto, 2016: 168, (16c)]

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- (23) A Lina afirmou [ não ter casado nunca ]. the Lina claimed [ not have.INF married never ] 'Lina claimed to have never married.' [R. Lacerda, p.c.]
- (24) \**A Lina não afirmou* [ *ter casado nunca* ]. the Lina not claimed [ have.INF married never ] 'Lina didn't claim to have never married.'
- (25) A Lina não afirmou [ ter casado ] nunca. the Lina not claimed [ have.INF married ] never 'Lina never claimed to have married.'

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#### Generalization and take-home message

Negative licensing	English	Croatian	Br. Portuguese	not attested
Event	$\checkmark$	$\checkmark$	$\checkmark$	*
Situation	$\checkmark$	$\checkmark$	*	$\checkmark$
Proposition	$\checkmark$	*	*	$\checkmark/*$

- If a language allows a complement of type X to be transparent for NEG licensing, it also allows NEG licensing across all complement types to the right of X on the ICH.
- E.g, there is no language where *decide*-type complements are transparent, but *try*-type complements are not.
- Any theory of complementation should capture this generalization...

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#### Different from traditional "Restructuring"

Clitic climbing	Br. Portuguese	Italian	Croatian	not attested
Event	*	$\checkmark$	$\checkmark$	*
Situation	*	*	$\checkmark$	$\checkmark$
Proposition	*	*	*	$\checkmark/*$

- Hypothesis: complementation configurations are the same in all three types of languages—Brazilian Portuguese also "has restructuring" (cf. neg licensing above).
- But clitic climbing has different restrictions—depending on the language, it targets different parts of the clause (Wurmbrand, 2014, 2015).
- True: ICH regulates transparency—a particular type of complement can never be *more* transparent than any type of complement to its right.
- Not true: all languages (with clitics) have clitic climbing; the lack of clitic climbing  $\neq$  lack of transparency.

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## A puzzle

- Syntax is partially autonomous in that in some cases, more structure (possibly vacuous structure) can be present than a strict syntax–semantics mapping would require.
- Cross-linguistically available configurations: lower bounds, no upper bounds:

Proposition	Situation	Event
CP	CP	CP
TP (or similar)	TP (or similar)	TP (or similar)
Voice domain	Voice domain	Voice domain

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### Tendencies

- Cross-linguistic tendency against a full structure in Event complements.
- Situation complements commonly alternate between full and partly reduced complements.

	Proposition	Situation	Event
Bulgarian clause introducers	$\check{c}e, \ ^{*}da$	$\check{ce}$ (+fut), $da$	*če, da
Greek clause introducers	oti, *na	oti (+fut), $na$	*oti, na
Polish clause introducers	$\dot{z}e,~^{*}\dot{z}eby$	$*\dot{z}e,~\dot{z}eby$	$*\dot{z}e,~*\dot{z}eby$
Buryat complementation	CP, *converb	CP, *converb	$^{*}CP$ , converb
English finite complements	possible or	possible	*
	required		
Croatian finite complements	required	dispreferred	*
Serbian DP subjects in $da$	possible	possible	*
complements			
Partial control	possible	possible	*

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#### Theoretical views

- This flexibility is in part the reason for recurring debates about to implementation of size differences.
- "Small" theories: Clause-building can stop when the minimal structure is reached (Wurmbrand, 2001 et seq.).
- "Big" theories: always full clauses (CP domains) are built, followed by structure removal/exfoliation (Müller, 2020).
- These debates have sometimes distracted from what we should not lose sight of.

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### Desiderata of all approaches

Proposition	Situation	Event
CP	CP	CP
TP (or similar)	TP (or similar)	TP (or similar)
Voice domain	Voice domain	Voice domain

- #1: derive the implicational relations among the different types of complementation and clause properties
   → Containment: adding, as well as removing, structure must follow the containment relations.
- #2: meet the lower bounds requirements (prevent over-Shrinking ≈ under-projection)
   ⇒ Synthesis
- #3: allow optional Shrinking ≈ optional projection
   → Independent life of syntax

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### Synthesis

- Syntax computes structure (relatively) freely.
- There is no (very little) selection.
- The output has to be interpretable and meet the restrictions of the parts at the interfaces.
- Meaning of a complementation configuration is determined conjointly be the matrix predicate and embedded clause (cf. Kratzer, 2006; Moulton, 2009a,b; Wurmbrand and Lohninger, 2019).



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### Synthesis—in big and small approaches

- Small approaches:
  - Structure is built—structure is interpreted.
  - If essential information is not projected, it would not be visible at the interfaces, and, as desired, the output would not compose correctly with the matrix verb.
- Big approaches:
  - CP is built—structure is removed—structure is interpreted.
  - To prevent over-shrinking, only heads that do not contain necessary information can be removed.
  - If essential information is deleted, it would not be visible at the interfaces, and, as desired, the output would not compose correctly with the matrix verb.



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#### Autonomous syntax

#### • Greek clause introducers

- (27) isxiristiken { oti / \*na } lisi to provlima. claim.PFV.PST.3SG { that / \*NA } solve.PFV.PST.3SG the problem 'He claimed to have solved/that he solved the problem.' [Wurmbrand and Lohninger, 2019, 13, (17a)]
- (28) eprospa0isen { \*oti / na } lisi to provlima. try.PFV.PST.3SG { \*that / NA } solve.PFV.PRS.3SG the problem 'He tried to solve the problem.'

[Wurmbrand and Lohninger, 2019: 13, (17c)]]



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### How much to grow or shrink?

#### • Event complements:

- Small: Only project the *minimal* structure. Big: Shrink as much as possible.
- How can 'minimal'/'as much as possible' be defined?
- Since Greek has no infinitives, all clauses are finite and one could add the restriction that a clause introducer is required.
- The minimal syntactic structure is then one that includes the clause introducer *na* (*na* is a low complementizer, e.g., in Rizzi's Fin).
- Either approach: Tense would be semantically vacuous.

Semantics *realizes* syntax, and may filter out certain derivations, but semantics does not *determine* syntax.

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#### Greek decisions

- Decide complements must be irrealis (unrealized), forward shifted in time.
- Propositional meaning: only in certain constellations/contexts (cf. She decided that he is a nice person).
- (30) apofasisen na / oti enna lii kathe mera decide.PFV.PST.3SG NA / that FUT solve.IPFV.PRS.3SG every day enan provlima. one problem
  'He decided to solve/that he will solve one problem every day.'
  \*'He came to the realization that he solves one problem every day.'
- (31) apofasisen oti lii kathe mera enan decide.PFV.PST.3SG that solve.IPFV.PRS.3SG every day one provlima.
  problem
  'He came to the realization that he solves one problem every day.'
  - \*'He decided that he will solve the problem.'

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### Equivalent options

- CP is either semantically vacuous OR has a semantics that is compatible with the requirements of the matrix verb
- E.g, an irrealis C, which would also be compatible with *decide*; irrealis C is only compatible with future T.
- Result: *decide* is compatible with either a TMA complement with the covert modal WOLL, or a complement including the operator domain with embedded overt future.



### Open question

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- Small approaches:
  - Why is there sometimes structure added that is not needed?
  - Answer: syntax leads an independent life.
- Big approaches:
  - If Shrinking cannot remove non-recoverable content, the projections removed must effectively be semantically contentless.
  - But if they are semantically vacuous, why are they projected at the beginning, and why do they sometimes have to be removed (they would not do any harm at the interface)?
  - Answer: like in small approaches, there are pure syntactic reasons for adding structure.

 Implicational complementation hierarchy (ICH)
 ICH vs. cartography

 Mapping between ICH and morphosyntax
 Misconceptions about restructuring

 Conclusions
 Conclusions

(33)Cinque hierarchy (Cinque, 1999, 2004) speech act (frankly, honestly)  $\gg$  evaluative ((un)fortunately, luckily)  $\gg$  evidential (allegedly, reportedly)  $\gg$  epistemic (probably, presumably >> past (yesterday) >> future (tomorrow) >> irrealis  $(perhaps) \gg alethic (necessariamente) \gg habitual (usually,$ generally)  $\gg$  repetitive(I) (repeatedly, again)  $\gg$  frequentative(I)  $(often) \gg volitional \gg celerative(I) (quickly) \gg anterior (already)$  $\gg$  terminative (no longer)  $\gg$  continuative (still)  $\gg$  retrospective  $(just) \gg proximative (soon) \gg durative (long, briefly) \gg$ generic/progressive (usually)  $\gg$  prospective (almost)  $\gg$  obligation  $(necessarily) \gg permission/ability (possibly) \gg completive$  $(completely) \gg VoiceP (well) \gg celerative(II) (quickly, fast) \gg$ repetitive(II) (again)  $\gg$  frequentative(II) (often)

ICH vs. cartography Misconceptions about restructuring Conclusions

Cartography (strongest view)	ICH
1:1 syntax–semantics mapping Elements with particular seman- tic functions must occur in desig- nated positions.	No 1:1 syntax–semantics mapping Different syntactic configurations can be mapped to the same interpreta- tion.
Fine-grained universal structure and order of projections	3 broad universal conceptual sorts; fine-grained (possibly language- specific) structure and orders possible
All restructuring is functional	Lexical and functional restructuring

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German lexical/functional	zu	IPP	fixed order	extraposition
Modals	_	+	+	_
Causative	_	+	+	_
Event complement	+	_	_	+ (marked)
Situation complement	+	_	_	+
Proposition complement	+	_	_	+ (preferred)

(34) a. dass Nova {versuchte} Salat zu essen {versuchte}. that Nova {tried} salad to eat {tried} 'that Nova tried to eat salad.' lexical
b. dass Nova {\*muss/\*geht} Salat essen {muss/geht}. that Nova {\*must/\*goes} salad eat {must/goes} 'that Nova must/is going to eat salad.' functional

(35)

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Transparency grades	finite compl.	LOM	SCR	structure
Modals	_	+	+	functional
Causative	—	+	+	functional
Event complement	%	+	+	$\mathrm{VP}/v\mathrm{P}$
Situation complement	+	_	+	TP
Proposition complement	+	—	—	CP

- a. Nova hat ihn versucht/vergessen zu stehlen. Nova has it tried/forgotten to steal 'Nova tried/forgot to steal it.'
  - b. Nova hat ihn beschlossen/geplant zu stehlen. Nova has it decided/planned to steal 'Nova decided/planned to steal it.'
  - c. \*Nova hat *ihn* behauptet/geglaubt, gestohlen zu haben. Nova has it claimed/believed stolen to have 'Nova claimed/believed herself to have stolen it.'

- (In)dependence properties may have different restrictions, within and across languages (Wurmbrand, 2014, 2015; Wurmbrand and Lohninger, 2019; Wurmbrand et al., 2020).
- But they nevertheless follow the ICH pattern:
  - If in a language Situation complements lack particular clausehood properties, Event complements lack those properties as well.
  - If in a language Proposition complements lack particular clausehood properties, Situation complements lack those properties as well.

- Restructuring/Non-restructuring is not a binary distinction.
   → There are different types (lexical vs. functional) and degrees of restructuring.
- Restructuring complements are bare VPs.
   → Reduced complements come in a range of sizes: VP, vP, TP.
- Restructuring complements lack a structural case position.
   → Some do, some don't.
- Restructuring is only found with infinitival complements.
   → ICH effects, including certain restructuring properties, are also observed in finite contexts (Stjepanović, 2004; Todorović and Wurmbrand, 2020).
- "Restructuring" is not language-specific.
  - $\hookrightarrow$  Size effects are a general phenomenon of complementation.

### Conclusions

ICH vs. cartography Misconceptions about restructuring Conclusions

- $\hookrightarrow$  There is a universal semantic hierarchy of complementation.
- $\hookrightarrow$  Morphosyntax tracks the hierarchy, but is not defined by it.
- $\hookrightarrow$  Syntax is partially autonomous, and feeds into semantics (which may filter out certain configurations).
- $\hookrightarrow$  Clausal domains are defined via containment, which yields an implicational hierarchy.

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# Thank you!

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