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AN IMPLICATIONAL UNIVERSAL IN COMPLEMENTATION—THEORETICAL INSIGHTS AND EMPIRICAL PROGRESS[*]

1. Introduction

Clauses selected by a verb (henceforth argument or complement clauses) have been divided into different classes based on the selecting verb's semantic requirements (e.g., interrogative, propositional attitude, modal), the morphosyntactic coding of the embedded clause (e.g., infinitive, subjunctive, nominalization), and the properties of the embedded subject (e.g., exceptional case marking [ECM], different types of control). Based on these properties, different degrees of integration and dependence on the matrix clause exist—for instance, a control clause, which requires a dependency between the embedded subject and a matrix argument, is less independent and more integrated into the main clause than finite embedded clauses with no subject restrictions. Similarly, different degrees of morphological, syntactic, and/or semantic complexity have been observed, exemplified, for instance, by the presence vs. absence of tense (morphology, projection, interpretation), agreement, an embedded subject, and other elements. Depending on which aspects of these classifications studies focus on, the resulting classifications are often not uniform. Nevertheless, abstracting away from certain details, a uniform picture has arisen, most notably demonstrated in Givón 1980, where a correspondence has crystallized between, on the one hand, the semantic function of the embedding configuration, and, on the other hand, the syntactic coding, as well as the independence and integration of the embedded clause.

In his influential typological study of complementation, Givón 1980 proposes the functional Binding Hierarchy in (1), which leads to the distribution of complements in (2) (note that the Binding Hierarchy is the upper forked ark, and 'high' refers to the right of the scale).
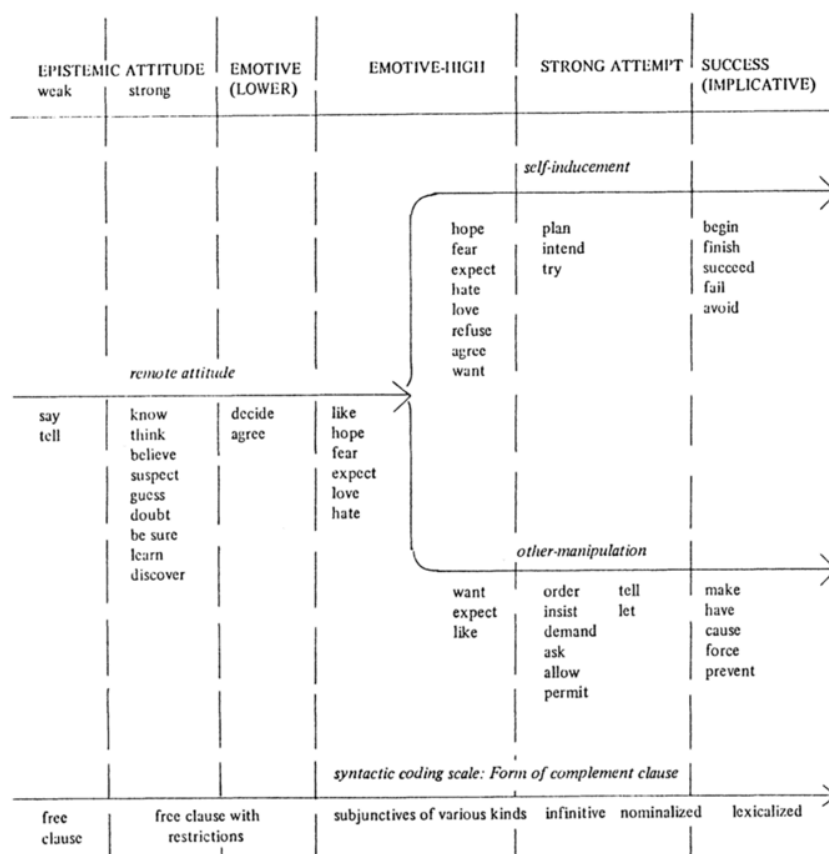
(1)   Binding Hierarchy
        The stronger the influence exerted over the agent of the complement
        clause by the agent of the main-clause verb, by whatever means, the

higher is the main-clause verb on the binding scale.

(2)

EPISTEMIC ATTITUDE		EMOTIVE	EMOTIVE-HIGH	STRONG ATTEMPT	SUCCESS
weak	strong	(LOWER)			(IMPLICATIVE)

self-inducement

			hope	plan	begin
			fear	intend	finish
			expect	try	succeed
			hate		fail
			love		avoid
			refuse		
			agree		
			want		

remote attitude

say	know	decide	like		
tell	think	agree	hope		
	believe		fear		
	suspect		expect		
	guess		love		
	doubt		hate		
	be sure				
	learn				
	discover				

other-manipulation

			want	order	tell	make
			expect	insist	let	have
			like	demand		cause
				ask		force
				allow		prevent
				permit		

syntactic coding scale: Form of complement clause

| free | free clause with | subjunctives of various kinds | infinitive | nominalized | lexicalized |
| clause | restrictions | | | | |

[Givón 1980: 369]

There are two major conclusions reached in this work: i) the semantic hierar-
chy derived from the Binding Hierarchy systematically correlates with the
morphosyntactic properties of complement clauses; ii) the hierarchy is *impli-
cational* in that the distribution of syntactic or morphological distinctions, if
present in a language, operate in a directional manner along the scale, leading
to implicational predictions about adjacent configurations (such as 'if a type
of complement has property X, all complement types to its right/left also have
property X'). The correlation between syntax and semantics is formulated as
the Syntactic Coding Hierarchy in (3), with some common parameters in (4).

(3)   The higher a verb is on the binding scale, the less would its comple-
        ment tend to be syntactically coded as an independent/main clause.

                                                        [Givón 1980: 337, (11)]

(4)   a.   The higher a verb is on the binding scale, the less is the agent in
                its complement/embedded clause likely to exhibit the case- mark-
                ing characteristic of main-clause subjects/agents/topics.
        b.   The higher a verb is on the binding scale, the less is the verb of its
                complement clause likely to exhibit the tense-aspect-modality
                markings characteristic of main clauses.
        c.   The higher a verb is on the binding scale, the more is the verb in
                its complement clause likely to be predicate-raised, i.e. lexicalized
                as one word with the main verb.

   [Givón 1980: 338, (12)]

It is important to note that, while the hierarchies in (2) are proposed to be
universal, the exact mapping of the two can show variation, as long as the
internal ordering of the hierarchies is respected. Single languages only show
a selection of the coding properties given, but whenever coding distinctions
are made within a language, they follow the hierarchy and lead to implica-
tional predictions. For instance, if a language realizes the complement of a
particular class only as an infinitive, all classes to the right of that class will
not be realizable as free independent clauses, but only as infinitives, nominal-
izations or lexicalizations.

        Strictly speaking, the functional Binding Hierarchy is defined for the
'other-manipulation' branch in (2)—for instance, to force someone to do
something means that the agent of the *force* clause exerts control and influence
over the subject of the complement clause. However, Givón 1980 notes that it
extends to the other classes (what is labeled as "self-inducement"), if 'influ-
ence' is understood as "strength of the agent's purpose to affect the accom-
plishment of the proposition in the embedded clause" (p. 342).

        In this paper, we will take a generative approach to the hierarchy,
maintaining the basic hypothesis in (5), but providing a structural definition
for some of the groupings observed.

(5)   There is a possibly universal implicational complementation hierarchy
        (ICH) which is defined semantically and detectable through a diverse
        set of morphological, syntactic, and semantic properties.

Concentrating on complements to lexical verbs (i.e., setting aside verbal elements realized in the functional domains of a clause, such as auxiliaries), a common distribution observed is that cross-linguistically, complements split into three classes (but finer-grained distinctions may be possible for some phenomena). We suggest in this paper, that these three complement types can be defined semantically as supersets of Givón's classes, following the terminology in Ramchand and Svenonius 2014. Importantly, the semantic categories proposed there are defined via containment relations, which, when applied to complement clauses, lead to an implicational 'clausehood' hierarchy of complements with different semantic and structural complexities:

MOST CLAUSAL ⋯	Class 1 ≫ Class 2 ≫ Class 3	⋯ LEAST CLAUSAL
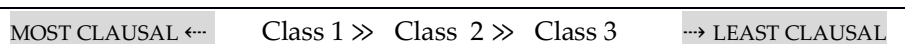
Clausehood will be represented through criteria of independence, transparency, integration, and complexity, and the implicational nature of the hierarchy is observed, as in Givón's hierarchies, in that Class 3 can never be more independent, more complex, less transparent and less integrated than Class 2; and Class 2 can never be more independent, more complex, less transparent and less integrated than Class 1. Although a language may not distinguish between some or all of the three classes regarding certain morphological or syntactic properties, (e.g., in Greek or Bulgarian, all complement clauses are finite, thus no finiteness distinctions exist among the three classes), the hierarchy nevertheless manifests itself, we hypothesize universally, following Givón, in that no language or property can go against the hierarchy. In other words, while certain effects may be neutralized in a language, no language or property shows higher independence/complexity or less transparency/integration for a class than for classes to its left.

In this paper we provide a definition of the three broad classes of complementation, illustrate the clausehood hierarchy via a range of properties in diverse languages, and provide a model that derives the hierarchy and its implicational nature structurally. We further suggest that complementation follows a synthesis model, where complements are not syntactically selected (e.g., there is no category or size selection), but freely built in different forms, with the only restriction that the resulting structures need to match with the semantic requirements of the matrix verbs. This view allows flexibility (such as meaning shifts of matrix verbs) and optionality in complementation, exactly as needed to handle the variation found within and across languages.

2. The implicational complementation hierarchy (ICH)

2.1. Narrowing down to three types of complementation

While the distribution of morphosyntactic properties varies significantly across languages, the semantic grouping of complement types shows a (more) stable distribution. This has been recognized in functional-typological (see, e.g., Givón 1980, Horie 2001, Cristofaro 2005, Dixon 2006, Noonan 2007), as well as structural-grammatical frameworks (e.g., Cinque 1999, 2001, 2004, Sundaresan 2012, 2018). Both types of approaches have resulted in hierarchies ranking complement clauses on some form of (in)dependence scale, which are surprisingly similar. Differences lie in the theoretical implementation of the hierarchies and the amount of detail.

Although the universality of some of the specific rankings and the fine-grained distinctions of these hierarchies has been questioned (see Ramchand and Svenonius 2014, Chomsky et al. 2019), a core and possibly universal ranking can nevertheless be isolated and maintained by grouping complement clauses into three broad classes, which may be further divided into (possibly language-specific) sub-classes. A central observation in the research on restructuring or clause-union (see Wurmbrand 2001, 2014a, 2015b), is that complement clauses can be broadly divided into *Propositions*, *Situations*, and *Events*, adopting the terminology and definitions in Ramchand and Svenonius 2014 (a similar classification has been proposed in Rochette 1988, 1990, although with different terminology). Complements of the type *Proposition* involve speech and epistemic contexts. These types of complements are temporally independent, have no pre-specified tense value, are anchored in an utterance or embedding context, and may involve speaker-oriented parameters. Complements of the type *Situation* involve emotive and irrealis contexts. These types of complements are elaborate eventualities without speaker- and utterance-oriented properties, but with time and world parameters, allowing them to refer to a specific, possibly pre-determined, time. Complements of the type *Event* include implicative and strong attempt contexts. These types of complements are semantic *Properties* (Chierchia 1984, Wurmbrand 2002) in that they lack speaker- and utterance-oriented properties as well as time and world parameters; they are tenseless, may involve actuality entailments, and may have reduced argument structure and/or event properties.

The three-way distinction has been robustly attested across languages, whereas the division into sub-classes shows variation. The resulting hierarchy is given in Table 1. *Independence* refers to properties such as the pres-

ence and/or interpretation of an independent subject or tense in the complement; *transparency* indicates whether the embedded clause is permeable for certain operations or dependencies; and *integration* gives the degree to which the embedded predicate is an integral part of (e.g., incorporated into) the matrix predicate.

MOST INDEPENDENT		LEAST INDEPENDENT
LEAST TRANSPARENT	Proposition ≫ Situation ≫ Event	MOST TRANSPARENT
LEAST INTEGRATED		MOST INTEGRATED

Table 1 Implicational complementation hierarchy (ICH)

The split between *Proposition* and *Situation* complements has been made in many syntactic works, originally based on the distribution of control vs. ECM in English infinitives (see Stowell 1982, Pesetsky 1992, among many others). While these English-specific aspects will be set aside here (see Wurmbrand 2014b, Wurmbrand 2019), the distinction has turned out to be essential regarding many properties cross-linguistically. *Proposition* configurations (see (6a) for some verbs in English) involve complements that can be assigned a truth value (*Nova claimed that she bought salad, which is true*—i.e., it is true that she bought salad) or have a presupposed truth value (as in the case of factive complements). *Situation* complements, on the other hand, combine with verbs such as those in (6b), and they refer to eventualities that are not evaluated for truth but for other aspects of content (*Nova asked me to buy salad, which is a good idea/not easy to do on Sundays*—i.e., to buy salad is neither true nor false but can receive a speaker assessment of the properties of the content).

(6) a. *Proposition*: admit, affirm, announce, assume, believe, claim, consider, discover, figure, find, forget (factive), imagine, know (factive), observe, say, suppose, tell (speech), wager
     b. *Situation*: agree, ask, choose, decide, demand, desire, know (modal), need, plan, promise, refuse, tell (imperative), want, wish

A further difference between the *Proposition* and *Situation* classes concerns the temporal and aspectual interpretation. *Situation* complements are temporally located at a particular time which is tightly connected to the properties of the matrix verb. Since these complements lack speaker-oriented/discourse-linking parameters, the time specifications cannot be linked to a clause-internal utterance context, but are anchored to the matrix clause. The most common type of *Situation* complements (but there may be other options) involve unrealized irrealis events, which are set in the future with respect to the time of

the matrix predicate (Abusch 2004). As shown in (7a,b), such complements can be modified by future adverbials, and even when the complement is finite as in (7c), the future orientation must be observed and a past interpretation is impossible (unless the meaning of *decide* is coerced into a different interpretation which we come back to below).

(7)   a.   *Clara decided to fly to Paris next week.*
        b.   *Clara decided that she will/would fly to Paris next week.*
        c.   **Clara decided that she flew to Paris last year.*

In *Proposition* contexts the tense dependency is different in that no specific temporal value is imposed by the matrix predicate. The embedded clause contains its own utterance context anchoring the embedded tense, but different from matrix clauses, the context is tied to the matrix clause through the "NOW" of the propositional attitude holder (cf. Wurmbrand 2014b for detailed evidence). *Proposition* complements can therefore be interpreted as occurring simultaneously with the matrix event as in (8a,b) or the time can be shifted to the past (with respect to the matrix time) as in (8c,d) (in finite contexts, a future interpretation is possible as well). Importantly, *Proposition* infinitives behave like finite clauses, in that they cannot occur in the non-progressive form when referring to a non-generic episodic event (that does not have a scheduling reading) simultaneous with the matrix time, as shown in (8a,b).

(8)   a.   *Clara believes/claims that she is eating/*eats salad right now.*
        b.   *Clara believes Danny to be eating/*to eat salad right now.*
               *Clara claims to be eating/*to eat salad right now.*
        c.   *Clara believes/claims that Danny ate salad.*
        d.   *Clara believes Danny to have eaten salad.*
               Clara claims to have eaten salad.

The latter property is part of a more general restriction on aspect in *Proposition* contexts (see Wurmbrand 2014b, Todorović 2015), which prohibits perfective aspect in contexts in which the event time cannot be included in the reference time (because the latter is too short; see Pancheva and von Stechow 2004). As shown in (9a) and (10a), *Proposition* complements cannot occur in perfective aspect in Serbian, Croatian, and Greek, whereas *Situation* complements can (cf. (9b), (10b); in Croatian, (9b) could only involve a non-finite complement, but the aspect properties are the same as in Serbian; I. Kovač, p.c.). Since the reference time of irrealis *Situation* complements is a possibly infinite future interval, the embedded event interval can be contained in it, thus allowing

perfective. In *Proposition* complements, on the other hand, the reference time is a very short interval (the attitude holder's NOW) and the embedded event interval cannot be contained in it, preventing perfective. Furthermore, (10c) shows that the effect is also observable in complements with an embedded past: while the imperfective statement allows two interpretations—a shifted past (the *solving* occurs before the *claiming*) and a simultaneous interpretation (the *solving* occurs at the same time as the *claiming*)—the perfective form only allows a shifted past interpretation. Since the past reference time in (10c) is restricted to a very short interval (the time of the *knocking*), under a simultaneous interpretation, the event interval could not be contained in it, hence prohibiting perfective under this interpretation. This perfective restriction in the past supports the relevance of the reference/event time ordering for perfective (rather than a specific restriction on present tense), and thus indirectly the existence of a short reference time interval in *Proposition* complements.

(9) a. *Jovan* *je* *tvrdio* *da* *čita* /
      Jovan AUX claimed DA read.3.SG.PRS.IPFV /
      *pročita *knjigu.*
      *read.3.SG.PRS.PFV book
      'Jovan claimed to be reading the book.'

    b. *Jovan* *je* *odlučio* *da* *čita* /
      Jovan AUX decided DA read.3.SG.PRS.IPFV /
      pročita *knjigu.*
      read.3.SG.PRS.PFV book
      'Jovan decided to read the (entire) book.'

                    [Serbian: Todorović 2015]

(10) a. *isxirizete* *oti* *lii* /
      claim.IPFV.PRS.3SG that solve.IPFV.PRS.3SG /
      *lisi *to provlima*
      *solve.PFV.PRS.3SG the problem
      (, *me* *to* *na* *to* *aγnoi*)
      (, with the NA it ignore.IPFV.PRS.3SG)
      'He claims to be solving the problem (by ignoring it).'

    b. *apofasisen* *na* *lisi* *to provlima.*
      decide.PFV.PST.3SG NA solve.PFV.PRS.3SG the problem
      'He decided to solve the problem.'

c. *isxiristiken*   *oti*   *elien*   /
claim.PFV.PST.3SG   that   solve.IPFV.PST.3SG   /
elisen   *to provlima*   (, *otan*
solve.PFV.PST.3SG   the problem   (, when
extipisen   *i porta)*
hit.PFV.PST.3SG   the door)
'He claimed that he solved/was solving the problem (when there was a knock at the door).'

[Cypriot Greek: C. Christopoulos, p.c.]

The third class of complements we will distinguish includes verbs such as the ones in (11a)[1], where complements denote tenseless *Events*. One of the main semantic characteristics of this class is that the time of the embedded event has to be simultaneous with the time of the matrix event and neither a future, (11b), nor a past interpretation, (11c), is possible. As we will see in section 2.3, these complements cannot be finite in English, but the tense restrictions can also be seen in languages that only have finite complementation, such as Greek in (12).

(11) a.   *Event*: avoid (implicative), begin, can, continue, fail, finish, forget (implicative), manage, may, must, start, stop, succeed, try
     b.   *Clara tried to eat the salad (*tomorrow).*
     c.   **Clara tried to have eaten the salad yesterday.*

(12) a.   **simmera eprospaθisen*   *na lisi*   *to provliman*
           today   try.PFV.PST.3SG   NA solve.PFV.PRS.3.SG   the problem
           avrio.
           tomorrow
           Lit. 'He tried today to solve the problem tomorrow.'
     b.   **prospaθo*   *na*   *efevɣan.*   / *efiɣan.*
           try.1SG   NA   leave.IPFV.PST.3PL / leave.PFV.PST.3PL
           Lit. 'I try for them to have been leaving/to have left.'
                                [(Cypriot) Greek: C. Christopoulos, p.c.]

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[1] We have included modals in this class, as they form the least clausal contexts in most languages. However, modals may be functional heads in certain languages, which constitutes a different type of complementation (see also fn. 3). The generalizations regarding the ICH apply foremost to complements of lexical verbs.

Furthermore, as shown in (11b), in contrast to *Proposition* complements, a non-progressive embedded predicate is possible, and so is perfective in (Cypriot) Greek, (13a) and Serbian, (13b).

(13) a. *eprospaθisen*   *na*   *lisi*   *to provlima.*
       try.PFV.PST.3SG   NA   solve.PFV.PRS.3SG   the problem
       'He tried to solve the problem.'   [C. Christopoulos, p.c.]

     b. *Jovan*   *je*   *pokušao*   *da*   *pročita*   *knjigu.*
       Jovan   AUX   tried   DA   read.3.SG.PRS.PFV   book
       'Jovan tried to read the (entire) book.'   [N. Todorović, p.c.]

Implicative and aspectual contexts are typically non-irrealis and non-future, but verbs like *try* pose an interesting in-between case. While, as we have just seen, a future interpretation is not possible, *try* complements also involve an irrealis aspect since the embedded event cannot be realized (i.e. completed) yet in a trying situation. Since *try* usually patterns with *Event* verbs, we have included it among this class, but we wish to note that it is a clear border-case (see also Givón's (2)), which may also show properties of the *Situation* class.[2]

     Lastly, as has been discussed extensively in the works on control, the *Proposition* and *Situation* classes differ from the *Event* class in the 'strength' of the requirement that the embedded subject is identical to (e.g., controlled by) a matrix argument (see also McFadden 2014). As shown in (14), while *Event* complements typically require full identity between the matrix controller and the embedded subject, *Situation* complements often allow a relaxed form of control, partial control, where the referent of the matrix argument merely has to be included among the referents of the embedded subject (see Landau 2000 for extensive discussion).[3]

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[2] Another aspect of the mixed behavior of *try* is suggested in Sharvit 2003 where it is shown that *try* contexts display some parallels with progressive in that they involve both an intensional and an extensional component.

[3] A similar observation and classification is made in McFadden 2014. However, in contrast to the proposal here, four classes of complements are distinguished in terms of the subject properties. In addition to the three classes that can be translated into our classification as *Proposition, Situation*, and *Event*, a class labelled as "little dependent" is given which involves perception verbs and causatives. This class is special in involving syntactically small complements (e.g., *v*Ps) but an independent embedded subject. One way to consolidate this class with our proposal is to assume that these verbs are not lexical verbs, but semi-lexical (see Wurmbrand 2001). As such, they are located along the clausal hierarchy in an expanded voice domain, and the embedded complement forms the main predicate of the matrix clause (see also Cinque 2001, 2004). In such a configuration, only a single clause exists and no subject-dependencies arise. Thus the observations regarding the identity requirements of embedded subjects stated in the text only apply to complementation with lexical verbs (see also section 2.4).

(14) Intended: the chair plus his associates would gather in the castle
  a.   *The chair tried to gather in the castle.
  b.   The chair decided to gather in the castle.

Furthermore, for languages like Greek, it has been noted that *Event* complements tend to involve obligatory control, (15a), whereas *Situation*, (15b), and *Proposition* complements, (15c), allow free reference.[4] Many authors have therefore postulated a PRO subject like in infinitives for the obligatory coreference configurations, whereas the free reference contexts involve an embedded *pro* subject (see, among many others, Iatridou 1988, Varlokosta 1993, Terzi 1992, 1997, and Landau 2004 for a summary).

(15) a.   *Ta pedhja   arxisan   na   trexun   / *trexi.*
        the children began.3PL NA   run.3PL   / *run.3SG
        'The children began to run.'   [Roussou 2009: 1816, (11)]
    b.   *Ipa   ston Kosta na   figi   o   yios tou.*
        told.1.SG to   Kosta NA   leave.3SG the son his
        'I asked Kosta for his son to leave.'   [Terzi 1997: 340, (25)]
    c.   *I Maria   ipe   oti   egrapsan   ena piima.*
        the Mary   said.3.SG that   wrote.3.PL one poem
        'Mary said that they wrote a poem.'   [Terzi 1997: 338, (11)]

In sum, we suggest the semantically based three-way split in Table 2, which represents an implicational hierarchy from most clausal on the left to least clausal on the right (to be motivated below). We want to emphasize again that this grouping of complement clauses in three broad groups does not mean

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A four-way split of complement clauses has also been proposed in Kouwenberg and Lefebvre 2007 for Papiamentu: although labeled differently in Kouwenberg and Lefebvre 2007, Papiamentu seems to show distinctions like a *Proposition* class, a *Situation* class and an *Event* class. Additionally, a fourth class exists, consisting of gerundials, which, interestingly, also involve perception verb complements. Possibly, the latter can be analyzed as semi-lexical configurations, similar to our suggestion for McFadden's "little-dependent" class. Although the split and initial data in Kouwenberg and Lefebvre 2007 are encouraging, we have to postpone a detailed study of Papiamentu in our framework to further research.

[4] The distribution of control shows some variation, in particular in the *Event* class. While Terzi 1997 considers control obligatory with verbs like *try*, Roussou 2009 allows non-coreference as well. The variation is, however, systematic and falls along the Givón scale: aspectuals and modals, are the most likely to trigger obligatory control, followed by implicative verbs. Clear future contexts are the least likely to require coreference. If what matters for control is a combination of tense and mood, the in-between nature of *try* may be expected, since, as noted above, it is both irrealis but also tenseless, and hence could alter between the two classes.

that the detailed hierarchical distinctions noted in Givón 1980 or Cinque 2001, 2004 are not relevant as well. For instance, the *Proposition* class shows variation in the distribution of shifted indexicals (Deal 2017, Sundaresan 2012, 2018) and ECM (Christopoulos and Wurmbrand To appear, Wurmbrand 2019), which may reflect a more fine-grained internal hierarchy of that class (Sundaresan 2012, 2018), or an extension of the clausal structure to a speech act domain above the regular clausal domain (see Krifka 2018/this volume). However, in contrast to the three-way split we suggest, finer-grained distinctions are not robust and exhibit cross-linguistic variation (see also Ramchand and Svenonius 2014). In what follows, we show that for many distributional properties, a collapsed grouping as in Table 2 is necessary as the basic classification of complements. After illustrating the existence of these three classes by a range of phenomena (sections 2.2-2.5), section 3 will provide an account of the three-way split, including a reason for why there are three broad groupings.

Properties	*Proposition*	*Situation*	*Event*
Temporal interpretation	embedded reference time (attitude holder's NOW); no pre-specified tense value	no embedded reference time; pre-specified tense value (most common future, modal)	tenseless, simultaneous
Type of control	partial control possible	partial control possible	exhaustive control

Table 2 Semantic classification

2.2. The ICH Signature

That complement clauses fall into three broad classes can be illustrated by properties which show different values for the three classes or combinations of properties which together single out three types of complements. A case of the first type of property are clause introducers in Bulgarian and Greek, both languages without infinitives (the same distribution is found in Macedonian; see Wurmbrand et al. 2020).[5] Declarative complement clauses are introduced by either *če* or *da* in Bulgarian and *oti* or *na* in Greek. As shown in (16a) and (17a), *Proposition* complements are obligatorily introduced by *če* and *oti*, which

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[5] The Greek data are from a Cypriot Greek speaker. As far as we are aware, for the points made in this paper, there are no differences between the two varieties of Greek.

are typically seen as regular complementizers corresponding to *that*. *Event* complements, on the other hand, are obligatorily introduced by *da* and *na*, as in (16c) and (17c). Lastly, *Situation* complements can go with either clause introducer, as in (16b) and (17b), as long as an overt future element is present in the *oti/če* cases.

(16) a. *Lea tvărdi*   {*če*   / **da* } *čete*   *kniga.*
        Lea claim.PRF.3SG   {that   / *DA } read.PRS.3SG   book
        'Lea claimed that she read a book.'

     b. *Lea reši*   {*če šte* / *da* } *čete*   *kniga.*
        Lea decide.PRF.3SG   {thatFUT / DA } read.PRS.3SG   book
        'Lea decided to read/that she will read a book.'

     c. *Lea se   opitvaše*   {**če*   / *da* } *čete*   *kniga.*
        Lea REFL try.PRF.3SG {*that   / DA } read.PRS.3SG   book
        'Lea tried to read a book.'

                                          [Bulgarian: Marchela Oleinikova, p.c.]

(17) a. *isxiristiken*   { *oti* / **na*} *elisen*   *to provlima.*
        claim.PFV.PST.3SG   {that / *NA   } solve.PFV.PST.3SG the problem
        'He claimed to have solved/that he solved the problem.'

     b. *apofasisen*   { *oti*   *enna* / *na*   } *lisi*
        decide.PFV.PST.3SG {that   FUT   / NA   } solve.PFV.PRS.3SG
        to provlima.
        the problem
        'He decided that he will solve/to solve the problem.'

     c. *eprospaθisen*   { **oti*   / *na* } *lisi*   *to provlima.*
        try.PFV.PST.3SG   { *that / NA } solve.PFV.PRS.3SG the problem
        'He tried to solve the problem'

                                          [Cypriot Greek: Christos Christopoulos, p.c.]

The distribution is summarized in Table 3 and represents what we call the *ICH Signature*—when a property distinguishes between different types of complements, *Proposition* and *Event* complements show the opposite values, and *Situation* complements either allow both values or 'side' with one or the other. The importance of ICH Signature effects, which many previous accounts of complementation cannot derive, is the systematicity: it is no coincidence, we argue, that *Proposition* and *Event* complements show the opposite values, as they are at the opposite ends of the ICH. Similarly, the ambivalent

nature of *Situation* complements is expected since they occupy a position between *Proposition* and *Event* complements on the hierarchy.

Clause introducers	Proposition	Situation	Event
Bulgarian	*če, *da*	*če* (+FUT), *da*	**če, da*
(Cypriot) Greek	*oti, *na*	*oti* (+FUT), *na*	**oti, na*
ICH Signature	+P	±P | +P | −P	−P

Table 3 The ICH Signature

Note that for these and the other complementation properties to follow, the classes are defined semantically and not necessarily via specific verbs. As listed in (6), certain verbs may belong to two classes. Our main hypothesis is that, depending on which interpretation is chosen in any given statement, the distributional properties may change and must follow the properties of the semantic class the verb belongs to under that interpretation. Some specific cases at hand are verbs like *know, forget*, or *tell*. [6] The verbs *know* and *forget* belong to the *Proposition* class when factive but to the *Event* class when modal (*know*) or implicative (*forget*). The verb *tell* belongs to the *Proposition* class when used as a speech verb, but to the *Situation* class when used as a command verb. Strikingly, the clause introducers change exactly as predicted in Table 3. The *oti* complements in (18)/(19) can only have factive interpretations, whereas the *na* complements can only have the modal/implicative interpretations. In other words, only *oti* is possible under the factive interpretation, and only *na* under the modal/implicative interpretations. [7] Similarly, the complement of *tell* acts as a *Proposition* complement under the speech interpretation in (20a) where it can only occur with *oti*, whereas it is a *Situation* complement under the command interpretation in (20b), in which case it can occur with *na*. [8]

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[6] Another verb that is notoriously ambiguous is the verb *expect*, which allows various irrealis interpretations (belonging to the *Situation* class) as well as a *believe*-type *Proposition* interpretation (see Bresnan 1972, Pesetsky 1992). In Wurmbrand 2014b, it is shown that the aspectual properties change as expected according to which type of verb is chosen.

[7] The verb *know* may also combine with a *na* clause when it is accompanied by negation or a question, in which case the interpretation involves an epistemic modal reading like "according to what I believe/think it must/cannot be the case that…" (Roussou 2009: 1814), which we assume is responsible for the switch of classes.

[8] The command interpretation can also be expressed with an *oti* clause if an overt modal (*prepi* 'must/should') is used.

(18) a. *Kseri   oti   odhiji*
        know.3SG   that   drive.3SG
        'He knows that she drives.'
        *'He knows (how) to drive.'   [Roussou 2009: 1814, (7c)]
    b. *Kseri   na   odhiji*
        know.3SG   NA   drive.3SG
        *'He knows that she drives.'
        'He knows (how) to drive.'   [Roussou 2009: 1814, (7c)]

(19) a. *eksixasen   oti enna lisi   to provlima*
        forget.PFV.PST.3SG   that FUT   solve.PFV.PST.3SG the problem
        'He forgot that he will solve the problem.'
        *'He forgot to solve the problem.'   [C. Christopoulos, p.c.]
    b. *eksixasen   na lisi   to provlima.*
        forget.PFV.PST.3SG   NA solve.PFV.PST.3SG   the problem
        *'He forgot that he will solve the problem.'
        'He forgot to solve the problem.'   [C. Christopoulos, p.c.]

(20) a. *Tu ipa   oti   efije.*
        Him told.1.SG that left.3SG
        'I told him that she had left.'
        *'I told him to leave.'   [Roussou 2009: 1814, (7b)]
    b. *Tu ipa   na   fiji.*
        Him told.1.SG NA   leave.3SG
        *'I told him that she had left.'
        'I told him to leave.'   [Roussou 2009: 1814, (7b)]

Theoretically, the distribution of *oti/če* and *na/da* raises many interesting questions. One much-debated issue is how to delineate and define when *na/da* is possible, in other words, the question of what unifies the *Situation* and *Event* classes (to the exclusion of the *Proposition* class). Traditionally, the difference between *oti/če* and *na/da* has been described along the lines of the indicative vs. subjunctive distinction (Joseph 1983, Terzi 1992), in which case the distribution of clause introducers—the ICH Signature effect—follows straightforwardly Givón's coding hierarchy. However, the notion of "subjunctive" has also been questioned for *na/da* since a uniform semantic characterization of all *na/da* contexts does not appear to be possible. Most accounts readily cover the *Situation* class (as this class predominantly involves modal or irrealis contexts), but they usually do not extend to the *Event* class, in particular the non-modal implicative (e.g., *manage*) and aspectual predicates (e.g., *begin*) in that

class.[9] This makes *na/da* the elsewhere case, and the challenge is to define the syntactic contexts in which *na/da* arises (see section 3.3).

A different direction has been taken in Roussou 2009 where it is suggested that *na* does not express semantic subjunctive but is a nominal element similar to a locative pronoun. Support for this claim could come from the fact that *na*, but not *oti,* can introduce a nominalization without an additional overt determiner (Agouraki 1991).[10] This could be taken to suggest that *na* complements are more nominal than *oti* complements, which again would follow Givón's coding hierarchy and the ICH, since nominalizations are cross-linguistically more common with *Situation* and/or *Event* complements.

In addition to the characterization of *na/da,* the ICH Signature effect poses two other questions, which are often ignored. First, why is it the *Situation* class that shows optionality between *oti/če* and *na/da* (and not either of the other classes); and second, why are *oti/če* statements not possible with *Event* complements. It is not obvious that previous accounts have answers to these questions. We submit that these questions lie at the heart of the ICH, and we will return to them in section 3.3. For now, let us conclude with the general characterization in Table 4: since *Proposition* and *Event* complements are at the opposite ends of the independence scale for the embedded tense and subject interpretations (see section 2.1), we can note that the *oti/če* vs. *na/da* distinction systematically aligns with this scale—the more independent a complement is, the more likely it is to be introduced with *če/oti*; the less independent the complement is, the more likely is *da/na.*

MOST CLAUSAL/INDEPENDENT	če/oti ≫ da/na	LEAST CLAUSAL/INDEPENDENT

Table 4 Bulgarian and Greek clause introducers

A second way in which ICH Signature effects are revealed is by the combination of two properties, which each have only two values. We illustrate this with the distribution of infinitives and overt subjects in Serbian. In Serbian, like in Greek and Bulgarian, all three types of complement clauses can be realized as finite complements, cf. (21). However, Serbian is different from Greek and Bulgarian in also having infinitives. Importantly, as shown in (21),

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[9] Some implicative verbs may be accommodated via a hidden goal, desire, or task component (see Roussou 2009 for a suggestion along those lines). For instance, *manage to do something* usually implies that achieving the event corresponding to the infinitive is desired by the subject. However, it remains to be seen whether this is a core semantic component of these verbs or a pragmatic effect. It is also not clear whether a hidden modality approach can extend to aspectual verbs.
[10] The diachronic development of *na* may also support this approach (L. Grestenberger, p.c.).

Situation and *Event* complements can be realized as non-finite clauses, but *Proposition* complements cannot.

(21) a. *Tvrdim*   {*da čitam*   / **čitati*   } *ovu knjigu.*
     claim.1SG   {DA read.1SG / *read.INF } this book
     'I claim to be reading this book.'   [Vrzić 1996: 305, (22a,b)]

   b. *Odlučila*   *sam*   {*da*   *čitam*   / *čitati*   } *ovu knjigu.*
     decide.SG.FEM AUX.1SG {DA read.1SG / read.INF } this book
     'I decided to read this book.'   [N. Todorović, p.c.]

   c. *Pokušala*   *sam*   {*da čitam*   / *čitati*   } *ovu knjigu.*
     tried.SG.FEM AUX.1SG {DA read.1SG / read.INF } this book
     'I tried to read this book.'   [N. Todorović, p.c.]

Although Serbian allows finite complements for all three classes of complementation, overt subjects are not possible in all of them. As shown in (22a,b) finite *Proposition* and *Situation* complements allow i) an interpretation where the embedded clause contains an empty element coreferent with the matrix subject), ii) an embedded subject that is different from the matrix subject, or iii) an embedded pronominal subject, which could be, but does not have to be, coindexed with the matrix subject. The situation is different in *Event* complements. We have seen above already that *Event* complements tend to trigger obligatory control. This is also the case in Serbian. What is striking, however, is that in the *Event* class no overt subject is possible, not even a pronoun coreferent with the matrix subject (which would satisfy the semantic control requirement). Since a finite complement is nevertheless possible in these cases, it is surprising that subjects are entirely excluded.

(22) a. *Jovan*   *je*   *tvrdio*   *da*   *je*   __ / *Petar*   / *on*   *otišao*
     Jovan   AUX   claimed   da   AUX   __ / Peter   / he   left
     pre Marije.
     before Mary
     'Jovan claimed to have left before Mary.'
     'Jovan claimed that Peter/he has left before Mary.'

   b. *Jovan*   *je*   *odlučio*   *da*   __ / *Petar*   / *on ode.*
     Jovan   AUX   decided   DA   __ / Peter   / he leaves
     'Jovan decided to leave-'
     'Jovan decided that Peter/he would leave.'

   c. *Jovan*   *je*   *pokušao*   *da*   __ / **Petar* / **on   ode.*
     Jovan   AUX   tried   DA   __ / *Peter / *he leaves
     'Jovan tried to leave.'   [Serbian: N. Todorović, p.c.]

Put together, as shown in Table 5, infinitives and overt subjects show an ICH Signature effect in Serbian: *Proposition* and *Event* complements show the opposite values whereas *Situation* complements are in-between. Once again, this distribution is not surprising in light of the ICH. Overt subjects are a property of independence, hence least available in the most dependent *Event* class. Infinitives are a dependent property, hence least available in the *Proposition* class.

Serbian	*Proposition*	*Situation*	*Event*
Infinitival complement	*	✓	✓
Overt subject	✓	✓	*

Table 5 ICH Signature effect in Serbian

In the next section, we will look more closely at the distribution of infinitives vs. finite clauses in several languages and show that finiteness is not a defining property of clause size or syntactic complexity, but rather a property that operates on the semantically defined scale of the ICH.

2.3. Implicational finiteness universal

From an English perspective, the complexity of an embedded configuration is typically taken to be the result of its syntactic coding. Sentences with a main verb plus one or more auxiliaries are seen as the least complex configurations since they form a single clausal domain. Sentences containing a finite or non-finite complement clause (typically) instantiate bi-clausal configurations, with infinitives often being treated as "less" clausal than finite clauses, since the former allow dependencies such as control and A-movement across them whereas the latter are often only transparent for A'-phenomena.[11]

MOST CLAUSAL ⬅⋯	finite ≫ infinitive ≫ auxiliary	⋯➜ LEAST CLAUSAL

While the above scale matches Givón's coding hierarchy and can be observed widely, there are several reasons to reject a definition of clausehood based on coding properties, instead of, as suggested in Givón 1980 and our approach

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[11] The claim that finite clauses do not allow A-dependencies across them has been shown to not be tenable cross-linguistically (see Wurmbrand 2019 for a summary of cross-clausal A-phenomena in a range of languages, and the consequences these pose for clausehood).

here, a semantically defined hierarchy which morphosyntactic coding operates on. That morphosyntactic coding is a consequence of the ICH and not a defining characteristic of clausehood has already been seen in the distribution of clause introducers in Bulgarian and Greek. Since these languages lack infinitives, yet still show ICH effects, coding cannot be the source of the differences.

A similar point can be made for Serbian. In addition to the ICH Signature properties mentioned in Table 5, there are several other syntactic properties which distinguish the three classes of complements, despite all of them occurring as finite complements (see Progovac 1993a, b, 1994, 1996, Stjepanović 2004). These authors note, for instance, that clitic climbing is possible out of *Event da*-complements, and marginally also out of *Situation* complements. Since Serbian still also allows infinitives, an infinitival complement is usually preferred by speakers when clitic climbing takes place. However, in a recent corpus study conducted by Jurkiewicz-Rohrbacher et al. 2017 it is confirmed that, despite being marginal, clitic climbing does indeed exist across finite *da*-complements. That study also provides the relative frequency of clitic climbing from different types of complements, and the scale given shows that clitic climbing is most frequent with the (*Event*) verbs *stop, start, try, can*, and least frequent with *Situation* verbs such as *order, force, ask*. Furthermore, Todorović and Wurmbrand To appear discuss the ordering of *da* and embedded adverbials. As shown in Table 6, adverbs have to follow *da* in *Proposition* complements but precede *da* in *Event* complements; once again *Situation* complements allow either ordering.

Serbian	*Proposition*	*Situation*	*Event*
Infinitival complement	*	✓	✓
Overt subject in *da* complement	✓	✓	*
Clitic climbing	*	marginal	✓
Adverb positions	{*da*} ADV {*da}	{*da*} ADV {*da*}	{?-*da} ADV {*da*}

Table 6 ICH differences in Serbian

These properties thus show that clausehood cannot be defined via finiteness, but that an independent semantic definition is necessary to delineate the different types of complements. The fact that the syntactic properties align, in the predicted way, with the three semantic classes we defined suggests that the ICH is a deep property of grammar.

An ICH effect regarding (non)finiteness can also be observed in English, in particular when compared with Serbian. As shown in (23), all three types of complements can occur as infinitives, but finite complements are only possible for *Proposition* and *Situation* complements and not for *Event* complements. Together with the finiteness restriction in Serbian, which disallows infinitives in *Proposition* complements, an ICH Signature effect arises as in Table 7. We thus conclude that (non-)finiteness operates on the independently existing semantic ICH.

(23)   a.   *Clara claimed to have left/that he left.*
        b.   *Clara decided to leave/that he would leave.*
        c.   *Clara tried to win/??that she would win.*

Finiteness	*Proposition*	*Situation*	*Event*
Serbian: Infinitival complement	*	✓	✓
English: Finite complement	✓	✓	*

Table 7 ICH Signature effect English & Serbian

Looking at the distribution of (non-)finiteness in other languages, we find further evidence for our claim that coding shows sensitivity to the ICH. In Wurmbrand et al. 2020, the micro-parametric variation regarding finiteness in the South Slavic languages is examined. Languages of this group differ regarding the availability of infinitives. Bu[lgarian] and Ma[cedonian], like Greek, do not allow infinitives in any context. All other South Slavic languages exhibit infinitives, but they differ in frequency: infinitives are least common/frequent in Sr [Serbian] and more widespread in Bo[snian], Sl[ovenian] and Cr[oatian], with further differences and preferences in these varieties. Although the distribution of (non-)finite complements across these languages is largely dependent on geography and language contact, the distribution *within* each language shows a grammatical pattern which follows an implicational finiteness universal that can be derived by the ICH.

Since Bulgarian and Macedonian do not use infinitives, we concentrate here on the grammatical patterns of the other four South Slavic languages. The distribution is given in (24).[12]

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[12] Note that due to the contact situation of these languages, language/dialect affiliation is not always clear-cut. Since categorical judgments may not always be possible, the marks should be understood as preferences. The data are given in Serbian in (24), but the judgments are to be understood as applying to the translations of these examples into the different languages.

(24) a. *Tvrdim* { *da čitam* / *čitati* } *ovu knjigu.*
claim.1SG { DA read.1SG / read.INF.IPFV } this book
'I claim that I am reading this book.' (finite) √Sr, √Bo, √Sl, √Cr
'I claim to be reading this book.' (non-finite) *Sr, *Bo, *Sl, *Cr

b. *Odlučila* *sam* { *da čitam* / *da* *ću* *čitati* /
decided.SG.F AUX.1SG { DA read.1.SG / DA will.1.SG read /

čitati } *ovu knjigu.*
read.INF.IPFV } this book
'I decided that I will read this book.' (finite) √Sr, √Bo, √Sl, *Cr
'I decided to read this book.' (non-finite) √Sr, √Bo, √Sl, √Cr

c. *Pokušala* *sam* { *da čitam* / *čitati* }
tried.SG.FEM AUX.1SG { DA read.1SG / read.INF.IPFV }
ovu knjigu.
this book
'I tried that I am reading read this book.' (finite)√Sr, ?Bo, *Sl, *Cr
'I tried to read this book.' (non-finite) √Sr, √Bo, √Sl, √Cr

As shown in (24a), Bosnian, Croatian, Serbian, and Slovenian are uniform in not allowing infinitival complements to *Proposition* verbs, thus the property noted above for Serbian in fact holds for all South Slavic languages. The *Situation* class in (24b) allows infinitives in all South Slavic languages, but otherwise exhibits variation. Serbian is the only language that can realize a finite present form with future meaning. Bosnian, Slovenian, and Serbian allow infinitives or finite forms with overt future (similar to what we have seen in Greek and Bulgarian), but Croatian strongly dis-prefers any finite form. Lastly, the *Event* class in (24c) permits infinitives in all four languages, with it being the only possible form in Croatian and Slovenian. A finite complement clause is allowed in Serbian and possibly in Bosnian, but judgements differ and the distribution has not been fully determined yet in the latter (see also fn. 12).

Cross-linguistically, as summarized in Table 8, there is an implicational relation in that *Situation* complements (as a class) are never 'less' finite than *Event* complements, and *Proposition* complements never 'less' finite than *Situation* (and *Event*) complements. For instance, if a language requires finite complements in the *Event* class, it also requires them in the other classes. If a language has the option between finite or non-finite complements in the *Event* class, it also allows finite complements in the other classes (it may require

them in the other classes). Thus there is no language where, for instance, *Situation* complements show an option between finite and non-finite complements, but *Event* complements must be obligatorily. This implicational relation is formulated as the finiteness universal in (25) in Wurmbrand et al. 2020.

Language	*Proposition*	*Situation*	*Event*
Bulgarian, Greek	finite	finite	finite
Romanian, Akan	finite	finite	(non-)finite
English	(non-)finite	(non-)finite	non-finite
Serbian	finite	(non-)finite	(non-)finite
Bosnian, Slovenian	finite	(non-)finite	non-finite
Croatian	finite	non-finite	non-finite

Table 8 Finiteness preferences across languages

(25)   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.

The finiteness universal thus provides further evidence for a semantically determined ICH, which aligns with coding via language-specific cut off points for finiteness, following the universal in (25).

2.4. Transparency and integration

The last area we discuss here as motivation for the existence of ICH are phenomena of *clause union, restructuring,* or *complex predicate* formation (see Rizzi 1978, Aissen and Perlmutter 1976; we will use the term *restructuring* here). In Wurmbrand 2001, it is shown that restructuring is a multi-layered phenomenon, involving different types and degrees of restructuring. For instance, so-called *lexical* restructuring (i.e., restructuring with thematic lexical verbs such as *try*) has to be distinguished from *functional* restructuring (i.e., mono-predicate configurations with non-thematic auxiliary-like verbs).[13] Functional restructuring, which involves affixal configurations in many languages, can be

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[13] There are attempts to unify these phenomena (see Cinque 2001, 2004, Grano 2012), but as far as we can see, these accounts i) do not cover all differences between the two broad types of restructuring (as discussed in Wurmbrand 2001, 2004, there are various syntactic differences regarding extraposition, verb clusters, or whether independent event structures are involved, which would be unexpected if all restructuring is functional); ii) do not extend to all lexical restructuring contexts (e.g., unaccusative restructuring verbs with a dative controller like *gelingen* 'manage' in German); iii) do not cover the scale of restructuring; and iv) cannot predict the implicational relations

seen as the most integrated form of complementation—there is no 'embedded' predicate, but the two verbal elements are part of a single clausal domain throughout the derivation.

A common characteristic of restructuring is clitic climbing—i.e., the placement of a clitic (or weak pronoun) associated with an embedded argument in the matrix clause. As shown in (26a,b), in languages like Italian (see Wurmbrand 2014a, 2015b for other languages), clitic climbing is possible from an *Event* complement but not a *Situation* complement. Languages like Czech on the other hand, allow clitic climbing from both types of complements (cf. (26c)). Clitic climbing from *Proposition* complements is generally not possible. Lastly, as shown in (26d), there are also languages, such as Brazilian Portuguese, which do not allow clitic climbing from any type of complement.

(26) a. *Piero **ti** verrà   a parlare di parapsicologia*
          Piero **to.you** will.come to speak   about parapsychology
          'Piero will come to speak to you about parapsychology.'
                                              [Italian: Rizzi 1982: 1, (1a,b)]
      b. **Piero **ti** deciderà   di parlare di parapsicologia*
          Piero **to.you** will.decide to speak   about parapsychology
          'Piero will decide to speak to you about parapsychology.'
                                              [Italian: Rizzi 1982: 1, (1c,d)]
      c. *Místo   toho se **ho**   rozhodl na moment   ignorovat*
          instead of.it SE **him.ACC** decided for moment ignore.INF
          'He decided instead to ignore him for a moment.'
                                  [Czech: Lenertová 2004: 157, (43); from ČNK)]

      d. *João   {*me}   tentou   {me}   ver*
          João   {*me}   tried   {me}   see.INF
          'João tried to see me.' [Brazilian Portuguese: Cyrino 2010: 9, (38)]

While the cross-linguistic distribution of clitic climbing is subject to variation, Table 9 shows that there is nevertheless an implicational relation: if a language allows clitic climbing from a type of complement, it also allows it from complements further on the right of the ICH scale.

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we find for clitic climbing. These accounts also cannot be extended to ICH Signature effects that are not obviously related to restructuring (such as the clause introducers in Greek).

Language	Proposition	Situation	Event
Brazilian Portuguese	*	*	*
Italian	*	*	✓
Czech	*	✓	✓

Table 9 Implicational hierarchy of clitic climbing

The absence of clitic climbing in a language has often been treated as the absence of restructuring—e.g., the absence of clause unification or reduced complements. Such an approach is problematic, however, when other properties are considered. In Brazilian Portuguese, for instance, licensing of elements such as *nunca* requires clausemate negation. As shown in (27a-d), matrix negation cannot license an embedded *nunca* in *Proposition* and *Situation* contexts; only embedded negation can do so. The situation is different for *Event* complements—as shown in (27e,f), matrix negation can license an embedded *nunca*.

(27)   a.   *A Lina*   (*não*)   *afirmou*   [*ter*   *casado*   *nunca*].
            the Lina   (not)   claimed   [have.INF   married   never]
            'Lina didn't claim to have never married.' [OK if *nunca* is in matrix: Lina never claimed ....]

       b.   *A Lina*   *afirmou*   *não*   *ter*   *casado*   *nunca*.
            the Lina   claimed   not   have.INF   married   never
            'Lina claimed to have never married.'

       c.   *A Lina*   (*não*)   *decidiu*   *sair*   *nunca*   (*mais*)
            the Lina   (not)   decided   leave.INF   never   (more)
            'Lina decided/didn't decide never to leave.'

       d.   *A Lina*   *decidiu*   *não*   *sair*   *nunca*   (*mais*)
            the Lina   decided   not   leave.INF   never   (more)
            'Lina decided never to leave.'

       e.   *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.'

       f.   *A Lina*   *não*   *começa*   *a estudar*   *nunca*
            the Lina   not   start   PREP study.INF   never
            'Lina never starts to study.'
                        [Brazilian Portuguese: Modesto 2013: 14, R. Lacerda, p.c.]

The difference between (27a,b) and (27e,f) would be surprising if all clause types were the same. Under our approach, this is not coincidental but a simple

ICH effect—*Event* complements are transparent for negative licensing in Brazilian Portuguese but *Situation* and *Proposition* complements are not.

If, as we submit, the ICH is a deep universal property of languages, the differences in clitic climbing in Table 9 are not the result of varying complementation strategies in the different languages, but the result of different properties of clitic climbing. Following Wurmbrand 2014a, 2015b, this can, for instance, be handled via different landing sites of clitics, which we summarize in section 3.3. Before turning to our account of how the ICH effects discussed so far hang together, we summarize the complementation options in Buryat, which will further support the three-way split suggested here.

2.5 Complementation in Buryat[14]

In Buryat, a Mongolian language spoken in the Russian Federation, complement clauses occur in three different syntactic configurations: converb constructions, clausal nominalizations, and full CPs. The converb construction shows the hallmark restructuring properties associated with *Event* complements (Bondarenko 2018a): they combine with matrix predicates like *begin, try, manage*; do not allow an embedded temporal orientation different from the matrix tense, (28a); no embedded subject is possible, (28b); negation cannot occur in the embedded predicate, (28c); and matrix negation licenses embedded negative elements, such as the NPI 'what' (an indefinite) in (28d).

(28) a.   *üsəgəldər   badmə   üglödər   namɛjə   zurə-žə*
         yesterday   Badma.NOM tomorrow 1.SG.ACC draw-CONV
         ʒxil-ɜ
         begin-PST
         'Yesterday Badma began to draw me tomorrow.'
                                       [T. Bondarenko, p.c.]
    b.   *bagšə*   Ø / **badm-in*   / **badm-ijə*   / **badmə*
         teacher_i Ø_i / *Badma-GEN / *Badma-ACC / *Badma.NOM
         honin   *ju:mə*   *xö:rə-žə*   *ürd-jə*
         interesting   thing   tell-CONV   manage-PST
         'The teacher managed to tell an interesting story.'
      *'The teacher managed to do so that Badma/someone told an interesting story.'   [Bondarenko 2018a: 44-45, (25-26)]

c.   *badmə   ju:-šjə   bӡšə-güj-žə   /   bӡšə-žə-güj
        Badma.NOM   what-PTCL   write-NEG-CONV   /   write-CONV-NEG
        ӡxil-ə
        begin-PST
        Intended: 'Badma began to not write anything.'   [ibid.: 46, (ii)]

d.   badmə   ju:-šjə   bӡšə-žə   ӡxil-ə-güj
        Badma.NOM   what-PTCL   write-CONV   begin-PST-NEG
        'Badma didn't begin to write anything.'   [ibid.: 46, (i)]

The second type of embedding configurations are clausal nominalizations which are found with verbs like *want, hear, see, be.happy, be.shy, envy, know, remember, regret, wait, allow, recommend, promise, decide,* and others. Clausal nominalizations are formed with participles and display nominal inflection (possessive agreement and case). The internal structure of nominalizations shows some properties of a tense-modal-aspect (TMA) domain—aspectual elements such as potential, perfect, or habitual are possible, (29a). Nominalizations have their own temporal orientation, as is shown in (29b) where a mismatch between the matrix and embedded tenses is possible. Nominalizations, in contrast to *Event* converb constructions, allow embedded negation, (29c), and matrix negation cannot license embedded negative elements, (29d). Lastly, nominalizations can contain an embedded subject, (29e). Importantly, the subject can only occur with genitive, the typical case within nominalizations, or accusative, which is assigned by the matrix predicate via ECM—nominative, which is the case for subjects in independent clauses, is excluded.

(29) a.   *lenə   lizə-də   [üšö   nӡgə   konfətə   ӡdi-x-ijə-n'   ]
            Lena   Liza-DAT [more   one   sweet   eat-FUT-ACC-3   ]
            *zübšö-gö
            allow-PST
            'Lena allowed Liza to eat one more sweet.'

     b.   *üglödər   badm-in   xaršə   šӡrdə-x-ijə-n'
            tomorrow   Badma-GEN fence   paint-FUT-ACC-3SG
            *üstər   dugər   mӡd-ə
            yesterday Dugar.NOM know-PST
            'Yesterday Dugar found out that Badma will paint the fence tomorrow.'

     c.   *badm-in   xaršə   šӡrdə-xə-güj-ə-n'   dugər
            Bandma-GEN fence   paint-FUT-**NEG**-ACC-3SG   Dugar.NOM

mʒd-ʒ
know-PST
'Dugar found out that Badma won't paint the fence.'

d.   *badm-in   ju:-šjə   šʒrdə-x-ijə-n'   dugər*
       Badma-GEN   what-PTCL   paint-FUT-ACC-3SG   Dugar.NOM
       mʒd-ʒ-güj
       know-PST-NEG
       i. *'Dugar didn't find out that Badma will paint something.'
       ii. 'Dugar didn't find out what exactly Badma will paint.'

e.   *bi   *sajənə   / sajən-in / sajən-ijə du: du:lə-žə*
       1SG   *Sajana.NOM   / S-GEN   / S-ACC   song sing-CONV
       bɛ:-x-ijə   šagən-a-b
       be-FUT-ACC   hear-PST1-1SG
       'I heard that/how Sajana sang a song.'

                                            [T. Bondarenko, p.c.]

The last complementation type are CP complements which occur with verbs like *believe, see, hear, be.surprised, know, forget, say, think, be.sorry, be.frightened, wait, endure, boast, ask, promise, decide,* and others. CP complements, like main clauses, involve full-fledged clausal domains displaying all clausal and temporal functions (complementizer, tense, negation, subject). As shown in (30a), the embedded clause can involve tense marking different from the matrix clause and a nominative subject. One property that sharply distinguishes CP complements from the other two types of complementation is the possibility of indexical shift. Indexical shift refers to the phenomenon that 1st and 2nd person agreement and pronouns receive an interpretation relative to the embedding context and not the actual speech context. That is, 1st and 2nd person are interpreted as the matrix speaker and addressee, respectively, but not the speaker or addressee of the actual context. This is illustrated in (30b): the embedded 1st person subject *bi* (see also the agreement on the embedded verb) can be interpreted as the speaker or be 'shifted' to the matrix subject.

(30)   a.   *üglödər   badmə   xaršə šʒrdə-xə   gʒžə*
            tomorrow   Badma-NOM fence   paint-FUT COMP
            üstər   dugər   mʒd-ʒ
            yesterday   Dugar.NOM know-PST
            'Yesterday Dugar found out that Badma will paint the fence tomorrow.'

b. *sajənə bi tɜrgə ɜmdəl-ɜ-b gɜžə mɜd-ɜ*
Sajana 1SG.NOM cart break-PST-1SG COMP know-PST
i. 'Sajana_i found out that she_i broke the cart.'
ii. 'Sajana found out that I broke the cart.'
[Bondarenko 2017 : 19, (83), T. Bondarenko, p.c.]

The complementation options in Buryat are summarized in Table 10 which highlights the three-way split and implicational hierarchy of dependence and, as we will suggest below, complexity.

Buryat	CP complement	Nominalization	Event
Embedded subject	✓	✓	*
Embedded negation	✓	✓	*
Embedded TMA elements	✓	limited	*
Embedded NOM	✓	*	*
Shifted indexicals	✓	*	*

Table 10 Complementation in Buryat

As we have seen, indexical shift is only possible in CP complements. This is in line with many current theories of indexical shift which treat the phenomenon as a property of the CP (see, among others, Anand and Nevins 2004, Anand 2006, Sudo 2012, Sundaresan 2012, 2018, Podobryaev 2014, Shklovsky and Sudo 2014, Messick 2016, Deal 2017). Since shifting is subject to syntactic restrictions (e.g., the case of the phrase containing the indexical and the syntactic domain), one approach has been to invoke a context-shifter (either a quantifier or operator), often referred to as *monster*, in the CP-domain. The obligatory lack of shifted indexicals in converb constructions and clausal nominalizations (even if the same matrix verb is used as in CP-complementation) then provides evidence for structures lacking (the relevant part of) the CP-domain in these configurations in Buryat.

There is one further property in Buryat which we have not mentioned yet—long passive. As shown in (31a), converb constructions allow a configuration in which the matrix verb is passivized (but not the embedded verb) and as a result, the embedded object is promoted to matrix subject. This property is a common restructuring property cross-linguistically (see Wurmbrand 2015a, Wurmbrand and Shimamura 2017), and only possible in highly reduced complements, namely, complements which lack embedded CP and IP domains and have no or only an underspecified *v*P domain. As shown in (31b,c), long passive is not possible in clausal nominalizations and CP-complements.

(31) a. *bɜšəg*   *tumən-ɜr*   *bɜšə-žə*   *ɜxilə-gd-ɜ*
       letter.NOM Tumen-INSTR write-CONV   begin-PASS-PST
       Lit. 'The letter was begun to write by Tumen.'
       'Tumen began to write the letter.'

    b. **bi*   *sajən-ar* *badm-in* *xarə-h-ijə(-n')*   *mɜdə-gd-ɜ-b*
       1SG   S-INSTR   B-GEN   see.PFCT-ACC(-3SG) know-PASS-PST-1SG
       Lit. 'I was known by Sajana that Badma saw (me).'
       Intended: 'Sajana found out that Badma saw me.'

    c. **bi*   *sajən-ar* *badmə*   *xar-a*   *gɜžə* *mɜdə-gd-ɜ-b*
       1SG   S-INSTR   Badma.NOM see.PST COMP know-PASS-PST-1SG
       Lit. 'I was known by Sajana that Badma had seen (me).'
       Intended: 'Sajana found out that Badma had seen me.'

                                 [T. Bondarenko, p.c.]

The combination of the two properties (shifted indexicals and long passive) constitutes again an ICH Signature effect (cf. Table 11). Moreover, it tells us something about the structural configurations of the three types of complements. Clausal nominalizations cannot involve a CP (otherwise indexical shift should be possible), but they contain their own functional object case and have some properties of the TMA domain. As suggested in Bondarenko 2018b, they are thus a type of TP/IP. *Event* complements, on the other hand, lack both—the CP-domain and the TMA domain.

Buryat	*CP complement*	*Nominalization*	*Event*
Long passive	*	*	✓
Shifted indexicals	✓	*	*
Structure	CP domain	TMA domain	Theta domain

Table 11 ICH Signature in Buryat

As shown in Table 11, the structural composition of complement clauses in Buryat shows a scale of complexity which is implicational, given the general view that clause-building follows functional sequencing: higher domains can only be built if lower domains are present. For instance, to add a CP domain, a TMA domain must be built first (note that we are not making claims about specific projections, just broad clausal domains; see also below). In the next section, we will suggest that this is what underlies the ICH in general.

      One issue remaining for Buryat is the semantic delineation of CP complements and nominalizations. While the class of *Event* complements is clearly

formed semantically along our definitions, CP complements and nominalizations seem to alternate quite freely. This shows that the semantic class of *Situation* complements can also syntactically project to a full CP (but the two configuration types do not mix and match—if the nominalization strategy is used, no CP is possible). Thus, syntax and semantics lead independent lives *to some extent* which we return to in section 3.2. Crucially, the main conclusion still holds that the hierarchy is respected whenever there are differences.

3. Theoretical implementation of ICH

In the previous section, we have seen that there are three supersets of complements which stand in an implicational relation. The hierarchy is defined semantically, and morphosyntactic properties are aligned along it. Table 1, repeated here as Table 12, gives several dimensions which have been relevant for the calculation of clausehood. Dependence differences were observed for the temporal and subject properties: *Proposition* complements are temporally independent and typically have no subject restrictions, *Situation* complements are somewhat dependent in requiring a future orientation and have some subject restrictions, and *Event* complements are fully dependent on the matrix tense and matrix subject. Transparency and integration effects relate to restructuring and clause union.

MOST INDEPENDENT		LEAST INDEPENDENT
LEAST TRANSPARENT	Proposition ≫ Situation ≫ Event	MOST TRANSPARENT
LEAST INTEGRATED		MOST INTEGRATED

Table 12 Implicational complementation hierarchy (ICH) (repeated)

This section addresses the question of why the hierarchy is the way it is and provides a possible implementation. We will build on the observation from Buryat and add the dimension of complexity and define it, following Ramchand and Svenonius 2014, via containment. The main proposal is that these dimensions are tied together via the syntactic structure, which is (in part) predictable from the meaning of a complement, and such defined syntactic and semantic complexity jointly creates the implicational scale of clausehood.

3.1 Complexity and containment

Our main proposal is that the conclusions about structural complexity in Table 11 are not just a property of Buryat but in fact the source of ICH Signature

effects in general (we return to an account of the specific ICH Signature effects we discussed in the next section). To address the question of how the ordering and implicational nature of the ICH arise, we start with the observation that the three types of complements have different *minimal requirements* as specified in Table 13. Following Ramchand and Svenonius 2014, *Propositions, Situations*, and *Events* are semantic sorts expressing conceptual primitives which are in a coherent containment relation—*Situations* are elaborations of *Events*, *Propositions* are elaborations of *Situations*. More specifically, *Situations* are created by combining time/world parameters with an existentially closed *Event*, and *Propositions* combine speaker-oriented/discourse-linking parameters with an existentially closed *Situation*. The ranking and implicational nature of the ICH can then be seen as a reflex of the resulting semantic complexity scale.

	Proposition	Situation	Event
Minimally required domains	Operator domain TMA domain Theta domain	TMA domain Theta domain	Theta domain
Complexity	most complex	intermediate	least complex

Table 13 Complement composition

As for the mapping of the (broad) semantic ICH categories to syntax, we follow the long-standing tradition in *Government and Binding* and *Minimalist* approaches to divide the clause in three domains. While the concrete labels vary in different approaches (see Table 14 for examples), the basic insight is consistent: the highest domain includes operator-related projections, the middle domain tense, modal, agreement projections, and the lowest domain theta-related projections. The domains may be more fine-grained in certain cases or languages (e.g., split IP domains, expanded voice domains), but the division into these three domains is nevertheless a core property found across models.

Domains	Operator	TMA	Theta
Chomsky 1981, 1986	CP	IP	VP
Chomsky 1995	CP	TP	*v*P
Grohmann 2003	Ω-domain	Φ-domain	Θ-domain
Ramchand and Svenonius 2014	CP (transition Fin)	TP (transition Asp)	VP

Table 14 Clausal domains

The stability of the meanings associated with the three clausal domains in different frameworks suggests a tight connection between the syntactic CP≫TP≫vP hierarchy and the semantic components of a clause. Ramchand and Svenonius 2014 provide a formal implementation of this connection which derives the syntactic hierarchy and establishes the implicational relations among the domains. At the core of the proposal are the conceptual primitives *Proposition ≫ Situation ≫ Event,* which are computed by combining the verb with its arguments (creating an *Event*), by relating an (existentially closed) *Event* to a time (through T, creating a *Situation*), and by anchoring a *Situation* to a *Proposition* through C (a similar approach is proposed in Ritter and Wiltschko 2009 and Wiltschko 2014, although with different terminology which does not affect the basic findings used here). *Figure 1* illustrates the containment relations among clausal domains and their semantic correspondences. Comparing this model of clause structure to the complement requirements of the ICH categories in Table 13, we see a direct correspondence, which is formulated as our main hypotheses in (32).
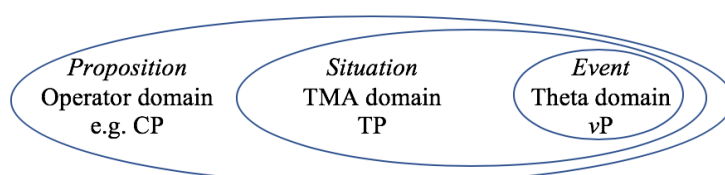
Figure 1: Containment/complexity

(32) a. The ICH reflects increased syntactic and/or semantic complexity from the RIGHT to the LEFT: a type of complement can never be obligatorily *more complex* than the type of complement to its LEFT on ICH.

    b. The implicational relations of the ICH arise through containment relations among clausal domains.

Concretely, this model predicts that the different complement types could differ in structure. In the next section, we further discuss the interaction of syntax and semantics and suggest that the mapping is not absolute. However, the model entails that there are *minimal* structure requirements that must be met: to yield a *Situation* as the semantic output, some aspects of the TMA domain must be present in syntax; to yield a *Proposition*, some aspect of the operator domain must be present. This is illustrated in (33): the minimum configuration of a *Proposition* complement, (33a), is necessarily more complex than that of an *Situation* complement, (33b), which in turn is more complex than the

minimum size of a *Event* complement, (33c). Note that our hypothesis refers to the *minimum* complexity of a complement. Languages may not always realize complements as in (33), but may project larger structures, thus eliminating or masking certain differences (see the next section). But we do maintain that whenever complements show differences of dependence, transparency, or integration, these differences follow from (32).

(33) Minimal structures

    a.   *Proposition*   b.   *Situation*   c.   *Event*

    believe   Op   *decide*   TMA   *try*   Theta
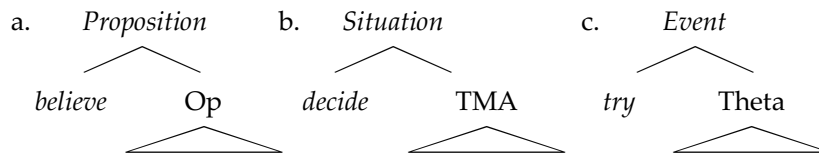
3.2 A synthesis model of complementation

Although we pursue a complementation approach that is grounded in a semantic classification, similar to cartographic approaches (Cinque 1999, 2001, 2004), we divert from models that "syntacticize" interpretive domains (Cinque and Rizzi 2010) in that we ascribe a certain autonomy to syntax. In contrast to fine-grained templatic cartographic approaches, the current system only involves the broad ICH categories *Proposition, Situation, Event*, which, following Ramchand and Svenonius 2014, are conceptual primitives necessitating a particular syntactic and semantic composition. For instance, to create a *Situation*, a temporal element introducing a time parameter is required to combine with an *Event*, but there could be different instantiations of this operation (tense, modality, certain types of aspect). Different syntactic structures could map to the same semantic concept, provided the composition includes the elements necessary to yield a particular interpretation. The mapping between syntax and semantics is thus not fully deterministic—syntax restricts meaning (in predictable ways), but does not fully determine it (see also Manzini et al. 2017, Manzini and Savoia 2005). To successfully map a syntactic configuration to a particular semantic concept, the minimal structure requirements laid out above must be met. The system does not prescribe a strict matching between a particular interpretation and a unique syntactic configuration, but only sets certain lower bounds. Such an approach allows variation within and across languages regarding the (morpho)syntactic realization of complements with the same meaning, which correctly describes the empirical landscape of complementation. The motivation for such an approach comes from cross-linguistic variation as well as optionality and the existence of

larger-than-expected structures in single languages. Although ICH effects such as subject and tense dependencies can be observed in an expectable fashion cross-linguistically, complement clauses can at the same time be realized as full clausal domains in many languages, without undergoing meaning changes (see, among many others, Wiklund 2007 for Swedish, Manzini et al. 2017 for Southern Italian varieties, or Müller 2016 for German). The output driven system developed in this project (syntax feeds into semantics but does not determine it) does not impose a strict mapping between syntactic categories and semantic constructs, but allows mismatches in one direction: syntactic structure that has no consequence for interpretation is possible. Figure 2 illustrates some options. A (vacuous) syntactic CP domain without the operators that turn a *Situation* into a *Proposition* will be mapped into a *Situation*, exactly like a CP-less TMA domain. Similarly, a TP without time parameters is mapped into an *Event* in the same way as a syntactic *v*P domain.

Figure 2: Syntax-semantics mismatches

A (partial) autonomy approach of syntax leads to a specific direction for how the relation between matrix verbs and their complements is established. In contrast to cartographic approaches, the current model is compatible with a *free merge* system (see for instance Chomsky et al. 2019), where the compatibility of verb-complement configurations is determined at the output (when syntax feeds into semantics). This *synthesis* approach to complementation builds on the concept of semantic selection (see Grimshaw 1979, Pesetsky 1992) but allows for mutual interactions between the matrix predicate and the complement. A crucial aspect of the synthesis approach is that in complementation the influence is mutual—a matrix verb can impose properties on the embedded clause, but properties of an embedded clause can also affect the matrix predicate. We have already seen examples of the latter—the verbs *know, forget*, or *tell* can involve different interpretations, depending on the choice of clause introducer in Greek. In English (and many other languages), too, different meanings correlate with different morphosyntactic coding: for instance, the speech meaning of *tell* occurs with a finite complement whereas the infinitive has only the command meaning. Similarly, Kouwenberg and Lefebvre 2007 show that in Papiamentu verbs change meaning depending on

the make-up of the complement clause (somewhat simplified, e.g., verbs are interpreted as propositional when combined with *ku* clauses, whereas they yield emotive/effective interpretations when combined with *pa* clauses).

The synthesis model proposed here opens the door for an approach which avoids duplicating these verbs in language over language (the class of these verbs is cross-linguistically quite stable). Instead of assuming that there are two verbs *tell*, *know*, *forget*, these verbs have a flexible (e.g., underspecified) semantics and freely combine with different types of complements. Depending on which type of complement is chosen, which is often reflected in morphosyntactic coding differences, different meanings are computed (i.e., the type of complement dynamically contributes to the meaning of the matrix predicate). The synthesis model complements semantic approaches that situate core meaning components of a complementation configuration, such as the attitude meaning, in the complement clause and not (just) in the matrix verb. In Kratzer 2006 and Moulton 2009a, b, for instance, it is suggested that the meaning of attitude contexts is 'spread' over the matrix and embedded clauses and, importantly, that aspects of the attitude meaning are attributed to the embedded complementizer rather than the matrix verb. Different choices of complementizers then affect the meaning of the complementation configuration and could lead to meaning changes.

Another example is given in (34) for the verb *decide*. If *decide* combines with a *na* complement, the future interpretation arises in the same way as in infinitives in other languages—via an embedded covert future element (Wurmbrand 2014b, Todorović 2015). On the other hand, in *oti* clauses, like in finite clauses in English, a future interpretation must be overtly marked with a future element (cf. *I decided that I *(will) solve the problem tomorrow*). If this element is omitted, the configuration cannot be interpreted like a *Situation* context, but is instead shifted to a *Proposition* context such as the performative use in cases like *I decided that he is a nice person* where the matrix subject evaluates or assigns truth to the embedded proposition (other attitude meanings are possible for some speakers as well, as shown in (34)).

(34)   *Apofasisen   na / oti   / oti enna lii*
         decide.PFV.PST.3SG   NA / that / that FUT   solve.IPFV.PRS.3SG
         kathe mera enan provlima
         every day   one   problem
         na, oti enna: 'He decided to solve/that he will solve one problem every day.'
         oti (no *enna*): 'He came to the realization that he solves one problem every day.'   [Cypriot Greek: C. Christopoulos, p.c.]

Several conclusions arise from this distribution. First, the future interpretation cannot just be built into the meaning of the matrix verb but has to have some structural correspondence (see also Wurmbrand 2014b for further arguments for this conclusion). If the future were to come solely from the matrix verb, why would the simple *oti* statement (without *enna*) not allow the same interpretation as the *na* or *oti enna* contexts (note that exactly this interpretation is available with the same present tense form of the verb in a *na* complement)? Second, the *oti enna* statement is unambiguous, only yielding the *Situation* interpretation and not the 'come to the realization' interpretation. One way to understand this is that the *Situation* meaning is the basic meaning of *decide*, and the switch to the *Proposition* interpretation only happens as a last resort. In an *oti* statement without *enna*, the combination of *decide* plus a future-less CP would not be interpretable, hence, the meaning of *decide* is adjusted. If, on the other hand, the complement involves a future element (either a covert modal in the *na* clause, or an overt *enna* in the *oti* clause), the complement combines smoothly with *decide* and no adjustment is needed, hence impossible. Lastly, the fact that a covert future modal is only possible in a *na* clause could be seen as evidence for a tight connection between *na* and the covert future element. Since not all *na* complements trigger a modal or future interpretation (see section 2.1), building the modality/future directly into the meaning of *na* would be problematic unless two different *na*'s are assumed. Instead one could follow the approach in Todorović and Wurmbrand To appear, where covert modals must be licensed by an irrealis operator (either a verb or other irrealis elements, such as *wh*-phrases, which would also extend to root clauses with *na*, which are possible in certain contexts).

To sum up, we have suggested that there is a synthesis relation between verbs and complements—complements are freely built in different ways, as long as the result leads to a well-formed semantic construct.

3.3. Putting everything together

Having set up the basic framework, we now return to the specific cases we discussed so far. The following questions need to be addressed:

(35) i.   Clitic climbing: Why does clitic climbing show ICH effects? Why, for instance, is there no language that allows clitic climbing from *Situation* complements but not *Event* complements?

ii.   Finiteness: Why does finiteness show ICH effects? Why is there, for instance, no language that allows finite *Event* complements

but not finite *Situation* complements?

    iii.   Greek, Bulgarian clause introducers: Why is it the *Situation* class that shows optionality between *oti/če* and *na/da* (and not either of the other classes)? Why are *oti/če* statements not possible with *Event* complements?

As for clitic climbing, we follow Wurmbrand 2015b where it is suggested that clitic positions are freezing positions from which no further movement is possible. Furthermore, languages differ regarding the location of clitic positions or phrases (see Wurmbrand 2015b for some independent motivation for the differences). For our purposes it suffices again to consider only the three broad clausal domains and not settle on specific projections. In languages like Brazilian Portuguese the clitic position is in the Theta domain, which is present in all types of complements and hence clitics are bound to the embedded predicate. In languages like Italian, clitics can (also) occur in the TMA domain, which is present in *Situation* and *Proposition* complements, but can be absent in *Event* complements. Thus, clitics can escape a *Event* complement but not the other types of complements. Lastly, in languages like Czech, clitics can target the operator domain which can be absent in *Situation* and *Event* complements, allowing clitics to cross such complements, but must be present in *Proposition* complements which therefore prohibit clitic climbing.

       The implicational nature is a direct result of the containment relation in *Figure 1*—to allow clitic climbing from *Situation* complements, the clitic position must be in the operator domain, which means that the clitic position can always be absent in *Event* complements when it can be absent in *Situation* complements (since the former are either the same or less complex than the latter). Put differently, to block clitic climbing from *Event* infinitives, the clitic position must be in the Theta domain, which means that it will necessarily be present in all types of complements. Thus there is no way to derive a language where clitic climbing is possible from *Situation* complements but not *Event* complements.

The finiteness hierarchy we observed poses a challenge for views that locate finiteness (solely) in the CP domain (e.g., cartographic approaches following Rizzi 1997). The notion of finiteness is a much-debated topic in syntax, morphology, and semantics, and due to the vast cross-linguistic variation in the distribution of finiteness, many works have concluded that there is no single morphosyntactic definition of finiteness, nor a single semantic function associated with it (see e.g., Cristofaro 2007, Bisang 2007, Nikolaeva 2007a). Instead,

languages utilize different morphosyntactic means to mark clauses as dependent or free (among them, tense, aspect, mood, illocutionary force, person marking, politeness, and others; see Nikolaeva 2007b). The finiteness hierarchy observed in Table 8 above, reinforces these conclusions. Although there are clear tendencies (*Proposition* complements tend to be inflected, whereas *Event* complements tend to be infinitives), no absolute property can be ascribed to any specific class of complement. Since all three types of semantic complements can be realized as inflected or infinitival complements in at least some language, the distribution shows that there is no unique semantic correlate of inflection, nor of infinitives.

Despite the variation, there is a clear pattern: the possibility of finiteness in *Event* complements entails the possibility of finiteness in *Situation* and *Proposition* complements. Likewise, the possibility of finiteness in *Situation* complements entails the possibility of finiteness in *Proposition* complements. If the three types of complements reflect different syntactic complexity as defined above (Figure 1, (32)), the generalization is that finiteness 'grows' upwards in structure in that the possibility of finiteness in a lower domain entails the possibility of finiteness in higher domains. The account of this generalization provided in Wurmbrand et al. 2020 suggests, following Adger 2007, that features related to finiteness are not confined to a particular syntactic position (such as the Fin head in cartographic approaches), but can occur in different clausal domains in different languages. For instance, if finiteness is expressed via agreement features, such features can be inserted (parasitically) on other clausal heads (*v*, T, etc.) or project independent agreement phrases in any domain of the clause. Since clausal domains are in a containment configuration and higher domains necessarily include the lower ones, it follows that settings in a lower domain affect all clauses that include that domain, i.e. also clauses with additional higher domains. For instance, if in a language the Theta domain is specified as (obligatorily) finite (as in Greek, Bulgarian, Macedonian), all types of clauses will be realized as finite since the Theta domain is included in all clause types (for further details see Wurmbrand et al. 2020).

Lastly, to account for the distribution of Greek and Bulgarian clause introducers we make the assumption that *oti/če* are elements of the operator domain, (36a), whereas *na/da* are elements of a lower domain. There are several options for the syntactic realization of *na*: an agreement head in the TMA or theta domains; a nominal head as suggested in Roussou 2009; or the spell-out of the transitional areas suggested in Ramchand and Svenonius 2014 which existen-

tially close the *Event* and *Situation* domains. All of these options are compatible with a structure like (36b), in which *na/da* are syntactic elements lower than the operator head realizing *oti/če.*

(36) a.   Op   b.   TMA

        oti/če   TMA   *na/da*
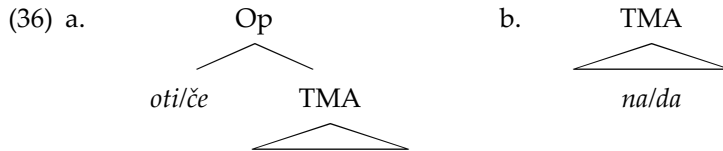
While we leave the exact location and function of *na/da* open (the literature is also controversial about that), we wish to point out that many tests have pointed to *na/da* being (or at least originating) lower in the structure than *oti/če.* A summary of the distributional properties of *oti* vs. *na* in Greek is given in (37).[15] *Na*, but not *oti*, can co-occur with C-elements such as *wh*-words and relative pronouns (Agouraki 1991, Philippaki-Warburton 1994) as well as complementizer-like elements such as *ja* 'for' (Giannakidou 2009); *na*, but not *oti*, is incompatible with the future marker *θa* ((Roussou 2000, 2009); and lastly, the subject can appear between *oti* and the verb but not between *na* and the verb (Terzi 1992). While we cannot provide a detailed account of all these properties, the overall differences in the distribution of *oti* vs. *na* as summarized in (37), makes the view that the two elements introduce clauses of different sizes as in (36) at least very plausible.[16]

(37)   {*wh/rel pron/ja/oti*} ≫ {*na/θa*} ≫ verb

The assumption in (36) directly derives the impossibility of *na/da* in *Proposition* complements: since *Proposition* complements require the operator domain (see (33a)), the only clause introducers in these contexts are *oti/če.*

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[15] We thank Christos Christopoulos for providing this summary.

[16] One complication is that although *na* and *θa* compete with each other, they are ordered differently with respect to negation. The grouping of *na* and *θa* thus has to be more complex. One option, inspired by a suggestion made by C. Christopoulos, would be to treat the overt future element as being composed of two parts (which has been suggested for future in general; see, among many others, Ogihara 1995, Abusch 2004) and pronounced as *θa* in the lower position (i.e., *na/θa*-part 1 ≫ negation ≫ *θa*-part 2). To be realized as *θa*, both parts are necessary, which is only possible when *na* is not present (since *na* and *θa*-part 1 compete for the same position). However, *na* is compatible with part 2 of the future element, which we suggest is the element WOLL we find in irrealis *Situation* complements. See also Merchant and Pavlou 2017 for a *spanning* analysis of *θa* (although with different structural assumptions).
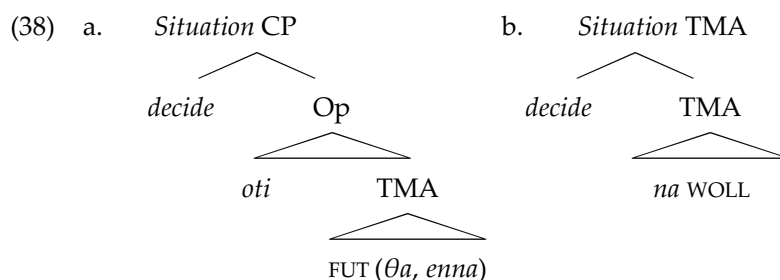
The second question concerns the impossibility of *oti/če* in *Event* complements. Recall that *Event* complements lack tense, are fully dependent on the matrix tense, and require subject identification (in contrast to *Proposition* complements which are temporally and subject-wise independent). Whatever these identification dependencies are (selection of a semantic *Property*, feature transfer, binding), we suggest that they are impossible across an active operator domain which would need to be present when *oti/če* are projected. Put differently, following the synthesis model, a clause introduced by *oti/če* triggers a *Proposition* interpretation, which is incompatible with verbs that require an *Event* complement (unless, of course, the meaning of the verb can be shifted, as in (18) or (19)).

The incompatibility of *Event* complements and an operator domain is found cross-linguistically. For instance, in Polish, as shown in Citko 2012, the complementizer *żeby* cannot occur in *Event* infinitives (such as the complements of *zdołać* 'manage', *mieć zamiar* 'intend', *zacząć* 'start', *musieć* 'must'), whereas it is optional in *Situation* infinitives (e.g., *postanowić* 'decide'). *Proposition* complements, on the other hand, cannot be infinitives (like in the South Slavic languages), and a complementizer (either *żeby* or *że*, depending on the verb) is obligatory (see also Bondaruk 2004). Although there are additional semantic factors at work for the distribution of *żeby* vs. *że*, the overall distribution shows a clear ICH signature effect, which can be derived in the same way as our account of *oti/če*.[17]

The last question regarding Greek and Bulgarian clause introducers is why the *Situation* class shows optionality between *oti/če* and *na/da*. Note that the examples with *oti/če* also involved an overt future element, which is obligatory. As we laid out in (33b), *Situation* complements minimally involve a TMA domain, which, if chosen, yields the clause introducers *na/da* (cf. (36b). Our system, however, also allows for larger structures of *Situation* complements if the compatibility with the matrix verb is maintained (see Figure 2). For an *Situation* verb such as *decide* this means that it can only combine with a

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[17] In this context it is noteworthy that in Dutch, *Event* and *Situation* complements can occur with the preposition/complementizer *om*, but *Proposition* complements cannot. While this appears to go against our proposal at first sight, it is expected under the following reasoning. *Proposition* complements always involve a CP, which is identifiable through the meaning resulting from the combination with a *Proposition* verb. Since the operator domain is identifiable by the semantic context, no special marking of that domain is necessary and the null version of C is preferred (similar to the obligatorily covert future in irrealis TMA complements, such as infinitives or *na* complements in Greek). *Event* and *Situation* complements, on the other hand, require an overt marking when growing bigger than what is identifiable from the semantics, and *om* is inserted to mark the presence of this (semantically vacuous) domain. The Dutch case is rather rare and we are not aware of any other language that follows this strategy.

complement that expresses an irrealis/future interpretation (recall that we do not assume selection of tense values, but only a synthesis relation between verbs and complements). Such interpretation can be achieved in two ways—a TMA complement with the covert modal WOLL, (38b) (see also fn. 16), or a full CP structure with an embedded overt future, (38a).

(38) a. *Situation* CP

decide   Op

oti   TMA

FUT (*θa*, *enna*)

b. *Situation* TMA

decide   TMA

na WOLL

The optionality observed for *Situation* complements thus essentially arises since, although the minimal structure would be the reduced TMA complement in (38b), an operator domain would also not do any harm, if it does not include the operators that trigger exclusively a *Proposition* complement (but it could include, e.g., an irrealis operator).

This leads us to some general concluding comments about optionality. Although differences between the three classes of complements can be observed cross-linguistically and ICH Signature effects are not hard to come across, it is also the case that complements can often be larger than what a direct syntax-semantics match would impose. In particular, *Situation* complements growing larger, as we have seen for Greek and Bulgarian (cf. (38)), is not uncommon, pointing to an approach such as our synthesis view (instead of a traditional selectional view). *Event* complements, on the other hand, tend to be more restricted. We have seen a number of cases where *Event* complements cannot be extended to a larger configuration, not even optionally, but show different patterns from the *Situation* and *Proposition* classes: in Polish, *Event* complements cannot occur with a complementizer; in Buryat, clausal nominalizations and CP configurations are impossible with this class; in English, Croatian and Slovenian, finite *Event* complements are impossible or highly marked; in Greek and Bulgarian, *oti/če* are impossible; in Buryat and Serbian, overt subjects are excluded in *Event* complements; and cross-linguistically, *Event* complements resist partial control. This confirms that *Event* predicates generally cannot combine with complements with independent

subject and/or tense interpretations and suggests that a local tense and/or subject identification is 'hard-wired' into these predicates.[18]

4. Conclusion

In this paper, we have summarized the distribution of several properties that indicate (in)dependence of a complement clause (see (39); dependence properties are then defined as the lack of these properties).

(39) Independence properties:
      nominative case, structural object case, overt subject, independent subject interpretation, agreement, tense marking, finiteness, independent temporal interpretation, negation, syntactic domain effects, lack of transparency, indexical shift, clausal operators, lack of morphosyntactic integration of the embedded verb into the matrix predicate (e.g, incorporation, verb cluster, complex predicate formation)

Each of these properties has its own distribution, but what we can observe is that they always operate along the scale in Table 15, in that independence properties occur on the left of the scale, whereas dependence properties occur on the right of the scale.

MOST INDEPENDENT		LEAST INDEPENDENT
LEAST TRANSPARENT	*Proposition ≫ Situation ≫ Event*	MOST TRANSPARENT
LEAST INTEGRATED		MOST INTEGRATED
MOST COMPLEX		LEAST COMPLEX

Table 15 Implicational complementation hierarchy (ICH) (repeated)

We have provided several ICH Signature effects that i) motivate a widely observed (possibly universal) three-way split of complements; ii) demonstrate that the basic grouping of complements is determined semantically (not by morphosyntactic coding); iii) show the implicational ordering of *Proposition,*

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[18] A remaining question is how tense and subject dependencies are achieved in contexts where *Event* complements (appear to) project to full CPs. Cross-linguistically this is the marked case, but it is possible in some languages. Possible directions are that such vacuous CPs are triggered by prosodic factors and not visible for the semantic dependencies, that 'accidental' tense and subject matching is sufficient to meet the matrix verb's semantic *Property* requirement, or that there are elements in the operator domain that mediate between the matrix predicate and the embedded tense and subject (as for instance in Landau 2000's approach to control).

Situation, and *Event* complements; and iv) indicate that morphosyntactic properties operate along the ICH.

Furthermore, we have suggested that the composition and ordering of the scale is not accidental but reflects different semantic and syntactic containment relations: the domain needed in an *Event* complement is contained in the domains needed in *Situation* and *Proposition* complements; the clausal domains needed in a *Situation* complement are contained in the domains needed in *Proposition* complements. These containment relations derive the implicational nature of the ICH.

Lastly, we have suggested a synthesis model of complementation, where complements are not syntactically selected (e.g., there is no category or size selection), but freely built in different forms, with the only restriction that the resulting structures need to match with the semantic requirements of the matrix verbs. This view allows flexibility (e.g., meaning shifts of matrix verbs, in particular in the 'border' areas of the scale; see also Givón 1980) and optionality in complementation, exactly as needed to handle the variation found within and across languages. While there is a significant amount of variability cross-linguistically, we have shown that the overall distribution is nevertheless systematic and (for large parts) predictable.

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