# The macro-event property and the layered structure of the clause

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We ask whether there is a "macro-event phrase," a uniform level of syntax at which complex scenarios may be described as single events under the Macro-Event Property (MEP). The MEP is a form-meaning mapping property that constrains the compatibility of event descriptions with time-positional modifiers. An examination of English infinitival complements, Ewe serial verb constructions, and Japanese converb constructions suggests that the putative crosslinguistic "macro-event phrase" is the verbal core of the Layered Structure of the Clause theory of Role and Reference Grammar. Across languages, simple cores necessarily have the MEP, whereas complex cores have it if and only if they are integrated by 'cosubordinate' nexus, defined as a symmetric union of two cores that together behave like a single core. We furthermore argue that this connection between core cosubordinations and the MEP may help explain why cosubordinate cores seem to always share an argument through control.

**Keywords:** event representation, macro-event property, verbal core, layered structure of the clause, role and reference grammar, control, juncture, nexus, cosubordination, Ewe, Japanese, English, converb constructions, serial verb constructions, infinitival complements

## 1. Introduction

Typological research has uncovered a surprising amount of variation in which parts of a complex motion event (Bohnemeyer et al. 2007) or causal chain (Bohnemeyer et al. 2010) can be described as a single event across the languages of the world. The intuitive property of presenting a scenario as a "single event" has been operationalized in these studies in terms of the Macro-Event Property (MEP), a form-to-meaning mapping property that constrains the compatibility of event descriptions with time-positional modifiers. In this article, we investigate

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the extent to which there is uniformity across languages in the structures that are associated with this property. In other words, we ask whether there is something like a "macro-event phrase," a uniform level of syntax at which complex scenarios may be described as single events in the sense that time-positional modifiers necessarily locate their parts together in time.

Drawing on evidence from English, Ewe, Japanese, and Yucatec Maya, we show that neither clauses nor verb phrases are inherently associated with the MEP. Instead, the MEP appears to be universally associated with constructions that comprise minimally a single lexical event descriptor and its syntactic arguments and maximally projections of multiple lexical event descriptors that share modifiers and operators (or 'functional categories,' i.e., traditional grammatical categories such as tense and aspect) semantically associated with event descriptions, such as modifiers of time and place. We show that the correct generalizations can be captured using two key notions of the theory of Role and Reference Grammar (RRG; Foley & Van Valin 1984; Van Valin & LaPolla 1997; Van Valin 2005; inter alia): the 'Layered Structure of the Clause' and the classification of the 'nexus' types that constrain the possible internal structure of each layer.

An examination of English event nominalizations, Ewe serial verb constructions, and Japanese converb constructions suggests that the putative crosslinguistic "macro-event phrase" may be the verbal (or, in the case of "eventive" nominals, nominal) core. Cores are constituted by expressions of semantic predicates and their syntactic arguments. Across languages, simple cores necessarily have the MEP, whereas complex cores have it if and only if they are integrated by 'cosubordinate' nexus, defined as a symmetric union of two cores that together behave like a single core, sharing operators and modifiers.

We furthermore argue that this connection between core cosubordinations and the MEP may help explain a key empirical finding first reported in Foley & Van Valin (1984: 261, 304): cosubordinate cores seem to always share an argument, most commonly – perhaps universally – through control. Control constrains the realization of an argument in a complement projection under coreference with a matrix argument, typically reducing the former to a gap with a bound-variable interpretation (e.g., *Sally$_i$ tried ∅$_i$to leave*). Bohnemeyer et al. 2007 observe that across languages, multiple references to the same reference object or 'ground' (Talmy 2000) in motion event expressions is dispreferred if these expressions have the MEP (e.g., *#Sally went into the kitchen out of the kitchen*). We generalize this principle to a hypothetical constraint barring arguments from coreference within 'macro-event expressions' (i.e., expressions that have the MEP), with reflexive/reciprocal marking being a strategy to avoid violations of this constraint in single cores and control being a strategy for avoiding such violations in core junctures.

Our study suggests that RRG is a powerful theoretical and analytical tool for modeling the syntax-semantics interface. This is a non-trivial finding, since the theory was not originally designed for this purpose, although the typology of form-to-meaning mapping has always been a theme in RRG research (see Van Valin 2009). The original motivation behind RRG, however, was to provide a model of syntax equally applicable to languages that vary on a number of fundamental typological parameters: languages that do vs. do not have verb phrases; languages that express predicate-argument structures syntactically vs. morphologically; languages that have different organizations of grammatical relations or no grammatical relations; and languages that do vs. do not have serial or multi-verb constructions or chaining constructions. If this model now turns out to offer more insightful representations of form-to-meaning mapping – as we believe is the case – this would strike us as powerful testimony to the potential of typological research for improving linguistic theory.

The discussion will proceed as follows. §2 explicates the MEP, while §3 introduces the RRG notion of the layered structure of the clause. In §4 the Core-MEP Hypothesis is given a preliminary formulation. §5 examines the MEP in simple cores, while §6 investigates the MEP in multi-core constructions, concentrating on English infinitival complements (§6.1), Ewe serial verb constructions (§6.2), and Japanese converb (*-te*) constructions (§6.3). In §7 the issue of linking and argument sharing in multi-core constructions is addressed, and conclusions are presented in §8.

## 2. The Macro-Event Property

The Macro-Event Property (MEP) is a semantic property of syntactic constructions – constructions used in event descriptions – that determines certain aspects of the range of event representations these constructions are compatible with. This property was introduced in Bohnemeyer et al. 2007 (see also Bohnemeyer 2003 and Bohnemeyer et al. 2010) to operationalize the intuition – often voiced in typological studies of event description constructions, such as serial verb constructions – that certain constructions differ from certain other constructions in that the former, but not the latter, are used to describe "single events." Some choice examples:

> (…) true SVC structures and covert coordination structures seem to feel different to native speakers. The covert coordination tends to be perceived as a sequence of distinct events, whereas the SVC is perceived as a single event (…)
>
> (Baker 1989: 547; emphasis JB&RVV)

> An SVC consists of more than one verb, but the SVC is conceived of as describing a single action. (Dixon 2006: 339; emphasis JB&RVV)

> Although two or more verbs are present, the sentence is interpreted as referring to a single action rather than a series of related actions. Although the action may involve several different motions there is no possibility of a temporal break between these and they cannot be performed, for example, with different purposes in mind. (Sebba 1987: 112; emphasis JB&RVV)

The problem with the intuitions expressed in these quotes is that it is not immediately obvious what it means, or how one knows, that an expression describes a single event, as opposed to a sequence of events all of which form part of a larger event. Consider (1)–(2):

(1) a. Sally smashed the vase.
    b. Sally hit the vase and it broke.

(2) a. Floyd drove from Rochester to Buffalo.
    b. Floyd left Rochester, drove for an hour, and arrived in Buffalo.

One might want to say that Sally's forceful encounter with the vase is represented as a single event in (1a) and as a sequence of two events in (1b). However, these two events are still parts of a single larger event – which may in fact be the very same event described in (1a). Similarly, Floyd's journey is described as a sequence of three stages in (2b), but these stages may be parts of the same motion event described in (2a). In what sense, then, do (1b) and (2b) each describe multiple events? Perhaps in the sense that the stages are distributed across various parts of the description? However, the prepositional phrases of (2a) do in fact map into two separate stages of the motion event – its beginning and end point. And compare (1a–b) to (1c) in this respect:

(1) c. Sally smashed the vase to pieces.

This resultative construction, too, references two stages of the event of breaking the vase. The verb refers to Sally's action and the secondary predicate to the result state of the vase. If having constituents that map into distinct stages excludes complex event descriptions from describing single events, then no serial verb construction could ever describe a single event and the intuitions in the above quotes would have to be misguided.

The source of the difficulty in deciding which of the above examples represents a single event may be the much greater fuzziness – and perhaps indeed outright lack – of our intuitions for upper bounds in event mereologies compared to object mereologies (cf., Casati & Varzi 1999). We can conceptualize all the events

narrated in a story as part of a single event. So perhaps it is impossible to classify event descriptions in terms of whether or not they represent "a single event," since it may well be possible to think of the meaning of any event description in that way. There is, however, another way to sort the event descriptions in (1)–(2) into two categories that appear to align more or less with the "single event" intuition expressed in the quotes. This classification exploits subtle differences among the descriptions in terms of the time-positional adverbials they are compatible with. The existence of these and similar differences was to our knowledge first noted during the Generative Semantics debate (cf. Fillmore 1972; Fodor 1970; Wierzbicka (1980: 162–63)). For instance, the adverbial a moment later locates exclusively the breaking event in time in (1b′); it will in fact be understood as expressing a distance from a reference point identified with the time of the hitting event in the absence of another viable antecedent. In contrast, in (1a′) and (1c′), a moment later locates both subevents together, expressing the distance of the entire sequence from some reference point that remains unmentioned in the fragment:

(1) a′. Sally smashed the vase a moment later
b′. Sally hit the vase and it broke a moment later
c′. Sally smashed the vase to pieces a moment later

Similarly, whereas it is possible to modify (2b) so as to locate the departure and arrival subevents in time independently of one another, as shown in (2b′), attempting the same in (2a) results in anomaly, as shown in (2a′). The only time-positional adverbials (2a) is compatible with denote intervals that host the entire larger motion event, as illustrated in (2a″).

(2) a′. #Floyd drove from Rochester at 10:10 to Buffalo at 11:10
a″. Floyd drove from Rochester to Buffalo in the morning
b′. Floyd left Rochester at 10:10, drove for an hour, and arrived in Buffalo at 11:10

Intuitively, there appears to be a cline of event description constructions in terms of what we might metaphorically call "tightness of packaging". Looser packaging allows, and tighter packaging prevents, the combination of constituents of the description with *time-positional* adverbials that locate just the subevent described by the constituent in time. We call the property of constructions disallowing temporal modifiers access to subevent expressions the macro-event property (MEP). The first formal definition of the MEP was proposed in Bohnemeyer et al. (2007). We offer here a slightly different, simpler, and less formal definition:

(3) Macro-event property (MEP): A construction C that encodes a (Neo-) Davidsonian event description ∃*e.P(e)* ('There is an event *e* of type/property *P*') has the MEP iff C has no constituent C′ that describes a proper subevent e′ of e such that C′ is compatible with time-positional modifiers that locate the runtime of e′, but not that of the larger event e.

This definition describes the conditions under which a construction C has the MEP. This requires all of the following to be case:

- C encodes a description *P* of some event *e*.
- If C has any constituent C′ that encodes a part ('subevent') *e′* of *e*,
  - then if C′ is compatible with time-positional modifiers,
    - then these modifiers should not merely locate *e′*, but some larger event, such as all of *e*.

Consider (2a) above: the PP *from Rochester* is a constituent of (2a) which could be said to correspond to a proper subevent of the motion event described by the sentence, namely, the departure subevent. However, this PP is arguably not compatible with a time-positional modifier of its own. The same goes for the goal phrase *to Buffalo*. The presence of temporal modifiers in these PPs makes (2a′) semantically anomalous. The only time-positional modifiers (2a) accepts are modifiers that have scope over the entire event described by the sentence, as in (2a″). This is evidence that (2a) has the MEP. In contrast, (2b) has constituents that accept subevent modification: the VPs, as illustrated in (2b′). Consequently, (2b) lacks the MEP.

The definition in (3) assumes an event mereology as spelled out, for example, in Krifka (1998: 199–207). One key difference between (3) and the definition in Bohnemeyer et al. (2007) is that (3) excludes from consideration constituents that take their own temporal modifiers, but do not describe subevents, such as the relative clause in (4):

(4) On Monday, Sally read the letter that Floyd had written on Sunday

The presence of the relative clause in (4) does not change the fact that the matrix clause has the MEP, because the RC does not describe a subevent of the event described by (4). Another difference from the 2007 definition is that we exclude tenses from the category of time-positional modifiers. We follow Klein (1994) in considering tenses expressions of constraints on the 'topic times' of utterances, not on the runtimes of eventualities (in contrast, Bohnemeyer et al. 2007 are non-committal on this matter). Time-positional modifiers are expressions that denote (sets/properties of) time intervals and combine with event descriptions such that the runtime of the described eventuality is understood to be included in

some of the intervals in the set denoted by the modifier. English examples include adverbs (*tomorrow*), PPs (*at noon*, *after the flood*), and temporal clauses (*when it rains*; *until the cows come home*; *before I go*).

The MEP makes it possible to operationalize the intuition behind the statements cited in the beginning of the section. Since every eventuality must have exactly one runtime, specifiability of the runtimes of multiple events is a robust criterion for identifying descriptions of multiple events, whereas specifiability of the runtime of only a single event is a robust criterion for identifying descriptions of single events. Bohnemeyer et al. (2007) apply the MEP to the typology of motion event descriptions, based on a sample of 18 languages, and show that these languages fall into three major types in terms of how much information they allow to be packaged in event descriptions that have the MEP. The type a language belongs to is determined by lexicalization and syntax. The study also uncovered principles of the syntax-semantics interface that are shared across the languages of the sample. Significantly, these principles are sensitive to the MEP, rather than to any construction type defined in purely syntactic terms. Some of these principles are general constraints on form-to-meaning mapping in macro-event expressions of any kind. An example is bi-unique assignment of thematic relations. One principle discovered in Bohnemeyer (2003), the 'unique vector constraint', appears to be specific to the motion domain: it prevents macro-event expressions from specifying more than a single direction vector. In Bohnemeyer et al. 2010, the MEP approach is applied to a new conceptual domain, the segmentation of causal chains.

## 3. The Layered Structure of the Clause

Clause structure is represented in RRG neither in terms of X-bar syntax nor in terms of traditional immediate constituency structure; rather, it is captured in a semantically-based model known as the **Layered Structure of the Clause** or LSC. It is based on a fundamental opposition, which so far has been found in all languages: an opposition between expressions of semantic predicates, expressions of their arguments, and expressions that modify them or their projections. In other words, all languages seem to distinguish predicates, arguments and modifying adjuncts, and this follows from the nature of language as a system of communication. Much of what is communicated is information about states of affairs in the world, and this involves reference and predication. The essential structural components of this model of the clause are (i) the NUCLEUS layer, which contains the expression of the predicate, (ii) the CORE layer, which contains the nucleus plus the expressions of the arguments of the predicate in the nucleus, (iii) the CLAUSE layer,

which subsumes the core plus some optional constituents, and (iv) an optional PERIPHERY for each layer, which contains adjunct modifiers. These aspects of the layered structure are presumed to be universal. The structure of the constituent projection of a simple English clause is given in Figure 1. There is no verb phrase in the layered structure, because verb phrases are not universal (Van Valin 2001).[1,2]

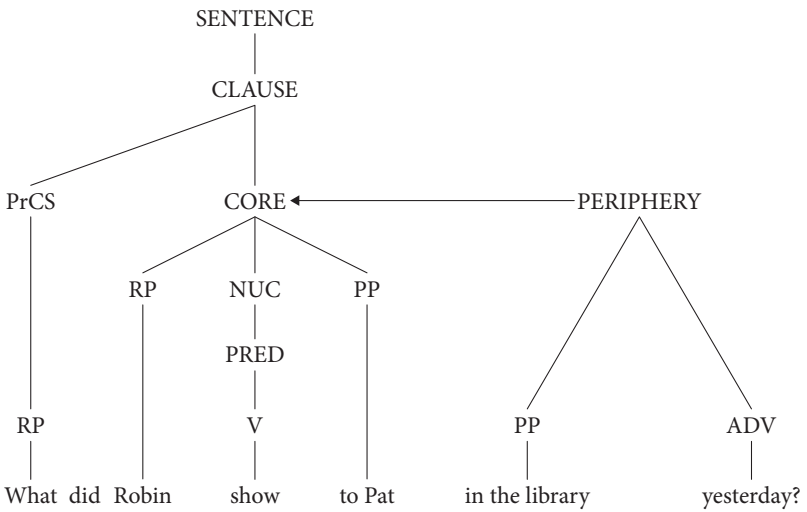


**Figure 1.** The layered structure of the clause in English

**1.** In languages which have VPs, such as English, the VP-like units are derived from a number of different constructional sources; a particularly important one is the interaction of the constituent projection of the clause with the focus structure projection (not discussed here); see Van Valin (2005, §3.5). See also the structure of the linked core in Figure 4 and Figure 7. What is crucial from an RRG perspective is that VPs are derived units in clause structure, not basic ones; hence they are not an inherent part of the constituent projection.

**2.** Abbreviations: A 'absolutive', ABL 'ablative', ACC 'accusative', ALL 'allative', AOR 'aorist', APP 'applicative', ASP 'aspect', B 'ergative', CAL 'calendric past', CL 'classifier', CLM 'clause-linkage marker', CMP 'completive', CNV 'converb', D2 'distal/anaphoric/text-deictic particle', DEF 'definite', DIR 'directional', FUT 'future', GEN 'genitive', ICV 'inherent complement verb', IDEO 'ideophone', IF 'illocutionary force', IMP 'imperative', INC 'incompletive', INGR 'ingressive', LDP 'left-detached position', LOC 'locative', LS 'logical structure', LSC 'layered structure of the clause', MEP 'macro-event property', MOD 'modality', NEG 'negation', NOM 'nominative, NUC 'nucleus', PASS 'passive', PER 'periphery', PRED 'predicate', PRCS 'precore slot', PRES 'present', PRFV 'perfective', REL 'relational derivation', RP 'reference phrase', RPIP 'RP-initial position', SUBJ 'subjunctive', SVC 'serial verb construction', TNS 'tense', TOP 'topic', VEN 'ventive'.

Arguments are instantiated in simple sentences like the one in Figure 1 either by Reference Phrases (RPs) or by pre/postpositional phrases (PPs). Some languages have a 'pre-core slot', which is the position of WH-words in languages like English and Icelandic (see Figure 1), and a 'left-detached position', which is the position of the pre-clausal element in a left-dislocation construction (see Figure 2).

A second important component of the RRG theory of clause structure is the theory of OPERATORS. Operators are closed-class grammatical categories like aspect, negation, tense, and illocutionary force. An important property of operators is that they modify specific layers of the clause. Table 1 presents the operators most relevant for this discussion.

**Table 1.** Operators

| | |
|---|---|
| Nuclear operators: | |
| | Aspect[3] |
| | Negation |
| Core operators: | |
| | Directionals |
| | Modality (root modals, e.g. ability, permission, obligation) |
| | Internal (narrow scope) negation |
| Clausal operators: | |
| | Status (epistemic modals, external negation) |
| | Tense |
| | Illocutionary Force |

Languages normally do not have all of these operators as grammatical categories; the only absolutely universal ones are illocutionary force and negation. Operators are represented in a separate projection of the clause, which is the mirror image of the constituent projection, in the sense that it involves a homomorphic (i.e., many-to-one mapping) hierarchy of layers.[4] An example of an English sentence with constituent and operator projections is in Figure 2.

**3.** This is viewpoint aspect, not lexical aspect; the latter is referred to as *Aktionsart* in RRG and is the basis for the decompositional semantic representation of a predicate, which is termed its 'logical structure'. See §5.

**4.** One of the main reasons RRG postulates a separate operator projection is that operators are subject to different ordering constraints from the predicates, arguments and adjunct modifiers of the constituent projection. See Foley & Van Valin (1984: 223), Van Valin & LaPolla (1997: 46–52), Van Valin (2005: 9–11). Another reason is that operator projections permit a precise expression of the scope of operators in complex sentences.

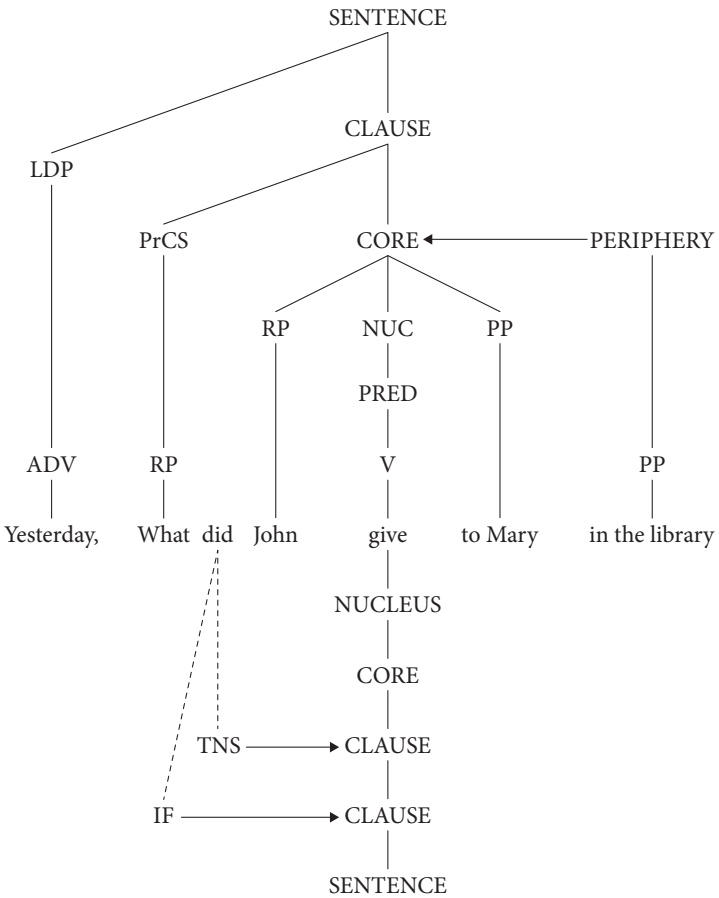


**Figure 2.** An English sentence with both constituent and operator projections

The sentence in Figure 2 involves a left-detached position as well as a pre-core slot housing a WH-expression. Note that there is no empty argument position in the core corresponding to the WH-word in the PrCS. In this example, *did* is labeled both 'tense' and 'IF' in the operator projection, because the presence and position of the tense operator signals illocutionary force in English: core-medial tense signals declarative IF, pre-core tense signals interrogative IF, and the absence of tense in a matrix core signals imperative IF. Note that the tense and IF operators occupy distinct clausal projections. This is the case because their combination is compositional. As a result, one of them must necessarily be part of the operand of the other.

It should be noted that while tense is a clausal operator, temporal adverbials modify the core via the core-level periphery in the constituent projection. This can be seen clearly with respect to gerunds and action nominals, which are nominalized cores; they can take temporal adverbs, as shown in (5), but not tense.

(5) a. The militia's shelling the city yesterday … Gerund
b. The shelling of the city by the militia yesterday … Action nominal

The three central components of the LSC also turn out to be the three fundamental building blocks of complex sentences in human language. The unmarked pattern for the construction of complex sentences involves combining nuclei with nuclei, cores with cores, clauses with clauses, or sentences with sentences. These are called levels of **juncture** in RRG, i.e. nuclear juncture, core juncture, clausal juncture, and sentential juncture.

Core junctures involve two or more cores (which may themselves be internally complex) in a clause. Examples from French, English and Mandarin are given in (6), and the structure of (6a) is presented in Figure 3. In this type of core juncture, the two cores share a core argument. 'Sharing a core argument' is represented formally in terms of the linking algorithm, which maps syntactic and semantic representations into each other (see §7).

(6) a. Je laisserai Jean manger les gâteaux.
1SG let.FUT John eat the cakes
'I will let John eat the cakes.'

b. I ordered Fred to force the door open.

c. Tā jiāo wǒ xǐe zì.
3SG teach 1SG write characters
'She teaches me to write characters.'

Core junctures like those in (6) represent a syntax-semantics mismatch: at the semantic level the logical structure of the second core is a semantic argument embedded in the logical structure of the other core (see (21)), but in the syntax the second core is not in a syntactic argument position, as clearly reflected in Figure 3. Evidence against the second core occupying a syntactic argument position can be derived as follows: syntactic argument positions necessarily involve subordination, and the subordinated argument can be a simple RP, a nominalized core, or a *that*-clause (as in Figure 4), for example. In the examples in (7), the *that*-clause in (7a) behaves like a syntactic argument, as shown by (7a′) and (7a″), but the infinitival complement in (7b) does not behave like a syntactic argument, as shown by the ungrammaticality of (7b′):

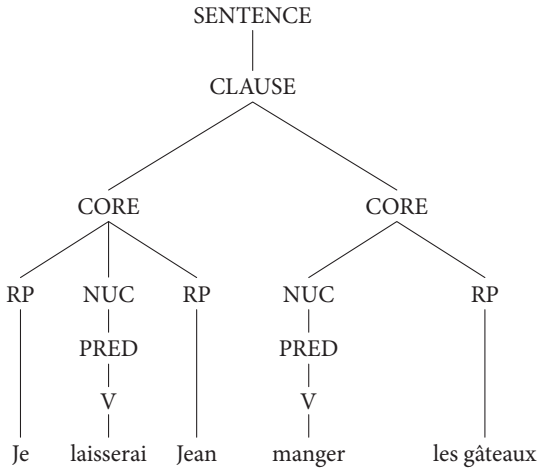


**Figure 3.** The structure of (6a)

(7) a. Fred told Bill that he should scram.
a′. It was that he should scram that Fred told Bill.[5]
a″. It was a bad joke that Fred told Bill.
b. Fred told Bill to scram.
b′. It was to scram that Fred told Bill (*/to do).

In the first sentence there is no syntax-semantics mismatch: the embedded logical structure in the semantic representation is realized as a finite subordinate clause in the syntax, *that he should scram*. Because it is subordinate structurally to the verb in the nucleus of the matrix core, it can be *it*-clefted just like a simple RP, as (7a′, a″) show. If the infinitival core in (7b) were subordinate in the same way, then one would expect that it, too, could be *it*-clefted as in (7a′, a″), but as (7b′) shows, this is in fact not possible. Example (7b) is only acceptable with the anaphoric complement *to do*, which is to say, without extraction. This strongly suggests that the structural relation between *Fred told Bill* and *to scram* in (7b) is not the same as the one between *Fred told Bill* and *that he should scram* in (7a). Note that this cannot be explained in terms of the infinitive lacking an overt

5. Some speakers find this sentence odd, but that is due to pragmatic and processing factors, not syntactic ones. The sentence is well-formed syntactically. It has reduced acceptability due to the conflict between the function of an *it*-cleft, which is to signal narrow focus, and the size of the clefted unit, a whole clause, which is not a good candidate for narrow focus.

subject; gerunds, which are nominalized cores, may or may not have an overt subject but can be *it*-clefted, because they are subordinated to the matrix verb in both cases, as (8) shows.

(8) a. Mary regretted her kissing John the most.
a′. It was her kissing John that Mary regretted the most.
b. Mary regretted kissing John the most.
b′. It was kissing John that Mary regretted the most.

Thus, core junctures such as those in (6) have a flat syntactic structure that does not reflect the fact that the logical structure of the second core is a semantic argument of the logical structure of the first.

Of equal importance in the RRG theory of complex sentences is the set of possible syntactic and semantic relations between the units in a juncture; the semantic relations are discussed below. The syntactic relations between units are called 'nexus' relations in RRG. In traditional grammar and most contemporary theories, only two basic nexus relations are recognized, coordination and subordination. Subordination is divided into two subtypes, daughter subordination and peripheral subordination. They are illustrated in Figure 4.

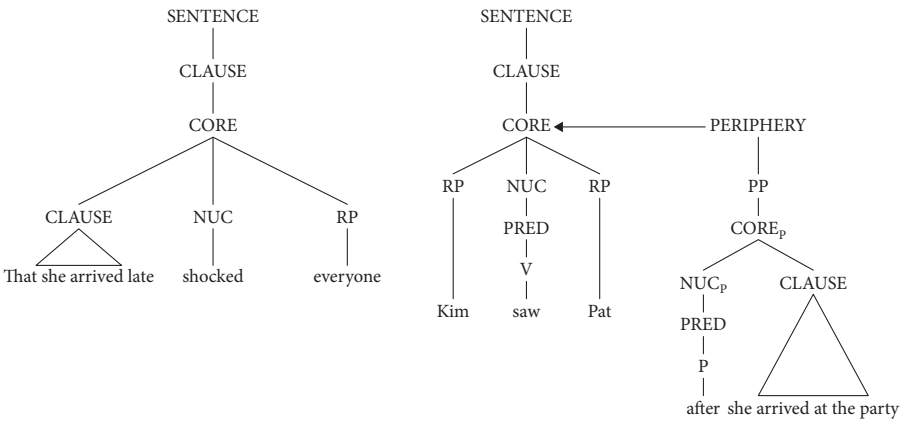


**Figure 4.** Daughter (left) and peripheral subordination at the core level in English

The embedded clause in the first sentence is a daughter of the core node, while in the second the embedded clause is an adjunct in the periphery modifying the core.

In addition to positing two types of subordination, RRG, following Olson's (1981) analysis of clause linkage in Barai (a Papuan language), distinguishes a third

nexus type: 'cosubordination', which is essentially tight, dependent coordination.[6] The dependence is operator dependence; that is, in cosubordination, the units must share one or more operators at the level of juncture. Structurally, there is a superordinate node dominating the two nodes defining the level of juncture. This node is required in the operator projection in order to capture the fact that the shared operator has scope over all units in the juncture. Because the constituent and operator projections are homomorphic mirror images of each other, the superordinate node is a feature of the constituent projection as well. Put more abstractly, two expressions joined in cosubordination together have the properties that are constitutive of a single unit of the particular layer: an operator projection and a periphery. This is opposed to coordination, in which each unit retains its operator projection and periphery and which therefore is not dominated by a superordinate node. The distinction between coordination and cosubordination thus crucially builds on the richer of structural properties of the LSC compared to immediate constituency and phrase structure grammars.

The following examples from Turkish (Watters 1993) illustrate obligatory operator sharing and the lack of it in Turkish core cosubordination and coordination, respectively. The term 'coordination' here is being used for an abstract linkage relation referring to a relationship of equivalence (i.e. both units are of the same syntactic layer) and operator independence at the level of juncture. It is distinct from conjunction, which is a construction type of the general form 'X conj Y', which may be one of the formal instantiations of coordinate nexus.

(9) a. Core cosubordination
Gid-ip gör-meli-yiz.
go-CNV see-MODAL-1PL
'We ought to go and see.'

b. Core coordination
Müzik dinle-yerek, uyu-yabil-ir-im.
Music listen-CNV sleep-MODAL-AOR-1SG
'While listening to music, I can sleep.'
(Not: 'while I am able to listen to music, I am able to sleep.')

6. Foley (2010) and Bickel (2010) both criticize the notion of cosubordination, but their arguments concern cosubordination at the clause level only, which is irrelevant to this discussion. See Van Valin (2015) for a critical examination of their arguments.

A standard diagnostic of core cosubordination is shared operator scope for core-layer operators such as deontic modals. In (9a), the modal operator *-mElI-* 'ought' (capitalization indicating a segment that is subject to vowel harmony) has scope over both cores, and therefore the nexus is cosubordinate; in (9b), on the other hand, the modal operator *-yAbIl-* 'able' has scope only over the final core, hence coordinate nexus. The structural representations for (9a, b) are given in Figure 5. Note the superordinate core node in Figure 5a dominating the two core nodes, which makes explicit that *-mElI-* 'ought' has scope over both cores. Since there is no shared core operator in (9b), there is no superordinate core node; rather, each core node is directly dominated by the clause node in Figure 5b.

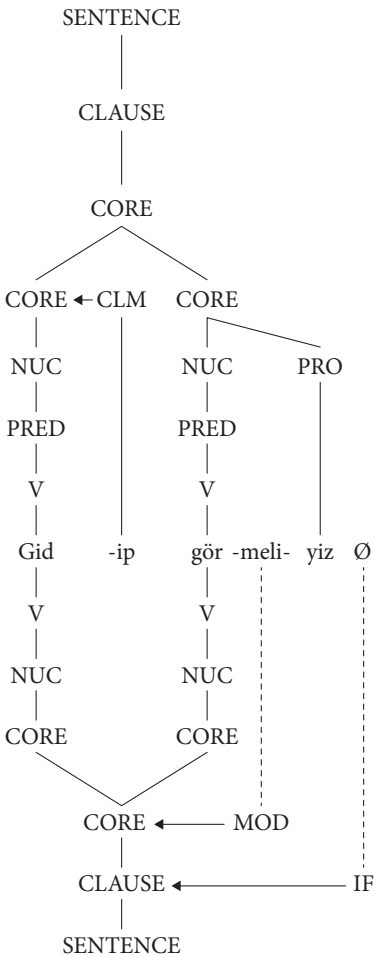


**Figure 5a.** Turkish core cosubordination

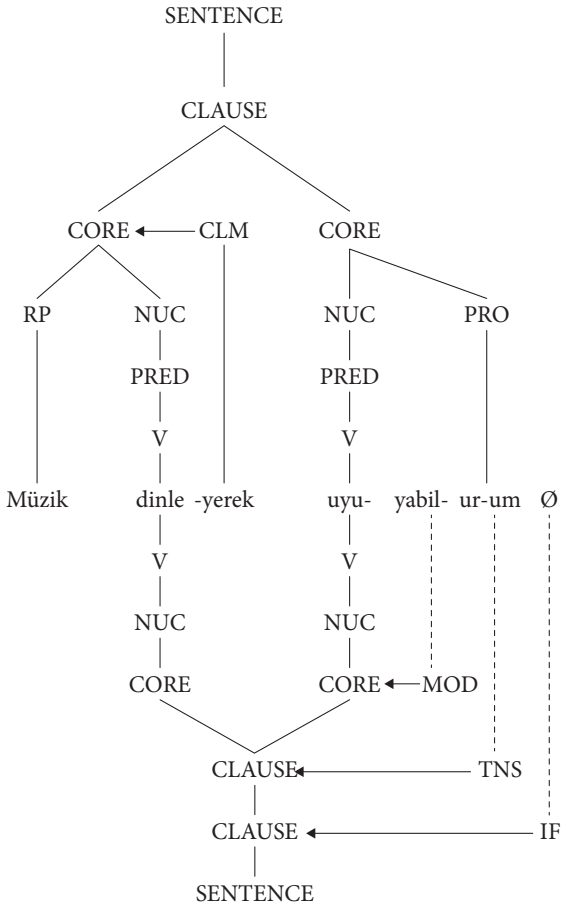


**Figure 5b.** Turkish core coordination

## 4. The Core-MEP Hypothesis

We have introduced the MEP as a property of constructions that constrains their behavior at the syntax-semantics interface. One important question that arises from this characterization is whether there is any kind of construction or unit of syntax that is inherently associated with the MEP, and whether such an association, if it exists, is recurrent and predictable across languages. Is there, we might ask, something like a "macro-event phrase"? Below, we show that neither clauses nor (traditional) verb phrases consistently have the MEP. The hypothesis we wish to explore in this article is, however, that there is indeed a kind of macro-event phrase and that this syntactic unit is the (verbal or nominal) core as introduced in Section 3:

(10) Core-MEP Hypothesis: Across languages:
  i. Single-core constructions necessarily have the MEP.
  ii. Multi-core constructions have the MEP only in case their cores are in a cosubordinate linkage; they lack the MEP otherwise.

The intuition behind (10) draws on two observations. First, among the three layers of clausal syntax posited by the Layered Structure of the Clause (LCS) theory, simple cores are the right size for the MEP. Nuclei are too small to even be tested for the MEP since they do not include arguments and their peripheries do not host time-positional modifiers. Clauses, on the other hand, are too large since they may contain multiple cores.[7] And second, simple cores have the right constituents for the MEP. They are constituted by the expressions of the elements of eventuality descriptions – predicates and arguments. And, crucially, unlike simple verb phrases, simple cores cannot contain multiple independent eventuality descriptions. That is, the complexity of eventuality descriptions that can be expressed in cores is constrained in just the way the MEP entails, as we show below.

Testing a given construction for the MEP is subject to a number of constraints. In particular, the construction and/or the lexical items involved in a particular test utterance may constrain the temporal relations between subevents in ways that can result in rendering separate time-positional modifiers anomalous, thus giving the illusion of the MEP, even though in purely syntactic terms the construction lacks it.[8]

Below, we begin by examining single-core constructions. We show that simple cores, unlike simple VPs, necessarily have the MEP, drawing on data from English event nominalizations. We then turn to multi-core constructions. We argue that these generally lack the MEP. However, we examine an important class of exceptions: core cosubordinations. This part of the argumentation draws on data from English complementation constructions, Ewe serial verb constructions, and Japanese converb constructions.[9]

---

**7.** As Lea Brown (p. c.) points out, verbal cores are the "Goldilocks zone" for the MEP.

**8.** A possible case in point are event ('direct') perception constructions such as *She watched him leave the building*. For conceptual reasons, the subevents expressed by the two verbal cores are strictly simultaneous. This excludes any modifiers that could disprove the MEP. However, one might doubt that this construction should have the MEP, given that the perception event involves merely a cognitive *representation* of the exiting event and such representations generally involve fairly loose syntactic integration. And indeed, the syntactic properties suggest coordinative rather than cosubordinative nexus.

**9.** We are of course by no means the first to notice the iconic relation between the complexity of syntactic constructions and the degree of freedom of temporal reference in them. Important precursors of this idea include Givón 1980, Foley & Van Valin 1984, and Noonan 1985.

## 5. Single-core constructions

As noted above, simple cores are the smallest unit that can have the MEP. To be a candidate for having the MEP, the syntactic unit must express the defining components of a semantic event description, the predicate classifying the action or state of affairs and the arguments referring to the event participants. The event can be located in time by a time-positional expression. The nucleus is too small, since it contains only the predicate, and does not contain the arguments representing the participants. Furthermore, the only temporal modifiers that modify the nucleus are aspectual and do not locate the event in time. The clause is too large, because it can include multiple cores, each with their own temporal modifiers, as illustrated in (11).

(11) Tom persuaded Sally on Monday to visit her sister on Friday.

In (11) *Tom persuaded Sally on Monday* is a single core, and *to visit her sister on Friday* is a single core; accordingly, the clause in (11) contains two cores, each with its own arguments, including one shared argument, *Sally*, and each with its own time-positional modifier, *on Monday* in the first core and *on Friday* in the second. There is only one tense operator over the clause, but what is crucial here is the fact that verbal cores are inherently constituents that describe (sub)events and that each core in (11) has its own time-positional modifier. Hence the clause does not have the MEP by the criteria spelled out in (3) above. The structure (constituent projection only) is given in Figure 6.

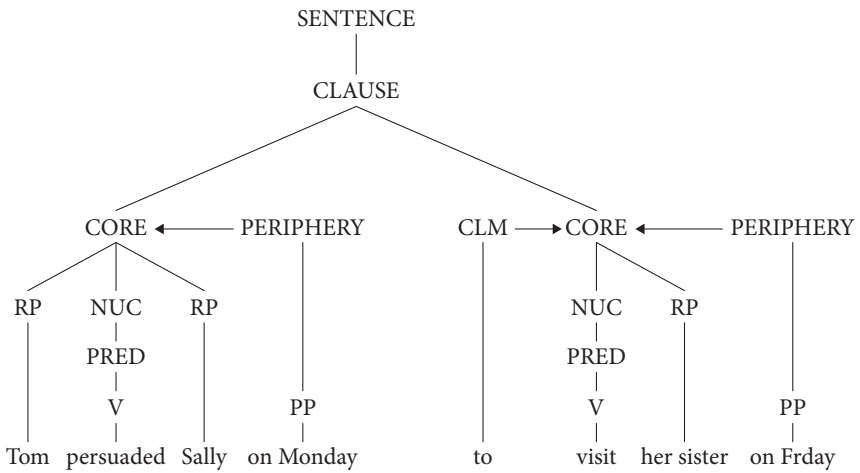


**Figure 6.** The constituent structure projection of (11)

When a clause consists of a single core, as in (12), it appears to have the MEP.

(12) Tom spoke to Sally on Friday.

This clause has the MEP, but that is because it contains only a single core, unlike (11). Thus, since the clause can contain multiple simple cores, it cannot be the locus of the MEP; rather, it is the core that naturally expresses a single event.

Why does the core naturally have the macro-event property? This follows from the semantic representation of cores, which is based on the decompositional representation of the predicate in the nucleus. The decompositional system is based on the lexical aspect distinctions originally proposed in Vendler (1957), with some extensions. A subset of the classes used in RRG is given in (13), with example sentences involving each type plus its causative counterpart given in (14). There is a set of tests which are used to identify the lexical aspect class of a predicate (Van Valin 2005: 34–39).

The decompositional system is adapted from the one proposed in Dowty (1979); the sample classes are summarized in Table 2.

(13) a. States: *be sick, be tall, be dead, love, know, believe, have*
b. Achievements: *pop, explode, collapse, shatter* (all intransitive)
c. Accomplishments: *melt, freeze, dry* (the intransitive versions); *learn, receive*
d. Activities: *march, walk, roll* (the intransitive versions); *swim, think, rain, read, eat*

| | | | |
|---|---|---|---|
| (14) | a. | State: | The boy is afraid. |
| | a′. | Causative state: | The dog frightens/scares the boy. |
| | b. | Achievement: | The balloon popped. |
| | b′. | Causative achievement: | The cat popped the balloon. |
| | c. | Accomplishment: | The ice melted. |
| | c′. | Causative accomplishment: | The hot water melted the ice. |
| | d. | Activity: | The soldiers marched in the field. |
| | d′. | Causative activity: | The sergeant marched the soldiers in the field. |

**Table 2.** Lexical representations for some of the lexical aspect classes

| Verb Class | Logical Structure (LS) |
|---|---|
| STATE | **predicate′** (x) or (x,y) |
| ACTIVITY | **do′** (x, [**predicate′** (x) or (x, y)]) |
| ACHIEVEMENT | INGR **predicate′** (x) or (x,y), or<br>INGR **do′** (x, [**predicate′** (x) or (x, y)]) |
| ACCOMPLISHMENT | BECOME **predicate′** (x) or (x,y), or<br>BECOME **do′** (x, [**predicate′** (x) or (x, y)]) |
| CAUSATIVE | α CAUSE β, where α, β are LSs of any type |

Examples of some English sentences with their logical structures are given in (15).

(15) a. STATES
The window is shattered. **shattered′** (window)
Fred is at the house. **be-at′** (house, Fred)

b. ACTIVITIES
The children cried. **do′** (children, [**cry′** (children)])
Carl ate snails. **do′** (Carl, [**eat′** (Carl, snails)])

c. ACHIEVEMENTS
The window shattered. INGR **shattered′** (window)
The balloon popped. INGR **popped′** (balloon)

d. ACCOMPLISHMENTS
The snow melted. BECOME **melted′** (snow)
Mary learned French. BECOME **know′** (Mary, French)

e. CAUSATIVES
The dog scared the boy. [**do′** (dog, Ø)] CAUSE [**feel′** (boy, [**afraid′**])]
The hot sun melted the snow. [**do′** (sun, Ø)] CAUSE [BECOME **melted′** (snow)]
The cat popped the balloon [**do′** (cat, Ø)] CAUSE [INGR **popped′** (balloon)]
Felix bounced the ball. [**do′** (Felix, Ø)] CAUSE [**do′** (ball, [**bounce′** (ball)])]

Note that these sentences are in fact single-core expressions, and accordingly these logical structures are first and foremost the semantic representations of cores.

Furthermore, events take place in space and time, and the core takes temporal and spatial modifiers, which occur in the core-level periphery. Adjunct modifiers are represented as higher predicates taking the logical structure of the predicate in the nucleus as an argument. This is illustrated in (16).

(16) a. Tom spoke to Sally on Friday in the library.
a′. **be-in′** (library, [**be-on′** (Friday, [**do′** (Tom, [**speak′** (Tom, Sally)])])])[10]
b. Tom spoke to Sally in the library yesterday.
b′. **yesterday′** ([**be-in′** (library, [**do′** (Tom, [**speak′** (Tom, Sally)])])])

Adjunct modification is illustrated in Figure 7, which lacks clause-level constituents and operators (hence the verb is shown in the citation form).

10. See Van Valin & LaPolla (1997), §3.2.3.1, for a richer decomposition of *speak* and other verbs of saying.

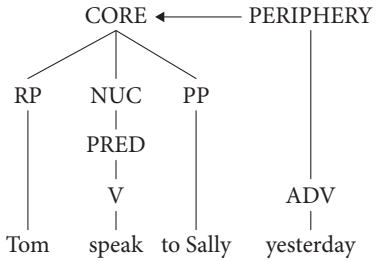


**Figure 7.** English core in (12) without clausal constituents or operators

As predicted by the MEP-Core Hypothesis, a single core cannot take multiple temporal or spatial modifiers of the same kind:

(17) a. *Tomorrow, Tom will speak to Sally on Friday.
b. *At Starbucks, Tom spoke to Sally in the library.

Only one time-positional and one space-positional modifier are possible, as in (16a). The logical structure for (16a) was given in (16a′), and it is clear why two contrasting time-positional modifiers are impossible: they give two different, incompatible temporal specifications. Two temporal specifications are possible when one is a further specification or narrowing of the position of the event in time, as in (18).

(18) a. Tom spoke to Sally on Friday in the morning.
a′. **be-on′** ([**be-in′** (morning, Friday)], [**do′** (Tom, [**speak′** (Tom, Sally)])])])[11]
b. On Friday, Tom spoke to Sally in the morning.
b′. *In the morning, Tom spoke to Sally on Friday.

The PP *in the morning* further specifies the temporal position of the event within the temporal domain introduced by *on Friday*. Hence there is no contradiction, as in (17a). That *in the morning* modifies *on Friday* and not *Tom spoke to Sally* directly can be seen in the different acceptability when each of the PPs occurs displaced in the left-detached position as in (18b, b′).

Contrasting time-positional adverbials are possible in sentences like (11), in which there are two cores in a single clause. The logical structure for (11) (repeated in (19a)) is given in (19b); the curly brackets delineate the scope of the preposition in the time-positional PPs.

---

**11.** The underlining under *Friday* signals that it is the argument of **be-on′**, despite being embedded in the internal prepositional logical structure.

(19) a. Tom persuaded Sally on Monday to visit her sister on Friday.
b. {[**be-on′** (Monday, [**do′** (Tom, [**say′** (Tom, Sally)])] CAUSE [**want′** (Sally}, {**be-on′** (Friday, [**do′** (Sally, [**visit′** (Sally, her sister)])])})]

In this logical structure, *on Monday* specifies the temporal position of the persuading, while *on Friday* gives the temporal specification of the possible resulting action. A comparison of (19b) with the structure in Figure 6 highlights the syntactic-semantics mismatch in (11): the logical structure for *Sally to visit her sister on Friday* is a semantic argument in the logical structure for *persuade* in (19), but the syntactic representation of the embedded logical structure is as a sister to the core instantiating the matrix logical structure in Figure 6, hence the nexus is not subordination (it is in fact coordinative: two sister cores immediately dominated by a clause node).

The obvious candidate for a phrase with the MEP in X-bar phrase structure is the VP. However, there are two properties of VPs that lead to the conclusion that it does not in fact have the MEP. The first is that the traditional VP does not contain all of the arguments of the verb; the external argument, usually an agent, occurs outside the VP. This objection cannot be raised, however, against two developments in the last few years. The first is the VP-internal subject hypothesis, according to which the agent-type argument occurs in the specifier of VP position, so that despite being within the VP it nevertheless asymmetrically c-commands the internal argument, which is a sister to the verb under the lowest V′. The second is the addition of *v*P, which introduces the agent-like argument and takes a traditional VP as the complement of the head, *v*, a light verb which is usually phonologically null. Under both of these hypotheses, the VP/*v*P would be the domain of biunique thematic-role assignment. The second problematic property of VPs cannot be so easily handled. Multiple time-positional modifiers are possible in a single VP, as in examples like (20).

(20) John complained from his departure from Buffalo at 8:00 to his arrival in Rochester at 9:15.

The phrase structure of (20) is given in Figure 8.

This VP contains two event nominalizations, departure and arrival, each of which licenses its own time-positional modifier; this would be the case under the VP-internal subject hypothesis or the *v*P analysis as well. Thus this VP fails to meet the criterion for having the MEP stated in (3), and we have already seen that the clause (IP/TP/CP) lacks the MEP as well.

The RRG structure for this sentence predicts that it would lack the MEP, because the event nominalizations are in fact deverbal, nominalized cores, each of

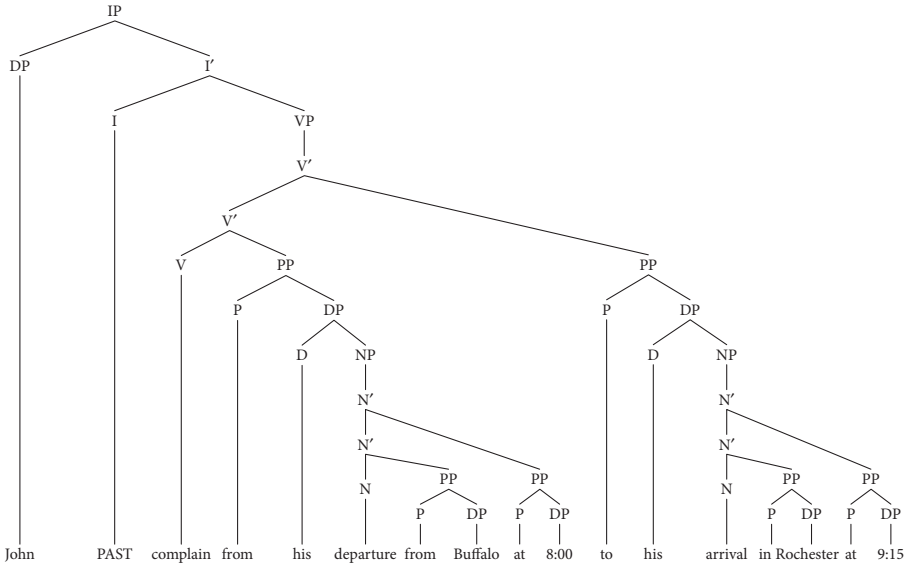


**Figure 8.** English VP in (20) with two time-positional modifiers

which licenses its own time-positional modifier; hence there are three cores in the structure, each of which can take its own time-positional modifiers. Consequently, the sentence lacks the MEP.[12] The layered structure of (20) is given in Figure 9. Each time-positional modifier occurs in a predicative PP in the periphery modifying the $\text{core}_R$ in an RP headed by an event nominalization, and each such RP is itself the object of a predicative preposition in a PP in the periphery modifying the core containing *John complained*.[13]

---

**12.** See Nunes (1993) and Van Valin & LaPolla (1997: 55–56, 186–89) for discussion of the similarities between verbal cores and deverbal nominals like *departure* and *arrival*.

**13.** In Figure 9, there are two different PP structures. The PP *from his departure* has a full layered structure with *from* as the prepositional predicate in the $\text{nucleus}_p$; hence this type of PP is termed a 'predicative PP' (Bresnan 1982). Only predicative PPs have a full layered structure; non-predicative PPs, e.g. *to* with *give* or *from* with *take*, mark arguments of a verb and therefore do not function predicatively. They have a simplified structure rather similar to the structure of a PP in immediate constituent structure. This opposition is reflected in the different PP structures: *from* is predicative in *from his departure*…, while it is non-predicative in *his departure from Buffalo* (cf. *he departed from Buffalo*, where *from Buffalo* is an oblique core argument); similarly, *to* in *to his arrival*… is predicative, whereas *in* in *in Rochester* is non-predicative (cf. *he arrived in Rochester*, where *in Rochester* is an oblique core argument). Finally, the *at* in the time-positional PPs is predicative.

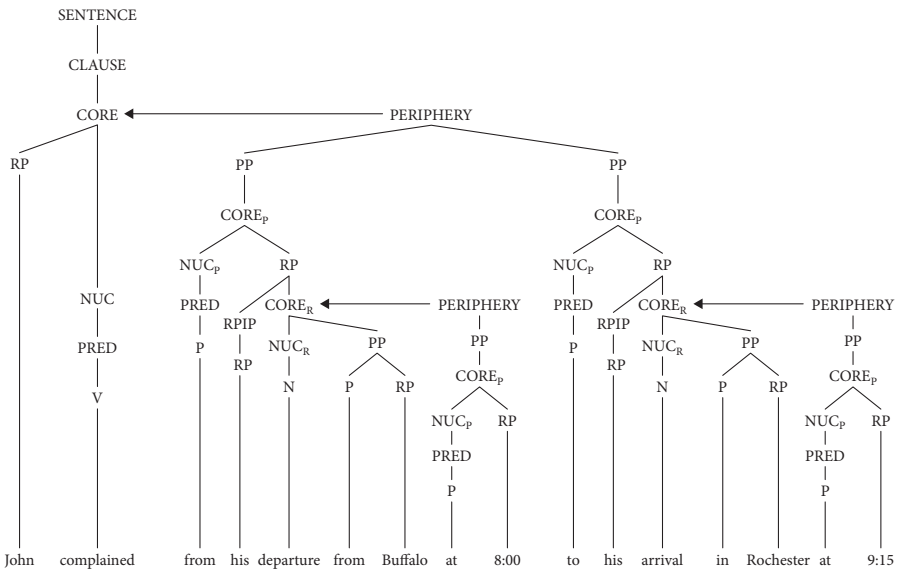


**Figure 9.** The layered structure of (20)

## 6. Multi-core constructions

With the crucial exception of cosubordinate nexus to be discussed momentarily, event descriptions that comprise multiple cores lack the MEP. This follows from the definition in (3) and from the fact that verbal cores are inherently constituents of event descriptions that encode subevents can accommodate their own time-positional modifiers.[14] Consider, for instance, (21) and (22), which feature an event nominalization and a clause as core arguments, respectively:

(21) Floyd's behavior at the party on Monday still angered Sally three days later.

(22) That Floyd had kissed Harriet at the party on Monday still angered Sally three days later.

In such structures, each core introduces its own periphery, which may host independent time-positional modifiers. This is illustrated for (21) in Figure 10. However, there is an important class of exceptions: across languages, core cosubordinations do appear to have the MEP. In (23), we state this observation as a hypothesis:

**14.** Stiebels (2010) observes that complex constructions expressing what she calls 'coherent events' disallow independent temporal modifiers in the matrix clause and the infinitival complement in German. This is clearly similar to the MEP.

(23) **Preservation-under-cosubordination Hypothesis:** Core cosubordination preserves the MEP.

In the following, we present supporting evidence for (23) from English infinitival complement constructions, Ewe serial verb constructions, and Japanese converb constructions. We show that all three constructions occur with both coordination and cosubordination, but have the MEP only in the latter case, suggesting that it is specifically cosubordinate nexus that ensures the MEP. We submit that the explanation for (23) lies in the two cores sharing a single periphery under cosubordination. This makes it impossible for them to take distinct time-positional modifiers. As a result, core cosubordinations necessarily have the MEP.

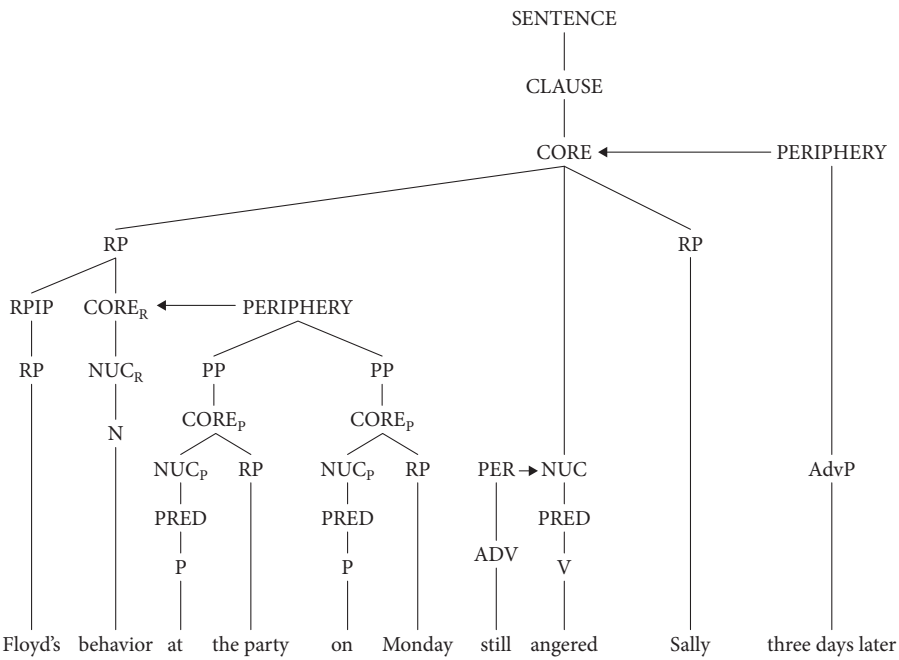


**Figure 10.** An event nominalization as a core argument in core subordination (LSC of (21))

Tests of (23) presuppose a criterion that distinguishes core cosubordinations from core coordinations and is independent of the MEP. As discussed in §3, the standard diagnostic for discriminating between core coordinations and core cosubordinations is the scope of deontic modals, which is predicted to extend to both cores in the case of cosubordinate nexus, but not in that of coordinate nexus. Unfortunately, as we explain below, this test is applicable in English, but neither in Ewe nor in Japanese. In both languages, deontic modality is expressed, not by operators, but by complex sentence constructions. We rely instead on an alternative criterion: core cosubordinations are dominated by a single mother core node

licensing a single shared periphery, whereas cores joined under coordinate nexus lack this merged behavior and retain their individual peripheries. As a result, adjuncts – core-layer adverbial modifiers – are predicted to occur in both cores independently under coordinate nexus, but not under cosubordinate nexus. As discussed in the beginning of this section, the key diagnostic behavior of macro-event expressions – the exclusion of independent temporal modifiers as per definition (3) above – is under this assumption in fact directly entailed by core cosubordination. To ensure mutual independence of our diagnostics, we use primarily locative adverbials to probe the nexus type of a given core juncture.

### 6.1 English: infinitival complements

Coordination of two cores under a clause node permits each core to retain its own periphery.[15] Such constructions therefore generally lack the MEP. This is exemplified by the *to*-complement construction in (24a), illustrated in Figure 6. However, *to*-complements also occur under core cosubordination, and when they do, their temporal interpretation is subject to the MEP. This is illustrated in (24b) and in Figure 11, which represents a core cosubordination under a core node.

(24) a. Tom persuaded Sally on Monday to visit her sister on Friday.
b. Chris went (*yesterday) to see Pat today.

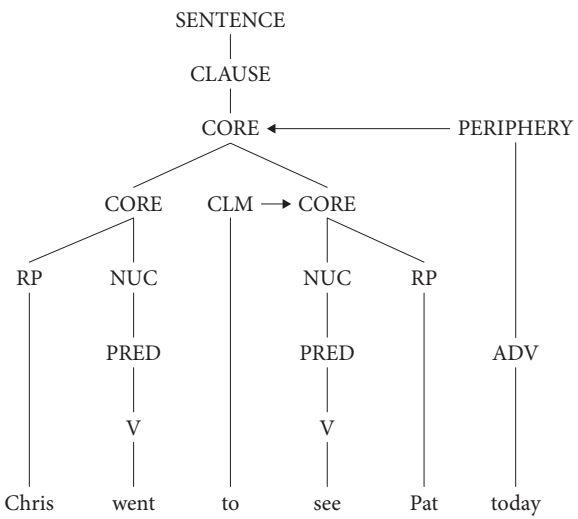


**Figure 11.** Core cosubordination with *to*-complement

15. It is crucial to keep in mind the distinction between coordination and conjunction discussed in §3.

Justification for a shared periphery (and to that extent cosubordination) in Figure 11, but not in Figure 6 (and thus coordination), comes from the interpretation of modal operators: whereas the second core is outside the scope of the modal verb in (25a), it is inside it in (25b) (cf. Van Valin & LaPolla 1997: 442–469; Van Valin 2005: 188–205):

(25) a. Tom must persuade Sally to visit her sister.
b. Chris must go to see Pat.

In (25a) Tom is obliged to persuade Sally of something, but Sally is not obliged to visit her sister; hence the deontic modal must have scope over only the first core. This is reflected in the operator projection in Figure 12, the layered structure of (25a). Note that the core nodes are directly dominated by the clause node, which allows each core node to have independent core operators, in this case deontic modality, as well as independent peripheries, as in Figure 6. Figure 12 shows both the deontic operator and the time-positional modifiers.

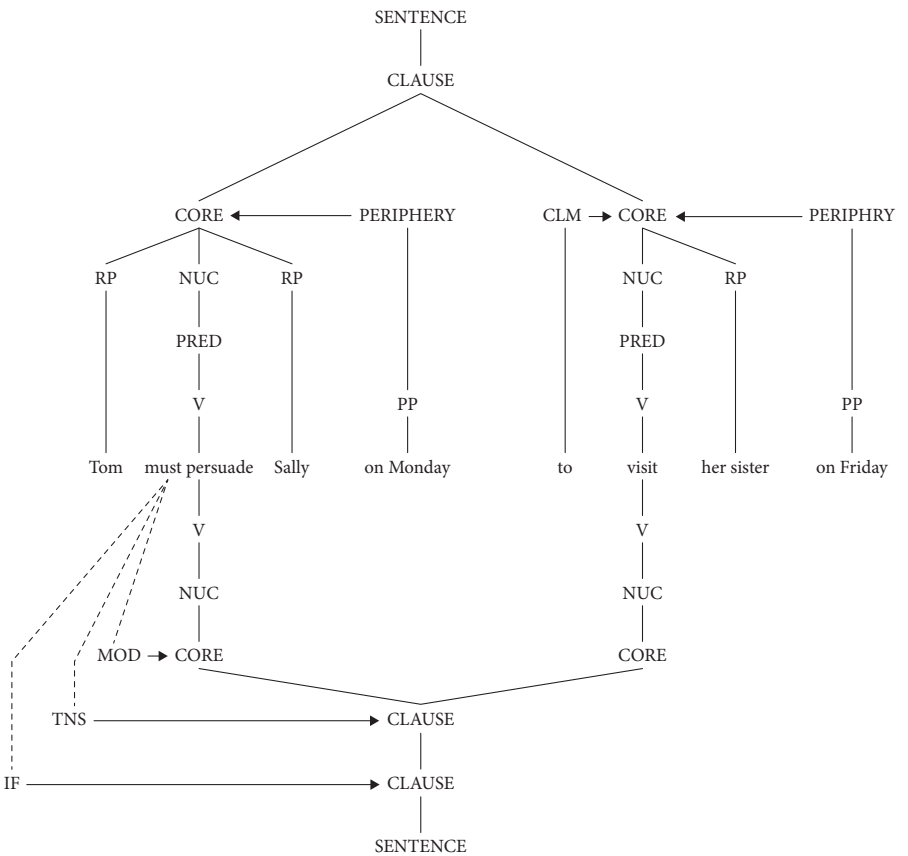


**Figure 12.** Core coordination with both deontic modal operator and independent time-positional modifiers

In (25b), on the other hand, Chris is obliged to go to see Pat, not just to go somewhere; here the obligation extends not merely to the motion event, but also to the meeting event. This is represented in the constituent and operator projections by a superordinate core node, as shown in Figure 13, the layered structure of (25b). It is the superordinate core node in core cosubordination that hosts the single core-level periphery containing the time-positional modifiers.

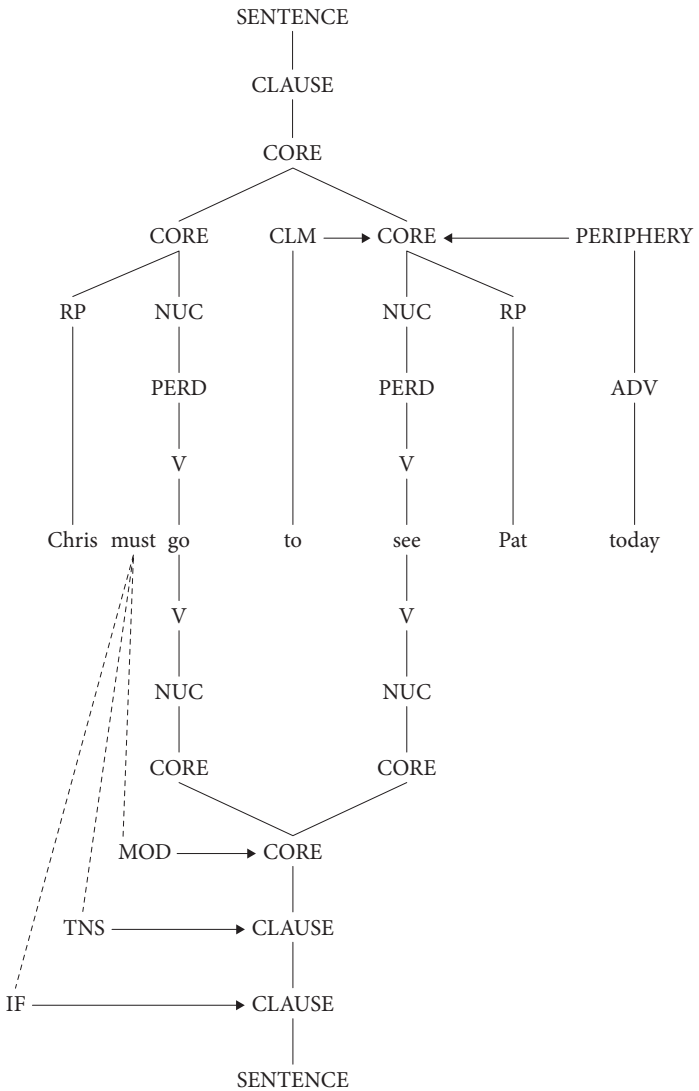


**Figure 13.** Core cosubordination with shared deontic modal operator and shared time-positional modifier

There are 'same-subject' infinitival complements that lack the MEP, and here too there is a correlation between the lack of shared modal operator scope and the ability to host an independent time-positional modifier, as illustrated in (26).

(26) John must plan today to leave for Chicago tomorrow.

In this example John is obliged to plan to leave for Chicago, but he is not obliged to leave for Chicago; the planning and the leaving are independent actions, and John's obligation extends only to the planning action. It is possible to add *regardless of whether he actually makes the trip or not* without contradiction to (26). Each action description can have its own time-positional modifier, and therefore the construction lacks the MEP, just like the 'different-subject' infinitival complement in (25a).

Core subordination, as exemplified in (8) and (21), also lacks the MEP, as both the matrix and embedded cores can have independent time-positional modifiers.

(27) a. Today Mary regrets having kissed John at the party last night.
b. Mary should regret having kissed John at the party.

In (27a) the matrix core takes the time-positional modifier *today*, while the gerund, the embedded nominalized core, takes *last night*, and this correlates with the lack of shared modal scope, as *should* modifies the relationship between *Mary* and *regret* in (27b), not that between *Mary* and *having kissed John at the party*.[16] Thus, the correlation between the interpretation of deontic modals and the possibility of independent time-positional modifiers holds in all three types of core junctures in English: shared deontic modal interpretation correlates with a shared time-positional modifier, and lack of shared deontic modal interpretation correlates with independent time-positional modifiers. This correlation is no accident: syntactically, it is the result of two cores forming a single superordinate core with a single shared operator projection. This shared projection allows for maximally one encoding of each semantic type of operator. And semantically, shared deontic modal scope signals that there is a single complex event involving one particular participant in

**16.** The fact that *Mary regrets today having kissed John at the party last night* is less acceptable than (27a) is related to the difference in nexus type between core subordination and core coordination (e.g. (11)). English generally disallows peripheral adjuncts between the verb and its object, i.e. between two core constituents, and the gerund object in (27) is a core argument, hence the reduced acceptability of the temporal adverbial, especially if the gerund is light, e.g. *Mary regrets today kissing John*. If the adjunct is a temporal PP, the acceptability is even further reduced, e.g. *Mary regretted after the party kissing John*. There is no such reduction in acceptability in core coordination, e.g. *Tom persuaded Sally on Monday/yesterday to visit her sister* (*on Friday/tomorrow*), because the infinitive is not a core argument of the first core but rather its sister, as Figure 6 and Figure 12 clearly show.

all sub-events, and this is why it correlates with the restriction on time-positional modifiers. The obligatorily shared core-level periphery is the constituent-projection counterpart to the shared deontic operator scope in the operator projection.

### 6.2 Ewe: serial verb constructions

Ewe has several types of serial verb constructions (SVCs) (Ameka (2005a,b), including the two types in (28)–(29), which we analyze as exhibiting core coordination (28) and core cosubordination, respectively:

(28) *Circle lá mli tsó blutɔ gbɔ́ le mɔ́-a dzí* ***vá*** *tó*
[circle DEF roll from blue place LOC road-DEF on] [VEN pass
*xɔ-a ŋú* ***hé vá*** *ɖó triangle lá gbɔ́.*
house-DEF skin] [ITI VEN arrive triangle DEF place]
'The circle rolls from the blue one on the road, passing the house, arriving at the triangle.'

(29) *Circle lá mli tsó blutɔ gbɔ́ le mɔ́-a dzí tó*
[circle DEF roll from blue place LOC road-DEF on] [pass
*xɔ-a ŋú yi dé triangle lá gbɔ́.*
house-DEF skin] [go ALL triangle DEF place]
'The circle rolls from the blue one on the road passing the house arriving at the triangle.'

The two constructions differ in that the one in (28) requires the directional particles *vá* 'ventive' and *hé* 'itive' in the cores. Henceforth, we refer to this construction as a **directional SVC** for short. The directional particles are grammaticalized from motion verbs meaning 'come' and 'go', respectively. Unlike lexical verbs, they do not take arguments and do not inflect for aspect (cf. Ameka 1991, 2005a,b, Ansre 1966). Importantly, they do not have the distribution of complementizers or conjunctions in Ewe, in that they are not selected by complement-taking predicates (unlike, e.g., the complementizer *bé* in (34) below). The complex SVC with the directional particles in (28) lacks the MEP, whereas the compact SVC without the directionals has it, as illustrated by the behavior of the time-positional modifiers in (28′) and (29′) (cf. also Bohnemeyer et al. 2007). The multi-macro-event SVC type is exemplified by (28) and tested in (28′). The examples in (29)–(29′) represented the plane SVC type that has the MEP.

(28′) Circle lá mli tsó blutɔ gbɔ́ le mɔ́-a dzí **le ga enyí me**

[circle DEF roll from blue place LOC road-DEF on **at.eight**]
**vá** tó xɔ-a ŋú **le ga asiéke me hé vá** ɖó triangle
[**VEN** pass house-DEF skin **at.nine**] [**ITI VEN** arrive triangle
lá gbɔ́ **le ga ewó me.**
DEF place **at.ten**]

'The circle rolls from the blue one on the road at eight, passing the house at nine, arriving at the triangle at ten.'

(29′) *Circle lá mli tsó blutɔ gbɔ́ le mɔ́-a dzí **le ga enyí me**
[circle DEF roll from blue place LOC road-DEF on **at.eight**]
tó xɔ-a ŋú **le ga asiéke me** yi dé triangle lá
[pass house-DEF skin **at.nine**] [go ALL triangle DEF
gbɔ́ **le ga ewó me.**
place **at.ten**]

intended: 'The circle rolls from the blue one on the road at eight, passing the house at nine, arriving at the triangle at ten.'

As predicted by this distribution and the Preservation Hypothesis, we analyze the plain serialization without the directional particles in (29) as a core cosubordination, but the SVC with the directional particles in (28) as a core coordination. In the following, we present independent evidence in support of these analyses.

Both constructions are core-layer junctures. Nuclear-layer juncture can be safely excluded given the positions of the referent (i.e., noun) and prepositional phrases between the verbs. Clause-layer juncture is incompatible with the observable data concerning the distribution of clause-level operators. An example is sentential negation. Example (30) is the negation of (29), expressed by the combination of the prefix *mé-* preceding the first verb and the sentence-final particle *o*:

(30) Circle lá **mé**-mli tsó blutɔ gbɔ́ le mɔ́-a dzí tó
[circle DEF **NEG**-roll from blue place LOC road-DEF on] [pass
xɔ-a ŋú yi dé triangle lá gbɔ́ **o.**
house-DEF skin] [go ALL triangle DEF place **NEG**]

'The circle does not roll from the blue one on the road passing the house arriving at the triangle.' (Bohnemeyer et al. 2007: 500)

Combining the negation marker *mé-* with any verb other than the first verb of an SVC is ungrammatical:

(31) *Circle lá mli tsó blutɔ gbɔ́ le mɔ́-a dzí **mé**-tó

[circle DEF roll from blue place LOC road-DEF on] [**NEG**-pass
xɔ-a ŋú yi dé triangle lá gbɔ́ **o.**
house-DEF skin] [go ALL triangle DEF place **NEG**]
intended: 'The circle rolls from the blue one on the road (but) not passing the house arriving at the triangle.' (Bohnemeyer et al. 2007: 500)

Expressing the intended meaning in (31) requires a biclausal construction (e.g., something like 'The circle rolls on the road from the blue square arriving at the triangle, but does not pass the house'). The same distribution holds for more complex SVC with the directional particles. Example (32) shows the negation of (28); Example (33) the ungrammaticality of negation with narrow scope over a non-initial verbal projection:

(32) Circle lá **mé**-mli tsó blutɔ gbɔ́ le mɔ́-a dzí vá tó
[circle DEF **NEG**-roll from blue place LOC road-DEF on [VEN pass
xɔ-a ŋú hé vá ɖó triangle lá gbɔ́ **o**.
house-DEF skin] [ITI VEN arrive triangle DEF place **NEG**]
'The circle does not roll from the blue one on the road, passing the house, arriving at the triangle.'

(33) *Circle lá mli tsó blutɔ gbɔ́ le mɔ́-a dzí vá
[circle DEF roll from blue place LOC road-DEF on [VEN
**mé**-tó xɔ-a ŋú hé vá ɖó triangle lá gbɔ́ **o**.
**NEG**-pass house-DEF skin] [ITI VEN arrive triangle DEF place **NEG**]
intended: 'The circle rolls from the blue one on the road, not passing the house, arriving at the triangle.'

In contrast, in a multiclausal construction, narrow-scope negation marked on a non-initial verb is possible. Consider for example the negated complement clause in (34):

(34) Kofi gblɔ ná Amí bé mé-ga-vá o.
Kofi say DAT Ami that NEG-REP-come NEG
'Kofi told Ami not to come.' [Lit.: 'Kofi said to Ami that he not come']

Having presented the evidence for core-layer juncture, we now turn to the nexus types of the two constructions. Subordination is not a likely option, as the meanings of the verbs involved make it difficult to see how any of the cores could be an argument of them. This leaves coordination and cosubordination, and indeed, as mentioned, we argue that the plain SVC without directionals involves cosubordination whereas the complex directional SVC is a core coordination.

As mentioned above, the standard diagnostic of core cosubordination is the scope of deontic modals. Unfortunately, this test is not available for Ewe, as deontic modals are expressed by a complex sentence involving subordination. Example (35) illustrates the structure of an expression of deontic necessity, which involves a metaphoric use of a locative predicate followed by a complement clause:[17]

(35) É-le bé Kofi ná-dzó.
3-be.at that Kofi SUBJ-leave
'Kofi has to/must leave.'

Given that deontic modals are not available at the core layer in Ewe, other sources of evidence must be considered. One case in point is locative adjuncts. Just like temporal adjuncts, locative adjuncts are core periphery constituents and thus are predicted to be universally shared under cosubordination, but not under coordination. Indeed, the cores in the directional SVC admit separate locative adjuncts:

(36) É-ɖa nú le dzodó*f*é hé vá ɖu le xéxé.
3SG-cook food LOC kitchen DIR DIR eat LOC outside
'He cooked in the kitchen and ate outside.'

The locative adjuncts in (36) indicate that the two cores have separate peripheries, suggesting coordination. In the absence of the directional particles *hé* and *vá*, the sentence can no longer accommodate two separate locatives, as shown by the ungrammaticality of the second locative in (37):

(37) É-ɖa nú le dzodó*f*é ɖu (*le xéxé)
3SG-cook thing LOC kitchen eat LOC outside
'He cooked in the kitchen and ate (*outside).'

We take the incompatibility of (37) with separate locative adjuncts in the two cores to be evidence of a shared periphery and thus of cosubordination.

Additional evidence comes from motion event descriptions. In verb-framed languages (Talmy 2000) and in serializing languages such as Ewe (Ameka & Essegbey 2001, Zlatev & Yangklang 2004), manner of motion is likewise expressed in the core periphery. As (38)–(39) illustrate, directional SVCs (those including the directional particles *hé* and *vá*) permit separate manner specifications in distinct cores. Examples (38) and (39) illustrate SVCs which are ungrammatical without the itive particle *hé*:

17. Examples (35)–(39) were kindly provided by Felix Ameka and James Essegbey.

(38) É-ɖíɖí le tó-á dzí dze anyí (*/hé) mli glamaglama
3SG-slip LOC mountain-DEF top ICV ground DIR roll IDEO
yi aga me.
go valley inside
'He slipped from the mountain, fell and rolled unevenly down into the valley.'

(39) É-ƒú du sésié gé ɖé tɔ-á me (*/hé)-ƒú tsi
3SG-ICV race hard drop ALL river-DEF inside DIR-ICV water
gidigidi yi tɔ-á gódo
IDEO go river-DEF behind.
'He ran hard and entered the water and swam with all his strength to the other bank of the river.'

In contrast, simple motion SVCs with multiple manner verbs are ungrammatical, witness the unacceptability of (38)–(39) without the itive particle *hé*.[18]

In summary, we hope to have shown that directional SVCs, which lack the MEP, involve core coordination under a clause node, as diagrammed in Figure 14. In contrast, simple SVCs without directionals are core cosubordinations under a superordinate core node, as illustrated in Figure 15. This is as predicted under the Preservation-under-Cosubordination Hypothesis, as simple SVCs have the MEP (29′), whereas directional SVCs lack it (28′).

**18.** This ungrammaticality may not, however, hold for all dialects of Ewe. The strict requirement of having the directional particles with coordinative nexus seems to be restricted to the Anlo dialect (F. K. Ameka and J. Essegbey, p. c.).

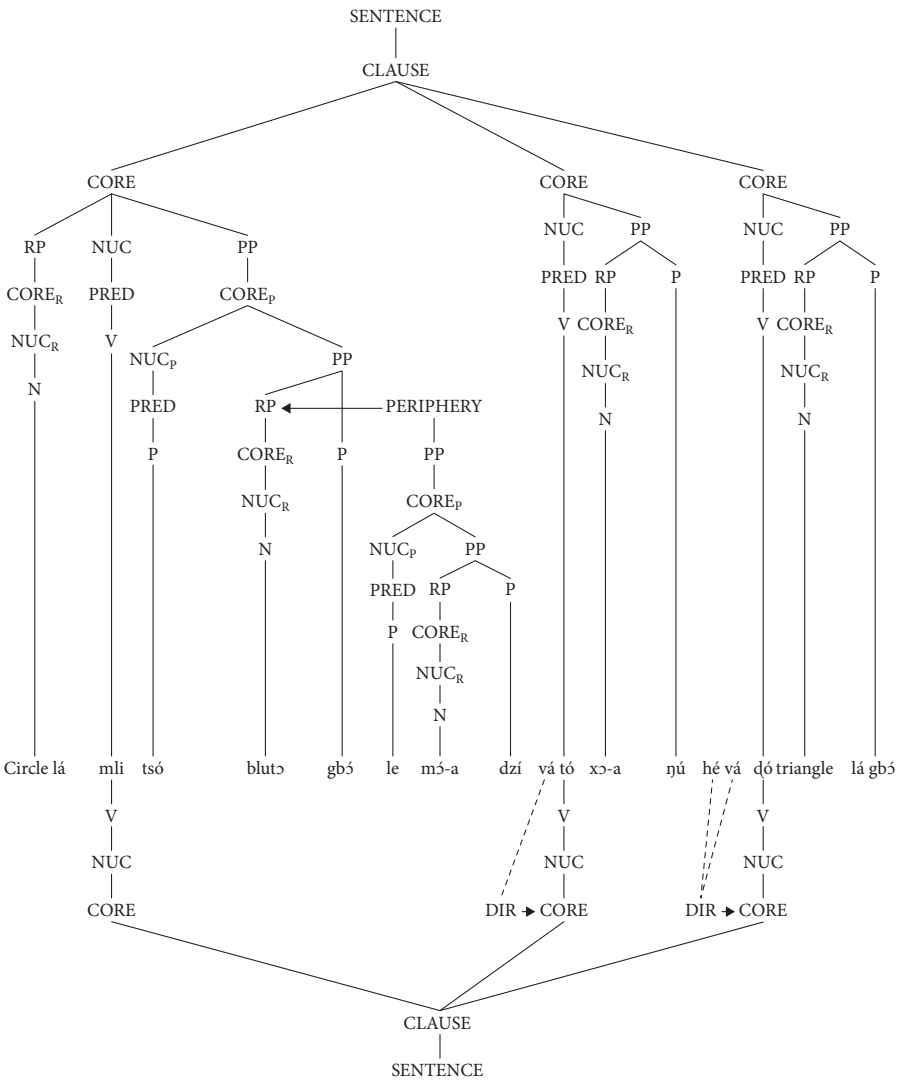


**Figure 14.** Core coordination in Ewe SVCs (LSC of (28))

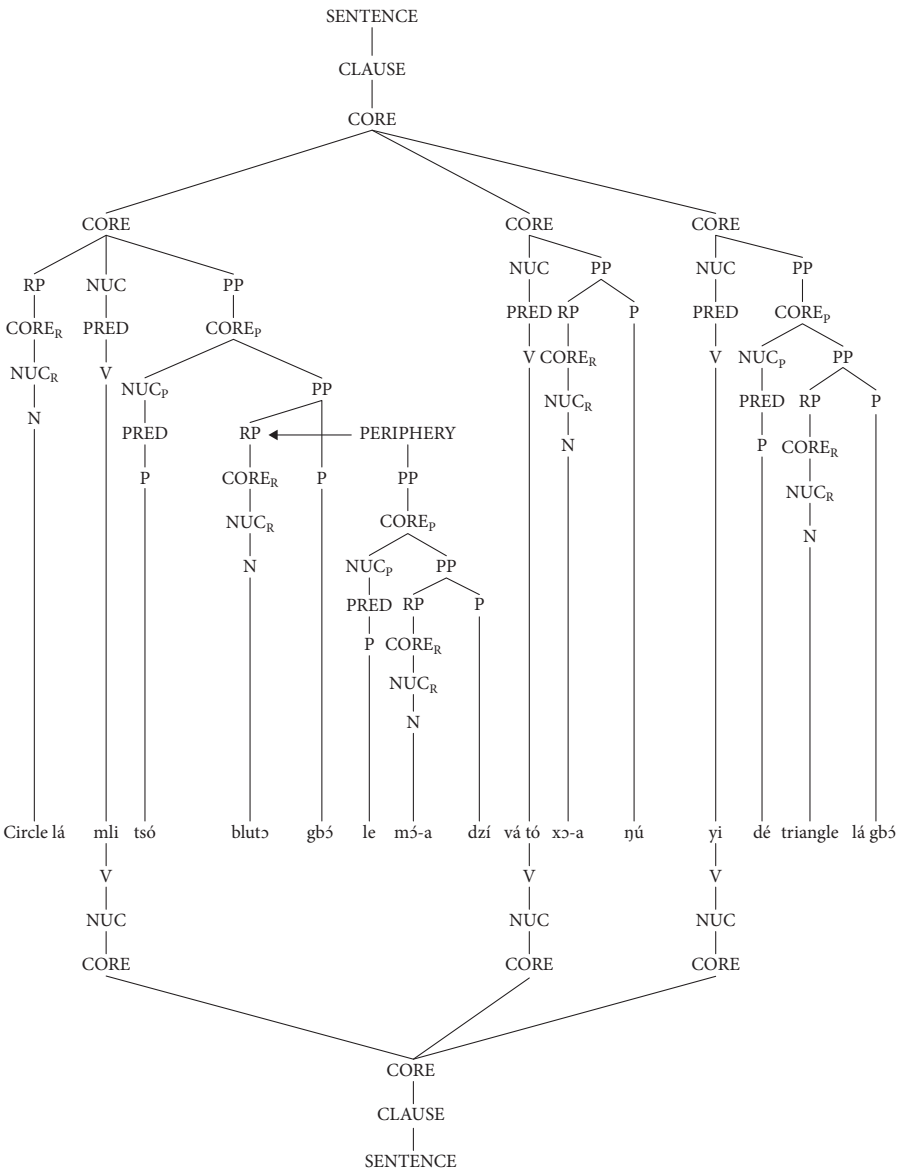


**Figure 15.** Core cosubordination in Ewe SVCs (LSC of (29))

## 6.3 Japanese: Converb constructions

Converbs are verb forms that encode syntactic and/or semantic relations between their units and those of other verbs. Typologists have restricted the notion to non-finite forms that encode adverbial relations (Nedjalkov & Nedjalkov 1987; Haspelmath & König 1995). We concede that this may be the crosslinguistic prototype, but we use the term more broadly here, since our concern is not the typology of converb constructions, but rather the question what the syntax of one language, Japanese, can teach us about the Core-MEP Hypothesis.

The most frequent and pervasive converb form of Japanese is the form in *-te*. *-Te* converbs are particularly interesting for our purposes because of their syntactic versatility: they occur with all juncture and nexus types (Hasegawa 1996). Nuclear junctures disallow any elements occurring between the verbs. In core juncture, the *-te* core is either itself an argument of the finite core or obligatorily shares an argument with it; see Section 7 on the role of argument sharing in core junctures. In clausal junctures, there is no obligatory shared argument and each unit has the possible constituents of whole clauses.

Nuclear junctures necessarily have the MEP, since they project single simple core nodes. We therefore ignore them here. Clausal junctures (as opposed to core junctures) with *-te* are invariably cosubordinations: at least one clause-level operator, illocutionary force, appears to always have scope over both the matrix and the *-te*-clause (Hasegawa 1996: 180–181). Thus, in (40), the speaker is understood to order the addressee to carry out both the matrix clause action of going home and the *-te*-clause action of finishing work quickly:

(40) Hayaku sigotu-o sumase-te, uti-ni kaeri-nasai.
quickly work-ACC finish-CNV home-LOC eturn-IMP
'Finish work quickly and go home!' (Hasegawa 1996: 181)

However, two-clause constructions are generally independent in terms of their temporal reference and thus lack the MEP. This is illustrated in (41) and (42):

(41) Maki-wa kinoo Oosaka-e it-te, Hiro-wa asita
Maki-TOP yesterday Osaka-ALL go-CNV Hiro-TOP tomorrow
Oosaka-kara kaet-te ku-ru.
Osaka-ABL return-CNV come-PRES
'Maki went to Osaka yesterday, and Hiro will return from Osaka tomorrow.'
(Hasegawa 1996: 180–181)

(42) Sono onna-no hito-ga Tokyo-ni tui-te
that female-GEN person-NOM Tokyo-LOC arrive-CNV
ituka-go-ni ookina jisin-ga oki-ta
five.days-after-LOC big earthquake-NOM happen-PAST
'The woman arrived in Tokyo and five days later there was a big earthquake.'
(Sotaro Kita p.c.)

Turning to core junctures with *-te*, these occur with all three nexus types. However, subordination of *-te*-marked cores is restricted to certain complement-taking predicates (Hasegawa 1996: 151–156).

In the following, we focus on those core junctures that are directly relevant for present purposes, core coordinations and core cosubordinations. What makes these two types of core junctures with *-te* simultaneously particularly interesting and particularly challenging for our purposes is that there is systematic syntactic ambiguity between them. The same set of surface strings is compatible with both coordinate and cosubordinate parses. However, strikingly, properties associated with cosubordinate parses – and only those – exclude the possibility of separate time-positional modifiers in the two cores.

To demonstrate this, we have to first establish a way to distinguish the two constructions. We achieve this by matching a semantic difference between two readings systematically associated with *-te* core junctures to a contrast between two sets of syntactic properties. The readings are illustrated in (43):

(43) Zyoon-ga teepu-o kii-te kankogugo-o benkyoo si-ta koto
Joan-NOM tapes-ACC listen-CNV Korean-ACC study do-PAST fact
a. 'the fact that Joan studied Korean by listening to tapes [core cosubordination]
b. 'the fact that Joan listened to tapes and studied Korean [core coordination]
(Hasegawa 1996: 168)[19]

We call interpretation (43a) the 'part-whole' interpretation. Under this reading, the *-te* core describes a proper subevent (Joan's listening to tapes) of the event described by the finite core (her studying Korean). In contrast, we designate (43b) the 'two-part' interpretation. This reading involves the two cores describing non-overlapping subevents of a larger event.

**19.** Hasegawa presents many of the examples as embedded clauses, in order to use *ga* to mark the subject, so that it is a core-internal argument. If the same clause were an independent clause, *wa* on the subject would be more felicitous, but in that case it would be in the left-detached position, as in (41) and (43), rather than in the core.

Following Hasegawa (1996: 156–175), we assume that the part-whole reading of *-te* core junctures reflects cosubordinate nexus. Hasegawa (1996: 175) lists as possible semantic relations between the two cores 'means' (as in (43a), 'location', 'material', 'manner', and 'measure'. Crosslinguistically, part-whole relations among events are the prototype of core cosubordinations. Typical manifestations include core junctures in which one core designates a phase, manner, means, or cause of the event described by the other (cf. Van Valin 2005: 183–224). However, core cosubordinations are not universally restricted to part-whole relations, as the 'plain' Ewe SVC discussed in the previous subsection illustrates.

In contrast, the two-part interpretations result from coordinate nexus in Hasegawa's analysis. Possible semantic relations between the events described by the two cores include 'sequence' (as in (43b), 'cause', 'reason', and 'concessive relation' according to Hasegawa (1996: 175).

To test the hypothesis that the part-whole readings reflect cosubordinate nexus and the two-part readings coordinate nexus, we require a structural diagnostic. As in the case of Ewe discussed above, the standard diagnostic – wide-scope interpretations of deontic modals with cosubordination vs. narrow-scope readings with coordination – is not applicable in Japanese, since deontic modality is expressed by complex sentences rather than operators (Hasegawa 1996: 150). As in the case of Ewe, we turn to adjuncts instead, based on the rationale that core cosubordination entails the existence of a single mother core with a single shared periphery, whereas cores in coordinate nexus should retain their separate peripheries. Consider (44), which has separate locatives in the two cores and in line with this excludes the part-whole interpretation:

(44) Heya-de Zyoon-ga teepu-o kii-te uchi-de kankokugo-o
room-in Joan-NOM tapes-ACC listen-CNV home-at Korean-ACC
benkyooshi-ta koto
study-PAST fact

a. #'The fact that Joan studied Korean at home by listening to tapes in her room'

b. 'The fact that Joan listened to tapes in her room and studied Korean at home' (M. Shimojo, p. c.)

Four of five native speakers that were consulted on this example preferred the two-part (here, sequential) reading (44b) (M. Shimojo, p. c.). The fifth speaker preferred the part-whole interpretation, but considered the sentence anomalous under this reading. There is no obvious semantic explanation for this asymmetry of readings, which is not present in (43). After all, studying tapes in one's room seems a perfectly sensible way of studying Korean at home. We believe that the difference in the distribution of readings between (43) and (44) can only be explained syntactically:

the presence of the two locative adjuncts in (44) inhibits a cosubordination parse. This in turn makes the part-whole (here, means) interpretation difficult to obtain.

We take the distribution of readings in (44) as evidence that the cosubordinate parse of (43), and of *-te* core junctures in general, is associated with the part-whole interpretation, whereas the coordinate parse of such examples is associated with the two-part interpretation. Next, we show that the presence of separate time-positional adverbials in the two cores likewise strongly favors a two-part interpretation:

(45) Asa Zyoon-ga teepu-o kii-te kinoo kankogugo-o
morning Joan-NOM tapes-ACC listen-CNV yesterday Korean-ACC
benkyoo si-ta koto
study do-PAST fact

a. #'The fact that Joan studied Korean yesterday by listening to tapes in the morning' [cosubordinate]
b. 'The fact that Joan studied Korean yesterday and listened to tapes in the morning' [coordinate] (M. Shimojo, p. c.)

The two parses we propose for the sentence corresponding to (45) (i.e., (45) without the subordinating *koto*) are diagrammed in Figure 16 and Figure 17 below. Just as in (44), the presence of the two adverbials does not semantically exclude the possibility of the part-whole interpretation in (45a). Such an interpretation would require the morning referred to by *asa* to be a part of the day referred to by *kinoo* 'yesterday'. Nevertheless, three out of five speakers found the two-part interpretation of (45) to be the most salient, while two other speakers preferred the part-whole interpretation, but at the same time considered the sentence anomalous under this interpretation.[20] We believe that the semantic anomaly of (45) under the part-whole interpretation, and thus also the preference a majority of the speakers asked showed for the two-part interpretation, is the result of the part-whole interpretation being associated with the cosubordinate parse of (45). Under this parse, (45) has the MEP and the presence of the multiple time adverbials thus produces semantic anomaly. Put differently, we take our consultants' judgments of (45) to be evidence that the cosubordinate parse of (45) has the MEP, as predicted by the Preservation-under-Cosubordination Hypothesis.

The examples in (46) and (47) further support the lack of the MEP parses with two-part readings (i.e., by our hypothesis, coordinate parses). The presence

**20.** One consultant noted that the part-whole (means) interpretation can be forced in context by prefacing (45) with something like 'Joan studies Korean in various ways everyday'.

of the separate time adverbials in the constituent cores demonstrates the absence of the MEP.

(46) Otooto-wa daigakusee de kodomo-no toki
younger.brother-TOP college.student COP.CNV child-GEN time
yoku kenka si-te uindo-saahuin-ga suki de kyonen
often quarrel do-CNV wind-surfing-NOM fond.of COP.CNV last.year
itaria e it-te
Italy-ALL go-CNV
'My younger brother is a college student and quarreled a lot when (he was) a child and likes wind-surfing and went to Italy last year and…'
(Hasegawa 1996: 163)

(47) zyoon-ga kyonen tukaikomi-o si-te kinoo kubi ni natta koto
Joan-NOM last.year embezzlement-ACC do-CNV yesterday got.fired fact
'the fact that Joan embezzled last year and got fired yesterday'.
(Y. Hasegawa, p. c.)

Similarly, the examples in (48) and (49) underscore the presence of the MEP in parses with part-whole interpretations, which according to our analysis exhibit cosubordinate nexus. Note the incompatibility of the sentences with a time adverbial specifying the temporal distance between the two subevents, in accordance with the MEP:

(48) Onna-no hito-ga osara-o teeburu-ni tataki-tuke-te
female-GEN person-NOM dish-ACC table-LOC hit+attach-CNV
(*go-hun-go-ni) wat-ta.
five-minute-later-LOC break-PAST
'The woman broke the dish (*five minutes later [i.e., after smashing it]) by smashing it against the table.'

(49) Onna-no hito-ga hanmaa-o tosi-te
female-GEN person-NOM hammer-ACC drop-CNV
(*go-hun-go-ni) sara-o wat-ta.
five+minute+later-LOC dish-ACC break-PAST
'The woman broke the dish (*five minutes later [i.e., after dropping the hammer]) by dropping a hammer.' (Bohnemeyer et al. 2010: 61)

The two parses of (45), with disambiguating temporal adverbs added, are diagramed in Figure 16 and Figure 17 below.

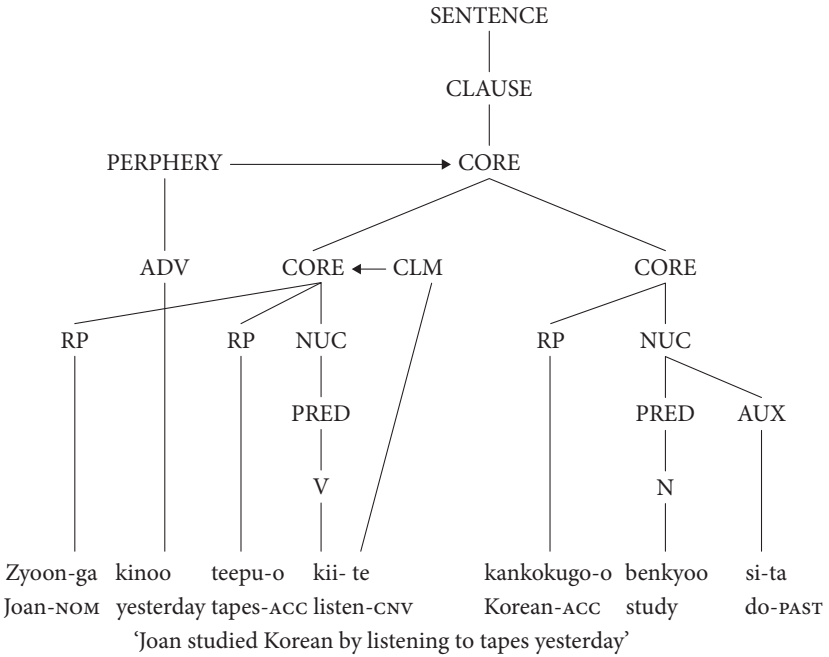


**Figure 16.** Core cosubordination with *-te* converb (LSC of (45a) minus the subordinating *koto*; cf. fn18)

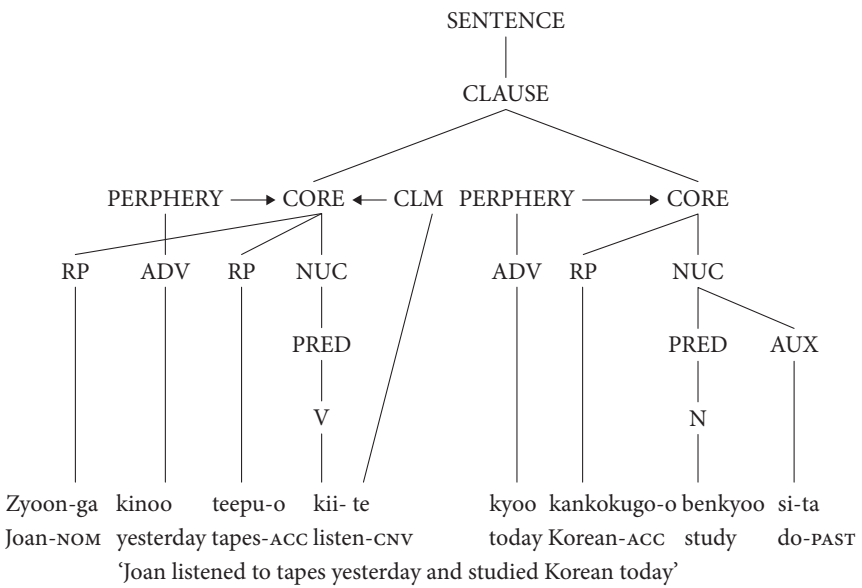


**Figure 17.** Core coordination with *-te* converb (LSC of (45b) minus the subordinating *koto*; cf. fn18)

One further piece of corroborating evidence for the above analysis comes from the behavior of *-te* junctures vis-à-vis negation. Hasegawa (1996: 172) shows that there is a negative morpheme, *naku-te*, which has core scope and which can be used to distinguish cosubordination from coordination. It contrasts with the negative *nai-de*, which has nuclear scope. Adding *naku-te* to the second core creates a scope ambiguity that differentiates between the two parses, as shown in (50), with the cosubordinate parse represented in (50a) and the coordinate one in (50b). Since the two cores in the cosubordinate structure form a single complex core, it is the complex core that is negated by *naku-te*, as in (50a). On the other hand, in the coordinate structure, each core is independent with respect to core-level operators, and therefore the scope of *naku-te* is limited to the core in which it occurs, as in (50b).

(50) Zyoon-ga teepu-o kii-te kankokugo-o benkyoo
Joan-NOM tapes-ACC listen-CNV Korean-ACC study

si-nakat-ta koto
do-NEG$_{CORE}$-PAST fact

a. 'the fact that it is not the case that Joan studied Korean by listening to tapes'

a′. [$_{CORE}$ [$_{CORE}$ Zyoon-ga teepu-o kii-te ] [$_{CORE}$ kankokugo-o benkyoo si]]-nakat- [core cosubordination]

b. 'the fact that Joan listened to tapes and didn't study Korean'

b′. [$_{CORE}$ Zyoon-ga teepu-o kii-te ] [$_{CORE}$ kankokugo-o benkyoo si]-nakat- [core coordination]

The fact that *naku-te* has core scope predicts that if the lexical items in the string make a part-whole interpretation implausible and thereby exclude a cosubordinate parse, only the narrow scope interpretation of *naku-te* is available. As (51) shows, this prediction is borne out:

(51) Zyoon-ga terebi-o mi-te ohuro-ni haira-nakat-ta koto
Joan-NOM television-ACC watch-CNV bath-LOC enter-NEG$_{CORE}$-PAST fact

a. ?'the fact that it is not the case that Joan took a bath by watching TV'

a′. [$_{CORE}$ [$_{CORE}$ Zyoon-ga terebi-o mi-te] [$_{CORE}$ ohuro-ni haira]]-nakat- [core cosubordination]

b. 'the fact that Joan watched TV and didn't take a bath'

b′. [$_{CORE}$ Zyoon-ga terebi-o mi-te] [$_{CORE}$ ohuro-ni haira]-nakat- [core coordination]

What (51) shows is that a wide-scope interpretation of *naku-te* is difficult to obtain (51a), whereas a narrow-scope interpretation is readily available (51b). This is straightforwardly explained by the lexical material of the sentence, which makes

the part-whole interpretation implausible (outside a scenario in which Joan has a bath routine that involves watching TV). Since *naku-te* takes core scope, the restriction to the narrow-scope reading suggests a core coordination analysis – under Cosubordinate nexus, *naku-te* should take scope over the higher core, i.e., wide scope. Thus, the limitation of the interpretation of (51) to the narrow-scope reading of *naku-te* and the co-occurrence of this reading with solely the two-part interpretation support the analysis that the part-whole semantics is associated with core cosubordination parses of *-te* constructions, whereas the two-part interpretation is associated with core coordination parses.

To summarize, *-te* converbs are common in both core cosubordinations and core coordinations. Except for lexical semantics and world knowledge, strings that allow one kind of parse generally also allow the other. However, the two syntactic structures are associated with different semantic interpretations: under cosubordination, the *-te* core describes a subevent of the matrix core event, whereas under coordination, the two cores describe distinct events. In line with the Core-MEP hypothesis, if each core contains a time-locational adverbial, the subevent interpretation – and by the same token, the cosubordination analysis – is unavailable. Similarly, negation can scope over both cores together under cosubordination only, and this again requires the subevent interpretation. Both sources of evidence confirm the systematic association between core cosubordination and the macro-event property.

## 6.4 Interim summary

In the previous three sections we have looked at multi-core constructions in English, Ewe and Japanese. We have specifically considered structures that are compatible with multiple nexus types, and argued that in all cases the core junctures with the MEP involve cosubordination. In this linkage type the constituent cores are tightly bound under a dominating core node, which can be modified by only one periphery containing at most one temporal position modifier. In subordination and coordination, on the other hand, the linkage between the cores is looser, permitting independent temporal positional modifiers for each core, which mean that the multi-core construction as a whole lacks the MEP; however, each of the constituent cores has it, unlike the constituent cores in the cosubordinate linkage.

## 7. Linking properties of multi-core constructions

In this section, we briefly examine the linking properties of macro-event expressions. We consider first a hypothetical general constraint on semantic role assignment in macro-event expressions, the **unique assignment constraint**, and then turn our attention toward argument realization properties of multi-core constructions with the MEP, focusing on obligatory control constructions. Argument sharing, expressed predominantly if not exclusively through obligatory control, appears to be a necessary (albeit not sufficient) property of multi-core macro-event expressions – that is, of core cosubordinations.

Bohnemeyer et al. (2007: 517–519) hypothesize that the well-known constraint on the unique assignment of semantic roles, known under labels such as Bresnan's (1980) 'biuniqueness condition' and Chomsky's (1981) 'theta-criterion', obtains neither for clauses *per se* nor for verb phrases *per se*, but specifically for expressions that have the MEP. For illustration, in Ewe, simple serial verb constructions (SVCs), which have the MEP, do not permit multiple assignments of the goal role (52), whereas directional SVCs, which lack it, do permit such assignments (53).

(52) ??Kofi vá afí sia gé dé a*f*é-á me.
[[[Kofi come place this]$_{\text{CORE}}$ [drop ALL house-DEF in]$_{\text{CORE}}$]$_{\text{CORE}}$]$_{\text{CLAUSE}}$
'Kofi came here entered the house.'

(53) Kofi vá afí sia hé gé dé a*f*é-á me.
[[Kofi come place this]$_{\text{CORE}}$ [ITI drop ALL house-DEF in]$_{\text{CORE}}$]$_{\text{CLAUSE}}$
'Kofi came here entered the house.' (Bohnemeyer et al. 2007: 518)

In the following, we reconsider the proposed constraint first for single-core constructions and then for multi-core ones. Combined with the Core-MEP Hypothesis, the unique assignment constraint entails that roles are necessarily assigned uniquely in core cosubordinations, but not necessarily in other multi-core constructions. The examples in (52)–(53) seem to support this idea. However, before we can test whether this is so, the formulation of the unique assignment constraint requires several clarifications, which we introduce by considering single-core expressions first.

Two questions that are closely related with one another and both of which need to be addressed before the unique assignment constraint can be formulated in a meaningful way are the level of granularity at which the constraint is assumed to hold (lexeme-specific roles; role types defined in terms of purely semantic properties, such as 'agent' and 'theme'; or super-types defined in terms of linking properties, such as the macroroles of RRG) and the inventory of roles for which it is assumed to hold. For instance, the LS decompositions of RRG employ a sparse

set of role types and may assign a role multiple times even within a single simple core, as illustrated in (54):

(54) a. John sliced the bread with a knife.
b. [**do′** (John, Ø)] [CAUSE [**do′** (knife, Ø)] CAUSE [BECOME **sliced′** (bread)]]

In RRG terms, both *John* and *the knife* are effectors in (54a), but due to differences in animacy and their positions in the causal chain, they get different interpretations.

As it turns out, the problem posed by examples such as (54) ties in with a systematic exception to the unique assignment constraint that appears to hold independently of whatever assumptions one makes about semantic roles: causees in causative constructions commonly violate the constraint. A case in point is the Yucatec causative constructions with *mèet* 'make', 'do' (see Bohnemeyer 2009: 203–204). Example (55) shows that this construction has the MEP, despite both *Juanita* and *Pedro* receiving an agent or effector role:

(55) *Juanita=e' byèernes-ak=e' t-u=mèet-ah
Juanita=TOP Friday-CAL=TOP PRFV-A3=make-CMP(B3SG)
u=mìis-t-ik u=nah-il Pedro sàabado
A3=broom-APP-INC(B3SG) A3=house-REL Pedro Saturday
'Juanita, last Friday, she made Pedro sweep her/his house on Saturday'

One might wonder whether the apparent violation of unique assignment in (55) is due to the causee being coreferential with the theme/patient of the matrix verb. This is not so. As (56) illustrates, if the second verb is transitive, it may appear in the passive voice with the causee being linked to an oblique agent phrase. If both causee and affectee are human, the passive is in fact preferred, as the comparison between (56a) and (56b) shows:

(56) Pedro=e' t-u=mèet-ah …
Pedro=TOP PRFV-A3=make-CMP(B3SG)
a. … ʔu=ts'ak-ik le=pàal le=doktòor=o'.
A3=cure-INC(B3.SG) DEF=child DEF=doctor=D2
'Pedro, he made the doctor cure the child.'
b. … u=ts'a'k-al le=pàal tumèen le=doktòor=o'.
A3=cure\PASS-INC DEF=child CAUSE DEF=doctor]=D2
'Pedro made the child be cured by the doctor).'

The challenges to the unique assignment constraint posed by (54) and (55)–(56) share two properties: (i) in both cases, they concern multiple assignments of an effector role within a single macro-event expression; and (ii) in both cases, the

two effectors differ in their place in the causal chain. One conceivable solution is a restatement of the unique assignment constraint that effectively treats roles that are tied to (i.e., entailed by descriptions of) causally related subevents as distinct roles. Intuitively, this makes some sense: if a macro-event expression entails a causal chain of a given internal structure, one should expect every role that derives from that structure to be uniquely assignable. Instruments and causees are unique roles. They may be effectors of sorts, but they differ from other effectors precisely in that they occupy by definition intermediate positions in the causal chain. A possible formal statement of this idea is attempted in (57):

(57) **Unique Role Assignment Constraint:** For every construction C that encodes a (Neo-) Davidsonian event description $\exists e.P(e)$ ('There is an event *e* of type/property *P*') and has the MEP, the following holds:

$$\forall \mathrm{RP_m}, \mathrm{RP_n}.\ (\mathrm{RP_m} \ll_{\mathrm{ic}} \mathrm{C} \,\&\, \mathrm{RP_n} \ll_{\mathrm{ic}} \mathrm{C} \,\&\, \exists e_m, e_n.\ e_m \ll_{\mathrm{e}} e \,\&\, e_n \ll_{\mathrm{e}} e \,\&\, \theta_{\mathrm{m}}([\![\mathrm{RP_m}]\!]^c, e_m) = \theta_{\mathrm{n}}([\![\mathrm{RP_n}]\!]^c, e_n)) \rightarrow (e_m \propto e_n \vee e_n \propto e_m))$$

The formula in (57) says that for all reference phrases $\mathrm{RP_m}$, $\mathrm{RP_n}$ that are immediate constituents of C (marked by an immediate constituent relation $\ll_{\mathrm{ic}}$), if there are corresponding proper subevents $e_m$, $e_n$ of $e$ ($\exists e_m, e_n.\ e_m \ll_{\mathrm{e}} e \,\&\, e_n \ll_{\mathrm{e}} e$) such that the referent of $\mathrm{RP_m}$ in context c ($[\![\mathrm{RP_m}]\!]^c$) stands in the same thematic relation to $e_m$ as the referent of $\mathrm{RP_n}$ does to $e_n$ ($\theta_{\mathrm{m}}([\![\mathrm{RP_m}]\!]^c, e_m) = \theta_{\mathrm{n}}([\![\mathrm{RP_n}]\!]^c, e_n)$), then the subevents $e_m$and $e_n$ must be causally related, i.e., either $e_m$ causes $e_n$ ($e_m \propto e_n$) or $e_n$ causes $e_m$ ($e_n \propto e_m$). In other words, for every pair of constituent RPs of C, if there is a pair of subevents of *e* such that the referents of the two RPs stand in the same thematic relation to these two subevents, then there must be a causal relation between these subevents.

The statement in (57) solves both challenges to the unique assignment constraint discussed above. It solves the problem of instruments and causees in macro-event expressions – which may for all intents and purposes have the same roles as the causer – by explicitly allowing arguments projected within a macro-event expression from causally related subevents to stand in identical thematic relations while excluding role identity (and thus requiring unique assignment) for all other subevents/participants. And it solves the problem of the potential dependence of the validity of the constraint on the level of granularity of role assignment and the presumed underlying classification of roles by stating the constraint for arbitrary semantic roles, using a generic role variable θ and the Neo-Davidsonian approach to semantic roles as predicates over the event variable developed in Parsons 1990.[21]

21. In Parsons' format, the (untensed) event description expressed by *Floyd ate the cake* could be represented as $\exists e.eat'(e)$ & *agent(floyd', e)* & *patient(cake', e)* 'There is an event *e* such that *e* is an eating event, *Floyd* is the agent of *e*, and *the cake* is the patient of *e*'.

Bohnemeyer et al. (2007) – who attempt no formal statement of the unique assignment constraint – assume without discussion that role assignment in macro-event expressions is *bi*-unique, i.e., not only can no more than one role of any one role type be assigned within a well-formed macro-event expression, but there are also no expressions of semantic arguments that are assigned multiple roles at the same time. In contrast, the formulation in (57) treats role assignment in terms of relations between subevents and the referents of syntactic arguments (RP). It does not assume a function that maps every argument referent into a unique role. The question of constraints on the mapping from arguments to roles awaits further research.

Another syntax-semantics mapping constraint on macro-event expressions proposed in Bohnemeyer et al. (2007) is the 'Referential Uniqueness Constraint'. According to this principle, macro-event expressions that contain multiple references to the same reference entity or 'ground' (Talmy 2000) are dispreferred. This is illustrated by the examples in (58):

(58) a. #Sally went out of [the tunnel]$_i$ in(to [the tunnel]$_i$/it$_i$).
b. Sally went out of the first tunnel into the second (tunnel).
c. Sally went out of the tunnel and (back) in (again).
d. Sally went out of the tunnel at 12:05 and (back) in (again) at 12:06.

A comparison between (58a) and (58b) makes it clear that the problem with (58a) is the coreferentiality of the two ground phrases. Coordination remedies the problem (58c), because it lifts the MEP (58d). Cf. Bohnemeyer et al. (2007: 520–521) for Ewe and Japanese examples.

Bohnemeyer et al. (2007) point out that the Referential Uniqueness Constraint bears a resemblance to the principle barring any two referring expressions from coreferentiality within a certain domain unless the second of them is a reflexive or reciprocal pro-form (e.g., Principles B and C of Chomsky's 1981 Binding Theory). We would now like to propose that a generalized version of the Referential Uniqueness Constraint, as in (59) below, can not only provide a unified account of phenomena such as those in (58) and the exclusion of coreferentiality of non-reflexive-marked referring expressions within the relevant domain, but can also explain the pervasive occurrence of syntactic control in core cosubordinations.[22] This predicts that the proper domain on which all of these principles operate is the domain of macro-event expression – in other words, the core.

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**22.** Of course, we are not the first to notice the close similarity between control and reflexive/reciprocal binding; cf., e.g., Levinson (1987: 417–421); Jackendoff (1990: 59–70).

(59) **Referential uniqueness constraint (RUC):** For every construction C that encodes a (Neo-) Davidsonian event description $\exists e.P(e)$ ('There is an event $e$ of type/property $P$') and has the MEP, the following holds:

$\forall RP_m, RP_n.\ (RP_m \ll_{ic} C \ \&\ RP_n \ll_{ic} C \ \&\ \exists e_m, e_n.\ e_m \ll_e e \ \&\ e_n \ll_e e$
$\&\ \exists \theta_m.\theta_m([\![RP_m]\!]^c, e_m) \ \&\ \exists \theta_n.\theta_n([\![RP_n]\!]^c, e_n)) \rightarrow [\![RP_m]\!]^c \neq [\![RP_n]\!]^c)$

This requires distinct referring expressions $RP_m$ and $RP_n$ to have distinct referents ($[\![RP_m]\!]^c \neq [\![RP_n]\!]^c$) provided they are thematically related to subevents of $e$.[23]

Syntactic control is a phenomenon whereby a semantic argument of one projection – the 'target' – is barred from realization by its own RP under identity with an RP of a distinct projection, the 'controller'. Instead, the target is realized by a gap with a bound-variable interpretation. As (60) illustrates, the roles of the two arguments may (a), but need not (b), be identical. The construction involves core cosubordination, as both cores are necessarily within the scope of the modal verb in (c), and it has the MEP, as the two cores do not permit independent time adverbials (d). Thus, the omission of the target of control saves (60a) from running afoul of the RUC.

(60) a. Sally tried to walk.
a′. **do′** (Sally, [**try′** ($Sally_i$, [**do′** ($x_i$, [**walk′** ($x_i$)])])])
b. Sally tried to understand.
b′. **do′** (Sally, [**try′** ($Sally_i$, [**understand′** ($x_i$, Ø)])])
c. Sally must try to walk/understand.
d. Sally tried (*at noon) to walk/understand at teatime.

The occurrence of control in complementation constructions such as those in (60) is licensed by the lexical argument structure of the matrix predicate (cf. Foley & Van Valin (1984: 309); Jackendoff (1990: 68–70); Van Valin & LaPolla (1997: 540–544); Van Valin (2005: 241–243)). By way of illustration, the linking from semantics to syntax in (60a) is represented in Figure 18. The relevant semantic role of the core that dominates the target is assigned to the bound variable. Because the role is assigned to a variable rather than to an RP referent, control constructions do not violate the Unique Role Assignment constraint in (57) even if they involve multiple assignments of the same role. For the same reason, such constructions are also in line with the Referential Uniqueness Constraint in (59).

23. The condition requiring thematic relations vis-à-vis subevents accounts for the fact that possessive pronouns are excluded from the RUC. They for example freely co-occur with antecedents in the same clause (e.g., *Sally tied her(*self) shoes*).

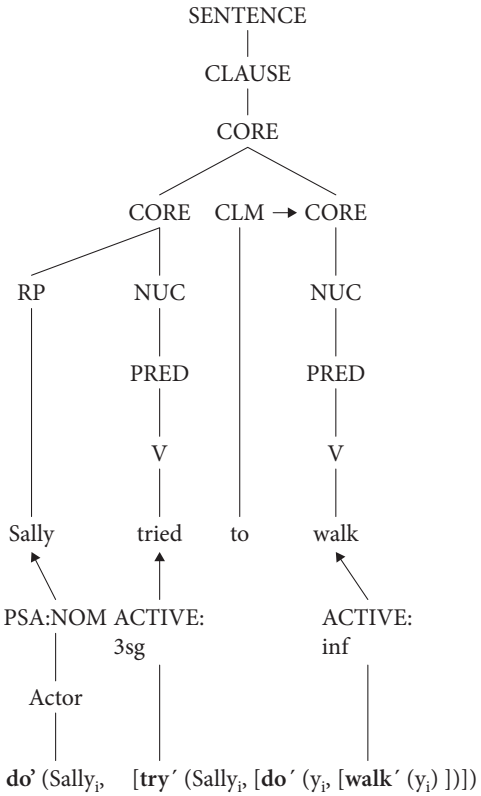


**Figure 18.** Linking from semantics to syntax in (60a)

But control is not restricted to complement-taking predicates. The plain Ewe SVC exemplified in (44) above – repeated in (61) for convenience – illustrates obligatory control under core cosubordination, while the directional SVC construction in (36) above, repeated in (62), is an example of obligatory control with core coordination. (Recall that the admissibility of the separate locative adjuncts in (62) indicates separate core peripheries and thus coordination, whereas the inadmissibility of separate locatives in (61) suggests a shared periphery and thus core cosubordination.) In both constructions, the subject of the non-initial verb is obligatorily omitted.

(61) É-ɖa nu le dzoddo*f*e ɖu (*le xexe)
3SG-cook thing LOC kitchen eat LOC outside
'He cooked in the kitchen and ate (*outside).'

(62) É-ɖa nu le dzodo*f*e he va ɖu le xexe.
3SG-cook food LOC kitchen DIR DIR eat LOC outside
'He cooked in the kitchen and ate outside.'

Whether they are licensed by complement-taking predicates or the syntax of complex constructions (such as the SVCs above), the proper domain in which control phenomena occur is that of core junctures. Japanese *-te*-converb constructions involve control in core junctures (cf. (43)–(50) above), but not in clause-layer junctures (cf. (41)–(42)) (Hasegawa (1996: 10–12; 176–180) and the literature cited therein). For convenience, (42) (clause-layer) is repeated in (63) and (45) (core-layer) in (64):

(63) Sono onna-no hito-ga Tokyo-ni tui-te
that female-GEN person-NOM Tokyo-LOC arrive-CNV
ituka-go-ni ookina jisin-ga oki-ta
five.days-after-LOC big earthquake-NOM happen-PAST
'The woman arrived in Tokyo and five days later there was a big earthquake.'
(Sotaro Kita p.c.)

(64) Onna-no hito-ga$_i$ osara-o teeburu-ni tataki-tuke-te
female-GEN person-NOM dish-ACC table-LOC hit+attach-CNV
(*go-hun-go-ni) ∅$_i$ wat-ta.
five-minute-later-LOC break-PAST
'The woman broke the dish (*five minutes later [i.e., after smashing it]) by smashing it against the table.'

The subjects are underlined for convenience. Note that since Japanese is a verb-final language and control is strictly anaphoric, the target of control occurs in the matrix clause, in reversal of the pattern in English complementation constructions.

The following examples illustrate a similar distribution for English complementation constructions:

(65) a. Sally$_i$ regretted (her$_{i/j}$) slapping Floyd.
b. Sally$_i$ regretted that (*/she$_{i/j}$) had slapped Floyd.

(66) a. Floyd$_i$ tried ∅$_i$ to close the door.
b. Floyd$_i$ wished that (*/he$_{i/j}$) was able to close the door.

(67) a. Harriet persuaded Sally$_i$ ∅$_i$ to leave.
b. Floyd$_i$ suggested to Sally that (*/she) leave.

(68) a. Floyd seemed to be annoyed.
b. Sally assumed Floyd to be annoyed.
c. Sally assumed that (*/Floyd) was annoyed.

Finite *that* complements, as in (67b) and (68c), exclude control and instantiate clause-layer juncture. Gerundial complements exhibit optional control; in (65a), the gerund is subordinate (compare (8) above). Infinitival complements lack overt

subjects. Their subjects are either control targets, as in (66a) and (67a), or the corresponding semantic role is linked to a matrix argument, as in (68a–b). The result is a core juncture, which is coordinate in the matrix-coding (or 'raising') cases and in (67a) and cosubordinate in (66a) (cf. §6.1).

Two tentative generalizations emerge:

(69) Juncture, nexus, and control:

i. Obligatory control is restricted to non-subordinate core junctures.
ii. Core cosubordination, but not core coordination, necessarily involves obligatory control.

The first of these was originally proposed in Foley & Van Valin (1984: 304). The key observation underlying (69ii) is that there are instances of core coordination that lack control, such as the matrix coding constructions in (68a–b).

The RUC as stated in (59) correctly predicts that coreferential RPs are dispreferred in core cosubordinations, given that core cosubordination entails the MEP. This explains part of (69). The aspects of (69) it does not explain are the following:

– The syntactic properties of control – in particular, the restriction of the target to a 'privileged syntactic argument' such as the subject in English (cf. Cutrer 1993; Foley & Van Valin 1984: 304–314, Van Valin & LaPolla 1997: 540–560; Van Valin 2005: 94–101, 241–250);
– The pervasive occurrence of control in core coordinations, which generally lack the MEP.

The MEP – and hence cosubordination – is thus a sufficient but not a necessary condition of control.[24,25]

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**24.** Future research will have to probe the conditions that explain the occurrence of control in core coordinations. Our assumption is that this distribution is the result of the necessary structural similarity between these two types of non-subordinate core junctures. In English, for example, this similarity manifests itself in both types employing infinitives. Since these do not license subjects, they are restricted to control and matrix coding constructions.

**25.** Tying binding and control phenomena to constraints on macro-event expressions is not incompatible with a pragmatic account of these phenomena as proposed in Levinson (1987; 2000: 261–365) and references therein. It is our hypothesis that the constraints on macro-event expressions are ultimately rooted in a preference for isomorphic form-meaning mapping at the syntax-semantics interface, and Gricean conversational principles generate precisely such preferred isomorphic mappings between forms and interpretations. What the account we have sketched here adds that a pragmatic deconstruction cannot explain by itself is that the presence vs. absence of the MEP in a construction predicts whether or not the construction exhibits the relevant binding phenomena.

## 8. Conclusion

In languages as typologically diverse as English, Ewe, Japanese, and Yucatec, we have found the core layer to align with the Macro-Event Property (MEP), which has been identified as a typologically significant form-meaning mapping property in previous research (Bohnemeyer 2003; Bohnemeyer et al. 2007, 2010). We have shown that in these languages, simple cores have the MEP, whereas complex cores have it exclusively under cosubordinate nexus, but neither under coordination nor under subordination. Far from being a coincidence, this alignment derives directly from the definitional semantic properties of the core layer: verbal cores express event predicates and their non-eventive syntactic arguments and open up a single periphery for modification. This means there is a unique position for a single (though internally potentially complex) time-positional modifier in each core – and restriction to a single time-positional modifier is the key diagnostic of the MEP. Multiple cores means multiple time-positional modifiers, unless the cores share a single periphery, as they do by definition under cosubordinate nexus. Given how directly the alignment between the core layer and the MEP follows from the architecture of the Layered Structure of the Clause (LSC), we predict it to hold universally.

As a model for describing and theorizing about morphosyntactic structure, RRG distinguishes itself from its competitors by recognizing a basic inventory of structure types that is language-independent because its elements are defined and identified partly with reference to form-meaning mapping properties. We are therefore not surprised by the finding that the LSC includes a structural layer that comes closer to instantiating a "(macro-)event phrase" than any unit recognized in models of phrase structure grammar. It is our hope that the present study has shown once again the usefulness of semantically informed models of grammar for typological research. We see this usefulness nicely illustrated by an unexpected finding the study has produced beyond the insight in the general alignment between the core layer and the MEP: the relation between core cosubordination and obligatory argument sharing, or more narrowly, obligatory control. We have argued that this relation is partially motivated by a property of macro-event expressions suggested to hold across languages in Bohnemeyer et al. (2007): the assignment of semantic roles is unique within them, in that any given role type is assigned maximally once and to a single syntactic argument or oblique. The research presented above has led to a clarification of this constraint: it holds unless two instances of a single role type derive from subevents that stand in a causal relation. The apparent crosslinguistic validity of this constraint and of the other findings of this study points toward the same conclusion as the crosslinguistic validity and adequacy of the application of the LSC model: more than in terms of their grammars, lexicons, and even the meanings they express, the languages of the world resemble one another in terms of *how* given kinds of meanings are expressed – that is, in the relationship between (morphosyntactic and lexical) form and meaning.

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