The Event Domain

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1 Introduction

Perhaps the single most important result of generative grammar is the understanding that natural language representations are hierarchically structured. The traditional label V(erb) has, not surprisingly, proved inadequate for describing the full range of morphologies and behaviours of this 'part of speech' crosslinguistically, and the complex representations it participates in. The purpose of this short article is to review some of the motivations and evidence for this more complex understanding of the category 'verb' and to try to consolidate and unify the insights from various different domains. Much of the work in this area in the past 20 years has used the label 'little v' as the terminological place holder for the verb-specific functional category that hosts additional or decomposed grammatical information required in this domain. However, the choice of label is not crucial here. The questions are more generally cartographic, namely, what are the extra categories and projections that can and/or must appear in the phrase structure of the verb phrase, and in what order?

The focus of this article is the phrase structural representation of the lowest, most embedded portion of a natural language sentence— the part that contains intuitively the lexical verb and its arguments. My own starting point will be in some sense semantic, since I think that this part of the natural language representation corresponds to what I will call *the core event building domain*, and that it has both a syntactic and semantic integrity and unity within the sentence. My own work in this domain has been about capturing generalizations with respect to the semantics of participant relations, and tying them together with aktionsartal, or event structure typology. However, we want our theory to be able to capture generalizations in various other empirical areas as well. I divide these concerns into the three broad groups listed in (1) below.

(1) (i)Generalizations about the representations of event structure and (verbal) participant relations in the syntax.

(ii)Generalizations about the nature and ordering of morphemes in the verbal extended projection, both free and affixal.

(iii)Generalizations about domains— locality effects as diagnosed in the syntax and morphology.

These are all complex areas empirically, and sheer practical necessity has dictated that different research programmes have emphasized different aspects of (i)-(iii) above. For example, I take the seminal work of Kratzer (1996) to essentially be about capturing (iii), while Harley (1995) and subsequent work within Distributed Morphology to have been particularly influential in the attention they have paid to (ii). Ramchand (2008) on the other hand makes (i) most prominent. This is of course simplistic, since most work actually aims to account for all three classes of phenomena in some way,— the adoption of the little v label across frameworks and research programs is testimony to that ambition and optimism.

The paper is structured in the following way. First, I provide a brief summary and recap of my own work on (i), discussing the motivations that have led Ramchand (2008) to propose a particular categorial deconstruction of the notion of V(erb) in section (2). In section 3, I provide a brief summary of the generalizations in domains (ii) and (iii) that a complete theory should also be able to account for. Finally, I add some new data from the empirical ground of auxiliary constructions in English to demonstrate the difficulty in unifying the solutions across the three domains (section 4). The final section (section 5) is more theoretical and conceptual. I reassess the cartographic and constructivist enterprise and provide a discussion of how to evaluate the existence and universality of functional heads. I will argue that in order to make progress, we need to ground our functional heads semantically. From this perspective, I will conclude that our empirical evidence points clearly to a separation of the different functions often ascribed to 'little v'. To anticipate, I will argue that event structure decomposition and participant relational semantics must be clearly separated from argument externalization, but that they are in a clear 'feeding' relationship.

2 Argument Structure and Event Structure

As Levin and Rappaport Hovav (2005) discuss in their important review monograph on argument structure, it seems clear that what is needed to capture the relevant generalizations is some kind of structured representation, probably making core reference to notions of causation and embedding. (See also Ramchand 2013).
Quoting from Levin and Rappaport Hovav (2005)

> The survey of types of lexical semantic representations in this chapter and the preceding one has also revealed that the semantic notions which figure in argument realization are derived largely from the properties of events which verbs describe.
> Levin and Rappaport Hovav (2005), pg 75

> ...embedding relations among arguments in an event structure are always respected in argument realization, with more embedded arguments receiving less prominent syntactic realizations.
> Levin and Rappaport Hovav (2005), pg 183

If we now consider evidence from the classic semantic work on aktionsart (starting with Aristotle and Vendler 1967 and leading to Taylor 1977, Dowty 1979, Smith 1995 among others), another type of typology emerges. To summarize, there is much linguistic evidence for the four natural classes of event shape as laid out in (2) (taken from Truswell, to appear).

(2) a. Culminated processes(process + culmination) ≈ accomplishments (e.g.*run a mile*)
b. processes ≈ activities (e.g.*run*)
c. culminations ≈ achievements (e.g.*hiccup*)
d. (neither process nor culmination) ≈ states (e.g.*exist*)

If one looks at the diagnostics presented in the formal semantic contribution of Taylor (1977), it is clear that activities and states have something in common: they share the subinterval property, which is a mereological notion capturing the property that the predicate applies truthfully to arbitrary subintervals of the asserted interval.[1] The subinterval property pairs

[1]In the case of states, this is true down to the subinterval size corresponding to a moment, whereas for activities there is a granularity limit because of their dynamicity.

states with activities (making them analogous to mass terms and plurals respectively in the nominal domain) and distinguishes them crucially from achievements and accomplishments which fail the subinterval property (and are hence more analogous to singular count terms). However, the above analogy underplays the internal complexity of accomplishments, and underplays too the deep linguistic cut between dynamic activities and states (despite the fact that they have divisivity and cumulativity in common).

The reason that mereologies work so well for individuals, but are less satisfying for eventualities boils down to the fact that individuals can be distinguished and packaged using simple *material* part-whole relations which are rather easy to match up with real world intuitions of subparts. On the other hand, deciding when something counts as a subevent of another event is fraught with paradoxes and technical semantic difficulties and is most often thought to require inertial worlds or some such intensional machinery (Dowty 1979, Landman 1992). The source of this additional complexity is *the notions of intention and causation* that link parts of one event to another.

Another difference between material part-whole relationships and causational/intentional glue, is that the latter seems to create discrete and finite internal packaging. In principle, causational or force-dynamical relationships could potentially build extremely complex event chains from these building blocks, to create complex networks of interacting eventualities. However, when it comes to meanings that are lexicalized as single *monoclausal* verbal domains, the situation is interestingly constrained. There is strong linguistic evidence for causational complexity both upstream and downstream of the dynamic core of an event, as expressed within the lexical semantics of individual verbal items, *but only maximally one of each.* This is shown in the decomposition in (3), with relevant English exemplars:

(3) **Lexical Verbs in English Across Event Types**

	[+durative]	[−durative]
dynamic event	rise	blink
caused dynamic event	raise	hit
caused dynamic event with result	destroy	win
dynamic event with result	$\text{empty}_{intrans}$	$\text{break}_{intrans}$

Internal causational complexity is thus rather restricted. It is well known in the literature, that in the building of complex causatives, indirect causes give rise to causational expressions that are more likely to be biclausal and less likely to be 'lexical' or mono clausal (Shibatani 1973). With respect to the addition of result, the data also suggest that only one such delimitation per event is possible (Simpson 1983, Tenny 1994 on the unique delimitation condition). Thus, the typology we see can be created by augmenting the dynamic core event with either a causally upstream or causally downstream state, but no further.

(4) DYNAMIC EVENT: e_{dyn}
CAUSED DYNAMIC EVENT: $e_{cause} \rightarrow e_{dyn}$
DYNAMIC EVENT WITH RESULT: $e_{dyn} \rightarrow e_{result}$
CAUSED DYNAMIC EVENT WITH RESULT: $e_{cause} \rightarrow (e_{dyn} \rightarrow e_{result})$

Returning explicitly to the argument structure domain, there are robust generalizations here too, that cut across languages. Crudely, the asymmetry between Theme/Patient on the one hand and Agent/Causer on the other seems to be universal, with the latter being chosen as the 'subject' in preference to the former if both arguments are to be expressed. Conversely, Theme/Patients seem to be lower in the structure and more tightly related to the verb hierarchically than Agents are.

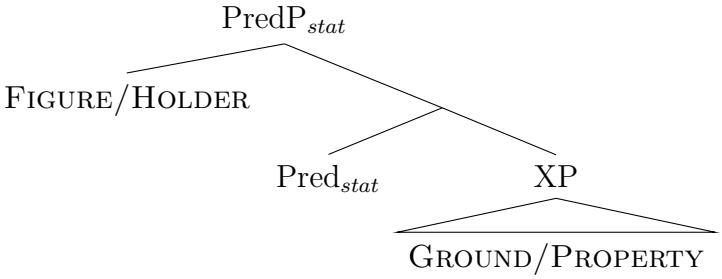
Also well known from the literature are generalizations that link up the internal argument with generalized notions of PATH, and the measuring out of the event (starting with Tenny 1987's Aspectual Interface Hypothesis and much subsequent work, such as Verkuyl 1972, Krifka 1989, Kratzer 2000, Zwarts 2006 to name a few). Since the lower portions of the event building domain are not my immediate concern here, I will simply refer the interested reader to this rich literature.

The point I wish to make here is that there is now substantial evidence showing (i) that argument positions related to causation are structurally high and in a privileged feeding relationship to formal subjecthood, and that (ii) arguments related to the undergoing of change are lower in the structure and are related to the boundedness of the event. In addition, in both cases, subevents and core event structure arguments seem to have an upper bound of 3. The aktionsartal and the purely thematic generalizations thus converge, a fact that

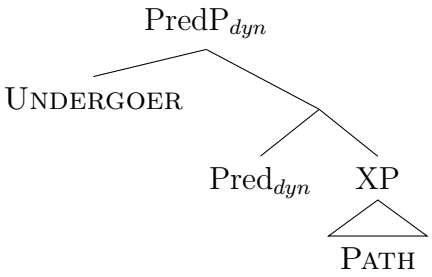
would be a conspiracy if both types of generalization did not actually flow from the same facts about the syntactic representation. This indeed is the major motivation behind the particular phrase structural proposal in Ramchand (2008). In what follows, I illustrate how those representations unify both classes of generalization.

First, we can conceive of verbal material as providing primitive eventuality descriptions. Suppose there are minimally two basic types of these: simple stative property predications over atomic individuals, and dynamic (changing property) predications over atomic individuals, corresponding to states and dynamic events respectively. The two types are schematized in (5) and (6) below. I have labelled the holder of a static property the HOLDER/FIGURE, and the holder of a changing property the UNDERGOER. The syntactic claim is that the structural position of specifier corresponds to the subject of predication with respect to the property described.

(5) **Static Property Predication**



(6) **Dynamic Property Predication (± continuous)**



Dynamic property predication is just a dynamized version of property-holding—- if a property can be predicated of an individual, then a *changing* property can also be predicated of an individual. This creates the UNDERGOER relation, and it has the same specifier complement structure that the stative predication above has, with the only difference that the predicational head here is dynamic. The complement of a static property description is the GROUND, which

the complement of a predicate of change is PATH.

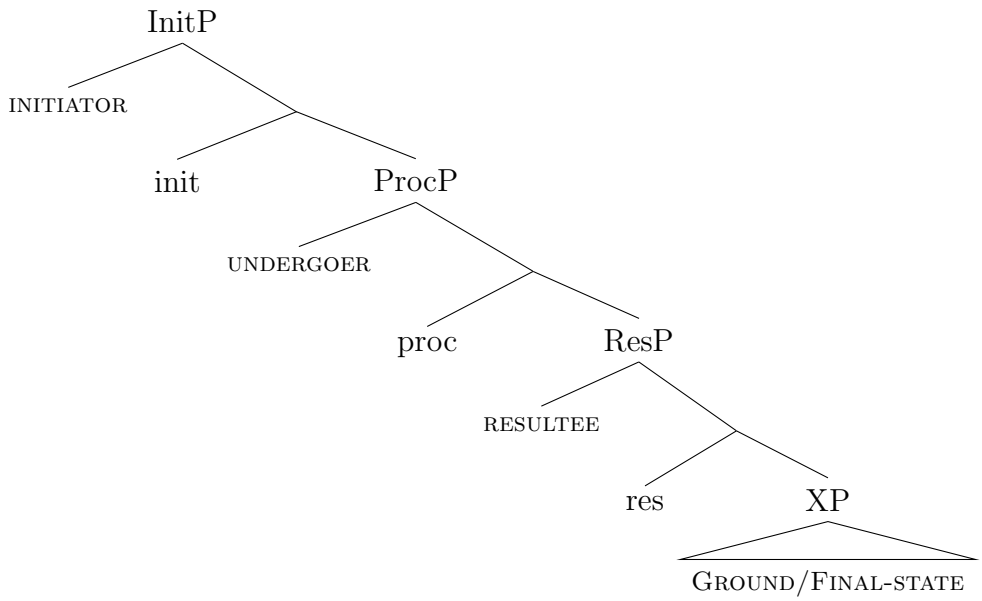
If we then compose dynamic and static property predication to model the augmentations justified by the linguistic typology in (4), then we automatically create an argument structure hierarchy with clear semantic entailments for each predicational position.

- *init*P introduces the causation event and licenses the external argument ('subject' of cause = INITIATOR)
- *proc*P specifies the nature of the change or process and licenses the entity undergoing change or process ('subject' of process = UNDERGOER)
- *res*P gives the 'telos' or 'result state' of the event and licenses the entity that comes to hold the result state ('subject' of result = RESULTEE) .

This is not a 'template' in a strict sense, just the expression of the full articulation of event structure that can be generated while still expressing the 'same' event.[2] In particular, for a dynamic eventuality, initP can be radically absent in this system, as can resP.

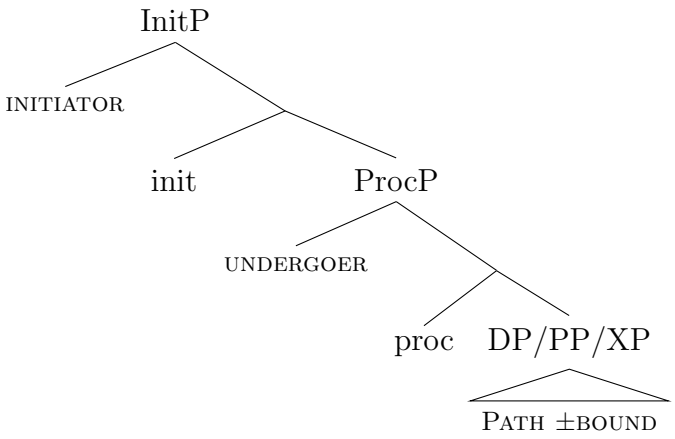
In (7) and (8), we see examples of the different structures that can be generated. If we add to these two, the corresponding versions where initP is absent, this set of structures is pretty much exhaustive.

(7) **Caused-Result Accomplishments and Achievements**



[2]As diagnosed by the impossibility of of distinct temporal modification, and the unity with respect to the argument domain.

(8) **Activities (Path −bound) and Accomplishments (Path +bound)**



An important aspect of this proposal is the claim that there is a general combinatorial semantics that interprets this syntactic structure in a regular and predictable way. Thus the semantics of event structure and event participants is read directly off the structure, and not directly off information encoded by lexical items. Causal embedding combined with *property predication* is the minimal semantic combinatoric glue derives theta role classification and their hierarchical relationships, as well as predicting the natural classes of event types that we find in English. This system unifies aktionsart and thematic role generalizations, and does so by using a very small number of primitives.

From this point of view, we have very strong motivation for decomposing the verb, even when a language shows no morphological internal complexity because it delivers the kind of structure that can be used to underpin the striking generalizations we find concerning argument structure hierarchies and event structure typologies across languages.

For later purposes, it is useful to highlight here that the outermost projection InitP proposed here is the one that bears closest resemblance to the projection that has been labelled little v in the literature. However, there are some important differences. In Ramchand (2008), there is no claim that InitP is obligatory; it does not provide the syntactic category of the verbal projection; it is not the locus for necessary information about Voice; it is not a phase head. InitP is defined here purely semantically/relationally as a stative property predication which is built upstream of a dynamic predication, and a nominal projection that is merged in its specifier automatically acquires the semantics of INITIATOR. I assume that the structural semantics contributed by the phrase structure unifies with the conceptual semantic content

provided by the root, and this fleshes out the meanings of the participant roles for particular verbs in richly detailed ways.[3]

3 Other Motivations for Functional Structure in the Verbal Domain

3.1 The Separability of the External Argument

The outer V of the VP shell introduced by Hale and Keyser (1993) and subsequent work is similar to the initP of Ramchand in that it augments both the event structure and the argument structure at the same time. However, the role of introducing the external argument can be logically distinguished from the event augmentation, and is the main focus of empirical observations in Marantz (1984) and the arguments in Kratzer (1996). Specifically, it has been argued that while internal arguments are semantically closely selected by the lexical verb in an idiosyncratic way, the external argument is freer and more constructional. Kratzer's VoiceP was proposed to do the job of introducing the external argument, and the event predicate that does so is simply *identified* with the event argument that Voice combines with; Voice does not do any causative augmentation in her proposal.

I agree with the hierarchical generalization which is one of the motivations behind this move, although I have argued that the internal argument has just as predictable and systematic a relationship to event structure as the external argument does. Be that as it may, the history of the Voice head is more closely tied to argument structure than to the internal topology of the events themselves.

The label chosen for this function is also telling. The choice between Active and Passive Voices for example makes reference to the abstract choice of 'subject' that is not correlated in an absolute fashion with thematic role.

(9) a. The police chased the thief. *Active Subject = Agent*

b. The thief was chased by the police. *Passive Subject = Theme*

[3]Unlike in Distributed Morphology (DM) I actually assume that verbal roots lexicalize different spans in the verbal extended projection, and so combine with the structural semantics in parallel to it, rather than in series (see Ramchand 2014 for discussion), but this is a separate issue.

But if the Voice head (and its different 'flavours' or versions) is supposed to track the kind of externalization that varies with traditional voice morphology, then it certainly cannot be equivalent to head labelled CAUSE, or INIT for that matter. Clearly, VoiceP is not the same thing as the highest head of the Ramchandian decomposition argued for in section 2.

3.2 Category Defining v

In DM, little v categorizes the root, which itself contains no category information (Harley 1995, Marantz 1997). However, it is also assumed, or at least hoped that it can do the semantic job of deriving event typology and introducing external arguments (Harley 1995). To do this, little v must come in flavours, with different features necessary to create the different typology of event types. The different flavours of little v as listed in Harley (2009) are shown below.

(10) a. v_{cause}: [+dynamic], [+change of state], [+cause]
b. v_{become}: [+dynamic], [+change of state], [−cause]
c. v_{do}: [+dynamic],[−change of state],[−cause]
d. v_{be}: [−dynamic],[−change of state],[−cause]

There is a difference between this system and the decomposition found in Ramchand (2008) as described in section 2. In the above system, there is only *one* extra head, and featural specification is used to capture the different types of aktionsart. In the system described in section 2, the aktionsart are composed from state vs. event via generalized causative embedding. In the system above on the other hand, there is no way of accounting for why certain feature combinations and combinations of little v heads are possible and others are not. In some sense, it is the idea that little v has a defining role as categorizer that lends naturalness to the idea that there is only one such head in any verbal extended projection. (There are however, even this system cases where more than one little v is used to create even more complex event types (see Cuervo 2003) for discussion).

However, in Harley (2009), Harley herself considers whether the category defining job of little v can be unified with its roles as introducing the external argument and assigning accusative case. She takes as her test case the phenomenon of verbalizations in English, where morphemes like *-ify*, *-ize* and *-ate* are actively involved. Subsequent nominalization of

these forms means that the nominalizer must be attaching to a full overly 'verbalized' vP. However, this predicts that an external argument and accusative case should be available in these nominalizations and they are not. Harley concludes,

> "The inevitable conclusion, then, is that the verbalizer v is not the external-argument- introducing head. Further, the verbalizer v does not select for the Case-checking head?rather, the external-argument introducing head does. The Agent head and the Case head must occur outside the verbalizing v head, and hence be excludeable from nominalizations. The Agent+Case-head complex, then, takes the verbalizing v head as its complement?in other words, the complement of VoiceP really is vP (VP!), not an acategorial root."

So v in the DM sense is also not equivalent to Kratzer's (1996) Voice P. Note that DM's use of v as a verbalizer is not restricted to derivational morphology, but is necessary for all verbal projections since roots themselves bear no syntactic category label. I will put this point aside in this discussion since it relates to a whole package of DM-internal assumptions that simply don't carry over to theories like my own which have neither acategorial roots nor a lexicalization convention that restricts itself to terminal nodes (see Ramchand to appear for more extended discussion of this particular issue). However, in terms of the clear descriptive generalizations, we can ask whether the functional head that hosts information about eventivity can be the same as the one which introduces the external argument and which assigns accusative case. The answer, as we have seen, appears to be negative.

3.3 Phases and 'Locality'

As a final, but important consideration, we need to ask how the v head which has been proposed relates to units of locality, or cyclic domains in the syntactic computation. In a sparse phrase structural decomposition, the widely assumed little v functional head is the highest one in the verbal domain, and it is natural to see it also as the edge of the phase. It is generally assumed, in Chomsky (1993) and subsequent work, that (non-unaccusative) vP and CP are phases for movement. More recently, it has been argued by Legate (2003), and by Richards and van Urk (2013) that there is a phase edge in the general vP/VP area that is a required escape hatch for movement. There are unresolved issues here however, with respect

to the timing of spell out and the size of the edge domain. Is little v the phase head, with VP being the spell out domain, or is the phase head actually something a bit higher, possibly Asp with vP being the spell-out domain? The problem with the work that explicitly addresses cyclicity and locality is that it often operates with a very coarse-grained phrase structure. However, as we have seen, the experts in the verbal domain seem to be concluding that v and Voice *cannot* be collapsed into one functional head. Where does that leave the research that shows evidence for phases, given that such research typically uses a much coarser grain in establishing the patterns? When it comes to evidence from phenomena such as ellipsis, the conclusions too are dependent on the starting assumptions about phrase structure. Merchant (2008) assumes for example that the v that takes VP as its complement *is* equivalent to Voice. His conclusion is then that while VP can be targeted by regular ellipsis, it is the full vP that must be the target of pseudo-gapping, where 'voice' mismatches are never tolerated. One reinterpretation of the Merchant facts could be that while only the full phase/spell-out domain can be a target for movement (as in one family of plausible theories of pseudo-gapping), any subconstituent of the first phase can be elided under identity as long as it is event-denoting. This would mean in turn, if Harley (2013) is right, that it is the higher, VoiceP projection that is the top of the phase, and not the little vP itself.

In short, while the notion of phases is important to settling the status of vP, syntactic work on locality turns out to be an unhelpful place to look to adjudicate between different versions of the decomposed structure of the higher VP. This is because such work tends to employ a more coarse grained phrase structure where the relevant distinctions are not made.

4 The English Auxiliary System and the Event Domain

We have seen that the event typological head (or heads) probably are not equivalent to the Voice head that licenses the external argument, and that Voice is certainly not equivalent to the category defining head v of DM. When it comes to phases, there is general agreement that there is a low zone that contains the verb which constitutes the first cycle in the syntactic computation, and which induces a locality domain. But since the one-head-does-all view of little v cannot work, we are left with much less information about how big the first phase must be and what functional heads it actually contains. In this section, I take a closer look

at the auxiliary system of English to push a little harder on the question of locality domains, and argue that the first phase must be populated with more, and different creatures, than is usually supposed. Finally, I will argue that the top of the first phase cannot be Voice in the traditional sense, but a much more abstract notion.

Most modern syntactic representations of the phrase structure of the English verbal extended projection simply assume a templatic ordering of Perf over Prog over Pass (Bjorkmann 2011, Sailor 2012, Aelbrecht and Harwood 2012, Bošković 2013), when these elements need to be explicitly represented.

(11) John might have been being chased by the cops.

Linguists differ with respect to whether they simply represent Perf, Prog and Voice as functional heads (Bjorkmann 2011 and Sailor 2012) and handle the inflectional facts via 'affix lowering' or AGREE, or whether they additionally assume separate functional heads hosting *-en* and *-ing* (Bošković 2013 and Harwood 2011). The standard syntactic assumption seems to be that some kind of selection is at work (not a cartography in the Cinque 1999 sense), and these projections are left out even for English when the literal perfect or progressive forms are not expressed in the sentence.

However, looking more carefully as auxiliary selection in English, we can see that it actually provides important evidence for 'zoning' in the functional sequence. Specifically, one can show there is an important syntactic and semantic joint between progressive and perfect in English that should be represented explicitly by an abstract cut-off point in the phrase structure. Specifically, with respect to a number of different linguistic tests, the progressive, unlike the perfect, appears to pattern qualitatively with the main verb and its arguments.

We have already seen that aktionsart is one of the verbal properties that is encoded by lexical items within the verbal domain. As is well known (see e.g. Dowty 1979), the progressive in English selects specifically for the aktionsart of its complement— combines with dynamic verbal projections and not stative ones (12).

(12) a. John is dancing the tango.
b. *John is knowing the answer.

Under the assumption that selectional restrictions are strictly local (Baltin 1989), the fact that the progressive places selectional restrictions on the Aktionsart of the verb phrase it combines with is initial suggestive evidence that Prog is low enough in the extended projection to select for the nature of the event structure described by the verb.

It is instructive to contrast this with the Perfect, which does not constrain the Aktionsart of its complement. In (13), we see that the perfect can combine with *any* main verb in the English language. While it is true that the meaning of the perfect changes subtly depending on the type of main verb, the perfect itself seems to be categorially unselective.

(13) a. John has destroyed the castle. (telic verb)
b. John has driven on ice (before). (atelic verb)
c. John has known Sue for three years. (stative verb)

At the same time, the perfect has a relationship with temporal anchoring which is different from the progressive, showing a more indirect relationship to the VP event description.

I follow previous work in assuming that T is the locus for relating the temporal interval associated with the event to the utterance time, either by precedence or overlap. Most modern implementations converge on the idea that this must be mediated by the notion of a 'reference interval' or 'topic interval' that is related in some way to the event (Klein 1994, Reichenbach 1947, Giorgi and Pianesi 1997, Demirdache and Uribe-Etxebarria 2000).

We see this mediation very clearly in the perfect tense, where the relationship established to the utterance time is not necessarily congruent with the event's notional run time.[4] For example, past tense adverbials are inadmissable in (14-a) even though the run time of the event described by 'writing' is fully in the past.

(14) a. John has written the letter (now).
b. When I saw him, John had already washed the car (the day before).

In the progressive, on the other hand, the event run time and the tense specification of the progressive auxiliary cannot be so distinguished. The progressive picks out a mereological subpart of the event as described by the VP, a relation that is possible *without* the pres-

[4]Problems with the semantic description of the English perfect in fact lie behind the original motivation for the idea, as expressed in Reichenbach 1947 's Reference Time.

ence of explicit temporal information. The different mereological subparts are not separably temporally modifiable.

(15) a. *John is building a house tomorrow now.
b. *John was building the house today yesterday.

The perfect tense seems to require the mediation of a a topic interval between the event and temporal anchoring, whereas the progressive expresses a relation to the non-progressivized event that is purely mereological and non-temporalized. The progressive describes a derived eventuality based on the verbal event description, by constructing a new event-concept which is not dependent on actual instantiations of the verbal event in question.[5]

The progressive and the passive are both the lowest in the full possible expansion of auxiliaries in English, and while the passive has traditionally been considered to reside within the first phase zone because it is the exponence of Voice, the same has not been systematically claimed for the progressive. It should be pointed out that the progressive shares with the passive the use of the helping auxiliary *be*, which Bjorkmann (2011) argues is inserted as a default to spell out tense features. This makes it more similar to the passive, and less similar to the modals and perfect constructions which introduce their own distinct tense carrying auxiliaries. Next, I turn to more direct evidence that progressive *-ing* heads a qualitatively different projection than the perfect *-en*, and that in particular lies *within the first cyclic domain* of the clause.

4.1 Expletive Associates

In this subsection, I show data from Harwood (2011), Harwood (2014) who independently arrives at the same conclusion that progressive must be inside the first phase. Harwood's evidence includes an extended argument based on classical VP ellipsis, and the idea that ellipsis is always targets a phasal spell-out domain, although under his account phases are 'flexible'.[6]

[5]I believe that this is in fact the reason that the progressive gives rise to the 'imperfective' paradox. The treatment of this paradox should be within the domain of lexical concept formation, and not in the deployment of possible world semantics.

[6]I am not equally convinced that traditional VP ellipsis is *directly* sensitive to zones the way Harwood suggests, and my own view of the zones involved does not allow 'flexibility' the way his account does. Part of

Harwood (2011) notes that the thematic subject of a verb in the expletive *there*-construction in English remains low in the clause and is moreover confined to positions left-adjacent either to the main verb, or to the passive or progressive participles. It can never surface to the left of the perfect participle.

The examples in (16) with the full complement of possible auxiliaries, show that there is only one position in the sequence for an expletive associate, between Perf *-en* and Prog *-ing* (cf. Harwood 2011).

(16) a. *There could have been being a truck loaded.
b. There could have been a truck being loaded.
c. *There could have a truck been being loaded.
d. *There could a truck have been being loaded.
e. *There a truck could have been being loaded.
f. A truck could have been being loaded.

Even when the progressive itself is not present, we see that the position to the left of the perfect participle is still unavailable, while the position to the left of the main verb and passive participle is fine, as we see in (17).

(17) a. There could have been a truck loaded.
b. *There could have a truck been loaded.
c. *There could a truck have been loaded.
d. A truck could have been loaded.

Similarly, leaving out the perfect and building sentences with just the progressive and the passive as in (18), shows exactly the same restriction: the 'low' subject position can surface to the left of the main verb, passive participle or progressive participle.

(18) a. *There could be being a truck loaded.
b. There could be a truck being loaded.
c. *There could a truck be being loaded.

the discrepancy between our accounts is that I take the semantic characterization of the lowest zone as 'event description' as primary and axiomatic.

d. A truck could be being loaded.

Thus, there is a 'low' position for the subject adjacent to the progressive participle (and passive participle), but the perfect participle is outside that low argument position.

4.2 VP fronting and pseudoclefts

Turning now to a distinct phenomenon concerning displacement, it has been argued by Sailor (2012) that VP fronting and specificational pseudo clefts can target a constituent between Perf *-en* and Prog *-ing* (cf. Sailor 2012). In (19) we see the constituent headed by *-ing* undergoing fronting, and in (20) we see it forming a grammatical cleft. Crucially, the constituent selected by the perfect auxiliary, and that selected by the modal, cannot be targeted in these constructions.

(19) If Mary says that the cakes will have been being eaten, then ...

a. *... [eaten], they will have been being.

b. ... [being eaten], they will have been.

c. *... [been being eaten], they will have.

d. *... [have been being eaten], they will.

(20) A: John should have been being praised. B: No, ...

a. *... [criticized] is what he should have been being.

b. ... [being criticized] is what he should have been.

c. *... [been being criticized] is what he should have.

d. *... [have been being criticized] is what he should.

When the progressive is not present, we see that the constituent consisting of the passive participle can also be fronted much like the progressive participle phrase. Nevertheless, the perfect participle phrase and the infinitival phrase selected by the modal are not legitimate targets.

(21) If Mary says that the cakes will have been eaten, then ...

a. ... [eaten], they will have been.

b. *... [been eaten], they will have.

c. *... [have been eaten], they will.

The examples in (22) show that when both the progressive and passive are present in the absence of the perfect, it is still the *-ing* phrase that fronts. The fact that the passive participle phrase does not front on its own seems to indicate that what is being targeted here is the maximal phrase of a certain type.

(22) If Mary says that the cakes will be being eaten, then ...

a. *... [eaten], they will be being.

b. ... [being eaten], they will be.

c. *... [be being eaten], they will.

These facts show that there is a privileged boundary at the point between Perfect *-en* and Progressive *-ing* which is not dependent on the surface presence of any specific aspectual feature or morphological exponent.

The facts can be modeled by assuming that when they exist, the main verb, passive participle and progressive participle all lie within a particular distinguished domain targeted by these fronting operations. This is the constituent that is fronted in 'VP -fronting', and what is clefted in the pseudocleft construction.

4.3 British nonfinite *do*-substitution

Finally, I turn to an argument of my own from British nonfinite *do*-substitution, which exposes the same essential division. Some background description of the facts is in order. In British English, *do* is an abstract pro-form that substitutes not just for eventive verbs but for stative verbs as well, after an auxiliary.

(23) a. John might leave, and Mary might do also.

b. John might really like oysters, and Mary might do also.

Although British English *do* can replace stative verbs, it is confined to main verbs and never substitutes for an actual auxiliary. In other words, it is in complementary distribution with stranding by auxiliaries. [7]

(24) a. John might have seen the movie, and Mary might (*do) also.
b. John might be singing a song, and Mary might (*do) also.

However, even within these constraints, not all nonfinite verbal forms may be substituted for by *do*:

(25) a. John might leave, and Mary might do also.
b. John has left, and Mary has done also.
c. John is leaving, and Mary is (*doing) also.
d. John was arrested, and Mary was (*done) also.

British nonfinite *do* can substitute for an infinitive modal complement or a perfect participle, but not for a progressive or passive participle. This phenomenon too, motivates a cut between Perf and Prog. The diagnostic is in some sense the converse of the previous one: the very constituents that could participate in the fronting constructions are the ones that British nonfinite *do* cannot substitute for.[8]

4.4 *-ing* lies in the Event Domain

We have seen robust evidence for two distinct domains from three independent sets of grammatical facts. In each case, the facts point to a joint between the progressive participial phrase and the perfect participial phrase when they exist (and we assume that the joint exists even when the morphological evidence is not so articulated).

- *-ing*-Phrases, Passive *-en*-phrases and main verb phrases all contain a base position for the external argument

[7]Note that the mismatched reading in 12(a) where *do* is construed as substituting for a main verb in nonfinite form after the modal auxiliary, is marginally possible here, but is irrelevant and will be ignored in what follows. The reading where it substitutes for the auxiliary phrase is robustly ungrammatical.

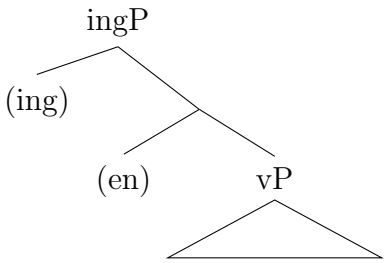
[8]Note that Baltin (2006) shows that British *do*-substitution does pattern like a *pro*-form, rather than ellipsis with respects to the tests in Hankamer and Sag (1976).

- *-ing*-Phrases, Passive *-en*-phrases and main verb phrases all form a unit with regard to independent mobility

- *-ing*-Phrases, Passive *-en*-phrases and main verb phrases cannot be substituted by the pseudo-auxiliary verb *do* in British English

Thus, with respect to a crude macro division of the clause into a VP-domain and a TP-domain, it seems the progressive and passive forms lie within the lower domain, while modals and the perfect lie within the higher. British English nonfinite *do*-substitution is a pro-form for the higher, but crucially not the lower domain.[9] If we locate passive *-en* in *-en*$_{pass}$*P*, and *-ing* in *-ing*$_{prog}$P, then the phrase structural description for what we find in the data can be represented as in (26).

(26) First Phase:



However, this is not yet either explanatory or satisfying, because it simply reuses the specific morphological forms as labels and as such is non-generalizable to other languages. For example, we want to know whether the projection headed by *en* is actually Voice, as described by Kratzer (1996). What then should be the the proper abstract label for the projection headed by *-ing*? Whatever we say here, the evidence from the progressive shows us that it is not good enough to simply associate the label Voice with the highest projection in the first phase verbal domain. That would have worked if all we ever found in that zone were passive or middle-like morphology; but the progressive is more properly described perhaps as 'aktionsartal' morphology. Even if we could motivate an abstract label for this (or example Ev(ent)P springs to mind) the question still remains whether there is an 'absolute' top projection for the spell-out domain. In other words, is it crucial that Voice, or the mystery top projection always be projected at the top of the phase even when they do not host participial morphology/function?

[9]This makes the difference between the British English dialects and the more restrictive ones, such as the American, quite simple to state: standard dummy *do* support in the more restrictive dialects has only finite instantiations, British English possesses a non-finite version of this *pro*-form as well.

In order to address these questions, I need to expand the discussion somewhat to include some more general theoretical and architectural issues. In the next section, I lay out the minimalist cartographic assumptions as discussed in recent work by Ramchand and Svenonius (2014), and return to the questions above in the light of that framework.

5 Constructivism, Cartography and Functional Structure

Ramchand and Svenonius (2014) (henceforth R& S) attempt a reconciliation of the cartographic enterprise with minimalist considerations by reconsidering the division of labour between universal and emergent categories and the role of the interfaces with cognition. We reject the rich functional hierarchy as an axiomatic part of UG. They argue that there is no plausible evolutionary scenario to support the natural selection of a language faculty with such a highly structured organization of functional features. However, we also take the results of the Cartographic enterprise seriously, and we seek a source for the rich functional hierarchy as displayed by various languages. In fact, a source for phrase structural category labels and their hierarchical relationship is required no matter how much of the specifics of cartography one accepts—even the pared-down C-T-*v*-V is a functional hierarchy in need of explanation. R& S argued that the rich functional hierarchy has multiple sources, one of which is extra-linguistic cognition, and another comes from language specific morphological and lexical devices.

R& S basically accept the evidence of a fundamental triparition of the clause into a V-domain, a T-domain, and a C-domain (Platzack 2000, Rizzi 1997) and provide this with a formal semantic grounding on a conceptual backdrop. Specifically, we take events (e), situations (s), and propositions (p) to be conceptual primitives recruited by the language faculty, and we take the hierarchy of C > T > V to follow from the interaction of (i) the way these conceptual primitives are organized in the wetware and (ii) the way they are harnessed by the syntactico-semantic system. Within the core zones we find a great deal of interlanguage and intralanguage richness and variation. We show that in some cases, the hierarchy is not in fact fixed; in other cases, there are independent factors giving rise to hierarchical effects. In yet other cases, we find language specific points of variation that are driven by language

and morpheme specific selectional factors (see also Wiltschko 2014, who arrives at a similar conception of the relationship between a universal spine and language specific elaborations).

If universal aspects of the phrase structure of natural language are sparse and abstract and follow from the nature of ontological domains, then this somewhat changes the way we ask the little v question. The verbal domain, under this conception, is the domain of event descriptions. It constitutes a first phase that builds a coherent description of this particular ontological type before being passed up and included in the description at the next level, which is that of situations. Situations in our view are complex entities which are built around events but have times, worlds and possibly locations as parameters.

So far, what we have seen is that the domain of event description involves a specification of event-structure aktionsartal/force dynamical properties, together with causationally ordered participant slots. However, it also seems to include certain modifications of the core event description. In the case of passive, the passive participle selects an eventuality type that has an INITIATOR and constructs an event description that makes the internal argument the aboutness-topic. The progressive also selects a particular eventuality type (in this case a dynamic eventuality) and creates a derived in-progress state (see Parsons 1990). Although Passive does not disrupt aktionsart properties (states remain states, and events remain events) it does change the choice of event TOPIC by suppressing or binding off the highest argument on the force-dynamical hierarchy. Progressive on the other hand leaves participant hierarchies intact but converts an event into a state. What the two have in common is that they *select* for some property of events, and return a derived event, showing that they sit firmly within the event domain.

Let us consider the questions we were left with at the end of the last section.

A. Is there a hierarchically highest, head, or 'phase head' if you will, in the event domain?

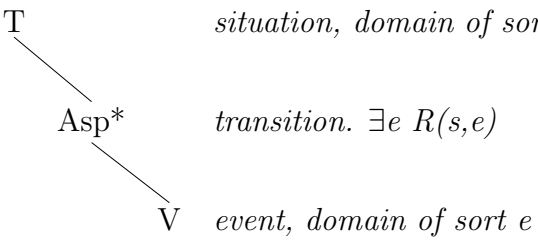
B. Is that head defined in 'absolute' or 'relative' terms?

C. Is it equivalent to the head that introduces the INITIATOR*, or causally most privileged argument in the event building part of the phrase structure?*

Given the evidence for domains given above, some version of the phase assumption must be correct, with the lowest phase coresponding to the verbal domain of event descriptions.

However, whether the phase head is absolute or relative is a trickier question. In R& S, the absolute and obligatory position in the phrase structure on top of the event domain is Asp*. This is the head that combines with a complete event description and converts it into a description of the higher ontological type, see (27).

(27)



situation, domain of sort s

transition. $\exists e$ *R(s,e)*

event, domain of sort e

One view would then be that there is no privileged highest head in the event domain per se, but it is the transitional head Asp*, which marks the end of the phase and triggers the spell out of the lower domain. The existence of progressive and passive morphology in a particular language are thus language specific and learned facts, together with their selectional relationships and hierarchical order.

Under this view, the V heads in the lowest domain are *all* event descriptors. They order themselves in a particular way because of local selectional requirements, and they each have a single abstract predicational position, based on the abstract notion HOLD.

(28) V_{proc}: $\lambda x \lambda e$[Process(e) & Undergoer(e,x)]

(29) V_{init}: $\lambda P \lambda x \lambda e'$[CausedProcess(e′, e) & P(e) & Holds(e′, x)]

(30) $V_{en_{pass}}$: $\lambda P \lambda y \lambda e' \exists e$[P(e) & Transition(e′, e) & Holds(e′, y)]

(31) V_{ing}: $\lambda Q \lambda z \lambda e' \exists e$[Q(e) & InProgressState(e′,e) & Holds(e′,z)]

The auxiliary verb *be* is inserted at the phase boundary if there is no available main verb to fill Asp* (essentially as in Bjorkmann 2011) .

Notice that here, we have argument positions for *all* subjects of predication— the force dynamical heads, as well as the derived eventive heads. In principle, all of these specifier positions (except the lowest) could be filled by external *or* internal merge.[10] However, the

[10]The system in Ramchand (2008) is built to allow movement of a single DP argument through adjacent specifiers in principle, thus accumulating the entailments from the various predicational positions. This creates different kinds of composite thematic roles. Thus, the movements allowed here into the specifiers of derived

morphological functors that create *derived* events always fill their specifiers via internal merge, by definition. There is no hierarchically superior Voice head that has the job of just *introducing* the external argument for the first time (as in Pylkkänen-like implementations that separate Cause and Voice (Pylkkänen 1999)). In the system I am proposing there are derived events, and derived 'highest arguments'. Entailments accrued from being in particular structural positions simply accumulate. The argument that ends up in the specifier of the top eventuality descriptor is going to be privileged with respect to grammatical subjecthood and nominative case. While the *-ing* head does not disrupt the force-dynamical relative ordering of arguments, *-en* (and presumably other types of morphology traditionally called 'voice') does.

In recent work on Hiaki, Harley 2013 also concludes that there needs to be a separation of causation and 'highest subject'. To this extent, we see a real convergence across frameworks. However, she rejects an account where there is an argument introduced in the specifier of the causation projection which then *moves* to the specifier of Voice in the default case. Her arguments for a more Pylkkänen-like view come from data which involve the presence of an applicative argument. In a nutshell, the data show that even though the applicative argument seems to be higher than the causing projection from the point of view of morphology and scope, it never gets 'chosen' as the subject of the resulting predication. To avoid this violation of relativized minimality, Harley argues that the external argument must be base generated in Voice and cannot be moved there from the lower causational projection (See also Harley (this volume)).

Unfortunately, adopting Harley's conclusion raises deep problems for the syntax-semantics interface. Introducing the external argument via Voice, and , in the case of applicative constructions, at a *distance* from the event describing heads, raises the problem of how the selectional semantics and relationship between that argument and the event description are to be established. Even if we had different Voice flavours, each specific to a particular verbal root and its cluster of functional heads, the selectional subcategorization frames DM would have to use for the job would not even be in a local relationship with those projections. For these reasons, I find her solution untenable.

However, I think Harley (2013) is right that we face a real paradox here. On the one hand, scope and morphological facts tell us that the applicative is added *outside* the whole

eventuality predications are not any different from what is already standardly assumed in the system.

causational projection, while on the other hand it is simply bypassed when an argument has to be promoted to subject position, and the initiator argument is chosen instead. As I have argued, I think there are extremely strong reasons for believing that the event describing force-dynamical heads come with their own specifiers and build argument relations in a semantically transparent way. I argued in section 2 that this was the only way to model the robust generalizations that we find about argument ordering, event structure and crosslinguistic event typology. The way to avoid the Harley paradox is to claim that the applicative argument, being outside the force-dynamical profile of the core event, is simply not eligible for promotion to subject. We could technically implement this by assuming some kind of extra prepositional covert structure introducing it. For the purposes of subject selection for the higher inflectional domain, the initiator argument would then (correctly) count as the highest eligible argument. However, just in case a derived event is created, we have a new eventuality and thus a new subject of predication can be established. At that point all bets are off. As far as I understand it from the Hiaki data, genuine passivization operations *can* turn the applicative argument into a derived subject.

So, the upshot of the discussion here is that we can maintain a simple view of zonal semantics by arguing that everything in the verbal domain is a head that constructs an event description of some kind. We keep the inventory and ordering of force-dynamical heads as proposed in Ramchand (2008), and as described in section 2 to maintain our crosslinguistic generalizations about aspect and argument structure. We admit that subsequent to the building of the core event, languages often possess (language specific) formatives that systematically manipulate and construct derived event descriptions from core event descriptions. As long as one is just building event descriptions from event descriptions, we remain in the first phasal zone of the clause. When the transitional head is reached (Asp* in the notation of R& S), the event domain is spelled out and the highest (possibly) derived external argument position is the one that is fed through to subsequent inflectional processes, such as agreement and nominative case.

This is what we *need* to say so far, given the facts we now know about causation and subject selection, and about the progressive. However, it is also possible to maintain all of the above, and propose an *additional* absolute highest head in the event domain that registers a choice of subject of predication for the whole complex event. This could not really be labelled

Voice, since as we have seen it must also be fed by progressive *-ing*, so one might give it a more neutral label such as Event-TopicP. It is unclear to me whether we gain anything conceptually from making the top of the verbal domain be an obligatory head with an absolute label, since the Asp* head which creates the sortal shift already performs that function. It remains to be seen however, whether there are any empirical arguments or predictions that would distinguish such an account from the more relativistic and minimal one consistent with Ramchand and Svenonius 2014.

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