The phase structure of tense*

Jonny Butler
Universität Stuttgart

I argue that phases should be defined as domains of quantificational closure. I propose that a phase consists of a core predicative category (V, T), topped by l-syntactic 'little' heads (*v*, *t*) that introduce situation variables; this whole structure then topped off by a CP level which closes off the variables introduced by the little heads. This derives a theory of temporal construal akin to that of Stowell (1996). The system is extended to cover aspectual notions like perfect/progressive, where evidence from their interaction with modality suggests that perfect and progressive aspect should be considered to head their own phases.

1. Intro

This paper argues for a view of phase structure (Chomsky 1999; etc.) where phases are defined in terms of quantification: each phase corresponds to one domain of quantificational closure, such domains being provided by a series of quantification-encoding CP levels interspersed through the clause (cf. Starke 1993,2001; Hallman 2000; Brody & Szabolcsi 2003; Butler 2003a). Specifically, the purpose of these CPs is to close off variables introduced by l-syntactic 'little' heads above core predicative categories V, T and N—little *v*, *t*, and *n*. For *v* and *t*, these are situation (s) variables; for n, individual (x) variables.[2]

This is shown to derive a system of tense construal along the lines of that proposed by Stowell (1996), wherein tense is a temporal ordering predicate, serving to order the situations denoted by the closed off s variables of *v* and *t* (corresponding to, respectively, the Event Time E and Speech Time S of Reichenbach 1947). The system is extended to cover (outer/viewpoint) aspectual notions (perfect/progressive) also, leading to the proposal that there are in fact more phases than the *v*P and CP phases generally assumed.

The structure of the paper is this: §2 goes through a particular view of l-syntax within *v*P (Hale & Keyser 1993; etc.), and justifies the topping off of

*Thanks are due to David Adger, George Tsoulas, and Tim Stowell for discussion; additional thanks to Tim for giving the title his blessing. Also to the audience at the workshop on which this volume is based, and an earlier audience in York. The final draft of this paper was completed some time ago: for an updated and (I like to think) better treatment of some aspects, see my doctoral dissertation (Butler 2004b).

[2] I assume for DPs that D and C are essentially the same category (cf. Cardinaletti & Starke 1999; Pesetsky & Torrego 2001), though in fact I don't consider the putative DP phase in detail here.

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*v*P with a CP layer. §3 extends this view of l-syntax to TP, attributing parallel structure to the verbal and temporal layers of the clause. §4 then goes through the system of tense construal in more detail. §5 extends it to aspectual construal, providing evidence that structure equivalent to that proposed for the verbal and temporal layers of the clause also obtains in the aspectual layers, performing the same quantificational function. §6 introduces an analysis of modality that in conjunction with the aspectual story provides further evidence for the aspectual phases proposed. §7 is a conclusion.

2. The Structure of the *v*P Phase

2.1. Situation structure and argument structure

I assume a structure for the verbal layer of the clause where it is decomposed into a V level and a *v* level. V, I take to be a lexical Root (Pesetsky 1995; etc.), which gives us the big 'meaning' semantics: basically, it is like an encyclopaedic entry that tells us what property is being predicated. So a Root like EAT tells us that we're talking about eating; a Root like MANOUEVRE tells us that we're talking about manouevring. But it doesn't tell us much else: in particular, it doesn't tell us anything about situational or argument semantics. What does tell us this is the *v*P layer (Harley 1995; Marantz 2001; Pylkkänen 2002).

v, I use as a shorthand for a more complex structure of 'little' heads, which syntactically encode situation (=event) structure. Each of these heads encodes one sub-situation, which when composed describe one macro-situation. This macro-situation is formalized as a situational variable `s` corresponding to something like a Davidsonian event argument (Davidson 1967). When this variable is given a reference (details of which below), it corresponds to something like the Reichenbachian Event Time E.

Arguments are merged as the specifiers of these little heads. The interpretation an argument receives will depend on what little head it is specifier of, thus deriving theta-roles: so if we have, say, a CAUSE head, the argument in its specifier will be interpreted as a causer, or agent. Argument structure is thus a reflex of situation structure.

Different versions of l-syntax assume different kinds/combinations of little heads. For my purposes here it doesn't really matter what the internal structure of this layer is; all we need to know is that the complex *v* level provides us with a (macro-)situational variable `s`.

I assume standardly that Root V moves up to the highest little *v* head in the structure.

2.2. Closure

There are various stories around in the literature relating to what happens to the situation variable in *v*P next. They largely claim that it is subject to existential quantification; what performs this quantification is where the variation comes in.

Probably the most common proposal is that it is subject to the EXISTENTIAL CLOSURE operation of Heim (1982); Diesing (1992). This is an operation which takes place at the mapping from the syntax to the semantics; its function is to insert an existential quantifier into the semantic representation, which closes off any stray variables not subject to binding by other quantificational elements. For Heim, this operation takes place at an abstract 'text' level—that is, over whole (possibly multi-sentential) utterances. Diesing influentially proposes that it rather takes place inside the clausal structure, with the quantification being over VP. In an l-syntax story, this reinterprets straightforwardly as quantification over *v*P.

Several analyses propose a similar kind of 'default' existential quantification over *v*P, but rather than Diesing's abstract closure mechanism, they posit that the quantifier is in fact represented structurally in the syntax. Of particular relevance here are the analyses in Stowell (1991) and Stowell (1996). Stowell (1991), following Kratzer (1995), proposes that something like Davidson's event argument is syntactically real, and is introduced as the outermost argument of the verb in *v*P. Specifically, he takes the verb to assign an EVENT theta-role, whose position is filled by an existential QP over events. Closure is, then, in a sense part and parcel of the event position itself: if a verb has an event argument[3], then it has existential quantification over that argument by default, and this quantification is syntactically represented.

Stowell (1996) gives an alternative analysis for such quantification. Here, he assumes that all verbs, stage-level or not, select an event argument (though 'event' here means something more general like 'situation', or 'eventuality'. I use 'situation' here). Stowell seems more agnostic about whether the argument is real or abstract in this paper; his trees suggest he takes it to be real, but to introduce an indefinite argument, and thus a variable (as Heim 1982), rather than a closed off QP as in Stowell (1991). He posits that this variable is given reference by a category he labels Z(EIT)P, which sits on top of *v*P, and is basically a kind of existential determiner over situations: 'ZP bears a structural relation to [*v*]P that is analogous to the relation that DP bears to NP' (Stowell 1996: 280). Again, then, something like existential closure is represented overtly in the syntax, though this time it is a result of some higher operator, rather than part of the denotation of the situation argument itself.

In Stowell's story, the higher operator is of category Z, a selective binder of situation variables, serving specifically to give the situation argument a reference. In fact, it serves to give it the reference of a time, and this time is the internal argument of the temporal predicate T. The proposal I make here is that this is unnecessary: we don't really need to give the situation argument the reference of a time, since we can get this just by virtue of the fact that it is an argument of T. If the operator–variable construction only denotes a particular situation, and the function of T is to order this situation temporally relative to some other situation, then this in itself will have the effect of making the situation (seem to) correspond

[3]Stowell, following Kratzer, assumes in this paper that only stage-level predicates assign an EVENT theta-role.

to a time. I suggest that rather, the operator is simply an ordinary existential, with no particular temporal relevance.

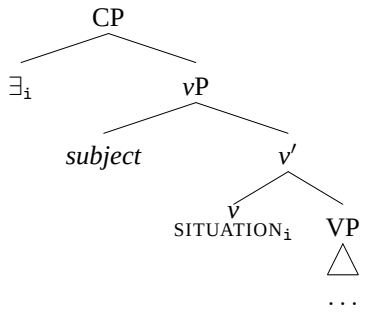
The immediate bonus of this is that we can take the operator not to be a selective binder of situation variables, but rather an unselective binder of variables generally (cf. Sportiche 2002). This allows it to correspond exactly to Diesing's *v*P closure operator, closing off both the situation variable `s`, and any `x` variables introduced by existential indefinite DP arguments.

Given the general usefulness of this operator position, I will adopt it here, though since I generalize its purpose away from situation/temporal related to more general closure, I won't adopt Stowell's ZP label. Instead, I will take this position to be a clause internal CP position. This label doesn't really matter—it could equally be labelled DP, or more non-commitally XP—but for the idea that there is a CP-like position here, see among others Starke (1993,2001); Belletti (2001); Jayaseelan (2001); Butler (2003a).

I take this quantificational[4] closure to define the EDGE of the *v*P phase, since any loose variables etc. should be dealt with by it. Anything that needs to escape closure will have to move out of the scope of this existential operator, to [Spec, CP]: this suggests an analysis where successive cyclic movement is movement to escape closure.

The general structure of the *v*P phase, then, is as shown in (1) (irrelevant details omitted).

(1)



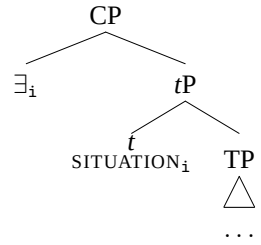
3. The Structure of the T Phase

A first point to avoid confusion: given that I now take both the *v*P and the CP phases to be CPs, I will refer to them by the label of their Root—the V phase and the T phase, respectively.

I take the structure in (1) to generalize to the T phase, and in fact to phases in general: a phase consists of a predicative Root H, topped by one or more l-syntactic little heads *h* encoding situation structure, topped by a CP which closes off variables introduced in the *h* layer. The structure of the T phase will thus be as in (2).

[4]Quantificational rather than existential because I assume other quantificational operators are sited here also; see §6.

(2)



T, like V, is a Root category that says what the predicate is about. In this case, it predicates a temporal relationship [±PAST] between two situations, which I will Reichenbachesquely refer to as the event situation E and speech situation S. More detail follows in §4.

t is like *v*: a little head that introduces a situation variable. There is of course a lot of syntactic evidence for some projection in this position, commonly labelled Agr(S) (Pollock 1989; etc.; etc.). This area of the clause is argued to be further decomposed by Cardinaletti (1997,2000); Cardinaletti & Roberts (1991); Sportiche (1996); Cardinaletti & Starke (1999); Manzini & Savoia (2002); which perhaps points to a finer grained structure for *t* analogous to the fine grained structure that *v* is standing in for here.

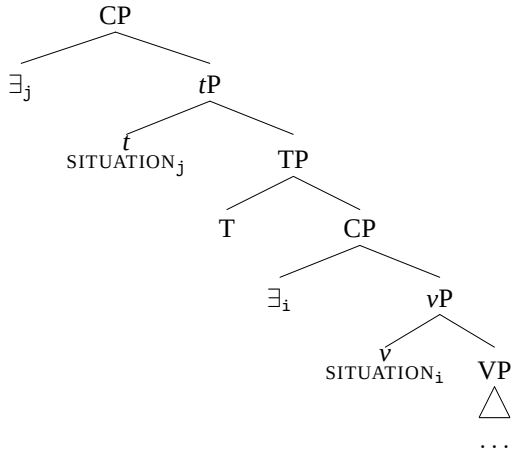
C heads the standard CP. Its salient purpose here is again existential quantification over the situation variable introduced by *t*, giving it reference, and giving us the speech situation S.

4. The Phase Structure of Tense

In short, the above discussion reduces to this: *v*P is immediately dominated by a CP, which contains some operator element taking in the situation variable associated with *v* and giving it referential status; this operator–variable pair gives us something like the situation time (i.e. Reichenbach's Event time E). We assume the same thing happens with external CP and the situation variable associated with *t*, giving us something like the Speech time S. The function of T is to specify some temporal ordering relationship between these two objects.

We end up, then, with a structure like that given in (3).

(3)



As far as the interpretation of (3) is concerned, we can, allowing for certain differences in structure, follow the ideas set out in Stowell (1996). Stowell decribes tenses as 'dyadic predicates of temporal ordering ... they take two time denoting phrases as their arguments, and it is in these categories that the referential properties associated with tenses reside' (Stowell 1996: 279). In Stowell's system, these phrases are ZPs; here, they are the operator–variable constructions associated with CPs and *t*/*v*. The tense predicate 'temporally locate[s] the denotation of E in relation to the denotation of its external argument ... PAST means "after" ... and PRESENT ... means "simultaneous with" or "overlaps" ' (pp.280–1). This clearly carries over easily to the structure given here.

To exemplify, (4a) would have the structure (4b).

This is interpreted along the lines of 'there exists a Speech situation S, and there exists an Event situation E, E a situation of raconteurs and roustabouts saying "Buddy, come on in"; S is located temporally after E'. This is basically the interpretation we want.

As the bones of an approach to tense, then, this is promising. But it has various specific details that need to be dealt with. First, it involves only two times, as opposed to (neo)-Reichenbachian approaches which often make use of three (Speech time S, Reference time R, and Event time E). The reason a third time gets invoked is to deal with 'complex tenses' such as the English perfect, which can't be dealt with straightforwardly by appealing to just two time points. Therefore it needs to be shown that this system is theoretically capable of dealing with the kind of empirical data that led to the Reichenbachian three-time system.

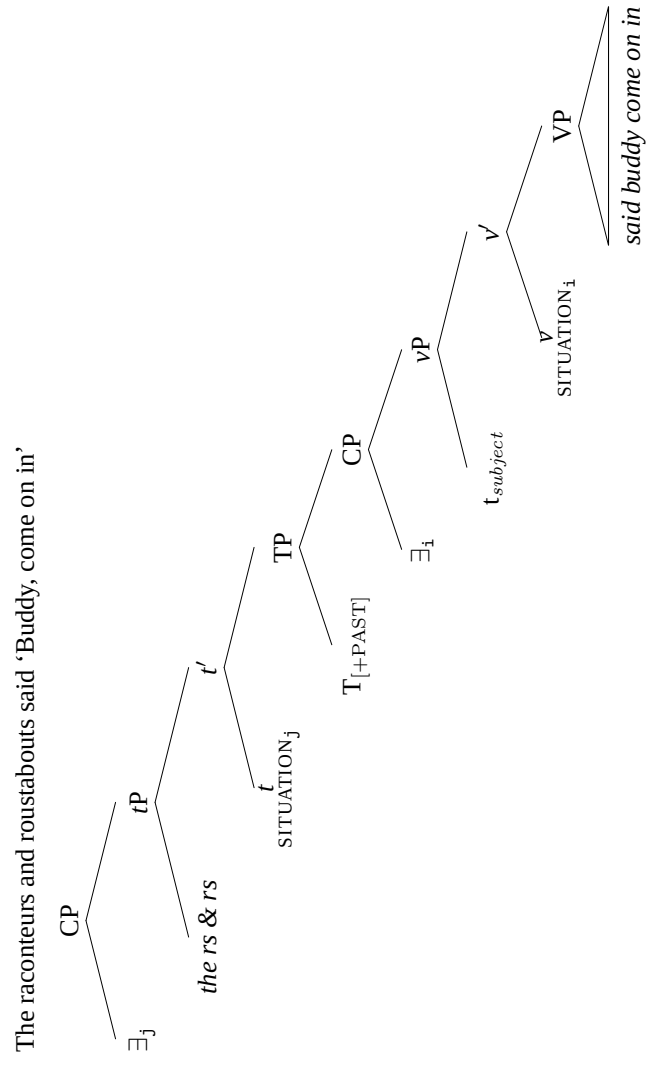
5. Aspect

5.1. Complex tenses

Reichenbach's (1947) original proposal to treat tenses as relating three times rather than just two was motivated by the fact that certain constructions can't be

(4) a. The raconteurs and roustabouts said ‘Buddy, come on in’

b.



dealt with using just two. In particular, the use of three times allows perfective constructions to be represented. (5–7) illustrate the English past, present, and future perfect respectively, and it is clear that the differences in interpretation among these three sentences can't be captured with reference to just two times.

(5) Susan had gone to sleep

(6) Susan has gone to sleep

(7) Susan will have gone to sleep

In the past perfect (5), E is taken to be ordered before R which is before S: that is, the Event situation is being evaluated as past from a time which is itself in the past with regard to the Speech situation. In the present perfect (6), S and R are taken to be simultaneous, with E preceding them. Note that this isn't the same as simple past, where E precedes just S: there is a distinct difference between (6) and (8), and it is captured well by the use of three time points.

(8) Susan went to sleep

In the future perfect (7), S and E are taken to be unordered with respect to one another, with R following both (cf. Comrie 1985; Hornstein 1990). There is no way we can capture this with only two times: we need three.

In a system where T relates only two time points, this problem obviously has to be dealt with along different lines. Here, I follow Vikner (1985); Zagona (1990); Stowell (1996); Demirdache & Uribe-Etxebarria (2001) in taking the obvious way out and treating perfect aspect as essentially equivalent to a [+PAST] tense predicate. This means perfect tenses generally express a relation between two separate tenses: *have* will order E relative to its own situation argument, which will basically be R; the denotation of this argument will be fixed as in the usual case of a subordinate clause in Stowell's system, by being controlled by the closest c-commanding situation argument. The implicit situation argument of (the head hosting) *have*, Stowell claims, is a result situation, so that 'the higher tense [T] provides its usual temporal argument structure, locating the time of the result state (the time of "having") in relation to ... the Speech Time ... The past participle provides an additional past tense, which orders the thematic verb's [Situation] Time in relation to that of the result state.' (Stowell 1996: 285)

What we have, then, is a means of getting a Reichenbachean 3-time system when we need to, and not when we don't, which is a good result.

5.2. Aspectual phases

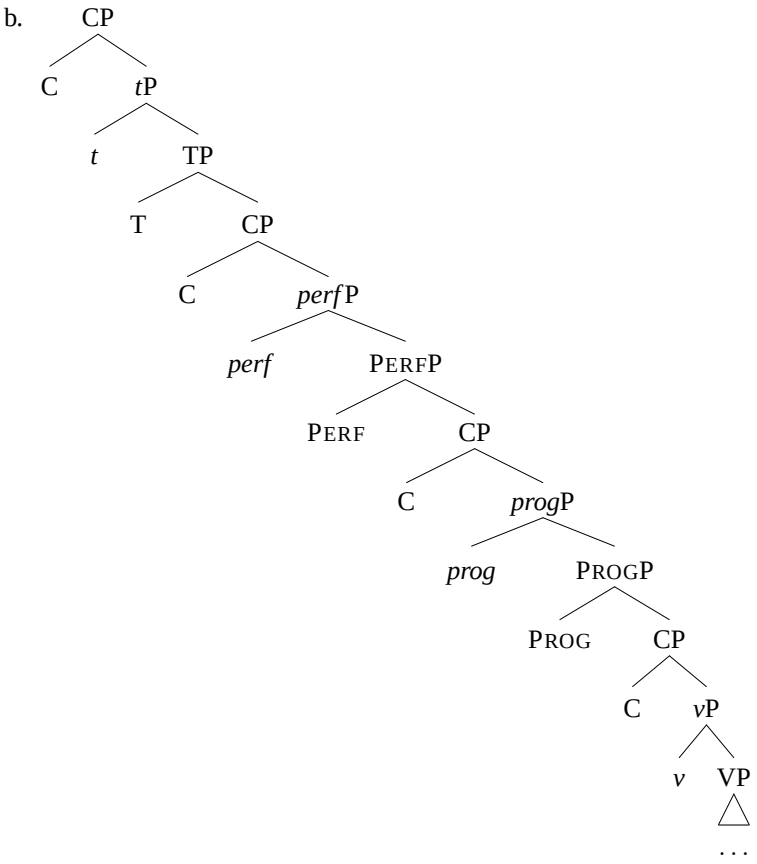
I am taking the perfect/progressive aspect to be fundamentally equivalent to tense, in that they introduce a new situation into the representation, and place this situation temporally relative to the situation denoted by their complement. Perfect aspect correlates with past tense, ordering the situation it introduces as after the situation denoted by its complement; progressive aspect correlates with present tense, placing the situation it introduces temporally within the situation denoted by

its complement. In general this makes perfect sense and is more than reasonable; see for example Stowell (1996) (and the discussion thereof above); Demirdache & Uribe-Etxebarria (2001); Butler (2003b) for extensive justification of what the system can get us.

For this story to run in the present framework, though, it is necessary also to postulate the same general structure for perfect/progressive elements as for the V and T phases: namely, a core predicative category (PERF/PROG), topped by l-syntactic situation stucture (*perf*/*prog*), which is in turn surmounted by a quantificational CP layer—that is, a sentence like (9a) must have a structure like (9b) (words omitted).

(9) a. The piano has been drinking

b.



Two questions arise here:

1. What empirical (syntactic or semantic) evidence do we have for these 'extra' CP levels?
2. Do we take these CPs to be phases or not?

§5.2.1 will deal with question 1, showing that negation, argued in Starke (2001); Butler (2003a), to be connected with CP levels, provides syntactic evidence for the existence of these CPs. Further arguments based on interpretive facts to do with modal/aspectual interaction will be presented in §6, after a theory of modal interpretation has been briefly introduced, which will show that in addition to negation, quantification must also be active in the aspectual CPs.

As to whether these CPs should be considered phases or not, this depends on how exactly we end up defining phases; discussion of this will be reserved till §7. For now, I will simply assume that the aspectual CPs are phases on a par with the T and V phases.

5.2.1. Negation

In Starke (2001); Butler (2003a), it is argued that CP layers host a negative operator, sited by Butler for concreteness in Rizzi's (1997) Foc position. Thus, the standard NegP is replaced by the internal FocP; the external FocP provides a wide-scope position for negation. Given that there are two additional CPs represented in (9b), we make a straightforward prediction that negation should be able to appear in (the Foc projection of) these CPs also. This prediction is borne out, as shown in (10).[5]

(10) [$_{\mathrm{CP}}$ [$_{\mathrm{TP}}$ the piano might [$_{\mathrm{CP}}$ (not) [$_{\mathrm{PERFP}}$ have [$_{\mathrm{CP}}$ (not) [$_{\mathrm{PROGP}}$ been [$_{\mathrm{CP}}$ (not) [$_{\mathrm{VP}}$ drinking]]]]]]]

There are various points raised here: one is that we don't see negation overtly in the highest CP; this seems to be a fact of English though—negation does appear here in many languages (Italian, for example), and it is certainly an available scope position for negation in English. Another is that we don't tend to see all these negations surfacing simultaneously, though there is nothing in the theory to force this; really it seems most likely to be a processing problem, since with appropriate context and stress patterns we can make the example reasonably felicitous. A third is that the two highest positions for negation, i.e. those either side of T, seem to give sentential negation whereas the lower positions seem to give constituent negation. In fact this falls out of the story in Butler (2003a), where subject movement played a crucial role. Canonically, I take the subject to sit in [Spec, *t*P], having moved up from its base position in [Spec, *v*P]. In order to interpret the subject in this position, though, we have to create a λ-abstract immediately below it (see Heim & Kratzer 1998 for why, and a way of doing this; see Butler 2004a for a variation on Heim & Kratzer's story whereby the λ-abstract is the semantic reflex of the EPP feature on *t*). The λ-abstract so created constitutes the main sentential predicate. Once the topmost CP is sorted, we then have a real proposition. If negation appears in the topmost CP, we of course have propositional, i.e. sentential, negation. If it appears in the next CP down, it will basically negate the predicate; this negative predicate will then apply to the subject, and this will also give you sentential negation; see Horn (1989) for details, especially chapters

[5] *Might* is added in (10) as a neutral probe for the syntactic position of T.

2 and 7. If, however, the negation is below this, it will be too low down inside the predicate to give you either propositional or predicate negation in the relevant sense, so you get only the constituent negation reading in these cases. This, then, seems to be good syntactic evidence that we have at least a Foc projection on top of the proposed PERF and PROG phases.

6. Modals

In Butler (2003a) I argued that modality is connected to the CP levels proposed here. There, I took modals to be quantifiers over possible worlds (Kratzer 1977, 1981, 1991), operating over some abstract world variables, whose provenance I left vague. Here, I will assume that in fact modals quantify not over world variables, but over situation variables; specifically, the ones introduced in the T/PERF/PROG/V phases.[6] This derives a situation semantics reinterpretation of Kratzer's world semantics story (cf. Portner 1992). The means of quantification, I take to be quantificational operators sited in the CP level of phases, extending the story for existential closure developed above to include other quantifiers too, most saliently a universal.

6.1. Propositions

I follow Kratzer in taking necessity modals like *must* to quantify universally, possibility modals like *might*/*can* to quantify existentially. I also follow her in taking modals to be propositional operators. I depart from Kratzer, though, in what I mean by 'proposition'.

One definition of phases familiar from Chomsky (2001) is that they are propositional elements. CP, Chomsky describes as propositional basically in the usual semantic sense (evaluable for truth, etc.). *v*P, he describes as propositional in the sense that it 'has full argument structure' (p. 22). Now, there is an argument to be had here as to whether these two sense of 'propositional' are really similar enough to be brought in as an argument for the unified nature of phases, but certainly the 'full argument structure' definition is a legitimate one in terms of logic; and in fact, we can boil both senses down to just this one. The V phase has full argument structure in that it has all its theta roles filled (or however we want to formalize this notion); the T phase also has full argument structure, in that it is a dyadic predicate needing two situational arguments for saturation, which are provided by the V phase and by *t*'s (closed off) situation variable (ditto for the PERF and PROG phases). It just so happens that this phase really is propositional in the usual, truth-evaluable sense, as well, because it predicates a temporal relation between two situations. This is exactly the case we need for a set of truth conditions. This being so, the real propositional parallel is the one referring to full argument structure.

[6]Modals must also relativise these variables to possibility, so we are talking about possible situations rather than just situations; we don't need to go into the technicalities of this here.

If we take it that this definition of propositional is the one that matters to propositional operators like modals, we predict that modals will be able to operate not just over the whole sentential proposition, but over any expression which is propositional in the relevant sense. Here, this means over any phase.

This gives us a prediction with regard to scope: in a simple clause, with just the T and V phases (i.e. no aspect), we have two positions in which modals can scope: one at the top of the clause, in the T phase's CP, and one in the middle, in the V phase's CP. These two positions should be easily distinguishable by their interactions with other scope bearing elements in the sentence; most relevantly, with non-presuppositional weakly quantified subjects (in the sense of Milsark 1974).

6.2. Subjects

It is commonly accepted, following Diesing (1992), that there are two basic scope positions for weakly quantified subjects, which can be distinguished by their different readings. Diesing takes non-presuppositional (existential) weakly quantified elements to introduce variables into the representation, which need to be quantified over by some higher element—either overt elements like temporal adverbs (*always*, *never*, *sometimes*, etc.), or by abstract closure operators like her existential closure operator discussed in §2.2 above, here reanalysed as a syntactically represented existential operator in the edge of the V phase. She takes presuppositional (quantificational) weakly quantified subjects not to be variables but to have their own quantificational force, and thus not to be associated with existential closure.

The two scope positions associated with these elements are [Spec, *v*P] for the existential cases, where the subject is existentially closed, and canonical [Spec, *t*P] for the presuppositional cases, where it is outside the scope of closure. Given these assumptions, we predict that:

1. Modals in the edge of the T phase will scope over the subject whether it is interpreted as existential or presuppositional, since they are higher than both subject scope positions.

2. Modals in the edge of the V phase will scope above existential subjects, since they are higher than [Spec, *v*P], but below presuppositional subjects, since they are lower than [Spec, *t*P].

(11) a. Some philosophers go to those seminars

Presuppositional reading: 'some philosophers (specifically, Quine, Carnap, and Socrates) go to those seminars'.

Existential reading 'there exist philosophers who go to those seminars, though I don't know who'.

b. Some philosophers must go to those seminars (epistemic necessity)

Presuppositional/quantificational reading: 'it must be the case that (at least) some philosophers go to those seminars (because Quine, Carnap, and Socrates all told me they were intending to)'.

Scope: modal > subject

Non presuppositional/existential reading: 'it must be the case that there are philosophers who go to those seminars (because they're about possible worlds)'.

Scope: modal > subject

c. Some philosophers might go to those seminars (epistemic possibility)

Presuppositional/quantificational reading: 'it might be the case that (at least) some philosophers go to those seminars (because Quine, Carnap, and Socrates all told me they were intending to)'.

Scope: modal > subject

Non presuppositional/existential reading: unable to distinguish relative scope.[7]

d. Some philosophers must go to those seminars (root necessity)

Presuppositional/quantificational reading: 'Quine, Carnap, and Socrates are required to go to those seminars'.

Scope: subject > modal

Non presuppositional/existential reading: ' it is required that some philosophers go to those seminars, as a condition on our being given money to run them'.

Scope: modal > subject

e. Some philosophers can go to those seminars (root possibility)

Presuppositional/quantificational reading: 'some philosophers—specifically Quine, Carnap, and Socrates—are able/allowed to go to those seminars'.

Scope: subject > modal

Non presuppositional/existential reading: unable to distinguish relative scope.[7]

The data in (11) confirm that the two positions posited are indeed available for modals; moreover, they show that the two scope positions for modals correspond to the two major readings for modals: those at the edge of the T phase are interpreted as epistemic, those at the edge of the V phase are interpreted as root. This is an interesting result; it correlates with the claim often found in the literature that epistemic and root interpretations for modals differ semantically along the lines that 'epistemic modals modify a sentence [= proposition] and deal with the truth value of that sentence; root modals relate ... [a subject] to an activity and deal with permission, obligation and ability' (Cook 1978: 6). This is basically what we would expect epistemic and root modals to do if they correspond to the

[7]There are going to be gaps in the paradigm here, since we assume possibility modals instantiate existential quantification; we can't therefore make any concrete predictions with regard to non-presuppositional/existential readings of weak subjects and possibility modals since we can't distinguish the relative scope of two existential quantifiers (May 1985).

two scope positions I claim here, since the higher, epistemic modals will invariably scope over a tensed (i.e. truth evaluable) proposition, including subject, whereas the lower, root modals will commonly intervene between a subject in [Spec, *t*P] and its *v*P predicate (the exception being where the subject is interpreted existentially, as above). This analysis also derives the old intuition from Ross (1969) that epistemics are lexically one-place (intransitive) predicates, somewhat like raising verbs, while roots are two-place (transitive) predicates, somewhat like control verbs.

For more extensive discussion of this story, see Butler (2003a); here, it is sufficient to note that epistemic readings for modals correspond to modals scoping above tense and the subject, while root readings correspond to modals scoping below tense and the subject.

6.3. Modal/aspectual interaction

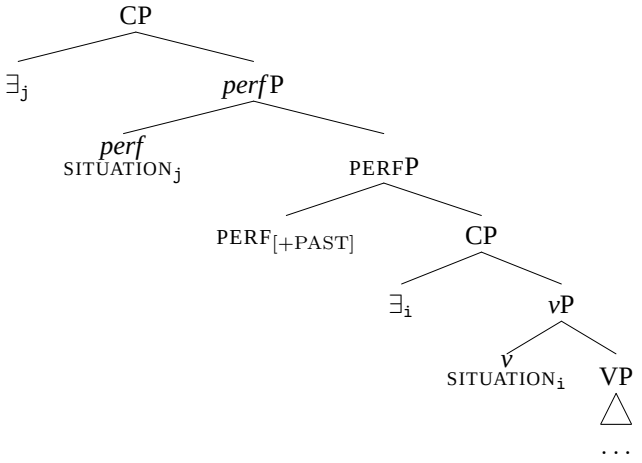
What does this have to do with aspect?

If modals are quantificational elements in the edge of a phase operating over situational variables in the domain of that phase, and if perfect/progressive aspect introduce situation variables and phases, then we make another prediction about where modals can scope: not just in the edge of the T and V phases, but also in the edge of the PERF and PROG phases.

We aren't going to find evidence like that seen above relating to subject interpretation, since subjects don't get interpreted in the aspectual phases. The clearest evidence, then, would come from the interaction of modality with aspect itself; and in particular, with perfective aspect.

We take PERF to be a temporal predicate like [+PAST] T, ordering two situations temporally relative to one another—specifically, ordering the result situation associated with *perf* and its own CP as after the situation denoted by its complement (which will be either a V phase or a PROG phase, depending) as in (12).

(12)



There are two CP levels in (12) that could act as the scope positions for modals—the CP of the PERF phase and the CP of the V phase. There are therefore two times at which the modal evaluation could be understood to take place: either in the past, if the modal is associated with the V phase, or in the 'now' of the PERF phase. We can think of this informally in terms of scope—the modals should be able to scope either over or under the perfect, depending which CP they are in. Condoravdi (2001) and Stowell (2004) show that this is so.

Condoravdi shows that for certain modal utterances containing perfect *have*, like (13), the modal receives different readings depending on whether it scopes above or below the perfect: if it scopes above it receives an epistemic reading (14), if it scopes below it receives what she calls a 'metaphysical' reading (15), which doesn't relate to the epistemic state of the speaker (or whoever) but simply refers to 'how the world may turn out, or might have turned out, to be' (Condoravdi 2001: 3). This is essentially the reading labelled by Palmer (1990) 'dynamic' modality: dynamic possibility he describes as expressing 'neutral possibility, simply to indicate that an event is possible'. (p. 83). Butler (2003a) and Palmer both treat dynamic interpreted modals as a subcase of roots, a generalized version of what are often described as 'ability' modals.

(13) He might have won the game

(14) He might have (already) won the game (# but he didn't)

(15) At that point he might still have won the game but he didn't in the end.
(Condoravdi 2001: 4; her (6b)–(7b))

As it stands, Condoravdi's analysis doesn't actually say much about the structure in (9b) or (12), since all we see are an epistemic and a root reading, which were taken above to be associated with the T and V phases, respectively. However, Stowell (2004) takes Condoravdi's basic insight and shows that root interpreted modals can scope over PERF also (16–17), in which case the modal

must be associated with the PERF phase's CP. We have already seen that root modals can scope under PERF in (15); (18) gives another example. In this case, the modal must be associated with the V phase's CP. This is exactly the kind of contrast we are looking for.

(16) You should have bought that book when you had the chance

(17) Max ought to have kept his mouth shut at the meeting
(Stowell forthcoming; his (22a,b))

(18) To be eligible for this loan, you must never have been turned down for credit before

As Stowell notes, it is 'more plausible to suppose that in [(16–17)] the relevant deontic obligation held at the past times in question, rather than obtaining at the utterance time (obligating the subject at the utterance time to have arranged things in the past in a particular way)' (p. 23). In (18), on the other hand, it is clear that the requirement for the subject never to have been refused credit does hold at the utterance time. Given that the modals in all of (16–18) are clearly root interpreted, we may conclude that modals are able to appear not just in the CPs of the V and T phases, as claimed above, but also in the CP of the PERF phase.[8] This then is more good evidence that this CP exists, and moreover that is is fundamentally equivalent in its function to the CPs of the T and V phases: that is, that these CPs are just as much phases on the current analysis as the T and V phases.

It is harder to use the same kind of reasoning to show that the CP of the PROG phase exists, since the temporal relationship at stake (present rather than past) doesn't allow such an obvious distinction to be made; but it seems entirely reasonable to infer that if the PERF CP exists, then so too does the PROG CP.

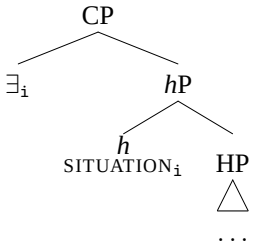
7. Outro

I have argued here that phases should be defined in terms of quantificational closure: the T and V phases (standard CP and *v*P phases) both involve quantificational (usually existential) closure over situation variables; the putative N phase (standard DP), though I haven't discussed this here, involves quantificational closure of individual variables (or perhaps sometimes situation variables, say with gerunds).

More specifically, I have argued for the general structure to represent this shown in (19).

[8] It may possible to formalize on this basis the distinction between what are known in the literature as 'ought to be' and 'ought to do' root modals, along the lines of: 'ought to be' modals are those where the modal scopes over aspect, but under the subject (thus having both root and epistemic properties); 'ought to do' modals are those where the modal scopes under aspect.

(19)



A Root head H is at the core of each phase; this is basically a property denoting category, telling us what property is going to be predicated. The predication itself is introduced by l-syntactic little heads *h* above H. Each of these introduces a sub-situation, which then compose to give a macro-situation variable s, this being something like a generalized Davidsonian event argument. The l-syntactic *h* layer basically spells out event structure syntactically, and any arguments of the predicate so derived are introduced as specifiers of the little heads. This is topped off by a CP layer, which is quantificational in nature, serving to close off variables introduced below, for temporal (§4), aspectual (§5), and modal (§6) interpretation. This CP layer corresponds to the EDGE of the phase, everything below is its DOMAIN.

This story ends up deriving us more phases than the classic two (three if we count DP): we are led to propose that (outer/viewpoint) aspect (perfect/progressive) should be analysed along the same lines, with a Root PERF/PROG each introducing a temporal predicate and situation argument thereof, exactly parallel to T. Is this to be seen as a problem?

No: the usual tests for phasehood, inasmuch as they work and are coherent (see Matushansky 2003 for a critique), generally relate to matters of argument placement/interpretation—reconstruction, QR, expletives, etc (cf. Legate 2003). What all these things really boil down to, though, is quantification: quantificational effects just happen to be more visible where you have a visible DP argument. Where you don't have such an argument (as far as interpretation is concerned)—e.g. in the aspectual phases—you don't see the same effects DP-wise, but you do see the same effects more generally: i.e. there must be quantification going on in order for the temporal/aspectual/modal interpretation to come out right (§6).

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Universität Stuttgart
Institut für Linguistik: Anglistik
Keplerstraße 17/4b (KII)
D-70174 Stuttgart
Germany

jonny@ifla.uni-stuttgart.de