

Complex Predicates as Complementation Structures*

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Abstract

In this paper it is proposed that a basic difference in structural dependency, the difference between selected complements of a head on the one hand and unselected adjuncts to a projection of a head on the other, correlates with a basic interpretive difference which is central to understanding the range of complex predicate constructions. Adjuncts, such as depictive predicates, are interpreted as conjuncts, as is commonly assumed. The standard assumption about complements is that their interpretation is by function application, where the specifics are then determined by the semantics of the selecting head. Here it is proposed that there is a common interpretive core to complementation, one which is monotonic and in some abstract sense mereological. This applies both to extended projections and to complements which are embedded in another extended projection, and is exemplified by resultatives as well as other secondary predicate types. The interpretation is monotonic in the sense that the selecting head preserves the interpretation of the complement, elaborating on it. It is mereological in the related sense that the complement is interpreted as an integral part of the interpretation of the whole.

1 Introduction

I suggest that a certain kind of syntactic dependency, which I identify with complementation, has a consistent semantic interpretation (a mereological one) and, due to the sensitivity of lexical insertion to the complementation structure, also has a consistent effect on phonological form. This means that there is a class of complex predicates formed by complementation, CCPs, with properties of

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both form and content which distinguish them from complex predicates formed by adjunction, ACPs. The descriptive classification of predicates as CCPs or ACPs corresponds to one which has been made in the literature, but I propose a novel Minimalist account for the restrictions on CCPs.

For a simple illustration from English of the two kinds, the CCP can be illustrated with a resultative as in (1a) (on the reading where the egg became fluffy), and the ACP with a depictive, as in (1b) (on the reading where the egg was cold at the time).

- (1) a. They beat the egg fluffy.
- b. They beat the egg cold.

According to various previous analyses,¹ the resultative AP is a complement of V, meaning that the maximal projection AP of the result predicate merges with the head V, while the depictive is an adjunct, meaning that the maximal projection AP of the depictive predicate merges with a phrasal projection, perhaps VP.

I adopt the analysis of resultatives as complements and depictives as adjuncts, and further suggest that the differences in form and interpretation between the two structures follow from the special status of the syntactic relation of complementation. I discuss four properties of complementation, as listed in (2).

- (2) H and C are heads; H takes CP as its complement
 - a. CP is interpreted as a part of HP
 - b. H may be realised as an affix on C
 - c. H and C may be realized together as a portmanteau
 - d. H may c-select properties of CP

ACPs lack these properties; they may be characterized as follows.

- (3) H and A are heads; AP is adjoined to HP
 - a. AP is interpreted as conjoined with HP
 - b. H may be compounded with A, or cliticized to it, but cannot be a true affix to it
 - c. H and A must be spelled out as distinct morphemes
 - d. H cannot select properties of AP

Here I briefly explicate these four contrasts in turn.

First, concerning (2a), I suggest in §2 that syntactic complementation has a narrowly restricted semantic interpretation: the meaning contributed by the head ‘elaborates’ on the denotation of the complement, so that the complement denotes the centrally constitutive part of the whole (cf. Ramchand and Svenonius 2014, and some related discussion in Hinzen and Sheehan 2013, who frame functional projection in terms of degrees of reference).

¹Rothstein (1983), Roberts (1988), Winkler (1997), inter alios, though other positions have been defended, see for example Simpson (2005) for discussion and additional references.

This means for (1a) that fluffiness is understood to be a *constitutive and essential part* of the event described; in other words, if an event is not characterized centrally by fluffiness, then (1a) is not an appropriate description. This consequence is simply lacking for (1b); thus there is no expectation that cold is a constitutive and essential part of the event described; being cold is simply conjoined with the main predicate, so that something is both a participant in the beating event and cold.

Next, in §4, I take up the issues of realization mentioned in (2b) and (2c). There, I argue that because of the way spell-out maps syntactic structures to phonological representations, a resultative predicate can be morphologically integrated into the selecting verb, as suggested by (4a), where the fact that *en-* is prefixed is a lexical stipulation for *rich* (cf. *red*den, **enred*; *thick*en, **enthick*). A resultative predicate can even be lexically subsumed by a portmanteau spelling out both its eventive and stative parts (verbal components PROCESS and RESULT in Ramchand 2008b), as in (4b). That is, (4a) and (4b) have syntactic structures similar to (1a), in that there is a stative result predicate which is a complement to an eventive process head.²

- (4) a. They enriched the crust.
- b. They melted the chocolate.

In contrast, I suggest, depictives cannot be morphologically integrated to the same degree; they can be incorporated or compounded; so that a structure like that in (5) is possible with a meaning like that in (1b).³

- (5) They cold-beat the egg.

But examples like this arguably involve syntactic adjunction, just like (1b). They are not subject to lexically idiosyncratic allomorphy of the type seen in (4a), and are not spelled out as part of portmanteaux, the way resultatives like that in (4b) can be. In other words, I am suggesting that there are no verbs of the forms in (6) with the meanings indicated.⁴

²In the case of (4b), there is only one surface exponent (*melt*) of the argument-structure-determining material; hence this would not count as a ‘complex’ predicate on a definition that required complexity of exponence.

³The verb here is a neologism. Attested examples like *wet-sand* and *cold forge* tend to be lexicalized and may refer to specific procedures or techniques, but the neologistic example, at least, shows that a depictive meaning is possible for a compound.

⁴There are verbs whose meanings seem to invite paraphrases like those in (6), but I will suggest that they should not be analyzed as literally spelling out an adjunct phrase. For example, a fresco is painted on a wall while the plaster is wet, but I suggest that (i) does not literally mean ‘Michelangelo painted the wall wet.’

- (i) Michelangelo frescoed the wall.

In fact, if a special paint were developed which bonded with dry plaster in the same way that normal fresco paint bonds with wet plaster, then it would be natural to use the term *fresco* for painting with this new paint. In contrast, it would not be natural to extend the word *melt* to a process which did not result in the internal argument becoming soft.

- (6) a. *They encolded the egg. ('They treated the egg while it was cold')
 b. *They colded the egg. ('They treated the egg while it was cold')

Finally, with respect to (2d), I discuss selection in §5, where I suggest that verbs select syntactic and lexical properties of their complements in a way that is unavailable to other dependencies.

2 A minimalist theory of complex predicates

In this section I outline a Minimalist theory of argument structure, drawing on previous research. I start by discussing the proposal of Baker and Harvey (2010), which makes the same analytic cut as my distinction between CCPs and ACPs, but which is based on Jackendovian lexical-conceptual structures. I then explain why I do not adopt the Jackendovian assumptions, and go on to develop an alternative which preserves the advantages of Baker and Harvey account.

2.1 Merger and coindexation

Baker and Harvey (2010) propose a theory of CPs which distinguishes between two types, merger constructions and coindexation constructions. Their empirical starting point is an observed difference between coverb constructions like the ones found in many languages of northern Australia, including Marra, and serial verb constructions, found in West Africa, East Asia, Oceania, and elsewhere. Their merger constructions correspond closely to what I am calling CCPs, and their coindexation constructions to my ACPs.

They suggest that coverb constructions, analyzed as merger constructions, “class fundamentally with monomorphemic predicates,”⁵ thus aligning them with a strict interpretation of the criteria adopted in previous definitions of complex predicates, such as that in Alsina et al. (1997).⁶ In contrast, they suggest that serial verb constructions, analyzed as coindexation constructions, allow a much broader range of meanings, including nonuniqueness of thematic roles, redundancy of predicate content, and temporal independence of the predicate subparts.

Merger constructions involve the unification (in the HPSG sense; see Shieber 1986) of two lexical-conceptual structures (LCSs). Each simplex LCS is built up out of basic conceptual primitive predicates CAUSE, BECOME, MOVE, and BE (drawing on Dowty 1979, Jackendoff 1983, Levin and Rappaport Hovav 2005, and other work). Baker and Harvey propose that simplex LCSs are

⁵A reviewer is puzzled by references to the numbers of morphemes. I take Baker and Harvey to use morpheme in the sense of phonological exponents, e.g. *enlarge* consists of two morphemes, while *melt* consists of one. See §4.2 for discussion of the significance of morphemes in this sense for understanding a syntactic structure. In Distributed Morphology, the word morpheme is sometimes used in a different sense, to refer to syntactic heads.

⁶“Complex predicates can be defined as predicates which are multi-headed; they are composed of more than one grammatical element (either morphemes or words), each of which contributes part of the information ordinarily associated with a head.” Alsina et al. (1997:1)

constrained by the following principles (Baker and Harvey 2010:20–21; I have labeled them UNIQUENESS and HIERARCHY, harkening back to earlier proposals about thematic hierarchies and uniqueness, e.g. Bresnan 1982):

- (7) UNIQUENESS: The major Predicate functions – CAUSE, BECOME, MOVE, BE – may appear only once in the LCS of the overall complex predicate.
- (8) HIERARCHY: The major Predicate functions must appear in the following sequential order:
- $$\text{CAUSE} > \begin{cases} \text{BECOME} > \text{BE} \\ \text{MOVE} \end{cases}$$

These constraints allow a small inventory of possible simplex LCSs. Baker and Harvey discuss the eight included in the table in (9).

(9)	Description	LCS	example
	state	BE	‘be wet’
	activity	MOVE	‘tremble’
	change of state	BECOME[BE]	‘sink, shatter’
	motion	MOVE[Path]	‘walk’
	caused activity	CAUSE[MOVE]	‘shake [something]’
	caused change of state	CAUSE[BECOME[BE]]	‘build [e.g. a house]’
	caused motion	CAUSE[MOVE[Path]]	‘walk [a dog]’

Merger involves the combination of two simplex LCSs, associated with different morphemes, to form a new LCS, one which is constrained by the same principles and is still simplex in Baker and Harvey’s sense. This is consistent with the observation of Alsina et al. (1997) that a complex predicate expresses only what a monomorphemic predicate could have expressed. In fact, Baker and Harvey seem to take an even stricter view, in that they do not seem to admit ditransitive-type meanings in their inventory of simplex LCSs; thus, the addition of a benefactive is for them not a possible outcome of Merger.⁷

They illustrate with the following examples from Marra, a language of northern Australia.

- (10) a. birli=gu-lini.
go.in=3SGS-GO.PC
‘He went in’
- b. birli=nga-Ø-ganji.
go.in=1SGS-3SGO-TAKE.PP
‘I put it in(side)’

They propose the following LCS representations for the component predicates.

- (11) a. *birli* ‘go in’ [_{Event} MOVE ([_{Thing} *x*], [_{Path} IN])]

⁷“This function—the introduction of non-subcategorized argument into monoclausal structures—is a prominent feature of serial verb constructions in West African languages and Caribbean creoles [...] Merger constructions, as exemplified by the coverb construction, never have this function.” Baker and Harvey (2010:18).

- b. *lini* ‘go’ [_{Event} MOVE ([_{Thing} *x*], [_{Path}])]
- c. *ganji* ‘take’ [_{Event} CAUSE ([_{Thing} *x*], [_{Event} MOVE ([_{Thing} *x*], [_{Path}])])]

Merger allows the formation of complex predicates with the following representations.

- (12)
- a. *birli+lini* ‘go in’ [_{Event} MOVE ([_{Thing} *x*], [_{Path} IN])]
 - b. *birli+ganji* ‘put in’ [_{Event} CAUSE ([_{Thing} *x*], [_{Event} MOVE ([_{Thing} *x*], [_{Path} IN])])]

Note that LCSs are not concatenated, but unified. Baker and Harvey show how their assumptions rule out other possible combinations. For example they suggest that **bak yu* ‘be broken’ is impossible because it would require the LCS of the higher verb (BE) to be subordinated to that of the lower one (BECOME BE), and they suggest that **wir lini* ‘go whistling’ is impossible as a merger structure because constraints on LCSs would force the conceptually implausible meaning, ‘move along a path by means of whistling’; they suggest that it contrasts in this way with predicates that mean things like ‘move along a path by means of dancing.’⁸ They also point out that causatives of transitives cannot be formed by Merger, as this would not be possible within a simplex LCS.

Causatives can, under certain circumstances, be applied to already-causative verbs. However, there is substantial evidence for distinguishing ‘inner’ or ‘lexical’ causatives from ‘outer’ or ‘syntactic’ causatives (Shibatani 1973; 1976, Pyllkkänen 2008). ‘Inner’ causatives apply inside the *vP* and cannot add an agent where there already is one, while ‘outer’ causatives can combine with a full *vP*, possibly including an agent. This is illustrated in (13) with examples from North Sámi: the inner causative *-d-* cannot be added to an already agentive verb, while the outer causative *-h-* can be (Julien 1996, Vinka 2002).

- (13)
- a. Son *stuori-d-ii* gova.
s/he big-CS-PST3SG picture.ACC
‘S/he enlarged the picture’
 - b. Basa-*h-i-n* Sára-*i* biktas-*iid-an*.
wash-CAUS-PAST-1SG Sara-ILL cloth-PL.ACC-1SGPOSS
‘I made Sara wash my clothes’ (Julien 1996: 121)

Here, a higher causative verb *-h-* takes a full *vP* as its complement, following Julien (1996), where the head verb is the already transitive *basa* ‘wash,’ and as a result there are two agents. Monomorphemes may express notions like that expressed in (13a), ‘enlarge,’ but never express such notions as that in (13b), ‘make wash.’

The narrower predicate, excluding outer causatives but including inner ones, conforms closely to the range of possible monomorphemic meanings. For exam-

⁸See their page 26. They note that there are other languages in which a verb meaning ‘go’ allows non-motional interpretations and hence can be combined with activity verbs like ‘whistle’ by merger.

ple, many languages have monomorphemic ditransitives like *give*, but none has a monomorphemic causative of an agentive verb (as long noted, *feed* does not really mean ‘cause to eat,’ and the indirect object has no agentive properties).⁹

The other class of CPs discussed by Baker and Harvey (2010) is coindexation constructions, which they illustrate with serial verb constructions. Here, they suggest, there are multiple LCSs, joined by argument sharing, formally represented in terms of coindexation. I illustrate with an example from the West African language Edo, from (Mark) Baker and Stewart (2002), of a construction which they call the ‘Consecutive Serial Verb Construction’ (CSVC). The second event is a (realized) consequence of the first, is contained in the same temporal domain, and they must share an argument.¹⁰

- (14) Òzó vbó òkhókhò ìgàn khién.
Ozo pluck chicken feathers sell
 ‘Ozo plucked the chicken of feathers and sold them’

Following Baker and Stewart (2002), this construction involves a *v*P adjoined to a *v*P, with argument sharing. Setting aside certain differences and concentrating on the broad outlines of their proposal, I will suggest that what Baker and Harvey call merger constructions are a subset of my CCPs, while my ACPs would correspond more or less to their coindexation constructions.

The objective of this paper is to try to make sense of why these kinds of complex predicates should exist, rather than others. For example, why should there be constraints like UNIQUENESS and HIERARCHY on simplex LCSs and not on coindexation structures?

2.2 Conceptual structure as something extralinguistic

In this subsection I briefly critique the theory behind the LCS approach to word meaning, before moving on in the next subsection to defend a minimalist alternative. See also Hinzen and Sheehan (2013) for a critical discussion of the generative semantics tradition pursued by Jackendoff.

Jackendoff (1990; 1997) suggests that LCSs are independent of language. He posits a part of cognition called conceptual structure, which is “a system of mental representations, not part of language per se, in terms of which reasoning, planning, and the forming of intentions takes place” (op cit p. 31). There is no reason to expect to find formal elegance in conceptual structure: The mind, Jackendoff argues, is a collection of ad hoc “gadgets” (1997: 20), the flotsam

⁹Hence, the indirect object of ‘feed’ does not pass any agentivity diagnostics, for example in *John fed Mary peanuts deliberately/accidentally/happily*, only John, and not Mary, can be understood as acting deliberately or accidentally or happily.

¹⁰Though see Aboh (2009) for an analysis of serial verb constructions which rejects the claim that arguments are shared. Aboh argues that the leftmost verb in serial verb constructions is used functionally, inserted in the T-domain (possibly as an aspectual head), and has no argument structure. This would leave unaffected the analysis here of depictives, which would still be analyzed as adjunction structures. Furthermore, it seems difficult to analyze the verb meaning ‘pluck’ in Baker and Stewart’s (14) as athematic and functional, since in the apparent interpretation, the chicken is plucked and only the feathers sold.

and jetsam of messy evolution. Language recruits bits and pieces of this in a hodgepodge of “Good Tricks” (a term Jackendoff adopts from Dennett 1995).

Thus linguistics, on Jackendoff’s account, cannot be expected to have or develop a theory of why LCSs are the way they are. A nonlinguistic component of mind, conceptual structure, has predicates and arguments and constraints on their combination, so if linguistic representations have some of the same features, there is nothing to explain.

There is reason to be dissatisfied with that state of affairs. For one thing, there is a methodological issue; if we assume that what we see is random flotsam washed up on an evolutionary beach, then there is no procedure for discovering any structure which might in fact be there. If we rather pursue a hypothesis involving a deeper explanation, we can test it and perhaps learn something in the process.

Secondly, the only evidence for the nonlinguistic conceptual structure posited by Jackendoff is in fact linguistic. This point is made forcefully in Hinzen and Sheehan (2013:Ch. 2). There is no nonlinguistic evidence for two-place predicates like CAUSE and BECOME and MOVE, in humans or nonhumans. There isn’t a shred of nonlinguistic evidence for simplex LCSs constrained by anything like UNIQUENESS or HIERARCHY in (7)–(8). The evidence adduced by Jackendoff and other cognitive and functional linguists is either based on language, or on the behavior of humans for whom language is an available mental resource. Careful studies of primate cognition¹¹ do not independently motivate anything like LCSs, so it is sheer conjecture that language might be constrained by nonlinguistic LCSs.

Thirdly, the structures posited by Jackendoff (and adopted by Baker and Harvey) are oddly like the linguistic structures they are designed to explain; the LCSs are depicted as bracketed structures which have the same configurational properties as the trees which are independently needed for syntactic structures. The model is peculiarly redundant, in requiring a generative system for recursively composing complex LCS structures from LCS predicates and arguments, and a distinct generative system for recursively composing complex syntactic structures from syntactic predicates and arguments, and a set of rules mapping the one to the other. This criticism applies to many related models of complex predicate meaning.

2.3 The Minimalist program

The Minimalist program (Chomsky 1995 *inter alia*) lays out a very different picture. In a quest to go “beyond explanatory adequacy” (Chomsky 2004), we are led to ask how the language faculty might have evolved—and given the absence of languagelike behavior in our nearest relatives, we are led to ask how it might have evolved in an evolutionarily short period. That points in a direction fundamentally different from the hodgepodge of tricks model favored by Jackendoff.

¹¹Cf. e.g. Seed and Tomasello 2010 on nonhuman primate cognition in general, or Schlenker et al. (2014) on the semantics of nonhuman primate communication.

Hinzen (2006) in particular argues that constraints on syntactic structures cannot be explained by appealing to properties of a preexisting language of thought; that language of thought is what we should be trying to explicate in the first place.

Thus, we are led to hypothesize that a single computational operation (which Chomsky calls Merge) recursively builds structures from a class of syntactic objects, SOs, which are linked to meanings. The zero hypothesis is that there are not two similar operations, one putting together conceptual predicates CAUSE and MOVE and another putting together syntactic predicates *ganji* and *birli*. Instead, there should be a single operation; the nodes that it combines may be interpreted as CAUSE and MOVE, and pronounced as *ganji* and *birli*.

If this is right, we are still left with the question of how to derive the descriptive effects achieved by the Baker & Harvey proposal and its Jackendovian predecessors from deeper underlying principles.

2.4 Configurational thematic role assignment

First, we accept the conclusion of Jackendoff (1983; 1990) and Parsons (1990) that thematic roles like agent and theme are relations between individuals and events. An event participant therefore implies an event. The VP-external subject hypothesis (Kratzer 1996) leads naturally to the hypothesis that each argument is introduced by a distinct head.¹² For an agent, there is the subevent which the agent initiates (Ramchand’s 2008b INITIATION) and for the patient or theme, there is the subevent which the patient or theme undergoes (Ramchand’s PROCESS).

So while the Jackendovian model explains the empirical fact that a theme cannot be higher than an agent in the argument structure of a single predicate by positing CAUSE over MOVE (HIERARCHY, cf. (8)), we have to pose the question of why MOVE cannot take CAUSE as an argument, or why process cannot take initiation as its complement. And while the Jackendovian model explains the empirical fact that a single verb does not take two Agents by positing the uniqueness of CAUSE in a given structure (UNIQUENESS, cf. (7)), we have to ask what this follows from.

The most interesting answer so far proposed is the one offered by Hale and Keyser (1993; 2002) and Higginbotham (2000): causation is simply an interpretation of the configuration $[V_1 V_1 [V_2 V_2]]$. That is, if V_1 takes V_2 as a

¹²See e.g. Lin (2001), Borer (2005), Ramchand (2008b), Bowers (2010), and Lohndal (2014) for related proposals and arguments. Most earlier treatments are not committed to there being a distinct head for each argument, since it is typically assumed that there are P-like elements (e.g. HAVE) which are fundamentally dyadic, relating two arguments, as in Hale and Keyser (2002). However, see Svenonius (2007) for a proposal that even the external argument (the ‘Figure’) of P is introduced by a distinct head, *p*. Note also that the maximally one-argument-per-head hypothesis defended here is distinct from the *One Role/Role Assigner Principle* of Marantz (1984) and the *Single Argument Hypothesis* of Déchaine (1993), where it was assumed that phrasal predicates could assign thematic roles, with the result that V could assign one thematic role to its object and then its projection, VP, could assign another to its subject.

complement, then the event described by V_1 is understood to be the cause of the event described by V_2 (see Schäfer 2012 for additional support for this approach). The part of the thematic hierarchy in which Agent and Causer are higher than Patient and Theme follows: If V_1 introduces a referent D_1 , and V_2 introduces a referent D_2 , then D_1 is understood as the causer or agent or initiator of the event as a whole, simply because V_1 is understood as causing V_2 , the subevent involving the other argument. Thus this proposal can be referred to as the CONFIGURATIONAL THEMATIC ROLE hypothesis.

Higginbotham (2000) further argues that this same basic relation, which he calls ‘telic pair formation,’ underlies the event structure of accomplishments and directed motion more generally (see also Higginbotham 1995); if two events $\langle e_1, e_2 \rangle$ form a telic pair, then e_1 leads to e_2 , in a way understood as causation or movement along a path or change of state. Thus Dowty’s BECOME and Jackendoff’s MOVE can also be given the same basic treatment as CAUSE, in terms of subevents standing in a basic asymmetric relationship.

Ramchand (2008b) develops the idea further. She suggests that if we recognize a basic distinction between events and states (s), then we must distinguish between $\langle s, e \rangle$, a state leading to an event, and $\langle e, s \rangle$, an event leading to a state. She suggests that what we call agents and causers are introduced by state predicates, so that causation is the interpretation of $\langle s, e \rangle$ (Ramchand’s initiation and process), while $\langle e, s \rangle$ is interpreted as resultative, a change of state (Ramchand’s process and result). If an event is combined with two states, the combination $\langle s, e, s \rangle$ is interpreted as a caused process leading to a result (Ramchand’s initiation-process-result), as in a typical transitive accomplishment.

Consider how the inventory of LCSs assumed by Baker and Harvey (displayed in (9), and again below in (15)) compares with the inventory of event types discussed by Ramchand (like Baker and Harvey, Ramchand assumes that events may take a Path complement).¹³

(15)	Description	Baker & Harvey	Ramchand
	state	BE	s
	activity	MOVE	e
	change of state	BECOME[BE]	$\langle e, s \rangle$
	motion	MOVE[Path]	$\langle e, \text{Path} \rangle$
	caused activity	CAUSE[MOVE]	$\langle s, e \rangle$
	caused change of state	CAUSE[BECOME[BE]]	$\langle s, e, s \rangle$
	caused motion	CAUSE[MOVE[Path]]	$\langle s, e, \text{Path} \rangle$

On the configurational thematic role hypothesis, it need not be stipulated that initiation is higher than process, nor that there can’t be two initiators in a single

¹³I set aside complex event sequences like $\langle e, e \rangle$ and $\langle s, s \rangle$. Ramchand rules out such complex event sequences through a general principle of event composition, but the latter might be implicated in two-place stative verbs, while the former might contrast with $\langle s, e \rangle$ as a type of causation (see e.g. Svenonius 2002 on the need to distinguish accompanied motion from ballistically initiated motion in Icelandic, in terms of overlap of the causing and caused subevents). I also set aside Baker and Harvey’s ‘caused motional inchoative,’ as the details of how it should be derived require discussion that would digress from the central point here.

sequence; the illusions of hierarchy and uniqueness are simply the outcome of a single interpretive rule, which in the domain of events, is associated with causation (as proposed by Hale and Keyser 1993; 2002).

Examples involving ditransitives and causatives of transitives (such as (13b)) are not counted as merger constructions by Baker and Harvey, but I do count them among CCPs. Thus the inventory in (15) is incomplete as an inventory of CCPs.

There are various ways to enrich the rather spare model laid out in (15), in order to capture additional distinctions. Ramchand suggests that some heads are specified to raise arguments into thematic positions, leading to composite thematic roles, while others are not. Domains, such as phases (Chomsky 2000; 2001 *inter alios*), would be expected to have an effect on the way configurational thematic roles would be assigned; that is, the interpretation of an event *e* leading to another event may be affected by whether the second event is or is not a phase; this is the most obvious way to accommodate the distinction between inner and outer causatives (cf. e.g. Pytkäinen 2008). Events may also be distinguished according to whether they carry entailments about mental states (cf. Reinhart 2002). Developing a full typology of possible predicate types goes beyond the scope of this paper.

3 Semantic interpretation: How complementation is interpreted

In this section I defend the idea that there is a systematic interpretation associated with syntactic complementation. I suggest, specifically, that the denotation of the complement forms the most centrally ‘constitutive part’ (Ramchand and Svenonius 2014) of the whole. To pursue the analogy in which a syntactic formative is the “head” of the phrase that it projects, we might say that the complement is the “body” in a mereological sense (see also Uriagereka and Pietroski’s (2002) discussion of a mereological relation *R* holding between subevents).

Another part of the intuition pursued here is that the head-complement relation is related to the Figure-Ground relation. Svenonius (2007) argues that prepositions ordinarily consist of two parts, the higher of which (*p*) introduces a Figure as a specifier, and the lower as complement; the lower part provides a Ground description, possibly with a Ground argument. Thus the relation between the Figure-predicate and the Ground-predicate is the complementation relation seen elsewhere (in which case the relation between the Figure and the Ground is indirect, and analogous to the relation between an Agent and a Patient).

Pietroski (2005) argues against the Fregean tradition that function-application is the most basic interpretation of concatenation, proposing instead that the interpretation of Merge is conjunction. His starting point is a neo-Davidsonian representation like the one in (16b), in which predicates over events are conjoined.

- (16) a. Pat quickly hugged Kim.
 b. $\exists e[\text{hug}(e) \ \& \ \text{Agent}(\text{Pat}, e) \ \& \ \text{Patient}(\text{Kim}, e) \ \& \ \text{quick}(e)]$

However, the neo-Davidsonian analysis fails to capture the fact that modifiers show relative scope. For example, compare the pairs of sentences in (17)–(19).

- (17) a. Pat deliberately quickly hugged Kim.
 b. Pat quickly deliberately hugged Kim.
 (18) a. Pat rudely quickly hugged Kim.
 b. Pat quickly rudely hugged Kim.
 (19) a. Pat secretly quickly hugged Kim.
 b. Pat quickly secretly hugged Kim.

In the (a) examples, on the most obvious interpretation, the ‘quick’ nature of the action is part of what is deliberate, rude, or secret, while in the (b) examples it is not. Simple conjunction does not capture this. The problem is rather general, even if many modifiers are such that different scopes lead to equivalent interpretation. It is not an artifact of the ‘subject controlled’ readings of certain adverbs (contra Parsons 1990:ch. 4). For example, Svenonius (1994b) shows that it applies to certain attributive adjectives, as illustrated in (20)–(21).

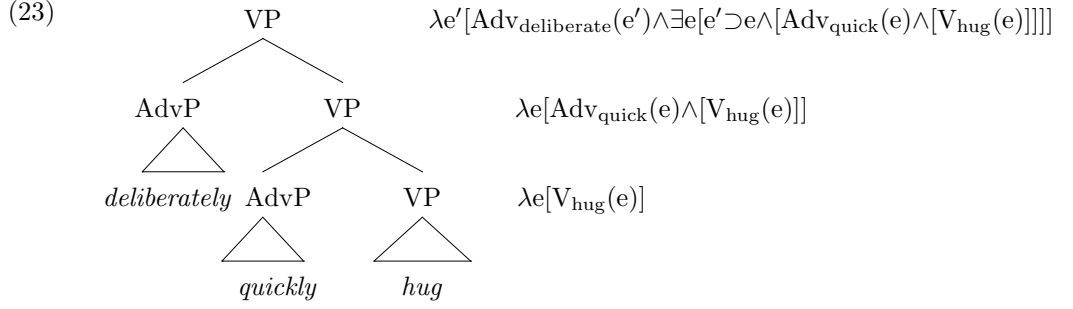
- (20) a. chopped frozen chicken: chicken which was first frozen, then chopped
 b. frozen chopped chicken: chicken which was first chopped, then frozen
 (21) a. a broken valuable vase: a vase which was valuable before it broke
 b. a valuable broken vase: a vase which is valuable despite being broken

Even in the simplest form of lexical combination, compounding, there is an asymmetry: a *frogman* or a *bird-dog* or a *waterbird* is not equal parts frog and man, etc. Rather, the head determines the kind, and the adjunct restricts it.

Such contrasts cannot be captured by simple coordination. Instead, it seems that what is needed is for each adjunct to modify a different argument, and for the two arguments to be related to each other by a simple mereological relation. I will use \subset for a basic, abstract mereological relation ‘part of,’ and \supset (‘contains,’ or ‘is constituted by’) for the same relation when it is more convenient to reverse the order of the elements standing in that relation. This is illustrated in (22) (omitting the arguments to focus on the adverbial scope).

- (22) a. Pat deliberately quickly hugged Kim.
 b. $\exists e, e'[\text{hug}(e) \ \& \ \text{quick}(e) \ \& \ \text{deliberate}(e') \ \& \ e \subset e']$

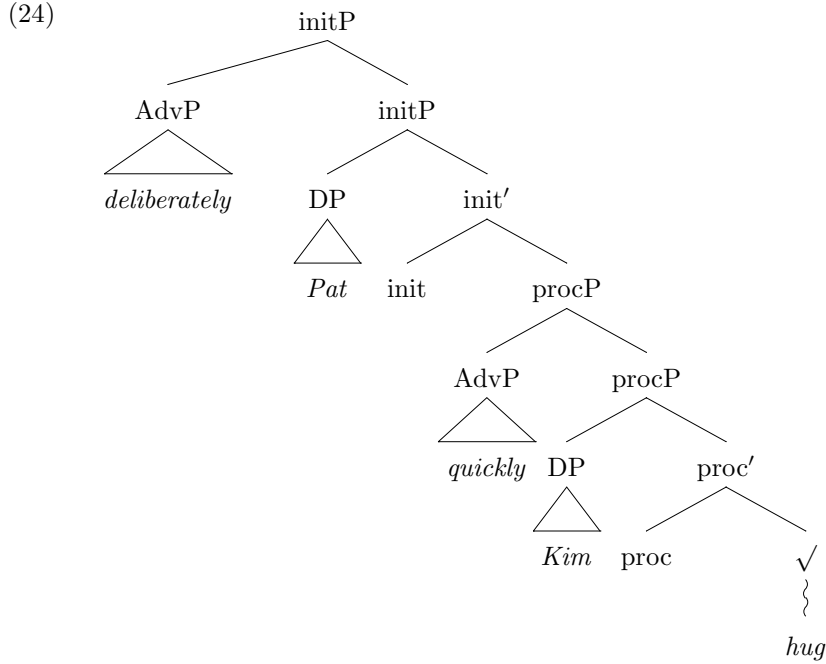
That is, there is an e which is a hugging and quick, and there is an e' which is deliberate, and e is a part of e' . A compositional tree is sketched below.



Existential closure is indicated outside the lower adverb to make explicit the fact that a higher adverb cannot bind into a lower domain, something which could be enforced in any number of ways.

The conjunction is there, as suggested by Pietroski, carrying the meaning of lower parts of structure up at each step (see also Lohndal 2014 on the source of conjunction). The question is where the mereological relation comes from. I suggest that it comes from complementation, and that the different VP nodes here are actually introduced by distinct heads. As suggested by Borer (2005) and various others, the meanings of verbal predicates are built up from several components.

Suppose that the e which is a hugging and is quick is also the process undergone by the object, and the e' which is deliberate is the action undertaken by the subject. Then at a minimum, the tree should contain a head introducing the internal argument (process, following Ramchand 2008b), and a head introducing the external argument (initiation, again using Ramchand's terminology; I noncommittally represent the root here as a complement of the lowest functional head simply for explicitness).



Here, the heads INIT and PROC directly represent the neo-Davidsonian relations for Agent and Patient in Pietroski's analysis. The agent and patient arguments are combined with their predicates by classical Fregean function application. The adjuncts, unselected, are interpreted through conjunction, as on Pietroski's analysis, but because they are adjoined to projections of different heads, they modify different subevents, capturing the asymmetric scopal relation. The lower subevent is interpreted as a subpart of the larger event. This much is commonly stipulated in fine-grained analyses.

Subject-controlled adverbs like *deliberately* are incompatible with low attachment (Ernst 2002), so the (b) examples in (17)–(19) require the adverb *quickly* to be attached higher, to an aspectual node (Ernst 2002), with a concomitant change in meaning (the subject was quick to (deliberately) hug, as opposed to the low, 'manner' reading). See also Ramchand and Svenonius (2014) for additional discussion of adverb interpretation consistent with the assumptions here.

In semantic analyses of extended projections which are explicit about the contributions of the individual heads, it is not uncommon to assume much of what is derived here. Semantic analyses of extended projections typically employ neo-Davidsonian event arguments or something similar: situations, intervals, propositions, or worlds. TAM functors introduce properties and relations over these arguments. Thus, a typical set of TAM heads would be the following (from Svenonius 2008), assuming an inventory of sorts e[vent], i[n]terval, u[tterance], p[roposition], all sorts of type e[ntity].

- (25) a. $\llbracket \text{Asp} \rrbracket = \lambda P \lambda i \exists e [R_{\text{Asp}}(i, e) \wedge P(e)]$
 b. $\llbracket \text{T} \rrbracket = \lambda P \lambda p \exists i [R_{\text{T}}(p, i) \wedge P(i)]$
 c. $\llbracket \text{Fin} \rrbracket = \lambda P \lambda u \exists p [R_{\text{Fin}}(u, p) \wedge P(p)]$

Again, conjunction ensures monotonicity, and existential closure limits the possibility of long-distance modification. The central issue here is the ad hoc relations R for the different functors, which translate as various mereological operators, including containment, overlap, and so on. As discussed above, I propose that these are instantiations of a more general mereological part relation including the Figure–Ground, ‘telic pair,’ and ‘leads to’ relations.

The lambda formula for each head in (25) is written in order to allow the functors to combine by simple function application, consistent with the standard type-driven interpretation. But this is simply an implementation. The proposal here is that the mereological relation is consistently the interpretation of complement-taking, and need not be stipulated for each head.

For heads which introduce arguments in specifier positions, the same facts hold concerning the complement; there is simply an additional argument position for the specifier.

$$(26) \quad \llbracket \text{V} \rrbracket = \lambda P \lambda x \lambda e \exists e' [R(e, e') \wedge \text{Subject}(x, e) \wedge P(e)]$$

As discussed in §2.4, the roles are interpreted contextually, so that the ‘subject’ of an upstream event may be a causer or agent, the subject of a downstream event a patient or theme. The same subject relation will relate grammatical subjects to the tensed situation, topics to the discourse-anchored proposition, and so on.

4 Spans and spell-out: Where form meets content

It is well established that phonology makes only limited reference to syntactic information (e.g. Inkelas 1989), but spell-out does map certain syntactic structures onto certain morphological and phonological constituents. Here I outline a suitably restrictive theory of spell-out in which the surface form of linguistic expression is sensitive to the syntactic configuration of complementation. A consequence of the theory is that individual morphemes (in the sense of exponents) cannot spell out branching syntactic structures; morphemes only spell out SPANS, which are complement-sequences of heads (Svenonius 2012).

4.1 Merge and workspaces

In the Minimalist program, syntactic structures are built from smaller components by the operation Merge. Merge builds head-complement structures when a head (i.e. an atomic element drawn from the lexicon) is merged with another element; according to Chomsky (2013), it is in this case that a minimal search of the two elements merged can determine a label for the whole (though see

Adger 2013 for critical discussion). In cases where two complex elements are merged, the determination of the label of the whole requires something more.

Besides the difference in labeling, there is a computational difference between head-complement structures and structures in which two phrases are merged. If Merge draws elements from the Lexicon (or from a Numeration, a subset drawn from the lexicon, Chomsky 1995), then head-complement merge can be performed within a single workspace for the already assembled complement. Phrase-phrase merge, however, arguably requires two workspaces, one for the assembly of each phrase, or else a way to store a phrase while another is constructed (Uriagereka 1999, Lohndal 2014).

Thus there are at least two things distinguishing structures resulting from the Merge of two complex phrases from those in which one of the elements merged is a head. I suggest that lexical insertion is sensitive to this distinction. Portmanteau morphemes show that lexical insertion is not strictly limited to terminal nodes. But at the same time, morphemes show limitations as to what kind of syntactic structure they can spell out. Hale and Keyser (2002) propose that only complements can be ‘conflated’ onto a head, for example when the noun *dance* is conflated with the light verb selecting it as a complement to form a verb (see also Ramchand 2008a). Consistently with this, I suggest that exponents spell out spans, which are contiguous sequences of heads such that one takes the other as a complement. This entails that single morphemes never have meanings which require the projection of a complex specifier or adjunct inside the morpheme. In this section I discuss several cases which motivate the restriction of lexical insertion to spans.

4.2 Morphemes and lexical insertion

I have already established the assumption that some morphemes are portmanteaux in Hockett’s (1947) sense, that is, they spell out multiple syntactic heads. A classic case is French *du* for *de+le* ‘to the.’ I take the spelling out of verbal eventive heads like INIT and PROC or PROC and RES in examples like *hug* and *melt* above to be portmanteaux as well. A well-known argument for this is the bieviteness of causative resultative verbs like *open*: *They opened the door again* has both a repetitive reading, corresponding to a repeat of the whole opening event, and a restitutive reading, corresponding to a repeat of only the lower state (von Stechow 1995).

Richards (2001) discusses the example of *give*, which contains *get*; even idiomatic meanings with *give* like the one in *give someone the creeps* are preserved in parallel constructions with *get*: *get the creeps*. In the terms of Hale and Keyser (2002), we could say that *give* is the ‘conflation’ of *get* plus another verb.

The range of meanings for monomorphemic predicates is greatly restricted, e.g. *dine*, *devour*, *eat*, *feed*, *gobble*, *subsist*, and *swallow* have different thematic and event-descriptive properties, but do not vary in terms of the principle of thematic uniqueness and the theta hierarchy. These principles, I argued in §2.4, follow within a given syntactic domain from configurational thematic role

assignment. Thus the empirical fact that monomorphemes do not spell out larger structures demonstrates that they are restricted in two ways: one, they are restricted to those syntactic domains (which we can equate with phases), and two, they are restricted to the complement line of the derivation, i.e. to a single workspace in the sense of §4.1.

The phenomenon of outer causatives, illustrated in (13b), shows that a morphologically complex verb phrase is not strictly constrained by thematic uniqueness. However, given what I have argued in §2.4, outer causatives must be CCPs, since causation is one interpretation of complementation. I return to constraints on morphologically complex CCPs in §§4.3–4.4, but here concentrate on the stronger restrictions on monomorphemic predicates.

For example, a word cannot have the meaning of a verb phrase containing a DP, with the concomitant binding possibilities. For example, suppose that a verb like *blab* literally meant ‘tell everybody.’ In the sentence in (27a), there is a possible reading where the pronoun *him* is bound by the quantified noun phrase; on that reading, it means that for every relevant person *x*, Kim told *x* that Pat liked *x*.

- (27) a. Kim told everyone that Pat liked him.
 b. Kim **blabbed** that Pat liked him. (no bound reading)

This suggests that *blab* cannot literally mean ‘tell everybody’ (or ‘tell every boy,’ etc.). Verbs which might seem at first glance to quantify over individuals are usually vaguer, and I suggest that this reflects a restriction on how much structure a verb can lexicalize.

Similarly, there are ‘lexically reflexive’ verbs like *shave*, but they do not literally contain a reflexive like *himself*. To see this, consider the effect of VP-ellipsis on the reflexive in (28a): The elliptical clause *Mary couldn’t* is ambiguous, giving rise to either a strict or sloppy reading—crucially, there is a strict reading, referring to times when Mary couldn’t shave John. This contrasts with (28b), in which only a sloppy reading is possible (i.e. it can only refer to times when Mary couldn’t shave herself, not times when Mary couldn’t shave John).

- (28) a. John shaved himself when Mary couldn’t.
 b. John shaved when Mary couldn’t. (no strict reading under ellipsis)

Thus the implicit internal argument of lexically reflexive *shave* is not identical to any pronounceable pronominal or anaphoric element in English. This is consistent with a general observation that single morphemes do not spell out entire phrases.

For one more illustration, consider depictives. Suppose that *fresco* literally meant ‘paint wet,’ with the same syntactic structure as the depictive construction. It happens that the depictive construction is ambiguous, because of the possibility of subject control; the painter could be wet.

- (29) a. Michelangelo painted the ceiling wet. (ambiguous; either Michelangelo or the ceiling could be wet)

- b. Michelangelo frescoed the ceiling. (unambiguous; the ceiling is wet at the time)

I take the systematic absence of branching phrasal structure from morpheme meaning to mean that morphemes cannot replace or spell out branching nodes under lexical insertion.¹⁴

Note that the restriction observed here is not the same as that known under the Lexical Integrity Hypothesis (Lapointe 1980) or the Atomicity hypothesis (Di Sciullo and Williams 1987); I am not denying the existence of syntactic structure within the word, or even within the morpheme. Apart from the complex verb meanings already noted, there are many cases of words with complex meanings that are plausibly analyzed as involving phrasal structure. For example an adverb like *always* contains a universal quantifier which can bind outside the word, as illustrated in (30), where the universal quantifier can bind the indefinite or a situational variable (Kratzer 1995).

- (30) A Moroccan always speaks French.

The combination of the quantifier here with the rest of the content of *always* (perhaps ‘situation’) is plausibly unified with the general mereological notion I propose here. In contrast, the universal quantifier in the hypothetical verb *blab* in (27b) occupied a thematic position, which requires it to be in a specifier position of a thematic head, given the discussion in §2.4.

To take another example, the word *home* seems to contain an anaphor which is sensitive to syntactic configuration; it is bound by the c-commanding subject in (31), even in a context where pragmatics would favor binding by the non-c-commanding subject of the adjunct phrase (Jackendoff et al. 1993, Collins 2007).

- (31) The thief left home before Mary arrived.

On my proposal, if an anaphoric argument is contained within the structure spelled out by *home*, it would have to be a complement, the ‘Ground’ of the abstract preposition (cf. the French preposition *chez* ‘at the home of’). Again, this is not an available option for a hypothetical reflexive *shave* because the hypothetical reflexive there would have the internal thematic role of undergoer, which makes it a specifier of PROC given the discussion in §2.4.

A third example involves what might look at first like a depictive, in North Sámi (Nickel and Sammallahti 2011). Nickel and Sammallahti call this derived

¹⁴This contradicts the proposals of McCawley (1968) and Starke (2014a;b) inter alia, where it is specifically argued that morphemes contain complex syntactic structures. It seems to me that the convincing examples of morphemes spelling out complex structures always involve complementation, hence spans. To discuss the examples involving complex noncomplement (‘left’) branches which have been proposed would take me too far afield. A partial reconciliation which would be compatible with my proposal and my empirical arguments would be if complex left branches within morphemes were restricted to a size smaller than a phase. In this paper I pursue the stronger position, that left branches cannot be included at all, partly as a matter of methodology, since the difference hinges partly on exactly how far syntactic decomposition goes, and partly on the identity of phases.

form the ‘cursive’ (p. 611).

- (32) a. guohc-ild-it
smelly-CURSIVE-INF
 ‘move, of something smelly’
 b. čáhp-uh-it
black-CURSIVE-INF
 ‘move, of something black’

The cursive suffix is variably *-ild* or *-uh*, depending on the verb stem. On my proposal, this has to involve complementation, because of the affixal nature of the cursive, as witnessed by its lexically controlled allomorphy (as I discuss further in §4.4). Given that it involves complementation, the property of being smelly or black must be the essential part (the “body” in the sense of §3) of the event described. Accordingly, unlike a depictive, these verbs most naturally refer to an individual-level property, that is, they mean ‘move [of something with property x],’ rather than ‘move while being in a state x.’

4.3 Syntactic structure and morphophonological structure

Syntactic structure provides the input for prosodic structure built by the phonology. Phonological computation may distort that structure, so that the output is not identical to the input, but differences will be phonologically motivated. For example, suppose that a certain syntactic structure Z (say, the English copula) maps to a phonological word in the input, but the exponents spelling out Z lack a vowel (e.g. its phonological content is simply /z/). The phonological word must contain a prosodically prominent head, which entails a syllabic nucleus. Language-specific phonological constraints determine whether an available nonvowel can be the syllabic nucleus (in English, /z/ cannot be syllabic), or whether a vowel is epenthesized, or whether the prosodic word containing the prosodically defective element is deleted, so that the prosodically defective element is incorporated into adjacent prosodic structure—a case of what Zwicky (1977) called a simple clitic, a clitic whose position is determined entirely by the syntax, but which is prosodically dependent on adjacent material.

In that case there is a mismatch between the prosodic input determined by the syntax (Z maps to a phonological word) and the prosodic output computed by the phonology (/z/ is cliticized onto the subject).

Adapting the Mirror Theory proposed by Brody (2000a;b), I will assume that embedded phrases—syntactic specifiers and adjuncts—are always mapped to phonological words in the input to phonology. This means that in the input to phonology, each specifier and each adjunct is a domain for lexical insertion and phonological processing (see Svenonius 2016 for detailed discussion).

The fact that a specifier or adjunct is a domain for lexical insertion has both morphological and phonological consequences. Morphologically, it means that it must have a distinct morpheme as its exponent. In other words, a morpheme cannot spell out a head together with its specifier or adjunct (though either

or both could be null). This imposes a strong restriction on portmanteaux, as already discussed in §4.2.

Phonologically, the fact that a specifier or adjunct is a domain for word formation means that in the input to phonology, it is a phonological word. Any deviation from this in the output (i.e. the surface form) must be phonologically motivated, e.g. by prosodic defectiveness of the exponent. This in turn means that the normal phonological realization of a head-complement sequence does not contain word boundaries; thus, a head-complement sequence is normally spelled out as a single word, and hence a head is an affix (a true affix, not simply a clitic) on its complement, unless something causes it not to be. I discuss these matters further in §4.4.

Consider two examples of complex predicates which diagnose, according to their meaning, as ACPs, but which are contained within a single word. The prediction here is that the two morphemes contributing thematic or event-descriptive information to the complex predicate are separated by a word boundary in the input to phonology, even if this is partly obscured by the phonological computation.¹⁵

Foley (1997) discusses a ‘visual’ (VIS) applicative *taŋkway* in Yimas, which entails that the agent is watching the beneficiary during the action.

- (33) a. na-n-taŋkway-iray-cut
 3SGO-3SGA-VIS-*cry*-RM.PAST
 ‘He cried over her’ (looking at her body in the canoe)
 b. na-mpu-taŋkway-iranta-irm-kia-ntut
 3SGO-3PLA-VIS-*dance-stand*-NIGHT-RM.PAST
 ‘They danced for her’ (in her honor, watching for her response)

Foley analyzes this in terms of an argument-sharing predicate, along the lines of what Baker and Harvey (2010) call coindexation. If Foley is correct, then the applicative in question both assigns at least one thematic role to the beneficiary (it is the object of seeing as well as the beneficiary) and another to the agent (possibly via control). Given the assumption, adopted in §2.4, that each thematic role is assigned by a distinct head, this means that the visual applicative *taŋkway* consists of at least two heads.

The fact that the applicative consists of two heads does not prove that it is not in the extended projection of the verb, as applicatives are standardly assumed to be in the extended projection of the verb (Pylkkänen 2008) and portmanteau morphemes can spell out contiguous sequences of heads. However, the meaning relation between the watching and the main verb is one of simultaneity, like a depictive, rather than of central constitution or causation, as would be expected if the relation were the mereological one posited in §3 for complementation. Thus the meaning points to this applicative being an ACP,

¹⁵The same applies to the examples mentioned by Baker and Harvey (2010) as single-word cases of coindexation, for example Alamblak *dbēhna-noh-me-r* ‘sick-die-REM.PAST-3SGM’ ‘he was sick and died.’ My prediction is that *dbēhna* ‘sick’ is separated from *noh* ‘die’ in the input to phonology, and this may be detectable through morphophonology.

not a CCP. The prediction of my proposal, then, is that it should be separated from the verb root by a word boundary in the input to phonology.

Indeed, Foley (1991:84ff) states that related classes of complex predicates in Yimas (valence-increasing prefixes and compounded verbs) are separated from the verb stem by a phonological word boundary ‘#’ (despite being immobilely bound to the verb), as diagnosed by various phonological and morphological effects. No such effect is discussed specifically for *taɲkway*, but the discussion of the class as a whole suggests that *taɲkway* too is separated from the verb stem by a phonological word boundary, as predicted on my account.

Rice (2010) discusses ‘activity incorporates’ in Athabaskan languages, including Koyukon.¹⁶

- (34) a. sel-he-ghe-d-o-l-deɬ
 shout-3PLS-QUAL-QUAL-PROG-VOICE-PL.*go*
 ‘They are going along shouting’
 b. k’eleek-ghe-d-o-l-kkaat
 song-QUAL-QUAL-PROG-VOICE-*paddle*
 ‘He is paddling along singing’

Rice applies the Baker and Harvey (2010) diagnostics and concludes that the activity incorporate is a coindexation predicate. It would be an ACP in my terms, following the same reasoning applied to Yimas—for example, the incorporate describes a simultaneous, accompanying activity rather than an integral part of the event; and the agentiveness of shouting or singing requires a bipartite predicate, given configurational thematic role assignment. The Koyukon activity incorporate forms a near-minimal contrast in this respect with the North Sámi ‘cursive’ examples in (32), where the property description was an integral part of the motion. Thus, although it is morphologically incorporated into the verb, my proposal predicts that just as with the Yimas visual applicative, there should be a phonological boundary between the Koyukon activity incorporate and the verb into which it is incorporated.

Indeed, it is well established for Athabaskan languages that there is a significant phonological boundary between a class of ‘disjunct’ prefixes and the verb (Kari 1976 *inter alia*). This boundary is normally marked #, as seen in Kari (1976) and Rice (2000). The activity incorporates belong to this class, so the prediction of my proposal is fulfilled.

4.4 Morphology and word formation

I have established that specifiers and adjuncts are separated from the projection line in which they are inserted by a word boundary in the input to phonology. This manifests itself in morphological and phonological restrictions, as already noted in §4.3. Morphologically, portmanteau cannot cross the word boundary,

¹⁶In the gloss, 3PLS is the third person plural subject agreement, QUAL is a ‘qualifier’ (which can be aspectual or indicate noun gender class or be lexically listed as part of the predicate), and PROG is progressive.

and contextual allomorphy cannot be conditioned by lexical classes across a word boundary. This means that arbitrary allomorphy of the type seen in (32), where different verb stems take different cursive suffixes, is a sign that an affix is included within the smallest phonological word (cf. Svenonius 2015). Phonologically, the word boundary may be observed as a barrier to assimilative processes, for example, subject to the specifics of the phonology of the language in question.

Brody (2000a;b) further proposes that the linearization imposed by spell-out on affixes within a word places superordinate material to the right, that is affixes are suffixes unless specified otherwise (see Bye and Svenonius 2012 on the lexical specifications of prefixes).

Elements within the projection line, then, are spelled out as a single phonological word (Brody 2000a;b), morphologically right-headed, unless a boundary intervenes. A phase introduces such a boundary (Marantz 2001, Marvin 2002, Newell 2008), but boundaries are also commonly introduced lexically. For example, the portmanteau *du* for *de* ‘to’ plus *le* ‘the’ in French shows that P takes D as a complement with no phrase boundary intervening in French (Svenonius 2012). But the fact remains that most instances of P and D are spelled out as head-initial sequences of function words in French, e.g. with the feminine definite article as in *de la maison* ‘to the house.’ There is no phonological word boundary between *de* and *la*, but it is clear that *de* is not suffixed to *la*. Thus there must be a feature ensuring that, for example, *de* is not affixal.¹⁷

5 Selection: The complement as privileged dependent

The theory of complementation outlined in this paper is primarily motivated by extended projections, head-complement sequences within the same major category. Arguments of lexical verbs, though traditionally analyzed as complements, are often specifiers on the model adopted here, for example any noun phrase with a thematic role such as theme or patient is typically a ‘undergoer’ or ‘resultee’ in the theory outlined in Ramchand (2008b), hence a specifier of PROC or RES.

However, some traditional complements may still be complements in the newer sense, and in this section I explore the possibility that clausal arguments of verbs are indeed typically complements, rather than specifiers. If that is correct, then an additional syntactic consequence of complementation can be demonstrated, namely that c-selection holds of complements, but not of specifiers or adjuncts.

¹⁷The fact that determiners are not suffixal on the noun in French is quite general, suggesting a syntactic phase boundary between N and D (see Svenonius 2004 on DP-internal phase boundaries). Syntactic phase boundaries are normally taken to be crosslinguistically invariant, so it is of some interest that Norwegian has a low definite suffix which shows affixal properties, see Svenonius (2015).

Various theories and descriptive frameworks for language recognize a complement relation. The canonical example of a complement is a subcategorized internal argument of a verb, for example *complain* takes a finite clausal complement, but not an infinitival one or one with *ing*, and *want* takes an infinitival, but not a finite or *ing* complement, while *describe* takes *ing* complements but not finite or infinitive complements.

- (35) a. Tracy {complained/*wanted/*described} that we should go left.
- b. Tracy {*complained/wanted/*described} to go left.
- c. Tracy {*complained/*wanted/described} going left.

Verbs show great variety in the kinds of complement clauses they select. For example, the following data set shows that selection for finite and nonfinite C are independent of each other (based on Rudanko 1989).

- (36) Both finite and nonfinite complements
 - a. They requested/prayed/learned/hoped that we should intervene.
 - b. They requested/prayed/learned/hoped to intervene.
- (37) Finite complement but not nonfinite
 - a. They denied/bragged/trusted/ruled that we should intervene.
 - b. *They denied/bragged/trusted/ruled to intervene.
- (38) Nonfinite complement but not finite
 - a. They wanted/entreated/aimed/conspired to intervene.
 - b. *They wanted/entreated/aimed/conspired that we should intervene.

Thus a verb like *deny* can lexicalize a V which has merged with a finite C but not a control C, and a verb like *want* shows the opposite pattern, while verbs like *request* can lexicalize either. Thus selection for control C and selection for finite C are independent of each other.

The pattern is actually more complex. Some verbs which reject subject control allow object control:

- (39) a. They trusted *(us) to intervene.
- b. The judge ruled *(the defendant) to have committed perjury.

Thus these verbs are compatible with control C, but only if they also take an object controller. The low controller can be seen as a kind of indirect object, which originates in one of the projections spelled out by the verb. Thus the possibility of object control is also arguably a question of selection. Again selection for (subject) control CP and selection for the complex of an object plus a control CP are independent (pattern again based on observations in Rudanko 1989).¹⁸

¹⁸Because of irrelevant details of lexical semantics, context is important for judging some of these examples, for example *The judge ruled Mary to have intervened* is easier to contextualize than *John ruled Mary to intervene*, but the latter is acceptable if John has the legal authority to determine whether what Mary does is intervention or not; similarly *%I pray God to help me* is easier to contextualize than *%John prayed Mary to intervene*, but the structure is the

- (40) Subject control, but not object control
 - a. They aimed/conspired/learned/hoped to intervene.
 - b. *They aimed/conspired/learned/hoped us to intervene.
- (41) Object control, but not subject control
 - a. They provoked/coaxed/trusted/ruled us to intervene.
 - b. *They provoked/coaxed/trusted/ruled to intervene.
- (42) Object control or subject control
 - a. They wanted/entreated/requested/prayed to intervene.
 - b. They wanted/entreated/requested/%prayed us to intervene.

In sum, there are several features of C which V must be sensitive to, when C heads a complement. External arguments are not subject to this degree of selection, for example verbs do not subcategorize for different categories of subjects (Svenonius 1994a), and consistently with this, external arguments are often treated separately from complements.

Furthermore, note that the close control that a verb has over its complement is arguably limited to the category of the complement (Baltin 1989); verbs don't select for internal details of the complement. Verbs don't select for complement clauses with certain kinds of subject, or with passive verbs.

For a syntactic object to select a category of complement, it must bear a feature to that effect. But the feature of the complement must be kept distinct from the category projected by the whole. For example, V selecting a C complement must be distinguished from C selecting V; when this V merges with a CP, it must be V which projects, not C, perhaps surprisingly given that C is the feature shared by the two (see Chomsky 2013 on the projection of shared features). Somehow, the subcategorization feature must be prevented from projecting, for example by its being uninterpretable. An uninterpretable C feature could be assumed to be deleted upon merge with an interpretable C (but see note 20).

If it is correct that traditional complement clauses are also complements in the formal sense I have developed in this paper, then complementation is not restricted to extended projections (Grimshaw 2005).¹⁹ Extended projections are a subset of complement structures. The term embedding can generally be applied to all cases which do not involve extended projections: specifiers, adjuncts, and the kind of complements discussed here.

If this line of thinking is correct, then phase status cross-cuts embedding, since there are phasal and nonphasal complement clauses, and there are also

same. Nonetheless, there seem to be speakers for whom both of the latter are ungrammatical, and a preposition is required: *I pray to/for God to help me*, in which case those speakers don't have an object control entry for *pray* (hence the % symbol before the sentences which are idiolectally restricted). The point here is unaffected.

¹⁹Adger (2013) argues that extended projections are created by self-merge, that is, no external element is merged, but a category is projected. The category is then labeled according to a functional hierarchy. This would mean that the construction of extended projections is entirely different from complement selection. Still, the nature of the dependency might be the same.

phase boundaries inside extended projections (*vP* inside CP). We might also expect both phasal and nonphasal specifiers and adjuncts, e.g. an incorporated object might be a nonphasal specifier, while a DP object might be phasal, and a finite clausal adverbial might be phasal while an incorporated adverbial might be nonphasal.

The partial independence of phasehood, embedding, and complementation is illustrated in the following table.

(43)

	Phase	Embedded	Complement
Embedded finite clause	+	+	+
DP argument, Finite adjunct	+	+	–
<i>vP</i> in CP	+	–	+
Utterance	+	–	–
ECM complement	–	+	+
(Some) Adv, incorporated N	–	+	–
Subpart of Ext. projection	–	–	+
*	–	–	–

Phases may be embedded or may continue extended projections, and may be complements or noncomplements, but a nonphase must either be a part of an extended projection, or must be embedded, under something which allows it to be interpreted.²⁰

Returning to complex predicates, what this means is that the higher head in a CCP can exhibit a high degree of selectivity for its complement. For example, the outer causative *-h-/-ahht-* of North Sámi (as seen in (13) in §2.1) can select for a full *vP*, while the inner causative *-d-* can select for a smaller VP (Julien 1996), and the higher verbs or light verbs of Baker and Harvey’s coverb (Merger) construction can exhibit a similarly high degree of selectivity for their coverb complements. In a resultative, the relationship between process and result is highly constrained, so only elements which can lexicalize the result state or appear as its complement can appear as resultative predicates.

ACPs are not expected to show c-selectional restrictions, though there are various kinds of constraints on adjuncts. For example, Rice (2010) notes various restrictions on the activity incorporates of Koyukon (discussed in §4.3). For example, the host verb must be an intransitive motion or body stance verb or a verb of locution; that only these provide a host for this class of incorporates does not suggest that these verbs c-select for incorporates the way, e.g. *complain* c-selects for a finite clausal complement. Rice also notes that the incorporated

²⁰The notion of extended projection opens up another way to think about c-selection. In an extended projection where F takes G as a complement, F is necessarily higher than G in the cartographic hierarchy. C-selection of the type discussed in this section involves a lower G taking a higher F as a complement. That is, for any <F,G>, a span in an extended projection, <G,F> could be a G c-selecting for an F complement. Suppose, for example, that F is Finiteness, G is V, and that *complain* spells out <G,F>. If sequences of <F,F> systematically reduce to <F>, then the merge of <G,F> (e.g. *complain*) with <F, ...> (e.g. *that ...*) could yield <G,F,...> (i.e. *complain that ...*), in which case subcategorization could be achieved without uninterpretable features.

element describes an oral activity. Such broadly semantically characterizable conditions belong to conceptual structure or nonsyntactic semantics, which is the purview of s-selection. S-selection is not restricted to complements, e.g. a subject can be required to be animate, by s-selection. Fleshing out the nature of conditions on adjuncts and comparing those with c-selection remains to be accomplished, but the prediction of the model is that fine-grained selection of syntactically relevant features is possible for heads combining with complement predicates to form CCPs, but not possible for heads combining with adjunct predicates to form ACPs.

6 Conclusion

I have argued that the complement relation should be recognized as a kind of syntactic dependency distinct from adjunction and specifierhood.

I have suggested that the complement relation constrains spell-out in two ways. First, morphemes are constrained to spell out ‘spans,’ which are defined in terms of complementation. Second, complement sequences have a special status in the formation of the phonological word. In these two ways, complement sequences are relevant to the external manifestation of syntactic objects, and so are relevant to whether a predicate is complex or not.

I have also argued that complementation is relevant to syntactic selection; a head selects for a complement, but not for its specifiers or adjuncts. This is one way in which CCPs (complementive complex predicates), including light verb constructions and coverb constructions, differ from ACPs (adjunctive complex predicates), including typical serial verb constructions.

Furthermore, I have suggested that complementation corresponds to a particular mode of semantic interpretation, in a strictly compositional semantics, a mode of combination which is distinct from that of adjunction and specifierhood. I have suggested that adjunction is interpreted as conjunction, specifiers are interpreted as ‘subjects’ (or ‘Figures’). To the extent that the specifier corresponds to our traditional notion of subject, the complement sequence is the predicate of that subject, hence again highly relevant to our understanding of complex predicates. Complements, I have suggested, are interpreted as mereological ‘bodies’ (building on the metaphor of ‘head’) or Grounds, in terms of the Figure–Ground gestalt.

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