

# Mapping a Parochial Lexicon onto a Universal Semantics

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## 1 Modularity and the Structure of the Language Faculty

In this paper we address the question of whether it makes sense to talk of ‘semantic parameters’ in natural language. Essentially, this is a question about modularity. Is there a ‘semantic module’ in which parametric variation can reside? We argue that there is not, though there is variation that is semantic in nature; we propose a way to treat it which does not invoke semantic parameters as they are usually understood.

Languages clearly vary in their inventories of words or lexical entries, with different conceptual content and associations. Such differences are to a large extent arbitrary and probably limitless, not reducing to any obvious discrete parametric system. Supposing that those details which are not syntactically relevant can be identified and set aside (we will refer to them as encyclopedic, in essentially Borer’s 2005a sense), it becomes possible to pose questions about that variation which is systematic, as we do here.

The question of modularity is a fundamental one in theoretical linguistics: to what extent is there compartmentalization of linguistic function? In our case, does a semantic module mediate between syntax proper and what Chomsky (2004) calls the Conceptual-Intentional systems (C-I)? Minimalist reasoning suggests that we explore the possibility that there is no modularization within syntax-semantics, and that a uniform system presents syntax/semantic representations which are interpretable by C-I. In that case, that variation among languages which is not encyclopedic can only reside in featural specifications of lexical items. Within these strict architectural limits, is it possible to make sense of all the variation among languages where meaning seems to be implicated? We will argue that it is both possible and desirable to do so, but that it requires a division of ‘semantic’ information into one subset that is an inherent part of the syn/sem computation, and another that can be cashed out through general conceptual mechanisms.

### 1.1 Underspecification of Lexical Content

This raises the question of whether C-I is uniform from one language to the next, or subject to variation. Once again, purely conceptual reasoning leads us to the zero hypothesis, that (since we know there is variation in syntax) there is no variation within C-I (more precisely, systematic cross-linguistic variation is not to be explained in terms of different C-I systems).

That leaves two possibilities: either the mapping from syntax to C-I is trivial, in which case all syntaxes have to be the same (and highly abstract) at the interface, or else the mapping from syntax to C-I is nontrivial, in which case two languages might express ‘the same thought’ while feeding off different syntax/semantic representations.<sup>1</sup> Thus, while we wish to claim that the *system* constructing syn/sem representations is the same for all languages (a universal computational system), we do not think that this forces the final representations for ‘the same thought’ to be the same, essentially because of the fact that different lexical ingredients may be available in different languages. On one level, this is an obvious point, and one which can be demonstrated for contentful lexical items whose encyclopedic content may vary from language to language. For example, to report an act of smoking a cigarette, a Bengali speaker may say (1a), where the verb used is the same one that is used for both eating and drinking as well, while an English speaker might say (1b), using a smoldering inhalant-specific lexical item ‘smoke.’<sup>2</sup>

- (1) a. ami sigret khacchi  
I cigarette imbibe.PROG.PRES.1SG  
‘I am smoking a cigarette.’  
b. I am smoking a cigarette.

Here, we claim that there is no reason to believe that the Bengali speaker and the English speaker are expressing ‘different thoughts’ in the relevant sense. Rather, the Bengali speaker uses a more underspecified lexical item referring to general imbibing, whose specific situational reference must be negotiated through sentence-contextual and real world information.

Examples such as this can be multiplied, but they are not restricted to purely lexical content words. In many languages, the pronominal system distinguishes between a first person plural inclusive and a first person plural exclusive form. If a language does not distinguish, then its first person plural form must do double duty, and the specific meaning retrieved from context.

The same is true for languages with explicit dual marking, exemplified below for Northern Sámi. English does not express dual marking, but uses one word (underspecified) for both situations. The question is whether two concepts correlate with different features in the syn/sem system itself, with morphological homonymy (as in (2)), or whether the C-I system simply

translates ‘we’ in English more vaguely with the extra information filled in (when needed) by some nonlinguistic process, as suggested by (3).

- (2) First person plural and dual pronouns

	SYNTAX/SEMANTICS	CONCEPTUAL-INTENTIONAL
<b>Northern Sámi</b>	<i>mii</i>	“I and others”
	<i>moai</i>	“I and one other”
<b>English</b>	<i>we</i>	“I and others”
	<i>we</i>	“I and one other”

- (3) Simplified

	SYNTAX/SEMANTICS	CONCEPTUAL-INTENTIONAL
<b>Northern Sámi</b>	<i>mii</i>	“I and others”
	<i>moai</i>	“I and one other”
<b>English</b>	<i>we</i>	“I and one or more others”

In this paper, we will claim that the latter situation exists, not just for contentful lexical items, but systematically for a variety of ‘meanings’ that have traditionally been considered functional. This does not mean, however, that variation is limitless. Rather, we defend the position that certain features are universally present in the syn/sem representations constructed by the computational system, but that two things can systematically vary: their particular encyclopedic content, and the information they carry that is relevant to discourse tracking and referential access systems. Deciding which features are universally necessary to a well-formed syn/sem representation, and which ones can be contextually filled in (and are therefore, on our hypothesis, subject to cross-linguistic variation) is an empirical issue. Acknowledging this potential locus of variation, however, is important in assessing claims about the universal properties of the syn/sem combinatorial system.

We assume that the same C-I interpretational *mechanisms* are available to all languages, and are fed by the same universal syn/sem system. However, the syn/sem system inevitably underdetermines full contextually augmented meaning. Hence the points of variation in this domain will concern meaning contributions that are not part of the narrow computation proper but which could be part of the lexical information of a particular item in a particular language. At one level, this is the most trivial kind of cross-linguistic variation: if you don’t have a word for *tomorrow* you can always say ‘the day after today.’ But at another level, it can have serious repercussions especially when the lexical items in question are more abstract, an area of variation that we think has been underappreciated. In this paper, we give some examples of systematic differences between syntactically and post-syntactically provided meaning components, where it is not necessary to assume either that the LF representations are identical or

even that each language has a differently constituted semantic component.

### 1.2 *Against a Distinct Semantic Component*

To distinguish our idea clearly from one which involves a semantic component, we give an example of a specific recent analysis that does assume a semantic component which can be a locus of parametric variation. Chierchia (1998a;b) analyzes the variation in the expression of noun phrases in Chinese, Italian and Russian. Chierchia suggests that Chinese NPs are semantically arguments (type e), whereas Italian NPs are predicates, and are converted into arguments by a syntactic head, D. Russian, on Chierchia's analysis, represents a third possibility, in which NPs are predicates but are made into arguments by a type-shifting rule.

Chierchia's analysis is designed to account for differences in the distribution of 'bare' (determinerless) noun phrases, for example as illustrated in (4), where Italian places strict restrictions on prenominal bare plurals, correlated in his analysis with the conditions on licensing of null D. Chinese, which has type e NPs, and Russian, which can type-shift NP to type e, do not have the same restrictions.

- (4) a. Xuesheng lai le.  
       student come PERF  
       'The student(s) came' (Chinese)
- b. \*Bambini sono venuti da noi.  
       children are come by us  
       ('Children came to our house') (Italian)
- c. Student vo-šël v komnatu.  
       student in-came in room  
       'A/The student came into the room.' (Russian)

In Chierchia's model we see that the very same syntactic form can give rise to two different semantic types in the different languages. The analysis proposed by Chierchia is schematically represented below in table (5).

(5) Chierchia's model

	SYNTAX	SEMANTICS	CONCEPTUAL-INTENSIONAL
<b>Italian</b>	NP	$P_{\langle e,t \rangle}$	predicate
	$DET_Q$	$Q_{\langle \langle e,t \rangle, \langle \langle e,t \rangle, t \rangle \rangle}$	quantificational determiner
	$DET_Q(NP)$	$GQ_{\langle \langle e,t \rangle, t \rangle}$	generalized quantifier
	$DET_D$	$\iota_{\langle \langle e,t \rangle, e \rangle}$	definite article
	$DET_D(NP)$	$D_e$	definite description
<b>Chinese</b>	NP	$K_e$	kind
	$DET'_Q$	$Q'_{\langle e, \langle \langle e,t \rangle, t \rangle \rangle}$	quantifier plus lowerer
	$DET'_Q(NP)$	$GQ_{\langle \langle e,t \rangle, t \rangle}$	generalized quantifier
<b>Russian</b>	NP	$P_{\langle e,t \rangle}$	predicate
	$DET_Q$	$Q_{\langle \langle e,t \rangle, \langle \langle e,t \rangle, t \rangle \rangle}$	quantificational determiner
	$DET_Q(NP)$	$GQ_{\langle \langle e,t \rangle, t \rangle}$	generalized quantifier
	NP	$D_e$	definite description (by type-shift)

According to Chierchia's proposal, the type-shifting process used by Russian is generally available, but its use is blocked in Italian by the availability of a definite article (type-shift as a last resort). The difference between Chinese and Russian is that in Chinese, NPs translate into type  $e$  and do not require any determiner to fill argument positions.

This is the kind of analysis that we claim to be unavailable in general. Instead, there are only two simple possibilities for the location of this difference between Chinese or Russian and English: it is in the syntax, that is, some other syntactic operator (another kind of  $D$ , for example an unpronounced one) is present in the apparently determiner-less languages; or it is in C-I, that is, the C-I can interpret an NP as an argument. In fact, recent work in both Chinese (Cheng and Sybesma 1999, Borer 2005b) and in Russian (Englehardt and Trugman 1998, Babyonyshev 1998) has argued for the presence of a null functional head performing the function of  $D$  in these languages.

For example, Cheng and Sybesma (1999) argue that classifiers in Chinese function in a way very similar to the way determiners do in Italian. They point out that in contexts where a bare  $N$  is ungoverned, certain readings are absent, just as in Longobardi's (1994) analysis of Italian. Furthermore, Cheng and Sybesma argue that in those contexts where Italian allows a seemingly bare  $N$  due to  $N$ -to- $D$  movement, Chinese has  $N$ -to- $Cl$ [assifier] movement. Thus, according to them, argumental noun phrases in Chinese are not simply NPs, but have functional structure, which we can loosely characterize as  $D$  for our purposes (though Cheng and Sybesma identify distinctions between the  $D$  of Italian and English and the  $Cl$  head of Chinese).

For Slavic, too, there are various arguments for functional structure in the noun phrase, despite the absence of articles. For example, Rappaport (to appear; 2001) shows that extraction from argumental noun phrases in Polish is bad, but extraction from predicative noun phrases is acceptable, as illustrated in (6).

- (6) a. Zlikwidowano klub, którego jestem honorowym członkiem.  
they.disbanded club of.which I.am honorary member  
‘They closed the club of which I am an honorary member’  
b. \*Zlikwidowano klub, którego wczoraj poznałem honorowego  
they.disbanded club of.which yesterday I.met honorary  
członka.  
member  
(‘They closed the club of which I met an honorary member yesterday’)

As Rappaport argues, this can be straightforwardly accounted for in terms of a structural difference between DPs and NPs. Of course, an account which does not assume an additional layer of structure in (6b) can be developed, but what it would do is to mimic the effect of a D layer.

In a similar vein, Romanova and Diakonova (2003) have argued that in Russian, extraction is possible from some NPs, when interpreted non-specifically, but not from others that are interpreted as specific. This is true even though neither NP shows a determiner overtly.

Under this latter kind of analysis, no semantic component would be necessary, and Chierchia’s schema in (6) comes out as the simpler table in (7).

(7) Our model

	SYNTAX/SEMANTICS	CONCEPTUAL-INTENSIONAL
<b>Italian</b>	NP <sub>⟨e,t⟩</sub>	predicate
	QP <sub>⟨⟨e,t⟩,t⟩</sub>	generalized quantifier
	D <sub>1</sub> P <sub>e</sub>	definite description
	D <sub>2</sub> P <sub>e</sub>	indefinite
<b>Chinese</b>	NP <sub>⟨e,t⟩</sub>	predicate
	QP <sub>⟨⟨e,t⟩,t⟩</sub>	generalized quantifier
	DP <sub>e</sub>	definite description or indefinite
<b>Russian</b>	NP <sub>⟨e,t⟩</sub>	predicate
	QP <sub>⟨⟨e,t⟩,t⟩</sub>	generalized quantifier
	DP <sub>e</sub>	definite description or indefinite

We think that on conceptual grounds, the theory that does not have a separate semantic component or module is superior to one which multiplies linguistic levels of representation in this way. Such a view would have the

burden of proof, and we should prefer any analysis with the same empirical coverage that does not require such a component.

### 1.3 *Against Identical LF Representations*

Taken to their logical conclusion, the conceptual reasons for not invoking a semantic component for the analysis of syntactic phenomena (such as the distribution of determiners just discussed) would give rise to an architecture where LF representations of the ‘same thought’ in different languages are analysed as more and more similar to each other, even in the face of increasing abstractness. Such a view would essentially force us into the position of assuming universal syntactic status for every ‘feature’ that shows morphosyntactic representation in even one human language.

In our view, however, the assumption of identical LFs would also miss important generalizations. While certain syn/sem elements (such as D, by hypothesis in the example above) are necessary to the computation, some others are clearly negotiated contextually. We suggest that general, non-linguistic properties of the C-I system allow C-I to interpret certain aspects (but not others) of syntactic representations which may be left underspecified by the syntax, for example, coindexation, identification of referents, etc. We suggest that the power of C-I to fill in such information is very different from what is usually envisioned as part of a linguistic semantic component. For example, syn/sem features must be present *throughout* the syntactic derivation (cf. the Projection Principle of Chomsky 1981); C-I introduces information afterwards (possibly in a cyclic fashion, cf. Chierchia 2004), so that it cannot be referred to by syntactic rules. Furthermore, C-I interpretations are likely to be subject to coercion.

In the example given above, the difference between Italian on the one hand and Chinese/Russian on the other survives as a difference in the syn/sem representations of the two language types (or LF, in traditional terminology) in our table (7). Specifically, Italian has two distinct D elements each of which carries different information concerning the discourse familiarity of the referent denoted by the DP. In our view, discourse definiteness is precisely the kind of ‘feature’ that can either be expressed by a language’s lexical items, or filled in post-linguistically by the C-I system itself as a matter of crosslinguistic variation. Chinese and Russian both have an ‘underspecified’ D, whose specific interpretation and organisation within a discourse representation is filled in by the C-I system. Because D heads in the phrase structure are required by UG, their presence can be inferred by the language learner and do not require overt morphophonological instantiation; because only one null item is inferred, its semantics must reduce to creating an entity interpreted as type *e* (the minimum required by the syn/sem computation) with everything else left underspecified.

#### 1.4 Possible Refinements

Even in languages that are very similar, such as English and Norwegian, we find differences in the distribution and interpretation of articles. For example, Norwegian has suffixal articles which can encode definiteness when used with a bare noun, but which must be ‘doubled’ with a word-like determiner element when an adjective is present ((8)).

- (8) Norwegian double definiteness
- a. et hus ~ huset  
a house house.DEF  
‘a house’—‘the house’
  - b. et stort hus ~ det store huset  
a big.N house the big.WK house.DEF  
‘a big house’—‘the big house’

The definite suffix is also required with demonstratives and possessives ((9)).

- (9)
- a. den koppen ~ denne koppen  
that cup.DEF this cup.DEF  
‘that cup’—‘this cup’
  - b. koppen min ~ koppen til Ingebjørg  
cup.DEF my cup.DEF to Ingebjørg  
‘my cup’—‘Ingebjørg’s cup’

When it comes to interpretational distribution, the definite suffix in Norwegian is required for abstract mass nouns ((10a)), and for kind denotations ((10b)) (Halmøy 2005), whereas English requires bare nouns in the first context and allows them in the second, as suggested in the translations.

- (10)
- a. Livet/\*Liv er ikke en film.  
life.DEF/life is not a film  
‘Life is not a film’ (\*‘The life...’)
  - b. Lyspæra/\*Lyspærer ble oppfunnet av Edison.  
lightbulb.DEF/lightbulbs became invented by Edison  
‘Lightbulbs were invented by Edison’ (or: ‘The lightbulb...’)

In general, the definite suffix in Norwegian may actually be correlated to ‘specificity’ (Anderssen 2006, Julien 2005), while the word-like determiner element is responsible for familiarity. This can be seen in the following examples, from Anderssen (2006): the nouns *intensjoner* ‘intentions’ and *bit* ‘bit, small piece’ do not have the definite suffix. To include the definite suffix here (*intensjonene*, *biten*) would be grammatical, but would give an inappropriate meaning: an implicit comparison of intentions, an actual smallest piece not eaten.



- (11) Definite suffix correlated to ‘specificity’:
- a. Han har de beste intensjoner.  
     he has the best intentions  
     ‘He has the best intentions’ (i.e. very good ones)
  - b. Jeg spiste ikke den minste bit.  
     I ate not the smallest piece  
     ‘I didn’t eat any piece at all’

In the absence of strong evidence that these correspond to distinct heads within a nominal extended projection, each with a distinct compositional semantic interpretation (and pending such a theory), we speculate that one way to see these facts is as in the table in (12) below.

- (12) Parametric variation in the negotiation of definiteness

	NORWEGIAN	ENGLISH	RUSSIAN
<b>Argumenthood</b>	Syntax/Semantics	Syntax/Semantics	Syntax/Semantics
<b>Familiarity</b>	Syntax/Semantics	Syntax/Semantics	C-I
<b>Specificity</b>	Syntax/Semantics	C-I	C-I
<b>Tracking</b>	C-I	C-I	C-I

In other words, Norwegian has a suffix explicitly signalling specificity as well as a prenominal definite article signalling familiarity, but leaves reference tracking up to C-I; English signals familiarity with the definite article but leaves what we are calling specificity up to C-I, as well as discourse tracking; and Russian, lacking a definite article, resolves familiarity, specificity, and discourse-tracking at C-I. This does not mean that Russian has no D, however, as (we assume) D is necessary to provide an argument in the first place (there being no semantic module in which to type-shift independently of the syntactic structure).

## 2 Discourse is Different

We have so far exemplified the logic of our position using analyses of definiteness variation and the D head in various languages. This phenomenon is important because it highlights the differences between two distinct domains of meaning. We think that many of the other cases where a semantic module or parameter could be invoked fall into this category as well. In other words, we think there is something distinctive about the kinds of meaning which can in principle be ‘filled in’ within C-I.

There is some evidence that elements of meaning that are relevant to establishing cross-sentential relations and general discourse coherence are handled by a different component of the brain than the narrow syntactic computation. For example, Caplan (1992) claims, citing among others

studies by Stachowiak et al. (1977), Brookshire and Nicholas (1984), that aphasic subjects with otherwise impaired language abilities show no significant impairment on tasks involving discourse coherence. Caplan notes it as both a surprising and robust finding in this area of psycholinguistics.

On the other hand, lexical items that invoke procedural meanings have always been a point of contention for linguists working at the semantics-pragmatics interface. It is well known that languages carry information concerning cross-sentential relations. Certain quantifiers in English carry presuppositional information about the nature of the reference set (e.g. *both*, *neither*) (cf. Heim and Kratzer 1998), and others carry presuppositions about the inferential relationship between the current proposition and the previous one (*but*, *however*). In the case of English *but*, Grice (1975) categorized this type of semantic effect as a ‘conventional implicature’—conventional because it was part of the conventional linguistic meaning of the item, implicature because it contributed to ‘procedural’ or pragmatic inferences (as opposed to purely truth conditional in his terms).

Later work has tended to obscure the difference between sentence-internal semantic organisational facts and those relevant to cross-sentential and referential properties. Discourse Representation Theory for example, collects information from different sources to form complete representations which are only then subject to truth conditions (Kamp 1979, Kamp and Reyle 1993). From the point of view of the discourse representations constructed, the contribution made by the syn/sem system can include both logical information and constraints on real world reference. What we are proposing here is that discourse information is in principle different from the syn/sem system in being negotiable, but that information relevant to it *can* be provided by individual lexical items. This gives rise to an important potential locus of variation.

### 2.1 Contextual Variables

It is relevant here to say some words on the relationship between our proposal and the recent debates concerning ‘minimal propositions’ (Bach 1994, Stanley 2000, Recanati 2002). Subscribers to the view of ‘minimal propositions’ (Bach 1994, Recanati 2002) argue that even when linguistic utterances are free from vagueness, indexicality and figurative use they may still express something that underdetermines the actual intended meaning of the speaker. On the other hand, Stanley (2000) claims that genuinely underexplicit sentences that fall short of having truth conditions must nevertheless give rise to syntactic logical forms that do contain the necessary information. As an illustration of the disagreement, consider the sentence in (13) below which is taken from Bach (to appear).

- (13) Everyone *in my family* went to the wedding.

For Bach, the italicized portion of the sentence has no correspondent at all in the logical form of the sentence uttered without it, but needs to be supplemented at some non-linguistic stage of processing. For Stanley, the implicit restriction on the universal quantifier actually does correspond to something in the logical form, a placeholder in the syntax which is the ‘contextual variable’. Note that even for Stanley (2000), the specific filled-in information triggered by a contextual variable is not itself explicitly represented in the sentence, so that he too is dealing with some version of a ‘minimal proposition’ even in these cases.

There is now a respectable tradition of contextual variables being employed in the syntax of LF representations to provide place-holders for semantically necessary information whose details must nevertheless be provided by context (Stanley 2000, Martí 2003). They have been proposed for a wide variety of cases including the comparison classes for adjectives and restrictions on quantifiers (von Stechow 1995, Martí 2003), where these variables are analogous to pronominal elements. The situation here closely resembles that of pronominal reference, since it concerns the referential properties of the individual variable provided by the nominal (nominal specificity). In general, we are broadly in agreement with the strategy of augmenting syn/sem representations with variables for items that might not be morphosyntactically overt. In this sense, we think the Stanley strategy is correct and the existence of null syntactic elements is often forced by the logic of the syn/sem computation. But we deny the assumption of identical LF representations for the ‘same’ thought that would require them in *all* cases. We think that the elements requiring a place-holder in the syn/sem computation belong to a restricted class. Stanley (2000) claims that the contextual variable must be invoked whenever anything has an impact on truth conditions.

“... all truth-conditional context dependence results from fixing the values of contextually sensitive elements in the *real structure* of natural language sentences” Stanley (2000), p. 392 (our italics)

We adopt a more conservative position here and make no a priori claims about where the line is drawn: any element that is part of the UG syn/sem computation must be present, by definition, but what that consists of is a matter for empirical investigation. It is important for us that the identical LF hypothesis is not invoked to automatically exclude certain classes of solution. Rather, in the cases that we examine here, there seems to be genuine linguistic variation with respect to how much information about

the reference of linguistic variables is explicitly encoded in the logical forms of sentences.

## *2.2 Connection to Acquisition*

If certain features can be provided either by the linguistic system explicitly, or filled in at C-I as a matter of parametric variation, we must address the question of how these systems would be acquired. Our model is partly motivated by developments in acquisition theory. Different kinds of knowledge mature at different ages (cf. Borer and Wexler 1987, Wexler 1999), probably at least in part reflecting the physical development of brain structure. But at the same time, certain phenomena are acquired earlier in some languages than in others, where the signals are less clear. We hypothesize that early acquisition due to heavy exposure leads to the syntacticization of certain phenomena, while late acquisition of the analogous phenomenon in other languages, due to ambiguous signals in the speech of adults, results in the phenomenon being treated in the syntax-semantics mapping at the interface with the Conceptual-Intentional component.

For example, we argued above that some notion of specificity was syntacticized in Norwegian, but left up to C-I to mediate in English; the evidence we presented for this was that a certain notion of specificity which is left up to context in English is signalled by the definite suffix in Norwegian. As it happens, there is also evidence from acquisition that the definite suffix has a different status from the definite article in English.

For one thing, the definite suffix is acquired much earlier in Norwegian than the definite article is in English or German. Anderssen (2006) shows that around the age of two, a Norwegian child is already using the definite suffix in 82% of the contexts in which it is considered obligatory in the adult grammar, and not overgeneralizing it to inappropriate contexts. English two-year-olds, by comparison, are using the definite article in only 40% of obligatory contexts, and German children do not seem to be much different from the English speakers in this regard (see Anderssen 2006, ch. 7 for references and discussion). Furthermore, English-speaking children, at least, are known to overgeneralize use of the definite article, using it in contexts in which it is inappropriate (Schaeffer and Matthewson 2005).

Anderssen (2006) argues that the fact that the definite suffix is a suffix affects the way it is acquired. Essentially, children who are learning simple vocabulary are exposed to a high number of systematically alternating forms. A typical noun in both English and Norwegian is either monosyllabic or trochaic. Unstressed function words preceding the stressed syllable can be ignored when suffixes cannot, in the identification of the vocabulary item to be learned. This leads to earlier acquisition of a definite suffix than of a free definite article, all else being equal.

This means Norwegian children are specifying certain aspects of discourse reference, and are receiving constant input that allows them to check the correctness of their specifications, at an age where English children are not attending to such matters as closely. We speculate that this leads to systematic differences in the way discourse reference is handled in the grammar. Similarly, when English children are learning the correct use of the definite article, Russian children are not.

### 3 Case Study: Tense

So far, we have looked at a case that is plausible to interpret as being negotiated within the non-linguistic C-I component: it is clear that cases of reference assignment and knowledge of familiarity conditions in context are crucially involved in issues of definiteness within the nominal domain. We turn now to an apparently different case, although an equally common point of crosslinguistic variation, that of the presence or absence of tense morphology in a language. We will show that, under most recent analyses of tense interpretation, this too hinges on the definiteness or specificity of variable assignment, but this time of the tense variable.

It is now acknowledged within the literature on the semantics of tense, that tense should be explicitly represented as a  $t$  variable—the referential theory of tense (Partee 1984, Kamp and Reyle 1993 *inter alia*). Consider the interpretation of the simple past tense in English in the following sentence.

(14) I forgot to turn off the stove.

Although the morphological tense marking on the verb in English tells us that the event is located at some time previous to the utterance time, it does not say precisely when. In fact, the truth conditions of the utterance here depend crucially on there being a particular time moment (the moments prior to leaving the house) when I failed to turn the stove off, and the sentence is not true if the time variable is simply existentially bound. Heim (1994) goes even further, and assumes that the past tense itself introduces lexical presuppositions restricting the reference time, although this is vague, constraining the reference time to merely precede the utterance time and no more. Crucially the exact reference time is left up to contextual negotiation (via the variable assignment function  $g$  in the formula below).

(15)  $\llbracket \text{PAST}_i \rrbracket^{g,c}$  is only defined if  $g(i) < t_C$  (the utterance time), in which case  $\llbracket \text{PAST}_i \rrbracket^{g,c} = g(i)$ . (from Heim 1994:144)

We now turn to a particular case study of a language without explicit tense morphology, as analysed by Matthewson (2004). This is the case of Lillooet Salish. In Lillooet, a ‘tenseless’ sentence may be interpreted as either

present or past (unless otherwise noted, all data from Lillooet are taken from Matthewson 2004).<sup>3</sup>

- (16) a. táyt-an  
hungry-1SG  
'I was hungry/I am hungry.'
- b. k'ác-an'-lkan  
dry-DIR-1SG  
'I dried it/I am drying it.'
- c. sáy'sez'-lkan  
play-1SG  
'I played/I am playing.'
- d. t'íq-kan  
arrive-1SG  
'I arrived/I am arriving.'

Matthewson proposes that such sentences in Lillooet contain a phonologically null tense morpheme, TENSE. According to her, TENSE introduces a reference time, a variable which receives its value from a contextually determined assignment function (Matthewson 2004:9). The assignment function in Lillooet differs from the interpretation of English PAST only in that it introduces no constraint on past-ness with respect to the utterance. Instead, all we know is that the reference time variable has been introduced and that its reference has to be fixed anywhere up to and including the present moment.<sup>4</sup>

- (17)  $\llbracket \text{TENSE}_i \rrbracket^{g,c}$  is only defined if  $g(i) < t_C$  (the utterance time) or  $g(i) \circ t_C$ , in which case  $\llbracket \text{TENSE}_i \rrbracket^{g,c} = g(i)$ .

There are two important points here. Firstly, there is evidence that the tense variable is indeed present in the syntax/semantics (i.e. it is not simply added on by some pragmatic component). The evidence for this comes from the fact that these tense variables exhibit anaphoric relationships across sentences that may not be overridden by context.

- (18) a. nilh ts7a ta skúl-a  
FOC here DET school-DET  
'Here is the school.'
- b. alkst lts7a kw s-Rhonda  
work here DET NOM-Rhonda  
'Rhonda works here' (\*'Rhonda worked here.'

- (19) a. tsícw-kan tu7 áku7 Amsterdam-a  
 go-1SG PAST DEIC Amsterdam-DET  
 ‘I went to Amsterdam.’  
 b. cw7it i qvl-a sman’c n-s-mán’c-em  
 many DET.PL bad-DET tobacco 1SG.POSS.-NOM-smoke-MID  
 ‘I smoked a lot of pot.’ (\*‘I smoke a lot of pot.’)

The other possibility is that Lillooet Salish actually has *two* null tense morphemes, one of which is PAST and the other of which is PRESENT. This possibility, as Matthewson shows, is undermined by evidence that in some contexts a ‘tenseless’ sentence may be used to denote an interval that overlaps with both the past and the present utterance time (i.e. which is vague with respect to the choice of whether the event precedes or overlaps the utterance time).

- (20) Context: Your friends Theresa, Charlie and Marie got drunk at the bar. You are looking after them because you don’t drink. Theresa threw up at 10 PM; Marie hasn’t thrown up at all. Just as Charlie is in the process of throwing up, another friend calls and asks

wat’k’ ha i snek’wnuk’wa7-lhkálh-a  
 vomit YNQ DET.PL friend(PL)-1PL.POSS-DET  
 ‘Our friends throw up?’  
 wat’k’ kw s-Theresa múta7 s-Charlie  
 vomit DET NOM-Theresa and NOM-Charlie  
 ‘Theresa and Charlie throw up.’

Thus, the evidence from Salish shows that what is universal is a T head in the syntax which must be interpreted as locating a reference time variable with respect to the Utterance time. The difference between Salish and English is the amount of information that is provided by the lexical item, as opposed to the amount of information that is negotiated by the context. Since the Salish functional head T provides little in the way of explicit constraints, and doesn’t paradigmatically contrast with another lexical item in T, it can be null.

#### 4 Case Study: Perfectivity Marking in Russian

Another case study that we will examine in some detail is the situation of overt perfectivity marking in a language like Russian. It is traditionally claimed that while Russian has the morphosyntactic category of Aspect, English lacks it. This, then, looks like another case of parametric variation among languages, and the question about semantic versus syntactic

parameters arises again.

If we are to understand the nature of this variation, it is first important to establish exactly what the perfectivity distinction in Russian actually means semantically, a much vexed question. We will first show that previous proposals fail to adequately capture the full range of facts, and that this casts doubt on a simple characterisation of the difference between English and Russian in terms of the presence (Russian) versus absence (English) of an aspectual head or feature. Rather, in line with what we have argued for Russian definiteness and Salish tense, the difference has to do with how the values for a null functional head are determined: syntactically, in Russian, or pragmatically, in English.

#### *4.1 What Perfectivity is Not*

Perfectivity in Russian can be diagnosed by four main language-specific properties: (i) perfectives cannot get a simple ongoing interpretation in the present tense; (ii) perfectives cannot be used as the complements of phasal verbs with meanings such as ‘begin,’ ‘finish,’ or ‘continue’; (iii) perfectives cannot form present participles; (iv) perfectives combine in discourse to form non-overlapping events in the narrative (see Kamp and Rohrer 1983, Schoorlemmer 1995, Filip 2000, Borik 2002, Romanova 2004 for examples and discussion).

Perfectivity in many cases is correlated with the appearance of a prefix on the verb root. This is not a completely reliable diagnostic since some unprefixated roots are ‘perfective’ in the above sense, and some prefixed roots are ‘imperfective’. This latter possibility is found quite systematically when the imperfective suffix attaches to a prefixed root that would otherwise be perfective. But although there is no single sufficient morphological indicator, there is good evidence that the distinction among stems is linguistically real, and that real morphological devices can combine productively to create members of the two different categories. In English, on the other hand, while there are some basic aktionsart categories, there are no pairs of morphologically related stems which vary according to the perfectivity parameter—on the contrary, many verbal forms in the past exhibit an ambiguity with respect to interpretation which forces the Russian speaker to make a choice in translation between perfective and imperfective. To this extent, we may say that perfectivity (whatever it is) is a semantically relevant category in Russian, but is not in English.

To zero in on exactly what head in the functional sequence of the clause might be relevant here, we need to ask whether perfectivity correlates with ‘inner aspect’ or accomplishment/achievement readings. The answer to this question in the literature has been a disappointing ‘no’. Basically, the standard tests for telicity (compatibility with ‘in an hour’ vs. ‘for an hour’) do



not work for all perfectives (cf. Borik 2002). For example, the test seems to work for the perfective verbs *pereletet* ‘cross’ and *izlit* ‘outpour’ below (examples (21) and (22)).

- (21) Samolët pere-letel granicu \*(za) čas.  
plane across-flew border in hour  
‘The plane flew across the border \*for an hour/in an hour.’
- (22) Ona iz-lila mne dušu \*(za) čas.  
she out.of-poured me soul in hour  
‘She poured out her soul to me \*for an hour/in an hour.’ (Svenonius 2004)

However, the very same test fails for a certain class of perfective verbs prefixed with *po* and *pro*. Thus, in the case of examples (23) and (24), ‘in an hour’ is bad while ‘for an hour’ is good.

- (23) Petja po-iskal knigu polčasa/\*za polčasa.  
Peter *po*-looked book half.hour/in half.hour  
‘Peter looked for a book for half an hour.’
- (24) Petja pro-sidel v tjur’me pjat’ let.  
Peter pro-sat in prison five years  
‘Peter was in prison for five years.’ (Borik 2002)

On the other hand, it is also not possible to correlate perfectivity with a ‘higher’ aspectual head encoding boundedness at the sentential level, because one can find sentences which are temporally bounded, without requiring a perfective stem (cf. Borik 2002).

- (25) Petja uže peresekal ètot kanal za polčasa/\*polčasa.  
Peter already crossed.IMP this channel in half.hour/half.hour  
‘Peter has already crossed this channel in half an hour.’ (Borik 2002)

One other strategy for analysing the semantic difference between the two types of stems is to characterize the perfectivity contrast as involving different ‘ways of viewing the event’. Classically, the perfective forms are said to view the event from the ‘outside’ as a ‘completed whole,’ while imperfective forms reflect a more ‘internal’ perspective on the event (Isačenko 1960, Comrie 1976), or as emphasising the endpoint of an event (perfective) vs. its visible or ‘ongoing’ portion (Smith 1991).

This classical view has also been formalized in more recent work, building on original insights by Reichenbach 1947, with an aspectual head *Asp* being responsible for ordering the reference time interval with respect to the event time interval in various ways (Klein 1994, Borik 2002, Demirdache and

Uribe-Etxebarria 2000). Basically, for Russian, perfective events will be constrained to be included by the reference time (or at least their endpoint will be), while imperfective events surround the reference time. However, this does not strictly work either (see Romanova 2005). As Romanova points out, there are many cases where the imperfective gets a natural reading for which no internal structure is perceivable or relevant (example (26)).

- (26) *General Factual/Present Perfect (PP)*  
 Ja ne pojdu v kafe. Ja uže ela  
 I not go.PERF.1SG in cafe. I already eat.IMP.PAST.FSG  
 ‘I am not going to a cafe. I already ate.’

Moreover there are certain striking pairs of sentences where the imperfective seems to get the ‘over and done with’ reading (the point-like reading), whereas the perfective implies the continuation of the result state.

- (27) *Annulled Result*  
 Kto zalez na čerdak  
 Who climb.IMP.PAST.MSG on attic  
 ‘Who climbed to the attic? (assumption is that they are not there any more)’
- (28) *Result Reading*  
 Kto zalez na čerdak  
 Who climb.PERF.PAST.MSG on attic  
 ‘Who climbed to the attic? (assumption is that they are still there)’

This is mysterious under the traditional view, and all of its modern implementations in terms of interval inclusion.

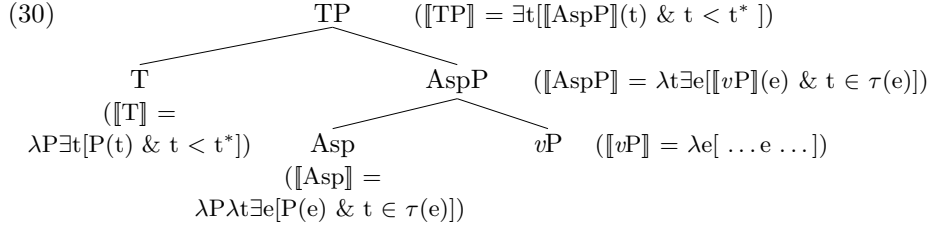
#### 4.2 An Alternative

We adopt instead the analysis developed in Ramchand (2004), which connects closely to our analysis of tense and definiteness in the previous section. In Ramchand (2004), it is proposed that perfectivity is actually the aspectual analogue of definiteness—definiteness with respect to a reference time variable.

The alternative analysis is like many of the recent formal ones in that it builds on the Reichenbachian intuition of the distinction between event time, reference time and utterance time. We continue to assume that there are tense variables in the semantics and that there are two relations at stake, that between an event and a ‘reference time’ (or assertion time) and that reference time and an utterance time (Reichenbach 1947, Klein 1994, Giorgi and Pianesi 1997, Demirdache and Uribe-Etxebarria 2000). (Basic schema repeated from Giorgi and Pianesi 1997.)

(29)	RELATION 1:	RELATION 2:
	S_R    future	E_R    perfect
	R_S    past	R_E    prospective
	(S,R)   present	(E,R)   neutral

We further assume that the locus of Relation 2 in the above table is an aspectual head, Asp, while the locus of Relation 1 is the tense head, T. So far we are in broad agreement with Klein (1994) and Demirdache and Uribe-Etxebarria (2000). Now instead of assuming that the Asp head relates a reference time *interval* to an event time *interval*, what if we assume that the function of the Asp head is to establish/introduce a time variable (which now represents a point individual) related to the event in a particular way. In other words, every event must have a run-time, or a temporal trace function  $\tau(e)$  (in the terms of Krifka 1989). The job of the Asp head is to specify a temporal individual within that run time, which will then be related to the utterance time via the T head. Thus the Asp head is crucial for relating the verbal eventive domain to the temporal domain: it provides the temporal trace of the event and establishes a temporal individual variable that can be connected to the utterance time. The general compositional schema is shown for the relevant portion of the tree in (30) below.



Ramchand (2004) argues that this system can be used to model the ‘perfective’/‘imperfective’ contrast, via a system more analogous to the definite/indefinite contrast than an independently aspectual one. Specifically, the claim is that perfectivity (more particularly, the perfectivity diagnostics) is sensitive to the existence of a *definite* event time given by AspP, as opposed to an *indefinite* event time given by AspP.<sup>5</sup>

Although the details of this analysis are beyond the scope of this article, a number of different aspectual heads in Russian can be specified under this analysis, some definite and some indefinite. The null head in Russian, for example (and also probably the *-ivaj-* imperfective suffix), simply chooses any arbitrary moment within the time trace of the event as its variable. This essentially reduces to an ‘indefinite’ assertion of some time moment once the  $t$  becomes existentially quantified ((31)).

$$(31) \quad \llbracket \text{Asp} \rrbracket = \lambda P \lambda t \exists e [P(e) \ \& \ t \in \tau(e)]$$

On the other hand, certain quantificational prefixes in Russian such as inceptive *za-*, or delimitative *po-*, provide more explicit lexical content to the aspectual head, essentially choosing or introducing a specific time moment within the temporal trace of the event ((32) and (33)).

$$(32) \quad \llbracket za \rrbracket = \lambda P \lambda t [P(t) \ \& \ t \text{ occurs at the onset of the temporal trace}]$$

In the case of *po*, a temporal bound is asserted to exist after a short run time for the event.

$$(33) \quad \llbracket po \rrbracket = \lambda P \lambda t [P(t) \ \& \ t \text{ is a specific moment a short way in to the temporal trace}]$$

There are other details here relevant to establishing the different ways that different prefixes can affect the choice of assertion time, and ensuring that the system works compositionally once prefixes and suffixes are combined, but this would take us too far afield here (the reader is referred to Ramchand 2004 for details). The point of this discussion is to motivate an alternative analysis of the perfective-imperfective contrast available to us which sees the distinction as a contrast in specificity, once the reference time variable is given an explicit representation in the semantics. The claim is that all the forms that give rise to a definite assertion time in Russian behave as ‘perfective’ from the point of view of the Russian internal diagnostics, while the others pattern as ‘imperfective’. Notice that this also gives us a handle on two further facts about imperfectivity when it arises in languages that previous accounts do not attempt to explain: firstly that in many languages which make a morphological distinction between perfective and imperfective forms, imperfectivity is the unmarked case (Kiparsky 1998); the second is that perfectives have a distinctive behaviour in discourse narrative structures, where chained perfective events are ordered rigidly within narrative structure, while imperfective ones classically produce overlapping events (Kamp and Rohrer 1983). This latter point is understandable if a specific anchoring moment is chosen for perfective events which is then used to construct a narrative time line; it also highlights the fact that representing events as perfective has inter-sentential effects on the discourse structure, a fact that we have seen is a hallmark of definiteness in the nominal domain.

With this analysis in hand, we can make a proposal about the difference between English and Russian in the verbal domain which is the mirror image of the difference between the two languages in the nominal domain. Consider the sentence pairs from Russian and English respectively, below.

- (34) a. Obez’jana jela jabloko (\*za) pjatj minut.  
           monkey ate.IMP apple in five minutes

- ‘The monkey ate an apple for five minutes/\*in five minutes.’
- b. Obez’jana s’jela jabloko \*(za) pjatj minut.  
 monkey ate.PERF apple in five minutes.  
 ‘The monkey ate the apple in five minutes/\*for five minutes.’
- (35) a. John ate the apple in an hour.  
 b. The ant ate the apple for a couple of minutes (before returning to the banana).

In Russian, there is no marking of nominal definiteness, and the discourse status of the object referent in (34) is contextually decided (see §4.3 on the connection between perfectivity and the definiteness of the object). The reference time in (34b) is definite in Russian, because a perfective stem has been chosen, and so the expression is interpreted as temporally bounded.

Conversely, English explicitly marks definiteness on the object of the verb, but leaves the definiteness of the reference time up to contextual negotiation. This is seen by the fact that the verb ‘eat,’ unlike the Russian equivalent, is possible with different continuations relating to temporal boundedness.

The upshot of this is that English can be analysed as having an Asp head in its logical representation, just as Russian really has a D head. The parametric differences reduce to the lexical items that exist in the language, and how much explicit presuppositional content they contain.

#### 4.3 *Slavic vs Germanic: Identical LF Representations?*

We contrast the above analysis with a competing description of the difference between English and Russian (or more generally, Germanic and Slavic) where a different architectural decision is made as to the locus of variation. Namely, the view under which all LFs are at some abstract level exactly the same, but with differences in morphological implementation.

Following a general strategy established by crosslinguistic work on quantification (Krifka 1987, Bach et al. 1995), Di Sciullo and Slabakova (2005) claim that Slavic and Germanic construct the same abstract representations at LF, differing only in the positional morphological manifestation of a shared set of features related to quantification (on D in Germanic; on V in Slavic). In this way they propose to capture the telicizing effect of quantized DPs (Verkuyl 1972; 1989, Tenny 1987) in Germanic, and conversely the specific or quantizing effect of Slavic perfectivizing prefixes on the interpretation of the Slavic DPs.

As attractive as this proposal might seem, however, there is good evidence that tying these two properties together with a shared feature is empirically wrong.

The claim for Russian is that marking perfectivity is just Russian’s way of indicating the quantizedness feature, which then affects the interpretation of direct objects by making them quantized. However, as Romanova and Diakonova (2003) have shown, the effects are not so predictable. Specifically, if we diagnose a specific interpretation of the direct object by an ability to take wide scope and to scramble, we see that for one class of perfective verbs the prediction holds up (see (36a) and (36b), from Romanova and Diakonova 2003).

- (36) a. Každyj student vy-brosil stat’ju.  
 every student out-threw.PERF article  
 Can mean: ‘There is a specific article that every student threw out’  
 b. Každyj immigrant pere-letel granicu.  
 every immigrant across-flew.PERF border  
 Can mean: ‘There is a particular border that every immigrant crossed.’

In addition, extraction from within such objects is degraded, if not completely ungrammatical (37a) and (37b) as would be expected of objects with a specific or definite interpretation (see Romanova and Diakonova 2003 for details).

- (37) a. ??O čem John vy-brosil stat’i?  
 about what.LOC John out-threw.PERF articles  
 ‘About what did John throw out articles?’  
 b. \*S kakoj stranoj John pere-letel granicu?  
 with what.INST country.INST John across-flew.PERF border  
 \*‘With what country did John cross a border?’

However, these very same tests fail for other classes of perfective verb. Taking the case of *po* prefixed verbs once again, the following sentence can give rise to either a definite *or* an indefinite reading of the object (like that above, the following data is taken from Romanova and Diakonova 2003).

- (38) Každyj student po-čital stat’i.  
 every student *po*-read articles  
 ‘Every student read (the) articles for a while’

In addition, if the scope possibilities of this object are assessed with respect to the universal quantifier ‘every,’ both the (a) and (b) scope interpretations are possible.

- (39) a.  $\exists y$  [y are articles] [ $\forall x$  [x a student] [x has read y]]  
 b.  $\forall x$  [x a student] [ $\exists y$  [y are articles] [x has read y]]

Consistent with the indefinite/non-specific reading, extraction is possible from within the object of a superlexical *po-* prefixed verb (see Svenonius 2004, Romanova 2004 and references there on the distinction between lexical and superlexical prefixes).

- (40) O čem deti po-čitali skazki?  
 about what children *po*-read tales  
 ‘What did children read tales about?’

So, it does not seem as if perfectivity marking on a V in Russian uniformly gives rise to a reliable correlate in the nominal domain (whether that be specificity, or quantizedness).<sup>6</sup> In fact, in a recent experiment, Slabakova herself reports that even though native speakers systematically judge perfective sentences as not ongoing in the discourse, their choice of specific or non-specific interpretations for mass objects is about 50-50 and does not significantly differ between the perfective and imperfective paradigms.

The flip-side of the claim, this time for English, also turns out to be false. In a recent paper, Smollett (2005) shows consistent failure of delimitation in English in the presence of quantized objects, even for creation/consumption verbs. Smollett (2005) argues that whether there is a definite endpoint or not is negotiated contextually. We have seen examples of this type already for English in (35) above, repeated here as (41).

- (41) a. John ate the apple in an hour.  
 b. The ant ate the apple for a couple of minutes (before returning to the banana).

So once again, no property encoded by English DP objects systematically carries over to an aspectual property of the V.

As discussed in the early part of this paper, assuming identical LFs is one attractive strategy for removing the need for a semantic component or a set of semantic parameters. However, the analysis it leads to here seems to be inadequate empirically, and moreover it remains unclear exactly how the parameter in question is to be stated. Under our view, parametric differences can be located within individual lexical items, with no syntactic featural differences and no difference in the functional sequence given by UG countenanced.

## 5 Conclusion: The Locus of Semantic Crosslinguistic Variation

Thus, in all the core cases we have examined where serious crosslinguistic variation has been proposed in the inventory and/or interpretation of functional heads, we have found a recurring pattern. In several important cases we find evidence for syn/sem structure where morphology is lacking (e.g. T

in Chinese or Salish, D in Russian or Chinese). One plausible assumption about the functional sequence is that it is necessary to construct representations that are well-formed in terms set by the C-I systems. For example, the D head is necessary for the creation of type *e* elements which can function as the (unsaturated) arguments of predicates. Tense in turn is necessary if the verbal extended domain is to be linked to the speech time in order to make a coherent claim about the world and create a proposition. If we are right about the aspect head, then it too is necessary to create the appropriate connection between the event domain and the temporal domain. In each of these cases, the languages differ in how much is explicitly encoded about the reference of these individual variables by their lexical items, and how much is filled in through context. Since one of the important tasks of the C-I module is to establish particular reference for individual variables, putting together information provided to it by both context and linguistic representation, we think that this is already an unavoidable locus of lexical and crosslinguistic variation. Given that this amount of variation must exist, a strong minimalist hypothesis is that this is in fact the limit of true semantic variation across languages.

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## Notes

<sup>1</sup>Of course, it must be confessed that we have no way of deciding systematically when two utterances in different languages constitute ‘the same thought.’ Levinson (2003) argues, for example, that under certain experimental conditions speakers of different languages will have different conceptualizations of the same situation. We will continue to assume, however, that truth conditions combined with discourse conditions on felicitous usage provide a workable framework for identifying equivalent C-I states, for present purposes.

<sup>2</sup>Alternatively, the English speaker could use the even more general verb *have*, which is more general again than the Bengali verb, illustrating the same contrast again but in the opposite direction.

<sup>3</sup>Sentences in Lillooet do get a default interpretation in ‘out of the blue’ contexts dependent on the aktionsart of the verb, but these are defeasible. The addition of temporal adverbials can also be used to further specify the time in a ‘tenseless’ sentence, although we will only be considering bare sentences here.

<sup>4</sup>‘Tenseless’ sentences in Lillooet cannot be interpreted with future time reference. For the future, an overt, more modal clitic must be used.

<sup>5</sup>There are obvious comparisons to be made here with the system advanced in Stowell (1996): Stowell sees his ZeitP as an analogue of the DP within the nominal domain.



<sup>6</sup>We are not denying that some such effects are found, but we think these are entailments based on specific properties of the stems that are involved. Crucially, we do not think that a single feature at LF regulates nominal interpretation and aspectual interpretation at the same time, i.e. that it is the same feature, just sitting on two different heads in the different languages.

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