Transitivity alternations in Yucatec, and the correlation between aspect and argument roles[1]

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Abstract

This paper analyzes the argument structure of Yucatec Mayan. In line with traditional assumptions but in contrast to more recent proposals, we show that Yucatec has ergative morphology but not a split-ergative system. For intransitive verbs there is a strict correlation between aspect and the type of linker: they take ergative clitics in the imperfect, but nominative suffixes in the perfect. Moreover, each intransitive verb is either inherently perfective or inherently imperfective, and only the opposite aspect is marked. We account for these data by two basic assumptions: (i) verbal (sub) predicates may characterize the beginning or the end of the situation, and (ii) imperfect selects an initial phase but perfect the end. In addition, Yucatec has an overt system of transitivity alternations: intransitive verbs may add a subject or an object, and transitive verbs may demote the subject or the object. We show that all these alternations fully conform to our basic assumptions. Finally, we show how three-place verbal concepts are expressed in a language with only two structural arguments by the interaction of detransitivization and transitivization.

1. Introduction

In this paper we will investigate the argument-linking system of Yucatec, a Mayan language from southern Mexico. Yucatec does not have morphological case, and no verb has more than two structural arguments. Structural arguments are encoded by two sets of person morphemes: elements of the first set are suffixed to the main verb, and elements of the second set are cliticized to an auxiliary that precedes the main verb. Some relevant verb forms are shown in (1).[2]

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(1) a. Imperfect (BY: xxix)
Táan=a wil-ik-en
DUR=2 see-IMPF-1
'You are seeing me'

b. Perfect (BY: xxxi)
T=a wil-ah-en
PAST=2 see-PERF-1
'You saw me'

c. Imperfect (BV: 621)
K=in meyah
INCOMPL=1 work
'I am working'

d. Perfect (BV: 621)
H meyah- n-ah- en
COMPL work- N-PERF-1
'I have worked'

e. Imperfect (BV: 343)
K=a wok-ol
INCOMPL=2 enter-IMPF
'You are entering'

f. Perfect (BV: 343)
H ʔok-etʃ
COMPL enter-2
'You entered'

With transitive verbs, the suffixes always relate to the object, and the clitics relate to the subject. However, intransitive verbs show a split: they take clitics in the imperfect, but suffixes in the perfect. The distribution of affixes in the imperfect suggests an accusative-based linking system, whereas the distribution of affixes in the perfect suggests an ergative-based linking system. Thus, at first glance it is unclear whether Yucatec is accusative-based or ergative-based.

The traditional assumption is that Yucatec is an ergative language like many other Mayan languages. Taking up the distribution of affixes just mentioned, Bricker (1978) classifies Yucatec as a split-ergative language in the sense of Dixon (1972, 1994). However, recent work has pondered on alternative classifications. Lehmann (1990) argues that Yucatec could as well be basically of the accusative type. Straight (1976) characterizes Yucatec as belonging to the active–inactive type in the sense of Fillmore (1968). Pustet (1992) emphasizes that Yucatec is only partially ergative, since it also exhibits accusative–nominative and active–inactive traits (in the latter respect similar to Lakhota: see Mithun 1991). Lucy (1994)

distinguishes between agent-salient, patient-salient and agent–patient-salient roots (thus implying an active–inactive pattern), on the one hand, but also characterizes the two sets of person morphemes as nominative vs. absolutive, implying an ergative–accusative split.[3] Finally, Lehmann (1996) stresses the role of control in Yucatec grammar, which is compatible with the view of an active–inactive type language.

An active–inactive classification of Yucatec is supported by only one set of data. The imperfect is unmarked in (1c) and the perfect is unmarked in (1f), whereas both aspects are marked in transitive verbs. Thus, if one contrasts the less marked forms in (1c) and (1f) with the transitive forms in (1a) and (1b), one sees an intransitive split: the subject of activity verbs (such as *meyah* 'work') is marked like the subject (or agent) of transitive verbs, and the subject of change-of-state verbs (such as *ʔok* 'enter') is marked like the object (or patient) of transitive verbs. Such an intransitive split is predicted under the assumption that the semantic role of arguments plays a major part in argument linking. However, the type of linker is shifted when the aspect of intransitive verbs is explicitly marked, as in (1d) and (1e). For instance, the suffix *-en* would have to encode 1.PATIENT in (1b), but 1.AGENT after the perfect morpheme in (1d). This fact makes it implausible that Yucatec is an active–inactive language. We summarize our argument schematically in (2), where "A" stands for agent and "P" for patient, and the placement of A and P corresponds to preverbal clitic vs. suffix. The characterization of both clitic and suffix turns out to be inconsistent.

(2)

Imperfect		*Perfect*	
a.	A- verb -P	b.	A- verb -P
c.	A- verb	d.	verb -A
e.	P- verb	f.	verb -P

Does Yucatec have an ergative–accusative split? As the examples in (1) show, intransitive subjects behave like transitive subjects in the imperfect, but like transitive objects in the perfect. Seen in isolation, the imperfect displays an accusative–nominative pattern, and the perfect an ergative–absolutive pattern. But there are only two sets of person markers. The preverbal subject clitics have to function both as ergative markers in the perfect and as nominative markers in the imperfect, while the object suffixes have to function both as accusative markers in the imperfect and as absolutive markers in the perfect. For instance, *-en* would have to encode 1.ACC in the imperfect, but 1.ABS in the perfect. It is not quite plausible that the person markers shift their specification depending on aspect. We summarize our argument schematically in (3),

which shows inconsistency in the classification of both preverbal clitics and suffixes.

(3)

Imperfect		*Perfect*	
a.	NOM-verb-ACC	b.	ERG-verb-ABS
c.	NOM-verb	d.	verb-ABS
e.	NOM-verb	f.	verb-ABS

For logical reasons, an ergative–accusative split requires a third set of person markers that function as nominative/absolutive independent of aspect.[4] However, such markers do not exist in Yucatec.

The problem with Yucatec is that the pattern-based analysis (accusative–nominative in the imperfect, ergative–absolutive in the perfect) conflicts with the requirement of a unique representation for each set of person markers. Although many authors seem to be aware of this difficulty, they continue to stick to the pattern-based methodology. If one follows Dixon (1994), who favors such a methodology, one may regard Yucatec as a split-S language,[5] or rather a fluid-S language because "every intransitive verb has the *potentiality* of either marking" (Dixon 1994: 79). But such a classification does not answer the conflict just addressed. We think that consistency in the representation of morphemes is a higher goal than following the pattern-based methodology. One reason is learnability: the child has to identify morphemes rather than patterns.

Therefore, we reject both an active–inactive classification and the assumption of an ergative–accusative split. Since there are only two sets of person markers, one set must be nominative/absolutive, while the respective other set can be either accusative or ergative. In other words, Yucatec must be either purely accusative-based or purely ergative-based. We will argue in this paper for the latter. We will show that the subject clitics are ergative markers and the object suffixes unspecified (i.e. nominative) markers, irrespective of aspect, whereas accusative markers are lacking. For this reason we will consider several morphological data from Yucatec in greater detail. (4) shows that this proposal yields a consistent result for the data in (1).

(4)

Imperfect		*Perfect*	
a.	ERG-verb-NOM	b.	ERG-verb-NOM
c.	ERG-verb	d.	verb-NOM
e.	ERG-verb	f.	verb-NOM

Assuming the preverbal clitics to be ergative morphemes entails that, for the class of intransitive verbs, the imperfect correlates with ergative, and

the perfect with nominative. We will try to show that this correlation between aspect and type of linker is what one expects on semantic grounds. Although the perfect forms given in (1b), (1d), and (1f) suggest that Yucatec is ergative-based (see [3]), it is the imperfect forms of intransitive verbs that require the ergative clitic.[6] This, again, shows that the pattern-based methodology yields the wrong results. Note that this kind of split, which is restricted to intransitive verbs, differs from the aspectually conditioned ergative split that one observes in other languages: in Hindi/Urdu, for instance, it is the perfect morphology that triggers ergative case in both transitive and intransitive verbs (Mohanan 1994).[7] Quesada (1997: 105) argues that for Yucatec, the ergative used in the transitive verbs and the "extended ergative" used in imperfective intransitives are conceptually distinct. Yet, such a distinction cannot be made within a single set of ergative clitics. The only relevant distinction is the way in which the grammatical feature that licenses an ergative clitic is introduced.

We will show that the ergative feature of transitive verbs simply follows from the existence of two argument roles that are semantically ordered, while that of intransitive verbs in the imperfect is supported semantically only in a subset of intransitive verbs, namely those that are agentive and do not have imperfect marking (see [1c]). In the complementary subset of intransitive verbs (those that are marked for imperfect; see [1e]), the ergative feature is grammaticalized and has no direct semantic basis.

As observed in the literature, it often depends on the semantic type of the intransitive verb whether it belongs to the class of inherently imperfective (ergative-marked) or inherently perfective (nominative-marked) verbs.[8] But each class includes unexpected items, so we have to conclude that lexical aspect is grammaticalized and not in all instances predictable. Such an intransitive split is in line with the well-known *unaccusativity hypothesis*, which claims that "unaccusative" verbs have an underlying internal argument that cannot be linked to accusative, and, correspondingly, that "unergative" verbs have an underlying external argument that cannot be linked to ergative — though in this case the "unergative" verbs are linked to ergative in their base aspect. More importantly, we will show that at least a few intransitive verbs in Yucatec behave in a way that clearly contradicts the essence of the unaccusativity hypothesis. The evidence we will present comes from transitivity alternations.

Yucatec is fully symmetric in that each intransitive verb can be transitivized and each transitive verb can be detransitivized. Conforming with the two complementary classes of intransitive verbs, there are two transitivization patterns. Moreover, there are systematic ways of detransitivization that lead to either inherently imperfective or inherently perfective

verbs. Each valency alternation is explicitly marked. Although both transitivization and detransitivization are also possible options in languages like English or German, they are often not overtly marked,[9] but in Yucatec they are always overtly marked. This makes Yucatec a good candidate to study transitivity alternations. (5) illustrates the four possible shifts: either the subject or the object is introduced, or demoted.

(5) Possible shifts between intransitive and transitive verbs:

intransitive	λx VERB(x)		λy	VERB(y)
		↕		↕
transitive	λy λx VERB(x,y)		λy λx	VERB(x,y)

The symmetric nature of transitivity alternations weakens the hypothesis advocated by Kratzer (1994), who claims that transitive verbs underlyingly have only one argument, the "object," and that the "subject" is introduced by voice operations. Yucatec allows both passive and antipassive, that is, two voices that operate differently on transitive verbs (see section 6.1), and it allows the introduction of either an additional causer or an additional affected object, that is, two complementary operations for transitivizing a verb (as will be shown in section 6.2). Thus, nothing in Yucatec supports the asymmetry claim of Kratzer.

We assume the theoretical framework of *lexical decomposition grammar* (Joppen and Wunderlich 1995; Wunderlich 1997a, 1997b). In this framework, verbs are represented by an articulate predicate-argument structure, which specifies the semantic ranking of arguments. If no lexical features intervene, it is this semantic hierarchy that is mapped onto syntax. In the lexical representation of a transitive verb like that in (6), "s" represents the situation to which the verb refers, "x" represents the higher-ranked argument (encoded by [+lr], with the reading that there exists a lower argument role), and "y" represents the lower-ranked argument (encoded by [+hr], with the reading that there exists a higher argument role).

(6) λy λx λs VERB(x,y)(s)
+hr +lr

An accusative NP is specified as [+hr] and thus linked to the lower role "λy," while an ergative NP is specified as [+lr] and thus linked to the higher role "λx." In contrast, a nominative (absolutive) NP is unmarked and can therefore be linked to either role, depending on whether it competes with accusative or ergative.

The combination of the two feature values, namely [+hr, +lr], characterizes structural arguments that are medial. Since Yucatec is a language

that does not have the option of three structural arguments, we expect that only one of the two features is present. Under the hypothesis that Yucatec is accusative-based we would have to predict that only the feature [hr] is present, and under the hypothesis that Yucatec is ergative-based we would have to predict that only the feature [lr] is present. The latter is what we actually assume, so we describe the subject clitics by the feature [+lr]: they are linked to each argument role that is specified by this feature value. In contrast, the object suffixes are left unspecified, so they can be linked to any argument role that is not specified for [+lr], that is, either to the ''object'' role in the presence of a higher-ranked argument, or to the only argument in intransitive predicates.

This strategy requires that intransitive verbs in the imperfect, taking the subject clitics specified as [+lr], must themselves be specified as [+lr] for their single argument role. For a subclass of these verbs, namely the agentive ones with inherent imperfect, this feature is semantically supported by the agent role, while it must be stipulated for the nonagentive ones with a marked imperfect. If one adds the hypothesis that subjects of intransitive verbs generally tend to follow the subject of transitive verbs in the imperfect (but the object of transitive verbs in the perfect), such a stipulation is not unmotivated. We will show that transitive subjects are more prominent in the imperfect than in the perfect, and vice versa for objects. In other words, aspect dominates semantic argument roles in the choice of linker.

The other lexical feature we will assume in this study is [perf]: inherently perfective verbs are marked by [+perf] and inherently imperfective verbs are unmarked. For a considerably large subset of verbs, the feature [+perf] is supported semantically, but for some instances it is not. We will show that these two features, [lr] and [perf], suffice to describe all the morphological operations involved in the transitivity alternations of Yucatec in the most economic way. That is, our approach accounts for these phenomena on the basis of minimal assumptions.

Our paper is organized as follows. In section 2, we discuss the system of person marking for transitive verbs and then present evidence that it is ergative-based in section 3. In section 4 we account for the correlation between inherent (lexical) aspect and the choice of argument linkers in the two classes of intransitive verbs, and we also consider two classes of derived intransitives. Section 5 deals with the question of how the correlation between aspect and argument role is semantically represented. Section 6 presents our analysis of transitivity alternations: detransitivization by means of passive and antipassive is considered in section 6.1, and transitivization by means of causative and affected object is considered in section 6.2. We then present additional evidence for our approach by

considering instances of noun incorporation in section 7. Finally, the theoretical conclusions we want to draw from this exercise are discussed in section 8.

2. Transitive verbs and the set of argument linkers

In this section we will introduce the basic patterns of transitive verbs and argument encoding. Transitive verbs in Yucatec have the general structure in (7), which is partly illustrated by the examples in (8).

(7) [aux-subject[[[[[[verb] derivation] voice] aspect] object] plural]]

(8) a. Imperfect (BY: xxi)
Táan=u hatsʔ-(i)k-en-oʔobʔ
DUR=3 hit-IMPF-1-3PL
'They are hitting me'

b. Perfect (BY: xxii)
T=u hatsʔ-ah-en-oʔobʔ
PAST=3 hit-PERF-1-3PL
'They hit me'

The auxiliary in the first position marks several kinds of tense, aspect, or mood. The choice of auxiliary depends on the aspect of the verb. The perfect, which is marked by the suffix *-ah*, only allows the past auxiliary *t-*, whereas the imperfect, marked by the suffix *-ik*, is compatible with a variety of auxiliaries, such as the habitual *k-*, the durative *táan*, and the definite future *héʔel*, among others. If no aspect morpheme appears, the verb receives subjunctive reading;[10] here, again, several auxiliaries are possible, such as the simple future *bin* 'go', the remote past *úutʃ* 'happen', and the irrealis *káʔah* 'occur' shown in (9).

(9) (BY: xxxiv)
káʔ(ah)=a wil -óʔon
occur=2 see -1PL
'You might see us'

Subject person is marked by clitics attached to the auxiliary but in some cases to the verbal stem; we indicate clitic attachment by "=." Object person is marked by a suffix, optionally followed by a plural marker. The plural markers do not make a distinction between subject and object. Furthermore, note that Yucatec does not have any morphological case markers. The full set of person and number markers is given in (10). The subject clitics in (10b) are more marked than the suffixes in (10a)

because they have an additional feature (+lr) in their lexical representation.

(10) a. Object suffixes (nominative)
-oʔon +1, +pl
-en +1
-etʃ +2
b. Subject clitics (ergative)
k +lr, +1, +pl
iN +lr, +1
a +lr, +2
u +lr (3rd person)
c. Plural suffixes
-eʔeʃ +2, +pl
-oʔobʔ +pl (3rd person)

We have assumed here that Yucatec has ergative markers, in line with the tradition. But, as mentioned before, some authors still discuss the question of how the grammatical functions are marked in Yucatec. Keep in mind that accusative systems, ergative systems, and active–inactive systems are distinguished by the way in which the verbal arguments are marked. Both accusative and ergative systems are crucially based on the inherent ranking of arguments in transitive verbs. The object is marked as the lower role (in our terms, by the feature [+hr] 'there is a higher role') in an accusative system whereas the subject is marked as the higher role (in our terms, by the feature [+lr] 'there is a lower role') in an ergative system. This distribution of markedness patterns has the consequence that the intransitive subject behaves like the transitive subject within accusative systems, but like an object of transitive verbs in ergative systems. In contrast to these types of structural linking, an active–inactive system uses conceptual resources for argument linking, in that agentive arguments (arguments that have control over the situation in the sense that they are able to start or to finish the situation) are marked for [+Contr]. That is, subjects of canonical transitive verbs and subjects of intransitive activity verbs are treated alike, in contrast to all other arguments. The assumption of an active system thus predicts an intransitive split: some intransitive subjects are marked for [+Contr], whereas others are not. Consequently, some subjects are treated like transitive subjects and others like transitive objects. As we will see in section 4, Yucatec indeed shows an intransitive split; however, this split does not involve a correlation between semantic role (control properties) and subject marking but rather a correlation between inherent aspect and subject marking.

Besides the possibilities of having accusative marking, ergative marking, or active marking, a fourth, although rarely attested, possibility is that Yucatec has an accusative–ergative marking. In this case, both features, namely [+hr] and [+lr], should be active. Under this hypothesis, one would expect that intransitive subjects are marked by means of a third set of linkers (which, however, do not exist in Yucatec), and moreover, that the combination [+hr, +lr], designating a medial argument as structural dative, is also possible (see Joppen and Wunderlich 1995 for Basque, an ergative language, and Wunderlich 1997a for German, an accusative language). As a matter of fact, however, Yucatec does not have the possibility of three structural arguments. In three-place verbs, the recipient is always obliquely marked by the preposition *tiʔ*, as shown by the examples in (11).

(11) (HO: 278)

a. tsʔaʔ le huʔun tiʔ (letiʔ) -oʔobʔ -oʔ
give DET book PREP PRON -PL -DIST
'Give that book to them!'

b. tiʔ ten a= tsʔaʔ -ik le huʔun -oʔ
PREP 1SG.PRON 2= give -IMPF DET book -DIST
'It is to me that you should/must give that book!'

Yucatec does allow recipients or goals to become object, but only if detransitivization (by antipassive or noun incorporation) precedes transitivization, which we will illustrate in sections 6 and 7. So there is good evidence that Yucatec has established only one of the features [+hr] and [+lr].

3. Evidence for Yucatec being ergative-based

In this section, we will show that Yucatec is indeed ergative-based, that is, that only the feature [+lr] is present. One piece of evidence comes from subject marking in the subjunctive mood. We have already mentioned that intransitive verbs show a split in their subject marking, depending on the aspect of the verb (a fact that is further discussed in section 4), but that aspect is neutralized in the subjunctive of transitive verbs. We therefore expect that intransitive verbs in the subjunctive should show the unmarked subject marker. The examples in (12) illustrate some instances of intransitive verbs in the subjunctive, marked by *-Vk* (where "V" marks a vocalic root whose melody is determined by the last stem vowel); here the object suffixes appear. Therefore these affixes should be regarded as unmarked.

(12) (BY: xlif.)
a. káʔah ʔòoh -ok -etʃ
occur enter -SUBJ -2
'You will enter'
b. káʔah ʃíimbʔal -n -ak -etʃ
occur walk -N -SUBJ -2
'You might walk.'

Further evidence comes from the nominal system of Yucatec. First, the object affixes are similar in form to the free pronouns, which occur sentence-initially for topicalized arguments or in combination with a preposition in order to encode oblique arguments; see (11) above. Since there is only one set of pronouns, listed in (13), the affixes that are similar to them should be regarded as the unmarked affixes.

(13) Free pronouns in Yucatec:

	Singular	*Plural*
1st Person	ten	toʔon
2nd Person	tetʃ	teʔeʃ
3rd Person	letiʔ	letiʔoʔobʔ

Second, predicative constructions with nouns, statives,[11] or place terms are formed by means of the object affixes, as shown in (14) and (15).

(14) (BV: 396)
a. katòolik -òʔon
Catholic -1PL
'We are Catholics'
b. kéʔel -en
cold -1SG
'I am cold'
c. meyh -il máak -en
work -REL man -1SG
'I am a worker'

(15) (BV: 290)
a. way -il -éʔeʃ -eʔ
here -REL -2PL -TERM
'You are natives of here'
b. pèetó(h) -il -en
Peto -REL -1
'I am a native of Peto/a Petoian'

Yucatec does not have a copula, so nominal predicates are directly combined with affixes from the set listed in (10a). This shows that these

affixes should be unmarked. If they were marked for [+hr], the predicative construction should contribute such a feature, which is highly implausible.

Furthermore, the possessor markers are identical with the subject clitics, which is not uncommon for ergative languages. A possessor is the higher argument of the predicate POSS and therefore more likely to be marked as [+lr] than as [+hr]; in line with this, accusative-based languages often have dative possessors. In order to get possessed, absolute nouns of Yucatec are suffixed by *-il*. We analyze *-il* as a suffix that introduces the predicate POSS into the semantic form of nouns and, simultaneously, marks the higher argument of POSS (i.e. the possessor) by [+lr]. This is shown in (16a). A consequence of this proposal is that relational nouns that directly take possessor markers (like *tàatah* 'father') must follow the same template, so that in this case the internal argument is lexically marked by [+lr] (so as if there were a lower argument to be possessed), as shown in (16b). This unifies the morphological expression of the possessor and leaves the referential argument of the noun unmarked. Full predications are given in (17).

(16) Nouns taking possessor affixes from the ergative set:

a.	maskabʔ-il	λy	λx {MACHETE(x) & POSS(y,x)}
	machete-REL	+lr	
b.	mehen	λy	λx SON(x,y)
	'son'	+lr	

(17) (A: 26)

a. in maskabʔ-il
   1 machete-REL
   'it is my machete'

b. in mehn-etʃ
   1 son-2
   'you are my son'

Furthermore, the object affixes are true affixes, whereas the subject clitics are not; they function as prefixes only if no auxiliary is present. It is more likely that obligatory affixes relate to the unmarked argument role than to a marked one. The last piece of evidence comes from the fact that there is no object suffix for third person singular (see [10a]). It is more likely that the unmarked than the marked set of linkers lacks an expression for 3sg.

Having considered evidence that Yucatec is ergative-based, we now turn to intransitive verbs. These verbs show a strong correlation between aspect and the choice of subject linkers.

4. Intransitive verbs

4.1. *The two basic classes*

Yucatec intransitive verbs split into two classes, both different from transitive verbs, as illustrated in (18) and (19).

(18) Inherently imperfective verbs (S: 194):
  a. Imperfect is unmarked
     K = a k'óoy
     INCOMPL = 2 dig
     'you are digging'
  b. Perfect is marked
     H k'óoy -n -a -etʃ
     COMPL dig -N -*PERF* -2
     'you have dug'

(19) Inherently perfective verbs (BV: 343)
  a. Imperfect is marked
     K = a k'utʃ-ul
     INCOMPL = 2 arrive-*IMPF*
     'you are arriving'
  b. Perfect is unmarked
     H k'utʃ-etʃ
     COMPL arrive-2
     'you have arrived'

Verbs that follow the pattern in (18) (like *k'óoy* 'dig') are inherently imperfective; they are marked in the perfect but unmarked in the imperfect. The perfect affix *-ah* (identical with the perfect marker of transitive verbs) is preceded by *-n*, a suffix to which we turn later. Other verbs that pattern with (18) and are thus inherently imperfective are listed in (20).

(20) Some inherently imperfective verbs (collected from AP, BY, and Be):

ʔaalkab'	'run'	ook'ot	'dance, dancing'
ʔéʔel	'lay eggs'	paak	'cut brush, clear'
ʔitʃkíil	'bathe'	peek	'move, vibrate'
b'aab'	'swim, paddle'	sahak	'be afraid'
balak'	'roll'	siit'	'jump, hop'
héʔesíin	'sneeze'	tìis	'gush out'
huum	'make noise'	tóoʃ	'rain'

kirits^{ʔ}	'squeak'	tuus	'lie (tell stories)'
k^{ʔ}aay	'sing, song, music'	t^{ʔ}aan	'say, language, saying'
léemb^{ʔ}al	'flash, flare up'	ts^{ʔ}uʔuts^{ʔ}	'suck, smoke, kiss'
lòok	'boil'	tʃeʔeh	'laugh'
míis	'broom$_{N}$, sweep$_{V}$'	wak^{ʔ}	'weave'
meyah	'work$_{N/V}$'	yàahkun	'love'
naay	'dream'	ʃùuʃub^{ʔ}	'whistle'
nóok^{ʔ}	'snore'	ʃik^{ʔ}nal	'fly'

Verbs that follow the pattern in (19) (like *k^{ʔ}utʃ* 'arrive') are inherently perfective; they are marked in the imperfect but unmarked in the perfect. The imperfect marker for intransitive verbs differs from that for transitive verbs: the affix is *-Vl* (instead of *-ik*), where "V" marks a vocalic root. The melody of this vowel is nearly always identical with that of the last stem vowel. We therefore assume spreading of the stem vowel's melody to the imperfect suffix. Other verbs that pattern with (19) and are thus inherently perfective are listed in (21).

(21) Some inherently perfective verbs (for identification purposes cited with the imperfect marker) (from the same sources as example [20])

ʔaah-al	'awaken'	pak^{ʔ}-al	'sow, plant'
ʔuutʃ-ul	'happen'	puuts^{ʔ}-ul	'escape, get away'
ʔeem-el	'descend'	p^{ʔ}uh-ul	'become angry, get mad'
ʔok-ol	'enter'	sih-il	'be born, birth'
b^{ʔ}aaʃ-al	'play itr., joke, amuse'	tuʔub^{ʔ}-ul	'forget'
hak^{ʔ}oolal	'be afraid'	tuuk-ul	'think'
han-al	'eat itr.'	tʃiʔb^{ʔ}-al	'bite'
kim-il	'die'	tʃ^{ʔ}iih-il	'grow'
k^{ʔ}utʃ-ul	'arrive'	tʃ^{ʔ}uuy-ul	'hang, be suspended'
lub^{ʔ}-ul	'fall'	waak^{ʔ}-al	'explode, burst'
luk^{ʔ}-ul	'leave, escape, flee'	wen-el	'sleep'
naats^{ʔ}-al	'approach'	ʃaan-al	'be late'

There is only one auxiliary that occurs with intransitive verbs in the perfect, namely *h-*, alternating with ∅,[12] similarly to the transitive verbs, which allow only *t-* in the perfect. In contrast, the imperfective aspect allows more than a dozen auxiliaries specifying several kinds of tense, aspect, or mood, as shown in (22). Lehmann (1992) has convincingly argued that these elements are independent auxiliaries (rather than prefixes or clitics on the verb); one reason is that they attract the subject markers. Moreover, some auxiliaries also exist as full verbs or can be identified as contractions of full verbs.

(22) Auxiliaries on verbs in the imperfective aspect (BY: viii)

k-	incompletive, habitual	
t(áan)	durative	
tsˀ(oˀok)	terminative	(full verb 'finish')
héˀel	definite future	
(hóˀo)pˀ	inchoative, inceptive	(full verb 'begin, start')
yàan	obligative, compulsive	(affirmative particle, verb of existence)
táant	proximate perfective	
káah	inceptive	(full verbs *kahtal* 'live, *dwell*'; *kaahsik* 'start'
tàak	desiderative	(full verb 'wish')
kˀabˀéet	obligative	(adverb 'necessary')
k-ERG-h	definite future	

This distribution of auxiliaries leads us to the assumption that the perfect is semantically more constrained than the imperfect and therefore the marked (semantically more complex) category in the pair of primitive aspects. In contrast, the imperfect seems semantically poor in that it allows various kinds of specification. Another piece of evidence comes from the fact that some intransitive verbs with inherent imperfective aspect can also be used as nominals without further derivation (e.g. *meyah* 'work', *naay* 'dream', *tˀáan* 'language, saying'). Nominals do not allow an articulated event structure, so it is expected that they are more likely formed from an unmarked than from a marked aspectual form.

The choice of argument linkers in intransitive verbs is exclusively conditioned by aspect, regardless of the class to which the verb belongs: The imperfective forms (or rather the auxiliaries that c-command the imperfective verb forms) take subject clitics, and the perfective forms take object suffixes. Given this fact, Yucatec is certainly not an active language in the sense of Fillmore (1968) or Klimov (1974).[13] But Yucatec differs from other well-known ergative split languages such as Hindi/Urdu; in the latter the perfect correlates with ergative case, and the imperfect with accusative case. If we are correct in analyzing the subject clitics as ergative morphemes (only licensed for argument roles that are marked for [+lr]), it is the unmarked aspect, namely the imperfect, that corresponds to ergative marking in Yucatec.

Given that the subject clitics can be described by the feature [+lr], the strong correlation between aspect and the type of argument linkers can be described as follows:

(23) Aspect–argument role correlation in Yucatec:
   a. Imperfective verbs have an argument role marked for [+lr].
   b. Perfective verbs have an unmarked argument role.

Both conditions are automatically satisfied in transitive verbs because these verbs always have an argument role that is inherently marked for [+lr], as well as an argument role that is unmarked. However, intransitive verbs have only one argument. Let us assume that inherently perfective verbs are lexically marked for [+perf], and that the argument role of all intransitive verbs not marked for [+perf] automatically gets assigned [+lr]. For each individual intransitive verb this distribution of features regulates to which of the two classes it belongs. The more precise statements in (24) follow then from (23).

(24) Aspect–argument role correlation for intransitive verbs in Yucatec:
   a. Intransitive verbs that are marked for [+perf] have an unmarked argument role.
   b. Intransitive verbs that are not inherently perfective are inherently imperfective, and thus have an argument role marked for [+lr].

Together, these two statements express the strong correlation $[\alpha\ \text{perf}] \leftrightarrow [-\alpha\ \text{lr}]$, where $\alpha = \{+, -\}$. So an intransitive verb is marked either for its aspect or for its argument role.

In the following, we show that the classification of intransitive verbs in Yucatec is semantically based on aspectual notions (rather than on control, although there is a weak correlation between aspect and control), and that this classification is grammaticalized, so exceptional assignment of [+perf] is possible. First, the assignment of [+perf] is semantically based. As far as we can tell, the following generalization holds for Yucatec without any exception (consult the lists of verbs given in [20] and [21] above):

(25) Intransitive verbs that denote a change of state (expressed by BECOME in their semantic form) are inherently perfective.

Change-of-state verbs (telic verbs) encode achievement of a result state; so if intransitive verbs have to have inherent aspect, it must be [+perf] for THESE verbs. We take this generalization as the core in every intransitive split conditioned by aspect.[14] It also supports our decision to take perfective as the marked value in Yucatec. In order to detect a grammatical feature such as [perf], the language learner has to find some clear positive instances on semantic grounds. After having done so, the learner might be able to also detect irregular instances. There is no need to identify negative instances on semantic grounds. Thus, (25) does not imply that [−perf] verbs should form a coherent semantic class. However, as soon as a classificatory feature such as [+perf] is grammaticalized, one expects that irregular items may appear, for whatever reason.[15]

The assignment of [+perf] is indeed grammaticalized in Yucatec. For some reason, a few verbs that are not change-of-state verbs, but rather activity (process) verbs, also belong to the [+perf] class; these verbs are arbitrarily assigned [+perf]: *han* 'eat', *ook* 'steal', and *pakʔ* 'sow, plant'. Note that all these verbs in a way denote accomplishments in relation to an implicit object and thus are perfective in a broader sense. Other verbs that do not denote a change of state but yet are grammaticalized as [+perf] are *pʔat* 'remain', *wen* 'sleep', *tʃʔuuy* 'hang around, be suspended', and *uutʃ* 'happen'; some of them are related to a possible change of state, a fact that may have motivated this classification. Whether the argument has control over the situation denoted by the intransitive verb does not play a major role for the classification, since both classes contain active as well as inactive verbs. In other words, agent saliency and patient saliency, the main factors of Lucy's (1994) account, are largely irrelevant.

Particularly interesting in the class of inherently perfective verbs is *han* 'eat'. Inherently perfective verbs are often described as "unaccusatives": verbs that underlyingly have an internal argument for which accusative is blocked. These verbs take object affixes in Yucatec in the morphologically unmarked aspect, so they seem to have an "internal" argument not only underlying but also on the surface. As we will show later, most of the inherently perfective verbs can be causativized in that an "external" (or higher) argument is added. However, *han* 'eat' is an exception; this verb can only add an internal argument (or object), which is indicated by the suffix *-t*. Consider the examples in (26).

(26) (Le90: 46)

a. k=a hàan -al
INCOMPL=2 eat -IMPF
'you are eating'

b. k=a hàan -t -ik
INCOMPL=2 eat -AO -IMPF
'you are eating it'

Han 'eat' becomes transitive in (26b), but what is added here is an object of eating. This shows that not all inherently perfective verbs are "unaccusatives" in the syntactic sense. A semantic classification that allows lexicalized exceptions is more to the point than a syntactic one.

The complementary class of the "unaccusatives" is the "unergatives": intransitive verbs that have an external argument underlyingly but do not allow ergative case. These verbs are just ergative-marked in our treatment: the single argument is assigned [+lr] because the verb is unmarked for [+perf]. The crucial fact is that this ergative marking is

not arbitrary but forced by the general aspect–argument role correlation expressed in (23).

The class of inherently imperfective intransitives is only partly based on semantic properties. Many verbs that belong to this class are activity verbs, having an agent or "external" argument. So the feature [+lr] assigned to this argument may be motivated by the inherent control properties of the argument.[16] But besides activity verbs that are lexically marked for [+perf], there are also inherently imperfective verbs without an agent; they denote an unbounded process rather than an activity, for instance, *balakʔ* 'to roll', *héesíin* 'sneeze', *léembʔal* 'flash, flare up', *nóokʔ* 'snore', *peek* 'move', *sahak* 'be afraid', *tìis* 'gush out', *tòo* 'rain'. All that we need to know about these verbs is that they are not inherently perfective. Given the aspect–argument role correlation of Yucatec, these verbs must then have an argument marked for [+lr].

Mirroring the pattern shown by the verb *han* 'eat' in the perfective class, there is at least one deviant verb in the imperfective class: *péek* 'move, vibrate' can only add a higher argument, which is indicated by the causative marker *-s*, instead of *-t*, which would be expected for verbs that already have an external argument. Other verbs that can only be causativized are *máan* 'pass by', *táal* 'come', and *bʔin* 'go', which are irregular in that they mark neither imperfect nor perfect, but only the subjunctive (Ayres and Pfeiler 1997: 55).

(27) Verbs that add a higher argument, not belonging to the inherently perfective class (Lu: 640)

a.	péek	'move, vibrate'	pek-s	'cause to move, vibrate'
b.	máan	'pass by'	máan-s	'pass, transfer, transport'
	táal	'come'	táa-s	'bring'
	bʔin	'go'	bʔi(n)-s	'take'

Whether an intransitive verb can be causativized by means of *-s* or can receive an additional internal argument by means of *-t* always depends on the particular meaning of the verb and is not fully determined by its membership in one of the two aspectual classes. The examples above indicate that neither unaccusativity/unergativity in the syntactic sense nor the semantic role of an argument as agent or patient determines to which of the two classes of intransitive verbs a particular verb belongs. It is rather inherent aspect that divides the intransitive verbs into two morphologically distinct classes, but some verbs belong to the [+perf] class without clear semantic motivation.

Summarizing our findings, we can say that the observed asymmetry in the class of intransitive verbs follows from a few assumptions, stated as follows.

(28) a. A few intransitive verbs are arbitrarily marked for [+perf].[17]
b. All change-of-state intransitive verbs are marked for [+perf] by semantic default.
c. All other intransitive verbs have an argument marked by [+lr] by grammatical default.

A desired result of our classification is that it explains the distribution of further affixes. Recall that the suffix *-n* appears in inherently imperfective verbs before both the perfect and the subjunctive suffix.[18] Consider the following examples.

(29) (BY: xvi)
a. táan in ʃíimbʔal
DUR 1 walk
'I am walking'
b. ʃíimbʔal -n -ah -en
walk -N -PERF -1
'I walked'
c. káʔah ʃíimbʔa(1) -n -ak -en
occur walk -N -SUBJ -1
'I could walk'

Both perfect and subjunctive forms take object affixes, which indicates that they have an unmarked argument. We therefore assume that the actual function of *-n* is to block assignment of the feature [+lr] in inherently imperfective verbs.[19]

Note also that the perfect marker is invariantly *-ah*, whereas the imperfect marker varies: it is *-ik* for transitive verbs but *-Vl* for intransitive verbs. Verbs that are inherently marked for [+perf] cannot simply be shifted to [−perf]. However, if we consider the imperfect marker *-Vl* to be merely a progressive marker that is added to [+perf], it is not unexpected that it differs from the simple imperfect marker *-ik*.

(30) -Vl marks progressive aspect (imperfect of [+perf] verbs)
-ik marks imperfect
-ah marks perfect

In section 5 we will discuss how these aspect markers are represented semantically.

4.2. *Derived intransitive verbs*

Besides the two classes of intransitive verbs described in the preceding section, Yucatec also has intransitive verbs that are morphologically

derived, namely derived inchoatives and the so-called positionals.[20] (31) illustrates an inchoative verb formed from an "adjectivelike" stative predicate; note that the combination of *-tʃah* and *-al* may also appear in the contracted form *-tal*.

(31) (BV: 565)

a. k=a wuts -tʃah -al k=a wuts-t-al
INCOMPL=2 good -INCH -IMPF (contracted form)
'you get well'

b. ʔuts -tʃah -etʃ
good -INCH -2
'you got well'

We assume that *-tʃah* introduces the predicate BECOME and therefore expect the resulting verb to be inherently perfective, which indeed it is. The imperfect in (31a) is formed by means of the progressive marker *-Vl*, here realized as *-al*, whereas the perfect form in (31b) does not show an aspect marker, which indicates that this form has inherent aspect.

The situation is slightly more complicated with positionals, exemplified in (32), because they do not have a preferred aspect in such an obvious way; instead they have ambiguous readings.

(32) (BY: xlv, D: 401)

a. táan in tʃʔuy -tal
DUR 1 hang -INCH.IMPF
'I am hanging' ('I am in a hanging position'/'I am getting into a hanging position')

b. tʃʔuy -lah -en
hang -INCH.PERF -1
'I hung' ('I was in a hanging position'/'I completed the act of getting into a hanging position')

According to Ayres and Pfeiler (1997), Lehmann (1993), and Lucy (1994), all verbs of body posture (such as *kul* 'sit [down]', *tʃil* 'lie [down]', *tsel* 'lie on one's side', *haw* 'lie face up', and *kap* 'be between things') are positionals that pattern in the same way as *tʃʔuy* in (32). Many positionals are formed from nominal roots, such as *tsel* 'side', *kap* 'the space between two things', or *kul* 'stem, block (of wood)' (Barrera Vasquez et al. 1991).

If we assume that *-lah* is the relevant derivational morpheme, contributing the meaning 'BECOME (LOCATED(x, AT N))', with "N" as the placeholder for the underlying nominal root, we would expect the resulting verb to be inherently perfective. The corresponding imperfect form is formed with the suffix *-tal*, which also appears as a contracted form in (31a). We conjecture that the set of locationals was subject to some

reanalysis, both morphologically (concerning the shape of derivational morphemes) and semantically (concerning the possible readings). If *kul* 'block of wood' is understood as an object that is convenient to sit on, *kul-lah* literally expresses 'having entered the proper position with regard to a block of wood', which means 'to sit', while *kul-tal* is the corresponding progressive form. But as soon as the positionals were lexicalized, *kul* could have been reanalyzed as the posture predicate 'sit' itself, so the imperfect form would also be adequate to express 'be sitting' rather than 'entering the state of sitting'. This explains why the locationals happen to be ambiguous. One meaning conforms with the derived-inchoative analysis, and the other meaning conforms with an analysis in which the root itself expresses a postural state. Only in the latter analysis do positionals form a third class of intransitive verbs, namely verbs that do not have an underlying aspect — under this analysis, *-tal* simply encodes imperfect and *-lah* encodes perfect for these verbs. However, if the reanalyzed root *kul* was already ambiguous, with 'sit' and 'become sit', thus inherently being either imperfective or perfective, it is unclear why the additional aspect markers are still attached, except for resolving the ambiguity. We conclude that the positionals of Yucatec can still be analyzed as derived intransitives.[21]

We summarize our analysis as follows:

(33) a. Derived inchoatives (inherently perfective):
-tʃah: λP λx λs BECOME P(x)(s), where P is a stative noun with adjectival meaning.

b. Derived positionals (inherently perfective):
-lah: λN λx λs ∃y {BECOME LOCATED(x, AT y) & N(y)}(s), where N is a noun that defines a typical location of posture. The nominal root can be reanalyzed as a posture verb.

c. *-t-al* is a contracted form that marks imperfect for both derived positionals and derived inchoatives (where *-t* indicates either derivational morpheme).[22]

This analysis is compatible with the view of basic intransitive verbs developed in section 4.1. We now attempt to understand the correlation between aspect and argument role more deeply, by considering types of predicates and how they combine in verbs.

5. Semantic considerations

We will consider how verbs are semantically represented and which predictions can be made for their aspectual and derivational behavior.

Verbs that are combined with their arguments express predicates that can be true or false of situations, where a situation is something that extends in time, so verbs express situation types.[23] Verbs may be decomposed into more than one predicate: at the beginning of a situation another partial predicate may be prominent than at the end of a situation. We assume that aspect determines which part of a situation is rendered prominent. In order to describe perfect and imperfect aspect in Yucatec, we propose the two operators POST (for 'posterior') and ANT (for 'anterior'). The posterior operator renders the end of a situation (or some adjacent state following the end) prominent, while the anterior operator renders the beginning of a situation prominent. What is true at the beginning of a situation need be true neither in the state just before the situation, nor at the end of the situation. Neither of the two aspect operators focuses on something that lies outside of the situation described by the verb, but they focus on different parts of that situation, namely the initial phase or the final phase (the end). In order to make such a distinction, we do not need particular knowledge about the boundaries of a situation.

For the sake of argument, let us assume that prototype transitive verbs can be decomposed into two predicates that are related to the initial vs. final phase of a situation and separately predicate of the arguments x and y. In the beginning of the situation, P(x) is prominent, and in the end of the situation, Q(y) is prominent, where P characterizes a process and Q characterizes a result state. Prototypical intransitive verbs then encode only one-half of this scenario, either the initial or the final phase. Some intransitive verbs encode a processual predicate P, while others encode a result-state predicate Q. Every situation s can be decomposed into $\langle s', s'' \rangle$, where s' is an initial phase, including the beginning, and s'' is the end in which a result state may have been achieved. If one assumes that intransitive verbs adapt to the pattern of transitive ones, processual intransitive verbs would have to be imperfective and ergative, whereas change-of-state verbs would have to be perfective and nominative in the default case. This is illustrated in (34).

(34)

Phases of a verb:	s'	s''	
Transitive verbs:	{ P(x) &	Q(y)	} (s)
Inherently imperfective intransitives:	{ P(x)		} (s)
Inherently perfective intransitives:	{	Q(y)	} (s)
Grammatical features:	[+lr]	[+perf]	

In the preceding section we have seen that the intransitive verbs of Yucatec are either perfective or imperfective inherently but can also be marked for the opposite aspect. Inherently perfective verbs render

prominent the result state, whereas inherently imperfective verbs render prominent some initial phase. We have seen that change-of-state verbs nearly always belong to the class of inherently perfective verbs, while processual verbs tend to belong to the class of inherently imperfective verbs. Although there are some verbs that are arbitrarily classified, it is worthwhile to consider mainly those verbs that belong to the semantic core.

Change-of-state verbs can be represented as follows:

(35) λx λs {p & BECOME S(x)}(s),
where p is an unspecified process, and S is a stative predicate

The transition to the result state expressed by S(x) may be gradual (in the accomplishment verbs) or nearly punctual (in the achievement verbs). Correspondingly, the process p that leads to the transition can be more or less extended in time. Let us assume that the operator POST corresponds to a function that gives for each situation s a value that holds at its end s″ (and possibly extends for a while). Similarly, ANT corresponds to a function that gives for each situation s a value that holds at an initial phase s′. For change-of-state verbs these values are defined as follows:

(36) a. POST{p & BECOME S(x)}(s″) = S(x)(s″)
b. ANT{p & BECOME S(x)}(s″) = {p & some partial effects on x}(s′)

We assume that the inherently perfective verbs of Yucatec already encode the POST operator, thus highlighting the state that is brought about. They can be marked for imperfect with the special suffix *-Vl*, which we analyzed as a progressive marker in (30). If a change-of-state situation is considered as progressing, S(x) itself certainly does not hold, but some partial effects may. We do not intend to introduce more semantic machinery here than necessary, although one may introduce a more articulate temporal structure.

Generally, inherently perfective verbs with the underlying predicate VERB (for instance, 'die', 'arrive', or 'approach') are represented as in (37a). Imperfect adds the anterior operator ANT to the underlying predicate, thus highlighting the process that brings about the result, as shown in (37b).[24]

(37) Inherently perfective verbs:
a. inherently: λx λs″ POST(VERB(x))(s″)
+perf
b. in the imperfect: λx λs′ ANT(VERB(x))(s′)
+lr

The appearance of the feature [+lr] in the imperfect is motivated insofar as the prediction of x is shifted more to the beginning of the situation, where, in principle, the effects could still be controlled. Moreover, the system becomes more symmetric if the subject of intransitive verbs always behaves like the subject of transitive verbs in the imperfect.

Processual verbs (expressing concepts such as 'laugh', 'dream', or 'swim') can simply be represented as follows.

(38) $\lambda x\ \lambda s\ P(x)(s)$, where P is a processual predicate

If P(x) is true of s, it is also true of all partial situations of s; there may also be continuations of s of which P(x) is true. The maximal situation of which P(x) is true may be controlled by the entity that instantiates the argument variable x, so this entity may exert agentive role, but this is not a necessary ingredient for processual verbs. In every case, P(x) is true in the beginning of s, so it is predicted that the inherent aspect must be imperfect. Generally, inherently imperfective verbs expressing the predicate VERB are represented as in (39a). Perfect then adds the posterior operator, thus highlighting the state that may be brought about, although such a state is not lexically specified.

(39) Inherently imperfective verbs:

a.	inherently	λx	$\lambda s'$	$\mathrm{VERB}(x)(s')$
		+lr		
b.	in the perfect:	λx	$\lambda s''$	$\mathrm{POST}(\mathrm{VERB}(x))(s'')$
			+perf	

In the end of a situation, the agent no longer exerts any control. It is therefore motivated that the feature [+lr] does not appear in the perfect. Moreover, the system becomes more symmetric if the subject of intransitive verbs always behaves like the object of transitive verbs in the perfect.

The representations given in (37) and (39) hold for all verbs that belong to the respective class, including those that are arbitrarily classified. If it is true that the locational verbs switch between stative and inchoative readings, it is simply undecided whether the posterior or the anterior phase is highlighted, so these verbs, although they are intransitive, can be marked by either perfect or imperfect. In the subjunctive, the situation denoted by the verb is always considered as a whole and no temporal phase of it can be highlighted.

Let us now turn to transitive verbs. A prototypical transitive verb has one argument with prominent agent properties, and another argument with prominent patient properties (Dowty 1991). Recall from (34) that these verbs might be decomposed into two predicates, P and Q, related to different phases of a transitive situation. P is specified for the type of

action taken by the agent, which controls the temporal shape of the situation, and Q is specified for the type of effect brought about on the patient. More generally, the first predicate is responsible for the processual properties, and the second one for the properties that finally delimit the situation. The assumption that transitive verbs are decomposed in this way is not implausible for verbs of production and verbs of consumption, which have an incremental or decremental object, respectively. The second predicate is BECOME EXIST(y) in the production verbs, but BECOME ¬ EXIST(y) in the consumption verbs.

So let transitive verbs be represented as in (40a). We call the two predicates ACT(x) and AFFECTED(y), keeping in mind that these are general predicates that have to be specified more narrowly by the particular verb. Recall that ACT(x) must hold at the beginning of the situation and AFFECTED(y) at the end of the situation, but that we do not need to know the actual borderlines of the situation. Imperfect then adds the anterior operator, thus highlighting the partial predicate ACT(x), which expresses the processual properties of the situation. Perfect adds the posterior operator, thus highlighting the partial predicate AFFECTED(y), which expresses the effects brought about.[25]

(40)
Transitive verbs:

a.	basic entry:	λy λx λs	{ACT(x) & AFFECTED(y)}(s)
b.	in the imperfect:	λy λ*x* λs′	ANT{*ACT(x)* & AFFECTED(y)}(s′)
c.	in the perfect:	λ*y* λx λs″	POST{ACT(x) & *AFFECTED(y)*}(s″)

Given this inventory, we are able to consider the ways in which transitive verbs are detransitivized. We predict that antipassive, a morphological operation that existentially binds the patient, yields intransitive verbs that are inherently imperfective; such an operation takes the possible effects for granted and focuses on the action taken by the agent. (We indicate the focusing effect by the feature "F.") We also predict that passive, a morphological operation that existentially binds the agent, yields intransitive verbs that are inherently perfective; such an operation takes the possible agentive action for granted and focuses on the effects brought about on the patient. We do not need the anterior or posterior operator, since we already focus on the predicate that holds at the initial phase or at the end of the situation, respectively.

(41) Prediction for detransitivization:

a.	Antipassive:	∃y	λx +lr	λs′	{[ACT(x)]$_F$ & AFFECTED(y)}(s′)
b.	Passive:	λy	∃x	λs″ +perf	{ACT(x) & [AFFECTED(y)]$_F$}(s″)

We also may consider the ways in which basically intransitive verbs are transitivized. Since there are two types of intransitive verbs, one with delimiting properties and one with processual properties, we expect two possible ways of transitivization. We predict that inherently perfective verbs can be causativized by adding an agent whose action brings about the change of state. Causativization thus adds an anterior predicate to the situation. In contrast, inherently imperfective verbs may be transitivized by adding a patient that is affected by the action. This type of transitivization thus adds a posterior predicate to the situation. Verbs that result from these operations should be subject to both perfect and imperfect, by which either the base predicate or the added predicate is emphasized.

(42) Predictions for transitivization:
   a. Causativization of inherently perfective verbs:
      $\lambda x\ \lambda u\ \lambda s \quad \{ACT(u)\ \&\ \mathrm{VERB}(x)\}(s)$
   b. Affected object in inherently imperfective verbs:
      $\lambda u\ \lambda x\ \lambda s \quad \{\mathrm{VERB}(x)\ \&\ AFFECTED(u)\}(s)$

All these predictions describe the ideal case. We have already mentioned above that Yucatec has inherently imperfective verbs that undergo causativization, as well as inherently perfective verbs that undergo affected object. Yet, as we will see in the next section, Yucatec is pretty near to being a language that instantiates the ideal case just sketched.

Theoretically, it is possible that transitivized verbs again undergo detransitivization. This yields four possibilities:

(43) Theoretical possibilities of detransitivizing a derived transitive verb:

a.	Passive	$\lambda x\ \exists u\ \lambda s'$	$\{\mathrm{ACT}(u)$	$\&\ [\mathrm{VERB}(x)]_F$	$\}(s')$
		$\lambda u\ \exists x\ \lambda s'$	$\{\mathrm{VERB}(x)$	$\&\ [\mathrm{AFFECTED}(u)]_F$	$\}(s')$
b.	Antipassive:	$\exists x\ \lambda u\ \lambda s''$	$\{[\mathrm{ACT}(u)]_F$	$\&\ \mathrm{VERB}(x)$	$\}(s'')$
		$\exists u\ \lambda x\ \lambda s''$	$\{[\mathrm{VERB}(x)]_F$	$\&\ \mathrm{AFFECTED}(u)$	$\}(s'')$

Note that existential binding is the weakest way to inactivate an argument; intransitivization can also take place by noun incorporation, which saturates the lowest argument role by adding a more specific predicate morphologically. So we expect that Yucatec, restricted to one-place or two-place verbs, should allow a certain expressive power by the interaction of transitivization and detransitivization.

6. Transitivity alternations

As already mentioned at the beginning of this paper, Yucatec shows remarkable symmetry in transitivity alternations, which are always overtly marked. Both subject and object of a transitive verb can be demoted, leading to an intransitive verb that belongs to one of the two classes of intransitives. Correspondingly, nearly every intransitive verb can be transitivized, by adding a subject or an object. The possible argument-changing operations are summarized in (44).

(44) Transitivity shifts in Yucatec:

Involved argument	Argument reduction: detransitivization	Argument extension: transitivization
subject [+lr]	passive, middle	causative
object [ ]	antipassive	affected object

The relationship between detransitivization and the resulting aspect class is strict: if the subject is demoted a perfective form results, and if the object is demoted an imperfective form results. In contrast, the relationship between the type of intransitive verb and the choice of transitivization is not strict: whether a verb undergoes causativization or affected object is not fully determined by its aspectual class.

The combination of both transitivization and detransitivization devices makes a language powerful in expressing verbal concepts. Since Yucatec realizes only one structural feature, namely [+lr] in our account, no verb can have more than two structural arguments. But devices that allow a language to add or to demote arguments transparently are just as powerful as devices that allow more than two structural arguments. If each argument-changing operation is overtly marked, the semantic roles of the remaining arguments can easily be identified.

In the following, we first consider detransitivization and turn then to transitivization. Finally, we will illustrate how the combination of the two devices works in Yucatec.

6.1. *Detransitivization*

A transitive verb becomes intransitive by means of passive or middle; both operations demote the subject. Passive is marked by glottal-stop insertion together with vowel lengthening, whereas middle is marked by vowel lengthening combined with high tone. For passive forms, where the subject is bound existentially, we have predicted that they are

inherently perfective and that only imperfect is marked. This is indeed the case, as shown in (45c) and (45d). Middle (or anticausative) is an operation by which a potential controller argument is removed; the predicate ACT(x) that describes the processual part in the representation of transitive verbs becomes invisible, so what is left is the predicate that describes the potential effects. We therefore predict that middle forms are inherently perfective, too, which indeed they are. This is illustrated in (45b), where the middle form is marked for imperfect, like a born intransitive, inherently perfective verb.

(45) (BY: xi)

a. k=in hekˀ -ik
INCOMPL=1 break -IMPF
'I am breaking it/something'

b. k=u héekˀ -el
INCOMPL=3 break.MID -IMPF
'it is breaking'

c. héʔekˀ
break.PASS
'it has been broken'

d. k=u héʔekˀ -el
INCOMPL=3 break.PASS -IMPF
'it is being broken'

A transitive verb also becomes intransitive by means of antipassive, which binds the object existentially. Antipassive is realized by vowel lengthening combined with low tone. As expected, in this case, the resulting form is imperfective, and the perfect has to be marked.[26]

(46) (BY: xi)

a. k=in hèekˀ
INCOMPL=1 break.ANTIP
'I am breaking'

b. hèekˀ -n -ah -en
break.ANTIP -N -PERF -1
'I have broken'

The demoted argument of passive and antipassive forms can be obliquely realized by means of a prepositional phrase, which we assume to be an adjunct whose information is integrated with the verb by semantic inference. This is illustrated in (47b) for the passive and in (48b) for the antipassive, corresponding to the transitive uses in (47a) and (48a).

(47) (BV: 452ff.)
a. k=u ʃok -ik
INCOMPL=3 read -IMPF
'S/he reads (something)'
b. yan=u= ʃóʔok -ol tiʔ tu men u= láak máak
EXIST=3 read.PASS -IMPF PREP PREP 3= other person
'It must be read to her by another person.'

(48) (B: 17)
a. màʔalobʔ ʔa= tan -ik màayah
well 2= speak -IMPF Maya
'You speak Maya well'
b. máʔalobʔ ʔa= t'àan ʔitʃ màayah
well 2= speak.APASS PREP Maya
'You speak Maya well.'

In contrast, the demoted subject in the middle construction is not realizable in this way, and derived transitive verbs never have a middle (although they allow both passive and antipassive), so the middle is more restricted than passive and antipassive. Moreover, the middle constructions are formed by several means and tend to get lexicalized with idiosyncratic meanings. We will therefore not consider middles any further here.

Both passive and antipassive are operations on the theta grid of transitive verbs: one argument role is existentially bound, while the other role remains unshifted in its featural specification. The argument role that is left in the passive was unmarked in the transitive verb and so remains unmarked, while the argument role that is left in the antipassive was designated as [+lr] in the transitive verb and so remains. We do not need any further stipulation in order to ensure the proper encoding of arguments in passive and antipassive forms. Moreover, intransitive verbs that do not have the feature [+lr] are automatically [+perf], so passive forms acquire this feature by default. (49) specifies the entries for the passive and the antipassive marker.

(49) Yucatec voices
a. Passive $\lambda V\ \lambda y\ \lambda s\ \exists x\ V(x,y)(s)$
b. Antipassive: $\lambda V\ \lambda x\ \lambda s\ \exists y\ V(x,y)(s)$

The dominance of aspect in the verbal inflection of Yucatec forces the voice-inflected forms into one of the corresponding intransitive classes. Passive forms are inflected like inherently perfective verbs and antipassive forms like inherently imperfective verbs, so they both shift their personal

markers when the opposite aspect is marked. If control were the relevant feature for the classification of intransitive verbs in Yucatec (which is implied by an analysis as active–inactive language), the two distinct verb types resulting from passivization and antipassivization should show a preference for either object affixes or subject clitics, and not, as shown, a preference for either perfective or imperfective aspect. The preference for aspect is explained by the assumption that the nature of the partial predicate to be focused by the voice operation is crucial: either the predicate that describes the potential effects is focused, and so the verb becomes perfective, or the predicate that describes the processual aspects of the situation is focused, and so the verb becomes imperfective.

6.2. *Transitivization*

As pointed out above, there are two distinct possible ways of adding an argument to an intransitive verb: the added argument may become either subject or object. Yucatec has two distinct suffixes for argument extension: *-s* encodes the introduction of a causer, and *-t* encodes the introduction of an affected object. All derived transitive verbs mark both, the imperfect and the perfect, in the same way as transitive roots.

(50a) shows an intransitive verb that is inherently perfective. It is transitivized by means of the suffix *-s* in (50b); a causer (or agent) is added.

(50) (S: 193)

a. k = a luk$^{\text{ʔ}}$ -ul
INCOMPL = 2 leave -IMPF
'you are leaving'

b. k = a luk$^{\text{ʔ}}$ -s -ik
INCOMPL = 2 leave -CAUS -IMPF
'you are removing it'

In contrast, (51a) shows an intransitive verb that is inherently imperfective; it is transitivized by means of the suffix *-t* in (51b); an object (or patient) is introduced.

(51) (S: 193)

a. k = a ʃóoy
INCOMPL = 2 detour
'you are detouring'

b. k = a ʃóoy -t -ik
INCOMPL = 2 detour -AO -IMPF
'you are detouring (from around) it'

In most cases, the applicability of the causative morpheme *-s* correlates with inherent perfect aspect of the intransitive root. Its counterpart *-t* covers a broader range: it introduces an object for intransitive roots but may also mark an additional argument for derived inchoatives, as shown in (52).[27] The surface ending *-tal* in (52a) is the contracted form of *-tʃah-al*; we assume that *-kVn*[28] in (52c) is a variant of the inchoative morpheme in *-t* suffixed forms.

(52) Transitivization of derived inchoatives (Le96: 121f.)

a. uts
good
'it is good'

b. k = u y-uts -t -al
INCOMPL = 3 good -INCH -IMPF
'it gets well'

c. k = in w-uts -kin -t -ik
INCOMPL = 1 good -INCH -AO -IMPF
'I enhance/repair it'

According to most sources (Lehmann 1996; Ayres and Pfeiler 1997; Bricker and Yah 1981), *-s* and *-t* are in free variation when derived inchoatives are transitivized. In any case, the added argument must be a causer. Derived inchoatives are characterized by the predicate BECOME P(x), where P is stative. For principled reasons, it is not possible to add any lower argument to such a predicate (see Kaufmann 1995; Wunderlich 1997b), so an added argument must be higher than x, that is, it must be a causer. Although in other cases it may make a difference whether *-s* or *-t* is chosen as suffix, here, no difference can arise. We conclude that *-s* is a causative suffix, but *-t* a more general transitivizer. Whether *-t* introduces an object or a subject depends on semantic restrictions on the predicates involved.

In section 5 we predicted that inherently perfective verbs might be subject to causativization, while inherently imperfective verbs might be subject to affected object. This is indeed the case. The majority of inherently perfective verbs undergo causativization by means of *-s*, and the majority of inherently imperfective verbs undergo affected object by means of *-t*. But, as we pointed out in section 4, in each class there is at least one item that goes the other way around. Whether a verb allows an additional subject or an additional object is not primarily determined by its aspectual class but rather by its semantic properties.

In the following, we disregard *-t* as a general argument-adding morpheme and analyze it only as introducing an affected entity; the corresponding predicate is relevant at the end of the situation, so it is second in order,

and the introduced argument becomes object. In contrast, *-s* introduces an entity that controls the situation. The predicate that describes some action of that entity must be relevant at the beginning of the situation, so it is first in order, and the introduced argument becomes subject.

(53) Transitivization morphemes (with "u" being the introduced argument):
   a. Causative: /-s/ λV λx λu λs {ACT(u) & V(x)}(s)
   b. Affected object: /-t/ λV λu λx λs {V(x) & AFFECTED(u)}(s)

In the default case, the verb undergoes a derivation according to its aspectual class. If the verb is marked as [+perf], the corresponding predicate is second in the derived verb, and if the argument role is marked for [+lr], it becomes subject of the derived verb. In a way, the properties of the intransitive verb are preserved in the derived transitive verb.[29]

(54) Inherently perfective verbs that undergo causitivization (default):
   a. luub$^{\text{ʔ}}$(-ul) 'fall': λx λs″ FALL (x)(s″) [+perf]
   b. luu$^{\text{ʔ}}$-s(-ik) 'fell': λx λu (+lr) λs {ACT(u) & FALL(x)}(s)

(55) Inherently imperfective verbs that undergo affected object (default):
   a. míis 'sweep': λx λs′ SWEEP(x)(s′) [+lr]
   b. míis-t 'sweep$_{\text{tr}}$': λu λx (+lr) λs {SWEEP(x) & AFFECTED(u)}(s)

As we have seen, our predictions for transitivization have been borne out. Let us now turn to the more complex cases in which detransitivization and transitivization alternate.

6.3. *Iteration of transitivity alternations*

As shown in section 2, Yucatec does not allow more than two structural arguments, so ditransitive verbs cannot appear. But this does not mean that three-place verbal concepts are excluded. If it is possible to bind either argument of a transitive verb existentially and to add a new argument in one or the other way, one expects that these two operations can be combined to generate a three-place verbal concept, in which at least one argument is existentially bound. This is in fact the case, as shown by the following example.

(56) (B: 22)

a. k = u kan -ik
INCOMPL = 3 learn -IMPF
'he is learning it'

b. k = u káʔan -al
INCOMPL = 3 learn.PASS -IMPF
'it is being learned'

c. k = u káʔan -s -ik
INCOMPL = 3 learn.PASS -CAUS -IMPF
'he is teaching it'

d. k = u káʔan -s -áʔal
INCOMPL = 3 learn.PASS -CAUS -PASS.IMPF
'it is being taught'

The transitive verb shown in (56a) is first passivized in (56b) and then causativized in (56c), and finally it is again passivized in (56d), so the three-place concept of 'teaching' is easily expressed, even if the final verb form is intransitive. Note that the passive morpheme, consisting in a glottal stop together with vowel lengthening, cannot be realized on the preceding phonetic material in (56d), so it is realized on the following imperfect morpheme *-al*. (There are convincing semantic as well as morphological reasons to assume that passive generally precedes imperfect.)

We also find instances where an intransitive verb is first causativized and then either passivized or antipassivized, which is illustrated by the following examples, taken from Bricker (1978). The inherently perfective verb 'die' is shown in (57a) and (57b), and its causative variant in the imperfect in (57c).

(57) (B: 3)

a. k = a kíim -il
INCOMPL = 2 die -IMPF
'You die.'

b. h kíim -etʃ
COMPL die -2
'You died.'

c. k = in kíin -s -ik -etʃ
INCOMPL = 1 die -CAUS -IMPF -2
'I kill you'

(58a) and (58b) illustrate the corresponding antipassive in the imperfect and perfect. Since the antipassive morpheme (vowel lengthening plus low tone assignment) cannot be realized for phonological reasons, the perfect marker *-ah* is used here instead.[30] But both the choice of auxiliary and

the subject clitic in (58a) clearly indicate that this form must be imperfective. Moreover, the repetition of *-ah* in (58b) shows that its first occurrence is certainly not a perfect marker.

(58) (B: 5)
a. k = in kíin -s -ah
INCOMPL = 1 die -CAUS -PERF
'I kill.'
b. kíin -s -ah -n -ah -en
die -CAUS -PERF -N -PERF -1
'I killed.'

(59a) and (59b) illustrate the passive of the derived verb 'kill' in the imperfect and perfect. Again, passive cannot be directly realized on the causativized verb. In the imperfect the passive is encoded on the following imperfect morpheme (as above), and in the perfect a special passive form that inherently expresses perfect is used.[31]

(59) (B: 14)
a. k = in kíin -s -áʔal tumèen letiʔ
INCOMPL = 1 die -CAUS -PASS.IMPF PREP PRON.3.SG
'I am killed by him.'
b. kíin -s -áʔabʔ -en tumèen letiʔ
die -CAUS -PASS.PERF -1 PREP PRON.3.SG
'I was killed by him.'

Not only causativized verbs but also verbs that have undergone affected object may again be detransitivized.

(60) (S: 193f.)
a. k = a kʔóoy
INCOMPL = 2 dig
'You dig.'
b. k = a kʔóoy -t -ik
INCOMPL = 2 dig -AO -IMPF
'You dig it (up).'
c. k = a kʔóoy -t -áʔal
INCOMPL = 2 dig -AO -PASS.IMPF
'It gets dug (up).'

In the antipassive, which binds the added argument existentially and which is predicted to be inherently imperfective, some verbs use the perfect marker *-ah* in the same fashion as above in (58) (for instance, *ʔutsʔben-t-ah*, derived from *ʔutsʔben* 'smell', and *wal-t-ah*, derived from *wal* 'fan'), whereas some other verbs (such as *míis* 'sweep' and *tsíibʔ*

'write') simply appear in their intransitive form when antipassive is intended.

Summing up, all the predictions concerning the possibilities of detransitivizing a transitivized verb, presented in (43) above, have been borne out, and in each case, the expected inherent aspect is indeed present. This shows that our account of argument structure and aspect in Yucatec is on the right track. The fact that passive and antipassive are formed, even if the phonological environment does not support their expression, indicates that the transitivity status of a verb plays a major role in this language. Moreover, the fact that an overtly perfect morpheme can be used to encode an inherently imperfective reading shows that aspect is the most important grammatical factor in the Yucatec verb: there cannot be any confusion with a "wrongly used" aspect morpheme when the meaning of the whole structure is determined by independent constraints.

Finally, we would like to point out that the interaction of transitivization and detransitivization observed in this section is an extremely powerful device, but only when each step is overtly indicated. We would not be surprised if even four-place concepts are expressed in this way. Only a lack of intimate knowledge may have prevented us from detecting such instances.

7. Further evidence from noun incorporation

Another detransitivizing device is noun incorporation, where the incorporated noun saturates the lowest argument of a verb. We expect that intransitive verbs resulting from noun incorporation are inherently imperfective, which is compatible with the fact that incorporated nouns induce a nondefinite or generic reading of the noun. For instance, a verb referring to tree-chopping is not expected to describe any individual tree to be chopped, but rather the process of chopping trees in general. The examples in (61) show that this is indeed the case: *ʧeʔ* 'tree/wood' is the object of a transitive verb in (61a) but is incorporated into the verb in (61b). Note that the imperfect is marked in (61a) but unmarked in (61b), so the latter represents an inherently imperfective verb. Only perfect is marked when a noun is incorporated, as shown in (61c). Finally, (61d) illustrates that verbs with incorporated objects can again be transitivized; the only option available is affected object by means of *-t*. This again is expected, so the facts from noun incorporation supply additional evidence for our account.

(61) (B: 15f.)

a. k = in tʃˀak -ik tʃeˀ itʃil in kòol
PRS = 1 chop -IMPF tree/wood PREP 1 cornfield/milpa
'I chop a tree in my cornfield/milpa'

b. k = in tʃˀak -tʃeˀ itʃil in kòol
PRS = 1 chop -tree/wood PREP 1 milpa
'I chop wood/trees in my milpa'

c. tʃˀak -tʃeˀ -n -ah -en
chop -wood/tree -N -PERF -1
'I chopped wood/trees'

d. k = in tʃˀak -tʃeˀ -t -ik in kòol
PRS 1 chop tree/wood AO IMPF 1 milpa
'I wood-chop my milpa'[32]

The example just considered is similar to the locative alternation observed in other languages. The locative alternation in English or German includes preposition incorporation, by which the meaning of a preposition is semantically integrated into the verb (Brinkmann and Wunderlich 1996). However, we do not think that this happens in Yucatec — the place in which the action takes place can truly be seen as an affected object here. So we do not assume a derivational relationship between the locative PP in (61a) and (61b) and the locative direct object in (61d). Affected object can rather be compared with the applicative operation (familiar from the group of Bantu languages) that freely introduces beneficiaries, locatives, or instrumentals as direct objects. However, the range of affected object differs from that of the usual applicative operation because only intransitive verbs can be subject to affected object.

Quite similar to the example just discussed are the following: first, the object that is subcategorized by the verb is incorporated, and then a goal is introduced as an affected object via *-t* suffixation.

(62) (Su: 145)

a. koˀoʃ hoy -haˀ -t -ik le pàkˀal -oˀ
HORT spread-liquid -water -AO -IMPF DEF garden -DEM
'Let's go irrigate the garden!'

b. h bˀin -etʃ a lam -kˀakˀ -t le kòl -oˀ
COMPL go -2 2 stick-into -fire -AO DEF cornfield -DEM
'You went to set fire to the cornfield.'

Noun incorporation also supplies a common means to express three-place concepts such as 'give' or 'sell'. In the following example, affected object provides a recipient after the transferred object has been incorporated.

(63) [*tun konloltketʃ*][33]
taan = u kon -lol -t -ik -etʃ
INCOMPL = 3 sell -flower -AO -IMPF -2
'He's selling you flowers.' (lit. 'he's flower-selling you')

As far as we can see, affected object does not include instrumentals in Yucatec. But in some cases, the incorporated noun can achieve instrument reading when a further object is added by *-t* suffixation, as shown in (64). We assume that verbs like *kʔebʔ* and *maʃ* are originally subcategorized for tool-like objects (that is, describe actions that one typically performs on these objects), and that they achieve the readings given in the glosses of (64a) and (64b) only if an affected object is added.

(64) a. (Su: 154)
k = a kʔebʔ -tʃeʔe -t -ik le
INCOMPL = 2 spread-open -stick/wood -AO -IMPF DEF
nal -oʔ
corn -DEM
'You husk the corn (using a husking tool)'
b. (T: 36)
maʃ -tun -t -eʔ
mash -stone -AO -TERM
'Stone-mash it!' ('Mash it with a stone!')

In view of transitivity alternations, noun incorporation competes with antipassive; it differs from antipassive in that the object of the verb is not only existentially bound but also specified by a nominal predicate. Consider the following representations:

(65) a. Antipassive
tʃʔàak: λx λs ∃y CHOP(x, y)(s)
b. Noun incorporation:
tʃʔak–tʃeʔ: λx λs ∃y {CHOP(x, y)(s) & WOOD(y)}(s)

Our account, based on the role of partial predicates of a verb, predicts that noun incorporation is similar to antipassive in all important respects: the resulting intransitive verb is inherently imperfective and is subject to affected object. These predictions have been confirmed.

8. Conclusions

We have shown in this paper that Yucatec only allows two structural arguments to be realized at once. In order to distinguish between two arguments, it is sufficient to assume one abstract case feature; we have

argued that the ergative feature [+lr] is the relevant one. This entails that Yucatec is ergative-based in all aspects and moods. Though a pattern-oriented analysis (as employed by various authors in the literature) correctly identifies an "accusative pattern" in the imperfect and an "ergative pattern" in the perfect, it fails to identify a third set of argument linkers, which would be necessary for an ergative–accusative split system. The free pronouns only appear with topicalized arguments or together with an oblique marker; so they certainly do not function as a third set that competes with the subject clitics and object suffixes.

Concerning the two possible argument roles, a productive and fully transparent symmetric system of transitivization and detransitivization has evolved in Yucatec: either the higher or the lower argument can be demoted or added. By the interaction of these devices it is also possible to express three-place verbal concepts. But only if each step in the derivation is overtly marked is the role of the arguments that are actually realized obvious. All transitivity operations together provide the language with an enormous expressive power, even if it relies on just one structural linking feature.

The symmetric system of Yucatec does not show any preference for a higher or a lower argument (for an agent or a patient role); both arguments of a transitive verb are salient; passive and antipassive are likewise possible. This result falsifies the claims by Marantz (1984) and Kratzer (1994), among others, who analyze transitive verbs as basically patient-oriented and introduce agents only by an additional voice operation.

Another remarkable feature of Yucatec is lexical aspect. Every intransitive verb (except positionals) is either inherently perfective or inherently imperfective, and there are only a few verbs that have both properties. The inherent aspect widely determines which type of transitivization a verb can undergo. Ergativity and lexical aspect are independent parameters of a language, but if they come together, the system that has evolved in Yucatec is the most plausible one. If an intransitive verb is marked for the feature [+perf], its subject should not have control properties. Arguments with control properties are more likely to be marked as [+lr], so verbs that are inherently marked for [+perf] rather should exclude ergative.

Furthermore, we have given evidence that the correlation between aspect and argument role in Yucatec is not only semantically based, but also grammaticalized for both the inherent and the marked aspect. For some reason or another, some verbal roots belong to the wrong class, whereas detransitivized verbs always belong to the expected class. We have shown that the aspect–argument role correlation for intransitive verbs is strict, even if one of the features [+perf] or [+lr] is arbitrarily

assigned. (Technically, this correlation is a feature-cooccurence restriction.)

(66) Aspect–argument role correlation in Yucatec:
  a. All intransitive verbs in the imperfect (inherent or marked) have an argument role marked for [+lr].
  b. All intransitive verbs in the perfect (inherent or marked) have an unmarked argument role.

Abstracting from these findings for intransitive verbs, we proposed to decompose transitive verbs into two major predicates. These predicates have been shown to be the basic elements for the aspectual system and for the assessment of a verb's individual arguments. Furthermore, these subpredicates are the elements that are focused upon in detransitivizations and added in transitivizations. Our claims are further supported by the fact that transitive verbs mark both aspects but are unmarked in the subjunctive, which neutralizes aspect, whereas intransitive verbs with intrinsic aspect have to mark subjunctive.

It has been argued in the literature that the Mayan ergative has developed from possessor marking (e.g. Bricker 1981), expressing control over objects, and that this kind of control may have been generalized to cover situations. In our account, control is a semantic factor, whereas ergative is identified with the abstract feature [+lr], regulating the hierarchy of arguments in two-place predicates. As soon as intransitive verbs are marked for ergative, [+lr] becomes a pure grammatical feature (even if the correlation with imperfect rather than perfect is partially motivated semantically). Quesada (1997) tries to explain the extension of ergative marking on intransitive verbs in Mayan by a hypothetical need for intransitive verbs in the imperfect to mark control of their argument. In our analysis, such a semantic motivation is not crucial for Yucatec: the ergative appearing on intransitive verbs is merely a consequence of the aspect–argument role correlation, which guarantees a symmetric system.

Our treatment of the feature [+lr] as semantically empty is supported by another Mayan language, Ch'orti', spoken in south-eastern Guatemala (Fought 1972, 1973; Oakley 1966; Quizar 1994). This language has preserved aspect marking only in intransitive verbs, where imperfect is marked by means of a third set of person affixes, which are variants of the ergative prefixes. This fact indicates that the lexically assigned feature [+lr] has been reanalyzed as the feature [+impf] for the additional set of affixes. Consequently, intransitive verbs with unmarked (nominative) suffixes receive perfect reading, as in Yucatec. The ergative prefixes [+lr] are only used when there indeed exists a lower role, that is, for subjects of transitive verbs or possessors.

A glance at unrelated languages with an aspectually conditioned ergative split reveals that our generalization for Yucatec may be reversed. For instance, Urdu/Hindi shows ergative only in the perfect of transitive verbs, and this marking also extends to intransitive verbs (Butt 1995). Interestingly, only "unergatives" in Urdu, that is, verbs that inherently would be imperfective–ergative in Yucatec, allow ergative, but only in the perfect rather than the imperfect. This shows that, although Yucatec and Urdu have the same underlying conceptual classification of intransitive verbs, they differ in how ergative marking is extended to intransitive verbs: to the unmarked aspect in Yucatec, but to the marked aspect in Urdu. This converse behavior does not follow in recognizable ways from the different origins of the ergative marker, which is a former instrumental marker in Urdu, but evolved from possessor marking in the Mayan languages. It rather follows from the internal architecture of these languages.

Recall from section 5 that the transitive verbs may be represented as {ACT(x) & AFFECTED(y)}, where ACT(x) is rendered prominent in the imperfect, and AFFECTED(y) is rendered prominent in the perfect. Urdu/Hindi is a true ergative–accusative split language. Following ideas from Dixon (1994) and Stiebels (personal communication), we assume that in such a split system, the less prominent argument should be the marked one in each aspect. This predicts that the object ("y") should be marked with accusative ([+hr]) in the imperfect, while the subject ("x") should be marked with ergative ([+lr]) in the perfect. The latter then extends to those intransitive verbs for which [+lr] is justified for semantic reasons. Since Yucatec does not have an ergative–accusative split in transitive verbs, the ergative–nominative split in the intransitive verbs must be differently determined. As we pointed out in section 5, in a system like Yucatec the subject of intransitive verbs directly follows the transitive argument that is rendered prominent in the respective aspect. It is marked like the transitive subject in the imperfect (hence, ergative), but like the object in the perfect (hence, nominative).

According to Dowty (1991), a split in the set of intransitive verbs may be dominated either by agentivity or by telicity; in our terms, by control or by inherent aspect. We have presented here a case study in which aspect plays the dominant role. In contrast, the Australian languages described by Austin (1997), which are ergative-based like Yucatec, mostly show a split between agent-oriented and patient-oriented verbs: the former can add an applied (affected) object, whereas the latter can add an agentive subject. In about half of the languages described by Austin, ditransitive verbs do not exist and detransitivization plays an important

role. So these languages show a kind of symmetry that is similar to that in Yucatec.

Interestingly, the two factors considered by Dowty predict that four classes of intransitive verbs are possible: in addition to agentive-atelic and nonagentive-telic, nonagentive-atelic and agentive-telic. So we have to expect that each type of system (the Yucatec and the Australian) includes instances from the "mixed classes" that are arbitrarily (or falsely) classified — examples from Yucatec have been discussed in section 4.1 — and furthermore, that there are verbs that are differently classified in the two systems. (67) illustrates the fourfold conceptual classification, with the mixed classes shaded. If [+perf] is the relevant grammatical feature, the members of class A should behave like nonagentive-telic verbs, but if [+Contr] is the relevant feature, these items should behave like agentive-atelic verbs. Similar things should hold for the members of class B.

(67)

	Type I (Yucatec)		Type II (Australian)	
	atelic	telic	atelic	telic
agentive		A	+Contr	A
nonagentive	B	+perf	B	

From the lists given in Austin (1997) we can indeed collect some items that are classified differently in Yucatec vs. the Australian languages. The class of verbs that form applied transitives, and hence are [+Contr] in the Australian languages, includes agentive-telic items such as 'enter', 'return', 'go down' — all of them are [+perf] in Yucatec. Similarly, the class of verbs that form causative transitives, and hence are [−Contr] in the Australian languages, includes nonagentive-atelic items such as 'vomit', 'be a cheat', 'be frightened', 'be glad' — all of them are [−perf] in Yucatec. Interestingly, the Australian languages show a split between active and inactive location, while these predicates belong to the positional class in the Mayan languages. Yucatec has two different roots for 'be afraid', an imperfective and a perfective, whereas in the Australian languages we rather find a split between 'be frightened' and 'be afraid, dislike'. So each of the languages considered has minimal pairs of items that are semantically similar but belong to different classes. However, which predicates actually appear in such a constellation depends on whether agentivity or telicity is the relevant feature.

We conclude that purely syntactic accounts, distinguishing between underlying objects and underlying subjects in intransitive verbs ("unaccusatives" versus "unergatives"), fail in principle. Such accounts may tolerate that the criterion for a bifurcation may vary from language to language, but they can never tolerate that a language has instances that

are falsely classified. A semantic analysis that allows lexical exceptions when a fourfold conceptual classification is mapped onto a twofold grammatical classification is certainly more to the point.

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Appendix. Glossary

1. *Grammatical terms*

ANTIP	antipassive voice
AO	affected object introduction
CAUS	causative
COMPL	completive aspect
DET	determiner
DIST	distal deixis
DUR	durative aspect
EXIST	existential predicate
HORT	hortative mood
hr	'there is a higher role'
IMPF	imperfective aspect
INCH	inchoative
INCOMPL	incompletive aspect
lr	'there is a lower role'
MID	middle voice
PASS	passive voice
PAST	past tense
PARTICIP	participle
PERF	perfective aspect
PL	plural
POS	positional
POSS	possessive predicate
PRED	predicate
PREP	preposition
PRON	pronominal
PRS	present tense
REL	relational (argument introduction)
SG	singular
SUBJ	subjunctive mood
TERM	terminative particle

2. *Sources*

A	Arzápalo 1973
AP	Ayres and Pfeiler 1997
B	Bricker 1978
Be	Bevington 1995
BV	Blair and Vermont-Salas 1967
BY	Bricker and Yah 1981
D	Danziger 1996
H	Hanks 1990
HO	Hofling and Ojeda 1994
Le90	Lehmann 1990
Le96	Lehmann 1996
Lu	Lucy 1994
S	Straight 1976
Su	Sullivan 1984
T	Tozzer 1921

Notes

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2. All abbreviations are explained in the Appendix at the end of the paper. The source of examples taken from the literature is indicated in parentheses. The nature of the suffix *-n* in (1d) is unclear, but see below. Since we do not intend to discuss the complex morphophonology of Yucatec, we represent all examples as segmented into morphemes, but note that the phonetic surface sometimes differs.
3. Nominative and absolutive are the respective unmarked instances in an accusative–nominative or an ergative–absolutive pattern. There is no way to distinguish these two grammatical functions in terms of any features. Therefore, we identify the terms "absolutive" and "nominative" in the following, which has already become standard practice in all recent work on this topic.
4. This is true for all languages with an ergative–accusative split. Although Dyirbal, for instance, has only two case suffixes (*-na*, marking accusative for 1st and 2nd person pronouns, and *-ŋgu*, marking ergative for 3rd person pronouns and nouns), both contrast with the unmarked nominative (Dixon 1972).
5. Note that the notion of a split-S system is purely descriptive. Interestingly, Dixon also includes active–inactive systems within the split-S systems.
6. If, alternatively, one assumes that Yucatec is accusative-based, the same problem would arise: although the imperfect forms display an accusative–nominative pattern, the perfect forms would require the accusative suffix.

7. Dixon (1994: 99) claims that if a split is conditioned by aspect, the ergative marking is ALWAYS found in perfective aspect. Yucatec conforms to this generalization only under the pattern-based analysis but falsifies it in our morpheme-based account. It is important to notice that Dixon bases his generalization on the consideration of transitive verbs (where it is true), whereas Yucatec has such a split just in intransitive verbs. We will come back to this problem in section 8.
8. We use the terms "perfect" and "perfective" (as well as "imperfect" and "imperfective") interchangeably, but we make a distinction between inherent (or lexical) and morphologically marked aspect.
9. Compare the following transitive versus intransitive uses of verbs in German and English:

(i)	Ich esse den Kuchen,	also esse ich.
	I eat the cake,	so I eat.
(ii)	Ich läute die Glocke.	Die Glocke läutet.
	I ring the bell.	The bell rings.
(iii)	Ich habe den Löffel zerbrochen.	Der Löffel ist zerbrochen.
	I have broken the spoon.	The spoon is broken.

10. Lucy (1994) classifies the subjunctive as "gnomic perfective aspect," indicating that it is used when no actual situation is in mind. Interestingly, this category is unmarked in transitive verbs (which have to mark either imperfect or perfect), but it is marked in intransitive verbs, which always have an inherent aspect (see below).
11. There is no evidence for the category "adjective" in Yucatec (see Tozzer 1921: 95); possible candidates are regularly treated in the same way as nouns. Some nouns also cover adjectival meaning, for instance, *kíin* means both 'sun, day, time' and 'hot'. In the remainder we will refer to nouns with adjectival meaning by the term 'stative'.
12. According to Ayres and Pfeiler (1997), the alternation is speaker-dependent. For some speakers, *h-* is obligatory, whereas others allow omission.
13. Pustet (1992) argues that Yucatec is similar to the active–inactive language Lakhota, in considering stative predications that only take object suffixes. She does not recognize that this is the way in Yucatec to form copular constructions, as shown in (17). Moreover, she fails to show that there is a complementary class of verbs that only take subject clitics. Only if there existed two complementary classes of intransitive verbs, one class of verbs that only take object affixes, and another class of verbs that only take subject clitics, could one put forward the argument that the semantic type of the verb is responsible for the choice of linkers. As Danziger (1996) has shown, Mopan, a Mayan language closely related to Yucatec, indeed has intransitive verbs that only take subject clitics; they form the corresponding perfect forms by analytical means, where the argument of the verb is realized as a possessor by means of a subject clitic. Danziger is very careful in her claims; she only says that Mopan tends to be of the active–inactive type, because she correctly observes that Mopan also has the class of inherently perfective verbs that take either subject clitics or object suffixes, depending on aspect, in the same way as Yucatec. So only a subclass of intransitive verbs participates in the active system. But since the imperfect forms of inherently perfective verbs still take the same clitics as the active verbs, one can hardly say that any active feature such as [+Contr] could express the context for subject clitics in general. We would rather assume that the grammatical system of Mopan is like that of Yucatec but defective, so that one feature of the symmetrical system of Yucatec is repressed.
14. Most scholars concerned with German assume that the intransitive split in the choice of the perfect auxiliary (*sein* 'be' vs. *haben* 'have') is determined by aspect. The most

plausible generalization one can find in this case is that change-of-state verbs take the auxiliary *sein* 'be' (Wunderlich 1997c).

15. One reviewer offered the criticism that we trust too much in the Spanish and English glosses when we classify Yucatec intransitive verbs semantically. We do not intend such a classification. It is enough to say that all verbs that are clearly glossed as change-of-state verbs belong to the inherently perfective verbs. In contrast, we have found no indication from the glosses that agentive verbs only belong to one of the classes cited in (20) and (21).
16. Similarly, it has been argued that two-place verbs that take a dative instead of an accusative object (like German *helfen* 'help', *folgen* 'follow') are lexically assigned by the feature [+lr], indicating that the object itself has control properties (Joppen 1995; Wunderlich 1997a). But there is a clear difference between the lexical option of assigning [+lr] (as in German and Basque) and a grammaticalized aspect–argument role correlation (as in Yucatec).
17. We assume that the irregular intransitives (*b'in* 'go', *máan* 'pass by', and *táal* 'come') are specified for both features, namely as [+perf v +lr]. Without any change, they can be used in the perfect or imperfect, but they have to obey the aspect–argument role correlation.
18. In many Mayan languages, the suffix *-n* serves as a voice marker. It marks passive and mediopassive in Huastecan, and antipassive in Ixil, Cakchiquel, Quiché, Kekchí, and Jacaltec, among others (due to Dayley 1981; Quesada 1997). But in Yucatec voice is realized in a different way, and *-n* obviously has nothing to do with voice.
19. Recall from note 13 that the inherently imperfective verbs of Mopan do not have a corresponding synthetic perfect form. We think that Mopan differs from Yucatec only in that it does not provide for the option of blocking assignment of the feature [+lr]. The morpheme *-n*, which does this job in Yucatec, is simply not present in Mopan. Consequently, the grammatical system may have been subject to reanalysis.
20. Lehmann (1993, 1996) treats the two classes as a single one because of some free variation in the relevant suffixes. We rely on the more elaborate sources of Bricker and Yah (1981) and Ayres and Pfeiler (1997), where these two classes are clearly distinguished.
21. In this respect Yucatec contrasts with Mopan, in which the positionals have been developed to a third class of intransitive verbs (Danziger 1996). Mopan has the suffix *ka'al* that derives stative positionals from the underlying root, as shown in (i); these statives can only combine with linkers from the suffix set and cannot be specified for aspect, similar to nominal predicates. The corresponding inchoatives can be formed by means of the imperfective suffix *-tal* and the perfective suffix *-laj*. Any stative/inchoative ambiguity is resolved; see the examples in (ii) and (iii).

(i) Positional stative (D: 402f.)
Tin-ka'al-en
sit-POS-1
'I am/was in a seated position'

(ii) Positional imperfective (D: 402f.)
Tan in-tin-tal
DUR 1-sit-INCH.IMPF
'I am in the act of seating myself'

(iii) Positional Perfective (D: 402f.)
Tan-laj-en
sit-INCH.PERF-1
'I completed the act of seating myself'

22. It is interesting to note that *-tal*, having two functions, allows certain ambiguities. So *uts-tal* can mean either 'become good/enhance' (cf. [31]) or 'become located in a good way' ('ponerse bueno'; AP: 45).
23. We distinguish between states (where the predication is temporally invariable), processes (which have one parameter that changes in time in an unspecified way), and changes of state (which have a specified result state). Activities form a subclass of processes in which an agent is present. Achievements and accomplishments are considered to be subclasses of changes of state.
24. Since inherently perfective verbs always express POST(VERB), we have represented these verbs in the imperfective aspect marked by *-Vl* (see [21] above), in order to refer to the meaning of the verb itself.
25. In order to be semantically coherent, a transitive verb with the entry specified in (38a) must get a causative reading: a first subevent, characterized by ACT(x), causes a second subevent, characterized by AFFECTED(y). The semantic form (SF) of verbs only specifies the minimal requirements for semantic interpretation; all those semantic aspects that can be inferred by general means are left unspecified. The relevant constraint for possible verbs that allows us to infer in this case the causal reading is COHERENCE ("Subevents encoded by the predicates of a decomposed lexical SF structure must be contemporaneously or causally connected"; see Kaufmann 1995; Wunderlich 1997b; Kaufmann and Wunderlich 1998). In this paper, we restrict ourselves to those aspects of semantic representation that are relevant for the correlation between aspect and argument structure.
26. Bricker (1978) analyzed the root form that is marked by low tone as object deletion, and the *-n* appearing in (46b) as antipassive marker. As pointed out above, the marker *-n* has another function than marking antipassive. Moreover, the combination of object deletion and antipassive in the perfect would not make sense because both are intransitivizing.
27. Furthermore all verbs borrowed from Spanish are marked with *-t* when used transitively, as shown in (i). This indicates that all loans are treated as unmarked with regard to aspect.

    (i) (AP: 61)
    k = in kréer -t -ik
    INCOMPL = 1 believe -AO -IMPF
    'I believe it.'

28. The unspecified vowel V follows a vowel-disharmony pattern: it appears as [*u*] after front vowels (*a, e, i*), but as [*i*] after back vowels (*u, o*).
29. Only in the few verbs that behave differently, discussed in section 4.1, is the featural specification of the base verb not preserved: the perfective verb *han* 'eat' undergoes affected object, and the imperfective verb *péek* 'move, vibrate' undergoes causativization. We assume that these derivations are licenced semantically. Accordingly, the resulting theta grid has to be specified. We do not assume feature inheritance in derivations. We would merely like to point out that the featural correspondence between the base verb and the derived verb indicates a high degree of correspondence between semantic and grammatical factors.
30. The same strategy is used with all transitive verbs ending in a consonant cluster, when they are inflected for antipassive. Consider the following example:

    (i) (BY: xiv)
    táan = u b$^{\prime}$ib$^{\prime}$l -ah
    DUR = 3 knock.down -PERF
    'He is knocking down.'

Consonant clusters at the right edge of the root are opaque for vowel features and therefore block vowel alternations of the root. For a formal treatment of consonantal blocking in Yucatec, see Krämer (1998).

31. The suffix *-áʔab*^{p} is a former passive marker from which the regular passive of modern Yucatec has evolved (Bricker 1978: note 8).
32. Bricker glosses this sentence as "I chopped wood/trees in my milpa." But obviously the preposition *itfil* is missing, so *kòol* 'milpa' has to be regarded as direct object.
33. We owe this example to the native speakers Antonio and Martin Acosta from San Francisco, California.

References

Arzápalo, Ramón (1973). *Das Pronominalsystem des Yukatekischen*. Munich: Fink.

Austin, Peter (1997). Causatives and applicatives in Australian Aboriginal languages. In *The Dative and Related Phenomena*, Kazuto Matsumara and Tooru Hayasi (eds.), 165–225. Tokyo: Hituzi Syobo.

Ayres, Glenn T.; and Pfeiler, Barbara (1997). *Los verbos Mayas. La conjugación de los verbos en Maya Yucateco Moderno*. Mérida: Ediciones de la Universidad Autónoma de Yucatan.

Barrera Vásquez, Alfredo; Bastarrachea Manzuno, Juan Ramón; and Brito Sansores, William (eds.) (1991). *Dicionario Maya. Maya–Español, Español–Maya*, 2nd ed. S. A. México: Editiorial Parrúa.

Bevington, Gary (1995). *Maya for Travellers and Students.* Austin: University of Texas Press.

Blair, Robert; and Vermont-Salas, Refugio (1967). *Spoken (Yucatec) Maya*, 2 vols. Chicago: Department of Anthropology, University of Chicago.

Bricker, Victoria R. (1978). Antipassive constructions in Yucatec Maya. In *Papers in Mayan Linguistics*, Nora C. England, Collete G. Craig, and Louanna Furbee-Losee (eds.), 3–23. Columbia: Museum of Anthropology, University of Missouri.

—(1981). The source of the ergative split in Yucatec Maya. *Journal of Mayan Linguistics* 2, 83–127.

—; and Yah, Eleuterio Po'ot (1981). *Yucatec Maya Verbs. (Hocaba Dialect)*. New Orleans: Latin American Studies Center, Tulane University.

Brinkmann, Ursula; and Wunderlich, Dieter (1996). How to lose semantic weight: accounting for the locative alternation by preposition incorporation. Unpublished manuscript, University of Düsseldorf.

Butt, Miriam (1995). *The Structure of Complex Predicates in Urdu.* Stanford: CSLI Dissertations in Linguistics.

Danziger, Eve (1996). Split intransitivity and active–inactive patterning in Mopan Maya. *International Journal of American Linguistics* 62, 379–414.

Dayley, Jon P. (1981). Voice and ergativity in Mayan languages. *Journal of Mayan Linguistics* 2(2), 6–82.

Dixon, Robert M. W. (1972). *The Dyirbal Language of North Queensland*. Cambridge Studies in Linguistics 9. Cambridge: Cambridge University Press.

—(1994). *Ergativity*. Cambridge: Cambridge University Press.

Dowty, David (1991). Thematic proto-roles and argument selection. *Language* 67, 547–619.

Fillmore, Charles J. (1968). The case for case. In *Universals in Linguistic Theory*, Emmon Bach and Robert T. Harms (eds.), 1–88. New York: Holt, Rinehart and Winston.

Fought, John G. (1972). *Chorti (Mayan) Texts (I)*. Philadelphia: University of Pennsylvania Press.

—(1973). Chorti semantics: some properties of roots and affixes. In *Meaning in Mayan Languages*, Munro S. Edmonson (ed.). The Hague/Paris: Mouton.
Hanks, William F. (1990). *Referential Practice. Language and Lived Space Among the Maya*. Chicago and London: University of Chicago Press.
Hofling, Charles Andrew; and Ojeda, Fernando L. (1994). Yucatec Maya imperatives and other manipulative language. *International Journal of American Linguistics* 60, 272–294.
Joppen, Sandra (1995). Case alternation and its conceptual basis: a study of Basque. In *Processes in Argument Structure*, Miriam Butt, Wilhelm Geuder, Sabine Reinhard, and Heike Winhart (eds.), 39–58. Tübingen: Seminar für Sprachwissenschaft, Universität Tübingen.
—; and Wunderlich, Dieter (1995). Argument linking in Basque. *Lingua* 97, 123–169.
Kaufmann, Ingrid (1995). *Konzeptuelle Grundlagen semantischer Dekompositionsstrukturen*. Tübingen: Niemeyer.
—; and Wunderlich, Dieter (1998). *Cross-Linguistic Patterns of Resultatives*. Working Papers "Theorie des Lexikons" 109. Düsseldorf: University of Düsseldorf.
Klimov, Georgij A. (1974). On the character of languages of active typology. *Linguistics* 131, 11–25.
Krämer, Martin (1998). *A Correspondence Approach to Vowel Harmony and Disharmony*. Working Papers "Theorie des Lexikons" 107. Düsseldorf: University of Düsseldorf.
Kratzer, Angelika (1994). The event argument and the semantics of voice. Unpublished manuscript, University of Massachusetts, Amherst.
Lehmann, Christian (1990). Yukatekisch. *Zeitschrift für Sprachwissenschaft* 9, 28–51.
—(1992). The genesis of auxiliaries in Yucatec Maya. In *Endangered Languages/Langues menacées*, J. C. Boulanger and C. Ouellon (eds.). Actes du XV^{e} Congres International des Linguistes. Quebec: Université Laval.
—(1993). Predicate classes in Yucatec Maya. *Funcion* 13/14, 195–272.
—(1996). Control in Yucatec Maya. In *SCOLIA. La sémantique des relations actancielles à travers le langues. Actes de la Table-Ronde Franco-Allemande, Nancy, 16 et 17 juin 1995*, 105–127. Strasbourg; CNRS "LANDISCO" and Université des Sciences Humaines de Strasbourg No. 7.
Lucy, John A. (1994). The role of semantic value in lexical comparison: motion and position roots in Yucatec Maya. *Linguistics* 32, 623–656.
Marantz, Alec (1984). *On the Nature of Grammatical Relations*. Cambridge, MA: MIT Press.
Mithun, Marianne (1991). Active/agentive case marking and its motivations. *Language* 67, 510–546.
Mohanan, Tara (1994). *Argument structure in Hindi*. Stanford: CLSI.
Oakley, Helen (1996). Chorti. In *Languages of Guatemala*, Marvin K. Mayers (ed.), 235–250. The Hague: Mouton.
Pustet, Regina (1992). Das Partizipationssystem des Yukatekischen: Nominativ-akkusativisch, ergativisch oder aktivisch? *Zeitschrift für Phonetik, Sprachwissenschaft und Kommunikationsforschung* 45, 189–199.
Quesada, J. Diego (1997). A note on Mayan "crazy" antipassivization. *Theoretical Linguistics* 23, 79–112.
Quizar, Robin (1994). Split ergativity and word order in Ch'orti'. *International Journal of American Linguistics* 60, 120–138.
Straight, H. Stephen (1976). Decompositional structure in Yucatec verbs. In *(Papers in) Mayan Linguistics*, vol. 1, Marlys McClaran (ed.), 189–201. Los Angeles: UCLA and American Indian Studies Center.
Sullivan, Paul R. (1984). Noun incorporation in Yucatec Maya. *Anthropological Linguistics* 26, 138–160.

Tozzer, Alfred M. (1921). *A Maya Grammar*. Cambridge, MA: Harvard University Press. (Reprinted 1997. New York: Dover.)
Wunderlich, Dieter (1997a). Cause and the structure of verbs. *Linguistic Inquiry* 28, 27–68.
—(1997b). Argument extension by lexical adjunction. *Journal of Semantics* 14, 87–134.
—(1997c). *Participle, Perfect and Passive in German.* Working Papers "Theorie des Lexikons" 99. Düsseldorf: University of Düsseldorf.