

The Grammaticization of Zero

Asymmetries in Tense and Aspect Systems

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0. Introduction

An interesting consequence of the grammaticization process is the development of meaning in zero-marked forms. When a grammaticizing overt morpheme becomes obligatory, it may happen that other meanings within the same functional domain, which previously had no grammatical expression, come to be expressed by a meaningful zero. In this paper I will describe a possible inferential mechanism by which meaning may develop in grammatical morphemes (= grams) with no overt expression. I will also examine the nature of the meaning of zero grams, arguing that such forms have positive semantic content, which arises from the communicative context. In addition, I will discuss the distribution of zero grams in the tense/aspect systems of a seventy-six language sample, focussing primarily on the fact that zeroes have a very different distribution among the aspects of the present tense versus the past tense.¹ I will argue that the different grammaticization of overt and zero grams in the present and past tense is due to the distinct functions of discourse formulated in the present versus the past tenses.

1. The conceptual domain of grammatical tense and aspect

Recent cross-linguistic studies of tense and aspect (Comrie 1976,1985; Bybee 1985; Dahl 1985 and Bybee & Dahl 1989) establish that perfective and imperfective are the most general and the most common senses expressed grammatically in verbal systems in the languages of the world. Perfect-

tive aspect can be characterized as viewing the situation (expressed by the predicate) as a bounded unit. The imperfective does not take the situation to be bounded, but rather views it as having some sort of internal structure. While some might want to view the imperfective as expressing the lack of perfectivity, I would argue here (as well as elsewhere, Bybee et al., in press) that the imperfective also has positive semantic content, and in fact can be subdivided into several different senses, which can have their own means of expression in some languages.

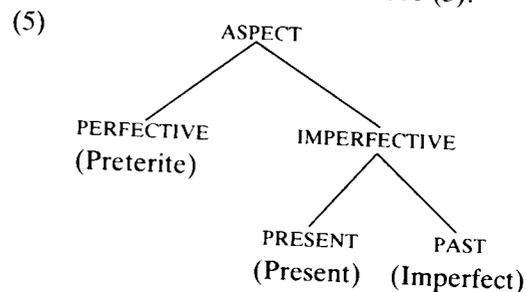
For dynamic verbs the most common sub-senses of imperfective are the progressive and habitual. The progressive takes a situation to be actively ongoing at reference time, while an habitual situation is one which is customarily repeated on different occasions, and as Comrie (1976) puts it, is characteristic of an extended period of time. Both progressive and habitual can be used in either the present or past tense, as the following English examples show.²

- | | |
|----------------------------------|-----------------------|
| (1) Malcolm is washing dishes. | (present progressive) |
| (2) Malcolm was washing dishes. | (past progressive) |
| (3) Malcolm washes dishes. | (present habitual) |
| (4) Malcolm used to wash dishes. | (past habitual) |

Given the perfective on the one hand, and the imperfective, divisible into progressive and habitual, on the other, our interest here is in the asymmetries inherent in the way these senses cross-classify with present and past tense. The first basic asymmetry lies in the fact that for most verbs there is no perfective aspect for the present tense. If perfective views a situation as having temporal boundaries (Comrie 1976), then for most verbs there can be no "present perfective", since a situation being presented as in effect at the moment of speech cannot at the same time be presented as bounded. An interesting exception to this, which illustrates the nature of a present perfective, can be found in present tense performative use of performative verbs (Dahl 1985: 81). The utterance "I bid three spades" is in itself a present bounded situation. Another similar class of present perfective functions occur in the narration of ongoing events, such as in sports commentary ("he kicks the ball, it misses the goal..."). However, for most verb classes and most discourse contexts, the present tense consists of the imperfective aspects of progressive and habitual, and the perfective is restricted to the past tense. (See also Comrie 1976:82-3.)

Thus Dahl (1985) argues that inflectional aspect systems (unlike the derivational ones of Slavic languages) most often are of a tripartite nature,

with present and past tense only distinguished in the imperfective aspect, as for example in Spanish and French. See (5).



Aspect is hierarchically higher than tense in this diagram, according to Dahl, because it is much more common for present and past imperfective to have similar expression than past imperfective and perfective. Further, Bybee (1985) argues that aspect is more relevant to the verb than tense is. Despite the proposal that aspect is in a sense more basic than tense, the discussion in this paper examines the present and past tenses in terms of the aspects which may be expressed in each one. Thus we see that present tense is inherently imperfective, so that a general present which includes both progressive and habitual could be called a 'present imperfective'.

Besides progressive and habitual in the present tense we also have generic statements. I would argue that habitual and generic are aspectually the same, and that the main difference between habitual and generic sentences has to do with the nature of the subject, as can be seen in (6) and (7), where the aspectual interpretation of the verb is essentially the same.

- (6) Dogs pant to cool off.
 (7) My dog pants to cool off.

This hypothesis is supported by the fact that no clear distinction in the expression of present habitual and generic emerges in a cross-linguistic survey of verbal categories in seventy-six languages (the Gramcats Project, to be described in more detail below). In this survey of reference grammars, we studied the meaning of all grams fixed in position with respect to the verb. While the expression of generic meaning is not commonly mentioned in reference grammars, the instances we found of explicit mention or exemplification of generic meaning showed that in ten out of eleven cases it is expressed by a form that could also express habitual meaning. Given no real aspectual difference between habitual and generic, the term habitual will be used here to cover the aspectual sense in both types of sentences.

For stative predicates, no distinction can be made between progressive and habitual. One could argue that a stative situation such as *he is tall* or *she knows the answer* is both habitual and progressive, that is, in progress at reference time, and also characteristic of an extended period of time. Or, one could think of progressive and habitual as applicable only to dynamic situations and argue that they are simply not relevant to stative predicates. The latter view is more compatible with the grammaticization paths of progressive and habitual, since the meanings of both are initially only applicable to dynamic predicates. In either case, however, statives interact differently with imperfective aspect, being neutral to the distinction between habitual and progressive. The major semantic distinctions applicable to statives are being in a state versus entering into a state, and present versus past.³ We will return in section 9 to a study of the various ways that stative predicates can interact with perfective aspect.

With this sketch of the senses covered by aspect in the present and past tense established, we now turn to a discussion of the way in which zero grams become meaningful.

2. Obligatoriness and zero markers

The evolution of lexical material into grammatical material is a long and gradual process, beginning with the occasional use of a periphrastic construction which gradually becomes more and more frequent. The developing gram, as it increases in frequency, loses specific semantic features, thereby becoming more general in meaning, while at the same time becoming more rigidly fixed in syntactic position. During the course of development a gram may also become obligatory. Not all grammatical morphemes are obligatory, rather it appears that the process of becoming obligatory occurs rather late in the entire chain of developments.

Two cases from English show the difference between a gram that has become obligatory and one that has not. Consider first the English Progressive (*be + ing*). Before this periphrastic construction developed and became frequent, the English Simple Present was used to indicate progressive, habitual and stative meanings in present time. In Modern English, the progressive meaning is expressed by *be + ing* and the Simple Present has the meaning of habitual with dynamic predicates. Thus

- (8) I drink decaf.

characterizes my general or habitual choice of beverages. It cannot be used to indicate that I am now (or shortly to be) engaged in drinking a specific cup of coffee, as the semantic anomaly of (9) shows:

- (9) *I drink a cup of decaf right now.

Rather, with dynamic predicates, it is obligatory that ongoing activities be described in the progressive:

- (10) I am drinking a cup of decaf right now.

The fact that the Simple Present is now incompatible with temporal phrases such as "right now" attests to the fact that it is explicitly expressing habitual meaning. The lack of a tense or aspect marker in the verb phrase conveys this particular meaning.⁴

In contrast, consider the Past Habitual periphrasis that is commonly used in English, *used to*. While this periphrasis is quite frequent in the past, it has not become obligatory. The evidence for this is the fact that the Simple Past is compatible with temporal phrases that indicate habitual situations. Thus (11) and (12) have nearly the same meaning:

- (11) She sang to him every day.

- (12) She used to sing to him every day.

If *used to* had become obligatory, then the Simple Past would be restricted to non-habitual meaning. (And since the Past Progressive is obligatory, if *used to* became obligatory, the Simple Past would have the meaning of perfective.) At present it is not so restricted, but can be used for single completed actions as well as habitual situations. Note that the Simple Past has an overt marker for tense — in the suffix or stem change — but if the Past Habitual were to become obligatory, then we would describe the Simple Past as having a zero marker for aspect.

Note the difference in meaning between the zero marker and the simple absence of a marker, as illustrated in (8) versus (13).

- (13) She sang to him.

In (8) the aspectual interpretation is clear and unambiguous, while in (13), the aspectual interpretation is open to either an habitual or a perfective interpretation. (It is not open to a past progressive interpretation presumably because the Past Progressive has become obligatory.) I would like to refer to the meaning that is expressed by a zero gram such as Simple Present as "zero meaning" and the meaning covered by the absence of a non-obligatory gram as "open meaning". Our question in the next section will be, how does "open meaning" change into "zero meaning"?

3. The development of zeroes

The grammaticization of zero involves some of the same mechanisms of change that push forward the grammaticization of overt material. As an illustration of the process, I will use the example of the English Progressive and Simple Present. I agree with García & Putte (1989) that the two factors primarily responsible are: first, the increase in frequency of the developing Progressive gram means that more and more often the expression of progressive meaning is associated with the use of that gram. Second, inferential reasoning comes into play here as it does in other semantic changes that take place in grammaticization. As argued in Dahl (1985); Bybee (1988); Faltz (1989); García & Putte (1989); Traugott (1989) and Traugott & König (1991), one of the mechanisms for semantic change in grammaticization is the conventionalization of implicature, by which a frequently-occurring inference that a hearer is licensed to make beyond the explicit meaning of an utterance becomes part of the explicit meaning.

The application of inferential change to the creation of zeroes involves the recognition of the important role played by Grice's Maxim of Quantity in the communication process. According to the Maxim of Quantity, the speaker attempts to make his or her contribution as informative as is required, but not more informative than is required. The hearer is entitled to assume that this is the speaker's goal. Now if there is a very frequently occurring expression of progressive meaning which, due to its increasing frequency, is losing much of its specific informative value and is becoming a generalized marker of progressive, given the high availability of this gram, if it is not used, the hearer is entitled to infer that its meaning is not intended, and that, in fact, some other meaning is intended. As García & Putte (1989) point out this inferential process is streamlined for frequently used expressions with the result that the inference becomes automatic and thus a part of the meaning of the construction. In this case the inference is that the absence of Progressive marking means that the speaker intends to signal the remainder of the aspectual domain of present tense — habitual with dynamic predicates, or stative.

Given that a general present tense is open to aspectual interpretations of habitual, progressive and stative, if progressive comes to be obligatorily expressed in another way, a former Present Tense in the same language will express only habitual and stative.

4. On the source of the semantic content of zeroes

Because overt grams develop from lexical morphemes, or phrases made up of grammatical and/or lexical morphemes, and since there is a predictable relation between the source meaning of a gram and the subsequent grammatical meanings, we can be relatively certain that the meaning of an overt gram consists of actual semantic substance that has been eroded and molded by use over time. While there are many questions about the mechanisms involved in this process, there is no question about the source of grammatical meaning for overt grams.

However, no such source is available for zero grams. If zero grams have actual semantic substance, where does this substance come from? Given the inferential mechanism proposed above for the development of meaning in zeroes, the semantic substance of zero grams must come from the discourse and cognitive context, which, of course, happens to be full of meaning. I would argue that certain meanings given by our understanding of the world are present when we speak, whether we explicitly mark them or not. Thus the conceptual domain of tense and aspect is universal in its broad outline and universally present when we speak.⁵ In this conceptual domain are certain foci of much-used tense and aspect meaning. For instance, the perfective aspect (as defined by Dahl 1985), is prototypically a past narrative aspect, used for presenting the foregrounded events in a past situation. Some languages have an overt gram for perfective, some use a zero gram, and others have no grammatical means for distinguishing perfective from other past functions. In all cases, however, perfective aspect is conceptually available, and even in English, where the Past Tense does not distinguish perfective from habitual, the perfective function exists and can be inferred from the context.

Thus we have a tense/aspect space in which we frame utterances, and the part of that space which is relevant for the situation in the proposition can either be explicitly signalled by a gram, or it can be inferred from the context. In fact, overt grams are not doing much more than the context does. The meaning they explicitly signal points to very large areas of the conceptual space within which an utterance is framed. These same areas can be evoked by the non-linguistic and linguistic context, leading to the often-expressed feeling that inflectional grams are highly redundant, and have extremely generalized and abstract meaning. This view explains why such obviously important grammatical distinctions as those between present

and past time reference, or perfective and imperfective aspect, are so similar across languages (as shown in Bybee 1985; Dahl 1985 and Bybee & Dahl 1989), and yet can be completely lacking in grammatical systems without impeding communication in the least: they are ever present in the context and thus can be inferred if a marker is lacking, but if one should be developing it naturally extends to cover these focal portions of the conceptual space.

To return to the development of zero grams, I said above that when a developing gram such as the Progressive becomes frequent enough so that it is reasonable to infer that if a speaker intended the progressive sense, s/he would have used the progressive, the non-progressive meanings of Simple Present come to be the only possible meanings. This view assumes that all of the aspectual senses of Present Tense are available in the conceptual arena, and when the progressive sense becomes conventionally associated with a particular gram, the other senses come to be conventionally associated with the absence of a marker.

Two more points need to be made about the nature of the meaning of zero grams. First, zero meaning is not "non" meaning, rather zero grams have true semantic content that is equivalent in many ways to that of overt grams. This is because the universal semantic space of tense and aspect is not homogeneous or topographically flat. Instead, there are prominent areas of this space that are important for cognition and communication — progressive, habitual and present state in the present tense portions — and these prominent areas tend to have grammatical expression. Thus zero grams have the potential to cover the same areas as overt grams.

Second, as we know from the work of Jakobson (1939) and Greenberg (1966), zero grams are not distributed randomly over the prominent portions of the conceptual space. Instead, certain meanings are sometimes expressed by zero grams while others never are. The cross-linguistic distribution of zero grams depends upon what is the normal or default interpretation within the conceptual domain. If we divide the tense/aspect domain into present and past tense, then we find that the default aspectual interpretation is different in present than it is in past. Thus zero grams appear for different aspects in the present than in the past tense, as we shall see in the next section.

5. The distribution of zero grams in tense and aspect systems

We have already discussed one asymmetry in the distribution of the aspects across present and past tense: the present tense may not sensibly be described from the point of view of perfective aspect. Since the present tense views the situation as in effect at the moment of speech, and the perfective views the situation as bounded, the two points of view cannot be taken at one and the same time (with the exceptions mentioned above).

A further asymmetry involves the distribution of zeroes in present and past tense. Table 1 shows the distribution of overt versus zero grams in the seventy-six languages of the Gramcats Sample. The languages of the Gramcats Sample were randomly selected within genetic groups to be representative of the languages of the world. Using written reference material, we recorded information about both the form and the meaning of all verbal grams fixed in position with respect to the verb for each language. Overt grams include affixes, auxiliaries, particles, reduplication, stem changes, stress or tone changes. Zero grams were recorded only if the reference material indicated that the lack of a marker signalled some definite meaning, and not in cases where the meaning was open.

Table 1. Number of languages having overt and zero expression of tense and aspect in a seventy-six language sample

	HABITUAL		PROGRESSIVE		IMPERFECTIVE		PERFECTIVE		ALL ASPECTS	
	overt/zero		overt/zero		overt/zero		overt/zero		overt/zero	
PRESENT	0	2	5	0	34	7	—	—	—	—
PAST	9	0	2	0	10	0	25	7	36	0
GENERAL	18	0	38	0	8	1	—	—	—	—

The numbers in Table 1 refer to the number of languages having a gram expressing the particular tense/aspect combination, and whether that gram has overt or zero expression. In the tense column, 'GENERAL' refers to cases in which one gram for e.g. habitual is used in both past and present time. Across the top, 'ALL ASPECTS' refers to general past tenses that express or co-occur with all aspects. Imperfective refers to grams that express both progressive and habitual.

The first observation to be made about the figures in Table 1 is that the proportion of zeroes is quite small; there were only seventeen zero grams as compared to over two hundred overtly expressed grams in this tense/aspect

domain.⁶ One reason for this is the fact that all of the gram-types in Table 1 have frequently occurring grammaticization paths leading to their development. The best documented and most common of these are:

1. Progressives (which develop from locative, postural or movement verb constructions) tend to develop into imperfectives or occasionally presents (see Comrie 1976; Bybee & Dahl 1989 and Bybee, Perkins & Pagliuca in press).
2. Anteriors (or perfects, which develop from stative auxiliaries plus a past participle, or from dynamic verbs such as 'finish' or 'come from') develop into perfectives or general past tenses.
3. Habitual grams tend to come from verbs meaning 'live', 'know' or 'be used to'.

There are two ways to view the distribution of zeroes in Table 1. First, if we just consider present (imperfective) vs. past tense, we see that present is sometimes unmarked, but past never is. So in languages that have a primary present/past distinction, present is unmarked and has meaning that has developed out of the default meaning. However, if we focus on the distribution of the zero grams among the aspects of the present and the past tenses, we observe an asymmetry. In the present tense the zero grams occur in the present habitual, in the general present (or present imperfective), and in one case only, in the general imperfective. On the other hand, the only zero grams in the past tense express perfective.

Given that the meaning of zero grams develops out of the default interpretation of the open meaning — that is, the most normal sense within a neutral context — the distribution of zeroes in Table 1 suggests that the default aspectual sense differs strikingly for present versus past tense. The hypothesis of this paper is that the default and thus most common function of the present tense is to describe **how things are** and the default and most common function of the past tense is to narrate **what happened**.

Thus in the present tense the default aspectual interpretation (for dynamic verbs) is habitual — the aspect that describes the general characteristics of scenes and their participants. In the absence of any aspectual marking in the present, or any contextual indications to the contrary, a present tense will be most likely to have this interpretation. In order to divert the tendency towards this interpretation in favor of a progressive one, special linguistic signals must be given, and some of these signals can develop into progressive constructions. Since the habitual aspect is the default aspect for present, a specific progressive can never be expressed by a zero gram in the present tense.

The past tense tends to be used for narration, and we know that in narrative the distinction between perfective and imperfective is very important, as the perfective tends to represent the main story line, while the imperfective gives background information (Hopper 1979). I hypothesize that in a past tense context, if there are no indications to the contrary, dynamic verbs are typically taken to present discrete events in the story line. If dynamic situations are intended to be habitual or progressive (that is, part of the background) some explicit linguistic indications will be necessary, leading to the development of a past progressive, past habitual or past imperfective. It follows then, that the past habitual, progressive or imperfective will not have zero expression.

A test of these hypotheses is possible: a count of the number of occurrences of each aspectual sense in each tense in naturally occurring spoken discourse (whether the language explicitly marks the functions or not), should reveal that in the present tense, the habitual aspect is more frequent than the progressive, while in the past tense, the perfective is more frequent than the imperfective. Published counts of the frequency of grammatically marked Preterite versus Past Imperfect in Spanish show the Preterite (which has perfective functions) is four times more frequent than the Past Imperfect (Gili Gaya 1960). Ongoing research by Sandra Thompson (personal communication) on spoken conversation in English reveals that the habitual function is by far the most common function in the present tense.

Of course this does not mean that the default functions cannot have overt marking. On the contrary, as Table 1 shows, with the exception of present habitual, they more commonly have overt marking than zero marking. However, the overt grams for these senses begin with much more specific functions and gradually expand into the very generalized senses. By the time they are fully generalized they are almost devoid of meaning, and do little more than set the situation in a broad area of the conceptual space. As mentioned above, the relevant aspectual function is often apparent from the context, so that these markers are sometimes redundant in context.

6. Present habituals

Further support for the hypothesis that habitual is the default sense of present tense, and that default senses tend not to have overt grammaticization comes from the cross-linguistic data as shown in Table 1. Here we see that not only is it possible for a present habitual to have a zero marking, but in

our database, **there are no cases of specific present habituals marked any other way**. That is, we have no overt grams that mark present habitual and nothing else. What we do have are cases of general presents that mark present habitual, progressive and stative, and cases of general habituals that can combine with either past or present tense. The lack of present habituals is remarkable when compared to the occurrence of past habituals in nine languages. My proposal is that since habitual is the default function of present tense, special markers of present habitual are not used frequently enough to become grammaticized.

As shown in Table 1, our data include habitual grams that may be combined with present and past tense grams, or that may occur in present and past contexts in languages that do not have tense, and we have cases of specifically past habitual grams. All of the latter, ten grams in nine languages, are formed with the marker of past tense combined with an habitual gram. For instance, in Alawa (Australian, Non-Pama-Nyungan), the habitual suffix *-kay* is added only to an auxiliary verb in the Continuous Past Indicative, as in (14) (Sharpe 1972:78):

- (14) *ñak ðil-apala-na-kay*
spear they-were spearing-it-HAB
'They used to spear them'

In Maidu (Penutian), the habitual suffix *-ús*, occurs only after the Past tense suffix, *-ʔ* (Shipley 1964:48)

- (15) *wéjeʔúsas*
talk-PAST-HAB-1S
'I used to talk'

Thus past habituals in our database are all structurally analogous to the English past habitual, *used to*, which has the past tense suffix as one of its components. This means that they were formed with a general habitual morpheme and the past tense morpheme, which leads us to ask why this same general habitual morpheme does not occur in present tense.

To answer this question, we can consider the history of the English *used to* construction. This construction became frequent in the 15th century, and at that time could be used both in the present and the past tense, but at first only with human subjects and dynamic predicates. It meant "to be accustomed to". The following is a present tense example:

- (16) *His modir vsith eueryday gretly to sorowe*
His mother uses everyday greatly to sorrow
(From the OED, c. 1440)

The main verb status of *use to* is evident from the following example in which it is used in the participial form:

- (17) The English then useing to let grow on their upper lip large Mustachio's
(From the OED, c. 1670)

Now present tense uses and main verb uses have disappeared. The phrase *used to* has reduced phonologically and the final consonants of *used* have assimilated to *to*, the erstwhile infinitive marker. It is now rare for any material to intervene between *used* and *to*.

What is of interest to us here is the fact that as the phrase grammaticized, the present tense usage disappeared. Or to put it another way, the present tense use did not grammaticize. I suggest that the reason for this is that the habitual was more frequently used in the past than the present, since in the present there would be fewer cases in which explicit mention of habitualness would be called for.

Another asymmetry in grammaticization in the past and in the present is that sometimes the progressive may generalize to imperfective in the past, but not in the present. It is known that progressive grams may generalize their meaning to include habitual and thus become imperfectives. Such changes are documented in Turkish (Underhill 1976), Yoruba and Scots Gaelic (Comrie 1976). In our database we have two cases of a similar occurrence, that is, a progressive construction that has generalized to express habitual, but interestingly enough, in these two cases, only in the past tense. In the present, the construction has not generalized to include habitual. The two languages are Margi (Chadic) and Kui (Dravidian). Consider the following examples from Kui, which uses the auxiliary *manba* 'to be, live or reside' plus a participle to form the progressive. Formerly, this compound tense expressed both ongoing situations and customary action in the past (Winfield 1928:86-7):

- (18) *sila poru tonditi deli tani amu panga tani seru rui masamu*
'at the time when the quarrel began we were ploughing in the field'

- (19) *kahe kuinga mrimi gandi muspi maseru*
 'in the early days the Kui people used to offer the meriah sacrifice'

The present of this same compound construction is used for progressive as in the following:

- (20) *amu mai naju tani idu ronda despi manamu*
 'we are building a house in our village'

But the present habitual uses the old inflectional present tense:

- (21) *kuinga kalu uneru eakive tara asaska kalu kunu*
 'Kui men drink toddy but their women refuse it'

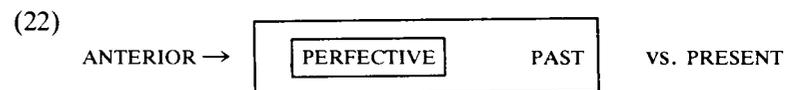
It appears, then, that the past progressive has generalized to include the habitual while the present progressive has not. Rather in the present, the older inflectional present continues to mark habitual. I suggest again that the reason for this is that in the past a special mark for habitual is more often necessary than in the present, where habitual is the default interpretation.

7. Zero presents

In addition to zeroes signalling present habitual, zeroes signalling a more general present tense also occur in the languages of the world. In Table 1 above, these are the zeroes under 'present imperfective.' Typically, these general presents cover progressive, habitual, present states and sometimes also future (especially 'scheduled' future). For instance, in Old English a general present of this sort was zero-marked except that in some forms it had characteristic person/number suffixes. In the Gramcats database, we have identified zeroes for general present in Tangan (Oceanic), Rukai (Malayo-Polynesian), Bari (Chari-Nile), Haka (Tibeto-Burman), Yagarua (Eastern New Guinea Highlands), Classical Latin and Modern Greek.⁷

A zero for present tense develops when an overt gram for past tense becomes obligatory. As I mentioned above, past tense grams develop from anteriors (which can come from *have* or *be* plus a past participle, from verbs meaning 'finish', or from other auxiliary constructions) or from temporal adverbs. As Bybee & Dahl (1989) point out, both perfective and past tense grams develop from anteriors. Whether the resulting gram is a perfective or

a past appears to depend upon whether the language already has a gram covering the past imperfective. If a past imperfective exists, then the developing gram becomes a perfective, as in French, where the *Passé Composé* replaced the *Passé Simple* — that is, one perfective replaced another, and the contrast with the *Imparfait* remains. On the other hand, if no past imperfective exists, the developing gram will extend to cover all of the past tense functions — including non-perfective ones. This appears to be happening in Dutch and German, where a construction cognate to the French one is replacing the pre-existing past tense. The diagram in (22) is intended to illustrate the fact that the perfective function is a subset of the general past tense. The grammaticizing anterior will stop at perfective if the non-perfective past (i.e. the imperfective past) has overt expression. Otherwise it will continue to generalize until it expresses past tense. If the present does not happen to have overt expression, then a zero present tense will thereby be created.



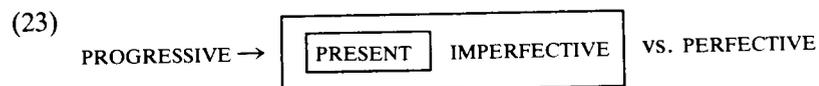
Note that if this suggestion is correct, that is, if a developing anterior will extend to cover as many of the past tense functions as possible given contrasting grams, then it would follow that there would not be the possibility of developing a zero imperfective. A zero imperfective would only arise if a developing anterior became a perfective but did not continue to expand into a past tense. Thus the remainder of the aspectual functions would be assigned to the zero, producing a zero imperfective. In our data, we have only one zero imperfective and that occurs in Slave (Athapaskan).⁸ It happens, however, that this zero form is rarely used, since Slave also has a progressive and habitual that can occur in the present tense. However, when it is used, it has imperfective meaning. Despite this example, our data generally support the hypothesis that an anterior will continue developing into a past tense if there are no competing grams in the past tense domain.

Besides a zero present contrasting with a single overt gram for past tense, languages also exist in which a zero present contrasts with a past tense that is divided into perfective and imperfective, as for example in Classical Latin and Modern Greek.

8. Zero perfective

Zero perfectives develop when a general imperfective becomes obligatory, usually by the further grammaticization of a progressive which is not restricted to present tense. This may have happened in the following languages of the Gramcats sample: Maung (Australian, Non-Pama-Nyungan), Abkhaz (Caucasian), Nakanai (Northeast New Guinea), and appears to be underway in Ngambay (Chari-Nile). It is also possible to have a zero perfective contrasting with overtly marked grams for habitual and progressive, rather than a general imperfective, as in Tem (Gur), Tojolabal (Mayan), and Worora (Australian, Non-Pama-Nyungan).

As mentioned earlier, imperfectives tend to develop from progressives (examples occur in Celtic and Yoruba [Comrie 1976], Turkish [Underhill 1976] and elsewhere). However, there are also cases of present progressives developing into general presents, as for example in the Chamus dialect of Maa (Heine 1990). But the latter development would only occur where a past tense already exists; if there were no past tense, the progressive would become a general imperfective. As the diagram in (23) shows, the present tense expresses a subset of imperfective functions, since imperfective functions can also occur in past tense. Thus a progressive restricted to the present by the existence of a past imperfective will become a present tense, while a progressive that is not so restricted will become an imperfective — expanding to cover as many functions as possible.



As with the anterior/past/perfective situation discussed in the preceding section, this hypothesis has consequences for zero expression. It predicts that the perfective could have zero expression, but that the past tense will not. A grammaticizing progressive will not stop at present unless there are already other overt markers of past (imperfective), thus a situation could not arise in which there was an overt present and a zero past. If there is no overt past gram, the developing progressive will continue to generalize into an imperfective, and in that case, it will create a zero marker for perfective where there was no overt marker before.

The data from the Gramcats database support this hypothesis, since there are no cases of a past tense expressed by a zero gram, but seven cases

does not explain the uses of this form. It is possible that this form is actually a perfective form.

The distribution of zeroes in the languages of our sample informs us not only about the default functions of tense and aspect markers, but it also suggests that grammaticization of an overt form will extend as far as possible in its semantic domain, assuming as many related functions as are available on its way to becoming obligatory. Thus progressives will extend to imperfective if possible, creating a zero for perfective if no overt gram exists for this function and an anterior will extend to past tense if possible, creating a zero for present tense if no overt gram already exists for this function.

9. Perfective with dynamic and stative predicates

Evidence was presented above that the perfective function is the default function in the past tense, since perfectives report the main sequence of events in narrative. In fact, for dynamic predicates the perfective function is the default function if there is no indication of temporal reference time, i.e. in a language in which there is no marking of present and past tense. On the other hand, for stative predicates the default interpretation would be 'state concurrent with reference time'. Given these default interpretations, the development of an overt progressive or imperfective for use with dynamic predicates would occasion the development of a zero gram with one interpretation for dynamic predicates — perfective, and another for stative predicates — present. Bickerton (1975) argues that this is the typical pattern in pidgin and creole languages, Welmers (1973:346f.) points out that this pattern also occurs in some African languages (e.g. in Yoruba), and the Gramcats survey turned up this pattern for zero grams in Nakanai, Ngambay and Tem.⁹

10. Conclusion

Recent work on cross-linguistic patterns of grammaticization postulates a universal conceptual space surrounding the communicative context of language use. Tense and aspect grams develop along a small number of paths and generalize their functions until they point to large focal areas in this conceptual space. Part of the motivation for the grammaticization of overt

of perfective expressed by zero. One possible near exception is found in Jivaro, where the unmarked verb form is called "present completive" or "present perfect", and is in some cases translated in the English Present Perfect (Turner 1958:64,93). Unfortunately, the reference material available to us markers is the need to express meanings distinct from the default meanings. As an overt marker becomes more frequent, the hearer can infer that its absence is intentional and meaningful, leading to the development of zero grams. Thus the cross-linguistic patterns of grammaticization of overt and zero forms directly reflects the language users' understanding of the meaning inherent in the communicative context.

Notes

1. This survey, known as the Gramcats project, was completed with the help of grants from the National Science Foundation (BNS 8318262), and a fellowship from the John Simon Guggenheim Memorial Foundation. The major co-workers on this project were William Pagliuca and Revere Perkins, to whom I am most grateful for methodological, empirical and theoretical contributions. For comments and suggestions which greatly helped to clarify the main points of this paper, I am grateful to Alan Hudson and Sandra Thompson.
2. The discussion in this paper will exclude mention of the future, because our focus here will be on the way present and past interact with the various aspects. The grammaticization of future has been treated in Bybee and Pagliuca (1987) and in Bybee, Pagliuca & Perkins (1991).
3. Sometimes a past habitual gram can occur with a stative predicate with the implication that a state in the past no longer exists, as in "My father used to have a car like that one." The habitual sense is lacking here.
4. Of course, cultural factors do modify the conditions on the communicative context, which in turn has an influence on the grammar, as Perkins (1988) has demonstrated.
5. The number of overtly expressed tense/aspect grams is just an estimate: Table 1 counts languages, and some languages have more than one progressive or habitual gram.
6. Given the nature of the reference material, it was sometimes difficult to know whether the lack of a tense marker signals a definite meaning or an open meaning; further investigation may reveal that some of these zeroes have open meaning rather than zero meaning.
7. Of course, in languages with derivational perfectives (such as the Slavic languages and Margi [Chadic]), the imperfective is unmarked. The claims made here apply only to inflectional aspect systems. See Dahl (1985) and Bybee & Dahl (1989) for differences between inflectional and derivational aspect.
8. However, Sankoff, in her contribution to this conference, argues that many of the so-called zeroes postulated for pidgin and creole languages do not contrast with obligatory grams, and thus have 'open' meaning rather than 'zero' meaning.

9. Interestingly enough, the Gramcats survey also revealed that overtly marked perfectives can have the same set of functions: perfective with dynamic predicates and present state with other predicates — either statives or change of state predicates. See Bybee et al., in press, for an extensive discussion of the means by which such situations arise.

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