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Degrees and dimensions of grammaticalization in Chitimacha preverbs

Daniel W. Hieber

University of California, Santa Barbara

1. Introduction

It is well known that grammaticalization is a composite phenomenon, consisting of a number of micro-level changes that give rise to broader patterns (Lehmann 2002:108–153; Norde 2009:120). Some commonly-cited dimensions of grammaticalization include frequency, productivity (actuation through the linguistic system), syntactic independence, lexicalization, and semantic compositionality, co-occurrence with competing forms in a process of renewal, and phonetic reduction, among others. But any one of these features may be absent, or present more strongly than others, for any given case of grammaticalization. While a form might exhibit a high degree of grammaticalization in terms of semantic shift, for example, it may also have undergone little to no grammaticalization in terms of syntactic reanalysis or phonetic reduction. Thus in explaining synchronic patterns through grammaticalization, it is not enough to show how a thing became grammaticalized (i.e. demonstrate the grammaticalization pathway). One must also examine the degree to which an element has been grammaticalized, and the dimensions along which that grammaticalization has occurred. This paper therefore adopts a multidimensional approach to the study of the grammaticalization of Chitimacha preverbs, which assumes that there is more than one way for a construction to exhibit grammaticalization, and that these dimensions of grammaticalization can therefore be analyzed independently of each other. I conclude that the grammaticalization of Chitimacha preverbs is not due to any one process or set of features, but rather the strong covariance among a number of features canonically attributed to grammaticalization phenomena.

Though preverbs in Chitimacha clearly constitute a unified class with certain core functions, their individual behaviors are diverse, and several members exhibit related but non-preverbal functions. While synchronic polyfunctionality and distributional differences are often explicable as the result of functional divergence and semantic persistence in grammaticalization (Hopper and Traugott 2003), such processes would be insufficient to explain the state of affairs for Chitimacha. Even preverbs which share the same grammaticalization pathways exhibit different synchronic behavior. This paper shows that only when the degree and dimensions of grammaticalization are accounted for does the synchronic behavior of Chitimacha preverbs become explainable.

Section 2 introduces the data used for this study, and Section 3 gives an overview of the system of preverbs and their possible historical origins. Section 4 examines the preverbs along each dimension of grammaticalization listed above, showing that each method tells us different things about the degree of grammaticalization for each preverb. Section 5 summarizes these findings, and argues that it is only when the dimensions of grammaticalization sufficiently covary that we recognize an instance of grammaticalization at work.

2. Data & Methodology

The Chitimacha language (ctm) was spoken in Louisiana until the death of its last native speaker in 1940. While the recent availability of archival materials in digital form has facilitated renewed academic interest in the language (Iannucci 2009; Hieber 2013; Brown, Wichmann, and Beck 2014; Mithun forthcoming), there remain few published descriptions of the language. The data for this study come from a collection of 88 texts dictated by one of the last fluent speakers, Chief Benjamin Paul, to linguist Morris Swadesh between 1930 and the time of Ben’s death in 1934. These texts consist mostly of tribal legends and personal narratives, but also a few expository and procedural texts. Swadesh later compiled these into a typed manuscript which he deposited at the American Philosophical Society Library in Philadelphia (Swadesh 1953). He also elicited 22 texts from Ben’s niece, Delphine Ducloux, but since she was somewhat less fluent than Ben, her texts were excluded from this study. For this research, Ben’s texts were retyped using the linguistic analysis software Fieldworks Language Explorer (FLEX) (Summer Institute of Linguistics 2013) and glossed at the sentence level using Swadesh’s free translations. Some general statistics regarding the resulting corpus are given in Table 1.

Table 1. Statistics for the corpus of Chitimacha texts

# of texts	88
# of paragraphs	418
# of sentences	3496
# of lexical entries (lexemes)	~3724
# of unique words (types)	4467
# of words (tokens)	29028

3. Background

A PREVERB is definitionally a category in flux. A common feature of all definitions is the synchronic layering indicative of grammaticalization in process, where certain (older) preverbs are more tightly syntactically bound to the verb and add only a vague contribution to its

meaning, and other (newer) preverbs are more clearly lexical and may be separated from the verb while still remaining a cohesive unit with it—a phenomenon known as TMESIS (Booij & van Marle 2003:1, 88; Diessel 1999:141; Lehmann 2002:86–92; Matthews 2007:318).

Individual preverbs may also exhibit divergence, so that lexical and grammatical uses of the same form coexist synchronically. Matthews (2007:318) even notes that, “It is perhaps for this last case that the term [preverb] is most useful.” Preverbs are therefore ideal candidates for grammaticalization studies like the present one.

Chitimacha is primarily verb-final and morphologically suffixing. Almost the sole exception to this preference is the system of preverbs, which in most cases appear immediately before the verb and comprise a lexical and syntactic unit with the verb. The Chitimacha preverbs and their meanings are presented in Table 2.

Table 2. *Chitimacha preverbs and their functions*

ʔap	<ol style="list-style-type: none"> 1. (to) here 2. coming
ʔapʃ	<ol style="list-style-type: none"> 1. returning here 2. together 3. randomly 4. reflexive 5. reciprocal
hi	<ol style="list-style-type: none"> 1. (to) there 2. going
his	<ol style="list-style-type: none"> 1. undoing 2. returning 3. doing in response 4. doing again
kap	<ol style="list-style-type: none"> 1. up 2. suddenly 3. inceptive 4. inchoative 5. stative
ka:pʔs	<ol style="list-style-type: none"> 1. up
kas	<ol style="list-style-type: none"> 1. returning there 2. reverse 3. apart
ni	<ol style="list-style-type: none"> 1. down 2. thing 3. detransitivizer 4. compound nominalizer 5. imperative

The preverbs have very different historical origins. *ʔapʃ* and *ka:pʔs* derive from *ʔap* and *kap* plus an internally-reconstructable reversative **-ʃ*. *his* too may follow this pattern with *hi*. *ʔap* and *hi* themselves are of uncertain origin. One known origin for preverbs crosslinguistically is the grammaticalization of preverbal adverbs into the verb complex (Lehmann 2002:87). This would be surprising for Chitimacha, which has no strong class of adverbs. Any words with

adverbial function are bimorphemic and clearly very recent, if not still semantically decompositional.

Forgács (2004) documents a different grammaticalization pathway for Hungarian, where some preverbs arose from postpositions that were reanalyzed as being part of the verb rather than the preceding noun. Chitimacha shows evidence that at least some of its preverbs followed a similar trajectory, by the way that preverbs affect the semantics and transitivity of the verb. Consider the meaning of the verb *kow-* ‘call’ when used with and without the preverb *hi* ‘to, toward’:¹

- (1) *ni ti:kmiʃ hi ko:naka*
 Governor to we.called
 ‘we called (to) the Governor’ (A03e.2)
- (2) *?akʃuʃ heʃʃʲin ko:ʃnaʔa.*
 cypress holy they.call
 ‘They call (i.e. name) them holy cypresses.’ (A09f.2)

In (1) *hi* is indistinguishable from a postposition. At the same time, *hi* does also frequently co-occur with the lexical postposition *hup* ‘to, towards’, perhaps casting doubt on the postpositional origin of *hi*.

- (3) *ʃe:nink hup hi niʃwiʔi*
 pond to to he.came.to.water
 ‘he came to the edge of a pond’ (A01a.2)

The preverb *kas* ‘returning back there, reversing, apart’ likely comes from the internally-reconstructable theme **kaʔ* ‘extending across, touching’ + the reversative **-ʃ*. *kap* ‘up, starting’ is even more uncertain, but may relate to the root **ka:p* that appears in *kaapte-* ‘sprout’. In both cases the exact pathway of grammaticalization is unclear. Since both seem to have been verbal roots, their origin as preverbs may stem from a serial verb construction, but such an analysis is clearly speculative.

Finally, the preverb *ni* has its origin in a noun meaning ‘thing’, and this gave rise to both its detransitivizing function as *ni* became incorporated into the verb (4)–(5), and its nominalizing use in lexicalized compounds (6)–(7).

¹ In referencing examples from the corpus, I follow Swadesh’s organization system of the speaker label (A = Ben Paul), text number, paragraph letter, and sentence letter. Thus A02c.5 refers to a text dictated by Ben Paul, which is the second text in that collection, in the third paragraph, fifth sentence.

- (4) *ʔun kun ʔuʔfi:kʔ ni kʔuʔʔfuji*
 some thing making DTRZR he.would.eat
 ‘making [himself] something, he would eat’ [intransitive use] (A07a.9)
- (5) *kipi ʃamaʃ kʔuʃmpujna*
 meat fresh they.usually.ate
 ‘they ate fresh meat’ (A74f.1)
- (6) *ni naki dempi*
 thing chicken.hawk killing
 ‘the story’ [< idiomatic *ni naki dempa-* ‘kill chicken hawks’] (A05e.11)
- (7) *ʔʃʔah ni ʃa ʔo:nif*
 bird thing voice many
 ‘mockingbird’ [lit. ‘many-voiced bird’]

Despite their diverse origins, there are a number of reasons for treating these eight words as a unified preverb class, and not as verbal prefixes or types of adverbs:

- Chitimacha preverbs share similar phonotactics: all are monosyllabic with short vowels except for *ka:pʔs*.
- While the preverbs are always prosodically part of the verb that follows, they do not become phonetically attached, except in some possible historical instances of *ni* as will be seen below. So while in other places /ʃ##hV/ → /ʃV/, one never sees this pattern with *ʔapʃ*.
- Preverbs have in common a directional sense as one of their meanings, suggesting a semantic basis to the category.
- There are structural and semantic patterns within the class. Consider the following pairs, selectively arranged so as to highlight their similarities: *hi* ‘to there’ : *his* ‘returning’; *ʔap* ‘to here’: *ʔapʃ* ‘returning here’; *kap* ‘up’: *ka:pʔs* ‘(returning) back up’. The general pattern is DIRECTION : RETURNING DIRECTION, with a final /s/ or /ʃ/ conveying the meaning RETURNING.²

² This is a simplification of the data. *hi* ‘to there’ also corresponds semantically to *kas* ‘returning there’ in terms of the DIRECTION : RETURNING DIRECTION analogy. *kas* occurs with over twice the frequency of *his* in my corpus (291 occurrences to 114), suggesting that *hi* : *his* is a less salient pair than *hi* : *kas*. The two forms may be in competition over which is most analogous to *ʔapʃ* in the *ʔap* : *ʔapʃ* pair. *his* is the most structurally analogous, but *kas* is the most semantically analogous. The frequency data suggest that *his* is the newer form, and may be slowly assuming the meaning of *kas*.

- With a few exceptions, the preverbs always occur in the same syntactic slot and are mutually exclusive. Swadesh (1939:147–148; 1946:329–330) even describes a set of rules which he calls “preverb displacement” that determine which of two preverbs will appear when more than one would be expected. Use of the preverbs in places other than the preverbal slot is not productive, but is restricted to a small, specific set of lexemes. These facts suggest a class which is somewhat paradigmatic and thus unified, and too restricted in its distribution to be considered adverbs.
- With the exceptions of *?ap* and *hi*, Swadesh says that the preverbs frequently form “an essential part of the verbal lexeme” (1939:147), by which he means they are semantically non-compositional in many (but not all) cases. This comports well with the shared definition of preverbs as displaying a range of more-or-less tightly bound uses, from the very lexical *?ap* and *hi* to the non-compositional uses that Swadesh mentions.
- There is no distinct class of adverbs in Chitimacha to lump the preverbs into, if one were so inclined. Almost without exception, adverbial words are minimally bimorphemic, synchronically analyzable, and do not occur in the same syntactic slots as preverbs. Adverbials occur only clause-initially or postverbally, and frequently co-occur with the preverbs, often with a direct object intervening between them.

Having given evidence of how these words constitute a sufficiently homogenous unit of study, I now turn to their differences, which constitute the *explananda* for this research.

4. Degrees and dimensions of grammaticalization

The first and most notable difference among preverbs is their absolute frequency of occurrence and overall frequency rank, shown in Table 3.

While Swadesh only gives ‘up’ as the definition for *kap*²s, all six of its occurrences in the texts convey a strong sense of ‘back up’, i.e. returning to the up position: ‘rise up (from the dead)’ (A11c), ‘rise up from his bed again’ (A16c), ‘as he got back up’ (A69c) (references are to text numbers and paragraphs in Swadesh 1949b). This lends further support to the DIRECTION : RETURNING DIRECTION pattern among the preverbs.

ni does not participate in this analogy for reasons discussed further on.

Table 3. Absolute frequency and rank of preverbs in corpus

hi	1298	33.50%	#2
kap	775	20.00%	#3
ni	646	16.67%	#5
ʔapʃ	462	11.92%	#8
ʔap	335	8.65%	#14
kas	279	7.20%	#17
his	74	1.91%	#51
ka:pʔs	6	0.15%	#534

If it is true that “the more frequently a form occurs in texts, the more grammatical it is assumed to be” (Hopper and Traugott 2003), then the preverbs at the top of Table 3 must be highly grammaticalized while those at the bottom are still significantly lexical. This is precisely what we find. The most frequent preverbs, *hi*, *kap*, *ni*, and *ʔapʃ*, each have specific grammatical functions on top of their lexical, directional ones, while the less frequent preverbs do not (cf. Table 2). Along just the frequency dimension alone, then, certain preverbs are found to be much more highly grammaticalized than others.

Related to frequency differences are differences in productivity. One way to measure this is by the number of verbs that each preverb can occur with, since the more productive a preverb is across lexemes, the more grammaticalized it has become. This was done using a representative sample, and the result of this count is shown in Table 4.³

Table 4. Productivity of preverbs

ni	195	25.42%
hi	190	24.77%
kap	154	20.08%
ʔapʃ	82	10.69%
kas	67	8.74%
ʔap	57	7.43%
his	20	2.61%
ka:pʔs	2	0.26%

³ This count was obtained by using a subset of all the verbs in the corpus. Because the texts were not yet fully glossed, and so information about lexical category was unavailable, regular expressions were used to search for affixes known to be unique to verbs, resulting in the 2,844 results on which the count was based. It was then easy to sort by stem and combine equivalent verbs.

Table 4 shows a pattern similar to the frequency counts in Table 1, with one noticeable difference: the preverb *ni* appears with a significantly greater proportion of verb roots than its overall frequency would suggest. While *ni* is only the third most frequent preverb overall, it is by far the most productive, occurring with more verb roots than any other. Given its use as a detransitivizer, this is unsurprising. While *ni* is somewhat less grammaticalized in terms of its overall frequency, it should be considered the most grammaticalized in terms of its productivity. The two dimensions of grammaticalization yield different results.

A third dimension of grammaticalization is the relative syntactic independence of each preverb, or the extent to which they may participate in tmesis. More tightly bound and thus grammaticalized preverbs will not allow for tmesis, while freer preverbs will. In Chitimacha, noun phrases only occur between the preverb and the verb in certain highly lexicalized and invariable instances. The resulting timetic constructions are likely fossilized reflexes of an earlier stage of the language where preverbs were syntactically independent from the verb. Examples are given in (8)–(9).

- (8) *hus wafi ki:stif we piji sih ki hi nam tʃʰah-t-ʔif-i*
 her thumb those cane joints LOC to brand hew-TRZR-CONT-NFsg
 ‘Her thumb print is embossed in those cane joints.’ (A13e.2)

- (9) *hi kaji ʔutʃi-tʃuj*
 to life do-FUT(sg)
 ‘you will live’ (A24a.9)

In (8), the verb takes a historical **-t* transitivizing suffix and the nominal object intervenes between *hi* and the verb. At one time the phrase literally meant ‘to hew a brand (as in a distinctive mark) into’, but now it simply means ‘to emboss’. Since this is taken as a lexical unit, the preverb *hi* now occurs before *nam*, the historical object. The same is true of the phrase *hi kaji ʔutʃi-* ‘to live’, literally ‘to make/do a life’.

Only *hi*, *ni*, and *ʔapʃ*, and *kas* participate in timetic constructions. Timetic *hi* occurs most frequently (n = 23), then *ʔapʃ* (n = 4) and *ni* (n = 2), and finally one occurrence of *kas*. Examples of each are given below:

- (10) *hi nej nuʃminaʔa*
 there land they.worked
 ‘they buried him’ (A35a.2)

- (11) *ʔapf ni nektma:fnaʔa*
 together DTRZR they.leagued
 ‘they leagued together (as with an animal spirit guide)’ (A67a.11)
- (12) *ni kaʔf hamʔi:kʔ*
 thing fortune having
 ‘having (good) luck’ (A10k.2)
- (13) *kas panʔ teykʔf*
 back person turning
 ‘turning back into a person’ (A35d.15)

While other metrics for assessing the grammaticalization of *hi* have so far shown it to be one of the most grammaticalized of the preverbs, it is actually the least grammaticalized in terms of its syntactic independence. It is the most adverb-like of the preverbs in this respect, and Swadesh often translates it with the English adverb ‘there’.

At the opposite end on the scale of syntactic independence is the preverb *ni*, which shows evidence of having been historically incorporated into a number of verb stems, as the verb pairs in Table 5 illustrate.

Table 5. Verbs with incorporated preverb *ni*

Verb	Unincorporated form
na:kʃte-, na:kʃt- ‘write’	ha:kʃt-, ha:kʃte- ‘write, draw’
napʔe- ‘raw’, napʃʔe- ‘be black’	hapt ‘vermillion’, *hapʃ ‘black’
nakst- ‘sell’	ʔaks-, ʔakst- ‘buy’
naʃi-, naʃma- ‘hunt’	haʃi-, haʃma- ‘stalk, hunt’
ne:mi- ‘be scared’	ʔem- ‘fear’
neʔʔin ‘temple’	heʔʔi- ‘be holy’
nekt- ‘skin, peel s.t.’	haki- ‘peel s.t.’
niʔʔi-, niʔaʔ- ‘believe’	(both forms have <i>ni</i> in common)
nih- ‘turn over’	ʔij- ‘turn’, ʔiht- ‘circle’
ni:nʃt- ‘turn upwards’	ʔi:nʃt- ‘upturn s.t.’
niki ‘real’	ʔiki- ‘hide’
nokt- ‘permit, release’	hokt- ‘leave, permit, release’
nokun ‘shoulder’, mokun ‘knee’	ʔokun ‘shoulder’
nowa ‘hominy’	huwo ‘crop’
nuki- ‘pray’	hu:ka ‘prayer’

No other preverb shows signs of historical or synchronic incorporation, and so in this respect *ni* is much more grammaticalized than its preverbal counterparts. *ni* is also the only preverb which may be preceded by a further preverb, suggesting that it is more tightly bound to the verb stem, though this happens only five times in the corpus, three of which occur in the same paragraph. An example is given in (14).

- (14) *wetk hus wa:k[?]ipaf ʔapf ni hejfmik[?]*
 then his pillow together DTRZR gathering
 ‘then, gathering up his pillow’ (A26h.5)

Another useful metric for assessing degree of grammaticalization is the extent to which a given preverb + verb combination has become semantically noncompositional (lexicalized). Swadesh believes this phenomenon to be quite frequent:

The presence of preverbs as fixed parts of verbal lexemes comes into conflict with the free use of preverbs in their literal senses, for the rule is that two preverbs may not precede the same verb stem. Verbs with bound preverbs either resist the use of free preverbs or are subject to what might be called preverb displacement; the free preverb is used and the bound one omitted. (Swadesh 1939:147–148)

Semantic compositionality is of course a difficult and subjective criterion to assess. Still, one way to approximate the number of semantically non-compositional forms is to see how many preverb + verb combinations appear in the Chitimacha lexicon that is based on these texts. Swadesh only listed preverb + verb combinations when their meaning was (in his view) not predictable based on the meaning of their composite elements. While is this certainly a subjective criterion, subjective does not mean arbitrary, and Swadesh’s intuitions on these matters still provide us with potentially useful insights in the aggregate. Table 6 shows the number of preverb + verb entries in the lexicon for each preverb.

Table 6. Number of semantically non-compositional uses of each preverb

kap	183
ʔapʃ	127
ni	114
kas	64
hi	30
his	15
ka:p [?] s	3
ʔap	2

The resulting count is drastically different from the overall counts for preverb frequencies. If more semantically integrated and non-compositional forms are taken to be indicative of preverbs further along the path of grammaticalization, then *hi* is a significantly less grammaticalized form (despite having the greatest overall frequency), and *?apf* is a significantly more grammaticalized form (whereas it is only middling in terms of overall frequency).

The final dimension of grammaticalization to be examined here is the co-occurrence of competing forms with the same meaning as the preverbs, which is suggestive of renewal. Chitimacha has a nominal marker *=(n)k* which among other uses functions as an adverbial ‘to’ or ‘at’:

(15) *we=nk ne t'uti ka:han*
 DEM=LOC even go(pl) cannot
 ‘they can’t [even] go there’ (A28d.7)

(16) *wetk we ?afinʃʃʔatʔaf hus hiʔi=nk kas tʃuji.*
 then DEM.DET old.man his be(NFsg)=LOC back he.went
 ‘[Then] the old man went back home.’ (A11b.2)

(17) *ni naki dempi kuti=nk daatk*
 NZR chicken.hawk killing end=LOC now
 ‘(We have reached) the end of the story now.’ [‘to tell a story’ is literally ‘to kill chicken hawks’] (A05e.11)

(18) *pakta=nk pekup hi tʃujiʔi*
 sky=LOC upward to he.went
 ‘he went away up to the sky’ (A09a.3)

It also appears on almost every noun phrase that serves as the object of a verb with *hi* or *?ap*, and also with directional postpositions like *hup* ‘to, towards’.

(19) *we se:ni=nk hi nitʃwinkif*
 the pond=LOC to when.he.came.to.water
 ‘when he got to the edge of the pond’ (A01a.3)

(20) *we se:ni waʔa=nk hi pefiʔi*
 the pond other=LOC there he.flew
 ‘he flew toward the opposite side of the pond’ (A01c.1)

(21) *namu =nk namu =nk hi t̃fu:fi?i*
 town=LOC town=LOC to he.goes
 ‘He goes from town to town.’ (A07a.14)

(22) *ha =nk ?ap nemna?a*
 this =LOC here they.crossed.water
 ‘they crossed over [water] to here’ (A02c.1)

(23) *wetk we siksink his we ?asink hup hi ne:t̃f̃?imi.*
 then the eagle ERG the man=LOC to to he.said
 ‘[Then] the eagle spoke to the man.’ (A02b.2)

I interpret this to be a case of renewal, where *=(n)k* is taking over the former function of directional preverbs like *hi* and *?ap*. Repeating this process for each of the preverbs gives the results in Table 7.⁴ It shows the frequency of co-occurrence of the two forms as a percentage of the total uses of each preverb.

Table 7. Co-occurrence of preverbs with locative *=(n)k*

kas	21.15%
hi	11.02%
his	10.81%
?ap	6.87%
ni	6.19%
kap	5.29%
?apf	3.90%
ka:p?s	0.00%

$$2 \sum obs \cdot \log \frac{obs}{exp} = G^2$$

⁴ Only cases in which *=(n)k* immediately preceded the preverb are included in this table.

	= (n)k	other	
kas	28	107	135
other	72		
	100		

You can use the above to get the expected, actual, and observed frequencies

According to this table, 21.15% of the time *kas* occurs in the corpus, it co-occurs with *=(n)k*. This metric is most useful for preverbs with primarily directional meanings, namely *hi*, *?ap*, *kas*, *his*, and *kap*'s. Along this dimension of grammaticalization, then, *kas* is the most grammaticalized since it shows the most evidence of functional renewal.

5. Summary & Conclusions


What makes a canonical case of grammaticalization? Section 4 examined six features that contribute to the process:

- Absolute frequency of occurrence (frequency)
- Productivity with different verb roots (actuation)
- Degree of syntactic independence (subdivided into tmesis and incorporation; syntactic integration)
- Semantic non-compositionality (lexicalization)
- Co-occurrence with competing forms (renewal)

To this we can also add phonetic reduction, which was not examined here.

It was seen that preverbs differ, occasionally drastically, in the extent to which they have become grammaticalized along each of these dimensions. Table 8 compares the ordinal ranking of the preverbs, from most grammaticalized at the top to least grammaticalized at the bottom, in terms of each of the six criteria.

Table 8. Comparison of relative degrees of grammaticalization

	Frequency	Productivity	Tmesis	Incorporation	Compositionality	Renewal	
More grammaticalized  Less grammaticalized	hi	ni	other	ni	kap	kas	
	kap	hi		other	other	ʔapʃ	hi
	ni	kap				ni	his
	ʔapʃ	ʔapʃ				kas	ʔap
	ʔap	kas	kas			hi	ni
	kas	ʔap	ni	his	kap		
	his	his	ʔapʃ	ka:pʔs	ʔapʃ		
	ka:pʔs	ka:pʔs	hi	ʔap	ka:pʔs		

Given the nature of grammaticalization as a composite phenomenon, these differences should not be surprising. But they do caution against relying on just frequency data as a representative measure of how far grammaticalized a form is. Though grammaticalized forms do tend to continue increasing in frequency long after the grammaticalization process is complete (or at least undisputably recognizable; Mair 2011:245), grammaticalization theory does not say this must be the case. A fully grammaticalized form could simply fall out of use or come to be replaced.

In fact, none of these features are sufficient for grammaticalization in themselves, and it may be that no one of these features is even necessary. And yet there are some general trends to the data. *hi* and *ni* consistently rank among the top three most grammaticalized forms, and *ka:pʔs* among the least, creating a rough cline of more-to-less grammaticalized preverbs. What this shows is that it is still meaningful to speak of general degrees of grammaticalization, as long as it is appreciated that such statements can only be made in the aggregate, and always risk conflating important differences. To say that *kas* is a generally less-grammaticalized form may be true in the aggregate, but ignores the highly grammaticalized nature of *kas* when viewed from the perspective of functional renewal in process.

What can we conclude from these seemingly disparate sets of data? Grammaticalization is not a monolithic process proceeding along a single dimension. Constructions grammaticalize in different ways to varying degrees, as we have seen for Chitimacha preverbs. It is not unidirectionality that defines grammaticalization, but *unity in change*. One or two of these

changes alone is not sufficient to constitute a case of grammaticalization. It is only when enough of these processes converge that we recognize it as a canonical case of grammaticalization. The multidimensional approach presented here has revealed that the apparent homogeneity of a small category of words is the result of a convergence of behaviors among forms that are actually quite diverse, each showing reflexes of its particular pathway of grammaticalization and persistence in its original meaning. This fortuitous alignment of independent phenomena is what gives rise to the larger phenomenon we call grammaticalization.

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