

## Nasal harmony in Awetí and the Mawetí-Guaraní family (Tupí)

Sebastian DRUDE

*Museu Goeldi / Belém-PA & Goethe Universität Frankfurt*

### 1. Object: Awetí and the Mawetí-Guaraní subfamily

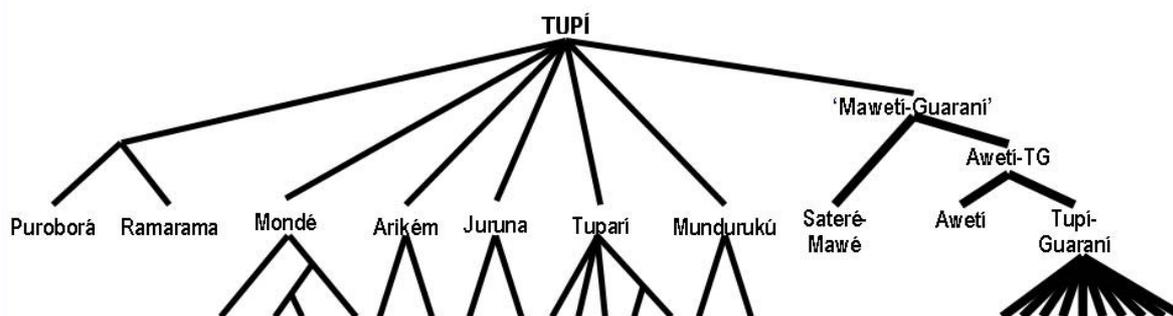
Mawetí-Guaraní is a shorter designation of a branch of the large Tupí language family, alongside with eight other branches or subfamilies.<sup>1</sup> This branch in turn consists internally of three sub-branches: the languages (Sateré-) Mawé and Awetí and the large Tupí-Guaraní subfamily. Hence its explicit but longish name could be Mawé-Awetí-Tupí-Guaraní

---

<sup>1</sup> The eight remaining subfamilies of the large Tupí language family, or 'stock' (*tronco*, in Portuguese) probably also can be grouped into more comprehensive genetic units (as is the case of the three 'subfamilies' in MATG). One of these intermediate genetic units, containing the almost extinct language Puruborá and the Ramarama family (i.e., Karo), is already indicated in Figure 1 (without a designation; a proposal has been 'Puruboramarama'). This genetic unit (cf. Galucio & Gabas Jr. 2002) emerged of the results of the Comparative Tupí project. In this project, at least one language of each branch of the Tupí family is studied by a member of the project, in particular the Sateré-Mawé language by Sérgio Meira. The current paper is another result of this project, and the author is grateful to the other project participants, in particular to Sérgio Meira, for discussion and sharing their data.

Thanks go also to the participants of the Meeting in Manaus in December 2007 which discussed the original oral presentation, in particular to Leo Wetzels, and also to Rui Rothe-Neves, who both provided valuable comments on an earlier version of this paper. It goes without saying that none of these is to be held responsible for any shortcomings of this paper.

(MATG). This genetic grouping has already been suggested (without any specific designation) by A. D. Rodrigues (e.g., 1984/85, Rodrigues & Dietrich 1997), and, more recently, it has been confirmed by comparative studies (Corrêa da Silva 2007, Drude 2006, Meira and Drude in prep.), which also more reliably establish the most probable internal ramification, according to which Mawé separated first, whereas the differentiation between Awetí, on the one hand, and the precursor of the Tupí-Guaraní (TG) subfamily, proto-Tupí-Guaraní (pTG), on the other, would have been more recent. The intermediate branch could be named Awetí-Tupí-Guaraní (Awetí-TG or ATG). Figure 1 shows the internal grouping of the Tupí family according to results of the Tupí Comparative Project under D. Moore at the Museu Goeldi (2000-2006).



**Figure 1. Major Branches of the Tupí family (Tupí Comparative project, 2006)**

In all three major branches of Mawetí-Guaraní there exists nasal harmony (NH) or, in other terms, 'spreading' of nasality. NH is similar in the three branches and so probably existed already in the hypothetical proto-language 'proto-Mawetí-Guaraní' (pMATG), as will be shown at the end of this contribution. (Possibly some form of nasal harmony existed earlier and maybe even already in proto-Tupí, as similar phenomena are observed in other Tupian branches, too.)

Awetí is the language the author is studying for 10 years now (including some 12 month of fieldwork and several additional months of work with usually two speakers in Belém).<sup>2</sup> This is the main reason why

<sup>2</sup> In the years 2001-2005 our research was sponsored by the Volkswagenstiftung within the Program for the documentation of endangered languages (DOBES). Therefore, during those years the focus was on a collection of a large corpus of annotated primary data (see *Awetí Documentation* in the references). The current paper marks the return of the focus on the analysis and description of the language structure.

we give a more detailed account of the facts in Awetí, in section 2, where we also develop the general approach of the contribution.

In the remaining sections, we present, in a more succinct manner, NH of Mawé (sec. 3) and of proto-Tupí-Guaraní (sec. 4). In section 5, we compare the systems of the three languages and propose and justify a reconstruction of the system of the proto-language pMATG. However, more than focussing on historical / reconstructive aims, the paper is rather of a descriptive and comparative character – on an abstract level, concentrating on the abstract systems and general properties rather than comparing and discussing individual forms and cognates. Only in the case of Awetí we will illustrate the postulated analysis with concrete examples.

The contribution takes a 'declarative' position, describing the facts on two levels, a phonetic and a phonological one, and the relations that hold among these levels, without making use of 'processes' or derivations (other than as handy metaphors). The underlying framework (cf. Lieb 1999, 2008) is close to an improved modern version of the traditional Trubetzkoyan phonological conception. Due to this position, the presentation does not presuppose knowledge of this specific theory but should be accessible with general knowledge of traditional / structuralist phonological concepts.

## 2. Nasal harmony in Awetí

The phonology of Awetí and its nasal harmony (NH) have been studied already in the 1970ies especially by Ruth Monserrat (Emmerich & Monserrat 1972, Monserrat 1976). The following presentation, however, is based on our own empirical observations working with Awetí speakers. It diverges (mostly in the form of analysis, only occasional in the observed facts) from Monserrat's account, which cannot be discussed in this contribution.

We start our discussion of NH in Awetí by comparing the indicative paradigms, unmarked for aspect, of the two transitive verbs **nātātu** 'to wait for sb./sth.' (stem: **tā**) and **nātupu** 'to see / look at sb./sth.' (stem: **tup**), listed for the 6 person (Ps.) combinations in (1):

(1)	Ps.	...tã	...tup	Ps.	...tã	...tup
	1	[ãntã]	[atup <sup>ɾ</sup> ]	1+2	[tʃĩntã]	[tʃitup <sup>ɾ</sup> ]
	2	[ẽntã]	[ɛtup <sup>ɾ</sup> ]	1+3	[ʒʒɛntã]	[ɔzɔjtup <sup>ɾ</sup> ]
	3	[wẽntã]	[wejtup <sup>ɾ</sup> ]	2+3	[pẽntã]	[pejtup <sup>ɾ</sup> ]

Both paradigms contain the same person prefixes **a-**, **e-**, **wej-**, **ti-**, **ozoj-**, and **pej-**. But all these person prefixes are phonetically nasalized throughout before a root with a nasal vowel, while the person prefixes are oral before stems without nasal segments.

In view of this regularity, we assume that the vowels of the person prefixes are not determined phonologically for orality or nasality, as this can be predicted from the context (here the next vowel). So the phonological explicit representation for the first person prefix is /a-/, where the underlined a stands for a 'neutral' **a**-vowel (an **a** without any of the two properties, neither 'nasal' nor 'oral').

While the vowels of the person prefixes are 'neutral', the vowel of the stem **tã** is intrinsically nasal, so the phonological representation of the stem **tã** is /tã/. In the end it is that /ã/ in the stem that 'triggers' phonetic nasality in all the other nasalized segments in (1). Equally, the /u/ in **tup** is intrinsically oral, and preceding vowels and consonants phonetically harmonize with it with respect to its orality.

As also can be seen in (1), if the stem-initial **t** follows immediately a vowel, an additional [n] appears in the nasal forms.<sup>3</sup> (Before the other stops, **p** and **k**, the respective homorganic nasals [m] or [ŋ] occur under the same circumstances.) We analyze this sequence, [nt], as a pre-nasalized phonetic variant of the stop /t/. Pre-nasalization always happens to stops when they occur *after* a nasal vowel – or after a nasalized one, as in the case of the forms of **nãtãtu** in (1). It can be seen that the final /ã/ is not the immediate cause for pre-nasalization of the stop, because stops that do not occur following a phonetically nasal vowel, for instance at the beginning of words, cannot be pre-nasalized; cf. a & b in (2). When a vowel precedes

<sup>3</sup> After the only consonant that occurs in this position, the palatal [ɲ] (the nasal allophone of /j/), [n] may be present but difficult to identify.

the stem, pre-nasalization will occur with the same segment. Compare c. in (2), with the person prefix **e-** '2.Sg.'.

- (2) a. [tām] village      b. \*[ntām] (village)      c. [ɛ̃ntām] your<sub>SG</sub> village

So, pre-nasalization is a case where a segment harmonizes with its immediately *preceding* segment. But generally, in Awetí elements harmonize with nasal (or oral) segments *at their right* (NH generally 'works' right to left). Indeed, suffixes do not harmonize with stems in Awetí, they are usually oral. This is illustrated in (3) for the imperfective suffix **-zoko** (**-oko** after consonants, which in turn are realized *lenis*, as in b.).

- (3) a. [ãntãzɔkɔ] I used to wait.      b. [atuβɔkɔ] I used to look.

There is a second case of the opposite direction. Morpheme-final segments such as [p] in (1) and [m] (2) always correspond in orality or nasality with the *preceding* vowels. Indeed, we assume that the nasal/oral contrast is neutralized for consonants in this position (end of morpheme), for the not-matching sequences are not possible, cf. (4), where '#' represents a morpheme-boundary.

- (4) a. \*[…tãp<sup>ʔ</sup>#], \*[…tũp<sup>ʔ</sup>#]      b. \*[…tam#], \*[…tum#]

Due to this neutralization, we conclude that on the abstract phonological level in this position an archiphoneme /P/ is present: /a-tuP/ [atup<sup>ʔ</sup>] 'I saw', /tãP/ [tām] 'village'. It does not carry neither the property 'oral' nor 'nasal', similar to the 'neutral' (underlined) vowels.<sup>4</sup> Again, nasalization (and oralization) of these segments illustrates NH 'working left to right', affecting, however, only one (adjacent) segment, as can be observed again in the imperfective suffix **-(z)oko** after the root **tem** 'to leave, go out', in (5).

- (5) [ãntẽmɔkɔ] I'm about to leave / I used to leave.

<sup>4</sup> Assuming archiphonemes /P, T, K/, which are different from usual stops /p, t, k/ and nasals /m, n, ŋ/ is independently justified due to *lenization*: frequently (after an oral vowel and when followed by another vowel due to affixation, composition or even across word borders) these segments show voiced continuant allophones [β, r, ɣ], as [atuβɔkɔ] 'I used to look' in (3), or in [etaɣ itɛtɛ] 'you cry about me' (inter-word-sandhi).

Nasalization concerns not only person prefixes but prefixes in general. For instance, the reflexive prefix is /**tē-**/, oral before oral stems and nasal before nasal ones, cf. (6).

- (6) a. [**atɛtup**ʔ] I saw myself.                      b. [**āntēŋkīj**] I hurt/kill myself.

The second, nasal form, phonologically /**a-tē-kīj**/, demonstrates that nasalization may extend over several syllables until the left end of a word.

Nasal consonants, too, cause nasalization of segments to their left, but not to their right. Both can best be seen in the case of prefixes containing nasal consonants. One example is the causative prefix **mo-**, cf. (7), with the intransitive stem **tak** 'cry'.

- (7) a. [**āmɔtak**ʔ] I made sb. cry.                      b. [**āntēmɔtak**ʔ] I made myself cry.

The vowel of this prefix, as in the case of other prefixes, is a neutral vowel, /**o**/ as can be seen when it gets nasalized in front of nasal stems such as **tem** /**tēP**/ 'go out', in (8). Note that it remains oral in (7) despite the preceding nasal consonant.

- (8) [**āmōntēm**] I made sb. go out.

Nasal harmony affects not only prefixes but holds also within stems of two or even more syllables. Mostly, stems are wholly nasal or fully oral, as those in (9).

- (9) a. [**āmpōwā**] I spun.                                      b. [**āŋkāřāj**] I scratched sb./sth.  
c. [**akitsitɛ**] I feel shame.                                d. [**atatap**ʔ] I crossed sth.

In these cases, we again propose that nasality or orality of the non-final vowels is phonetic (due to NH) and that in the phonological representation there are neutral vowels in the non-final syllables: /**pōwā**/ 'spin', /**karāj**/ 'scratch', /**kitsitse**/ 'feel shame', /**tatap**/ 'cross'.

There are, however, cases where a stem has two parts, one nasal to the left and one oral to the right (the opposite is not possible). One theoretical possibility for this would be of course that a nasal consonant /**m, n, ŋ**/ occurred in the middle (or beginning) of a stem. As a matter of fact (due to diachronic reasons, see section 5), this almost never happens,

at least not in verbs; apparently in Awetí nasal consonants occur only in verbal stems that have a nasal vowel.

But sometimes a nasal *vowel* occurs in the non-final syllable of a stem. For instance there is a form that contrasts with a. in (6) only with respect to nasality, cf. (10).

(10) [ãntẽntup<sup>7</sup>] I heard sb/sth, I listened to sb/sth.

Morphologically, we propose that (10) has the following form: /**at-ẽntuP**/, where /**at-**/ is an allomorph of the first person singular prefix which occurs before transitive stems that start with a vowel.<sup>5</sup> It is an empirical fact that in /**ẽntuP**/ 'hear, listen' and in similar stems an intrinsically nasal vowel occurs in a non-final syllable.<sup>6</sup> All prefixes harmonize with that first, nasal, (rather than with the final) vowel. Intrinsically oral vowels occur only in final syllables of stems (and of suffixes), which is where neutral vowels never occur.

Once there is nasality present in a word, all segments to its left are (directly or indirectly) affected by it. So, oral vowels or oral voiced consonants, or medial oral stops (other than pre-nasalized), do not occur left of a nasal vowel or consonant in the same word, as is illustrated by the impossible forms in (11).<sup>7,8</sup>

(11) \*[ãtã], \*[atã], \*[antã], \*[antẽntup<sup>7</sup>], \*[ãtẽntup<sup>7</sup>], \*[ãntẽntup<sup>7</sup>], \*[ãntẽtup<sup>7</sup>]

<sup>5</sup> It is irrelevant in this context if the /t/ might be a separate morpheme, as can be argued.

<sup>6</sup> This means that the distribution of nasal vowels overlaps with that of 'neutral' vowels, so the contrast oral–nasal is not completely neutralized in non-final syllables in Awetí stems, differently from (most) TG languages. Thus 'neutral' vowels are not genuine archiphonemes. In this contribution, we nevertheless stick to them because they allow to represent straight forwardly the mere phonetic nature of orality and nasality in most non-final syllables. In a stem with two phonetically nasal vowels it is impossible to determine if nasality of the left vowel is intrinsic or due to NH. We assume in the phonological representations that the latter is the case.

<sup>7</sup> In fact, nasality in Awetí may be rather weak, on nasalized as well as on intrinsically nasal vowels, and may even disappear at all under circumstances the details of which have still to be identified (main factors seem to be velocity and carefulness of speech). The same holds for the pre-nasalization of stops. So, in certain styles of speech some of the forms listed here *can* occur.

Generally, in this paper we always refer to the phonetic forms in the style of speech where nasality is fully realized. These forms are always possible and are preferred when elicited or in careful speech. So where we use a nasal symbol on the phonetic level, this indicates that nasality may (and usually will) be present and will always be the accepted and possibly the preferred pronunciation.

<sup>8</sup> Other instances where an oral segment occurs left of a nasal segment are in case of composition.

Finally we demonstrate in (12), below, that glottal segments are transparent to NH. Observe that the first syllables of a. but not of b. are nasal.

- (12) a. [ĩntɛʔĩnĩ] my hammock      b. [kajɛʔototapʔ] our central men's house

In **it-e'-inĩ** in (12)a., **i(t)-** is the nominal first person singular prefix and **e(ʔ)-** the prefix that marks alienable possession. (Both prefixes are represented by their consonant-final allomorphs that occur before vowels; the consonant does not occur before consonant-initial morphemes, hence the parenthesis.) In (12)b., **kaj-e'-ototap**, **kaj-** is the nominal prefix for the first person plural inclusive.

Using typological parameters developed for phenomena of 'spreading', the general properties of NH in Awetí as shown above can essentially be resumed in the five statements in (13).

(13) **Statements resuming nasal harmony in Awetí.**

1. Generally, using procedural metaphors, NH in Awetí 'works', or nasality 'spreads', from the right to the left.<sup>9</sup>
2. If it works from left to right, it affects at most one segment, while to the left it can cover several syllables, mostly until the beginning of the word.
3. The 'source' of nasality (segments that are believed to be nasal on the phonological level and with which other segments harmonize on the phonetic level), is usually (a) one of the intrinsically nasal vowels /ã, ẽ, ĩ, õ, ũ, ỹ/ or (b) one of the nasal consonants /m, n, ŋ/. (c) Besides these, phonetically nasalized vowels cause nasalization of a consonant at their right.
5. Segments that harmonize phonetically as to nasality or orality, that is, the affected 'targets' of nasal spreading, are: (a) the phonologically neutral vowels /a, e, i, o, u, ɨ/; (b) the voiced consonants (viz., the glides /j, w/, the liquids /l, r/ and the reflexive fricative /z/); (c) the plosives /p, t, k/ and the affricate /ts/, which have pre-nasalized phonetic variants [mp], [nt], [ŋk] and [nts]; and (d) the final consonants /P, T, K/ which have among their oral variants the

<sup>9</sup> In agreement with current phonological literature, we will often also use such metaphors, without, however, committing ourselves to the existence of *processes* and the like. What can be observed are, of course, (utterances of) word forms in which certain parts or sequences of segments are phonetically nasal or nasalized, and of which we have reasons to believe that in a more abstract 'phonological' representation only some segments contain the property 'nasal' or similar, and these segments generally are found at the right end of the phonological correspondences of the phonetically nasal stretches. Again, in a procedural metaphor the nasal segments in the abstract representation can be said to be the 'source' or 'cause' or 'origin' of nasality in other segments in the phonetic representation, but of course the relationship between the two levels of representation is not of a temporal nature.

unreleased stops [p̚, t̚, k̚] and the 'lenis'<sup>10</sup> continuants [β, r, ɣ], and as their nasal variants [m, n, ŋ].

6. The glottal segments /ʔ, h/ are not affected by, and transparent to, NH.<sup>11</sup>

A more systematic and abstract account of the phonetic forms attested in Awetí is given in Table 1, focussing on the stops (nasals and plosives including pre-nasalized plosives) which show the most intriguing variation in Awetí, and, as we will see later, which is where the three branches of MATG show most divergence. On the left is the phonetic part of the table, each cell representing a pattern of a hypothetical phonetic sequence. In this part of the table, **a** stands for any phonetically oral vowel and **ã** for any phonetically nasal vowel. Analogously, **t** stands for any phonetically oral stop, **n** stands for any phonetically nasal consonant, and **nt** for any homorganic bi-segmental nasal-plosive consonant (pre-nasalized plosive or post-oralized nasal). Patterns which are impossible in Awetí are crossed out and shaded in grey.

		Phonetic			Phonological		
		<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>
		[t]	[nt]	[n]	[t]	[nt]	[n]
1	[#..a]	#ta	#nta	#na	#t[a]		#n[a]
2	[#..ã]	#tã	#ntã	#nã	#t[ã]		#n[ã]
3	[a..#]	at#	ant#	an#	aT#		
4	[ã..#]	ãt#	ãnt#	ãn#			ãT#
5	[a..a]	ata	anta	ana	<u>a</u> ta		
6	[ã..a]	ãta	ãnta	ãna		ãta	<u>a</u> na
7	[a..ã]	atã	antã	anã			
8	[ã..ã]	ãtã	ãntã	ãnã		<u>a</u> tã	<u>a</u> nã

**Table 1. Abstract possible and impossible sequences involving stops in Awetí**

<sup>10</sup> For TG and pTG, to our knowledge, this term has been first used by Schleicher (1998).

<sup>11</sup> Articulatory phonetic studies may well prove that glottal segments are in fact also affected by NH (the position of the velum may vary). But this does still not necessarily imply that we would have to include the property ('feature') 'nasal(ized)' in these segments, or that these segments would have to count among the 'targets' of nasalization. In the conception used in this contribution, the phonetic level contains only (and all) properties of linguistic entities that are intended by a speaker in order to produce a 'normal' utterance of these entities, and which are required by a native speaker in order to accept an utterance as sounding 'normal' to him. Both conditions do not seem to apply to 'nasal(ized)' in the case of glottal sounds in Awetí.

On the right, we repeat the same table for phonology, that is, for each existing phonetic form we give our phonological interpretation. Underlined and capital letters are to be understood as before. Observe that the phonological nature of the vowel in lines 1 and 2 depends on following other syllables in the word, if any. Also, for facilitating the presentation, in lines 5-8 we assume that the vowel to the right is the last in a stem.

In order to illustrate these patterns, in (14) for each occurring pattern (identified by its cell) we list a word (mostly nouns, consisting only of a stem) of Awetí, naming its phonetic and phonological forms, and a gloss.

(14)	1a. [ta] /ta/	eye	[tukit̃] /tukiT/	salt
	1c. [mɛ] /me/	(particle)	[miʔak] /miʔaK/	manioc starch
	2a. [tʃin] /tʃiT/	fly	[tã] /tãʔẽ/	(a certain) pot
	2c. [nã] /nã/	he/she/it	[nũjã] /nujã/	meat, flesh, muscles
	3a. [ɛt̃] /eT/	name		
	4c. [ãmãn] /amãT/	rain		
	5a. [atu] /atu/	grandfather (vocative)		
	6b. [ʃntɛntap̃] /otɛtaP/	door (the part ɛta)		
	6c. [pĩrĩŋit̃] /pĩrĩŋiT/	humming-bird (the part iŋi)		
	8b. [mĩntã] /mĩtã/	fish-hook		
	8c. [ĩnĩ] /inĩ/	hammock		

In what follows, we justify our phonological analysis in a more systematic manner which permits comparison with the other two languages, below, with reference to the cells in Table 1.

As can be seen in the cells 6b and 8b in the phonological part, we analyze the pre-nasalized plosives as phonetic variants ('allophones') of the plain plosives rather than as post-oralized variants of the nasal consonants (as in Tupí-Guaranian languages, see below section 4). The reason for this is that there is a contrast between the possible sequences 6b and 6c and between 8b and 8c; and 1b, 6a and 8a are impossible whereas 1a and 1c exist.

Equally, the reason for analyzing the left vowel (and similarly other non-last vowels) in 5a, 6c and 8b+c as phonologically neutral (unspecified for nasality or orality) lies in the fact that an oral vowel left of a nasal vowel is impossible in virtually all non-composed words in Awetí (no

simple word following a pattern of any of 7a,b,c exist), so that the nasality at the left of a nasal vowel (cf. 8b+c) or nasal consonant (cf. 6c) can be predicted from the nasality of the segment at right in question, or the orality of the left vowel in 5a from that of the orality of the following consonant and vowel.

Only in the cases represented by 6b the nasality of the left vowel cannot be predicted (phonologically, all segments at its right are oral), and we have to assume that in this case the nasality of the left vowel is phonological.

It is for two reasons that we conclude that it is the left, rather than the right, vowel that adopts to the other harmonically in a sequence of agreeing vowels: a) in the case of 6c – in contrast with 6b –, it appears obvious that it is the phonological nasality of the consonant of the right that 'causes' the phonetic nasality of the left vowel (observe that 3c, 5c and 7c are impossible), and the impossibility of oral vowels continues to the left until the beginning of the word. It seems plausible that the direction of adaptation among vowels is the same. b) There is no case of a prefix that causes nasality or orality of distant segments of other prefixes or stems at their right – on the contrary, almost all prefixes have a phonetically oral variant that combines with oral stems and a nasal variant that combines with nasal stems or prefixes at their right (see **a-**, **te-** and **mo-** in the examples above). Suffixes, on the other hand, are almost always oral even if the stem ends in a nasal segment. The few suffixes that contain nasal segments do nevertheless not cause nasality of the word as a whole. This in turn is an argument for our analysis that the last vowel of the stem is always phonologically (inherently) oral or nasal, differently of most vowels in prefixes and in non-final syllables in stems.

Finally, we adopt an analysis of the final consonants where nasality or orality is neutralized in the consonants. We represent the final segments phonologically with capital letters as usually applied for archiphonemes. In principle, the facts represented by the lines 3 and 4 (the last consonant and the preceding vowel always correspond in nasality or orality) allow also for an alternative solution where it would be the nasality of the consonant which existed on the phonological level rather than that of the vowel. Our

solution has been at least considered for several Tupí-Guaranian languages and also for Awetí by Monserrat (1977: 2). She preferred the alternative solution, because their 'morphonemic behaviour' that way 'permits a safer interpretation'.

We hold that this analysis generalizes best the behaviour of all final consonants (including glides which also agree in nasality / orality with the preceding vowel, as Monserrat (1977: 2-4) already admitted) and captures well the regularity of the pattern of all stems (where the final vowel is always inherently nasal or oral). Also, the final consonants show other unique features, especially lenition, which suggests that they may be particular phonemes (with a restricted distribution, independently from the context of neutralization), allowing for an analysis where no phonological 'features' are deleted or exchanged by other incompatible features in order to obtain the phonetically attested forms.

Given our analysis of the sample forms, NH in Awetí can be accounted for by the 'rules' in (15), still referring to the patterns exemplified in the cells in Table 1.

(15) **Informal declarative 'rules' of nasal harmony in Awetí**

1. Any neutral vowel at left of a nasal vowel (independent of the intervening consonant or consonants) is phonetically nasal (as 7a,b,c are impossible) and equally at the left of a nasal consonant (for 3c, 5c and 7c are impossible).
2. Voiced consonants (glides, liquids or fricatives) in the same environment are also phonetically nasal (not covered by Table 1).
3. All these segments are oral if they are at the left of only oral segments (cf. 5a).
4. Non-final plosives or affricates are pre-nasalized adjacent at the right of a nasal vowel (6a vs. 6b) or adjacent at the right of a nasalized vowel (8a vs. 8b), else as plain oral stops / affricate.
5. Final consonants correspond in nasality / orality to the preceding vowel (lines 3 and 4; this holds also for glides; other consonants do not occur in this position).

### 3. Nasal harmony in Mawé

In order to facilitate comparison with Awetí, in what follows we will outline nasal harmony in Mawé (Sateré-Mawé) in a similar manner as we did for Awetí in section 2.<sup>12</sup>

The general properties of nasal harmony (NH) in Mawé can essentially be resumed in the statements in (16), analogous to (13) for Awetí. We do not exemplify these statements with phonetic or phonological forms of Mawé for reasons of space and because we do not dispose of first-hand phonetic data. These statements, however, have been checked in 2005 and 2006 with Sérgio Méira, who has collected and analyzed many field data of Mawé.

(16) **Statements resuming nasal harmony in Mawé**

1. Generally, NH in Mawé 'works' from the right to the left without 'jumping' across transparent segments.<sup>13</sup>
2. If it works from left to right, it affects at most one segment, while to the left it may cover several syllables, sometimes until the beginning of the word.
3. The 'source' of nasality is usually (a) one of the intrinsically nasal vowels /ã, ê, ĩ, õ, ũ, ɨ/ or (b) one of the nasal consonants /m, n, ŋ/.
4. Segments that harmonize phonetically as to nasality or orality, that is, the 'targets' of nasal spreading, are: (a) the phonologically neutral vowels; (b) the glides, the liquids and the fricatives; (c) the plosives /p, t, k/ which have pre-nasalized phonetic variants [mp], [nt] and [ŋk] *following* a (phonologically) nasal vowel; and (d) the final consonants /P, T, K/ which have among their oral variants the unreleased stops [p̚, t̚, k̚] and as their nasal variants again [m, n, ŋ] (some have 'lenited' continuants as variants).
5. The plosives /p, t, k/ are not transparent to NH from the right.

One sees at first glance that the main difference to Awetí lies in the behaviour of the plosives /p, t, k/.

---

<sup>12</sup> Data and analysis of Mawé has been gently and generously provided by Sérgio Méira in intensive debates about earlier versions of this paper. However, the format of presentation, some details of the phonological analysis and all possible shortcomings are mine.

<sup>13</sup> The behaviour of the glottal consonants as well as that of the fricatives in Mawé has to be verified. Possibly only sonorant consonants may be nasalized in Mawé.

		Phonetic			Phonological		
		<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>
		[t]	[nt]	[n]	[t]	[nt]	[n]
1	[#..a]	#ta	#nta	(#na)	#ta		#na
2	[#..ã]	#tã	#ntã	#nã	#tã		#nã
3	[a..#]	at#	ant#	na#	aT#		
4	[ã..#]	ãt#	ãnt#	ãn#			ãT#
5	[a..a]	ata	anta	ana	<u>ata</u>		
6	[ã..a]	ãta	ãnta	(ãna)		ãta	<u>ana</u>
7	[a..ã]	atã	antã	anã	<b>atã</b>		
8	[ã..ã]	ãtã	ãntã	ãnã		ãtã	<u>anã</u>

**Table 2. Abstract possible and impossible sequences involving stops in Mawé**

Table 2, focussing on the plosives, makes these differences more explicit.<sup>14</sup> (The table is analogous to Table 1 for Awetí, see there for explanations and conventions. Differences to Awetí are shown in boldface in the phonological part of the table.)

As was the case in Awetí, and for the same reasons, the prenasalized stops are analyzed as variants of the plain plosives. Also lines 3 and 4 are identical to their counterparts for Awetí, suggesting that the same analysis (with abstract archiphonemes, due to neutralization) is justified also for Mawé.

The reasons for neutral vowels and for assuming that the rightmost rather than another vowel of a nasal or oral sequence is phonologically determined are not quite so obvious as in Awetí. In particular, we find words where an oral vowel is followed by a nasal vowel (cf. cell 7a), and

<sup>14</sup> The existence of morphemes following the pattern of cells 1c and 6c has still to be verified; we assume in what follows that they do exist. The main arguments would remain unaffected if it turned out that they are not attested in Mawé.

this leads us to assume that (cf. cell 8b) the first of two nasal vowels with a pre-nasalized stop in between is phonologically nasal.<sup>15</sup>

However, also in Mawé prefixes phonetically tend to agree with the left edge of stems in nasality / orality, while suffixes are more independent of the segments they follow, which suggests spreading in the same direction. But, as 'blocking' segments (the plosives, cf. cell 7a) exist, spreading in Mawé works rather 'one segment a time'. In particular, the left vowel in cells 5a, 7a and 8c do not harmonize with the right vowel but with the immediate following consonants.

We suggest that the differences can be explained most easily if we assume that in Mawé, differently of Awetí, cf. (20), the (non-final) plosives contain a feature 'oral' on the *phonological* level, which explains their 'opacity' for nasality. At the same time, the phonotactic rules and distribution of all vocalic and consonantal units are then almost the same as in Awetí, as can be expected for two genetically closely related languages.

As a conclusion, we resume nasal harmony in Mawé again in the form of 'rules' in (17), in parallel to (15).

(17) **Informal declarative 'rules' of nasal harmony in Mawé**

1. Any neutral vowel at left and adjacent to a nasal or nasalized consonant is realized nasal (for 3a, 5c and 7c are impossible).
2. Neutral vowels at left and adjacent to an oral plosive are realized orally (cf. 5a and 7a vs. 6a and 8a).
3. Glides, liquids or fricatives at left and adjacent to a nasal or nasalized vowel are nasalized (not covered by Table 2).
4. These segments are phonetically oral if they are at the left of a phonetically oral vowel.

---

<sup>15</sup> An alternative analysis is possible where the first vowel in cell 7a is phonologically oral (/atã/) and the first vowel in cell 8b is neutral (as in Awetí) and harmonizes with the second nasal one (/atã/). Our proposal is to be preferred for diachronic reasons (see section 5) since it explains with one small change (inclusion of the feature 'oral' in the plosives on the phonological level in Mawé) all major differences to Awetí; also the distribution of nasal, oral and neutral vowels is the same as in Awetí (differences to pTG are to be accounted for by changes that occurred in that branch). Sérgio Méira (p.c.) attributes orality of the first vowel to some rule of orality as default and not to inherent orality on the phonological level, which is in accordance to our proposal that the left vowel in 7a is 'neutral' (in our sense) on the phonological level. In our view, it agrees or 'harmonizes' with the following (consonantal) segment.

5. Non-final plosives are pre-nasalized adjacent at the right of a nasal vowel (6b vs. 6a, cf also 8b) but do not occur at the right of a nasalized vowel (in 8a the first vowel is inherently nasal), elsewhere as plain oral stops, also before nasal vowels (cf. 7a).
6. Final consonants correspond in nasality / orality to the preceding vowel (lines 3 and 4).

#### 4. Nasal harmony in proto-Tupí-Guaraní

Proto-Tupí-Guaraní (pTG) is the hypothetical proto-language from which the current and historical languages of the Tupí-Guaraní (TG) language family have developed. TG in turn is the largest branch of MATG and of the whole Tupí language family. Structural properties and a reasonable part of the basic lexicon of pTG, which itself is not spoken anymore for centuries, have been reconstructed by several scholars (Adam 1896, Jensen 1989, 1998, 1999, Lemle 1971, Mello 2000, Rodrigues 1984/85, Rodrigues & Dietrich 1997, Schleicher 1998), based on shared properties revealed by studies of currently spoken Tupí-Guaranian languages. In what follows, we use these reconstructions, in particular that of Mello (2000, for reconstructed forms), Schleicher (1998) and (Jensen 1998), which contain most details on the structural properties in focus here.

As far as can be deduced from the current languages and the available reconstructions, the properties of the proto-language pTG with respect to nasal harmony listed in (18) can be postulated. The list is again analogous to (13) for Awetí and to (16) for Mawé.

(18) **Statements resuming nasal harmony in pTG**

1. Generally, NH in pTG works from the right to the left.
2. In a lesser degree it works from left to right, affecting usually only one segment but in some cases a whole suffix, while to the left it can cover several syllables, usually until the beginning of the word.
3. The 'source' of nasality is usually (a) one of the intrinsically nasal vowels /ã, ê, î, ô, û, ỹ/ or (b) one of the nasal consonants /m, n, ŋ/.
4. Segments that harmonize phonetically as to nasality or orality, that is, the 'targets' of nasal spreading, are: (a) the phonologically neutral vowels; (b) the glides, liquids and fricatives;<sup>16</sup> (c) the nasal consonants /m, n, ŋ/ which have

---

<sup>16</sup> The behaviour of fricatives (usually rather marginal consonants in the TG languages anyway) has to be verified; maybe only sonorant consonants may have been nasalized in pTG.

post-oralized phonetic variants [mp], [nt] and [ŋk]; and (d) the final consonants /P, T, K/ which have among their oral variants the unreleased stops [p̚, t̚, k̚] (some also have 'lenited' continuants), and as their nasal variants [m, n, ŋ].

5. The initial and medial plosives /p, t, k/ and the glottal segments are not affected by and transparent to NH.

The main differences to Awetí and Mawé lies in the behaviour of the nasal consonants /m, n, ŋ/ (which not only cause NH to their left, as they do in Mawé and Awetí, but which are also affected themselves, having an oral – post-oralized – and a nasal variant) and of the plosives /p, t, k/ (not affected by and transparent to NH in pTG, while in Awetí and Mawé they are 'targets').

Again, these properties can be made more explicit by a table analogous to Table 1 for Awetí and Table 2 for Mawé. What can be hypothesized for pTG is shown in Table 3.

		Phonetic			Phonological		
		<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>
		[t]	[nt]	[n]	[t]	[nt]	[n]
1	[#..a]	#ta	#nta	#na	#t[a]	#n[a]	
2	[#..ã]	#tã	#ntã	#nã	#t[ã]		#n[ã]
3	[a..#]	at#	ant#	na#	aT#		
4	[ã..#]	ãt#	ãnt#	ãn#			ãT#
5	[a..a]	ata	anta	ana	ata		
6	[ã..a]	(ãta)	ãnta	ãna	(ãta)	ana	
7	[a..ã]	atã	antã	anã			
8	[ã..ã]	ãtã	ãntã	ãnã	atã		anã

**Table 3. Abstract possible and impossible sequences involving stops in pTG**

As has been stated above, the intervocalic bi-segmental consonants [mp], [nt] and [ŋk] as in cell 6b of Table 3 are analyzed as post-oralized variants of the nasal consonants rather than pre-nasalized variants of the plosives as in the other two branches of MATG. This is due to the fact that [m, n, ŋ] only occur in front of (at least phonetically) nasal vowels (cf.

cells 2c and 8c but no patterns like 5c and even not 1c or 6c where they occur in Awetí and probably in Mawé), while the post-oralized nasals only occur in front of (phonetically) oral vowels, even at the beginning of words as in cell 1b, where they contrast with the plain plosive (in 1a), but the post-oralized nasals do not occur before nasal vowels (cf. the pattern in 8b which in contrast is possible in Awetí and Mawé).<sup>17</sup>

The reanalysis of the pattern in cell 6b can be illustrated as in Table 4, where we compare the words for 'child of a woman', phonetically virtually identical in all three branches but phonologically different.

Awetí	Mawé	pTG
[mẽmpitʰ]	[mẽmpitʰ]	*[mẽmpitʰ]
/mẽpiT/	/mẽpiT/	*/mẽmiT/ <sup>18</sup>

**Table 4. The word 'child of a woman' phonetically and phonologically**

As Table 4 also exemplifies, a second reanalysis concerns also cell 6b and is a consequence of the first: Nasality of the first vowel is now attributed to the following nasal consonant, so at the phonological level we can assume a neutral vowel in the first syllable of words like \*/mẽmiT/. If forms of the pattern in cell 6a indeed did not exist in pTG (this seems probable but has to be verified), then all non-final vowels in pTG were neutral (cf. 5a, 6b, 8a+c, no pattern of line 7 is possible anyway, like in Awetí). That means that we have the four types of morphemes (stems, in particular, belong to the first three classes only, while affixes, especially prefixes, typically belong to the fourth type) in pTG listed in (29).

<sup>17</sup> It has to be verified if forms of the pattern of cell 6a existed in pTG. It seems that they rather did not; but if, this would be another evidence for a contrast between the post-oralized nasals (6b) and the plain plosives (6a) in an otherwise identical environment.

<sup>18</sup> Most reconstructions give \*/memir/ as proto-form; we hold, however, that our analysis can be transferred to pTG and possibly to many current TG languages once one accepts neutral instead of phonologically oral vowels and morpheme-final archiphonemes instead of having to decide between one of the allophones.

**(19) Four types of morphemes w.r.t. nasality / orality in pTG**

- a) wholly oral morphemes (cf. 5a);
- b) wholly nasal morphemes (cf. 8a+c);
- c) morphemes which are oral at the end and phonetically nasal at their beginning due to a medial *nasal consonant* (realized as a post-oralized nasal, cf. 6b);
- d) morphemes which are neutral, in our sense, (undetermined on the phonological level), adopting nasality or orality of the (closer side of) adjacent morphemes.

This configuration is indeed the case in many current individual TG languages, while in Awetí and Mawé we have four similar types of morphemes, but in the third group the cause of nasality at the left can be an inherently non-final *nasal vowel*, too.

As the lexical accent usually is on the last syllable of the stem in most TG languages (as well in Awetí, Mawé and, for that matter, also in many other Tupian languages as far as they are accent languages) and hence, probably in pTG, one can postulate that nasality / orality (besides nasality of nasal consonants) develops into a feature not of individual vowels or syllables but of the morpheme and even word as a whole, or that there exist or emerge *oral and nasal lexical accents*.<sup>19</sup> If this stage was reached already in pTG, there would only be neutral vowels on the segmental phonological level, and a feature "oral" or "nasal" would figure somewhere in the phonological supra-segmental structure instead.

Again, in (20) we resume NH in pTG in declarative rules in analogy to (15) and (18).

**(20) Informal declarative 'rules' of nasal harmony in pTG**

1. Any neutral vowel at left of a nasal or nasalized vowel or consonant is realized nasal (for 3a, 5c and 7c are impossible).
2. Glides, liquids or fricatives in the same environment are nasalized (not covered by Table 3).
3. These segments are phonetically oral if they are at the left of a phonetically oral vowel and no nasal consonant intervenes.
4. Nasal consonants are post-oralized adjacent at the left to an oral vowel (1b, 6b).

---

<sup>19</sup> For instance, this analysis has been proposed for Paraguayan Guaraní by Gregores & Suárez (1967). However, Drude (2004) shows an alternative analysis for Paraguayan Guaraní along the lines outlined above for Awetí, where nasality / orality are still seen as features of segments and not of supra-segmental structure.

5. Initial and medial plosives (and apparently also glottal consonants) are transparent to and apparently unaffected by NH.
6. Final consonants correspond in nasality / orality to the preceding vowel (lines 3 and 4).
7. Inherently oral *and* nasal vowels occur only at the end of morphemes, coinciding with the position of the lexical accent, therefore nasality / orality may be developing into a feature of accents or of the morpheme as a whole.

## 5. Comparative synopsis and reconstruction of pMATG

The three systems of nasal harmony in Awetí, Mawé and pTG show several similarities, as should not come as a surprise in the case of three related languages.<sup>20</sup> The properties listed in (21) are shared by the two current languages and the proto-language as hypothetically reconstructed.

### (21) Shared properties of nasal harmony in the three MATG branches

1. Generally, NH in MATG works from the right to the left.
2. In a lesser degree, affecting usually only one segment, it works left to right.
3. The 'source' of nasality is at least (a) one of the intrinsically nasal vowels /ã, ê, î, ô, û, ỹ/<sup>21</sup> or (b) one of the nasal consonants /m, n, ŋ/.
4. The 'targets' of nasal harmony are at least: (a) the phonologically neutral vowels; (b) the glides, liquids and fricatives;<sup>22</sup> (c) the final consonants /P, T, K/ which have among their oral variants the unreleased stops [p̚, t̚, k̚], 'lenited' continuants, and as their nasal variants [m, n, ŋ].
5. At least the glottal segments are not affected by and usually transparent to NH.

We see no reason not to assume that these shared properties would not be due to retention from the hypothetical proto-language pMATG. (Stronger evidence for this would come from outside of MATG.)

The divergences lie exactly in the behaviour of the nasal consonants and plosives and in the phonological alignment of the homorganic bi-segmental (nasal + oral stop) consonants, which exist and are mono-

<sup>20</sup> Generally, we share Schleicher's (1998: 325f) intuition that the genetic distance and time depth of the Tupí-Guaranian subfamily tends to be overestimated. However, his own estimate of only 700–800 years may be an exaggeration to the other extreme.

<sup>21</sup> If the 'source' of nasality in some TG languages or even pTG was best analyzed to be 'nasal accents' or a property of the morpheme or word as a whole, rather than inherently nasal vowels, (and analogously for orality, for that matter), this would probably be a (recent) development of these languages and not a property of the proto-language.

<sup>22</sup> Again, the behaviour of fricatives (usually rather marginal consonants in the MATG languages anyway) has to be verified; maybe only sonorant consonants may have been nasalized.

phonemic in all three branches. For ease of comparison, we repeat the phonetic parts of the tables for the three languages in Table 5.

	Mawé			Awetí			pTG		
	a	b	c	a	b	c	a	b	c
	[t]	[nt]	[n]	[t]	[nt]	[n]	[t]	[nt]	[n]
1 [#..a]	<b>#ta</b>	<del>#nta</del>	(#na)	<b>#ta</b>	<del>#nta</del>	#na	<b>#ta</b>	<del>#nta</del>	<u>#na</u>
2 [#..ã]	<b>#tã</b>	<del>#ntã</del>	<b>#nã</b>	<b>#tã</b>	<del>#ntã</del>	<b>#nã</b>	<b>#tã</b>	<del>#ntã</del>	<b>#nã</b>
3 [a..#]	<b>at#</b>	<del>ant</del>	<del>an#</del>	<b>at#</b>	<del>ant</del>	<del>an#</del>	<b>at#</b>	<del>ant</del>	<del>an#</del>
4 [ã..#]	<del>at#</del>	<del>ãnt</del>	<b>ãn#</b>	<del>at#</del>	<del>ãnt</del>	<b>ãn#</b>	<del>at#</del>	<del>ãnt</del>	<b>ãn#</b>
5 [a..a]	<b>ata</b>	<del>anta</del>	<del>ana</del>	<b>ata</b>	<del>anta</del>	<del>ana</del>	<b>ata</b>	<del>anta</del>	<del>ana</del>
6 [ã..a]	<del>ãta</del>	<b>ãnta</b>	(ãna)	<del>ãta</del>	<b>ãnta</b>	ãna	( <u>ãta</u> )	<b>ãnta</b>	<u>ãna</u>
7 [a..ã]	<b>atã</b>	<del>antã</del>	<del>anã</del>	<del>atã</del>	<del>antã</del>	<del>anã</del>	<del>atã</del>	<del>antã</del>	<del>anã</del>
8 [ã..ã]	<del>ãtã</del>	<b>ãntã</b>	<b>ãnã</b>	<del>ãtã</del>	<b>ãntã</b>	<b>ãnã</b>	<u>ãtã</u>	<b>ãntã</b>	<b>ãnã</b>

**Table 5. Phonetic patterns involving stops in the three branches of MATG**

Patterns that are shared by all three branches are marked in boldface; patterns that do not occur anywhere are shaded and crossed out (cf. lines 2 to 5 which are identical in all three branches). Of the 24 cells, this is the case of 17 (it may well be 18, or 75%, if [**ãta**] does indeed not reconstruct for pTG).

We tried to make the divergences in the remaining cells more visible using different degrees of shading and single crossing out of the whole cell (if the pattern only does not exist in any branch) vs. double crossing out of the form (pattern impossible in two branches). Patterns that are only possible in one branch are also underlined.<sup>23</sup>

In most cells in Table 5 where there are divergences, Awetí and Mawé share their values. Despite these similarities, it is Awetí and pTG which probably are closer related one to another than to Mawé, having developed from an intermediate proto-language "proto-Awetí-Tupí-Guaraní" (pATG) (Corrêa da Silva 2007, Drude 2006, Meira & Drude in

<sup>23</sup> We assume here that the patterns of cells 1c and 6c are possible in Mawé. In any case it is probable that they existed in pATG, the hypothetical intermediate proto-language from that Awetí and pTG developed, because they exist in Awetí, and because the pattern in 1c is the most plausible source for the pattern in 1b in pTG, see below.

prep., Rodrigues 1984/85). Therefore, it is most probable that in these cases it was in the development to pTG where the changes occurred, because it is unlikely that Mawé and Awetí underwent these changes independently.

This concerns the cells 1b+c: plain nasals before oral vowels at the beginning of words probably got post-oralized in pTG. Also, in cells 8a+b, the sequence "nasal vowel followed by pre-nasalized plosive" probably changed in pTG into "nasal vowel followed by plain plosive" – by the way, a development similar to that from Latin to (at least certain dialects of) Portuguese, cf. [tīnta] > [tīta] 'paint'.<sup>24</sup> It is equally probable that the pattern "plain nasal followed by oral vowel" in cell 6c has become impossible generally in pTG, either by nasalizing the following vowel, > 8c, or by post-oralization, > 6b (see the development at the beginning of words, cells 1b+c). Finally, the pattern in cell 6a, if it had to be assumed for pTG, would be a different case, maybe coming from pMATG forms with pattern 6b.

There is only one pattern, that of cell 7a, which is only possible in Mawé, divergently from the other two branches. The statistical argument "2:1" does not even apply in this case, as the shared lack of this pattern in Awetí and pTG is likely to be retention from the intermediate pATG. Therefore, only evidence external to MATG will be able to conclusively decide if pATG or Mawé underwent a change here. Given that nasal harmony is found in several other branches of Tupí, it seems more likely that the plosives in some way were affected by or at least transparent to nasality already in the proto-language (like the pattern in cell 8b in Awetí

<sup>24</sup> In principle, the reverse could also be true and an earlier sequence like [ātā] could have developed into [āntā] in Awetí as the pronunciation of /atā/. As we saw above, in Mawé this phonological sequence is pronounced [atā], and in this case this would reflect the earliest stage of a process of ongoing nasalization. There are too few cognates exhibiting this pattern to decide this question, and those we found are inconclusive: A few show the pattern suggesting that Mawé preserves the original form ('door', mw: /okēT/ [ɔkēn], aw: /otēT/ [ɔntēn], pTG: /okēT/ [ɔkēn]; 'head', mw: /ʔakāK/ [ʔakāŋ], aw: /ʔakāK/ [ʔāŋkāŋ], pTG: /ʔakāK/ [ʔakāŋ]). But many either exhibit a sound change in Mawé from a plosive to a glottal or continuant, which excludes these examples as strong arguments for either hypothesis ('cloud', mw: /iwihīT/ [iwihīn], aw: /iwitūK/ [iwīntfīŋ], pTG: /iβatīK/ [iβātīŋ]; 'curassow', mw: /mijū/, aw: /mitū/, pTG: /mitū/; 'village/place', mw: /ejāP/ [ēnām], aw: /etāP/ [ētām], pTG: /etāP/ [ētām]; 'toe', mw: /piehā/, aw: /pitā/, pTG: /pitsā/). In other cases, nasality is present on both sides of the plosive, supporting our hypothesis ('toucan', mw: /jūkāK/ [jūŋkāŋ], aw: /tukāK/ [tūŋkāŋ], pTG: /tukāK/ [tūkāŋ]; see also the irregular correspondence 'branch', mw: /haŋā/ [hāŋā], aw: /akā/ [āŋkā], pTG: /akā/ [ākā], also suggesting a nasal consonant in the proto-form), or it changed to the left side ('nouse', mw: /ʔāpi/ [ʔāmpi], aw: /ʔapīj/ [ʔāmpīj], pTG: /ʔapūj/ [ʔāpūj]; this should also count as an argument for our hypothesis).

or 8a in pTG rather than 8b in Mawé), so for the time being we postulate that rather Awetí and pTG preserve the original pattern.

Before we expose the result of the phonetic reconstruction, we compare the three phonological tables in Table 6. The conventions are analogous to those above, except that boldface again marks divergences in one branch.

	Mawé			Awetí			pTG		
	a	b	c	a	b	c	a	b	c
	[t]	[nt]	[n]	[t]	[nt]	[n]	[t]	[nt]	[n]
1 [#..a]	#t[a]		(#n[a])	#t[a]		#n[a]	#t[a]	<b>#n[a]</b>	
2 [#..ã]	#t[ã]		#n[ã]	#t[ã]		#n[ã]	#t[ã]		#n[ã]
3 [a..#]	aT#			aT#			aT#		
4 [ã..#]			ãT#			ãT#			ãT#
5 [a..a]	<u>a</u> ta			<u>a</u> ta			<u>a</u> ta		
6 [ã..a]		ãta	( <u>ana</u> )		ãta	<u>ana</u>	<b>(ãta)</b>	<u>ana</u>	
7 [a..ã]	<b>atã</b>								
8 [ã..ã]		ãtã	<u>anã</u>		<u>a</u> tã	<u>anã</u>	<b>atã</b>		<u>anã</u>

**Table 6. Phonological patterns involving stops in the three branches of MATG**

The only case of a phonological rather than a phonetic change is that of the pattern in cell 6b. We argued already in section 4 (see especially Table 4 and discussion there) that this change has probably happened in pTG rather than in Mawé and Awetí independently.

One phonological pattern (**ãtã**) exists only in one branch, and maximally two (**ana** and **ãta**) existed in just two branches. Besides this, all phonological patterns continued to exist in all branches, occasionally changing their pronunciation. We list in (22) below all discrepancies and their possible diachronic explanation.

(22) **Phonological differences involving plosives and NH in MATG branches**

1. The pattern /**ātā**/ occurs only in Mawé (cell 8b, where Awetí has /**atā**/). We argued already above that this is likely to be a new development in Mawé rather than a property of pMATG.<sup>25</sup>
2. The phonological pattern /**āta**/ did probably not exist in pTG (cell 6a). In Mawé and Awetí, this pattern was realized as [**ānta**] (cell 6b), and this pronunciation was maintained in pTG in other words that have it in Mawé and Awetí (see again the discussion around Table 4). Therefore, it is probable that the phonological pattern /**āta**/ did not exist any more in pTG.<sup>26</sup>
3. Word-initial /**n**/ before phonetically oral vowel changed its pronunciation from [**n**] to [**nt**] in pTG only (cells 1b vs. 1c), as argued above.
4. The pattern /**ana**/ is pronounced as [**ānta**] only in pTG (cell 6b). In Awetí and in Mawé (if it is confirmed there), this phonological pattern is realized as [**āna**] (cell 6c). As argued above, it is likely that pTG introduced this change in analogy to the beginning of words.
5. Finally, the pattern /**atā**/ exists in all three branches but is pronounced differently in each. In Awetí the pronunciation is [**āntā**] (cell 8b), as it was possibly already in pATG. In pTG, its pronunciation was [**ātā**] (cell 8a), and we postulate that this is an innovation of pTG. In Mawé, however, the pattern is realized as [**atā**] (cell 7a). Again, it is difficult to decide if this phonetic pattern existed in pMAT. Our hypothesis is that this was not the case. If there is evidence that [**atā**] had existed in pMATG, there are two possible phonological interpretations: (1) The plosive was not transparent to NH, as in Mawé, so the left vowel could have been neutral (adapting to orality of the plosive): /**atā**/ (2) If the plosive was transparent like in Awetí and pTG, a neutral left vowel would lead to a pronunciation as [**ātā**] (cell 8a) or [**āntā**] (cell 8b), so the left vowel would have to have been inherently oral already on the phonological level: /**atā**/ (2). This, however, would be a pattern not attested in *any* of the MATG branches, making it rather unlikely.

In any case, if pattern 7a [**atā**] existed in pMATG, the plosive was transparent at least in pATG so that NH would have been applied; in this case the more probable pronunciation of /**atā**/ in pATG would have been [**ātā**], as in pTG, which Awetí would have further developed into [**āntā**]. As said above, for the time being we believe it to be more likely that the plosive was transparent

<sup>25</sup> However, if the alternative analysis discussed in footnotes 24 and 27 should turn out to be more appropriate, it cannot be excluded that the medial plosives were not transparent already in pMATG, leading to an analysis of pMATG [**āntā**] as /**ātā**/, as in Mawé.

<sup>26</sup> Unfortunately, we know of no clear and complete cognate sets (mono-morphemic) involving a pattern /**VCV**/ where /**C**/ is not a (pre-nasalized) stop.

already in pMATG and acquired the feature 'oral' later in Mawé.<sup>27</sup> Accordingly we propose that the original pMATG pronunciation of /**atã**/ was [**ãntã**], as in Awetí.

Summing up what has been said, we can provide below in Table 7 the possible phonetic forms of the proto-language pMATG and their phonological interpretation, analogously to the tables for the individual languages in previous sections.

		Phonetic			Phonological		
		<i>a</i>	<i>b</i>	<i>c</i>	<i>a</i>	<i>b</i>	<i>c</i>
		[t]	[nt]	[n]	[t]	[nt]	[n]
1	[#..a]	<b>#ta</b>	<del>#nta</del>	<u>#na</u>	#t[a]		<u>#n[a]</u>
2	[#..ã]	<b>#tã</b>	<del>#ntã</del>	<u>#nã</u>	#t[ã]		<u>#n[ã]</u>
3	[a..#]	<b>at#</b>	<del>ant</del>	<del>an#</del>	aT#		
4	[ã..#]	<del>at#</del>	<del>ãnt</del>	<b>ãn#</b>			ãT#
5	[a..a]	<b>ata</b>	<del>anta</del>	<del>ana</del>	<u>ata</u>		
6	[ã..a]	<del>ãta</del>	<b>ãnta</b>	<u>ãna</u>		<u>ãta</u>	<u>ana</u>
7	[a..ã]	atã?	<del>antã</del>	<del>anã</del>	atã? atã??		
8	[ã..ã]	<del>ãtã</del>	<b>ãntã</b>	<b>ãnã</b>		<u>atã</u> <u>ãtã??</u>	<u>anã</u>

**Table 7. Reconstruction of patterns involving stops in pMATG**

In the phonetic part, patterns in boldface are unanimous and underlined patterns reconstruct with a solid base. Only cell 7a is rather unlikely but cannot be totally excluded.

The phonological reconstruction has been lengthy discussed above. For the most part the reconstruction is unanimous (bold cells) or very plausible (underlined). Again, only cell 7a is dubious, and, if it exists, the phonological interpretation for patterns of cell 8b may (but even then probably does not) change.

<sup>27</sup> True, this leaves us with an explanation for the source of the phonetic pattern [**atã**] in Mawé which assumes that the phonological change (/t/ gets opaque for NH by acquiring a trace "oral") caused a change in pronunciation. However, what is passed on from generation to generation are rather phonetic forms. This could count as an argument for the opposite hypothesis formulated in footnote 24: [**atã**] would be the original pMATG pattern to which NH would have been applied in Awetí and pTG. This question cannot be pursued here any further without more phonetic data of Mawé and more evidence from other Tupian languages.

In a nutshell, it seems most probably that the system of NH in the proto-language was quite similar to that of today Awetí (with some small possibility that it assembled some or even all properties of NH of today Mawé)<sup>28</sup>. The Awetí and Mawé systems are quite close, despite the genetic distance, which means that pTG was more innovative.

As a conclusion, given the reconstruction that we propose here, the main developments in the three branches were those listed in (23).<sup>29</sup>

**(23) Development of NH from pMATG to the three MATG branches**

1. NH in Awetí remained basically unchanged.
2. Plosives between vowels became opaque for NH in Mawé.
3. In pTG, nasals before oral vowels changed to bi-segmental homorganic consonants, possibly first at the beginning of words.
4. In pTG, bi-segmental homorganic consonants between nasal vowels ceased to exist (by changing into a plain nasal or into a plain plosive; or perhaps by denasalization of the second vowel), and those in front of oral vowels got re-analyzed as variants of the nasal consonants, not of the plosives. Therefore, the plain plosives themselves became transparent but not affected by NH in pTG.
5. In pTG, partly as a consequence of the above, inherently nasal and oral vowels happened to occur only at the end of morphemes, coinciding with the position of the lexical accent, so nasality / orality may be developing into a feature of accents or of the morpheme as a whole (cf. no. 7 in (20), above).

<sup>28</sup> This outcome might raise suspicions, since, as the saying goes, a reconstruction is more likely to resemble the language the researcher who did the reconstruction is most familiar with. To my defence I can only say that the result came as a surprise for me myself, and that I am most willing to accept corrections of the presented facts and especially hints of shortcomings in my reasoning.

<sup>29</sup> If the alternative analysis discussed above and in footnotes 24 and 27 should turn out to be more appropriate, there are still two possibilities how points 1 and 2 would read.

If, what seems more plausible, medial plosive were transparent in pMATG but the pattern [atã] existed, phonologically /atã/, then [ãntã] was phonologically /atã/, and the development was: 1. Medial plosives between an oral and a nasal vowel /atã/ [atã] became opaque in Mawé so that the left vowel got reanalyzed as neutral in Mawé /atã/ [atã], and the sequence [ãntã] got reanalyzed as /ãntã/ in Mawé. 2. The left vowel in the pattern /atã/ [atã] turned neutral and got nasalized /atã/ [ãntã] in Awetí, leading to the pre-nasalization of the plosive, merging with /atã/ [ãntã].

If however medial plosives should have been opaque in pMATG like in Mawé, and [atã] existed as realization of /atã/, then the pattern [ãntã] would have been phonologically /ãntã/, and the development would have to be stated like this: 1. Medial plosives between an oral and a nasal vowel /atã/ [atã] became transparent in pATG, so that the left vowel got nasalized, resulting in pATG /atã/ [ãntã]. 2. The medial plosives between the two nasal vowels became pre-nasalized in Awetí /atã/ [ãntã], merging with /ãntã/ [ãntã], which became reinterpreted as /atã/ as well.

## References

ADAM, Lucien

1896 Matériaux pour servir à l'établissement d'une grammaire comparée des dialectes de la famille Tupí. *Bibliothèque de Linguistique Américaine* 18, Paris: J. Maisonneuve.

### AWETI DOCUMENTATION

2006 *A Documentation of the Awetí Language and Aspects of the Awetí Culture*. By Drude, Sebastian (principal researcher), Sabine Reiter (researcher) and Hans-Heinrich Lieb (project director). With the assistance of Waranaku Awetí, Awajatu Awetí, Yakumin Awetí, Tawyjat Awetí, Parawajru Awetí, Su Xiaoquin, Eva-Maria Rößler, and others. 230 Sessions. DOBES-Project, 2001-2005.

Awetí archive:

[http://corpus1.mpi.nl/ds/imdi\\_browser/> DoBeS Archive > Aweti](http://corpus1.mpi.nl/ds/imdi_browser/>DoBeS%20Archive%20>Aweti)

Project overview: <http://www.mpi.nl/DOBES/projects/aweti>

CORREA da Silva, Beatriz Carretta

2007 Mais fundamentos para a hipótese de Rodrigues (1984/1985) de um Proto-Awetí-Tupí-Guaraní. *Línguas e Culturas Tupí*, Rodrigues A. D. & Cabral A. S. A. C. (eds.), pp. 219-40, Campinas: Editora Curt Nimuendajú.

DRUDE, Sebastian

2004 Wörterbuchinterpretation: Integrative Lexikographie am Beispiel des Guaraní. *Lexicographica*, Series Maior 120. Tübingen: Niemeyer.

2006 On the position of the Awetí language in the Tupí family. Guaraní y "Mawtí-Tupí-Guaraní". *Estudios históricos y descriptivos sobre una familia lingüística de América del Sur*, Dietrich W. & Symeonidis H. (eds.), pp. 11-45, Berlin & Münster: LIT Verlag.

EMMERICH, Charlotte & MONSERRAT, Ruth Maria Fonini

1972 Sobre a fonologia da língua Aweti (Tupi). *Boletim do Museu Nacional N.S. Antropologia* 25: 1-18.

GALUCIO, Ana Vilacy & GABAS Jr., Nilson

2002 Evidências para o agrupamento genético Karo-Puroborá, Tronco Tupí. Proceedings of the 17° Encontro nacional da ANPOLL, Gramado.

GREGORES, Emma & SUÁRES, Jorge A.

1967 A Description of Colloquial Guaraní. *Janua Linguarum*, Series Practical XXVII no. Den Haag & Paris: Mouton.

JENSEN, Cheryl Joyce S.

1989 *O desenvolvimento histórico da língua Wayampi*. Campinas: Editora da Unicamp.

1998 Comparative Tupí-Guaraní Morphosyntax. *Handbook of Amazonian Languages*, Derbyshire D. C. & Pullum G. K. (eds.), pp. 487-618, Berlin & New York: Mouton de Gruyter.

1999 Tupí-Guaraní. *The Amazonian Languages*, Dixon R. M. W. & Aikenvald A. Y. (eds.), pp. 125-64, Cambridge: Cambridge University Press.

LEMLE, Miriam

1971 Internal classification of the Tupí-Guaraní linguistic family. *Tupí Studies* 1: 107-29. Norman: SIL.

LIEB, Hans-Heinrich

1999 Morph, Wort, Silbe: Umriss einer Integrativen Phonologie des Deutschen. *Variation und Stabilität in der Wortstruktur: Untersuchungen zu Entwicklung, Erwerb und Varietäten des Deutschen und anderer Sprachen*, Butt M. & Fuhrhop N. (eds.), pp. 334-407, Hildesheim etc.: Olms.

2008 The Case for Two-Level Phonology: German Obstruent Tensing and Nasal Alternation in French. *Studies in Integrational Linguistics*, Sackmann R. (ed.), Amsterdam, Philadelphia: John Benjamins.

MEIRA, Sérgio & DRUDE, Sebastian

in prep. A Preliminary Reconstruction of Proto-Mawetí-Guaraní Segmental Phonology.

MELLO, Antônio Augusto Souza

2000 Evidências fonológicas e lexicais para o sub-agrupamento interno Tupí-Guaraní. *Línguas Indígenas Brasileiras Fonologia, Gramática e História*. Atas do I Encontro Internacional do Grupo de Trabalho sobre Línguas Indígenas da ANPOLL, Cabral A. S. A. C. & Rodrigues A. D. (eds.), pp. 338-42, Belém: Editora UFPA.

MONSERRAT, Ruth Maria Fonini

1976 *Notas sobre a morfofonêmica Aweti*. Manuscript, Rio de Janeiro.

1977 *Nasalização em Aweti*. Manuscript, Rio de Janeiro.

RODRIGUES, Aryon Dall'Igna

1984/85 Relações internas na família lingüística Tupí-Guaraní. *Revista de Antropologia* 27/28.

RODRIGUES, Aryon Dall'Igna & DIETRICH, Wolf

1997 On the linguistic relationship between Mawé and Tupí-Guaraní. *Diachronica* XIV: 265-304.

SCHLEICHER, Charles Owen

1998 *Comparative and Internal Reconstruction of the Tupi-Guarani Language family*. Ph.D. dissertation, University of Wisconsin-Madison.

TRUBETZKOY, Nikolai Sergei

1989 *Grundzüge der Phonologie*. Göttingen: Vandenhoeck & Ruprecht. [1st Edition Travaux du Cercle Linguistique de Prague 7 (1939)].