NASAL HARMONY IN AWETÍ

AND THE 'MAWETÍ-GUARANÍ' FAMILY (TUPÍ)

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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.[1] This branch in turn consists internally of the languages (Sateré-) Mawé and Awetí and the large Tupí-Guaraní subfamily, and so its explicit but longish name could be "Mawé-Awetí-Tupí-Guaraní" (MTAG). This genetic grouping has already been suggested (without any specific designation) by A. D. Rodrigues (e.g., 1984/85; Rodrigues and 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).

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).[2] This is the main reason why 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 sec. 5, we compare the systems of the three languages and propose and justify a reconstruction of the system of the proto-language pMAGT. 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 and 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 two paradigms of indicative, unmarked for aspect forms the two transitive verbs ***nãtãtu*** 'to wait for sb./sth.' (stem: ***tã***) and ***nãtupu*** '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]	[atupʼ]		1+2	[tʃĩntã]	[tʃitupʼ]
2	[ẽntã]	[etupʼ]		1+3	[ɔ̃ʐɔ̃ɲtã]	[ɔʐɔjtupʼ]
3	[w̃ẽɲtã]	[wejtupʼ]		2+3	[pẽɲtã]	[pejtupʼ]

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 segment.

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 /a̱-/, where the underlined "a̱" 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 segments in (1). Equally, the /u/ in **tup** is intrinsically oral, and preceding vowels and consonants phonetically harmonize with it in 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.[3] (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 this case. 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 the stem, pre-nasalization will occur with the same segment, as in c. in (2), with the person prefix **e-** '2.Sg.'.

(2) a. **[tãm]** 'village'   b. ***[ntãm]** ('village')   c. **[ẽntãm]** 'your$_{SG}$ 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 where the opposite is true. 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'#], *[…tũp'#]   b. *[…tam#], *[…tum#]

Due to this neutralization, we conclude that on the abstract phonological level in this position an archiphoneme /P/ is present: /a̲-tuP/ 'I saw', /tãP/ 'village'. It does not carry neither the property 'oral' nor 'nasal', similar to the 'neutral' (underlined) vowels.[4] Again, nasalization (and oralization) of these segments illustrates NH 'working left to right', affecting, however, only one 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'

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

(6) a. [atɛtup'] 'I saw myself'   b. [ãntẽŋkĩɲ] 'I hurt/kill myself'

The second, nasal form, phonologically /a̰-tɕ-kɨ̃j/, 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. [ãmɔtak̚] 'I made sb. cry'   b. [ãntẽmɔtak̚] 'I made myself cry'

The vowel of this prefix is a neutral vowel, /o̰/, as in the case of other prefixes, as can be seen when it gets nasalized in front of nasal stems such as **tem** /tẽP/ 'go out', in (8).

(8) [ãmɔ̃ntẽm] '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. [ãmpɔ̃w̃ã] 'I spinned'   b. [ãŋkãɾ̃ãɲ] 'I scratched sb./sth.'

    c. [akɨtsitsɛ] 'I feel shame'   d. [atatap̚] '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: /po̯wã/ 'spin', /ka̯rãj/ 'scratch', /ki̯tsi̯tse/ 'feel shame', /ta̯tap/ '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 does never happen, at least not in verbs; apparently in Awetí nasal consonants occur only in verbal stems that have a nasal vowel anyway.

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)   [ãntẽntup̚] 'I heard sb/sth, I listened to sb/sth'

Morphologically, we propose that (10) has the following form: /a̯t- ẽtuP/, where /a̯t-/ is an allomorph of the first person singular prefix that occurs before transitive stems that start with a vowel.[5] It is an empirical fact that in /ẽtuP/ 'hear, listen' and in similar stems an intrinsically nasal vowel occurs

in a non-final syllable.[6] 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 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 nasal vowel or consonant in the same word, as is illustrated by the impossible forms in (11).[7]

(11)   *[ãtã], *[atã], *[antã], *[antẽntup'], *[ãtẽntup'], *[ãntɛntup'],

    *[ãntẽtup']

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. [ĩntẽʔĩnĩ] 'my hammock'   b. [kajɛʔɔtɔtap'] 'our central men's house'

In *it- eʔ 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.[8]

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.

4. Segments that harmonize phonetically as to nasality or orality, that is, the affected 'targets' of nasal spreading, are: (a) the phonologically neutral vowels /a̠, e̠, i̠, o̠, u̠, i̠/; (b) the voiced consonants (the glides /j, w/, the liquids /l, ɾ/ and the reflexive fricative /z̬/); (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 unreleased stops

[p̚, t̚, k̚] and the *'lenis'*[9] continuants [β, ɾ, ɣ], and as their nasal

variants [m, n, ŋ].

5. The glottal segments /ʔ, h/ are not affected by, and transparent to,

NH.[10]

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.

On the right, we repeat the same table for phonology, that is, for each existing phonetic form we give our phonological interpretation. Again, 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 if other syllables follow in the word. 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'   [tukɨtʃ] /tu̱kɨT/ 'salt'

      1c. [mɛ] /me/ (particle)   [miʔakˀ] /mi̱ʔaK/ 'manioc starch'

      2a. [tʃĩn] /tĩT/ 'fly'   [tã̚ʔɛ̃] /ta̱ʔẽ/ '(a certain) pot'

      2c. [nã] /nã/ 'he/she/it'   [nũɲã] /nu̱jã/ 'meat, flesh, muscles'

      3a. [ɛtʃ] /eT/ 'name'

      4c. [ãmãn] /a̱mãT/ 'rain'

      5a. [atu] /a̱tu/ 'grandfather (vocative)'

      6b. [õntẽntapˀ] /o̱tẽtaP/ 'door' (the part *ẽta*)

      6c. [pɨ̃rĩɲɨtʃ] /pɨ̱rɨɲɨT/ 'humming-bird' (the part *ɨɲɨ*)

8b. [mĩntã] /mita̰/ '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* do exist.

Equally, the reason for analyzing the left vowel (and similarly other non-last vowels) in *5a*, *6c* and *8b+c* as phonological 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 a̰-, tḛ- and mo̰- 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), 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*, 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.[11]

The general properties of nasal harmony (NH) in Mawé can essentially be resumed in the statements in (25), 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 much 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.[12]

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, ẽ, ĩ, õ, ũ, 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, 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/. The following Table 2, focussing on the

plosives, makes these differences more explicit.[13] (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 pre-nasalized 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) 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 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.[14]

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. However, 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 phonetic connection 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 (27), 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.

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 in general. 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 and 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 (28) can be postulated. The list is again analogous to (13) for Awetí and to (25) 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, ẽ, ĩ, õ, ũ, 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[15]; (c) the nasal conso-nants /m, n, ŋ/ which have 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], '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.

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).[16]

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.

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 ***/memiT/**. 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).

(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 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***.[17] 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 in the phonological intonation structure instead.

Again, in (30) we resume NH in pTG in declarative rules in analogy to (15) and (27).

(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 of an oral vowel (*1b*, *6b*).

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 being 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.[18] The properties listed in (31) 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, ẽ, ĩ, õ, ũ, ỹ/ [19] 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[20]; (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 do not see any reason not to assume that these shared properties are not due to retention from the hypothetical proto-language pMATG. (Stronger evidence for this would com 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-phonemic in all three branches. For ease of comparison, we repeat the phonetic parts of the tables for the three languages in Table 5.

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 shading and single crossing out (if the pattern only does not exist in one branch) vs. double crossing out (pattern impossible in two branches). Patterns that are only possible in one branch are also underlined.[21]

In most cells in Table 5 where there are divergences, Awetí and Mawé share their values. But 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 and Drude in 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. [tĩnta] > [tĩta] 'paint'.[22] It is equally probable that the pattern "plain nasal followed by oral vowel" in cell *6c* turned 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.

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 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 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.

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.

Two phonological patterns do not exist in all three branches. Besides this, all phonological patterns continued to exist in all branches, occasionally changing their pronunciation. We list in (32) below all discrepancies and their possible diachronic explanation.

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

1. The pattern /ãtã/ occurs only in Mawé (cell *8b*, where Awetí has /a̰tã/).

    We argued already above that this is likely to be a new development in Mawé rather than a property of pMATG.[23]

2. The phonological pattern /ãta/ did probably not exist in pTG (cell *6a*). In

    Mawé and Awetí, this pattern was realized as [ãnta] (cell *6b*), and this

    pronunciation was maintained in pTG in words that have it in Mawé and

    Awetí (see again the discussion around Table 4). Therefore, it is

probable that the phonological pattern /ãta/ did not exist any more in pTG.

3. Word-initial /n̥/ before phonetically oral vowel changed its pronunciation from [n] to [nt] in pTG only (cells *1b* vs. *1c*), as argued above.

4. The pattern /a̰na/ is pronounced as [ãnta] only in pTG (cell *6b*). In Awetí and in Mawé (if it is confirmed there), this phonological pattern is realized as [ãna] (cell *6c*). As argued above, it is likely that pTG introduced this change in analogy to the beginning of words.

5. Finally, the pattern /a̰tã/ exists in all three branches but is pronounced differently in each. In Awetí the pronunciation is [ãntã] (cell *8b*), as it was possibly already in pATG. In pTG, its pronunciation was [ãtã] (cell *8a*), and we postulate that this is an innovation of pTG. In Mawé, however, the pattern is realized as [atã] (cell *7a*). Again, it is difficult to decide if this phonetic pattern existed in pMATG, we would suspect that this was not the case. If there is evidence that [atã] 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): /a̰tã/. (2) *If* the

plosive was transparent like in Awetí and pTG, a neutral left vowel would lead to a pronunciation as [ãtã] (cell *8a*) or [ãntã] (cell *8b*), so the left vowel would have to have been inherently oral already on the phonological level: /atã/. This, however, would be a pattern not attested in *any* of the MATG branches, making it rather unlikely.

In any case, if pattern *7a* [atã] 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 /a̰tã/ in pATG would have been [ãtã], as in pTG, which Awetí would have further developed into [ãntã].

As said above, for the time being we believe it to be more likely that the plosive was transparent already in pMATG and acquired the feature 'oral' later in Mawé.[24] In this case the original pMATG pronunciation of /a̰tã/ 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.

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) vary.

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).[25] 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).

(23) Development of NH from pMATG to the three MATG branches.[26]

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 (or by changing into a plain nasal or into a plain plosive; or perhaps because the following vowel became oral), 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).

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Figures

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

Tables

TABLE 1: *Abstract possible and impossible sequences involving stops in Awetí*

TABLE 2: *Abstract possible and impossible sequences involving stops in Mawé*

TABLE 3: *Abstract possible and impossible sequences involving stops in pTG*

TABLE 4: *The word 'child of a woman' phonetically and phonologically*

TABLE 5: *Phonetic patterns involving stops in the three branches of MATG*

TABLE 6: *Phonological patterns involving stops in the three branches of MATG*

TABLE 7: *Reconstruction of patterns involving stops in pMATG*

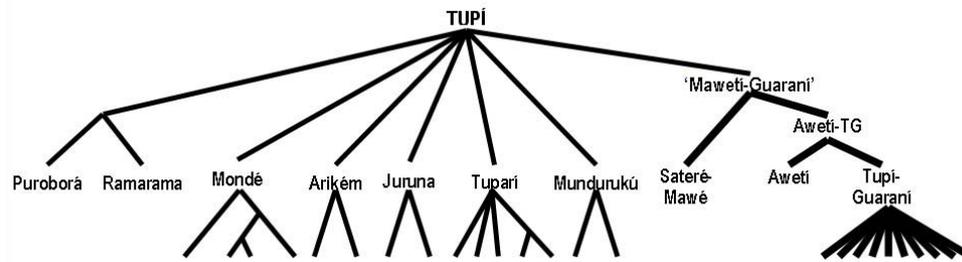**Figure 1.** Major Branches of the Tupí family (Tupí Comparative project, 2006)

TABLE 1: *Abstract possible and impossible sequences involving stops in Awetí*

		Phonetic				Phonological		
		a [t]	*b* [nt]	*c* [n]		*a* [t]	*b* [nt]	*c* [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~~		a̱ta		
6	[ã..a]	~~ãta~~	ãnta	ãna			ãta	a̱na
7	[a..ã]	~~atã~~	~~antã~~	~~anã~~				
8	[ã..ã]	~~ãtã~~	ãntã	ãnã			a̱tã	a̱nã

TABLE 2: *Abstract possible and impossible sequences involving stops in Mawé*

		Phonetic				Phonological		
		a [t]	*b* [nt]	*c* [n]		*a* [t]	*b* [nt]	*c* [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~~		a̠ta		
6	[ã..a]	~~ãta~~	ãnta	(ãna)			ãta	a̠na
7	[a..ã]	atã	~~antã~~	~~anã~~		a̠tã		
8	[ã..ã]	~~ãtã~~	ãntã	ãnã			ãtã	a̠nã

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TABLE 3: *Abstract possible and impossible sequences involving stops in pTG*

		Phonetic				Phonological		
		a	*b*	*c*		*a*	*b*	*c*
		[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~~		a̠ta		
6	[ã..a]	(ãta)	ãnta	~~ãna~~		(ãta)	a̠na	
7	[a..ã]	~~atã~~	~~antã~~	~~anã~~				
8	[ã..ã]	ãtã	~~ãntã~~	ãnã		a̠tã		a̠nã

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TABLE 4: *The word 'child of a woman' phonetically and phonologically*

Awetí	Mawé	pTG
[mẽmpɨf']	[mẽmpɨf']	*[mẽmpɨf']
/mẽpɨT/	/mẽpɨT/	*/mẹmɨT/[27]

TABLE 5: *Phonetic patterns involving stops in the three branches of MATG*

		Mawé			*Awetí*			*pTG*		
		a [t]	*b* [nt]	*c* [n]	*a* [t]	*b* [nt]	*c* [n]	*a* [t]	*b* [nt]	*c* [n]
1	[#..a]	#ta	~~#nta~~	(#na)	#ta	~~#nta~~	#na	#ta	#nta	~~#na~~
2	[#..ã]	#tã	~~#ntã~~	#nã	#tã		#nã	#tã		#nã
3	[a..#]	at#			at#			at#		
4	[ã..#]	~~ãt#~~		ãn#			ãn#			ãn#
5	[a..a]	ata			ata			ata		
6	[ã..a]	~~ãta~~	ãnta	(ãna)	~~ãta~~	ãnta	ãna	(ãta)	ãnta	~~ãna~~
7	[a..ã]	atã			atã			atã		
8	[ã..ã]	ãtã	ãntã	ãnã	ãtã	ãntã	ãnã	ãtã	~~ãntã~~	ãnã

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TABLE 6: *Phonological patterns involving stops in the three branches of MATG*

	Mawé a [t]	Mawé b [nt]	Mawé c [n]	Awetí a [t]	Awetí b [nt]	Awetí c [n]	pTG a [t]	pTG b [nt]	pTG c [n]
1 [#..a]	#t[a]		(#n[a])	#t[a]		#n[a]	#t[a]	#n[a]	
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]	ata			ata			ata		
6 [ã..a]		ãta	(ana)		ãta	ana	(ãta)	ana	
7 [a..ã]	atã								
8 [ã..ã]		ãtã	anã		atã	anã	atã		anã

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TABLE 7: *Reconstruction of patterns involving stops in pMATG*

		Phonetic				Phonological		
		a	*b*	*c*		*a*	*b*	*c*
		[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		a̧ta		
6	[ã..a]	~~ãta~~	ãnta	ãna			ãta	ana
7	[a..ã]	atã?	antã	anã		atã? / a̧tã??		
8	[ã..ã]	~~ãtã~~	ãntã	ãnã			a̧tã / ãtã??	a̧nã

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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.

[3] 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.

[4] 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, ɾ, ɣ]**, as **[atuβɔkɔ]** 'I used to look' in (3), or in **[etaɣ itɛtɛ]** 'you cry about me' (inter-word-sandhi).

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

[6] 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 straight forward to represent 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.

[7] 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.

Other instances where an oral segment occurs left of a nasal segment are in case of composition.

[8] 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 representation 'phonological' 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.

[9] This term has been, to our knowledge, first used by Schleicher (1998) for TG and pTG.

[10] 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.

[11] 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.

[12] 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.

[13] 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.

[14] 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

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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 segment.

[15] 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.

[16] 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.

[17] This analysis has been proposed for Paraguayan Guaraní by Gregores & Suáres (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 suprasegmental structure.

[18] 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.

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

[20] 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.

[21] 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.

[22] In principle, the reverse could also be true and an earlier sequence like [ãtã] could have developed into [ãntã] in Awetí as the pronunciation of /ḁtã/.

As we saw above, in Mawé this phonological sequence is pronounced [atã], and in this case this could 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: /o̯kẽT/

[ɔkẽn], aw: /o̧tẽT/ [ɔ̃ntẽn], pTG: /o̧kẽT/ [ɔ̃kẽn]; 'head', mw: /ʔa̧kãK/ [ʔakãŋ],

aw: /ʔa̧kãK/ [ʔãŋkãŋ], pTG: /ʔa̧kãK/ [ʔãkãŋ]). 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: /i̧wi̧hĩT/ [ĩwĩhĩn], aw: /i̧wi̧tĩK/ [ĩwĩntʃĩŋ], pTG: /i̧βa̧tĩK/ [ĩβãtĩŋ];

'curassow', mw: /mi̧jũ/, aw: /mi̧tũ/, pTG: /mi̧tũ/; 'village/place', mw: /ȩjãP/

[ẽɲãm], aw: /ȩtãP/ [ẽntãm], pTG: /ȩtãP/ [ẽtãm]; 'toe', mw: /pi̧ȩhã/, aw: /pi̧tã/,

pTG: /pi̧tsã/). In other cases, nasality is present on both sides of the plosive,

supporting our hypothesis ('toucan', mw: /jũkãK/ [ɲũŋkãŋ], aw: /tu̧kãK/

[tũŋkãŋ], pTG: /tu̧kãK/ [tũkãŋ]; see also the irregular correspondence

'branch', mw: /ha̧ɲã/ [hãɲã], aw: /a̧kã/ [ãŋkã], pTG: /a̧kã/ [ãkã], also

suggesting a nasal consonant in the proto-form), or it changed to the left

side ('nouse', mw: /ʔã̧pi̧/ [ʔãmpi̧], aw: /ʔa̧pĩj/ [ʔãmpĩɲ], pTG: /ʔa̧pũj/ [ʔãpũɲ];

this should also count as an argument for our hypothesis).

[23] However, if the alternative analysis discussed in footnotes 22 and 24

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 [ãntã] as /ãtã/, as in Mawé.

24 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. The opposite hypothesis formulated in footnote 22 would maybe better account for this: [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.

25 This outcome may raise suspects, as a saying goes that a reconstruction is most 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.

26 If the alternative analysis discussed above and in footnotes 22 and 24 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 /a̠tã/ [atã], and the sequence [ãtã]

got reanalyzed as /ãtã/ in Mawé. 2. The left vowel in the pattern /atã/ [atã]

turned neutral and got nasalized /a̠tã/ [ãtã] in Awetí, leading to the pre-

nasalization of the plosive, merging with /a̠tã/ [ãntã].

If however medial plosives should have been opaque in pMAGT like in

Mawé, and [atã] existed as realization of /atã/, then the pattern [ãntã] would

have been phonologically /ãtã/, and the development would have to be

stated like this: 1. Medial plosives between an oral and a nasal vowel /a̠tã/

[atã] became transparent in pATG, so that the left vowel got nasalized,

resulting in pATG /a̠tã/ [ãtã]. 2. The medial plosives between the two nasal

vowels became pre-nasalized in Awetí /a̠tã/ [ãntã], merging with /ãtã/ [ãntã],

which became reinterpreted as /a̠tã/ as well.

[27] Most reconstructions give */memɨr/ 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.