AMERINDIA n°35, 2011

Stress in Awetí and its acoustic correlates

Sebastian DRUDE[1]

Museu Paraense Emílio Goeldi & Johann Wolfgang Goethe-Universität Frankfurt

1. Introduction

This paper describes the distribution and phonetic properties of stress in word forms in Awetí, a Tupían language spoken by ca. 150 people in central Brazil in the Upper Xingu area. Awetí does not belong to, but is arguably the closest relative of, the better known Tupí-Guaraní subfamily, the largest branch of the Tupí stock.

The study has two parts: sections 3-5 describe on which syllable the stress falls, for word forms with different stems and affixes. Sections 6-8 investigate the acoustic phonetic correlates of stress. Thus, this contribution in general takes a similar approach as that by Gordon and Rose (2006) with the following qualifications: (1) the acoustic investigation is a field linguist's first exploration with a much more limited data corpus and without the methodological and technical (in particular, statistical) sophistication of a specialized phonetician; (2) for reasons of time and space, no systematic attempt has been made to compare Awetí data and findings to that of other (not even Tupían) languages or to discuss them under a broader typological

[1] I would like to thank Rui Rothe-Neves, Jost Gippert and two anonymous reviewers for their valuable comments. I also thank Loretta O'Connor for helping me to improve the English. Remaining shortcomings are my own responsibility.

point of view; (3) on the other hand, the description of the position of stress is much more detailed, discussing most known suffixes of Awetí; (4) the acoustic study of pitch tries to take not only the absolute f_0 value into account, but also the pitch contour in and around the stressed syllable, which turns out to be crucial. To the best of my knowledge, the last two points are attempted for the first time not only for Awetí but probably for any Tupian language. (This does not exonerate this study from the need to be redone with more data and state-of-the-art statistical methodology.)

After a short overview of the word classes and general phonotactics of Awetí (section 2), we briefly discuss the notion 'stress' and show that, in Awetí, it is generally located on the last syllable of the stem in morphologically simple forms (section 3). We then discuss regular and isolated exceptions to this rule (section 4). In section 5, we describe the position of stress when inflectional or derivational suffixes are present – usually, stress in suffixed word forms remains on the last syllable of the stem. We then present a preliminary study of the acoustic-phonetic details of the manifestation of stress, observing word forms in isolation (section 6: methodology; section 7: results) and finally studying one word in different syntactic contexts (section 8).

2. Background: word classes and phonotactics of Awetí

In this section we give some background information intending to facilitate the understanding of the content of the next sections, in particular the phonological interpretation of the sample word forms.

In Awetí, we have identified so far the word classes listed in (1).

(1) Major word classes of Awetí

- Verbs (three subclasses: transitive, active intransitive, stative)
- Nouns (pronouns and substantives, some of the latter inherently possessed)
- Postpositions
- Adverbs
- Different types of other particle words
- Ideophones

Of these, the verbs, most nouns, almost all postpositions, and even a few adverbs inflect for person through the use of person prefixes. Simple verb forms also may inflect for aspect and mood through the use of suffixes. There are three or four nominal case suffixes at most, and there is 'nominal tense', but this is rather derivational, not inflectional, in nature. There are

also derivational processes that change the subcategory or valency of verbs, many of which are marked by prefixes, some by suffixes. Several derivational affixes change the major class of a word, almost all of them suffixes. Certain verbal categories, in particular modal ones, are expressed by use of particles, and in general particles abound in Awetí discourse.

The phonological structure of morphs and word forms does not vary among the word classes. Generally, Awetí syllables are of the form CV, CjV or CVj (where "j" stands for a glide */j,w/*) – except for the last syllable of a root or suffix, which may additionally end in an occlusive */P,T,K/*. These abstract phonemes have the respective phonetic realizations as [m,n,ŋ] after nasal vowels, as unreleased [*p̚, t̚,k̚*] after oral vowels and before pause or oral stops, and as lenited [*β, ɾ, ɣ*] after oral vowels and before vowels or sometimes before the glottal stop (*[kwaɾʔɨp̃~ kwaʔɾɨp̃]* 'sun (*kwat*) tree (*'yp*)') or before glides (*[taʔwaɾwatu]*) 'big (*watu*) jaguar (*ta'wat*)').

The nasality / orality contrast is a special issue in Awetí, as in many Tupian languages. Most phonemes may phonetically adopt orality or nasality from other segments in a process of nasal harmony.[2] The last syllable of a root or suffix has vowels that are inherently oral or nasal. These vowels do not change phonetically, but the non-final syllables usually harmonize with the nasality or orality of the following syllable or with the nasality of a nasal consonant */m,n,ŋ/*. This holds true for almost all segments in prefixes. In some cases, a non-final syllable of a stem or a prefix also may have an inherently nasal vowel. Most suffixes are inherently oral; the few suffixes with a nasal segment do not cause nasalization of the preceding stem nor of other preceding suffixes.

The typical Awetí root and several affixes are disyllabic, and indeed the phonotactic distribution of the phonemes is arguably best described using a disyllabic template as in (2), where brackets indicate optional elements.

(2) Basic positions for Awetí phonemes in disyllabic roots:

$[C_1]\ [V_1\ [C_2]]\ V_2\ [C_3]$

Examples of disyllabic roots (in orthographic representation) include *akup* /a̲*kuP*/ 'hot', *'aka* /ʔa̲*ka*/ 'break', *kazã* /*ka̲ʐã*/ 'work', *mẽpyt* /*mẽpɨT*/

[2] In Awetí, segments agree usually with segments to their right, which means that 'nasal spreading', or better 'nasal harmony', works mainly from right to left. The stops */p,t,k/*, however, are realized *[mp,nt,ŋk]* or *[mb,nd,ŋg]*, respectively, when they follow a nasal or nasalized vowel. For more details see Drude (2009).

‘(woman’s) child’, *eko* /e̲ko/ ‘walk’, *mỹje* /mɨ̃je/ ‘wake up’, *aip* /a̲iP/ ‘grow (up)’. In morphs with one syllable, the elements [V_1C_2] are not present. Examples include *’am* /ʔãP/ ‘to stand (upright)’, *ap* /aP/ ‘to cut’, *jung* /jũK/ ‘to put’, *kyt* /kɨT/ ‘to rain’, *pi* /pi/ ‘to sting’. These same elements [V_1C_2] can also be repeated to obtain morphemes with three or more syllables.

Awetí phonemes distribute among these positions as specified in (3). The symbols apply the IPA conventions, designating a typical phonetic realization of each phoneme, including for the more abstract phonemes /*P,T,K*/. The underlined vowels are to indicate ‘neutral’ vowels (which are phonologically not specified for nasality or orality, as opposed to inherently oral vowels in V_2).

(3) Distribution of Awetí phonemes among the basic positions

C_1 : /j, w, p, m, t, n, k, ʔ, ts, h, l/
C_2 : /j, w, p, m, t, n, k, ŋ, ʔ, ts, h, l, ɻ, ɣ, ɾ/
C_3 : /j, w, P, T, K /
V_1 : /a̲, e̲, i̲, o̲, u̲, ɨ̲, ã, ẽ, ĩ, õ, ũ, ɨ̃/
V_2 : /ã, ẽ, ĩ, õ, ũ, ɨ̃, a, e, i, o, u, ɨ/

In this contribution we use the Awetí orthography, which diverges in some minor points from the IPA-based symbols used in (3): (a) the orthography does not distinguish ‘neutral’ vowels from oral vowels, leaving both unmarked;[3] (b) the closed central unrounded vowel /ɨ/ is represented by <y>; (c) the glottal stop /ʔ/ is represented by an apostrophe-like letter <’>; (d) the archiphonemes /*P,T,K*/ are represented by <p,t,k>, <w,r,g> or <m,n,ng>, depending on the orality or nasality of the preceding vowel and on the next segment; (e) an inherently nasal vowel followed orthographically by a morpheme-final nasal consonant <m,n,ng> does not receive the tilde, not even if suffixes follow. The phonological representation of the examples in the previous and following paragraphs should suffice to illustrate the orthography.

If we include occurrence of glides in addition to the basic position, we get a more complete picture of Awetí phonotactics: /*w*/ may occur after certain consonants or as a result of re-syllabification, and non-final syllables may end in /*j*/. A more complete picture is presented in (4).

[3] In the template presented above, they are in complementary distribution and can therefore easily be identified if the morphological composition of a word form is known.

(4) Positions for Awetí phonemes (complete)

$[C_1\ [w/j]]\ [V_1\ [[w/j]\ C_2\ [w/j]]]\ V_2\ [C_3]$

Examples of disyllabic stems with glides include *pwaka /pwa̲ka/* 'to distribute', *wajpok /wa̲jpoK/* 'to vomit', *mowka /mo̲wka/* 'to teach, to inform', *kwawap /kwa̲waP/* 'to know', *kwãkwap /kwãkwaP/* 'to rest'. Monosyllabic roots are for example: *pwaj /pwaj/* 'to send', *kwap /kwaP/* 'to pass by', *pja /pja/* 'wide'. Prefixes do not have *C_3* and mostly not even V_2 (i.e., monosyllabic prefixes are maximally composed of $C_1V_1C_2$). Suffixes, in turn, do not usually have C_1. Further, most affixes have two allomorphs, one with or without a final or initial vowel so as to avoid consonantal clusters (other than those involving glides). Therefore, these are generally rare and mostly restricted to cases of composition of stems.

3. Regular stress of words of different classes

As it is the case with many Tupian accent-languages,[4] the stress in Awetí generally falls on the last syllable of the stem. Here is not the place to go into theoretical details, but I wish to define how the term *'stress'* is understood in this study. This can be summarized by the statement that *stress is understood as an inherent property of a syllable of a word form which consists of the capacity to carry syntactic accentuation*.[5]

Under *'syntactic accentuation'* (or *'syntactic accents'*, which is in some respects similar to the more common term 'sentence stress'), I understand patterns of syntactic intonation that stretch over several syllables and usually several words, possibly over the sentence as a whole, and in which generally one 'highlighted' syllable stands out in some way, giving prominence to the word that the outstanding syllable belongs to. 'Highlighting' means the syllable might have higher intensity or length, but usually f_0 is the most important metric: the syllable may be the last high pitch syllable before a sequence of low pitch syllables, or the first low syllable in a sequence of low syllables, etc.; the details vary among syntactic accents and languages. The outstanding syllable in turn identifies

4 This has been described at least for Tembé (Eiró 2001), Parakanã (Silva 1999) Suruí do Pará (Barbosa 1993). Other such languages have been reported by Dietrich (1986, 1990). Gordon & Rose (2006) also identify this status for Juma; however, the very short section in Abrahamson & Abrahamson (1984) rather indicates that stress can be attracted by certain suffixes. Note that this work does not make any systematic attempt at comparing Awetí data with other Tupían or South American languages.

5 See Lieb (1984a, 1996b), and the fundamental study by Bolinger (1958). We use, however, 'stress' instead of 'word accent'.

a word in focus for semantic reasons. This is particularly evident in the case of contrastive syntactic accents, but also non-contrastive syntactic intonation usually involves a specific syllable in a particular word which 'bears' the syntactic accentuation. In sum: if a word bears syntactic accentuation, it is generally one particular syllable in the word which stands out. This syllable which can highlight a word by syntactic accentuation carries 'stress' (or 'word accent', in other terminologies). We speak of the 'stress-bearing syllable', or even shorter simply the 'stressed syllable' of a word (form).

By saying that stress is an 'inherent capacity', it is implied that this property does not manifest itself in each use of the word form in question; that is, a stress syllable is not actually accentuated syntactically in every occurrence. The syntactic accent may highlight another word in the sentence, depending on the focus and discourse-related properties. When the word is uttered in isolation, however, one can assume an implicit syntactic context like *"the word is…"* or *"what I wanted to say is…"*, where the word in question is indeed in focus and therefore highlighted by a syntactic accent. It follows that the accentuation pattern observable on a word form in isolation is usually indeed the manifestation of a syntactic accent. By studying isolated word forms, or word forms in a carrier sentence which implies focus on the word form in question, it should be possible to identify the highlighted syllable which bears the syntactic accent and hence is the stress-bearing syllable of the word form, if a word can carry syntactic accentuation at all.

The general rule of stress in Awetí, that the last syllable of the stem carries the stress, is independent of the nasality or other segmental-structural features of the syllables, in particular of their vowel quality and their 'weight'. This means that syllables with any vowel and with or without consonants in coda or onset position can carry stress.[6] Stress is also independent of the word class. This all is illustrated by the examples in (5) to (16), below, each for a different word class, with stress syllables in different C-V-structures and vowels. The stress-bearing syllable is underlined.

6 But see the comments on optional resyllabification in the next footnote.

(5) Stress in simple polysyllabic intransitive active verbs

aj-eko	*w-atuk*	*e-'azym*	*ozo-etej*	*kaj-aip*	*kaj-ajp*[7]
1-walk	3-take.bath	2-sneeze	13-dream	12-grow	12-grow

(6) Stress in simple polysyllabic transitive verbs

at-etyt	*wej-jupã*	*tit-ejõj*	*pej-'yjtym*	*e-petu*	*a-wã'up*
1-roast	3-beat	12-call	23-burry	2-blow	1-assume

(7) Stress in simple polysyllabic stative verbs

i-katu	*e-jo'yk*	*i-pilang*	*i-pypẽ*	*lole*
3-good	2-cold	3-red	3-wide	bad

(8) Stress in common polysyllabic substantives

ite-'ypo	*'ypeng*	*n-uwaj*	*'e-ta'ẽ*	*typy'yp*
1-possessions	woodpecker	3-tail	2-pot	line/queue

(9) Stress in the polysyllabic personal pronouns[8]

atit	*ito*	*kajã*	*ozoza*[9]	*'e'ipe*	*ta'i*
1♂	1♀	12	13	23	3pl♀

(10) Stress in the deictic pronouns[10]

uja	*akyj*	*akoj*	*jatã*	*kitã*	*kujtã*
prox.1♀	prox.2♀	dist.12♀	prox.1♂	prox.2♂	dist.12♂

(11) Stress in simple disyllabic adverbs

mimo	*mote*	*majũ*	*ko'jem*	*mojte*
yesterday	a.long.time.ago	here(to)	tomorrow	early

---

7 Both realizations of the last verb *taipu* 'get older, reach the mature age (of a person)' are possible. Resyllabification of an */i/* to [j] , or of an */u/* to [w] adjacent to a vowel (in particular a low vowel) is an optional but very frequent phonetic phenomenon.

8 There are different pronouns in men's and women's speech ('genderlects') for the first person singular and the third person singular and plural (cf. Drude 2002). Forms not listed here are monosyllabic.

9 Observe that the form for the first person plural exclusive has stress on the penultimate syllable. This form is clearly composed of the general morpheme for the first person plural exclusive (usually a prefix, *ozo-*) and the groupal nominal suffix *-za* 'all the… / a group of…', which does not carry stress.

10 All simple deictic pronouns are polysyllabic, and have again different forms for the two genderlects.

(12) Stress in simple disyllabic postpositions

ete	*eze*	*kyty*[11]	*tsoa*	*ywã*
with/about	mixed.with	for/to	towards	along

(13) Stress in sentential particles, interrogatives and interjections

ehẽ	*kape?*	*kari'aw?*	*aka!*	*atsy!*	*nawỹj !*
yes	where.is.(3)?	why?	(pain)	disgusting!	let's.go!

(14) Stress in different types of second position particles

'yto	*etsan*	*tepe*	*zotsu*	*'ytoto*
then	temporarily	in.vain	self	truly/very

(15) Final phrasal/sentential particles are monosyllabic or unstressed (clitics)

me	*a'yn*	*ika*	*'a*	*'ẽ*
('DEF')	('INDEF')	apparently	(emotion)♂	(emotion)♀

(16) Stress in ideophones (many are monosyllabic; repetitions are frequent)

ãj	*tyk*	*pyw*	*kut*	*atiw*	*ihĩ*	*toho*	*kutsu*	*kyryry*	*tsirik*
scream	walk	take	drink	sneeze	cry	toss	wash	drag	walk.on.leaves

4. Exceptions: stems with non-final stress

There are a number of simple verbs (we count some 30 so far) with stems which end in an /*e*/, following a lenis consonant, that is, one of /*w,j,m,n,ŋ,ɣ,ɾ*/, forming a syllable which does not usually carry stress. It is very probable that the /*e*/ has been added rather recently and that most of the lenis consonants (except /*j*/ and in some cases /*w*/) developed from lenis realizations of the original morpheme-final consonants /*P,T,K*/ (see above section 2). The stress, then, remains on the former final syllable. Reduplication sheds an interesting light on this /e/: in consonant-final active verbs without such an */e/*, the segment is added once at the end of the reduplicated stem (*aj-ut* → *aj-ur-ur-e*); for active stems which already show the */e/* in the simple stem, the reduplicated form has the */e/* only once, again at the end (*o-wyg-e* → *o-wyk-wyg-e*). This suggests an analysis of the */e/* as a separate morph without meaning, i.e., a thematic vowel or similar unit.

[11] The postposition *kyty* 'for, to, DATIVE' has varying stress, frequently it is on the penultimate syllable. Specific conditions involve the person prefix or the number of syllables of a complement noun.

(17) Verbs ending in unstressed *[lenis]+e*

wej-mo'ege	*o-tige*	*o-wyge*	*o-waje*	*o-mỹje*	*o-zymane*	*o-tire*
3-produce	3-sit	3-finish	3-hang	3-wake.up	3-spin	3-leave

Apparently the same */e/* can be found with some forms of the monosyllabic verb *(t)ut(u)* 'come', in particular with the Imperative forms *j-ure* 'IMP.SING-come', *pej-jure* 'IMP.PLUR-come', contrasting with Indicative forms such as *aj-ut* '1-come'. There is one verb which occurs with both variants, with and without */e/*: *'awyku ~ 'awygetu* 'press'.

In addition to this major group with penultimate stress, there are a few other verbs which have an */ã/* as an additional final unstressed vowel. Especially in the case of the verb 'to gain weight', the consonant before the final vowel does not suggest the recent addition of just the vowel but at the possible addition of the whole syllable *-zã,* which also occurs in several mood suffixes of stative verbs. We present most of these verbs in (18).

(18) Further verbs with penultimate stress, ending in *-ã*

o-kangã	*o-kyr'azã*	*w-apungã*	*o-'atungã*	*o-pozã*
3-dry	3-gain.weight	3-mold	3-burn.down	3-to.be.overloaded

Again, reduplication data suggest that we are confronted with a separate morph */(z)ã/*, which is not part of the proper stem and hence does not carry stress.

As in the case of verbs, there is also a major group of substantives which have penultimate stress. They have in common a final syllable ending in *yt* (*/yT/*). In most cases the preceding consonant is also lenis, allowing for a similar hypothesis of the recent addition of an additional element,[12] but at least in one case, 'hen/rooster', there is a *fortis* consonant (oral occlusive) rather than the expected lenis consonant.

[12] Note that most substantives ending in *yt* designate plants or animals, and note also that the word for 'sperm' is *yt*, which may well be related to the semantics of living things, so one may suspect that we have here the relic of a sort of nominal classifier. But there are no other convincing hints of a system of nominal classification in Awetí (or in closely related Tupian languages), and most substantives designating plants or animals do not have that element. Another more plausible origin is the allomorph *ytu* (after consonants) of the suffix *tu* (see below), which derives substantives from stative verbs, with lenition of the final consonant: *tuwut* 'is big' – *tuwurytu* 'what or who is big', with loss of the final *u*.

(19) Substantive stems with penultimate stress ending in *yt*

pyringyt	*mokãjyt*	*takanyt*	*tamỹjyt*	*temiryt*
mocking.bird	macaúba	parrot.sp	crab	mangaba

apuryt	*jukwangyt*	*porywyt*	*nukakyt*
parrot.sp	urucum	costume	hen/rooster

This is one of the few cases where one can think of the benefit of orthographically marked stress (with a graphical accent), as there are also several regular substantives ending in *yt* (some even in *[lenis]+yt*) with stress on the last syllable.

(20) Substantives with regular final stress ending in *yt*

kujãkyt	*ekyt*	*tukyt*	*tywyt*	*kywyt*
girl	honey	salt	♂'s.younger.brother	♀'s.brother

There are a few other substantives or pronominal-like elements which also have irregular stress on the penultimate syllable. The first, designating a certain type of parrots, has been said to be a dialectal variant of *takanyt*, in (19) above. The third, designating the 'whole community' (of a village), has the final 'groupal' suffix *-za*.

(21) Further cases of nouns with penultimate stress

takarĩ	*momati*	*momatsaza*
parrot.sp	all(people)	all/community

There are a few adverbs which present exceptions to the general rule. A probable source for many are unstressed case suffixes (formerly analyzed as postpositions) *-wo* 'by, with, in' or *-pe* 'in, at' or the postposition *ti* 'from' which possibly fused with (now unknown) substantives or deictic words in the past. The word 'at night' presents another pattern, with a final *-ko* of unknown origin.[13]

(22) Adverbs with penultimate stress

kype	*nazãtiwo*	*ypytako*	*tatuti*
here	after.that	at.night	at.left

[13] Note that there is no substantive proper for 'night' in Awetí. This word too may have developed in a process analogous to that involving postpositions.

Similar cases are found among the postpositions, several of which are complex, formed of another postposition or a (relational) substantive which today often does not exist anymore, and of one of the above-cited general locative postpositions / case suffixes.[14] Interestingly, most or all postpositions with penultimate stress, even without any recognizable former second postposition, end in *-o*. Of all word classes, the postpositions probably show the highest percentage of penultimate stress.

(23) Postpositions with penultimate stress, ending in *-o*

ewizako	*pywo*	*'ywo*	*'apo*	*'ypywo*	*tetako*
after	inside.of	(going)with	above/on	close.to	parallel.to

There are also several particles of different categories with penultimate stress. All of these occur in some slot of the second position (or 'Wackernagel position'), that is, after the first major constituent of the clause (where also particles with final stress occur, see above). Most of them are disyllabic or formed of a simple particle with an additional first syllable *we-* or *wo-*, and most have a lenis consonant in the middle.

(24) Particles with penultimate stress

weti	*wene*	*wian*	*zanu*	*tene*	*wezanu*
ADVERTATIVE	still	temporarily	also	without.motive	again

5. Suffixes and their influence on stress

The majority of suffixes, inflectional as well as derivational, do not change the stress position, which remains on the last syllable of the stem. Of the inflectional suffixes, only one mood suffix and one allomorph of a verbal aspect suffix attract the stress, and both are disyllabic. In the case of derivational suffixes, class-changing suffixes usually do not affect the stress. However, there are stems which are formed by derivational suffixes which don't change the major class (noun, verb). These have the stress on the new last syllable (that is, on the derivational suffix).

We exemplify first 'regular' inflectional suffixes, beginning with verbal aspect (*-ju* and *-(z)oko*) in (25), verbal mood (*-(t)u* and *-aw*), in (26), and verbal negation (*-(y)ka*), in (28).[15] There is a rule of resyllabification, illustrated in (27), involving the mood suffix *-aw*. The stress position, in these

[14] In some cases, the substantive can still be elicited, but the form occurs almost always in connection with the postposition / case suffix. This is the case of *'ypy* 'region close to', in (23).

[15] The consonant-initial suffixes tend to fuse with final dental/palatal consonants /*T,j*/ <t,n,j>.

cases, may be on the final syllable of the word form, as the final syllable of the stem fused with the suffix. In (29) we show that even tri-syllabic combinations of affixes of both kinds still do not change the location of the stress.[16] In (25) and thereafter, we include some forms in the (unmarked) perfective indicative in order to illustrate rules of morphophonology.

(25) Inflectional verbal aspect suffixes *-ju* and *-(z)oko*: stress is on the stem

aj-eko	*o-kyt*	*aj-eko-ju*	*o-ky-ju*	*aj-eko-zoko*	*aj-atug-oko*
1-walk	3-fall(rain)	1-walk-PROG	3-fall(rain)-PROG	1-walk-IPVF	1-take.bath-IPVF

(26) Inflectional verbal mood suffixes *-(t)u* and *-aw*: stress is on the stem

it-eko-tu	*it-atuk-u*	*i-pemim-pu*	*it-atuk-aw*	*nã-pemim-paw*
1-walk-SUBJ	1-take.bath-SUBJ	1-surround-SUBJ	1-take.bath-GER	3-surround-GER

(27) Resyllabification with suffix *-aw*: last syllable of the stem fused with suffix

it-ekw-aw	*a-kyzy*	*i-kyz-aw*	*a-'api*	*nã-'apj-aw*	*a-pypẽ*	*nã-pypj-ãw*
1-walk-GER	1-wash	1-wash-GER	1-throw	1-throw-GER	1-sew	3-sew-GER

(28) Inflectional verbal negation suffix *-ka* / *-yka*: stress is on the stem

aj-eko-ka	*aj-atug-yka*	*a-tuw-oko-ka*
1-walk-NEG	1-take.bath-NEG	1-see-IPVF-NEG

(29) Combinations of verbal aspect and mood suffixes: stress remains on the stem

it-eko-ju-tu	*it-atug-oko-tu*	*it-eko-j-aw*	*it-atug-okw-aw*
1-walk-PROG-SUBJ	1-take.bath-IPFV-SUBJ	1-walk-PROG-GER	1-take.bath-IPFV-GER

Nominal inflection by suffixes in Awetí concerns semantic case only. No case suffix attracts stress.[17]

(30) Nominal case suffixes: stress is on the stem

inĩ-zan	*nã-to'otar'yw-an*	*motang-ywo*	*belẽj-ype*
hammock-ESS	3-friend-ESS	medicine-INST	Belém-LOC

16 Again, there are resyllabification rules by which vowels turn to glides or may be omitted at all. The latter also holds for the unstressed /*-e/* discussed around (17).

17 This property is one of the reasons to analyze *-(y)wo* and *-(y)pe* as suffixes rather than postpositions, because postpositions usually take the sentence accentuation inside the constituent of which they are the nucleus. The other reason is the allomorphy with an initial *y* after final consonants, not found on postpositions. In addition, neither element inflects for person, as do most postpositions.

There are only two exceptions to the rule that inflectional affixes do not affect the position of the stress: the disyllabic modal suffix -°*apan* (purposive) 'attracts' stress to its first syllable, as shown in (31), and the same holds for the allomorph -°*eju* of the progressive verbal aspect suffix, which occurs after one of the stem-final phonemes */P,K,w/*, exemplified in (32).[18]

(31) Purposive mood suffix -°*apan*: stress moves to the suffix

it-atuk-apan	*nã-pemim-papan*	*it-ekw-apan*
1-take.bath-PURP	3-surround-PURP	1-walk-PURP

(32) Progressive aspect suffix allomorph -°*eju*: stress moves to the suffix

aj-atuk-eju	*wej-pemim-peju*	*it-atuk-eju-tu*	*it-atuk-ej-aw*
1-take.bath-PROG	3-surround-PROG	1-take.bath-PROG-SUBJ	1-take.bath-PROG-SUBJ

With stative verbs, an allomorph *-eju* of the same aspect suffix occurs after any final consonant (*/P,K,w/* and also */T,j/*). This allomorph does not block lenition, and its behaviour as to stress position is unique: these word forms have two syllables which can be stressed, with the position in each occurrence depending on factors related to speaker, style and rhythm. In isolation, often both syllables receive high pitch. The two syllables are exactly the last of the stem and the syllable which has the *e* of the affix as its nucleus.

(33) Progressive aspect suffix allomorph *-eju* with stative verbs: two stress syllables

i-pilang-eju	*t-opetyj-eju*	*e-ta'og-eju*	*i-mẽpyr-eju*
3-red-PROG	3-sleepy-PROG	1-angry-PROG	3-child-PROG

Among the derivational suffixes, interestingly, those which change membership between the major word classes do not attract stress. Consider the examples for derivation of nouns from stative verbs (which usually denote properties) by suffix *-(y)tu* in (34) and for the different suffixes for

[18] Formulated formally in a more correct way: the word stress in word forms which contain these suffixes is on the syllable which is formed of a possible final consonant of the preceding stem and the initial vowel of one of these morphs. Rules of resyllabification again apply here. The abstract phoneme "°" only occurs at the beginning of these and a few other suffix morphs (such as */-°aw/*, cf. (26) and */-°u/*) and manifests itself phonetically and orthographically as a homorganic stop after nasals or glides, or by blocking lenition of preceding oral stops. */-°apan/* probably was formed from the derivational suffix (instrumental nominalizer, see below (35)) *-ap* and the essive case suffix *-(z)an*, as is indicated by the fact that the first syllable of the suffix is oral, despite the nasal second syllable. It appears that *-ju* and *-(z)an* and possibly some other suffixes in some instances may attract word stress to the *preceding* syllable.

derivation of nouns from active verbs in (35).[19] In both cases the derivational suffix can be added to a stem which is already followed by an aspectual suffix, another feature which makes these derivational suffixes look like inflectional suffixes.[20]

(34) Derivation stative verb to noun: stress remains unchanged

t-aty-tu	*i-pilang-ytu*	*t-opetyj-eju-tu*	*t-opetyj-ezoko-tu*
?-hurting-NR	?-red-NR	?-sleepy-PROG-NR	?-sleepy-IPVF-NR

(35) Derivation active verb to noun: stress remains unchanged

t-atuk-at	*nã-pemim-pap*	*te-po-kyz-ap*	*t-atug-okw-at*
?-take.bath-AGNR	3-surround-INSTNR	REFL-hand-wash-INSTNR	?-take.bath-IPVF-AGNR
who takes a bath	trap (for it/him)	hand soap	who usually bathes

On the other hand, derivational suffixes which do not change membership between the major word classes do attract stress. Consider the examples for derivation of active intransitive (*-'at*) and transitive (*-ka*) verbs from stative verbs in (36) and for derivation of transitive verbs from transitive verbs (*-(t)ukat*) in (37). There are also verbal suffixes which do not change word class at all but add a semantic element of 'wanting' (*-tej*, *-tut*), in (38). For nouns, there are the suffixes for 'nominal tense', viz. 'former' (*-(p)ut*) and 'future' (*-(z)ã'jap*), which we analyze as derivational (without change of word class), in (39).

(36) Derivation of active verbs from stative verbs: stress moves to the suffix

i-lole	*o-lole-'at*	*o-lole-'a-ju*	*wej-lole-ka*	*wej-lole-ka-ka*
3-bad	3-bad-GET	3-bad-GET-PROG	3-bad-MAKE	3-bad-MAKE-NEG
is bad	got bad	is breaking down	spoiled (sth.)	did not spoil (sth.)

(37) Derivation of transitive verbs from transitive verbs: stress moves to the suffix

a-mỹje	*a-mo-mỹje*	*a-mo-mỹje-tukat*	*wej-lole-ka-tukat*
1-wake.up	1-CAUS-wake.up	1-CAUS-wake.up-caus	3-bad-MAKE-CAUS
I woke up	I woke sb. up	I made sb. wake sb. up	I made sb. spoil sth.

19 The verb to noun suffixes *-ap* 'INSTNR' and *-at* 'AGNR' are phonologically */-°aP/* and */-°aT/*, and they trigger the same rules of resyllabification as does *-aw*, see (27) above.

20 As mentioned before, not to change the position of the stress is a property also of the nominal 'groupal' suffix *-za*, which does not, however, change the part of speech.

(38) Semantic derivation of active verbs: stress moves to the suffix

a-'u	*a-'u-tej-ju*	*aj-atuk-tur-yka*	*a-tup-tu-ju*
1-eat	1-eat-WANT-PROG	1-take.bath-WANT-NEG	1-see-WANT-PROG
I ate	I want to eat (I am hungry)	I did not want to take. a bath	I want to see sth.

(39) Semantic derivation of nouns ('nominal tense'): stress moves to the suffix

nã-pepo-put	*nã-kang-ut*	*n-uwyg-ut*	*inĩ-zan'jap*
3-wing-FORMER	3-bone-FORMER	3-blood-FORMER	hammock-FUTURE
(his) former wing	(his) former bone	(his) former blood	a future hammock

There is one last nominal suffix which also may also be considered derivational, although its function is to negate, and often to negate a predicative noun in equational sentences. The stress of word forms with this suffix is mainly on the last syllable of the original stem, but depending on the speaker and in order to stress the negation or for other rhetorical factors, it may fall on the last stem of the affix. Consider the examples in (40).

(40) Nominal negation: stress on original stem and secondary stress on the suffix

inĩ-e'ym	*awyty-za-e'ym*	*morekwar-e'ym*
hammock-NEG	Awetí-GRP-NEG	chief-NEG
no hammock	not an Awetí	not a chief

6. Acoustic correlates of stress in single word forms: methodology

In the limited space of this paper I cannot present a conclusive study of the acoustic manifestation of stress in Awetí. In this section I will, however, give first general results of an acoustic phonetic comparison of stressed syllables with syllables that do not carry stress in single Awetí words. I do so with respect to three properties: intensity, duration and pitch. In the next section I will give first preliminary results of observations of word forms in syntactic contexts. This study was carried out by me alone during one field trip (2008).

For the study of single word forms, I choose 21 words (or two-word phrases which are thought to have only one stress[21]), mostly forms of

[21] A domain of stress that exceeds the single word form has been claimed for several Tupí-Guaranían languages, e.g. for Mbyá-Guarani (Dooley 1982: 321), for Urubu-Ka'apór (Kakumasu 1986: 401), and for Chiriguano and other languages (Dietrich 1986). For Émérillon, Gordon and Rose (2006) discuss the domain as the size of (or perhaps smaller than) the Intonation Unit or Intonation Phrase. This question of course depends on theoretical assumptions; with the conceptions outlined in section 3, I try to capture the relatedness of stress and syntactic accentuation, which naturally may have intonation units larger than the word as its domain.

substantives. They were selected so that different morphological and phonological situations were represented, from simple disyllabic nouns up to word forms consisting of five syllables. Some were composed of two nominal stems, others of a nominal stem plus different kinds of affixes, and one is followed by a postposition. Most (viz. 15) word forms have final stress, the remaining penultimate (5) or in one case antepenultimate stress. The word forms and their distinctive properties are given in (41).

(41) The twenty-one words / small phrases studied

> *tezyk* 'sweet potato' [simple, all oral, final */K/*]; *tsãpit* 'pepper' [simple, first syllable nasal, final */T/*]; *tsãpizan* 'as pepper' [essive case]; *tsãpit eze* 'with pepper' [with postposition]; *tsãpirywo* 'by pepper' [instrumental case, antepenultimate stress]; *tsãpi'jyt* 'small pepper' [composed with monosyllabic property stem]; *tsãpirwatu* 'big pepper' [composed with bisyllabic property stem]; *tsãpirut* 'former pepper' [derivation 'nominal tense']; *mani'yp* 'manioc plant' [composed, first element nasal, final */P/*]; *peti'yp* 'pequi tree' [composed first element oral, final */P/*]; *peti'a* 'pequi fruit' [composed, oral, final open syllable]; *peti'a'ỹj* 'pequi nut' [composed of three stems, final nasal syllable and glide]; *peti'azỹ* 'pequi spine' [composed, final nasal syllable]; *mor'apot* 'pequi pit' [lexicalized composition]; *marirawozy* 'small pepper' [lexicalized composition, open final syllable]; *tserere'ekyt* 'honey of European bee' [composed, total five syllables]; *takãnyt* 'parrot' [simple but penultimate stress with lenis-initial final syllable]; *nukakyt* 'hen / rooster' [simple but penultimate stress with fortis-initial final syllable]; *ypytako* '(at) night' [simple adverb, penultimate stress with open final syllable]; *nãmimpap* 'place to hide' [nominalization, nasal stressed syllable]; *tepokyzap* 'soap' (lit: 'instrument to wash oneselve's hand') [composition and nominalization, oral].

The rationale for this selection is that if stress is indeed an autonomous feature, it should be acoustically identifiable independently of the segmental and morphological composition of word forms and hence, across all these different forms. Impressionistically, stress appears to be rather uniform in Awetí. Of course it is in principal possible that stress manifests itself differently in different environments and even probable that some features influence its acoustic correlates in some way. Still, in this limited explorative study it was impossible to control all possible factors; the goal is rather to pinpoint and substantiate the most stable and general correlates of stress.

With the same objective, I also analyze six analogous verb forms with different inflectional suffixes for each of five different verbs, read in isolation by one speaker.[22] Again, the verbs were chosen so as to cover

[22] One form, *nãkyzytu*, was missing in the recordings; therefore we have in fact only 29 verb forms.

different types with respect to open / closed syllables, nasalization and morphophonemics;[23] see the table in (42).

(42) The six verb forms of five verbs studied

Stem:	*kwaluk*	*kỹj*	*kyzy*	*man*	*mim*
Meaning:	urinate	kill, hurt	wash	surround	hide, steal
ABSOLUTE	*kwaluku*	*tokỹjtu*	*(nãkyzytu)*	*nãmantu*	*nãmimpu*
1.SG. PFV	*akwaluk*	*akỹj*	*akyzy*	*aman*	*amim*
2.SG. PROG	*ekwalukeju*	*ekỹju*	*ekyzyju*	*emanju*	*emimpeju*
3. IPFV	*okwalugoko*	*wejkỹjoko*	*wejkyzyzoko*	*wejmanoko*	*wejmimoko*
IMP.SG. + *me*	*ikwaluk nge*	*jokỹj jẽ*	*jokyzy me*	*joman ne*	*jomim me*
2.SG. GER	*ekwalukaw*	*ekỹjtaw*	*ekyzaw*	*emantaw*	*emimpaw*

Two recordings each with two male speakers were made, "A", about 20 years of age, and "W", about 32. Both men are literate and, like most Awetí, bilingual in Awetí and Kamayurá; both also speak Portuguese well. For all recordings I used a Zoom H4n solid state audio recorder with a head worn Shure WH20-XLR microphone in order to minimise external noise and keep the distance between mouth and microphone as constant as possible. For the 21 word forms / phrases in (41), in one recording each speaker uttered the word forms in isolation (answering to the Portuguese equivalent) and in the other the word was embedded in a carrier sentence. I also asked one of the speakers (A) to read the 21 words one after another; I believe that the result allows identifying certain effects of an overall enumeration intonation.

For each recording, I used the Praat computer program (Boersma and Weenink 2009) to first identify and label the phonetic segments and syllables and then to perform a variety of measurements: the medium intensity and intensity peak of all vowels; the duration of whole phonetic syllables and of vowels; and five different pitch values (see below) for the vowels in all syllables, in order to identify regularities which might be associated with the position of stress. To guarantee homogeneous results, the measurements were automated with the help of Praat scripts. The

[23] For instance, fusion of the progressive suffix *-ju* with *kỹj* and *man*, but not *kwaluk* and *mim*; one with a final open syllable and one with each of the final consonants */P,T,K/* and one glide.

resulting tables were imported to a spreadsheet program for further calculation of mean values and derivations etc. The sound-files, Praat scripts and resulting tables can be accessed in the Awetí archive (see 'Awetí Documentation' in the references) for inspection and further calculations.

There are admittedly several limitations and potential or actual difficulties with this approach. First of all, the sample is rather small; in particular data from more speakers belonging to different age and gender groups are needed.[24] As for relying on words read in isolation, there is the risk of intonation of enumeration intonation, e.g., of an unnatural duration and an overall enumeration pitch contour, in particular in the case of the different verb forms read one after another.[25] Also, I did not systematically take vowel quality into account, although it is known that in many languages duration, intensity and pitch may vary (independently from stress and accents) according to the degree of openness and other vowel quality features.

Other problems are of a general methodological nature: what exactly is to be measured? In the case of intensity, one can consider, for instance, the mean value for the vowel or the value at a specific point (e.g., in the centre) of the vowel. I measured the mean value and the maximum value, in order to be able to compare the results and identify which of these two factors shows more robust correlation with stress. In the case of duration, one can measure the whole syllable or only the vowel. Again, for the same reasons, I measured both.[26]

It might also be that there is influence of the syllable structure and of the property of segments (oral vs. nasal, initial stop versus continuant, final unreleased consonants) on our measurements. As explained above, despite awareness of these factors when choosing the word forms, at this stage I did not perform any systematic attempt at isolating and controlling them, opting instead for as diverse a sample as possible.

In the case of the pitch measurements, one can for instance consider measuring the medium value, the highest (or lowest) point, the point at the temporal middle of the vowel or the point with greatest intensity. Also, for

---

24 For Emérillon, Gordon and Rose (2006) find evidence that the manifestation of stress varies from speaker to speaker.

25 However, comparison with the list read with enumeration intonation indicates that this did not occur.

26 In the case of measuring the syllables, there are also general questions about the syllable frontier, in particular in the case of prenasalized stops which are phonologically part of one consonant. We considered a phonetic division where the nasal part belongs to the first syllable. We also did not include final nasal or oral stops, which we consider extra-syllabic and which may also be difficult to measure in the case of unreleased stops.

analyzing pitch, pitch contours inside the vowel or syllables may well be important, and it may equally be relevant to establish an overall pitch contour for the word form as a whole, and not just to compare the isolated syllables. Therefore, I measured the maximum pitch and the mean pitch of all vowels (note that I did not consider glides and voiced consonants which often begin or continue the pitch pattern of the syllable), and determined a basic pitch contour by measuring the pitch at three points: at 15%, 50% and 85% of its duration. I did not choose the very beginning or end of the vowel in order to minimize influence of transition effects (and often no value is determinable by the formulae). I then determined an overall rise ("r") or fall ("f") comparing the height of the first and last point. If the difference was bigger than 3.5%, I considered the rise or fall to be strong ("R" or "F"). The inner pitch contour was determined by comparing the central point with the first and last point – if there was a difference bigger than 2%, I considered this a rise (/) or fall (\), and otherwise it was defined as a constant pitch (–). With this methodology, I obtained results such as "R//" (strong raising pitch contour in both halves), "f–\" (weak fall with constant pitch in the first half), or "r/\" (raising and then falling pitch contour which ends higher than it started).

7. Acoustic correlates of stress in single word forms: results

Intensity

Although far from conclusive, the observation and measurements of the intensity of the vowels of the 21 words (and the 29 verb forms) allow formulating some general tendencies. I found that the mean as well as the maximum intensity for the vowels vary rather little within each of the different utterances, independently of the type of utterance.[27] There are generally no different results between the medium and the maximum measures. (In only a few cases a maximum of intensity is found outside the vowels.)

As said above, for more robust results the measurements would have to take vowel quality into account. Many of the word forms have a high vowel in the stressed syllable, and this may partly account for cases where the highest intensity is not found on the stressed syllable, as high vowels cross-linguistically tend to have less intensity than low ones.

[27] For each word, I calculated the mean intensity (in decibels) of all vowels and their mean absolute deviation. Dividing the latter by the first, I get the relative mean deviation (best expressed in percent). This value is almost always below 3%. The mean value of all mean deviations in percent is close to 2.4%, which means that the intensity of a given vowel is typically only 2.4% higher or lower than the average vowel intensity in the same utterance. These values are very similar for both, the maximum intensity value and the mean intensity values for each vowel.

However, observation of the tables generated with the help of Praat did not indicate any clear correlation, and the use of statistical methods that control the influence of vowel quality go beyond the scope of this study. Similar remarks hold for the results for duration and pitch.

Given the high uniformity of intensity among the vowels in Awetí words, it would generally appear difficult to single out a specific syllable by its intensity. And indeed, neither the highest mean value for the vowel nor the absolute peak fall regularly on the syllable that carries stress.[28] In some of the lists this happens even well below chance. Often the stress syllable even has values below the medium value for all syllables of the uttered word.

Therefore, within the limited scope of this study, I do not see any possibility to use intensity as a criterion for identifying the stress syllable in these words. It might be of significance, however, at least for identifying feet and the speech rhythm of Awetí, that for single words there seems to be a preference for the vowel with highest intensity to be in an odd-numbered syllable (mostly the first, sometimes the third, syllable).[29] The syllable with the lowest maximum intensity is also significantly more often on an even-numbered syllable than on an odd-numbered one. On the other hand, I do not observe a clear general pattern of alternating strong and weak syllables in the utterances. Therefore, and for the low variation of intensity in general, I hesitate to postulate, say, a preference for trochaic (intensity) feet in Awetí.

Duration

There is no phonological segmental length in Awetí. Even when two identical vowels meet for morphological reasons, the result is not distinguishable from a syllable of average duration (as if one of the two vowels was deleted). A similar situation holds for consonants. But still, the phonetic length (relative duration) of the syllables, or that of their nuclei (the vowels), may be significant in identifying the syllable which carries the stress.

I measured the duration of the vowel and that of the syllable as a whole for each syllable in the sample utterances. By observing the measurements, it seems clear that the influence of different segment types

---

28 The vowel of the stress syllable has the maximum of intensity in about two third of the cases only in the case of the enumeration-like readings. With the words spoken in isolation this happened only in 29%, and with carrier sentences the frequency is even only 21% of all cases.

29 The vowel with maximum intensity is in three-fourth of the utterances in an odd-numbered syllable, for one speaker in the case of utterances with carrier sentence even in 90% of the utterances. Interestingly, here the enumeration-readings score low, possibly because in these utterances intensity is used to reinforce highlighting of the stressed syllable.

(nasals, lenis consonants vs. stops, vs. glides etc.) has to be studied more thoroughly before I can advance conclusive statements about the significance of the relative duration, for these seem to have considerable influence, in particular on syllable length.[30] Therefore, from here on I focus on vowel length only, although probably this, too, is influenced by the quality of the vowel and by the adjacent segments.

In contrast to the intensity measures, the variability of duration is rather high (average mean deviation of 27% for vowel duration[31]). It is remarkable that in the enumeration reading, all stress-bearing syllables contain also the longest vowel of the word, so in this case duration seems indeed to be used to mark, or reinforce the marking of, the stress location. Therefore vowel length might indeed be a significant factor, even if a large part of the variation is dependent on the segmental structure rather than stress position.

This finding is supported by the observation that generally the vowel in the stress syllable is longer (in the average 29% longer[32]) than the mean duration of vowels in the word utterance. Nevertheless, it would appear that vowel duration cannot be the decisive factor in determining the stress syllable. In one third of the cases the stress-bearing syllable does *not* have the vowel with longest duration, which by first inspection cannot be related to some other obvious factor (such as vowel quality). Also, in several cases the duration of the vowel in the stress syllable is even below the mean value for all vowels of the word. In sum, the simple equation "stress syllable = longest vowel" does not hold true, and duration seems not be the most important (let alone the only) criterion for identifying stress.

Pitch

The results for the contribution of the (relative) pitch to the identification of the stress syllable must, too, still be considered preliminary. As long as I have not clearly identified the existing syntactic

---

30 In the case of open final syllables, it is notoriously difficult to identify the endpoint of the vowel; I nevertheless did not exclude such words from the data set, using Praat's intensity curve for orientation.

31 Again, for each word, I calculated the mean duration of all vowels and their mean absolute deviation. Dividing the latter by the first, I get the relative mean deviation (best expressed in percent). The average value of all mean deviations in percent is close to 27%, which means that the duration of a given vowel is typically 27% longer or shorter than the average vowel duration in the same utterance.

32 I subtracted the mean vowel duration of an utterance from the duration of the stressed vowel and divided this value by the mean vowel duration. If the duration of the stressed vowel is longer (as was usually the case), this value is positive and expresses its longer (if negative, shorter) relative duration (best expressed in percent). The mean value for all utterances is 29%, that is, stressed vowels are typically significantly longer than the mean duration of all vowels in the same utterance, but not much higher than the average mean deviation of length (27%).

accents (prosodic – in particular intonation – patterns of syntactic accentuation) and their function, I cannot be sure to correctly interpret the pitch contours found on the isolated word forms.

Nevertheless, in many non-tonal languages pitch is the main factor for the overall sentence intonation ('syntactic accentuation' or 'sentence stress') pattern, and as I explained above, I conceive stress as the potential for sentence accentuation and therefore expect that pitch may be decisive for stress as well, even more so as duration and intensity seem unable to reliably identify the stress-bearing syllable. Pitch has been claimed to be a primary correlate of stress at least for Kamaiurá (Seki 2000: 419) and for Mbya-Guarani (Dooley 1982: 321). In fact, the same may hold for several other Tupí-Guaranían languages since studies of prosodic features including the acoustic correlates of stress are not available for most of them.

In any case, variation of fundamental frequency f0 in Awetí, which is not a tone language, is in a range which permits clear patterns.[33] At first sight, however, the results for pitch seem to be similar to those for duration – in only around 60% of the uttered forms the vowel with the highest mean pitch is in the stress-bearing syllable, even in the case of the reading with enumeration intonation. The matches for the vowel with the highest maximum pitch are only slightly better, around 64%.

But when one inspects the 36% 'deviant' uttered word forms (where the vowel with highest mean or maximum pitch is not in the stress syllable, cf. Tables 1&2 in the appendix), there are almost always regular explanations for the deviation. This is most clearly the case for the list reading with enumeration intonation: Here the highest pitch is simply almost always on the last syllable; only in the last uttered form the last syllable has (extremely) low pitch. This obviously allows attributing the deviations to the enumeration intonation.[34]

Also the deviations in the case of the set of verb forms are very regular. Here the explanation lies not, however, in enumeration intonation (the last syllable only has highest pitch when it is the stress syllable), but in the composition of the forms. One case consists of the utterances with the

---

33 The average mean deviation (calculated in the same manner as above for intensity and duration) within uttered words measuring pitch peaks in vowels is 7%. The value for the mean deviation within uttered words, measuring the mean pitch for each vowel, is identically 7%.

34 There are two further forms with highest pitch before the final syllable. In one case, *peti'yp*, this seems to be a spurious effect of creaky voice (and vowel quality) due to the following glottal stop. The other case is the third-to-last uttered word, with highest pitch on the penultimate syllable, which is the stress syllable. This may indicate a break of the enumeration pattern, and a return to 'natural' intonation.

final enclitic particle *me*, which is conspicuous for its consistent association with high pitch in natural discourse. If I do not consider these particle occurrences, the highest pitch is, as expected, on the preceding (the stress-bearing) syllable. Secondly, all imperfective forms (with the suffix *-(z)oko*) have highest (mean and maximum) pitch on the syllable following the stress syllable (which contains the first *o* of the suffix). The second highest pitch values are on the preceding (the stress-bearing) syllable.

Despite the higher pitch, it would not be correct to assign stress in these cases to this first syllable of the suffix. This becomes clearer when one considers the internal and overall pitch contour. It can be observed that after one or several syllables with low, and usually falling, pitch, there is a rise of pitch on the stress syllable. In the case of the suffix *-(z)oko* (and some other suffixes), this rising movement seems to be continued for a while on the first suffix syllable, but this syllable usually has an overall falling pitch contour (that is, the shape "f/\"), albeit on a high level (*cf*. Figures 2 & 3 in the appendix). This pattern holds for most 'deviant' utterances.

Indeed, the internal pitch contour of the vowels (including adjacent syllables), in combination with their pitch level, seems to be the most reliable indication of the stress syllable in Awetí. A rising pitch, almost always after one or several syllables with falling, and overall low, pitch, is found in 100% of the utterances of word forms in carrier sentences with both speakers, notwithstanding that the absolute highest maximum or mean pitch may happen to be on another vowel. The same holds for the enumeration-like reading (even for words with non-final stress), except for the last word, which has low and falling pitch on the last (and stress-bearing) syllable. (This is probably the indication of the end of the enumeration.)

In the case of the simple words with penultimate stress *takãnyt*, *nukakyt*, *ypytako*, and also in the case of *tsãpizan*, the last syllable has higher pitch with speaker A (not with speaker W), but the raising of the pitch starts clearly on the stress syllable, and the final syllables have usually an overall falling contour. When read as a list (enumeration intonation), the same words even have rising pitch on the last syllables of these words (and also in the case of *tsãpirywo*),[35] but again, the stress

[35] It seems that both speakers, when uttering the words in isolation, treat the postposition *eze* as if it was a suffix, assigning the main stress on the substantive (with a secondary raise on the final syllable with one speaker). In carrier sentences, however, the difference of suffix and postposition is clear for both speakers, with the highest and raising pitch on the final syllable of the postposition (and a secondary raising syllable in the substantive with the other speaker). This behaviour contributes to making postpositions and suffixes difficult to distinguish in Awetí.

syllable is clearly marked by being the first syllable with rising pitch after a syllable or syllables with low (and falling) pitch contour. See Tables 1&2 and Figures 1&2 in the appendices for data and illustration, and the complete data in the Awetí Archive.

Using these criteria (first syllable with higher and rising pitch after syllables with lower and usually falling pitch) for the identification of the stress syllable, one get satisfactory results also for most word forms uttered in isolation. There are only four word utterances of speaker A and two of speaker W, not concerning the same words, which show a clearly different, almost inverted, pattern: the stress syllable vowel has the lowest overall mean pitch, and a falling pitch contour. In these word utterances, the preceding syllables are higher, but have usually also falling pitch.[36] I consider these utterances to be instances of the manifestation of a different intonation pattern, that is, another syntactic accent (similar to that which marks the end of an enumeration). The exact shape and function of this syntactic accent have to be understood better; but it seems clear that the stress syllable indeed bears a syntactic accent, marked in this case by overall lowest pitch. Note that with carrier sentences this intonation pattern does not occur in our sample.[37]

Although these findings are promising, it must be stressed once more that it would be precipitate to conclude that the correlation of stress in Awetí has been reliably identified. Deeper studies with a much larger data basis, taking into account factors such as in particular vowel quality and applying standard statistical methods need to be carried out. Before that, these results are not much more than well-founded working hypotheses.

8. Acoustic correlates of stress for word forms in context

It is to be expected that the patterns of stress manifestation change considerably when the words are uttered in different syntactic environments. For this explorative study, I observe 21 utterances by each of the two speakers. In each, the word *pira'yt* ‘fish’ occurs in a different context – as subject, object, complement of postpositions, or as a predicate – and in different positions (sentence-initially and medially). Often

[36] Space does not allow to show more than one example here: speaker A, *tsãpirut* in isolation, has the values 123.5Hz & F– on the first, 125Hz & F-\ on the second and 106.9Hz & F\\ on the third, stressed, syllable.

[37] There are still some four forms spoken in isolation by one speaker which do not in all aspects reflect the marking of the stress syllable – usually because of an overall falling pitch contour on the stress vowel. These cases may be explainable by observing the morphological composition and the behaviour of adjacent glides and nasals, the effects of which have not been taken into account in this study.

sentences differ only in the occurrence of the adverb *mimõ* ‘yesterday’ in first position (so that *pira’yt* comes in non-first position) or one of the final particles *me* or *a’yn*, which do not change the proposition nor the sentence type. There are also occurrences of the negated form *pira’yryka* ‘(there are) no fish’, and the last three phrases are questions.

(43) The twenty-one small phrases containing ‘*pira’yt*’ studied

> (1) *pira’yt opotpore a’yn* ‘the fish jumped’; (2) *mimõ pira’yt potporetu a’yn* ‘yesterday the fish jumped’; (3) *pira’yt ologe a’yn* ‘the fish escaped’; (4) *mimõ pira’yt ologetu a’yn* ‘yesterday the fish escaped’; (5) *an pira’yryka* ‘there are no fish’; (6) *mimõ an pira’yryka me* ‘yesterday there were no fish’; (7) *mimõ an pira’yryka a’yn* (ditto); (8) *a’ywõju pira’yt* ‘I shoot fish’; (9) *mimõ a’ywõju pira’yt* ‘yesterday I shot fish’; (10) *mimõ a’ywõju pira’yt ne* (ditto); (11) *mimõ a’ywõju pira’yt a’yn* (ditto); (12) *oto pira’yt kyty* ‘he went for fish’; (13) *pira’yt kyty oto a’yn* (ditto); (14) *mimõ pira’yt kyty nãtotu* ‘yesterday he went for fish’; (13) *mopaza wejmoto tu’umytu pira’yt kyty* ‘the shamans give pequi pit to the fish’; (14) *mopaza wejmoto tu’umytu pira’yt kyty a’yn* (ditto); (15) *mopaza wejmoto tu’umytu pira’yt kyty me* (ditto); (16) *pira’yt papuwo kajkar’utejtu* ‘when the fish runs out we are hungry’; (17) *wan pira’yt?* ‘is there any fish?’; (18) *pira’yt ’ekỹj?* ‘did you kill fish’; (19) *’ekỹj pira’yt ne?* (ditto).

From the two recordings, I isolated the occurrences of *pira’yt* (or *pira’yryka*) and took the same measurements as before for the single word forms: mean and maximum intensity of the vowels, duration of syllables and vowels, and maximum and mean f0 as well as f0 at 15%, 50% and 85% (by duration) of the vowel.

The rationale for this procedure was to fix this time the phonological and morphological composition of the word in focus and change only the syntactic environment by as many factors as I was able to think of.

In what follows, I carry out the same analyses as before in order to see which of the characteristics change in different syntactic and intonation environment. Of course, again, as long as I have not identified the different syntactic intonation patterns, our observations may be incomplete or even mistaken in some details.

Intensity and duration

Observing the intensity in the 42 utterances of forms of the word ‘fish’ in different syntactic contexts, there is again surprisingly little variation between the three (or five) syllables; on average, the maximum intensity in the vowels deviates by only 2.4% from the mean value. This

again seems to make marking of any syllable by intensity not very plausible. Even stronger evidence is that only in one utterance does the stress syllable vowel have the highest maximum of intensity of all syllables in the same word form.

There is, on the contrary, a robust tendency (in 88% of all 42 utterances) for the maximum intensity to be in the second syllable, independent of the context, including at the beginning of the sentences (being evidence against a speculative trochaic rhythmic preference in Awetí). I do not consider a hypothetically possible rule such as "the stress syllable is that after the syllable with highest intensity", which seems rather improbable and should have had at least some effect in the utterances of the single word forms.

The duration of the vowels in utterances of *pira'yt* in different contexts is also not consistently associated with stress – only 55% of the longest vowels occur in the stress-bearing syllable. Even in cases where the longest vowels does occur there, this is not necessarily an effect of the stress position and may well be, for instance, a side effect of a general tendency of the vowels to become longer and longer from syllable to syllable.[38] There are some coincidences in the distributions of longer and shorter pronunciations of vowels between the two speakers which also point to an influence of the wider environment, which again may have different reasons (rhythm, sentence intonation, etc.).

Pitch

The measurements of pitch values in the utterances of *pira'yt* in different contexts confirm the findings from the study of utterances of single words reported above, and allow a refining of them in some aspects. Again, this study needs refinements, for instance, the position of the target word in the phrase has to be taken into account.

As before, it would be naïve to expect the highest maximum or mean pitch regularly to occur in the stress syllable. Not surprisingly, this is even less often the case in the context utterances than for the isolated forms, for one speaker (A) in just 29% of the cases. This speaker has remarkably often a high pitch in the first syllable – but in all these utterances, the pitch on that high first syllable is clearly falling. A falling

38 The first syllable has in all cases the shortest vowel, which may be due to its vowel quality or similar reasons.

pitch contour, however, is usually incompatible with being a stress-bearing syllable in Awetí if the results of the preceding section are correct.

In turn, the stress-bearing syllable is again consistently associated with a raising pitch contour after overall lower, and falling, pitches on the preceding vowel or vowels. As it turns out, the low and falling pitch contour on the preceding syllable is possibly the most stable correlate of stress in Awetí. See Table 3 and Figure 3 in the appendices for data and illustration.

It can also be observed that the negative suffix *-yka* behaves similarly to *-(z)oko*, with first a higher pitch than that of the preceding (stress-bearing) syllable, but having itself generally an overall falling pitch contour. Only the particle *me* is again almost always carrying sentence-final high (and rising) pitch.

The utterances of questions are interesting, in particular those where the word *pira'yt* is in final position or followed only by *me*. Here, we have a clearly different sentence intonation: questions seem to require a final falling pitch contour in Awetí. When the stress syllable is the last of the whole utterance, both speakers pronounce a clear rise-fall on the notably longer final syllable. When the stress syllable is followed by *me* in a question, this particle has a falling pitch contour, which with speaker W begins already on the vowel of the preceding (stressed) syllable, while the speaker A maintains a raising contour on the stress syllable.

There is only one group of utterances where the syntactic context indeed changes the behaviour of the stress-bearing syllable: when the word is followed by the postposition *kyty*. In utterances of these sentences, the final syllable regularly does not have a significantly higher pitch than the preceding syllab le, and even more significantly, it does not show a clear rising pitch contour.[39] We believe that in these sentences the word *pira'yt* is not highlighted at all, and that therefore its final syllable does not bear any syntactic accent. Instead, the accentuation falls on the first syllable of the postposition. This illustrates that the stress only entails the capacity of bearing a syntactic accent. Depending on the context, this potential property does not surface, as in these cases before this postposition.[40]

---

[39] The contour of the vowel in the final syllable of *pira'yt* may still be more or less steady and may even have a minor overall rising, as often is the case with speaker A, or an initial rising phase, as happens in several instances with speaker W.

[40] Still, note that the preceding syllables *pi* and in particular *ra* have consistently a falling pitch contour.

9. Conclusion

In the first part of this contribution, we demonstrated that stress in Awetí usually falls on the last syllable of the stem in simple words, with some exceptions which in turn mostly show certain regular patterns. This general rule is still valid when inflectional suffixes are added, again with a few exceptions. Derivational affixes generally do not change the stress position if they cause a change of the major word class, but several derivational affixes which change the verb type or valency or are purely semantic do attract the stress. This is a pattern which falls somewhere between the two types of Tupí-Guaranían languages distinguished by Gordon and Rose (2006): "In many languages, stress is bound by the word and may fall on suffixes (Urubu-Ka'apór, Anambé, Kayabí, Yuki, Guarayo, Avá-Canoeiro). In other languages (Parintintin, Tapirapé, Juma, Tembé, Parakanã), stress is fixed on the root even when followed by suffixes, indicating that the domain of stress is the root." (cf. footnote 4).

In the second part we offered an explorative acoustic-phonetic study of the acoustic correlates of stress in Awetí, studying utterances of single word forms and of one word in different contexts. Intensity seems to be rather uniform among the syllables in words and sentences in Awetí; it cannot be clearly related with word stress (or sentence accent) at all. Duration interacts in some way with stress but seems more strongly determined by other factors. It seems therefore to be insufficient for the identification of the stress-bearing syllable.

Our analysis of the pitch contour of single words and words in context suggests that pitch is the most important feature for identifying the stress syllable in Awetí words and phrases. The stress syllable does not necessarily have the overall highest pitch, but if it bears syntactic accentuation at all, it almost always has a significantly higher pitch than the preceding syllable(s). More importantly, it has generally a clearly rising pitch contour while the preceding (and usually the following) syllables have an overall falling pitch contour, in particular the immediately preceding syllable. Exceptions to this general rule are easily captured by rules which may refer to the morphological composition of the word, to the word which follows syntactically, and in some cases to the sentence type.

Although certainly more detailed and methodologically more sophisticated studies with a larger corpus and controlling of factors such as vowel quality will be necessary to corroborate (or change) these first results, I hope that this study has demonstrated the importance of taking

not only the maximum or mean pitch of syllables into account (as do Gordon and Rose 2006 for Émérillon), but crucially also the pitch contour of the stress-bearing and surrounding syllables.

Abbreviations

♀=woman (speaking); ♂=man (speaking); 1=first person singular; 12=first person plural inclusive; 13=first person plural exclusive; 2=second person singular; 23=person second plural; 3=third person; AGNR=agent nominalizer; CAUS=causative (derivation); 'DEF'=comparable to 'definite'; DIST=distant from; ESS=essive case; GER=gerund (mood); GRP=groupal; IMP=imperative; 'INDEF'=comparable to 'indefinite'; INST=instrumental case; INSTNR=instrumental nominalizer; IPFV=imperfective aspect; LOC= locative case; NEG=negative; NR=nominalizer; PL=plural; PROG=progressive aspect; PROX=close to; PURP=purposive (mood); REFL=reflexive voice; SING=singular; SUBJ= subjunctive mood.

References

ALMEIDA, Antonio, Irmãzinhas de Jesus & de PAULA, Luis Gouvea
1983 *A língua tapirapé*. Rio de Janeiro: Biblioteca Reprográfica Xerox.

Awetí Language Documentation Project (DOBES, 2001-2006)
2006 *A Documentation of the Awetí Language and Aspects of the Awetí Culture*. By Drude S. (principal researcher), Reiter S. (researcher), Lieb H.-H. (project director), with the assistance of Waranaku Awetí, Awajatu Awetí, Yakumin Awetí, Tawyjat Awetí, Parawajru Awetí, Su Xiaoquin, E.-M. Rößler, and others. Max Planck Institut. Online at: http://www.mpi.nl/DOBES/projects/aweti http://corpus1.mpi.nl/ds/imdi_browser/ > DoBeS Archive > Aweti

BARBOSA, José Natal
1993 Contribuição à análise fonológica do Suruí do Tocantins. Master's Thesis. Universidade de Brasília. Instituto de Letras.

BOERSMA, Paul & WEENINK, David
2009 Praat: doing phonetics by computer. Amsterdam: Phonetic Sciences, University of Amsterdam. Computer program, version 5.1. Available at <http://www.praat.org>.

BOLINGER, Dwight L.
1958 A theory of pitch accent in English. *Word 14*: 109-49.

DIETRICH, Wolf
1986 *El Idioma Chiriguano*. Madrid: Instituto de Cooperación Iberoamericano.
1990 *More evidence for an internal classification of Tupí-Guaraní languages*, Indiana, Beiheft 12, Berlin: Gebr. Mann Verlag.

DRUDE, Sebastian
2002 Fala masculina e feminina em Awetí. *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. & Dall'Igna Rodrigues A. (eds), 177-90. Belém: Editora UFPA.
2009 Nasal harmony in Awetí: a declarative account. *Revista Virtual de Estudos da Linguagem,* special edition: *Linguistic Studies on Brazilian indigenous languages,* W. de Lima Silva (ed.) 7.

EIRÓ, Jessiléia Guimarães
2001 Contribuição à Análise Fonológica da Língua Tembé. Master's Thesis. Univ. Fed. do Pará, Belém. Centro de Letras e Artes.

GORDON, Matthew & ROSE, Françoise
2006 Émérillon stress: A phonetic and phonological study. *Anthropological Linguistics* 48.2: 132-68.

LIEB, Hans-Heinrich
1984 A method for the semantic study of syntactic accents. *Intonation, accent and rhythm: Studies in discourse phonology*, Gibbon D. & Richter H., 267-82. Berlin-New York: de Gruyter.
1996 A functional view of word accent. *Prague school linguistics: 70 years of existence of the Prague Linguistic Circle and 100th anniversary of Roman Jakobson's birthday*, Hajicová E. & Böhmová O. (eds), 37. Prague: Charles University.

SEKI, Lucy
2000 *Gramática do Kamaiurá, Língua Tupi-Guarani do Alto Xingu.* Campinas: Ed. UNICAMP.

SILVA, Auristéa Caetana Souza
1999 Aspectos da referência alternada em Parakanã. Master's Thesis. Universidade Federal do Pará, Belém. Centro de Letras e Artes.

Appendices

TABLE 1: Medium pitch results for speaker W, 20 words in carrier sentences, in Herz (Hz) and pitch contour (ct). Highest medium pitch is marked in bold, as are falling pitch contours in pre-stress and post-stress syllables and rising pitch contour on the stress syllable. 'Deviant' results are underlined. Highest medium pitch does not necessarily fall on the stress syllable, but the pattern "falling before and rising on stress syllable" is very robust, even in compounds.

Syllable	–4		–3		–2		–1		stress s.		+1		+2	
Measures	Hz	ct	Hz	ct	Hz	ct	Hz	ct	Hz	ct	Hz	ct	Hz	ct
tezyk							144	F\\	171	R//				
tsãpit							161	F\\	195	R//				
tsãpĩzan							157	F\-	200	R/-	126	F\\		
tsãpirywo							171	F\\	188	R//	219	F\\	122	f\-
tsãpit eze			146	F-\	147	f--	139	F\\	169	R//				
tsãpit'jyt					147	f--	137	F\\	167	r/-				
tsãpirwatu			145	F\-	163	R//	135	F\\	147	R/-				
tsãpirut					170	F\-	149	F\-	190	R//				
mani'yp					133	R-/	128	F\\	154	R//				
peti'yp					155	F\\	143	r-/	172	R//				
peti'a					159	F-\	139	F\\	148	R//				
peti'azỹ			156	F\\	139	F\\	122	F\-	147	R/\				
peti'a'ỹj			151	F\\	144	F-\	138	F-\	143	R//				
mor'apot					144	F\\	142	F-\	142	r--				
marirawozy	144	r--	153	f--	153	F-\	132	F\-	168	R/-				
tserere'ekyt	153	f--	153	f--	160	F-\	132	F\\	150	R//				
tãngkanyt							152	f-\	194	R//	126	F\\		
nukakyt							138	F\\	161	R/-	132	F\-		
'ypytako					154	F\\	142	F\\	157	r/\	119	F\\		
nãmimpap							152	F\\	188	R//	138	F\\		

TABLE 2: Medium pitch results for speaker W, 28 isolated verb forms, in Herz (Hz) and their pitch contour (ct). Highest medium pitch is marked in bold, as are falling pitch contours in pre-stress and post-stress syllables and rising pitch contour on the stress syllable. 'Deviant' results are underlined; they involve regularly certain morphemes.

Syllable	–3	–2	–1	stress s.	+1	+2
Measures	Hz ct	Hz ct	Hz ct	Hz ct	Hz ct	Hz ct
kwaluku			120 F\-	134 r/\	118 F\\	
akwaluk		115 r/-	117 F\\	137 R//		
ekwalukeju	121 r--	122 f\-	116 F\\	140 r--	116 F\-	
okwalugoko		114 r--	123 f--	126 R-/	133 F-\	116 F\\
ikwaluk nge		113 F\\	116 F\-	125 R//	147 R/-	
ekwalukaw		122 f-\	118 F-\	142 R/\	115 F\\	
tokỹjtu			125 f\-	149 R//	106 F\\	
akỹj			121 r/-	142 R//		
ẽkỹju			128 r/-	154 R//	119 F\\	
wejkỹjoko			127 f--	137 r/-	142 F-\	110 F\\
jokỹj jẽ			125 F\-	137 R//	152 r--	
ekỹjtaw			131 R/-	149 R//	112 F\\	
akyzy		121 r--	123 f--	147 R//		
ekyzyju		128 f-\	122 f-\	147 R/-	113 F\\	
wejkyzyzoko		122 R/-	118 f--	128 R//	134 F\\	99.9 F-\
jokyzy me		114 f-\	117 r--	132 R//	148 r--	
ekyzaw		122 f/\	117 f--	134 R//		
namantu			132 F\-	146 R//	110 F\\	
aman			123 r--	142 R//		
emanju			127 r/-	139 R//	114 F\\	
wejmanoko			125 f--	126 R//	135 F-\	103 F\\
joman ne			115 F\\	126 R//	143 r/-	
emantaw			121 f--	132 R//	110 f-\	
nãmimpu			130 F-\	157 R//	114 F\\	
amim			118 r--	146 R//		
emimpeju		122 R//	131 f--	143 R/-	114 F-\	
wejmimoko			126 f--	135 R/-	137 f-\	108 F\\
jomim me			122 F-\	132 R/-	148 R//	

TABLE 3: Medium pitch results for speaker A: 21 utterances of *pira'yt* ("p.") in different contexts, in Herz (Hz) and their pitch contour (ct). Highest medium pitch is marked in bold, as are falling pitch contours in pre-stress and post-stress syllables and rising pitch contour on the stress syllable. 'Deviant' results are underlined. It is easily seen that the ("falling-rising") pitch contour is more indicative than the pure pitch height.

Syllable	–2		–1		stress s.		+1		+2	
Measures	Hz	ct	Hz	ct	Hz	ct	Hz	ct	Hz	ct
p. *opotpore a-yn*	134	f--	130	**f--**	143	R/-				
mimo ***p.*** *potporetu a-yn*	183	F\-	167	F-\	165	R/-				
p. *ologe a'yn*	170	F-\	165	**f--**	174	R//				
mimo ***p.*** *ologetu a'yn*	159	F\-	147	F\\	155	R//				
an ***pira'yr****yka*	201	F-\	160	F\\	160	R//	224	R/-	109	F\\
mimo an ***pira'yr****yka me*	173	f--	149	F\\	141	R//	160	**f--**	135	F\\
mimo an ***pira'yr****yka a'yn*	185	F\-	167	F\\	172	R//	190	F\\	132	F\\
a'ywoju ***p.***	168	F-\	142	F\\	164	R//				
mimo a'ywoju ***p.***	143	F-\	122	F\\	141	R//				
mimo a'ywoju ***p.*** *ne*	146	F-\	128	F\\	132	R/-				
mimo a'ywoju ***p.*** *a'yn*	159	F\-	139	F\\	133	r/\				
oto ***p.*** *kyty*	188	F\-	163	?\.	146	F-\				
p. *kyty oto a'yn*	152	f--	151	F-\	159	f--				
mimo ***p.*** *kyty natotu*	173	f--	160	F\\	148	**r--**				
mopaza wejmoto tu'umytu ***p.*** *kyty*	142	F\-	128	F\\	122	**r--**				
mopaza wejmoto tu'umytu ***p.*** *kyty a'yn*	146	F-\	129	F\\	134	f--				
mopaza wejmoto tu'umytu ***p.*** *kyty me*	135	f--	119	F\\	116	**r--**				
p. *papuwo kajkar'utejtu*	140	r--	139	F\\	142	R/-				
wan ***p.****?*	178	F\\	144	F\\	163	R/\				
p. *'ekyj?*	141	r--	137	**f--**	157	R//				
ekyj ***p.*** *ne?*	170	F\\	138	F\\	177	R//				

FIGURE 1: Pitch contour for *ypytako* (uttered with carrier sentence)

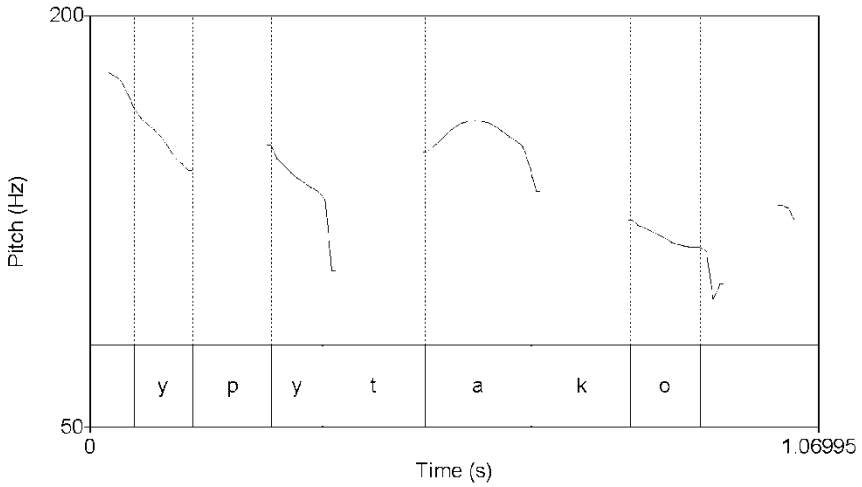

FIGURE 2: Pitch contour for *tsãpirywo* (uttered with carrier sentence)

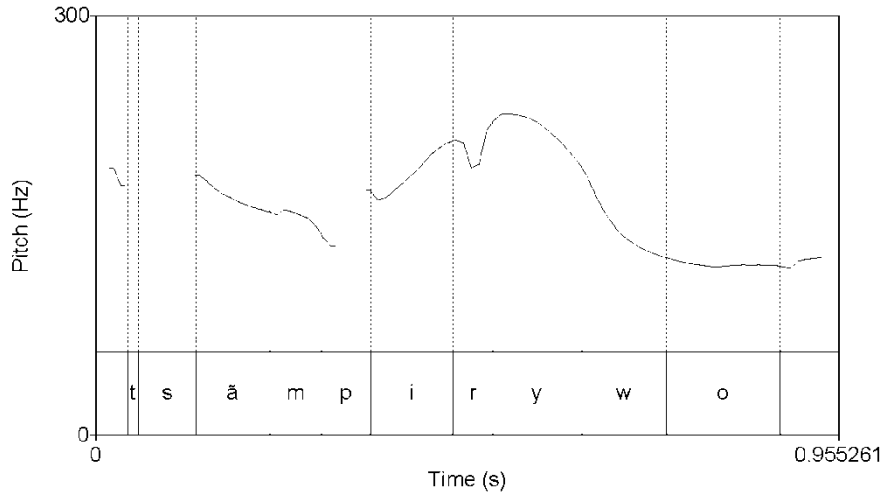

FIGURE 3: Pitch contour for *pira'yryka*, from the sentence *mimo an pira'yryka a'yn.*