THE ROLE OF TONE IN NAMBIKUÁRA

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O. Introduction

This paper presents the feature of tone as found in Nambikuára[1], and the role it plays in clarifying the meaning in both spoken and written Nambikuára.

Languages in which tone is an integral feature of the phonology are found in Africa, East Asia, Mexico, and to a lesser extent, in South America. In Brazil some of the more prominent examples of tonal languages are the Ticuna, Mura-Pirahã, and Nambikuára.[2] A tonal language has been defined by Pike as 'a language having lexically significant, contrastive but relative pitch on each syllable.'[3]

The phonological feature of tone is not to be confused with intonation which consists of a pitch contour 'distributed over phrases rather than being completed on single syllables, though a single syllable may also constitute an entire phrase and thus have intonation applied to it.'[4]

In Nambikuára the morpheme is frequently only one syllable in length. This is more evident in verb words than in noun words. The pattern is, however, only partial since multi-syllable morphemes do occur. But due to the tendency toward short one syllable morphemes, a greater emphasis is placed on the pitch of any given syllable. This will be illustrated in more detail later on.

Tonal languages are divided into two rather broad groups known as register systems and contour systems. A register tone is 'one in

which, within the limits of perception, the pitch of a syllable does not rise or fall during it's production.'[5] A contour tone is 'one in which during the pronunciation of a syllable there is a perceptible rise or fall, or some combination of rise or fall...'[6]

There are also various combinations of the two systems. In one of the combinations 'level tonemes occur and act in the structure of the language like the gliding tonemes which are also present....On a single syllable any one of the gliding tonemes may occur or any one of the level tonemes, but not a sequence of any two gliding or level tonemes.'[7] This is the system as found in Nambikuára.

1. Basic structure of the tone system

The tone system in Nambikuára consists of one register tone or pitch, and two glides or contours. The register tone is relatively low. The contours are either rising from a point close to the low register tone, or falling from a relatively high point to a point approximately the same as the low register.[8]

In the orthography the tone is indicated by using a raised numeral following the syllable on which it occurs.

A falling contour is indicated by using a raised [1] immediately following the syllable.

$$s\bar{u}n^1 \, na^3 \, ra^2 \qquad \diagdown\!\!\underline{\quad}\!\diagup \qquad \text{'It's lacking salt'}$$

$$wi^1 \, na^3 \, ra^2 \qquad \diagdown\!\underline{\quad}\diagup \qquad \text{'It's pretty'}$$

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A rising contour is indicated by using a raised ^{2} immediately following the syllable.

$s\tilde{u}^2 na^3 ra^2$ ╱ __ ╱   'It's cool.'

$k\tilde{a}in^2 na^3 ra^2$ ╱ __ ╱   'It's big.'

A low register tone is indicated by using a raised ^{3} immediately following the syllable.

$y\tilde{u}n^3 na^2 ra^2$ __ ╱╱   'He had some.'

$hxan^3 na^3 ra^2$ __ __ ╱   'It's all gone.'

2. Relationship of tone to other features in the language

a. Phonological features

1) Laryngealization is a feature of the language entirely separate from the tone system. As such it must be marked for every instance in a manner distinct from the marking system used for tone. In the Nambikuára orthography a laryngealized vowel is underlined. It occurs with any of the three tones and therefore contrasts lexically.

(1) $\underline{on}^2 na^3 ra^2$ 'burn, scorch'

(2) $on^2 txain^1 na^3 ra^2$ 'they are afraid'

(3) $\underline{\tilde{i}}^3 ain^1 na^3 ra^2$ 'they are planting'

(4) $\tilde{i}^3 ain^1 na^3 ra^2$ 'they are going'

(5) $xw\underline{\tilde{i}}^1 sxu^2$ 'frog'

(6) $xw\underline{\tilde{i}}^3 sxu^2$ 'sweet potato'

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$$(7) \quad a^3 lxu^3 kwi^2 lhu^2 \qquad \text{'type of honey'}$$

$$(8) \quad a^3 lxu^3 kwi^3 lhu^2 \qquad \text{'canes (taquara)'}$$

It's occurance is not dependent on a contiguous glottal stop.

$$(1) \quad sax^3 te^2 na^3 ra^2 \qquad \text{'heavy'}$$

$$(2) \quad aun^3 na^3 ra^2 \qquad \text{'festering sore'}$$

$$(3) \quad ya^3 na^3 lhu^2 \qquad \text{'lizard'}$$

It is not contingent on the occurance of glottalized consonants.

$$(1) \quad sxa^2 na^3 ra^2 \qquad \text{'He is lying down'}$$

$$(2) \quad tx\tilde{a}n^2 na^3 ra^2 \qquad \text{'It is a tight fit'}$$

$$(3) \quad tan^3 na^3 ra^2 \qquad \text{'It's tart'}$$

It is not predictable from any other feature of the language.

2) Consecutive falling contours will dip only slightly on each syllable until the last falling tone which drops to its normal low.

$$\tilde{u}^3 h\tilde{u}^1 ai^1 na^1 tai^1 ti^2 tu^3 wa^2 \qquad \text{'I gave it to them.'}$$
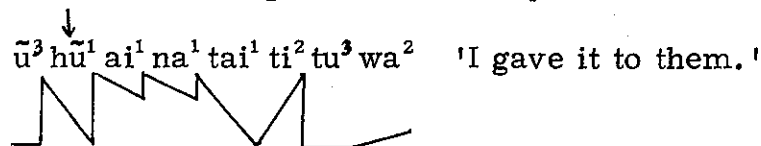
Consecutive rising contours after the first one will begin at a point much higher than the low register tone, but will still begin low enough to have a slight rise on each syllable.

$$\tilde{a}u^3 xi^2 na^2 ra^2 \qquad \text{'He is sleeping.'}$$

3) Tone contrasts occur on both stressed and unstressed syllables. Stress is not marked in the orthography since the native

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speaker intuitively knows where the stress will go. In this paper it

will be marked by an arrow immediately above the stressed syllable

whenever it is pertinent to the discussion.

Contrasts in stressed syllables:

In the following examples each of the three tones occurs in the

stressed syllable.

(1) $\downarrow$ so^1 na^1 ra^2 'I took it'

(2) $\downarrow$ so^2 na^3 ra^2 'He is taking it'

(3) $\downarrow$ yo^3 te^3 la^1 wa^2 'I will pick'

(4) $\downarrow$ so^1 te^3 la^1 wa^2 'I will take'

Contrasts following stress:

In the following example the first word has a rising contour

[2] on the penultimate syllable whereas the second word has a low reg-

ister tone [3].

(1) $\downarrow$ tut^2 ta^3 lxi^2 su^2 'armadilo'

(2) $\downarrow$ khãi^3 ha^3 lxi^3 su^2 'fish'

Contrasts preceding stress:

In the following examples the first word has a low register

tone [3] preceding the stressed syllable and the second word has a

rising contour [2].

(1) ya^3 la^3 $\downarrow$ nai^2 la^1 wa^2 'It's a tucano'

(2) ya^2 la^3 $\downarrow$ lai^2 la^1 wa^2 'It's the truth'

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In stressed syllables the tones are slightly intensifed in the case of contour tones.

In a string of consecutive falling contours the tone on the stressed syllable falls to the level of the low register tone before starting the next falling contour.
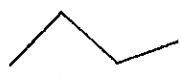
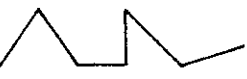$$\downarrow$$
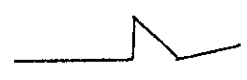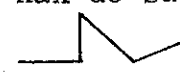sa² so¹ ai¹ na¹ tu¹ wa²   'I will get them'
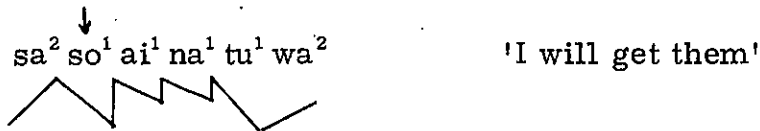
In a similar situation when a stressed syllable occurs in a string of consecutive rising contours, the tone of that syllable will begin at the level of the low register rather than the higher point normal for consecutive rising contours.

ĩ³ na² na² ra²   'He drank'

sa² so² na³ ra²   'He is taking it'
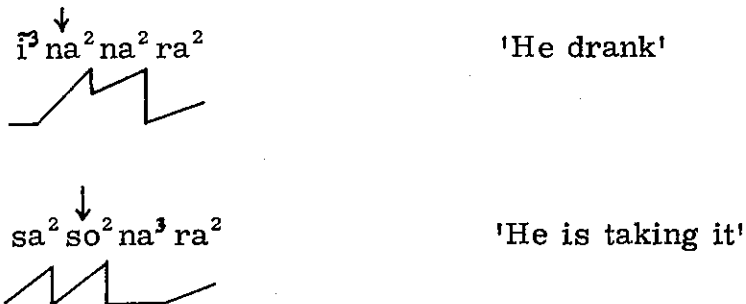
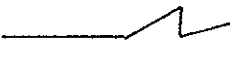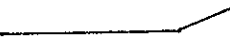Combinations of contiguous pitches affect the tones in only one instance. When the stressed syllable begins with a liquid continuant and has a falling contour [1], a preceding low register tone [3] will be perturbed to a rising contour [2]. See especially contrasts in first syllable in examples (4), (5), and (6) below.

(1) ũ³ hũ¹ xna² hxa³ tai¹ ti² tu³ wa²   'I didn't give it to you.'

(2) a² lũ¹ su²   'tapir'

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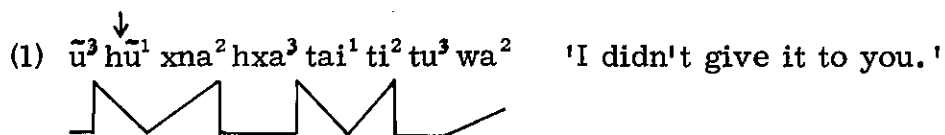
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(3) wa^{2}lit^1 su^2 'rubber

(4) a^{2}li^1 te^3 la^1 wa^2 'I want to clean (capinar).'

'(5) a^{3}na^1 te^3 la^1 wa^2 'I will lie down'

(6) a^{3}li^3 te^3 la^1 wa^2 'I will leave'

(7) kax^3 do^1 su^2 'monkey'

The tone on the final syllable of a sentence, i.e. preceding silence, shows less contrast than elsewhere.

wa^{3}kon^3 na^2 ra^2 'He worked' past

wa^{3}kon^3 na^3 ra^2 'He is working' present

It should be noted that the sentence final rising contour ^{2} does not rise as high as other rising contours ^{2}. Nor does it stay down as low as would be the case of a low register tone ^{3} in other positions in the sentence. Therefore one could write the sentence final tone as either ^{2} or ^{3}. There is no phonological reason for choosing one over the other. In experiments conducted with semi-literate Nambikuáras, the reaction was more favorable to the use of ^{2} than to the

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use of ^{3}. (Their preference has been followed in current usage, thus the final 'ra' is written with a rising contour 'ra^2'.)

4) Nasalization does not affect tone in any way.

b. Morphophonemics: Grammatical features causing tone per-
turbation

1) One of the grammatically determined verb classes perturbs any tone in the stressed syllable of the verb stem to a rising contour if it is immediately followed by the present tense third person singular suffix, 'na^{3}ra^2'.^{9}

(1) xyau^3-na^{1}wa^2 'I am staying' pres. 1st sing.

(2) xyau^3-ain^{1}na^{3}ra^2 'They are staying' pres. 3rd pl.

(3) xyau^2-na^{3}ra^2 'He is staying' pres. 3rd sing.

(4) xyau^3-na^{2}ra^2 'He stayed' past. 3rd sing.

It will be noted that the tone ^{3} on example (3) is perturbed to a rising contour ^{2} whereas in all the other examples the tone is a low regis-
ter tone.

(1) sa^{2}so^1-na^{1}wa^2 'I am taking' pres. 1st sing.

(2) sa^{2}so^1-ain^{1}na^{3}ra^2 'They are taking' pres. 3rd pl.

(3) sa^{2}so^2-na^{3}ra^2 'He is taking' pres. 3rd sing.

(4) sa^{2}so^1-na^{2}ra^2 'He took' past 3rd sing.

The same pattern holds in this set except that in this case a falling contour is perturbed to a rising contour ^{2} in example (3).

2) One grammatically determined verb class perturbs the final

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syllable of a verb stem to a falling contour [1] if it is immediately followed by the imperative suffix.

(1a) $\tilde{i}^3 xi^1 -s\tilde{e}^1 ra^2$ 'Go home!'

(1b) $\tilde{i}^3 xi^2 -na^1 tu^1 wa^2$ 'I will go home.'

(2a) $\tilde{i}^3 na^1 -txa^2$ 'Drink!'

(2b) $\tilde{i}^3 na^2 -te^3 la^1 wa^2$ 'I will drink.'

3) A man's name must add the suffix 'yah^{3}la^2', or a phonological variant of the same form, to the existing name, as part of the noun classification system. This may be a name adapted from Portuguese:

$pe^2 -jah^3 la^2$ 'Pedro'

Or the name of an animal used as a proper noun in Nambikuára:

$sa^3 wi^2 -lah^3 la^2$ 'Parakeet'

Or a descriptive phrase used as a proper noun:

$n\tilde{u}^3 ka^2 y\tilde{a}un^1 -jah^3 la^2$ 'Crooked-arm'

However, if a verb phrase is nominalized to describe someone, the low register tone is perturbed to a falling contour [1].

$kwhi^1 txa^2$ $a^3 nan^3 -jah^1 la^2$ 'The one who killed the deer'
    deer   kill- one

4) The presence of a second person pronoun perturbs the final tone of the verb stem or verb stem suffix to ^{1}.

    *$\tilde{i}^3 yau^1 \tilde{u}x^{\downarrow 3} -ti^3 tu^1 wa^2$ 'He will show you'
becomes
    $\tilde{i}^3 yau^1 \tilde{u}x^{\downarrow 1} -ti^3 tu^1 wa^2$

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Compare:

ĩ³ yau¹ ũ³ -na¹ tu¹ wa²   'I will show him'

ĩ³ yau¹ ũ³ -ain¹ tu¹ wa²   'They will show him'

The second person subject pronoun is vowel initial, therefore there are cases of phonological ambiguity due to regular morphophonemic vowel elision and tone transfer patterns. These remain, however, grammatically unambiguous with syllable final n and tone [1] indicating second person.

*xyau³ -in¹ tãu³ a²   'while you're there...'

becomes

xyaun¹ -tãu³ a²

but:

xyau³ -na¹ tãu³ a²   'while I'm there'

xyau³ -ain¹ tãu³ a²   'while they are there'

and:

*ĩ³ xi² -in¹ tãu³ a²   'when you come home...'

becomes

ĩ³ xin¹ -tãu³ a²

ĩ³ xi² -na¹ tãu³ a²   'when I come home'

*ĩ³ xi² -ain¹ tãu³ a²   'when they come home'

becomes

ĩ³ xain¹ -tãu³ a²

The third set gives a simple case of elision following morphophonemic rules already described elsewhere.[10]

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c. Morphophonemics: Elision

This section will deal with those cases in which elision occurs causing tone perturbation. In the preceding sections, the morphemes remained unchanged except for tone. Here, the elision which occurs affects the normal language patterns and also perturbs the tone of the morpheme.

When two verb stems are juxtaposed to form a compound verb, the final suffix of the first stem and the initial prefix of the second stem elide. The vowel of the suffix is lost, while the vowel of the prefix is retained and the pitch of the resulting syllable is perturbed to a falling contour [1].

*$\underline{a}in^3 n\tilde{u}^3 kxi^2$ $\hat{a}^3 si^3 xwe^3 ta^1 hxai^2 h\tilde{e}^1 ra^2$ 'He began to believe' becomes

$\underline{a}in^3 n\tilde{u}^3 kx\tilde{a}^1 si^3 xwe^3 ta^1 hxai^2 h\tilde{e}^1 ra^2$

However, when two complete verbs are juxtaposed including the word suffixial endings, the adjoining vowels will coalesce retaining the vowel of the second verb, but in this case no perturbation occurs.

*$xw\tilde{a}^3 sx\tilde{a}^3$ $\tilde{i}^3 ye^3 kxain^1 ta^1 hxai^2 h\tilde{e}^1 ra^2$ 'They came and becomes   talked'

$xw\tilde{a}^3 sx\tilde{i}^3 ye^3 kxain^1 ta^1 hxai^2 h\tilde{e}^1 ra^2$

When two verb roots are juxtaposed to form a compound verb root, neither tone perturbation nor elision occur.

$hu^3 kxa^2$ $t\tilde{e}^3 xw\tilde{a}^3 ain^1 na^3 ra^2$ 'They come bringing the bow'
bow   bring-come-they-are

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3. Emphatics

There are morphemes in the verb suffix system to indicate 'very much' -- 'kaix^2' and 'not at all' -- 'ti^{3}hex^2'. These morphemes show a greater degree of intensity by changing the rising contours to falling contours and adding greater stress.

kaix^1 'very much'

te^{3}hex^1 'not at all'

Other verb qualifiers indicate intensity in a similar way.

wa^{3}su^{3}txi^3 xwã^{3}na^{2}ra^2 'He came quickly'

but: wa^{3}su^{1}txi^3 xwã^{3}na^{2}ra^2 'He came very quickly'

In the second syllable the tone changes from ^{3} to ^{1} for intensity.

yã̃n^{2}txã^{3}xnai^{3}na^{2}ra^2 'He ran fast'

but: yã̃n^{1}txã^{3}xnai^{3}na^{2}ra^2 'He ran very fast'

In this set the contrast is on the first syllable between ^{2} and ^{1}.

4. Importance of Tone in Oral Communication

The semantic load carried by tone varies in different languages. In Munduruku̇ in Amazonia, it appears that tone need not be symbolized in the orthography. Meaning is redundantly marked in the language systems so that context, in most instances, eliminates all possibility for ambiguity. Nambikuára, in contrast, depends heavily upon tone for oral communication. This is illustrated by the fact that occasionally, when, for some physical reason, it is inconvenient for a Nambikuára to separate his teeth, he may still participate in a conversation

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by talking through closed teeth using tone as his principle means of communication.

Both lexical and grammatical features are minimally dependent upon tone and tone perturbation for their identification. Examples of non-redundantly marked lexical items involve noun stems, verb stems, and verbal inflexional contrasts. For the readers convenience, contrasting syllables are underlined in illustrative word sets.

Contrasts in noun stems:

$ya^2\underline{na}^1lhu^2$ 'onça'

$ya^3\underline{na}^3lhu^2$ 'lizard'

$\underline{sxi}^3sxu^2$ 'tocandeira ant'

$\underline{sxi}^2su^2$ 'house'

Contrasts in verb stems:

$\underline{don}^3-na^3ra^2$ 'He is building'

$\underline{don}^1-na^3ra^2$ 'He is growing'

$a^3\underline{li}^3-te^3la^1wa^2$ 'I will leave'

$a^2\underline{li}^1-te^3la^1wa^2$ 'I will clean (capinar)'

Contrasts in verb suffixes involving person and aspect:

$wa^3ko^3-\underline{na}^1ra^2$ 'I worked' past 1st. sing.

$wa^3kon^3-\underline{na}^3ra^2$ 'He is working' pres. 3rd sing.

$wa^3kon^3-\underline{na}^2ra^2$ 'He worked' past 3rd sing.

Contrasts in verb suffixes involving person and negation:

$\tilde{u}^3h\tilde{u}^1-\underline{xna}^2tai^1ti^2tu^3wa^2$ 'He gave it to you'

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$\tilde{u}^3 h\tilde{u}^1$ -$\underline{xna}^3 tai^1 ti^2 tu^3 wa^2$ 'I didn't give it to him'

5. Considerations for orthographic representation of tone

1) In a language where it seems essential to write tone, there are various options for how to do so. The decision can be made 1) to mark only as much tone as is needed to remove any ambiguity, or 2) to mark full differentiation.

The symbolization used in marking tone only in ambiguous situations is varied and is a relatively new field of fruitful experimentation. That used for marking full differentiation is more limited. There is, in either of the symbolizations chosen, the option of symbolizing all tones or all except one tone, the latter being the most common.

2) There is, in addition, ample discussion on the choice between symbolizing tone by the use of different types of accents or by a system of raised numerals.

a) An accent system using acute, grave, and circumflex would be adequate for representing a three tone system. It would also be adequate for a four tone system providing the option of leaving one tone unmarked was followed.

b) An alternate analysis could classify the same data as a register system. In such a system, two accent marks would be adequate to represent either three or four tones. The tone contours would, in this method be represented by a combination of both accents.

low register tone

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       high register tone   ´

       rising contour   ˇ

       falling contour   ^

    c) Raised numerals, each representing a separate tone, would be adequate to represent systems with any number of tones.

    A full discussion of the advantages and disadvantages of each of these methods is outside the scope of this paper. The following points are, however, pertinent to this discussion.

    a) It is difficult for new literates to distinguish between accent marks which, by nature, are small in relation to the other printed matter and have only minimal differences between each other.

    b) When more than one diacritical mark is needed simultaneously for a vowel, distinction between them is difficult. The method of 'stacking' more than one diacritical above or below a vowel also causes difficulties in printing in addition to raising the cost of already small and expensive editions.

    c) Raised numerals, though easily read, give the written text an appearance that is distinct from that of Indo-European languages. This can be a psychological factor either for or against their use, depending upon the local attitudes toward intercultural contact and cultural identity.

6. Specific considerations for symbolizing tone in Nambikuára

    1) In Nambikuára the syllable is the basic phonological unit;

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thus minimal differences in syllable structure should be clearly indicated orthographically. The importance of this is amplified by the fact that numerically, monosyllabic morphemes are in the majority, though some disyllabic and polysyllabic morphemes do occur. The change of just one syllable can alter the meaning of an entire word or sentence. If the recognition of meaning distinctions can be facilitated by some quick method for syllable recognition, it will be advantageous to use such a method.

Monosyllabic morphemes:

    (1) $khai^3 - su^2$ 'quati - indefinite marker'

    (2) $taut^3 - su^2$ 'hawk - indefinite marker'

Disyllabic morphemes:

    (1) $ya^3 lan^3 - su^2$ 'tucano - indefinite marker'

    (2) $ka^3 w\tilde{\underline{a}}^3 - lhxu^2$ 'stream - indefinite marker'

    (3) $sa^3 wi^3 - lhu^2$ 'parakeet - indefinite marker'

    (4) $ki^3 han^3 - na^2 ra^2$ 'lying - he did'

Polysyllabic morphemes:

    (1) $a^3 lxu^3 kw\underline{i}^2 - lhu^2$ 'honey - indefinite marker'

    (2) $ka^3 lu^3 wh\tilde{a}in^3 - kax^3 - su^2$ 'tree-classifier-indefinite marker'

    2) Most dialect groups of the Nambikuára family have a three tone system. Mamaindé, however, has four.[13] If all these groups are to be incorporated into the same or very similar orthographic systems, the possibility for marking both three and four distinct tones should be

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inherent in the system.

3) It seems highly desirable that any orthographic system used for Nambikuára, a minority group surrounded by Portuguese speakers, should allow for rapid transfer of reading skills to Portuguese whenever the Nambikuára are ready for it.

Accents are used in Portuguese to mark vowel quality and stress placement. If the same accents are used in Nambikuára to represent features of tone, nasalization, or laryngealization in a manner different from Portuguese, they will cause interference in the reading transfer.

4) Separate orthographical representation is needed in Nambikuára for nasalization, laryngealization and tone since these are three independent, and often simultaneously occuring features.

a) Nasalization is partially symbolized in Portuguese by the use of the til (~) over the stressed vowel. Since nasalization needs to be represented in Nambikuára, it is presently done with a til on both stressed and unstressed nasalized vowels.

b) Laryngealization in the sense of a glottalized consonant is generally represented by an apostrophe (') in orthographies for Brazilian Indian languages. Smalley[14] has suggested that laryngealization in vowels be marked with a glottal stop over the laryngealized vowel. These symbolizations are considered impractical for Nambikuára due to a reluctance to 'stack' symbols, for example, in the case

of a vowel which was simultaneously laryngealized and nasalized.

Laryngealization is presently represented by underlining the laryngealized vowel. The mark is distinct from the til, and avoids 'stacking' of symbols. With its own location in relationship to the vowel it has the additional pedagogical advantage of having different features marked in different places. This produces a desirable redundancy which considerably reduces the pattern recognition task.

7. Conclusion

Tone in Nambikuára is presently represented by a system of small superscript numerals in syllable final position. This system has the following advantages:

. 1) It allows for marking nasalization (˜ over the vowel), laryngealization (_ under the vowel), and tone (superscript numeral at end of the syllable) all on the same vowel/syllable without stacking diacritics.

2) It allows for keeping the orthography uniform in all Nambikuára languages by using another superscript numeral for the fourth tone in Mamaindé.

3) It does not hinder the transfer of reading skills to Portuguese because no symbol (such as accent marks) is used to represent a strikingly different phonological feature in Nambikuára than it does in Portuguese.

The orthography of Nambikuára, including the symbolization for

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tone discribed above, has proven thus far to be a very workable one.
The Nambikuára learn to read and write without undue difficulty and
use the symbols for laryngealization, nasalization, and tone very
accurately. The great majority of those who have tried to learn to
read and write are now somewhere along the road to being indepen-
dently literate. In addition, there are some who use written Nambi-
kuára as a means of communication to those 'out of town' on visits, to
people in other villages, etc. This, it would seem, indicates that the
orthography in use is sociolinguistically acceptable to the Nambikuára.

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FOOTNOTES

1. Nambikuára was classified by McQuown and Greenberg as in the
Ge-Pano-Carib Phylum (Sol Tax, Aboriginal Languages of Latin Ameri-
ca, Current Anthropology 1: 5-6 431-6 September-November, 1960).
There are about 200 speakers of the Nambikuára dialect as spoken in
Serra Azul, in northwestern Mato Grosso, Brazil. The data for this
paper are based on information gathered during various trips to Serra
Azul in the time between 1961 and 1974 in accordance with a contract
with the Museu Nacional do Rio de Janeiro and with the cooperation of
the Fundação Nacional do Indio. A concordance of 22,000 morphemes
and 4,700 words from Nambikuára texts was used in the analysis done
for this paper. The concordance was prepared at the University of
Oklahoma Computor Laboratory under the Project for Computor Sup-
port for Linguistic Field Research, which is partially supported by
National Science Foundation Grant GS-1605. The present paper was
written under the auspices of the Summer Institute of Linguistics at
Cuiabá, Mato Grosso, Brazil in 1974.

2. The phonological system of Nambikuára is comprised of the follow-
ing features. The consonants are stops p, t, k, x (glottal stop), d
(implosive), j (dz), resonants r, n, nh (N), 1, fricatives s, h, and
glides w, and y. All consonants have glottalized and aspirated coun-
terparts. The vowels are i, e, a, o, u, ai, au. All of which have

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laryngealized ($\underline{V}$), nasalized ($\tilde{V}$), and simultaneously laryngealized

and nasalized ($\underline{\tilde{V}}$) counterparts. The tones are falling ([1]), rising ([2]),

or level ([3]).

3. Pike, Kenneth L. Tone Languages. Ann Arbor: University of
Michigan Press. 1956 p. 3

4. ibid, p. 15

5. ibid, p. 5

6. ibid, p. 5

7. ibid, p. 13

8. Mamaindé has a high register tone in addition to those found in
Nambikuára of Serra Azul. In Mamaindé, then, there are high and
low register tones and two contours, one rising, and one falling be-
tween the two register tones. Cf Kingston, Peter K. E., Notas Sobre
o Sistema Tonal Mamaindé, in press.

9. In subsequent examples suffixes will be separated from the stem
by a dash when they are pertinent to the discussion.

10. Kroeker, Barbara J. 'Morphophonemics of Nambiquara', Anthro-
pological Linguistics, 14.1:19-22, January 1972.

11. Crofts, Marjorie, 'Must Tone Always be Written in a Tonal Lang-
uage?' Technical Papers for the Bible Translator, 27.1:127-134, Jan.
1976.

12.   For a similar phenomenon cf Cowan, George M., 'Mazateco Whistle Speech', Language 24:280-86, Jul-Sep 1948.

13.   The semantic load of tone in Mamaindé appears to be much less than that in Nambikuára of Serra Azul.   It is not yet certain to what degree tone will need to be marked in Mamaindé, but provision should be made for it in case full marking is necessary.

14.   Smalley, William A.   Manual of Articulatory Phonetics, Practical Anthropology, Tarrytown, New York, 1964, p. 398.