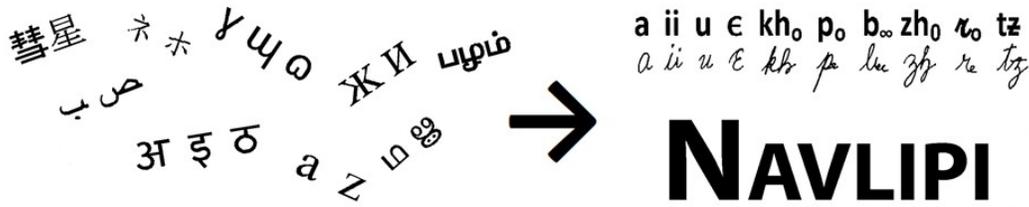


The Basics ABOUT NAVLIPI

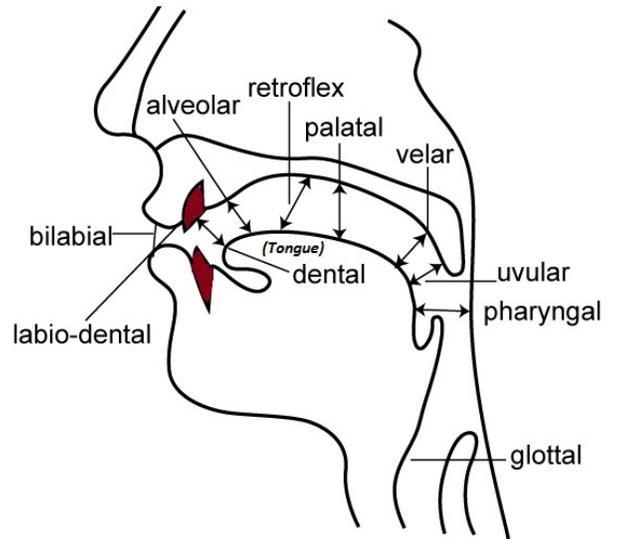


PRIMER: How are language sounds (phones) classified according to “articulation position” and “phonochromaticity”

In the context of languages, a **phone** is any *sound* created by the human vocal apparatus, such as the **b** in *boy* or the **k** or **i** in *king*. It may be a vowel, a “consonant” or an exotic sound like a clicking sound (like the English sound rendered “tsk tsk” in cartoon balloons).

For simplicity, here we limit our discussion to articulation positions of “consonants”, as these are easier to understand than those for vowels and other classes of sounds. “Consonants” can be nearly completely classified using just two variables: **Articulation position** and **phonochromaticity** (the “color” of the phone).

The *articulation position* of a sound is where in the human vocal apparatus it originates or is articulated from. For “consonants”, the figure below helps illustrate common articulation positions in the human vocal apparatus (in the figure, the teeth are colored brown and the tongue is labeled), and what they’re called.



Referring to the figure, some typical phones in English (as an example) can be classified as follows:

- *Velar*: **k** as in *king*.
- *Palatal*: **ch** as in *child*.
- *Alveolar*: **t** as in *to*.
- *Labiodental*: **f** as in *full*.
- *Bilabial*: **p** as in *pet*.
- For *Dental*, we turn to Spanish **t** as in *tu*.

Phonochromaticity, the “color” of the phone, designates the type of phone. Types include, e.g., *aspirated*, *unaspirated*, *voiced*, *unvoiced*, *nasal*, *fricative*, *flap (tap)*, *click*, etc.. Some of these phonetic terms are self-explanatory: Thus, *aspirated* phones are uttered with an extra breath, e.g. in *ph* (aspirated) vs. *p* (unaspirated). *Voiced* means the vocal chords vibrate. This can be perceived by simply placing two fingertips on the throat where the Adam’s apple normally is, then uttering in quick succession the pair of sounds *k* (unvoiced) and *g* (voiced), or *p* (unvoiced) and *b* (voiced), or *t* (unvoiced) and *d* (voiced). The vibration of the vocal chords will be clearly perceived when uttering the second sound of each pair, which is voiced. A *nasal* sound is one in which the breath is expelled through the nose, as in *n* or *m*. A *fricative* is a rubbing, hissing or other frictional sound, as in *s* or *f*. A *flap* or *tap* is distinguished from a full plosive sound in that the organs of articulation are not fully closed and then suddenly opened, as in a plosive, but rather just lightly tapped or flapped. A *click* is a sound like the one rendered *tsk tsk* in English, or the sound one makes to egg on a horse.

PRIMER: What's a phoneme?

In order to understand *NAVLIPi*, it is essential for the reader to be very familiar with the concept of a *phoneme*.

In the context of languages, a *phone* has been defined above. A *phoneme* then is a *phone with a linguistic significance*. A phoneme is unique to a particular language. Two phones can be part of the same phoneme in a language, or they can be distinct, separate phonemes.

A quick test for a phoneme vs. a phone is as follows: If, in a particular language, upon substitution of one phone by another in a word, the meaning of the word changes, then the two phones are separate, distinct phonemes in that language. On the other hand, if such substitution does *not* change the meaning of the word, then the two phones are part of the same phoneme. Thus in English, the phones **p** and **b**, as in the words *pit* and *bit*, are distinct phonemes, since substitution of the **p** by the **b** in these words completely changes their meaning. On the other hand, in Mandarin, if one says *pu* or *bu*, or *Beijing* or *Peijing*, it doesn't change the meaning of the word; so the phones **p** and **b** are part of the same phoneme in Mandarin. Similarly, the phones [p] (unaspirated) and [ph] (aspirated) are components of the same phoneme in English, since substitution of one by the other does not change meanings of words: E.g. in the word *put*, the *p* can be pronounced with ([ph]) or without ([p]) aspiration. However, [p] and [ph] are different phonemes in Hindi/Urdu, since substitution of one by the other does change the meanings of words entirely: e.g. *pal*, "an instant" vs. *phal* "fruit". In English, [p] and [ph] are said to be *allophones* of the same phoneme. In Western linguistic terminology, phonemes are designated by forward slashes: thus, the phoneme incorporating the [p] and [ph] sounds in English is designated as /p/. In contrast, in Hindi/Urdu, where these two sounds are distinct phonemes, we designate /p/ and /ph/.

What is phonemic idiosyncrasy?

Phonemic idiosyncrasy can be defined as the existence of very different sets (usually, pairs) of phones as allophones of the same phoneme in one language, whereas the same phones exist as distinct phonemes in another language. One example is that cited above: The bilabial sound [p] and its aspirated counterpart, [ph], are allophones of the same phoneme, /p/, in English, whereas they are distinct phonemes in Hindi/Urdu. Another example is the unvoiced and voiced bilabial phones, [p] and [b], which are allophones of the same phoneme in many Chinese languages. That is to say, one can say *Beijing* or *Peijing*, or *pu* or *bu*, without change of meaning, in a Chinese language like Mandarin. On the other hand, [p] and [b] are of course different phonemes in most Indo-European languages. E.g. in English, *pet* and *bet* have entirely different meanings. As yet other examples of peculiar allophones found in some languages, we can cite [x] (uvular/velar fricative, the famous “uvular *r*” or “throaty *r*” of Parisian French and also much modern German, a sound coming from deep within the throat), and [r], the rolled or trilled *r*-sound. These are two radically different phones of modern French and German. Here, the first phone is a velar or uvular fricative and the second an alveolar tap or trill or semivowel. Nevertheless, these are part of the same phoneme in Parisian French and standard German. Other, even more illustrative, examples are the [v]/[w] and [f]/[ph] phone pairs of Hindi/Urdu. These are freely interchanged and have the same phonemic value, although they are obviously very different sounds. That is to say, in Hindi/Urdu, one can say *phal* or *fal* and still mean the same thing, “fruit”; or *varshaa* or *warshaa*, and still mean “rain”.

To put it another way, actual speech sounds are organized into different, and cross-cutting, significant sets in various languages: Citing the example above, *p*, whether aspirated or unaspirated, is the same phoneme in English, but the two versions belong to contrasting phonemes in Hindi, where (however) *f* is heard as the same sound as aspirated-*p*.

Why is it important for an alphabet (a script) to be able to convey information on phonemic idiosyncrasy?

To date, no practical world alphabet conveys phonemic information, let alone information on phonemic *idiosyncrasy*. Why is this important? Well, the expression of phonemic idiosyncrasy across languages must somehow be incorporated into and accommodated by a single writing system, a universal script, for reasons that will be clear from the sequel.

For example, an English speaker, when reading Hindi/Urdu in the universal script, should be able to immediately comprehend that the phone [v] can also be pronounced as a [w], although when reading English in the same universal script, [v] and [w] are pronounced quite differently. Similarly, a Hindi/Urdu speaker should immediately be able to comprehend, when reading English in the same universal script, that [p] and [ph] have the same value in English, unlike the case in his/her own language. As another example, an English speaker, when reading Arabic in the same script, should immediately be able to understand that [p] and [b] are not separate phonemes in Arabic, and such bilabial sounds are usually, but not always, pronounced as [b], the [p] being absent in nearly all (but *not* all) Arabic dialects. Etc. etc.. *The universal script must contain and be able to convey this information.* That is to say, a truly universal script *must* convey information on phonemic idiosyncrasy.

This is one of the reasons that finding a common script that accommodates both Hindi/Urdu (a North Indian, Indo-European-base language) and Tamil (a South Indian, Dravidian-base language) has proved so difficult. Attempts to write Tamil in the Dewanaagari script used for Hindi or the Arabic-base script used for Urdu, or to write Hindi/Urdu in the Tamil script, lead to insurmountable difficulties. For starters, it is difficult to express the fact that in Tamil, there is no phonemic distinction between aspirated and non-aspirated sounds.

Again, prior to Navlipi, no world script did this.

What are the main features of NAVLIPI?

NAVLIPI simply means “new script” in Sanskrit and the modern Sanskrit-base languages of India. Here are some features of *NAVLIPI*:

- It is based on the Roman (Latin) script. It uses just five new or transformed letters (glyphs) in addition to the 26 letters of the Roman script.
- In addition to being a *phonemic* script, *NAVLIPI* is also a precise *phonetic* (phonic) script that very accurately transcribes the sounds and features found in *all* the world’s languages. These include the more common features such as tones as well as the less common ones such as clicks, ejectives and implosives. It is thus applicable to *all* the world’s languages. It is capable of transcribing equally well a tonal language such as Mandarin and a click language such as !Xo Bushman, in an extremely “user-friendly”, intuitive and practical way.
- It is far more thorough, complete, distinct and practical than the alphabet of the International Phonetic Association (IPA) the Americanist alphabet, and other “universal” world scripts. It addresses the serious drawbacks and (some) errors of these scripts even in standard phonetic (i.e., non-phonemic) transcription. And of course, these other scripts/alphabets are not phonemic, but rather phonetic (phonic).
- *NAVLIPI* uses no cumbersome diacritics, rather making heavy use of “*post-ops*”, post-positional operators. A typical *NAVLIPI* post-op is h_{\circ} , which indicates aspiration, e.g. as in ph_{\circ} , the aspirated counterpart of the p sound. Another typical *NAVLIPI* post-op is ∞ (a subscripted infinity sign) which indicates a combination of unvoiced (as in the p sound) and voiced (as in the b sound) phones; this is useful for transcription in a language such as Mandarin, where unvoiced and voiced sounds are frequently part of the same phoneme (in this example transcribed as b_{∞}).

How does NAVLIPI transcribe phonemic idiosyncrasy?

NAVLIPI transcribes phonemic idiosyncrasy in a very facile, intuitive manner, illustrated by the following examples:

- For the common (aspirate + non-aspirate) phoneme, *NAVLIPI* simply uses a subscripted circle, \circ . Thus the /p/ phoneme of English of the example above, which includes the phones [p] and [ph], is simply transcribed as p_{\circ} .
- For less common phonemes such as the one combining the [x] (uvular fricative) and [r] (trilled “r”) in Parisian French and Hochdeutsch German, or the one combining the v and w sounds in Hindi/Urdu, *NAVLIPI* simply uses compound letters (glyphs), here the digraphs xr and vw respectively.
- For the complex (voiced + unvoiced) phoneme present in most Chinese languages, *NAVLIPI* uses the post-op ∞ (a subscripted infinity sign) to indicate a combination of unvoiced (as in the p sound) and voiced (as in the b sound) phones. Thus, the bilabial Mandarin phoneme found in the word meaning “no” and pronounced both pu and bu is transcribed as b_{∞} , as in the *NAVLIPI* transcription $b_{\infty}u$.

What does NAVLIPI look like?

Here are some examples of what *NAVLIPI* looks like for the five most widely spoken languages of the world (listed sequentially, in decreasing order of speakers, Mandarin, Hindi/Urdu, English, Arabic and Spanish):

Mandarin (Beijing)

你不认识他吗?

Nii^{˥˩} b_∞u> ɿqɿnsh₀i th₀aaɿ, maa?

Legend:

- ˥˩ = 3rd tone (falling, mid-to-low + rising, low-to-mid). This is an example of a *NAVLIPI post-op*, a post-positional operator, positioned *after* the phone it is describing (“operating on”).
- b_∞ indicates voiced + unvoiced, i.e. that this can be uttered as a *b* or a *p* sound without changing the meaning of the word. (This is an example of the transcription of phonemic idiosyncrasy in *NAVLIPI*.) (∞), the subscripted infinity sign, is another *NAVLIPI post-op*, indicating (voiced + unvoiced).
- > = 2nd tone, rising mid-to-high.
- q = the sound of the *e* in English *father*.
- ɿ = 4th tone, falling high-to-low.
- sh₀ = the sound of the *sh* in English *shoot*.
- th₀ = aspirated *t*.
- aa = the sound of the *a* in English *father*.
- ɿ = 1st tone, level, high.

Hindi/Urdu (standard, Khari Boli) in Dewanaagari alphabet

बच्चे खेलते रहे ।

bacce kh₀eltɛ rahɛ.

Legend:

- c = sound of *ch* in English *child* or of *c* in Italian *duce*; emulates Italian.
- kh₀ = aspirated *k*.
- ɛ = sound of *é* in English and French *fiancé*; distinguished from the *e* of English *pet*.

English, British pronunciation

beautiful, sunny day

bju^{tt}₀iful, sani dt₀.ei

Legend:

- j = sound of *y* in English *yes*.
- uu = long *u*.
- ^{tt} = alveolar plosive, the *t* sound of English *stop*, distinguished from the dental *t* sound of Spanish or Hindi/Urdu *tu*. In ^{tt}₀, the added subscripted circle indicates that this sound can be uttered unaspirated or aspirated, without changing the meaning of the word. (This is an example of the transcription of phonemic idiosyncrasy in *NAVLIPI*.)

- **dt** = alveolar plosive, the *d* sound of English *wordy*, distinguished from the dental *d* sound of Spanish *diente* or Italian *dente* or Hindi/Urdu *daant*. In **dt_o**, the added subscripted circle indicates that this sound can be uttered unaspirated or aspirated, without changing the meaning of the word. (This again is an example of the transcription of phonemic idiosyncrasy in *NAVLIPi*.)
- Other *NAVLIPi* glyphs (letters) already explained above.

Spanish, Madrid pronunciation

occurido la semana pasada
 okurriido laa sɛmaanaa paasaadaa

Legend:

- **aa**= sound of *a* in English *father*.
- Other *NAVLIPi* letters already explained above.

Arabic, Egyptian, Cairo pronunciation

استيقظ الشاب الطويل القامة فجأة وكأنه يكمل آخر ماتبقى
 ɔstɔjaak..ata eshʔaab_{oo}u at..aawilu alk..amati Fɔjɔ:ɔten wo kaannaau
 jukmelu a: axɛɔ mɔtɔb_{oo}k..ɔ

Legend:

- **ɔ** = sound of *a* in English *Jack* or *hat*. One of the only five new letters (glyphs) of *NAVLIPi*, supplementing the 26 glyphs (letters) of the Roman (Latin) alphabet.
- **k..** = pharyngeal/uvular *k* sound, usually transcribed into Roman script as *q* in current usage.
- **b_{oo}** = indicates voiced + unvoiced, i.e. that this can technically be uttered as a *b* or a *p* sound without changing the meaning of the word; but more precisely, in most Arabic, the *p* sound simply does not exist. (This is an example of the transcription of phonemic idiosyncrasy in *NAVLIPi*.)
- **t..** = the characteristic “pharyngealized” dental *t* sound of Arabic, of course phonemically distinguished from the “standard” dental *t* sound.
- **:** = the glottal stop, like the sound of the elided *t* of English Cockney *lot of money*, or of the ‘ in the original pronunciation of *Hawaii*’i.
- Other *NAVLIPi* letters already explained above.

Some more features of NAVLIPI to get a feel for it

Here are some more examples of *NAVLIPI* letters (glyphs) and usage that will give the reader a better idea of what *NAVLIPI* is all about; it is by no means comprehensive- for a more comprehensive review, the reader is referred to the detail found in the *NAVLIPI* book, Vol. I:

New letters (glyphs): *NAVLIPI* has only **five** new letters (in addition to the 26 of the Roman/Latin alphabet), of which two will be used rarely, since they are not common in the world's most widely used languages. The three that will be commonly used are:

- **ɔ** , an “inverted-c”, used for the sound of *a* in English *Jack* or *hat*.
- **Ω** , the “omega”, borrowed from the Greek to represent the *au* in English *caught*. This is used to distinguish from the *o* of Spanish *dos* .
- **ĵ** , an “inverted-j”, to represent the sound of the *j* in English *Jack* or *jet*. Thus, in *NAVLIPI*, the modern Roman letter *j* reverts to its original use as found in German, Swedish, etc., representing the sound of *y* in English *yes*. (The ancient Roman of course simply used the *i* in place of the later *j*). (The letter *y* is then used in *NAVLIPI* to represent the *u* of French *tu* or the *ü* of German *üblich*, thus reverting to its very original, “y-grecque” usage.)

Long and short vowels: Sticking to its objective of practical discretization, *NAVLIPI* recognizes only two vowel lengths, *short* and *long*, for most languages. It then simply doubles (reduplicates) the short vowel to represent the long one. Thus, **i** and **ii** are used to represent the vowels in English *bit* and *beet* respectively. The only exception here is for the vowel representing the *a* in English *father*. Since this is already represented in *NAVLIPI* by a double letter, **aa**, the long form of this vowel is transcribed **aa_o** in *NAVLIPI*, i.e. using a subscripted “little-circle” as a post-op. Quite evidently, in the rare languages that phonemically distinguish between, e.g., short, medium and long vowels, a triplication can be used to represent these, e.g., as **i**, **ii** and **iii**.

Phones related to the dental **t** and **d** sounds:

- (As already noted above), *NAVLIPI* uses **ṭ** to denote the alveolar *unvoiced* plosive, the *t* sound of English *stop*, to distinguish it from the dental *t* sound of Spanish or Hindi/Urdu *tu*.
- Similarly, it uses **ḍ** to denote the alveolar *voiced* plosive, the *d* sound of English *dumb*, or German *das* to distinguish it from the dental *d* sound of Spanish *dos* or Hindi/Urdu *do*. The **ḍ** in fact emulates some German and Swedish transcriptions, (e.g. in *Brandt*), which were originally intended to distinguish from the Latin, pure dental *d*.
- Similarly uses **ṭ̣** (letter *t* with strikethrough) to represent the retroflex (tongue curled back), *unvoiced* plosive found in Indian subcontinent languages (e.g. in Hindi/Urdu *taeni*, “branch/twig”, transcribed in *NAVLIPI* as **ṭ̣eeni**). And the corresponding *voiced* retroflex plosive is rendered **ḍ̣** (the letter *d* with double strikethrough), as in the *NAVLIPI* transcription of the Hindi/Urdu word that means “box”, **ḍ̣abbaa**.
- *Flaps* or *taps* are non-vowel sounds uttered with a fleeting, light flapping or tapping of the tongue at the articulation position, rather than a full closure followed by an explosion of the breath, as in a plosive. These are very characteristic of the Indian subcontinent languages. To represent these retroflex flaps, which are currently rendered in Dewanaagari script by adding a diacritic, a dot, under the Dewanaagari letter, *NAVLIPI* uses the post-op (**.**), i.e. a single dot. It thus, in a sense, emulates the Dewanaagari transcription, but using a post-op rather than a diacritic. Thus, the unvoiced and voiced retroflex flaps are rendered **ṭ̣.** and **ḍ̣.** respectively, in *NAVLIPI*.
- Thus, in place of the two letters **t** and **d** available in the Roman/Latin script to represent *all* these eight phones, *NAVLIPI* uses eight distinct glyphs: **t**, **ṭ**, **ṭ̣**, **ṭ̣.**, **d**, **ḍ**, **ḍ̣** and **ḍ̣.** And of

course, further, *NAVLIPI* transcribes phonemic idiosyncrasy in the Germanic and the South Indian Dravidian-base languages, most of which don't distinguish phonemically between aspirate and non-aspirate. Thus, when one types the letter *t* in the *NAVLIPI* English/W. European or Tamil keyboards, it automatically comes out as *t_o*, which means it can be pronounced as a *t* or a *th* sound.

Uvular and pharyngeal sounds:

- To represent uvular (or rarely, pharyngeal) plosives, e.g. as found in Arabic (e.g. the uvular unvoiced plosive transcribed in Roman script as *q*, as in *Al Qaeda*), *NAVLIPI* uses a simple post-op, a double dot (.), operating on the corresponding velar plosive. Thus, the *q* of Arabic is rendered *k.* in *NAVLIPI*.
- Similarly, the “pharyngealized dental” sounds, such as the *t* in Arabic *kitaab* (“book”), are also rendered with a double dot post-op.

Some common and less common post-ops:

- As also already noted above, the post-op for aspiration is *h_o*, i.e. the letter *h* with an added, subscripted little-circle. This emulates current Roman transcription (e.g. *ph* vs. *p*), but at the same time distinguishes from the letter *h*. Thus, the aspirated, unvoiced velar, dental and bilabial plosives are rendered, respectively, as *kh_o*, *th_o* and *ph_o*, respectively in *NAVLIPI*.
- Similarly, the post-op for fricativization is *h_o* i.e. the letter *h* with an added, subscripted oval. This post-op would again be used with (i.e. operate on) the corresponding plosive. Thus, the dental fricative sound of the *th* in the British and American (but not Indian!) English pronunciation of *thin* is simply transcribed *th_o* in *NAVLIPI*.
- To represent clicks, *NAVLIPI* simply uses the post-op *z*, i.e. the letter *z* with strikethrough. Thus, the lateral “giddyap” click, which is related to the *l*-sound, is simply rendered as *lz*, whilst the dental click, the sound represented as “tsk tsk” in English is simply rendered as *tz*.

Some other common phones and phonemes:

- **c** is used to represent the sound of the *ch* in English *child* or of the *c* in Italian *duce*. As noted above, this borrows from the Italian.
- As noted above, **ε** is used to represent the sound of the *a* in English *hay*, whilst **e** is retained solely for the *e* of English *pet*. The long form of the latter vowel, as in English *fair*, is then simply represented by a reduplication of this letter, i.e. **ee**. Thus, in *NAVLIPI*, English *fair* would be transcribed as *feer*.
- **sh_o** is used to represent the sound of the *sh* in English *sheet*. This attempts to accommodate the common English usage, at the same time using the post-op *h_o* to indicate that this is a fricative sound. (Clearly, it does not strictly abide by *NAVLIPI* notation, since *sh_o* would technically imply fricativization of the *s* sound, which is already a fricative.) In a similar manner, **zh_o** is used to represent the sound of the *s* in English *pleasure*.
- **x** is used to represent the velar fricative, the *ch* of German *doch* or the *kh* of Arabic *khilaaf* (“against”). This is again in line with usage found in many modern Roman transcriptions.
- **r** is used to represent the lateral phone variously pronounced as a trill, a semi-vowel or a flap/tap in different languages. In nearly all widely spoken languages, the *r* is actually a phonemic condensate, representing at least these three phones. Nevertheless, *NAVLIPI* still uses separate letters to distinguish the central trill, tap/flap and semi-vowel.
- To represent nasalization of a vowel, *NAVLIPI* offers two options: (1) The use of the tilde (~), but used as a post-op rather than a diacritic. (2) The post-ops **n_o** or **m_o**. Thus the French *non* could be transcribed in *NAVLIPI* as *no~* or *non_o* or, optionally, *nom_o*. (In common French pronunciations, a more accurate transcription may be *nΩ~*, but that is another matter.)

- Many West African languages, e.g. Igbo, phonemically distinguish between bilabial sounds and corresponding “velarized” bilabial sounds. In common Roman transcription, these pairs of sounds are usually transcribed as *p* and *kp*, *b* and *gb*, etc. However, in more accurate phonetic transcriptions found in many phonetic alphabets, the digraphs (e.g. *k* and *p*) are connected with a curved line underneath them to show that they represent a single, velarized sound, rather than two distinct phones. *NAVLIPi* retains the former, simpler Roman transcription (i.e. without the curved underline, which would be a diacritic), as it posits that any reader reading these languages in the universal script will be well aware of the unique velarized phones found in them, and will thus recognize **kp** and **gb** etc.

Transcription of tones: In *NAVLIPi*, tones are represented as post-ops. Three of the Mandarin tones were already used and explained in the short passage transcription above, and Mandarin provides a useful exemplar for elaboration of the *NAVLIPi* system of transcribing tones again. The post-ops used by *NAVLIPi* to transcribe the four tones of Mandarin are shown below. It is seen that the post-ops are meant to be graphical representations of the tones. E.g., the 2nd tone, “rising, mid-to-high”, has a 45° angle up-slope terminating in a short, upward hook.

- 1st tone, level, high: |
- 2nd tone: Rising, mid to high: 
- 3rd tone: Falling (mid-to-low) + rising (low-to-mid): 
- 4th tone: Falling, high-to-low: 

Keyboarding: More detail on the *NAVLIPi* keyboards is available on the FREE *NAVLIPi* KEYBOARDING SOFTWARE page on this site. Briefly, however, *NAVLIPi* keyboarding has the following salient features:

- The software at present comes as the following five (5) different, language-specific “keyboards”. (Additional keyboards, e.g. one for West African languages, will be added in the future.) These keyboards are all usable simultaneously once the software is installed and the user can freely toggle between them at will. These keyboards are pre-selected from a menu prior to starting to type. This selection is made outside the word processor. Each keyboard is further available in five (5) “fonts”, approximating *Times New Roman*, *Arial*, *Courier*, *Calibri* and a *Script*-type font. These further fonts are selected from the font menu within the word processor, much as one might select *Arial* or *Times New Roman* in *Word*. One can also of course select the font *size* for the font chosen, again from the word processor’s menu, as done normally with other fonts. The five (5) language-specific keyboards are:
 - (1) *English/West European*: Applicable to all *non*-Romance languages of Europe (e.g. German, Russian, Hungarian and isolates such as Basque).
 - (2) *Hindi/Spanish*: Applicable to all languages of the northern part of the Indian subcontinent, including Pushtu, Dari and the non-Indo-European “tribal” languages, and to Faarsi (Persian), Baloch (Baluchi), Kurdish, and other Indo-European languages of the near East. It is also applicable to all Romance languages of Europe and to Greek.
 - (3) *Mandarin/Cantonese*: Applicable to all Sino-Tibetan languages.
 - (4) *Arabic*: Applicable to Arabic, Hebrew, Amharic and related languages.
 - (5) *Tamil*: Applicable to all Dravidian languages of the southern part of the Indian subcontinent and to Singhalese. Also applicable to non-Dravidian “tribal” South Indian languages.