What Does “Traditional Phonology” Have to Offer a New Phon Lab?
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(1) The current state of phonology
a. diverse, disjointed, unclear boundaries, disparate goals
b. a lot of introspection, stock-taking, critiques, healthy diversity of views and agendas
c. largely oriented towards the surface due to optimality theory and technology
d. cutting-edge research tends to be experimental, instrumental, quantitative, computational
e. increasing rejection of the basic concepts and methodologies of the structuralist-generative heritage, ultimately denying that phonology is anything like we used to think

(2) What is “traditional phonology”?

a. phonology = grammar
b. structuralist commitment
   i. two or more levels of representation
   ii. rules or constraints to relate these levels
   iii. discrete categories and distinctive features
   iv. metrical constituents and prosodic domains
c. central role of “contrast”

(3) Virtually all of the above has been questioned by someone, e.g. whether there is a distinction between phonetics and phonology, whether there are underlying forms, whether there are (discrete) categories, whether one can maintain a distinction between synchrony and diachrony, etc.

(4) In short, is there robust patterning in phonology as has been traditionally assumed?

   ...all phonology might ultimately be redistributed between the theory of phonetic rules and the theory of lexical organization... insofar as rules apply postlexically, they are phonetic and gradient, and insofar as they treat discrete categories, they are part of the lexicon rather than applying to the output of syntax.
   Of the Ilokano rules [I] studied... either they seemed phonetic in character, so that my conventional phonetic transcription represented an over idealized categorization of continuous data, or they struck me as not fully productive, lexicalized rules. At the time I occasionally wondered, “Where is the normal phonology that I was trained to study?”

   ...at the proper level of description, all phonological patterns are sound changes in progress, as they are all gradiently and variably implemented, and they are all ever-changing... gradience and variation are the very stuff of phonology and sound change.... (p.214)
   ...the phoneme is not an entity on any level — functional, phonetic, psychological or even metaphorical. Rather, at best, “phoneme” is merely a terminological expedient.... (p.215)

(5) Perhaps useful to consider an analogous (robust?) example from syntax

a. Yes-no question formation in English as “I was trained to study”
   i. invert the first word of the auxiliary with the subject:
John could have denied it → Could John have denied it?

ii. if there is no auxiliary, insert do and apply the rule:
John denied it → Did John deny it?

b. The rule requires the “discrete” categories as SUBJECT, AUXILIARY and WORD — but fuzzy!

c. Makes predictions about what constitutes a word in English (Zwicky & Pullum 1983)
   i. John couldn’t deny it → Couldn’t John deny it?
   ii. John could’ve denied it → Could John’ve denied it (*Could’ve John denied it?)

d. Use of yes-no question inversion is not automatic (Enfield & Stivers 2009)
   i. Subject-auxiliary inversion: Did you drive your car to work this morning? 19.4%
   ii. Declarative + tag: You drove your car to work this morning, right? 29.9%
   iii. Declarative (±intonation): You drove your car to work this morning? 43.3%
   iv. Indirect speech act: I guess you drove your car to work this morning. 7.5%

e. While “phonetically-based phonology” seeks a non-arbitrary, deterministic relation between phonological patterning and phonetics, subject-aux inversion seems to be an uncontroversial “rule” of English grammar independent of whether analogous “grounding” can be established

(6) Recurrent confusion between research agenda and “truth”

   a. if you are interested in gradience, there’s plenty to be found
   b. if you are interested in structural patterning, there’s plenty of that too
   c. “phonetically-based phonology” is a research agenda: how far can we (they) get by bringing the phonetics into the phonology; where does it “leak”?
   d. some feel that the goal of linguistics is to study speaker-hearers rather than languages, thus phonology could be about mouths, ears, and brains—rather than sound systems
   e. often claimed that linguistics is a branch of cognitive science; cf. the “call” to be cognitive
   [Linguistics] developed originally as a branch of cultural anthropology and philology but has developed in past decades as a branch of cognitive science. (Professional Master’s Programs in the Social Sciences: Current Status and Future Possibilities, a report to the Ford Foundation, Council of Graduate Schools, 2002, p.18)

Phonology is a branch of cognitive science. (Bruce Hayes, Workshop on Phonology: An appraisal of the field, Linguistic Society of America Annual Meeting, Anaheim, Jan. 4-7, 2007.)

The central object of inquiry in linguistics... is the nature and structure of the cognitive faculty that supports Language. This is by no means all that linguists do, and I do not mean to denigrate the study of ways Language is used, the role of Language in society, and other pursuits. I do want to claim, though, that the central task for a “scientific study of language” is to arrive at an understanding of an aspect of human cognitive organization. It is this that, like it or not, makes cognitive scientists of us all. (Anderson 2008:796)

f. linguistics as cognitive science = a research agenda, an attempt to give purpose to the field

g. linguistics has other crucial interfaces and applications (e.g. culture, interaction, history, contact, population movements, documentation, e.g. of endangered languages), but also concern of seeking internal, cross-linguistic, and typological generalizations, universals

h. this does not negate the existence of an autonomous core to linguistics—concepts and methodologies in which only linguists partake—which continues to provide rich insights into the nature of language through theoretical, typological, descriptive and historical investigation
What does traditional phonology have to offer a phon lab whose interests are likely to concern production, perception, cognition etc.? Can the formal, typological, descriptive, and historical study of phonological systems be helpful? Two dichotomies: (i) phonetics vs. phonology; (ii) synchrony vs. diachrony.

Characterizations of phonetics vs. phonology by those who assume a difference

<table>
<thead>
<tr>
<th>phonetics</th>
<th>phonology</th>
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<tbody>
<tr>
<td>quantitative</td>
<td>qualitative</td>
</tr>
<tr>
<td>gradient</td>
<td>categorical</td>
</tr>
<tr>
<td>continuous</td>
<td>discrete, quantal</td>
</tr>
<tr>
<td>physical</td>
<td>symbolic</td>
</tr>
<tr>
<td>analog</td>
<td>digital</td>
</tr>
<tr>
<td>semantic</td>
<td>syntactic</td>
</tr>
</tbody>
</table>


“The relationship of phonology to phonetics is profoundly affected by the fact that it involves disparate representations.” (Pierrehumbert 1990:378)

A universal phonetic tendency is said to become “phonologized” when language-specific reference must be made to it, as in a phonological rule. (Hyman 1972:170)

...the original cause for the emergence of all alternants is always purely anthropophonic (Baudouin de Courtenay 1895 [1972:184])


universal phonetics > language-specific phonetics > phonology

(“mechanical”) > (“speaker-controlled”) > (“structured”)

One way to look at this is that phonetics can tell phonology what it doesn’t have to account for.

...it is... very much part of the business of phonologists to look for “phonetic explanation” of phonological phenomena.... just as when syntacticians look for pragmatic accounts of aspects of sentence structure, the reason is to determine what sorts of facts the linguistic system proper is not reponsible for... (Anderson 1981:497)

Phonology has sometimes not distinguished between accounting for two different things

a. synchronic properties which have a direct link to their phonetic origins, e.g. Cohn’s (1998:30) phonetics and phonology “doublets”

b. synchronic properties which do not have such a direct link, but rather represent restructurings, rule-inversions, analogies etc. (and are not necessarily “crazy rules”)

Synchronic vs. diachronic naturalness

any... historical sound change is a potential synchronic P-rule... it is not the case that every synchronic P-rule is a possible sound change.... One frequent cause of this asymmetry is that some synchronic rules collapse or ‘telescope’ more than one (natural) sound change. (Hyman & Schuh 1974:84).

In other words, phonology should be able to tell phonetics what it doesn’t need to account for...
For the rest of my talk I would like to focus on an example of each of the situations in (11), both concerning the phonetic vs. phonological properties of voiced prenasalized stops (\(^m_b\), \(^n_d\), \(^g_g\)) and nasal + voiced stop sequences (mb, nd, ng), both of which will be abbreviated as ND.

a. postnasal devoicing /mba/ → [mpa] (allegedly unnatural but occurring)
b. F0-lowering after ND /mbá/ → [mbà] (natural but inconsistent)

Post-nasal voicing = widespread

Perhaps the most common process to apply to the oral consonant in nasal-oral sequence is post-nasal voicing of voiceless consonants. (Herbert 1986:236)

A healthy supply of languages voice obstruents after nasals, but not after vowels, glides, or liquids. (Hayes 1995b:2).

Yao postnasal voicing [Eastern Bantu] (Ngunga 2000)

a. ku-N-péleka → kuu-m-béleka ‘to send me’ -N- ‘1 sg. object prefix’
ku-N-túma → kuu-n-dúma ‘to order me’
ku-N-ćápila → kuu-n-jápila ‘to wash for me’
ku-N-káána → kuu-n-gáána ‘to refuse me’
b. ku-N-sóosa → kuu-sóosa ‘to look for me’

Post-nasal voicing is a common response to the constraint *NT: “avoid nasal+voiceless stop” (< Pater’s 1996 *NC, which accounts for the conspiratorial nasal effacement in (15b))

NT → ND = “grounded”, “phonetically driven”, “widely attested”

...the tendency toward postnasal obstruent voicing is present in all languages that have nasal + voiceless obstruent (“NC”) clusters; all languages must “deal with it”, either phonologically by abandoning the attempt to produce NC clusters, or phonetically by establishing an outcome that preserves the contrast in spite of the pressure to obliterate it. (Hayes 1999, abstract from website)

Post-nasal devoicing would be quite “unphonetic” and unexpected

ND → NT = “ungrounded”, “rare or unattested” (Hayes 1999:263, Flemming 1995:3)

Devoicing DOES occur, e.g. in Tswana [S. Bantu] (Tucker 1929, Cole 1955, Dickens 1977 etc.)

a. bón-á ‘see’
   dis-á ‘watch’
   áráb-á ‘answer’
   (/g/ → Ø when not postnasal)
b. m-pón-á ‘see me!’
   n-tis-á ‘watch me!’
   n-kařáb-á ‘answer me!’ (< N-gáráb-)

A *ND constraint accounts for the postnasal devoicing in (18), the conspiracy in (19a) and the distributional absence of [ND] throughout the Tswana lexicon in (19b)

a. mu-bón-é → m-món-é ‘see him!’
   mu-bits-é → m-míts-é ‘call him!’
   cf. bón-á ‘see’, m-pón-á ‘see me’
   bits-á ‘call’, m-píts-á ‘call me’

b. Distribution of NC in Tswana, based on Creissels (1996), ca. 5,700 lexical entries
(20) Many other languages have NT but not ND (see Hyman 2001); however, the phonetic facts and the *ND constraint in Tswana have been called into question by Zsiga, Gouskova & Tlale (2007)

(21) Postnasal devoicing in closely related Shekgalagari (Dickens 1986, Solé et al, in preparation)

<table>
<thead>
<tr>
<th></th>
<th>mp</th>
<th>mph</th>
<th>mb</th>
<th>nt</th>
<th>nth</th>
<th>nd</th>
<th>ntl</th>
<th>nths</th>
<th>nk</th>
<th>njh</th>
<th>ng</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>5</td>
<td>3</td>
<td>---</td>
<td>1</td>
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<td>4</td>
<td>2</td>
<td>10</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>C2</td>
<td>22</td>
<td>2</td>
<td>2</td>
<td>21</td>
<td>1</td>
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<td>8</td>
<td>3</td>
<td>5</td>
<td>14</td>
<td>16</td>
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<td>C3</td>
<td>4</td>
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</tbody>
</table>

two exceptions: ámbúľénsi 'ambulance'; bánibapėţa 'gratter fort'

(22) Reduplication shows that devoicing is clearly phonological (RED = ‘do X a little here & there’)

<table>
<thead>
<tr>
<th></th>
<th>xu-paka-paka ‘to praise’</th>
<th>xu-m-paka-paka ‘to praise me’</th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>xu-tuta-tuta ‘to respect’</td>
<td>xu-n-tuta-tuta ‘to respect me’</td>
</tr>
<tr>
<td></td>
<td>xu-k'óba-k'óba ‘to beat’</td>
<td>xu-ŋ-k'óba-k'óba ‘to beat me’</td>
</tr>
<tr>
<td></td>
<td>xu-kela-kela ‘to show’</td>
<td>xu-ŋ-kela-kela ‘to show me’</td>
</tr>
<tr>
<td>b.</td>
<td>xu-bona-bona ‘to see’</td>
<td>xu-m-pona-pona ‘to see me’</td>
</tr>
<tr>
<td></td>
<td>xu-duja-duja ‘to point at’</td>
<td>xu-n-tu-a-tu-a ‘to point at me’</td>
</tr>
<tr>
<td></td>
<td>xu-g'isa-g'isa ‘to feed’</td>
<td>xu-ŋ-k'isa-k'isa ‘to feed me’</td>
</tr>
<tr>
<td></td>
<td>xu-ata-ata ‘to like’</td>
<td>xu-ŋ-kata-kata ‘to like me’</td>
</tr>
<tr>
<td>c.</td>
<td>xu-ŋsa-ŋsa ‘to defeat’</td>
<td>xu-m-p'ŋsa-p'ŋsa ‘to defeat me’</td>
</tr>
<tr>
<td></td>
<td>xu-sup-a ‘to point at’</td>
<td>xu-n-ts'upa-ts'upa ‘to point at me’</td>
</tr>
<tr>
<td></td>
<td>xu-jeba-jeba ‘to look at’</td>
<td>xu-ŋ-t'eba-t'eba ‘to look at me’</td>
</tr>
<tr>
<td></td>
<td>xu-xana-xana ‘to refuse’</td>
<td>xu-ŋ-k'ana-k'ana ‘to refuse me’</td>
</tr>
<tr>
<td>d.</td>
<td>xu-zitsa-zitsa ‘to inform’</td>
<td>xu-n-tsitsa-tsitsa ‘to inform me’</td>
</tr>
<tr>
<td></td>
<td>xu-zwel-zwel ‘to tell’</td>
<td>xu-ŋ-t'wel-t'wel ‘to tell me’</td>
</tr>
</tbody>
</table>
Voicing into closure: Stops

(23) /xʊ-m-bóːn-a/ 'to see me' → xʊ-m-pón-á in both Tswana and Shekgalagari, but /xʊ-mu-bóːn-a/ 'to see him' is realized differently

a. Tswana: *ND functions as a conspiracy /xʊ-mu-bóːn-a/ → xʊ-m-móːn-á
b. Shekgalagari: classic counterfeeding opacity /xʊ-mu-bóːn-a/ → xʊ-m-bóːn-á

(24) As a result, [mp] and [mb] contrast in Shekgalagari (but not in Tswana)

a. /xʊ-m-bóːn-a/ → xʊ-m-pón-á 'to see me'
b. /xʊ-mu-bóːn-a/ → xʊ-m-bóːn-á 'to see him/her'

(25) Solé et al (in preparation) did an instrumental study of Shekgalagari, including an examination of

a. [mp] from /m+p/ : [m-palɛl-a] 'refuse me!' /xʊ-palɛl-a/ 'to refuse'
b. [mp] from /m+b/ : [m-palɛl-a] 'count for me!' /xʊ-balɛl-a/ 'to count for'
c. [mb] from /m+b/ : [m-balɛl-e] 'count for him!'

(26) The results (NB There also are a few exceptional cases of [nd, ŋũ, ŋ])

a. there is no phonetic difference between [mp] from /m+p/ (“voiceless”) vs. /m+b/ (“devoiced”) in the voicing into closure or any of the other parameters analyzed

b. the degree of passive voicing of nasal + voiceless stop does not exceed that of vowel + voiceless stop (cf. Coetzee, Lin and Pretorius 2007 for Tswana)
c. instead there is anticipatory partial denasalization of the nasal before voiceless consonants, including the [mp, nt, ŋkũ, ŋk] which derive from /mb, ŋd, ŋgũ, ŋg/

(27) Interpretation

a. early raising of the velum (most likely to ensure sufficient oral pressure for the following obstruent) results in devoicing (and affrication of N+fricative sequences, e.g. /nz/ → nts)

These two facts taken together, lack of greater passive voicing of voiceless stops postnasally and “intrusive” stops, suggest speakers of these languages inhibit nasal leakage into the stop closure by an early raising of the velum relative to the oral constriction in ND sequences. Such early velic raising during the oral closure for the nasal will result in a long stop closure (with the nasal and oral valves closed) which, in the absence of articulatory adjustments, is likely to devoice (due to the difficulty to sustain vocal fold vibration as oral pressure rises over time, and the pressure differential drops below the threshold for vocal fold vibration (Ohala 1983)). Similarly, in NZ sequences, anticipatory velic closure will result in an intervening stop and oral pressure rise during the stop and fricative constriction leading to passive devoicing. The devoiced obstruent, having a strong release burst due to the high pressure accumulated in the oral cavity, may have been reinterpreted as voiceless. (based on Solé et al, in preparation)

b. further support comes from the fact that Shekgalagari unaspirated stops are variably ejective (Monaka 2005a,b), as elsewhere in the Sothro-Tswana group
The coordination of active laryngeal raising and cricothyroid activity would create aerodynamic and articulatory conditions to inhibit voicing. The goal of laryngeal raising is most often to devoice a segment, not to increase articulatory strength. (Dicanio 2008:74)

c. recalling the Hayes’ quote in (17) re postnasal voicing, if anything, Shekgalagari appears to “deal with it” by taking active countermeasures, including the coordination of laryngeal raising for ejectives (= enhancement?), which can be schematized as:

\[ *m+b > mbb > mp \sim mp' \] (longer stop closure, devoicing, ejectivization)

(28) Moral: the phonetics-phonology relationship is more symbiotic than sometimes assumed
a. phonetics makes a prediction (e.g. postnasal consonants tend to be voiced, not voiceless)
b. phonology finds a counterexample (in fact, several—Hyman 2001)
c. phonetics helps confirm that the counterexample is “real”

(29) The second ND property has to do with its inconsistent behavior with respect to so-called voiced obstruent “depressor consonant” effects on tone which
a. trigger
   i. lowering of H or L
   ii. conversion of H to LH or L
   iii. delinking of H (esp. if followed by H)

b. block
   i. raising of H or L
   ii. H tone spreading (see (30a))
   iii. H tone plateauing

(30) Depressors block H tone spreading in Ikalanga, e.g. /z'v/ (Hyman & Mathangwane 1998:197, 204)

\[
\begin{array}{c}
\text{ci-pó} \quad \text{cii-có} / \quad \text{‘your gift’} \\
\hline
\text{L} \quad \text{H} \quad \text{L} \quad \text{H}
\end{array}
\quad \quad
\begin{array}{c}
\text{z’i-pó} \quad \text{z’i-ì-zó} / \quad \text{‘your gifts’} \\
\hline
\text{L} \quad \text{H} \quad \text{L} \quad \text{H}
\end{array}
\]

Since L-H and H-L tend to become L-LH and H-HL as a natural horizontal assimilation [tone spreading], it can now be observed that the natural tendency of tones to assimilate sometimes encounters obstacles from intervening consonants. Voiceless obstruents are adverse to L-spreading, and voiced obstruent are adverse to H-spreading. The inherent properties of consonants and tones are thus often in conflict with one another. In some languages (e.g. Nupe, Ngizim, Ewe, Zulu), the consonants win out, and tone spreading occurs only when the consonants are favorably disposed to it. In other languages (e.g. Yoruba, Gwari), the tones win out, as tone spreading takes place regardless of the disposition of intervening consonants. (Hyman 1973:165-166)

(31) Two interpretations of the effect of voiced obstruents on F0
a. enhancement of the phonetic voicing  
   b. enhancement of the phonological [voice] contrast

...because no other articulation is likely to produce the F0 depression as an automatic byproduct, the depression must itself be a product of an independently controlled articulation, whose purpose is to enhance the [voice] contrast.” (Kingston & Diehl 1994:425)

Enhancement of the type we are considering here can be considered as a form of ‘fine-tuning’ of a basic phonological contrast.” (Keyser & Stevens 2001:287)

(32) Consonant and tone features according to Halle & Stevens (1971), Halle (1972)

<table>
<thead>
<tr>
<th></th>
<th>tones</th>
<th>voiceless obstruents</th>
<th>sonorants</th>
<th>voiced obstruents</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H M L</td>
<td>p t k f s m n l w y</td>
<td>b d g v z</td>
<td></td>
</tr>
<tr>
<td>stiff</td>
<td>+ - -</td>
<td>+ - -</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>slack</td>
<td>- - +</td>
<td>- - -</td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>
(33) Further considerations/complications
   a. the above 3-way distinction is not sufficient for tone, e.g. up to 5 contrastive pitch levels
   b. the above 3-way distinction is not complete for consonants (Hombert 1978), e.g. implosives
      are pitch-raisers, hence are expected to pattern with voiceless obstruents
   c. while the “best” pitch depressors are fully or breathy voiced obstruents, and although the
      phonetics of voice is complex (Kingston & Diehl 1994), depressor consonants readily become
      unvoiced, e.g. in Nguni (Schachter 1976, Traill 1990, Downing, to appear)
   d. prenasalized voiced stops [mb, nd, ñɡ] are sometimes depressors, sometimes not

(34) Is it phonetic voicing or enhancement of CONTRASTIVE [voice] that causes depressor effects?
...F0 will only vary with the presence of voicing in stops that contrast for [voice].... (Kingston &
Diehl 1994:436)
Since implosives and prenasalized stops are not contrastively voiced [in Suma], they are assumed to
be unspecified for the feature [voice] and, therefore, naturally excluded from the depressor consonant
group. (Bradshaw 1995:263)
Il convient de souligner que seules les consonnes phonologiquement sonores—c’est-à-dire s’opposant
à des sourdes de même point et mode d’articulation—exercent un effet d’abaissement [in Yulu], ce
qui n’est jamais le cas des consonnes phonétiquement sonores des séries glottalisée (partiellement),
prénasalisée, nasale continue et vibrante. Cet état prouve, s’il en est besoin, la pertinence d’une
approche phonologique des unités articulatoires. (Boyeldieu 2007:5)

(35) Testible hypothesis: ND will function as depressor consonants only if ND contrasts with NT

(36) Three of four logical combinations are found concerning the contrastiveness and F0 effects of ND

<table>
<thead>
<tr>
<th></th>
<th>ND contrasts with NT</th>
<th>ND doesn’t contrast with NT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ND = depressor</td>
<td>Nguni*</td>
<td>Lamang, Musey, Ngizim, Ouldeme, Podoko; Shona</td>
</tr>
<tr>
<td>ND ≠ depressor</td>
<td></td>
<td>Bole, Geji, Miya, Zar; Yulu, Suma, Ikalanga, Mijikenda*</td>
</tr>
</tbody>
</table>

* Nguni includes Swati, Zulu, Ndebele, Xhosa; Mijikenda includes Giryama, Digo, Kauma, Rihe.

(37) Apparent generalizations
   a. if /ND/ contrasts with /NT/, /ND/ will have the same F0 effects as /D/
      In all cases [in Swati], the prenasalized counterparts of depressor consonants are themselves
depressor consonants, while the prenasalized counterparts of non-depressor consonants are
themselves nondepressors. (Schachter 1976:213)
   b. if ND does not contrast with NT, ND may have the same F0 effects as /T/ or /D/

(38) Post-nasal de-aspiration in Nguni (NTʰ > NT), e.g. Ndebele (Pelling 1971; Galen Sibanda, p.c.)
   a. u-pʰondo ‘horn’   pl. im-pondo   cf. impisi ‘hyena’
      u-pʰawu ‘sign, mark’ pl. im-pawu   imbizi ‘pot, pan’
   b. u-tʰango ‘fence’   pl. in-tango   cf. intaba ‘hill, mountain’
      u-tʰungo ‘rafter’   pl. in-tungo   indaba ‘matter, news, report’
   c. u-kʰuni ‘firewood’ pl. iŋ-kuni   cf. iŋkalo ‘waists, hill passes’
      u-kʰalo ‘waist’   pl. iŋ-kalo   iNgalo ‘arm’

But note that NT > NTʰ is more widespread, e.g. Mwiini, Zigula, Pokomo, Pare, Shambala,
Ngulu, Bondei, Namwanga, Chichewa; NT > Tʰ is also widespread, e.g. Swahili, Yaa, Giryama,
Digo, Yaka, Cokwe, Makua, Venda
Two further points re /NT/ vs. /ND/, both illustrated by Ikalanga (Mathangwane 1999)

a. contrastive [NT] may be found only in borrowings, e.g. Ikalanga kámpá ‘a camp’, pénte ‘paint’, donkí ‘donkey’

b. *NT can develop into depressor consonants
   i. *mp, *nt, *ŋk > p̥, t̥, fi (Ikalanga) (ND = non-depressors)
   ii. *mp, *nt, *ŋk > m̥, n̥, fi (Shona) (ND = depressors)

Possible interpretations of the variable depressor status of non-contrastively voiced ND

a. different phonetic properties (e.g. timing): prenasalized stops vs. poststopped nasals—not likely (see Cohn & Riehl 2008)

b. different tonal processes (phonologized/morphologized, lexical/post-lexical?) — not likely:
   i. register lowering after ND in Podoko, but not in Yulu
   ii. H tone spreading blocked by ND in Ngizim but not in Bole or Zar

c. different historical sources: *NT, *ND, *D, *N, etc.—not likely (cf. Shona vs. Ikalanga)

Well-known that the prenasalization of ND can be “redundant” (depending on the analysis)

a. the New Guinea Pattern, also Mixtec: “hypervoicing” (Iverson & Salmons 1996)
   /p, t, k/
   /b, d, g/ → mb, nd, ng (by position or in all environments)
   /m, n, ŋ/

b. the South American Pattern (e.g. Maxakalí; Gudschinsky et al 1970:84-85, Wetzels 2007)
   /p, t, k/
   /b, d, g/
   /m, n, ŋ/ → mb, nd, ng (before an oral vowel)

/ND/ must be underlying in Chadic whether [+depressor] (Ngizim) or [-depressor] (Miya)

   p t c k kW
   b d j g gW
   m n ŋ
   mb nd ng gW
   ɓ ɗ j’ (+ other consonants)

Numerous phonological accounts are available (“The Too Many Analyses Problem”)

a. different underlying representations: analyze [ND] as /NT/ vs. /ND/

b. different featural analyses of /ND/: e.g. obstruent vs. sonorant (cf. Schuh 1998 for Miya)

c. different contrastive hierarchy (Dresher 2003, Mackenzie 2008)

Contrastive hierarchy approach predicts that contrastive [+voice] on ND must be present (and hence have a depressor effect), but non-contrastive [+voice] need not be (Mackenzie 2008)

a. Ngizim  b. Miya
   [+voice] [-voice]  [+prenasalized] [-prenasalized]
   [+prenasal] [-prenasal]  [+voice] [-voice]
(45) Maybe a different opposition is being enhanced: [ND] vs. [N]; cf. Masa (Chadic, Chad) L vs. M as a function of the initial root segment (Caïtcoli 1978:77)

<table>
<thead>
<tr>
<th>initial root segments</th>
<th>tone</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. b, d, g, v, z, ž, š, ř</td>
<td>L “Le ton moyen est incompatible avec les consonnes</td>
</tr>
<tr>
<td>b. p, t, k, f, s, č, ř, h, š, ř, f, l, r, w, y, a, e, i, o, u</td>
<td>M sonores ayant une correspondante sourde....”</td>
</tr>
<tr>
<td>c. m, n, η</td>
<td>L, M = contrastive (*mb, *nd, *ŋ &gt; m, n, η; cf. Musey)</td>
</tr>
</tbody>
</table>

(46) Western Austronesian NDV > N³V > NV without merger with N (or NT) (Court 1970)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Sea Dayak</td>
<td>[nâŋ(a)] ‘to set up ladder’</td>
<td>[nâŋa] ‘to straighten’</td>
</tr>
<tr>
<td>b. Sundanese</td>
<td>[mâŋ(d)] ‘to bathe’</td>
<td>[mâŋi] ‘very’</td>
</tr>
<tr>
<td>c. Ulu Muar Malay</td>
<td>[mŋøet] ‘to twitch’</td>
<td>[mŋøei] ‘to bellow’</td>
</tr>
<tr>
<td>d. Mëntu Land</td>
<td>[møm(b)ak] ‘gong stick’</td>
<td>[mømæk] ‘sleeping mat’</td>
</tr>
<tr>
<td>Dayak</td>
<td>[nîn(d)ai] ‘to love’</td>
<td>[nînai] ‘snake (sp.)’</td>
</tr>
</tbody>
</table>

(47) So, why is non-contrastively voiced ND sometimes a depressor, sometimes not? Problem: We don’t have a (phonetic) base line: We don’t know what the (intrinsic) phonetic F0 effect of ND is expected to be: (i) depressor like D? (ii) neutral like N? (iii) either? (iv) intermediate? (cf. (32))

<table>
<thead>
<tr>
<th>voiceless obstruents</th>
<th>&gt; sonorants</th>
<th>&gt; voiced prenasalized</th>
<th>&gt; voiced obstruents</th>
</tr>
</thead>
<tbody>
<tr>
<td>p t k f s</td>
<td>m, n, l, w, y</td>
<td>mb, nd, řg</td>
<td>b d g v z</td>
</tr>
<tr>
<td>tone:</td>
<td>H</td>
<td>M</td>
<td>?</td>
</tr>
<tr>
<td>stiff</td>
<td>+</td>
<td>-</td>
<td>?</td>
</tr>
<tr>
<td>slack</td>
<td>-</td>
<td>-</td>
<td>?</td>
</tr>
</tbody>
</table>

(48) Conclusions

a. the relationship between phonetics and phonology is a symbiotic, not antagonistic one
b. two cases were presented showing how each feeds the other:
c. phonology presents and phonetics confirms cases of postnasal devoicing as a counterprocess to the better-known phonetically-grounded process of postnasal voicing
d. phonology presents conflicting effects of voiced prenasalized consonants (ND) on tone, on which phonetics has not yet spoken—but will do so soon, I predict

(49) Final questions

a. experimental, instrumental, quantitative, computational studies are important, necessary, etc. but do they render obsolete the concepts and methodologies of traditional phonology?
b. has traditional phonology reached a deadend? Is synchronic phonology likely to see as dramatic an expansion of the knowledge base as phonetics, psycholinguistics, and even morphology and syntax? (Is traditional phonology a victim of its own success?)
c. while traditional phonology has centered around the development and application of theories and methodologies to help gain and express insights into the nature of phonological systems, do some deny structural phonology because of “truth” or because they have a different agenda and/or wish to look at speech sounds at a different “level” (e.g. Port & Leary 2005)?
d. traditional phonology is a branch of grammar and will be around as long as linguists care about grammar
e. I do not wish to denigrate those who want to focus on neurons, laryngeal muscles, reaction times, or the effects of sounds on the cilia in the inner ear.... Although I would not want to
confuse MY research agenda with “truth”, I would personally be quite comfortable if we modified Steve Anderson’s assertion in (6e) as follows:

the central task for a “scientific study of language” is to arrive at an understanding of grammatical structure, typology and universals, both synchronic and diachronic. It is this that, like it or not, makes grammarians of us all.

References


Creissels, Denis. 1996. Lexique Tswana-Français on diskette. Lyon. [ca. 5700 entries]