Some Interesting Implications of Clicks

Wm. G. Bennett
Rutgers University

1. Overview

(1) The overall use of click consonants in natural languages ranges from none at all (in languages like English) to frequent use of a complex inventory of clicks (in many Khoisan languages). However, a cross-linguistic survey[1] shows that the distribution of clicks is surprisingly limited.

(2) Only a few patterns of distribution occur in natural languages; specifically, clicks are always restricted to onsets, or root-initial onsets.

(3) When nasal and non-nasal (='oral') clicks have different distributions, nasal clicks are always less restricted than non-nasal clicks.

Two observed universals

(4) Clicks are never codas

(5) Every language with clicks has nasal clicks

Two implicational relationships

(6) Non-initial clicks imply initial clicks [...!] → [#!][2]

(7) Oral clicks imply nasal clicks [!] → [n!]

Aims of this talk

(8) Present a phonological explanation for the universals in (4) & (5), and the typologies associated with them, based on airstream features

(9) Show how this explanation derives the implicational relationships in (6) & (7)

(10) Point out one interesting implication of this proposal: phonetically impossible segments may be outputs of phonology

---

* I am deeply indebted to all the people who got me interested in clicks, and everyone who gave me advice on this presentation. The list includes: Amanda Miller, Bonny Sands, Akin Akinlabi, Paul de Lacy, Alan Prince, Paula Houghton, Seunghun Lee, Mike O'Keefe, Jimmy Bruno, Aaron Braver, Jeremy Perkins, Patrick Houghton, Carlo Linares, Tiffany Kershner, Zukile Jama, and Russell Kaschula. Thanks, everyone!

[1] The universals and typologies presented here are based on the occurrence of clicks in approximately 30 languages. A full list of these is included in the appendix.

[2] **Transcription conventions: *!* is a plain click, *n!* is a nasal click, *g!* is a voiced click.**

Short overview of the proposal

Features and representations:

(11) Two airstream features, [±lingual][3] & [±pulmonic], distinguish the relevant segment types, in the following way:

a. Vowels and normal pulmonic consonants are [−lingual, +pulmonic]

b. Oral clicks are [+lingual, −pulmonic]

c. Nasal clicks are [+lingual, +pulmonic]

Constraints: (Definitions in section 5)

(12) *[+lingual]

(13) IDENT-Onset-[lingual]

(14) IDENT-Initial-[lingual]

(15) AGREE [pulmonic]

(16) IDENT-Onset-[pulmonic]

(17) IDENT-Initial-[pulmonic]

2. Typology of click occurrence patterns

(18) There are only 3 patterns for where languages can allow clicks. Clicks may be:

a. Forbidden in all positions (English)

b. Allowed in word-initial onsets, but not anywhere else (N|uu)

c. Allowed in any onset (isiZulu)

(19) Some examples:

Pattern	Language	Example words	Impossible words
18a	English	[noʊ.ziʲ], ‘nosy’	*[n!oʊ.!iʲ], *[n!oʊ.ziʲ]
18b	N|uu[4]	[ǁu.ni], ‘be lost’	*[ǁu.n!i]
18c	isiZulu[5]	[i.li.li], ‘earring’	–

[3] Terminological note: ‘lingual’ airstream is comparable to ‘ingressive velaric’ in older sources

[4] N|uu data from Miller (2007)

[5] Zulu data primarily from Doke (1930/1984)

(20) There are also only 3 attested patterns for the distribution of nasal & oral clicks relative to each other. Languages may allow:

a. Nasal clicks only (Dahalo)

b. Nasal & oral clicks initially, only nasal clicks word-medially (Sandawe)

c. Nasal and oral clicks anywhere clicks are allowed (isiZulu)

(21) Some examples:

Pattern	Language	Example words	Impossible words
20a	Dahalo[6]	[nǀa.ba], 'forest'	*[ǀa.ba]
20b	Sandawe[7]	[ǁˀo.nǁˀa], 'baboon'	*[ǁˀo.ǁˀa]
20c	isiZulu	[ǀa.ǀa], 'climb!'	-

(22) Some notable non-occurring patterns:

a. Plain clicks, but no nasal clicks ('Anti-Dahalo')

b. Oral & nasal clicks initially, only oral clicks medially ('Anti-Sandawe')

c. Word-final clicks only ('Anti-Nǀuu')

3. Features and Representations

(23) I assume, following recent work (Miller 2007, Miller et al. 2007a, b), that airstream specifications distinguish clicks from non-clicks

Two airstream features

(24) **[± lingual]** (cf. 'Ingressive velaric airstream'; abbreviated as [±ling])

a. [+lingual] segments are produced with a lingual airstream

b. [-lingual] segments have no lingual airstream used in production

[6] This Dahalo example from Maddieson et al. (1993)

[7] Sandawe data primarily from Wright et al. (1995)

(25) **[± pulmonic]** (cf. 'pulmonic egressive airstream'; abbreviated as [±pulm])

a. [+pulmonic] segments have pulmonic airflow during articulation

b. [−pulmonic] segments have no pulmonic airstream involved in production

(26) Background assumption: all segments are fully specified for these features

Representations for different segment types

(27) Vowels, and normal pulmonic consonants are [−ling, +pulm]

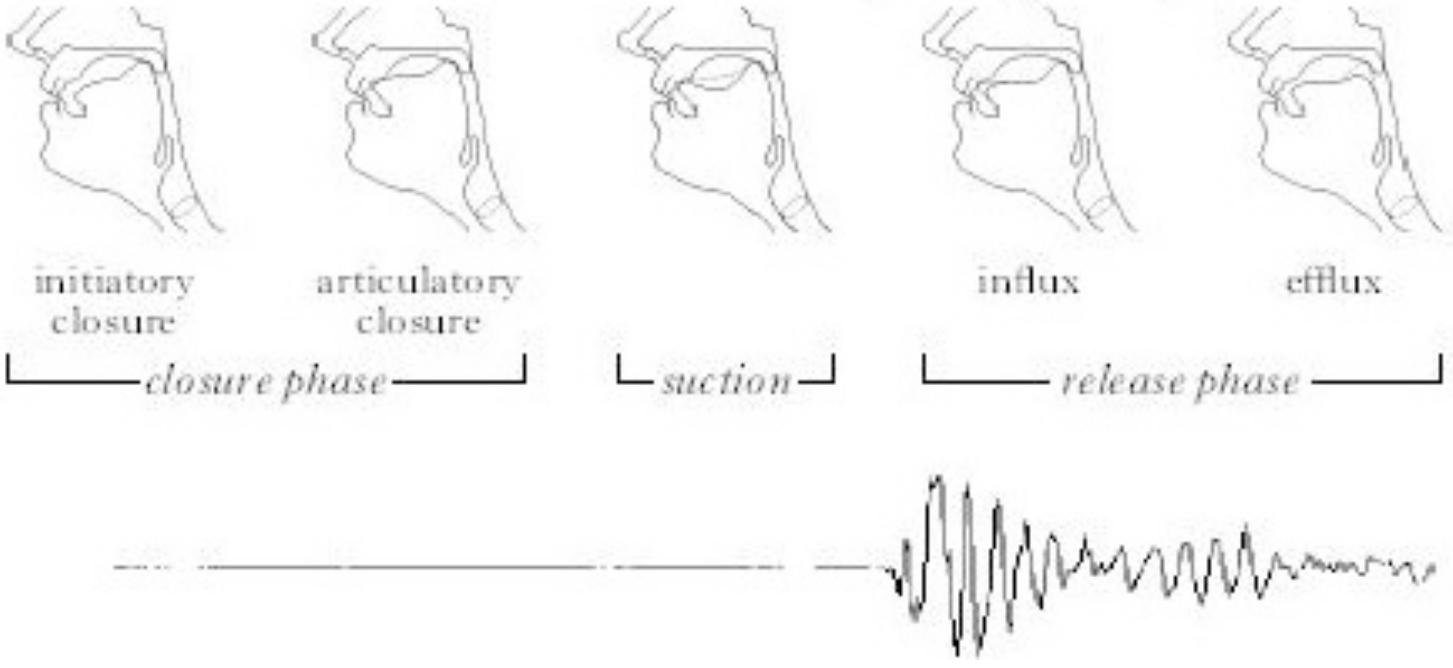
(28) Plain (and other oral) clicks are [+ling, −pulm]

(29) Nasal clicks are [+ling, +pulm]

4. Why would nasal clicks be [+pulmonic]?

(30) There is both phonetic and phonological evidence that supports treating nasal clicks as [+lingual, +pulmonic] (rather than [+lingual] and [Nasal])

A brief review of click production (diagram taken from Dogil & Mayer 1998)



(31) Production of a click involves 3 stages: (as depicted above)

a. Closures – two closures seal off a cavity in the mouth

b. Suction – the cavity is enlarged, creating suction

c. Release – the closures are released, creating noise associated with a click

The phonetic basis for /n!/ as [+pulmonic]

(32) A key side-effect of (31): Because oral closures are required to produce a lingual airstream, the oral cavity is necessarily blocked during click production

(33) If the velum is raised during click production, the vocal tract is fully sealed off

(34) In that situation, it is impossible to maintain the airflow needed for a [+pulmonic] segment – air flowing out of the lungs has nowhere to go

(35) Lowering the velum, on the other hand, makes a pulmonic airstream possible by allowing air to escape through the nasal cavity

(36) Thus, the only way a segment can be both [+lingual] and [+pulmonic] is if the velum is lowered to let the pulmonic airflow escape out of the nose[8]

(37) Since they have pulmonic airflow through the nose, [+pulmonic] clicks have audible phonetic nasality, just like true nasals.

(38) Because a dorsal closure is needed to make a lingual airstream, [+pulmonic] clicks sound like they are accompanied by a dorsal nasal (such as [ŋ] or [ɴ]).

(39) However, the nasality of [n!] arises from different features than that of [ŋ]:

a.	'True' nasals, like [ŋ], have a lowered velum because they are [Nasal]
b.	Nasal clicks are 'False' nasals – they have a lowered velum because that's the only way they can be [+pulmonic] and [+lingual] at the same time

(40) **Recap**: the articulatory factors involved production of a lingual airstream explain why [+lingual, +pulmonic] segments must be phonetically nasalized

Phonological evidence from Sandawe for /n!/ as [+pulmonic]

(41) A pattern of medial click nasalization in Sandawe (Maddieson et al. 1999, Wright et al. 1995, Elderkin 1992) provides more evidence that nasal clicks are [+pulmonic], rather than [Nasal][9]

[8] This is not an entirely new idea: for instance, Ladefoged & Maddieson (1996) note that many people find nasal clicks easier to produce because pulmonic airflow is not impeded.

[9] Ladefoged & Traill (1984) report a similar process of non-initial click nasalization in Nama, and offer an explanation based on pharyngeal pressure escaping through the nose, much like in (32)–(35).

(42) Sandawe has several types of clicks, including both nasal and non-nasal clicks

(43) Word initial onsets may be oral or nasal clicks (or non-clicks):[10]

a.	/ǁoo/	[ǁoo]	'path, vein'
b.	/**n**ǁoo/[11]	[**n**ǁoo]	'to milk'
c.	/**tɬ'**atɬ'a/	[**tɬ'**atɬ'a]	'garbage'

(44) Clicks that do not occur at the start of a word must be nasalized:

a.	/!u!ˀe/	[!u**n**!ˀe]	'kidney'
b.	/n|a**n**|aʔo/	[n|a**n**|aʔo]	'to cut'
c.	/ǁˀoǁˀa/	[ǁˀo**n**ǁˀa]	'baboon'
d.	/g|i**g**|o/	[g|i**ng**|o]	'(type of) finch'

(45) Examples like those in (44) show that input oral clicks surface as nasalized clicks non-initially, even in a completely non-nasal context.

(46) Non-clicks are not affected by this phenomenon (as in (43c), (44b))

(47) This pattern is bizarre and likely problematic if we suppose that nasalized clicks are simply [Nasal] counterparts of oral clicks.

(48) It would be a case of contextual neutralization to [Nasal], despite both the neutralizing segment and the context not being [Nasal]

(49) However, if we treat nasal clicks as [+pulmonic], the pattern makes much more sense – it's actually neutralization to [+pulmonic]

(50) **Recap**: treating nasal clicks as merely [Nasal] leads to a bizarre (48) and incomplete (cf. 46) explanation. Treating nasal clicks as [+pulmonic] instead gives a very sensible looking result (49), which (45) naturally follows from.

---

[10] Data and underlying forms in this section come from Wright et al. (1995), Maddieson et al. (1999), and Kagaya (1993). Transcriptions have been adjusted slightly to match the conventions used here.
[11] Remember, *n!*, *g!* and *ng!* are di-/tri-graphs, not clusters

Section summary

(51) The [+lingual, +pulmonic] specification that I propose for nasal clicks is supported on both phonetic and phonological grounds.

5. Proposed constraints

(52) We can capture Sandawe's nasalization, as well as the rest of the typologies from section 2, using the constraints below.

Constraint definitions (abbreviations in parentheses)

For input segments X & Y, with output correspondents X' & Y':

(53) ***[+lingual]** **(*ling)**
assign one violation for each [+lingual] segment in the output

(54) **IDENT-Onset-[lingual]**[12] **(ID-Ons[ling])**
if X' is a syllable onset, then X & X' must have the same value for [± lingual]

(55) **IDENT-Initial-[lingual]** **(ID-Init[ling])**
if X' is a word-initial onset, X & X' must have the same value for [± lingual]

(56) **AGREE [pulmonic]** **(AGREE[pulm])**
adjacent output segments X' and Y' must have the same value for [± pulmonic]

(57) **IDENT-Onset-[pulmonic]**[13] **(ID-Ons[pulm])**
if X' is a syllable onset, then X & X' must have the same value for [± pulmonic]

(58) **IDENT-Initial-[pulmonic]** **(ID-Init[pulm])**
if X' is a word-initial onset, X & X' must have the same value for [± pulmonic]

(59) These constraints divide neatly into subclasses:

(60) The constraints in (53), (54), and (55) govern [±lingual]; ranking of these constraints determines where a language allows clicks (vs. non-clicks)

(61) The constraints in (56), (57), and (58) govern [±pulmonic]; ranking of these constraints determines where a language allows oral clicks (vs. nasal clicks)

[12] AGREE [±pulmonic] modeled after Lombardi (1995)

[13] Positional faithfulness constraints modeled after Beckman (1998)

Factorial typology of constraints on [±lingual]

	Crucial Ranking	Word Shapes Allowed
(62)	*[+lingual] is undominated	* [!a!a!], * [!a!a], * [!ata], ✓[tata]
(63)	IDENT-Init [ling] » *ling	* [!a!a!], * [!a!a], ✓[!ata], ✓[tata]
(64)	IDENT-Ons [ling] » *ling	* [!a!a!], ✓[!a!a], ✓[!ata], ✓[tata]

(65) The interaction of these constraints derives the ban on coda clicks: (cf. (4))

(66) No ranking of the constraints on [± lingual] allows coda clicks to surface

(67) This is because *[+lingual] forbids clicks in all positions, and none of the faithfulness constraints protect the underlying [±lingual] value in a coda.

(68) It also follows from this that non-initial clicks imply initial clicks: (cf. (6))

(69) When *ling is dominated by ID-Init [ling], but *not* ID-Ons [ling], clicks are allowed only word-initially (i.e. ID-Init [ling] » *ling » ID-Ons [ling], as in (63)).

(70) Non-initial clicks are possible only if ID-Ons [ling] » *ling. This ranking allows clicks in all onsets; thus, it allows clicks as word-initial onsets as well.

Factorial typology of constraints on [±pulmonic]

	Crucial Ranking	Word Shapes Allowed
(71)	AGREE [pulmonic] is undominated	* [!a!a], * [!an!a], ✓[n!an!a]
(72)	IDENT-Init [pulm] » AGREE [pulm]	* [!a!a], ✓[!an!a], ✓[n!an!a]
(73)	IDENT-Ons [pulm] » AGREE [pulm]	✓[!a!a], ✓[!an!a], ✓[n!an!a]

(74) The interaction of these constraints derives the implicational relationship between oral clicks and nasal clicks (! → n!, cf. (5) & (7))

(75) Clicks in syllables are always adjacent to vowels (or sometimes glides); these are necessarily [+pulmonic] segments. Therefore, AGREE [pulmonic] invariably favors nasal clicks over oral clicks. [14]

(76) When faithfulness constraints for [±pulmonic] dominate AGREE, [-pulmonic] inputs can be faithfully realized (as non-nasal clicks). However, that ranking cannot *dis*allow faithful realization of [+pulmonic] inputs (i.e. nasal clicks).

6. Interaction of the interactions

(77) The intersection of the two factorial typologies in (62-64) & (71-73) produces the patterns of nasal & oral click distribution for all languages I've considered.

(78) The patterns found in 5 example languages, and crucial rankings for them:

Language	Click types allowed:		Relevant rankings of constraints on:	[±lingual]
	Initially	Non-initially		[±pulmonic]
a. Dahalo	Nasal	Nasal	ID-Ons-[ling] » *[+ling]	AGREE[pulm] » ID-Init-[pulm], ID-Ons-[pulm]
b. Sandawe	Nasal, Oral	Nasal	ID-Ons-[ling] » *[+ling]	ID-Init-[pulm] » AGREE[pulm] » ID-Ons-[pulm]
c. isiZulu	Nasal, Oral	Nasal, Oral	ID-Ons-[ling] » *[+ling]	ID-Ons-[pulm] » AGREE [pulm]
d. N|uu	Nasal, Oral	No Clicks	ID-Init-[ling] » *[+ling] » ID-Ons-[ling]	ID-Ons-[pulm] » AGREE [pulm]
e. English	No Clicks	No Clicks	*[+ling] » ID-Init-[ling], ID-Ons-[ling]	(No evidence for ranking, since no clicks occur)

(79) **Recap**: The analysis proposed in section 5 gives correct typological results

[14] The universal (but violable!) preference for nasal clicks created by AGREE [pulm] is not unprecedented: Güldemann's (2001:39) classifies nasal clicks as 'plain', and the 'radical cluster analysis' discussed by Nakagawa (2006:255-261) treats nasal clicks as unmarked.

(80) However, examining the full typology reveals an unexpected complication: there is a class of rankings that contradicts the proposed explanation for why oral clicks imply nasal clicks (in (74-76)).

(81) Let's consider the combination of these crucial rankings:

a. ID-Ons [pulm] » AGREE [pulm]

b. *ling » ID-Ons [ling], ID-Init [ling]

(82) The two groups of constraints refer to different features, so we might expect that the ranking of (81a) relative to (81b) won't matter.

(83) Since *ling is undominated in (81b), this should give a language with no clicks

(84) What happens when we simply concatenate (81a) above (81b)?

(85) For some inputs, the expectations in (82-83) are met: nasal clicks are mapped to non-clicks, as shown in the following tableau:[15]

/ n! a / [+L,+P]	ID-Ons [pulm]	AGREE [pulm]	*ling	ID-Ons [ling]
a. ☞ ka [-L,+P]				*
b. n!a [+L,+P]			W *!	L
c. !a [+L,-P]	W *!	W *	W *	L

[15] [±lingual] and [±pulmonic] specifications are abbreviated as [±L, ±P] in candidates

(86) Oral click inputs, on the other hand, show the expectations to be false: oral clicks (c) are preferred over both nasal clicks (b) and non-clicks (a):[16]

/ ! a / [+L,-P]	ID-Ons [pulm]	AGREE [pulm]	*ling	ID-Ons [ling]
a. ☠ ka [-L,+P]	*!			*
b. n!a [+L,+P]	e *!		W *	L
c. ☹ !a [+L,-P]	L	W *	W *	L

(87) This seems to be a ranking that allows oral clicks, but bans nasal clicks. That's problematic, in that there are no such languages (cf. (5), (7))

(88) This is an effect of ID-Ons [pulm] being undominated:

a. Mapping nasal clicks to non-clicks satisfies faithfulness to [±pulmonic]

b. Mapping oral clicks to non-clicks violates faithfulness to [±pulmonic]

(89) **Recap**: when some faithfulness constraint for [±pulmonic] is undominated, oral clicks are faithfully realized, even if *ling » ID [ling]. We don't want that.

Section Summary

(90) The proposal from section 5 produces all attested patterns of click distribution

(91) But, it also generates a pattern that seems to be impossible (✓[!], but *[n!])

7. A potential solution

(92) So far, we've used two binary features ([±lingual] & [±pulmonic]), but have considered only three segment types (!, n!, & K) distinguished by them.

(93) The missing combination is **[-lingual, -pulmonic]** (written here as [ʗ])

[16] Desired winners are marked with ☠, actual (but unwanted) winners are marked with ☹

(94) Including candidates with [ʗ] changes the result of the ranking in (86): it maps input oral clicks to the [ʗ] candidate (instead mapping them faithfully)

/ ! a / [+L,-P]	ID-Ons [pulm]	AGREE [pulm]	*ling	ID-Ons [ling]
a. ☞ ʗa [-L,-P]		*		*
b. ka [-L,+P]	W *!	L		e *
c. n!a [+L,+P]	W *!	L	W *	L
d. !a [+L,-P]		e *	W *!	L

(95) **Recap**: If GEN produces candidates with [ʗ], the constraints I proposed (in section 5) *do not* generate languages with only oral clicks (and no nasal clicks).

(96) From a phonetic standpoint, [ʗ] seems ill-formed: no known segments are obviously (or observably) specified as having no airstream

(97) [ʗ] does seem phonologically well-formed, though: GEN needs to produce both [-lingual] & [-pulmonic] in other possible combinations, and the constraints are capable of making this combination optimal (as (94) shows)

(98) This suggests that [ʗ] is phonologically real, even if it isn't phonetically licit

Section Summary

(99) The previous section identified a ranking that generates a grammar with oral clicks and no nasal clicks (cf. 91), a pattern which is impossible (cf. (5), (7))

(100) Allowing [-lingual, -pulmonic] candidates amends this prediction: the ranking instead maps [!] to [ʗ], and thus re-captures the [!] → [n!] generalization (7)

(101) This suggests that phonetically ill-formed candidates not only possible candidates, but also possible phonological outputs[17]

[17] A caveat: this is not conclusive proof. For instance, it's possible that the grammars that produce [ʗ] are not learnable, or that the non-existence of a language with [!] but not [n!] is an accidental gap.

8. Conclusion

What I have tried to explain

(102) The typology of click distribution, including (103) and (104).

(103) Two universal restrictions on the occurrence of click consonants:

a. Clicks are never codas

b. All languages with clicks have nasal clicks

(104) Two closely related implicational relationships:

a. word-medial clicks → word-initial clicks

b. oral clicks → nasal clicks

Components of my analysis

(105) Two independently-motivated airstream features:

a. [±lingual], which distinguishes clicks from non-clicks

b. [±pulmonic], which distinguishes nasal clicks from oral clicks

(106) A novel representation: nasalized clicks are actually [+lingual, +**pulmonic**]

(107) Six violable, universal, constraints based on these airstream features

Results

(108) The universals and implications observed (in section 1) are derived from the nature of the constraints proposed

(109) The full typological range observed (in section 2) is explained by different rankings of the same constraints. The absence of many unattested patterns is also correctly predicted.

(110) If the use of [-lingual, -pulmonic] candidates (in section 7) is valid, then this proposal also implies that phonetically non-existent segments can be phonological outputs.

Appendix – list of languages considered

(111) The list is separated into three categories: languages with ostensibly no clicks, languages with marginal use of clicks, and languages with full use of clicks.

(112) Languages with no clicks (or only non-syllabic/paralinguistic use of clicks):
English, German, Greek, Ibibio
Total: **4**

(113) Languages which use nasal clicks in language games, or special contexts:
Ningdu Chinese, Damin (a ritual language based on Lardil)
Total: **2**

(114) Languages with normal/full use of click consonants:
Ju|'hoan, N|uu, !Xóõ, Griekwa, Nama, Eastern Khoe, Ekoka !Xun, ||ani, G|ui, Korana, Sandawe, Hadza, Dahalo, isiXhosa, isiZulu, siSwati, seSotho, siNdebele, siYeyi, Kxoe, Standard Namibian Khoekhoe, ǂKhomani, Naron, G‖ana, Hietshware, Sesfontein Damara, Angolan !Xu, ǂHoan
Total: **28**

(115) Combined total for this list: **34** languages

Why is this a survey of 'approximately' 30 languages?

(116) Names are a source of error:

a. some of the languages I've treated as different may be different names for the same dialect

b. some of the data sets I've omitted for being the same as other members of this list may actually represent distinct dialects

(117) Most languages in (81), the 'no clicks' category, are excluded. The majority of the world's languages lack click consonants; including more of these would make the total number of languages significantly larger.

Selected References

(For a full bibliography, including sources for languages not discussed here, please contact me)

Beckman, Jill. 1998. Positional Faithfulness. Dissertation manuscript, University of Massachusetts, Amherst. ROA-234

Dogil, G. and Mayer, J. (1998). Selective phonological impairment : a case of apraxia of speech. *Phonology* 15, 143-188.

Doke, C.M. (1984). Textbook of Zulu Grammar. Cape Town: Maskew Miller Longman. Sixth edition. First printed 1930.

Elderkin, Edward D. (1992). Predictable nasality before East African clicks. *Afrikanistische Arbeitspapiere* 29, 111-12

Güldemann, Tom. (2001). Phonological regularities of consonant systems across Khoisan lineages. University of Leipzig Papers on Africa, Languages and Literatures 16. Leipzig: Institut für Afrikanistik, Universität Leipzig.

Kagaya, Ryohei. (1993). A Classified Vocabulary of The Sandawe Language. Asian & African Lexicon vol 26. Tokyo: Institute for the Study of Languages and Cultures of Asia and Africa (ILCAA).

Ladefoged, Peter and Ian Maddieson. (1996). The Sounds of the World's Languages. Cambridge: Blackwell Publishers.

Ladefoged, Peter and Anthony Traill. (1984). Linguistic Phonetic Descriptions of Clicks, *Language* 60 (1), 1-20.

Lombardi, Linda. (1995). Why Place and Voice are Different. ROA-105

Maddieson, Ian, Peter Ladefoged & Bonny Eva Sands. (1999). Clicks in East African languages. In Finlayson, Rosalie (ed.), African mosaic: festschrift for J. D. Louw. Pretoria: University of South Africa, 59-91.

Maddieson, Ian, Siniša Spajić, Bonny Sands, & Peter Ladefoged. (1993). Phonetic Structures of Dahalo. *Afrikanistische Arbeitspapiere* 36, 5-53.

Miller, Amanda. (2007). The phonology of click consonants. Manuscript submitted to *Phonology*, Cornell University.

Miller, Amanda, Johanna Brugman, Bonny Sands, Levi Namaseb, Mats Exter, and Chris Collins (2007a). The Sounds of N|uu: place and airstream contrasts. In Pittyaporn, A. and Lee, H.S.,(eds.), *Working Papers of the Cornell Phonetics Lab*

Miller, A., Brugman, J., Sands, B., Namaseb, L., Exter, M. and Collins, C. (2007b). Differences in Airstream and Posterior Place of Articulation among N|uu Clicks. Submitted to *JIPA*.

Nakagawa, Hirosi. (2006). Aspects of the Phonetic and Phonological Structure of the G|ui Language. Unpublished Ph.D dissertation, University of the Witwatersrand. South Africa.

Prince, Alan & Paul Smolensky. (1993). Optimality Theory: Constraint Interaction in Generative Grammar. MIT Press. RuCCS-TR-2. ROA-537.

Sagey, Elizabeth. (1986). The representation of features and relations in nonlinear phonology. Ph.D dissertation, MIT. Cambridge, Mass.

Wright, Richard, Ian Maddieson, Peter Ladefoged & Bonny Sands. (1995). A phonetic study of Sandawe clicks. *UCLA Working Papers in Phonetics* 91, 1- 24.

Wm. G. Bennett
bennettw@rutgers.edu

Rutgers University
Linguistics Department
18 Seminary Place
New Brunswick, NJ 08901