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Clicks, genetics, and "proto-world" from a linguistic perspective

Tom Güldemann

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Knight et al. (2003) have argued, largely from a genetic perspective, that clicks “may be more than 40.000 years old” (p.470) and thus “are an ancient element of human language” (p.471). This has nourished the hypothesis, expressed especially in popular science, that clicks were a feature of the ancestral mother tongue. The claim by Knight et al. (2003) is based on the observation that two populations in Africa speaking languages with click phonemes, namely Hadza in eastern Africa and Ju|’hoan in southern Africa, are maximally distinct in genetic terms: both Y chromosome and mtDNA data suggest that the two “are separated by genetic distance as great [as] or greater than that between any other pair of African populations” (p.464). It is also claimed that the only explanation for the presence of clicks in the two groups is inheritance from an early common ancestor language, hence the alleged, very great age of clicks in general. Other explanations for the clicks of Hadza and Ju|’hoan, in particular independent development and language contact, are explicitly excluded by the authors.

This paper seeks to demonstrate on the basis of purely linguistic evidence that this view cannot be accepted: both independent innovation and contact-induced transmission of clicks are attested. The click system of Hadza in particular will be shown to have a profile which is quite compatible with an explanation in terms of language contact. The linguistic evidence thus does not imply that clicks go back to a language spoken at the dawn of human evolution; there is no good reason to exclude the possibility that the emergence of clicks in Africa represents a far later episode in the diversification of human speech. More reliable hypotheses about the early development of language can be reached only by truly interdisciplinary research in the disciplines concerned, here genetics and linguistics.

This paper was presented on previous occasions; namely at the Institut für Afrikanistik, Universität zu Köln (28/11/2003); at the “Jour fixe” series of the Institut für Afrikanistik, Universität Leipzig (17/12/2003); at the “Geneling” series of the Max Planck Institute for Evolutionary Anthropology Leipzig (12/03/2004); at the International Conference “Evolution of Language (EVOLANG)” at Leipzig (02/04/2004); at the “Human Genetics Seminar” of the Faculty of Health Sciences, University of Cape Town (06/09/2005); and at the International “Leipzig Spring School on Linguistic Diversity” (23/03/2006).

Clicks, genetics,
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Tom Güldemann

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1. Introduction

'Current Biology', a leading journal of its discipline, has published an article by Knight et al. (2003) with the title "African Y chromosome and mtDNA divergence provides insight into the history of click languages". This article does in fact not only deal with the history of click languages but involves far-reaching conclusions for the early evolution of human language(s) before the colonization of man outside Africa and thus concerns linguistics in general.

The authors discuss phylogenetically relevant genetic¹ data (regarding both Y chromosome and mtDNA) of two African populations speaking languages with clicks, namely Hadza in eastern Africa and Ju|'hoan in southern Africa (sometimes referred to in the paper by the generic term "San"), and conclude that the two groups are genetically maximally distinct with respect to the modern diversity of humans:

... San and Hadzabe are among the most highly divergent of African (and therefore global) population pairs. (p.470)

The separation of the ancestors of click-speaking Hadzabe of Tanzania and click-speaking San of Botswana and Namibia appears to be among the earliest of human population divergences. (p.469)

From a linguistic perspective, they claim that the only explanation for the presence of clicks in Hadza and Ju|'hoan is inheritance from an early common ancestor language and explicitly exclude other explanations for the presence of clicks in the two groups. Following from the supposed age of the genetic populations, they propose a second major hypothesis relevant for linguistics:

The deep genetic divergence among click-speaking peoples of Africa and mounting linguistic evidence suggest that click consonants date to early in the history of modern humans. (p.464)

In more concrete terms, they conjecture that clicks "may be more than 40.000 years old" (p.470). Under the usual (though not uncontroversial) assumption that all modern languages descend from a single common ancestor, the simplified hypothesis that clicks were a feature of the ancestral mother tongue has been expressed especially in popular science (see, e.g., *New York Times* of 20/03/2003, *Die Zeit* of 27/03/2003, *Academic Press - Daily inSCIght* of 22/10/2003).

Knight et. al.'s analysis of the genetic data regarding Hadza and Ju|'hoan is not unproblematic (M. Stoneking p.c.). Moreover, the general scenario for the origin and proliferation of clicks in Africa in genetic terms must be far more complex than outlined by

¹ The term "genetic" will be reserved here for biology. As soon as family relationships among languages are concerned, the term "genealogical" will be used.

the authors because the Ju|'hoan population is biologically not representative for all southern African click-speaking groups (Chen et al. 2000).

In any case, the present paper takes the author's interpretation of the genetic data as a given; it provides a more thorough discussion of the LINGUISTIC aspects of the problem. Even with the genetic part of the argumentation intact, it shows that there is no strong case for the above hypotheses as far as the history of early human language(s) is concerned.

Knight et al.'s paper contains a number of misinterpretations and misrepresentations of the available linguistic data.² A linguistically better informed analysis yields several types of evidence contradicting their view. In particular, independent innovation and contact-induced transmission of clicks are more important than assumed and the profile of the Hadza click system is more compatible with such non-genealogical explanations. More generally, there is no “mounting linguistic evidence” suggesting that clicks go back to a language spoken at the dawn of human linguistic evolution. There is in fact a real possibility that the emergence of phonemic clicks in Africa represents a far later episode in the diversification of human speech.

This article will thus reiterate a general methodological point, which might appear trivial, but in practice is not: apparent historical correlations between genetic and linguistic data should not be addressed from either perspective only; more reliable hypotheses about the early development of linguistic populations and human language in general can only be reached by truly interdisciplinary research in the disciplines concerned.

Before discussing the subject matter, the terminology must be clarified, because Knight et al.'s paper (cf., e.g., p.464, 468-9) is potentially confusing in this respect. A first remark concerns the term “San (traditional foragers)”, which by and large has the same meaning as the older, but derogatory *Bushmen*. In its standard use, it refers to a population of a particular subsistence mode (at least until fairly recently) in a certain geographical area, namely hunter-gatherers of southern Africa.³ While at most a convenient entity of cultural anthropology, the concept is vacuous in terms of linguistic and genetic classification: the different San groups speak a number of languages comprising inter alia three quite distinct language families (see Section 2.2) and possess very different genetic profiles, on both an African and global scale.

² It is unclear to me to what extent the authors on the one hand received expertise feedback from linguists specialized in the relevant languages and on the other hand integrated it into their argumentation.

³ It is thus comparable to “Aborigines” referring generally to the indigenous hunter-gatherer population of Australia. The word *saa-n* (-n is a gender-number suffix for common plural) was originally used by the pastoralist Khoekhoe (for this term see below) as a generic exonym for hunter-gatherers and literally means ‘foragers’.

The term “Khwe” is potentially even more misleading, because it can be confused with *Khoe* (< *khoe* ‘person, human being’), which refers to one of the Khoisan language families. This purely linguistic entity comprises in cultural terms hunter-gatherer and pastoral groups and in genetic terms population profiles which are typical for southern African and others which are much less so.

What the authors actually mean with “Khwe (traditional herders)” are the pastoralist *Khoekhoe* (= formerly *Hottentots*). These are a concrete anthropological entity defined by culture, geography, language, and genetic profile; i.e. they are the pastoral groups of South Africa and Namibia speaking language varieties of a sub-branch of the *Khoe* family and are genetically of the southern African type with some non-southern African admixture.⁴

Pace Knight et al. (2003: 469), “Khwe” (alias *Khoe*) and “San” are not complementary concepts, some ethnic groups self-identify as *Khoe* AND *San*, because they call themselves in their own language *Khoen* ‘people’ and are/were culturally *San*, i.e. hunter-gatherers. This also means that the terms “San”, “*Khoekhoe*”, and “*Khoe*” are semantically neither comparable to nor exclusive of each other and hence cannot be used in a meaningful way for referring together to what is commonly meant by “Khoisan”.

2. The modern distribution and function of clicks

It is generally assumed that clicks have a very uneven occurrence across the world’s languages. However, this view applies only to one kind of click use. For a full understanding of the modern distribution of clicks in human language it is necessary to make a basic distinction between two employments of clicks, namely as PHONEMIC speech sounds which distinguish lexical meaning on the one hand and as non-phonemic, PARALINGUISTIC speech sounds on the other hand.

2.1. Clicks as non-phonemic speech sounds

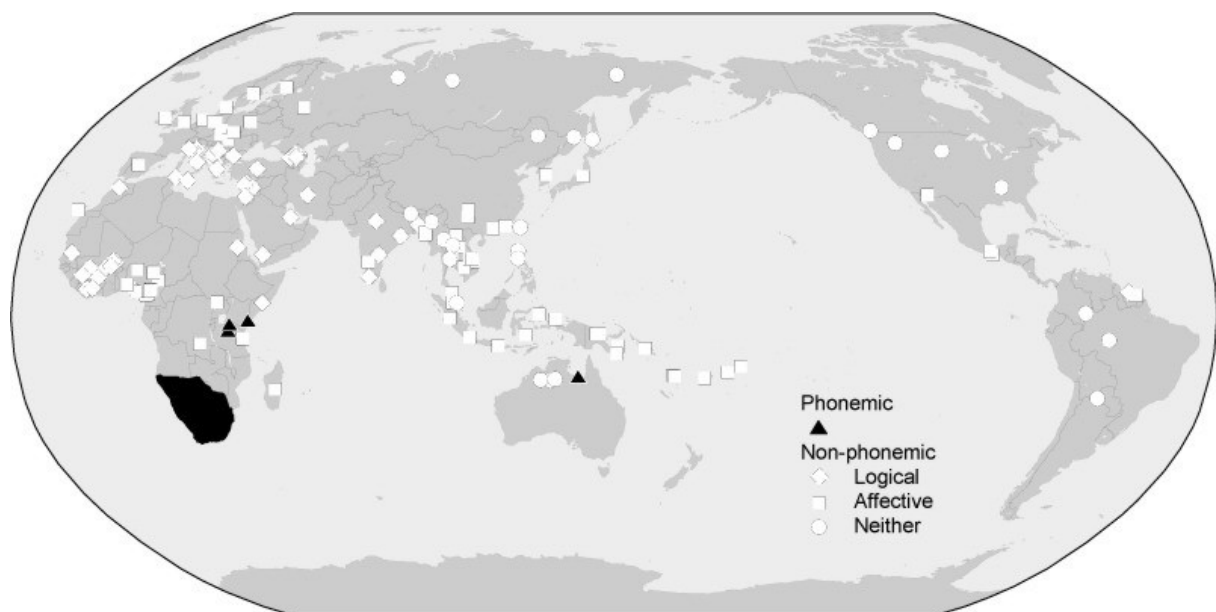
While clicks as phonemes are indeed alien to the large majority of modern languages, the use of clicks as a paralinguistic phenomenon is attested far more frequently -- a fact known and discussed in science for a long time (cf., e.g., Darwin 1872).

⁴ *Khoekhoe-n* was originally the pastoralist’s autonym and means literally ‘real people, people of people’. “*Khoekhoe*” has two slightly different connotations in linguistics related to the primary sense. On the one hand, it denotes one of the two branches of the language family *Khoe* (cf. Voßen 1997). On the other hand, “*Khoekhoegowab*” refers to a concrete *Khoekhoe* variety, which is an official, standardized language in Namibia. This has a more recent and complex genesis and is thus not only spoken by (former) pastoralists.

Gil (2005) is a first attempt to a world-wide survey of the distribution of non-phonemic clicks. He distinguishes three sub-types of such clicks which are: (a) “logical” (= click means “yes” and/or “no”); (b) “affective” (= click expresses “positive” and/or “negative” attitude; cf. dental click [ɽ] in English for negative attitude); and (c) “neither (a) nor (b)” (= click is used for turn-taking, communication with babies and animals, etc.; cf. lateral click [ɽɽ] in English for driving horses).

Since paralinguistic phenomena are virtually undocumented in average linguistic descriptions, Gil’s study is based largely on personal communications. The results of the survey, which are shown in Map 1, do not provide complete coverage of the globe; in particular, an area without dots does not imply the absence of paralinguistic clicks.

However preliminary the results are, two conclusions can be drawn with respect to the present topic: clicks per se are geographically and genealogically widespread across human languages and, as a consequence, should not be viewed as unusual speech sounds in terms of production and in-principle usability in language.



Map 1: Clicks in the world’s languages (phonemic clicks exhaustive, non-phonemic clicks after Gil 2005)

2.2. Clicks as phonemic speech sounds

Clicks as phonemes, which are those concerned in Knight et al. (2003), show a highly different distribution when compared to their non-phonemic use in that they are restricted to just three wider geographical locations: two in Africa and one in Australia. This is also shown in Map 1.

From all what is known about the present linguistic diversity on earth, Table 1 provides a complete list of attested languages and language groups with click phonemes.

	<i>Language</i> or LANGUAGE FAMILY	Area	Highest linguistic affiliation
1	all JU-†HŌA (includes “Northern Khoisan”)	southern Africa	isolate family ¹
2	all TUU (= “Southern K.”)	southern Africa	isolate family ²
3	all KHOE-KWADI (includes “Central K.”)	southern Africa	isolate family ³
4	<i>Sandawe</i>	eastern Africa	isolate language (?or to Khoe-Kwadi) ⁴
5	<i>Hadza</i>	eastern Africa	isolate language ⁵
6	<i>Dahalo</i> (CUSHITIC)	eastern Africa	Afroasiatic
7	some BANTU (groups K30, R40, S30, S40) ⁶	southern Africa	Niger-Congo
8	<i>Damin</i> (speech register of <i>Lardil</i> , TANGKIC)	northern Australia	Australian

Notes: 1 see Westphal (1974), Sands (2003), Güldemann (forthcoming b), Honken (2006)

2 see Güldemann (2005)

3 see Güldemann (2004), Güldemann and Elderkin (forthcoming)

4 see Elderkin (1986, 1989), Güldemann and Elderkin (forthcoming)

5 see Sands (1998a, b)

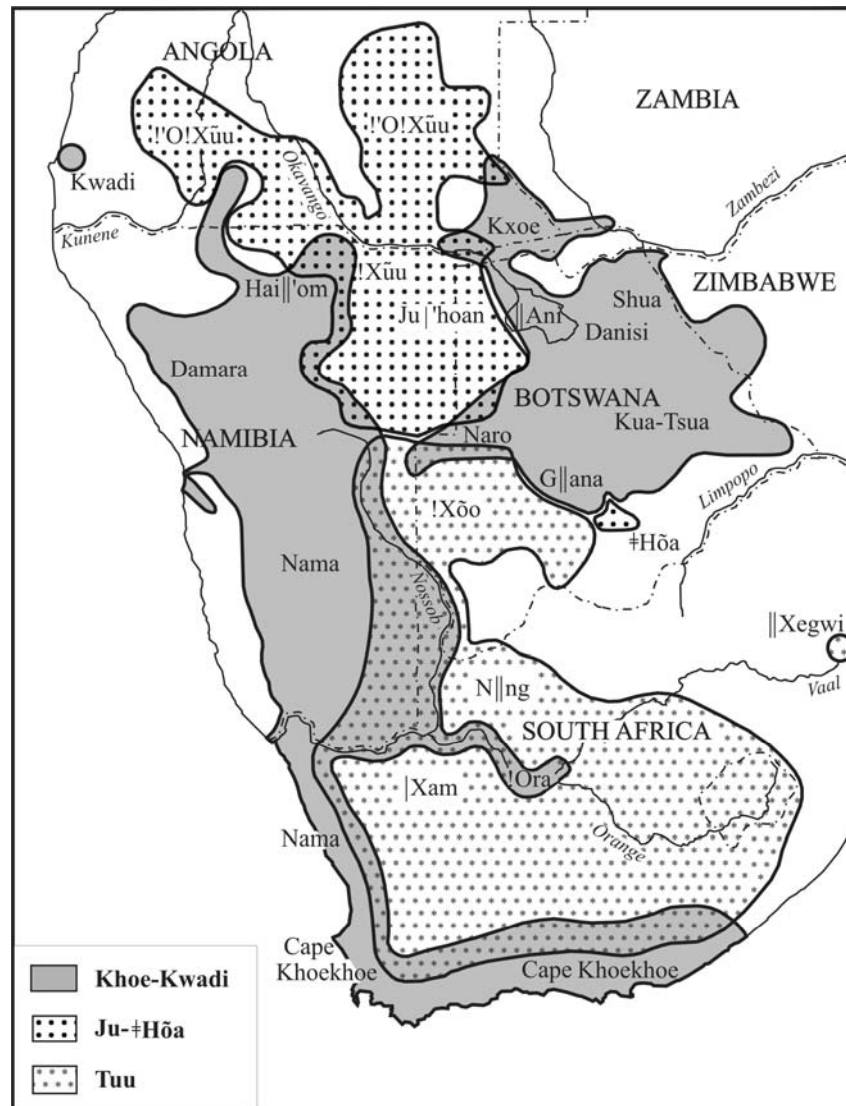
6 in K30: Kavango group; R40 = Yei; in S30: Southern Sotho; S40 = Nguni group

Table 1: Attested *languages*/LANGUAGE GROUPS with click phonemes

Table 1 displays eight independent linguistic lineages; that is, each of these units represents a separate genealogical group in the sense that it has not (yet) been shown to have a relative among the attested languages of the world (a lineage can be an isolate language, a language family, or a yet larger group). This classification has been established according to commonly accepted linguistic methodology, namely the historical-comparative method.

Greenberg (1963) and others have claimed that the units 1-5 form a genealogical language group “Khoisan”, and the units 1-3 a lower order group “Southern African Khoisan”

(cf. Map 2). Both the wide and narrow version of this hypothesis rest on evidence that does not conform to the standards of historical comparison and diachronic typology and are not accepted by the majority of Khoisan linguists; they thus have to be rejected for the time being (cf. Güldemann and Vossen 2000, Güldemann forthcoming a).⁵



Map 2: Non-Bantu language families with clicks in southern Africa

⁵ This classification does not imply that some language (group) is not related genealogically to another one. Future research might well support or newly bring up viable hypotheses on higher order relations of one or the other unit. The notes in Table 1 indicate problematic classifications and promising hypotheses for higher-order classifications including the respective references. A very “optimistic” guess on “Khoisan” brings down the number of independent lineages to no less than four or three.

The above set of languages and groups is not homogeneous regarding the use of click phonemes. There are differences between individual lineages in terms of the functional load and the phonotactic employment of clicks.

The functional load of clicks in a language can be ascertained by two parameters: (a) the complexity of the click phoneme system and (b) the importance of clicks for the distinction of lexical meaning. The complexity of click systems is measured conveniently by the size of the segment inventory. Charts of individual click systems which are representative of eight of the nine lineages in Table 1 are given in the appendix. It can be seen that the size of click inventories ranges from 3 clicks (in Dahalo) to 83 clicks (in East !Xõo). A summary of inventory sizes of click phonemes across languages and language groups is given in Table 2.

Inventory size	“Khoisan”	Bantu	Other
Great (30 and more)	Ju, #Hõa, most Tuu, most Khoe	-	-
Intermediate (between 10 and 30)	//Xegwi (Tuu), Khoekhoe (Khoe), Sandawe	Nguni Bantu, Yei	-
Small (10 and less)	Kwadi (8), Hadza (9)	Southern Sotho (5) Kavango Bantu (5)	Dahalo (3), Damin (5)

Table 2: Inventory size of click phonemes across *languages* and language groups

The importance of clicks in the lexicon can be measured in a language by the relative frequency of items with and without clicks. Although the available information on this parameter is still insufficient, a rough cross-language comparison can be achieved on the basis of various kinds of data such as figures in the published literature, personal communication by language experts, and estimates from available dictionaries or vocabularies. Since approximate values are already sufficient for the present purpose, my analysis of dictionaries has been very crude in that I counted the pages of words with clicks vs. without clicks.⁶ Table 3 provides a synopsis of the available data.

⁶ This is possible in most click languages of southern Africa, because clicks there are word-initial (see below).

	Language	Language family	Clicks	Source
1	Ju ’hoan	Ju	60%	Dickens 1994
2	‡Hõa	-	?	-
3	Eastern !Xõo	Tuu	69%	Traill 1994
4	Standard Khoekhoe	Khoe (Khoekhoe)	63%	Haacke and Eiseb 2002
	Naro	Khoe (Kalahari)	40-50%	Visser 2001, Barnard 1985
5	Sandawe	-	22%	Kagaya 1993, Elderkin p.c.
6	Hadza	-	15-25%	Elderkin 1978: 20, p.c.
7	Dahalo	Cushitic	<5%	Tosco 1991
8	Zulu	Benue-Congo	ca. 15%	Herbert 1990b: 296
9	Damin	Tangkic	17%	Hale and Nash 1997: 253

Table 3: Approximate proportion of click lexemes in individual languages

However imprecise the figures in Table 3 are, they suffice to give an idea about the existence of considerable differences across click languages regarding click frequency. In general, languages from the Ju, Tuu, and Khoe families, located in southern Africa, have a high proportion of click words in the lexicon (50% and more), while all other languages have considerably less lexemes with clicks (25% and less).

The lexical frequency of clicks does not necessarily correlate in a language with the click inventory size. For example, Khoekhoe varieties conform to the general areal trend of a great importance of clicks for the lexicon in spite of their relatively small segment inventories. Nevertheless, both measurements can be conflated so that a language can be assigned to an approximate place on a scalar continuum between high and low functional load on clicks. Such a summary is given in Figure 1.

HIGH <-----> LOW

JU, ‡Hõa, Sandawe, Yei, Kwadi, Southern Sotho, Kavango
 TUU, KHOE Nguni BANTU Hadza BANTU, Dahalo, Damin

Figure 1: Functional load of click phonemes across *languages/* LANGUAGE GROUPS

Languages with click phonemes also differ with respect to the phonotactic characteristics of clicks, that is, their syntagmatic distribution vis-à-vis other speech sounds within words. Prototypically clicks are associated with a particular stem structure of lexical items, namely C(C)VCV (C = consonant, V = vowel, C in parentheses indicates a consonant cluster), in which clicks are restricted to the first consonant position. This applies to Ju-ǀHǀoǀa, Tuu, and Khoe-Kwadi.⁷ Traces of this pattern are found in Sandawe; Damin does not have the same stem structure but its clicks are at least word-initial. The only exceptions to this property are Bantu languages, Hadza, and Dahalo, where clicks can also have a medial position.

2.3. Summary

The following can be summarized for the modern distribution and function of clicks:

- (1) Clicks as such are common as human speech sounds.
- (2) Clicks as phonemes are cross-linguistically quirky (cf. Maddieson 2005).
- (3) Click phonemes have a high functional load only in Ju-ǀHǀoǀa, Tuu, and Khoe-Kwadi. (While these are commonly subsumed under “Southern African Khoisan”, here they will henceforth be referred to as “core click languages”.)

Clearly, the phenomenal space regarding clicks is limited. However, the above data are sufficiently diverse to assess Knight et al.’s (2003) claims with more rigor. In the following, several types of objections will be made which relate to (a) the treatment of non-genealogical explanations for the origin of clicks (Section 3, and with particular reference to Hadza, Section 4) and (b) the general properties of clicks as a class of phonemic speech sounds (Section 5).

3. The origin of clicks in individual languages

There are three basic types of explanations for the question as to how a language or a population has come to possess a certain linguistic feature. They are: (a) retention from an ancestor language, (b) independent innovation, and (c) contact. Knight et al.’s (2003) general linguistic hypotheses rest on the assumption that clicks in modern languages are by default inherited, inter alia in Hadza and Juǀ’hoan, and only in a few cases they are due to language contact with “genuine” click languages. Hence they can conclude that the origin of clicks

⁷ Güldemann (2001: 45-7) argues that a large inventory of stem-INITIAL clicks has a considerable importance in most of these languages for the distinction of lexical meaning.

goes back to a single historical process; that is, their “mono-genesis” in proto-world or a similarly ancient language. In the following I will try to demonstrate that the downplaying or even outright exclusion of explanations for clicks other than inheritance are not at all supported by the entire range of cross-linguistic data on clicks in human languages.

3.1. Independent innovation of clicks

A first defect of Knight et al.’s (2003) approach is to ignore entirely the possibility of independent innovation of click phonemes, because it is clearly attested in one case, namely in Damin. This is a fully functional speech form used in an Australian Aboriginal group by second-degree male initiates to ritually related community members. The normal linguistic register is Lardil - a language of the Tangkic family (Non-Pama-Nyungan, Australian). Lardil and the initiate register Damin are mutually unintelligible, so that the latter can be considered to a certain extent to be a separate language.

While Damin is a parasitic speech form on Lardil in terms of grammatical structure, it differs from it radically in lexicon and phonology (Hale 1973: 443). One of the special phonological properties of Damin is a set of five click phonemes (see Table 8 of the Appendix). It is clear that these developed as a local innovation associated with the creation of the Damin register. McKnight (1999: 245) writes:

The Demiin [= Damin] speakers claimed that the language was developed in Dreamtime ... But I think one can safely conclude that it was initially invented by a few initiated men who consciously decided to invent a language that would be spoken by knowledgeable men -- that is, men who were subincised. When that was done is open to conjecture. ...

What is remarkable about Demiin is the extraordinary linguistic insight that the inventors had about language. They were obviously acutely aware of the sounds and grammar of Lardil. What is more, they could imagine sounds that do not occur in Lardil or any other language that they were familiar with in the Gulf area. They systematically used new sounds in Demiin in a logical and coherent fashion, and they discarded some of the Lardil sounds. By these means, and by incorporating Lardil grammar with some modifications into Demiin, they invented a language for which the basics could be learnt in a few sessions but which the uninstructed would find confusing and unintelligible.

According to N. Evans (p.c.), there is also linguistic evidence for the innovative status of Damin-typical sounds, including clicks: some of its words can be shown to have been created by replacing normal consonants of inherited words by new marked speech sounds, for example, Damin *m!ii* (*m!* stands for a nasal labial click [m⊙]) < proto-Tangkic **mi(y)i* ‘vegetable food’ and Damin *k’uu* < proto-Tangkic **kuu* ‘eye’.

Another important fact about Damin clicks is that they “are in all essential respects like those of the Khoisan languages of southern Africa” (Hale 1973: 443). Among other things, they occur only in word-initial position -- only a characteristic of the core click languages -- and they display the same basic influx types (dental, alveolar, palatal, labial; only the lateral click is lacking). The lack of a larger set of so-called effluxes or accompaniments is due to the restricted system; the only existing nasal accompaniment conforms in fact to typological expectations in that a prevalence of nasalization is also typical of small click systems in Africa (cf. Maddieson, Ladefoged and Sands (1999: 87) on the East African click languages). The only unique feature in Damin is the re-articulated version of a click as a phonemic segment. An important conclusion from all these facts for the present topic is that independent click origin is not necessarily detectable by different properties of the relevant sounds.

3.2. Contact proliferation of clicks

A second type of non-genealogical origin of clicks involves contact between populations with languages that are distinguished by the presence/absence of clicks. Contact provides four basic scenarios for the proliferation of these sounds across languages or genetic population types. Each scenario on its own represents an idealization, because more than one scenario can be involved in a particular case.

First, a population with a click language can change its biological profile through heavy gene flow; this is excluded by Knight et al. (2003: 470) on account of the genetic data and will not be discussed any further. A second possibility is that clicks are borrowed by a population with a click-less language from a click language.

A possibility of click proliferation totally ignored in Knight et al.’s discussion is language shift; here two further scenarios can be distinguished. On the one hand, a population can shift from a click language to a click-less language whereby clicks enter the target language by substrate interference. On the other hand a population can shift from a click-less language to a click language whereby clicks are retained.

Only click borrowing and click language substratum, but not gene flow and click language superstratum are associated by language change regarding the presence/absence of clicks (cf. Thomason and Kaufman 1988). With respect to genetic properties of the population, a rough probabilistic generalization would be a cline of salience of genetic change: heavy gene flow would involve the highest degree; a click language substratum is also likely to leave a trace in the genetic record of the relevant population; the language shift scenarios from and to a click language are not necessarily associated with easily detectable genetic change. A summary of the four scenarios is given in Table 4.

	Language change regarding clicks	Population-internal genetic change
(a) Gene flow into a click language	NO	HIGH
(b) Borrowing from a click language	YES	↑
(c) Language shift from a click language	YES	↓
(d) Language shift to a click language	NO	LOW

Table 4: Contact scenarios for the proliferation of clicks across languages or populations

As Knight et al. (2003) acknowledge, there are attested cases of contact-induced click origin. They briefly mention the cases in Bantu languages of southern Africa; another case is probably the Cushitic language Dahalo in eastern Africa, although here independent origin cannot be safely excluded either. That these languages have acquired clicks through contact with click languages can be discerned from several facts. Most importantly, click sounds cannot be reconstructed to the respective proto-language. Also, language contact is historically attested or can be assumed, because unrelated click languages are found in the geographical vicinity. Finally, there is partially direct linguistic evidence that click words are borrowings from one or the other attested core click language.⁸

The case of Dahalo is the historically least clear one; regarding a contact scenario, it is a possible candidate for both the borrowing scenario (b) and the interference-through-shift scenario (c). Click lexemes cannot be reconstructed to Proto-Cushitic, but there is also no apparent source in modern click languages; there exist at least other click languages in eastern Africa so that clicks are likely to have been a wider areal feature in the past.

For southern African Bantu with clicks, contact with core click languages is attested up to the present and must be assumed to have occurred already in prehistoric times. The contact scenarios (b) and (c) are both relevant, but can no longer be disentangled.

Regarding the contact proliferation of clicks in general, the evidence from the secondarily acquired systems in Bantu provides three important conclusions to the effect that clicks, once borrowed, have a life on their own in the borrowing language and can undergo changes which are independent from their properties in the original donor languages.

First, click inventories of some Bantu languages are as complex as, or even more complex than systems of such Khoisan languages as Standard Khoekhoe, Kwadi, Sandawe,

⁸ This does not imply that all click words in these languages can be traced back to an identifiable source language (see also below).

and Hadza. Thus, Yei has 27 click phonemes (cf. Sommer and Voßen 1992) and Nguni varieties have 15 such segments (Poulos and Msimang 1998).

Second, there exist click accompaniments in Bantu which are not attested in any of the possible source languages. Such a genuinely Bantu click type is the murmured nasal series in Zulu (see Table 7 of the Appendix).

Finally, Nguni gives clear indications that a considerable number of click words are not due to borrowing or substrate interference, but have been innovated on the basis of the inherited Bantu lexicon. Quite similar to the origin of certain Damin click words, this can be discerned from two lexical patterns: (a) a click has replaced an original consonant as in *-cima* = [[ima] ‘extinguish fire’ from Proto-Bantu **-dima* and (b) there exists a doublet of lexical items distinguished by a slightly different meaning and the opposition click vs. non-click as in *-chela* = [[hela] ‘pour ceremonially, asperse’ vs. *-thela* ‘pour’.

Herbert (1990b) makes the important observation that the salience and degree of integration of clicks in the phoneme systems of Bantu languages correlates in South Africa with another feature, the existence and importance of a particular speech form in the linguistic community. This concerns Nguni and to a lesser extent Southern Sotho. *Isihlonipho sabafazi* (= ‘wives’ avoidance language’), as this register is called in Nguni, is part of a wider complex of avoidance customs which primarily concerns the behavior of married women towards their male in-laws (see, inter alia, Kunene 1958, Finlayson 1982, Herbert 1990a). Its linguistic reflex in its most extreme form is a taboo on uttering the names of senior male in-laws (focusing on the father-in-law) and any of the syllables of which these names are composed. A major strategy to achieve this goal is the substitution of an original consonant by another consonant, for example, a click. Herbert (1990b), following Faye (1923-5), argues that the contact of Bantu speakers with click languages provided them with a welcome addition to the available inventory of segments, which as a class was recruited in particular for the Hlonipha register, but also entered the normal language. This is one reason why many click words cannot be traced back to a non-Bantu source and explains why Southern Nguni (= Xhosa and Zulu), where Hlonipha is most salient, displays the highest degree of click integration in the linguistic system.

A general conclusion from the above observations is that in the long run the contact-induced origin of clicks is, like their independent innovation, not necessarily detectable by the properties of the click system or by the historical profile of the click lexicon.

A final point regarding contact-induced click origin concerns the idea of language shift. Such a scenario can involve the proliferation of any linguistic feature into another population,

including a quirky one like clicks. Important here is that genetic changes can be virtually absent if the shifting population maintains its distinct identity. Such language shifts seem to be particularly relevant for hunter-gatherers where contact with other groups often involves unilateral, socially “upward” gene flow. Classical cases where hunter-gatherer populations certainly underwent language shift, but kept (initially) fairly separate from their contact groups are *inter alia* the Negritos in the Philippines, the Wanniyala-aetto (alias Veddah) in Sri Lanka, the Pygmies in central Africa, and the Okiek (alias Ndorobo) in eastern Africa.

The possible shift of a population TO a click language is particularly challenging in the present context. It could confront us with a “perfect crime”, so-to-speak, because it need not have a considerable effect on the genetic profile of the shifting population AND does not involve a language change regarding clicks.

One might be tempted to counter that click languages are unlikely targets of language shift, because they are mostly spoken by hunter-gatherers and, partly as a result of this fact, are generally associated with low social prestige. However, this assumption is irrelevant in the present context for two reasons. On the one hand, there is sufficient evidence that languages of foraging cultures did expand and thereby were targets of language shift just like any other language; this must have been particularly relevant before the global expansion of food production.⁹ On the other hand, click languages are not necessarily associated with a cultural profile of low prestige; some have been the target of language shift until fairly recently like Sandawe in eastern Africa (Newman 1994) as well as languages of the pastoral Khoekhoe in southern Africa (*cf. inter alia* Traill 1995).¹⁰ The modern marginalization of most click languages seems to be the result of more recent historical processes both on a global scale (marginalization of hunter-gatherer subsistence) and in Africa in particular (Bantu expansion, European colonization).

⁹ See, for example, Ives (1990) and Golla (2000) on the Athabaskan expansion in northwestern North America; Evans and McConvell (1998) and McConvell (2001) on the Pama-Nyungan expansion in Australia; and Bahuchet (1993) on the westward spread of a Pygmy population within the Congo Basin giving rise to such modern widely dispersed groups as the Mbuti in northwestern Congo-Kinshasa, the Aka in the southwestern Central African Republic, and the Baka in southeastern Cameroon and northeastern Gabon.

¹⁰ A probable language shift without a change of the genetic profile also seems to be relevant for the Damara in Namibia. Their original language might have been from the Khoe-Kwadi family, but unlikely the Khoekhoe subbranch; today, however, they speak the same language as the Nama who are a pastoral Khoekhoe group.

3.3. Summary

It can be summarized that both types of non-genealogical origin of clicks, i.e. independent innovation and contact, are attested. These involve 3 of the 8 independent lineages with click languages listed in Table 1: Bantu of Niger-Congo, Dahalo of Afroasiatic, and Damin of Australian. The Bantu languages provide in fact more than one case of click borrowing: at least the clicks in Yei (R40) and Kavango Bantu (K30) on the one hand and in Southern Sotho (S30) and Nguni (S40) on the other hand are historically unrelated. Hence, there are at least 4 instances of non-genealogical clicks. The controversial case of Hadza aside, these account for half of all attested, reasonably independent cases of clicks. Under a more optimistic view on genealogical relations within “Khoisan” (e.g., 4 instead of 5 groups, in case Sandawe turned out to be related to Khoe-Kwadi), this would even rise to more than half of the total. In view of this fact, there is no empirical ground for underestimating or even excluding non-genealogical explanations for the presence of clicks in a language.

4. The historical problem of clicks in Hadza

In the following section, I will show that a non-genealogical origin of clicks is particularly relevant for Hadza. For this purpose, it is useful to recapitulate the main features of its clicks. First, the inventory of 9 segments is clearly in the lowest range of complexity (see Table 2); within an alleged “Khoisan” group, it is the simplest or second-most simple system (the Kwadi system with 8 clicks is uncertain). Second, clicks in Hadza have a relatively low frequency in the lexicon unlike the majority of “Khoisan” languages (see Table 3). Finally, the phonotactics of clicks in Hadza are not that of core click languages; Hadza is the only “Khoisan” language without a trace of this feature. All in all, the Hadza click profile is not reminiscent to cases where clicks are most likely of a genealogical nature.

The problem of clicks in a language should, of course, not only be evaluated in purely structural-linguistic terms. After all, a click profile like the Hadza one can be reached via two scenarios: the gradual elaboration of a borrowed or innovated click system or the truncation of an inherited system that was originally more elaborate and salient. However, the historical and areal setting of the Hadza, too, does not single out the genealogical scenario against others.

One non-linguistic factor is the time depth of this population. According to Knight et al. (2003), the Hadza are one of the oldest genetically distinct groups, involving several tens of thousands of years. Such a time depth puts serious limits to any attempt to determine the origin of a certain linguistic feature. In any case, the potential number and complexity of

historical events which may have occurred within this enormous time span to give rise to the genetic and particularly to the linguistic profile of the modern Hadza are apparently underestimated by the authors. Their assumption implies that Hadza had almost the entire human linguistic history for acquiring clicks within a non-genealogical scenario. This should be seen against the case of a Bantu language like Yei which just had a time span of ca. 2000 years to develop a click system which is three times as big as that of Hadza.

This implies that one cannot rule out that clicks emerged in Hadza independently in space and/or time from clicks in the rest of Africa, *pace* Knight et al. who write (2003: 470):

Two lines of evidence, rarity of clicks in human languages and complexity of the shared repertoire of clicks and accompaniments, suggest that independent invention of clicks in San and Hadzabe populations is an unlikely explanation for the observed genetic pattern. With regards to complexity of click repertoires, each click language includes a particular set of clicks and accompaniments. Some languages include larger sets than others do, but these sets do overlap. The clicks integral to Hadzane largely overlap with those clicks integral to Khwe and San languages. The hypothesis of independent invention, as it applies to the languages of the Hadzabe and San, lacks linguistic support.

Apart from the fact that click innovation in Hadza is compatible with the genetic data and the time depth involved, the above statement is linguistically grossly inadequate. Clicks as such are not rare in human languages (see Section 2.1). The clicks in Hadza deviate in several ways from those in the core click languages. Finally, Damín shows that clicks DO emerge independently and then are comparable to African clicks. Moreover, compared to Hadza, Damín has only a slightly smaller inventory; it has in fact one more click influx (labial); and its clicks conform with “canonical” phonotactics, while those of Hadza do not.

Entertaining here the idea of independent innovation of clicks for Hadza does only mean that it must not be excluded offhandedly. Another non-genealogical hypothesis, namely contact, has in fact a slightly greater probability. This not so much because the case of Damín -- the only clear case of independent click innovation -- does not involve clicks in a “normal” speech register, but rather because a contact scenario fits nicely with the linguistic areal context of Hadza. That is, apart from the fact that clicks are widely available globally and particularly in Africa as paralinguistic speech sounds, Hadza is spoken in eastern Africa where clicks are also attested as PHONEMES elsewhere. While this area is not, and with all likelihood never was, homogeneous in terms of such population criteria as genetic profile, mode of subsistence, social organization, etc. as well as the genealogical affiliation of the languages involved, some linguistic features cut across non-linguistic and linguistic boundaries. For the present discussion it is important that eastern Africa hosts still today three unrelated click languages which are geographically dispersed and whose click words cannot

be traced back to a single source. This suggests that the area in the past hosted more click languages and language groups, which were obliterated with a few exceptions in the course of later colonization by such non-click lineages as Cushitic, Bantu, and Nilotic. In other words, clicks were a likely areal feature of eastern Africa in the past.

Knight et al. (2003: 470) also exclude explicitly the possibility that Hadza clicks are the ultimate result of population contact when they write:

A third a priori explanation of sharing of clicks by San and Hadzabe in the context of genetic differentiation is linguistic borrowing. Xhosa, for instance, while uncontestedly a Bantu language, incorporates some clicks borrowed from Khwe or San languages. The extensive population contact required for such click borrowing, however, leaves a genetic signature through gene flow, as has been well documented. ... Finally, distortions of the tongue required to produce click consonants inhibit borrowing of the full repertoire of clicks by adult nonnative speakers. The Nguni language, for instance, includes a click system that is far less deeply integrated and complex than the systems of Hadzabe and San languages.

Again, this statement contains several untenable assumptions and assertions, both in general and for Hadza in particular. One major problem is that they entirely ignore the possibility that clicks in the Hadza population are the result of language shift. Both shift scenarios, i.e. clicks were either a feature of the source language or the target language, are compatible with the genetic record and the linguistic facts regarding the Hadza click system.

For their exclusion of click borrowing, too, there are no empirical grounds. As discussed above, Hadza is far from having “the full repertoire of clicks” and the production of its nine distinctive segments does certainly not require any “distortions of the tongue.” Its click use is overall different from that in core click languages. Also, clicks have been acquired through contact in at least three independent cases, namely in Dahalo, in Bantu languages of northern Namibia/Botswana, and in Bantu languages in the east of South Africa. The clicks in such Bantu languages as Nguni (including Xhosa) and Yei are not “less deeply integrated and complex” than in Hadza, rather to the contrary. Clicks do not display “canonical” phonotactics in both Bantu and Hadza, but Bantu displays more complex click inventories than Hadza and at least one genuine click accompaniment.

Finally, one must reckon with the possibility that the modern system and distribution of clicks in Hadza are the result of a series of processes whereby a small click inventory acquired by contact expanded later through purely language-internal changes; the Bantu evidence shows that such a scenario accounts in fact for systems which are far more complex than that of Hadza. Overall, Hadza clicks are more similar to those of languages where they are due to contact rather than to inheritance.

To be sure, to regard Hadza clicks to be due to language contact is not uncontroversial. However, it is not compelling when Maddieson, Ladefoged and Sands (1999: 67-8) state that

There is no evidence that clicks are a borrowed feature of the phonology of Hadza; neither the language-internal distribution of the clicks nor the ability to identify their sources in external loans points in this direction.

On the one hand, these authors ignore Elderkin (1978: 29-32) who does identify potential phonotactic evidence in Hadza “for clicks belonging to a secondary [i.e. borrowed] system.” On the other hand, their argument regarding a lacking source language is invalid, because the clicks in the Cushitic language Dahalo are certainly secondary and there is no identifiable click source either.

A local contact scenario for Hadza clicks in eastern Africa leaves open the question whether click phonemes have emerged in Africa more than once, i.e. in eastern and southern Africa independently; again, this is theoretically possible. It is also plausible, however, that all clicks attested in African languages today are due to a single historical event, despite their modern geographical dispersal. Given that the Bantu expansion into eastern and southern Africa is only a few thousand years old, it is quite possible that there existed an earlier linguistic macro-area that reached from eastern Africa to the southern end of the continent. Under this hypothesis, the Bantu spread would have submerged a linguistic-areal connection between eastern and southern Africa by causing the extinction of a great many languages, which may have been of different type and genealogical affiliation, but shared at least some linguistic features -- *inter alia* clicks as a common phoneme type.

This scenario is suggested by several synchronic linguistic indications: (a) typological similarities across such unrelated lineages as South Cushitic, Sandawe, and Hadza in eastern Africa and the various “Khoisan” language groups in southern Africa, for example, the presence of lateral consonants, (b) an exclusive typological affinity of Khoe-Kwadi towards languages in eastern Africa (Heine and Voßen 1981, Güldemann forthcoming c), possibly involving even a genealogical link between it and Sandawe (Elderkin 1986, Güldemann and Elderkin forthcoming), and (c) linguistic features in some Bantu languages of eastern and southern Africa which can be interpreted as the result of interference from such a pre-Bantu substrate (Güldemann 1999).

It is unwarranted under this scenario that there must be a genetic and/or linguistic affinity between the Hadza population and those speaking the core click languages in southern Africa. The geographical distance and the time depth involved would suggest that the latter are not the direct source of Hadza clicks. These would rather come from a click-speaking population that existed at a time when the wider geographical area had a higher

incidence of click languages and of which the linguistic and genetic profiles are no longer clearly identifiable.

In general, the historical processes that have brought about the modern click distribution in Africa involve with all likelihood a complex scenario of divergence, convergence, and obliteration of distinct languages and populations across space and time, including language shifts that leave no or few linguistic and genetic traces. So even under the assumption that Knight et al.'s (2003) interpretation of the genetic data is correct, the existence of clicks in Hadza can be reconciled with various patterns of language contact.

In conclusion, Knight et al.'s (2003: 470) claim that "current genetic and non-genetic data are inconsistent with three of four a priori explanations for sharing of clicks without genetic similarity" is certainly inadequate. The available data are in fact CONSISTENT with all explanations considered, i.e. independent emergence, language/population contact, and inheritance from an early ancestor language, which -- it must be stressed -- has not been falsified by the above discussion. While any scenario for the origin of clicks in Hadza must be highly speculative, to the extent that the evaluation of one hypothesis against the other is a matter of weighing degrees of plausibility, the genealogical explanation is, however, least compatible with the linguistic evidence.

5. Historical aspects of clicks as a phoneme type

The general hypothesis by Knight et al. (2003) implies two assumptions: (a) clicks as phonemes have been lost in the great majority of linguistic lineages and (b) clicks were locally retained in some African languages. They do not provide, however, a plausible scenario of how/why the status of clicks as "normal" speech sounds in early forms of human language changed towards their highly marked status within modern linguistic diversity. This leads to the general question of the stability of click phonemes over time. They only entertain briefly two hypotheses:

Clicks may have persisted for tens of thousands of years, independently in multiple populations, as a neutral trait. Alternatively, clicks may have been retained, because they confer an advantage during hunting in certain environments. (p.464)

Apparently, they follow the general assumption that clicks are inherently instable and can be lost fairly easily, except if there is a factor countering this tendency. The following section will address different questions relating to the stability and age of phonemic clicks arguing that clicks are neither inherently instable nor evidently old.

5.1. A cultural advantage of click phonemes?

Knight et al. (2003) are, of course, aware of the problem that clicks have been retained for such a long time, despite their alleged instability, and then with a very skewed geographical and genealogical pattern, i.e. in just a few African languages. Since the first hypothesis in the above citation does not solve either of the two puzzles, they propose an alternative hypothesis, namely that clicks might be advantageous to hunter-gatherers:

So far, we have discussed clicks as if assuming their cultural neutrality. We cannot rule out the possibility, however, that clicks may have persisted because they confer, in particular environments, an advantage. Click systems may impact hunting success. During stalking of prey, Jul'hoansi revert to a hushed whisper-like communication. Speech is devoiced and consists almost entirely of clicks. ... Click density of Jul'hoan allows devoiced communication. While there is little precedence for phonetic elements conferring a functional advantage, we hesitate to rule out this possibility without further study. (p.471)

The above hypothesis is also mentioned in the initial summary of the article and is the only one tackling the above issues. In view of this fact, a wording like “hesitate to rule out this possibility” is quite an understatement; rather, it must be concluded that another explanation is not available to the authors. Their hypothesis is, however, highly unlikely for reasons of both a general and specific nature.

First, it remains to be shown that hunting success is at all decisive for the survival of foraging communities; just to take the case of the southern African San, it has been shown that even under a traditional way of life their diet consisted predominantly of plant food.

Another problem is that not all languages/ language groups where clicks can be traced back to an early stage of linguistic development are demonstrably associated with a hunter-gatherer culture. For example, the speakers of Proto-Khoe, the ancestor of the majority of modern languages subsumed under “Khoisan”, seem to have had a partially food-producing subsistence according to the reconstructed lexicon (cf. Köhler 1986, Voßen 1997).

Also from a general perspective, their hypothesis still does not answer the question why clicks were retained in just a few hunter-gatherer groups. Presumably, Knight et al. (2003) imply that the human populations colonizing the world outside Africa already had lost clicks (hence no inherited clicks outside Africa). But even these out-of-Africa colonizers without clicks must have been hunter-gatherers. Why then did clicks cease to be advantageous already for certain forager groups in ancient Africa before the global human expansion?

Finally and most importantly, Knight et al. (2003) build a major hypothesis on a minor empirical phenomenon. A closer look at precisely this feature, based on a brief literature

survey and field investigation, reveals that their argument rests on shaky grounds, to say the least.

The phenomenon they refer to with “hushed whisper-like communication” is called in Ju|’hoan *gòngòma* or *gùmágùmá* (cf. Dickens 1994: 179). It is not only used in hunting, but represents a fairly ordinary aspect of human languages in general; it is not just “whisper-LIKE”, it is nothing but whispered Ju|’hoan in the canonical sense of the word, entirely parallel to whispering in, for example, English. Its articulatory basis, auditory effect, and efficiency for certain purposes has, pace the authors, nothing to do with the “click density of Ju|’hoan”; any language allows “devoiced communication”, rendering the consonants to be more important clues to speech recognition.

Ironically, this acoustic effect of whispering makes the hypothesis particularly unlikely, because clicks are auditorily the strongest consonant type attested in human languages (cf., e.g., Traill 1985: 170ff). In being such high-impact sounds, they appear to be the worst option available from the sound class of consonants for avoiding disturbance of game through noise. That mammals do not react indifferently to clicks, as opposed to non-click speech sounds and other non-linguistic noise (e.g., from a dry leaf creaking under a hunter’s foot), is evident from the fact that one domain of paralinguistic clicks is in fact precisely the communication WITH animals (see Section 2.1).

That there is no connection between clicks and hunter success is corroborated by published information on the context and way of use of *gòngòma* ~ *gùmágùmá* in Ju|’hoan and whispering in other click languages during hunting:

... If they speak at all, it is in muted tones. Most communication is by hand signal. ... (Silberbauer 1981: 209-10)

After reconnoitering, the hunters plan their approach, ... the attack is worked out in a series of gestures and a whispered word or two. (Silberbauer 1981: 211)

When a few hunters work together, they communicate with hand signals. When they cannot see one another, they may use bird calls and whistling. Once the animal has been sighted, they may come together and discuss their strategy in soft whispers. (Liebenberg 1990: 108, see also p.55)

As opposed to one possible reading of Knight et al.’s description, whispering is not used when the communicating parties of a hunt are separated by some distance whereby clicks would bridge this space without disturbing the prey. Instead, it is employed as silent FACE-TO-FACE communication to coordinate the end phase of the hunt, i.e. before actually approaching the game for the final attack. Compared to whispering in other languages, the use of whispering involving clicks does not have advantages for the avoidance of noise; on the

contrary, according to all what is known, one is forced to conclude that it would, if anything, disfavor hunters.

5.2. The stability of click phonemes

As mentioned above, there is a general assumption that clicks are difficult and hence instable as a sound class, which would favor their loss over time. This seems to be corroborated at first glance by the observation that most of the recent, historically observable cases of language change affecting click languages indeed attest *inter alia* for click loss (cf. Traill and Vossen 1997), so that one is tempted to assume that click loss is an important aspect in the dynamics of such languages.

This hypothesis is, however, not at all conclusive from a more general perspective. The click loss referred to above is described for northern !Xūu varieties (Ju-#Hōa family), northeastern and eastern Kalahari Khoe languages (Khoe-Kwadi family), and the easternmost !Ui language ||Xegwi (Tuu family); it is presumably relevant for yet other languages, for example, Kwadi (cf. Güldemann and Elderkin forthcoming). Looking at the geographical locations of these languages (see Map 2) it can be observed that all of them are situated at the periphery of the core click language area in southern Africa and, as a result, share a particular socio-linguistic setting, as recognized by Traill and Vossen (1997): they have had an intimate contact history with click-less Bantu languages, which are sociolinguistically more prestigious and often are the ultimate targets of language shift. Thus, the frequent and considerable click loss in these core click languages might well be a phenomenon that is associated with an extra-linguistic factor of language change rather than motivated by properties inherent to the speech sounds themselves.

This seems in fact to be more likely, given the situation in click languages in relatively “undisturbed” sociolinguistic environments where clicks are stable sounds. Traill (1974: 39-40) writes on the so far most complex system of the !Xōo language complex (Tuu family):

It is a striking fact that the !xō dialect area exhibits such homogeneity at all levels of linguistic structure, phonetic, phonological, morphological and syntactic, despite its largeness (about 90,000 square miles). This may argue for a relatively recent dispersal of the dialects, but it is impossible to give substance to this. What one can say, however, is that the homogeneity suggests that an unexpected degree of stability is characteristic of the language. I say “unexpected” for two reasons. Firstly, one may be led by the nature of Bushman [= San] society to expect sociolinguistic conditions which would favour unchecked differentiation; communities are very small, often socially isolated and there is not the linguistic self-consciousness or literacy that would lead to standardisation. On the linguistic side the language shows amazing phonetic complexity and one would expect - although there are not well-developed theoretical grounds for this - this to amount

to an instability in the sense that it would lead to the rapid rise of many variant pronunciations. It is just a fact that the number of phonetic parameters a Bushman controls in speech production represents something approaching a maximum for human linguistic behavior, and I suggest (theories of markedness and the so-called “principle” of least effort aside) that it is reasonable to expect such complexity to go hand in hand with instability. But this turns out not to be the case. Far from variability or simplification being the rule, the maximum phonetic complexity is retained and lexical items retain fairly standard pronunciations.

There are yet other indications that clicks are not inherently instable and prone to loss. Looking at the clicks in an average core click language and comparing them with other consonants, they in fact turn out to be exceptionally “successful” sounds. Within a language, they normally outnumber other consonants, both in the phoneme inventory and in the lexicon (see Section 2.2). Cross-linguistically, there is no other major sound type which is subject to such an extensive series formation (inter alia by the unique possibility of combining with a second, i.e. the pulmonic, air-stream mechanism) and thus can provide an enormous multiplicity of lexically distinctive segments (!up to 83 in East !Xõo).

Last but not least, the evidence presented in the previous sections, namely that click systems can emerge independently, be transferred to click-less languages, and expand over time, also does not suggest that this sound class is an inherently recessive linguistic feature.

While the available data do not allow one to give a conclusive answer to the problem of click stability, they certainly justify the null-hypothesis; that is, all things being equal, clicks as a sound type are not more (in)stable than other infrequent speech sounds. Hence, any theory which assumes proto-world to have been a click language has to invoke more than just the alleged “instability” of clicks for motivating that the clicks have mostly been lost.

5.3. The age of click phonemes

Another widely held view on clicks is that there is something inherently “archaic” to these sounds. In linguistics, too, this idea has an uninterrupted tradition, going back to the first scientific research on click languages in southern Africa; one can notice a clear conceptual continuity in the relevant works, for example, from Grolier (1990), over Stopa (1960, 1977) and Ginneken (1938), back to Bleek (1862). Until fairly recently, this approach could hardly be separated from the stereotypical idea that the southern African peoples speaking the core click languages are themselves “archaic” and “primitive”. Compare a representative statement like that by Jespersen (1922: 418, capitals mine):

First, as regards the purely phonetic side of language, we observe everywhere the tendency to make pronunciation more easy so as to lessen the muscular effort; difficult combinations of sounds are discarded, those only being retained which are pronounced with ease ... In most languages now

only such sounds are used as are produced by expiration, while inbreathed sounds and clicks or suction-stops are not found in connected speech. In civilized languages we meet with such sounds only in interjections ... In some VERY PRIMITIVE South African languages on the other hand, clicks are found as integral parts of words; and Bleek has rendered it probable that in former stages of these languages they were in more extensive use than now. We may perhaps draw the conclusion that primitive languages in general were rich in all kinds of difficult sounds.

In modern treatments of the issue, the old age of click phonemes is simply asserted without giving new and convincing evidence in support. Compare, for example, Kohler (1998: 267) who states “clicks, although very rare in the world’s languages ... must be regarded as being among the basic archetypal phonemic elements of sound systems.” The crux of the matter in this claim is the necessary distinction between phonemic and non-phonemic clicks. It is indeed probable that clicks are “archetypal” elements of human communication as a non-phonemic, paralinguistic phenomenon, because this is supported by cross-linguistic evidence (see Section 2.1). That clicks are archetypal as PHONEMES is a possible hypothesis, but it is speculative on linguistic grounds.

The available data are also compatible with an alternative hypothesis which is not tied to a very ancient stage of human language.¹¹ In line with the empirical findings laid out in Section 2.1 clicks have been widely available as a paralinguistic aspect of communication throughout human history. It is conceivable that, before this background, they made it very occasionally from this domain into the phoneme inventory of a language. The major reason for this assumption is the following empirical fact: there are only two attested cases where clicks in modern languages cannot at all or not exclusively be ascribed to inheritance or contact, i.e. where it is certain that clicks are completely or partly independent from clicks in the core group of modern click languages in southern Africa; they are the click innovation in Damin and the click proliferation in Nguni Bantu. Significantly, both cases suggest that the innovative “promotion” of clicks from non-phonemic to phonemic speech sounds involves more than just their mere availability; that is, they are both associated with a marked sociolinguistic phenomenon in the form of an avoidance language. Apart from the general fact that a language with linguistic avoidance is overall more dynamic in historical terms, this suggests the following, more general scenario for the rare, but possible INDEPENDENT innovation of click phonemes.

¹¹ There may, of course, be more theoretical possibilities for the origin of clicks. One linguistically relevant scenario is the emergence of clicks by way of natural sound changes from other more frequent consonants. Since there are as yet no empirical grounds for this idea, it will not be discussed here.

Clicks are initially recruited for phonemic purposes in a marked speech register. Here, they have at least two potential advantages as a new and marked sound class vis-à-vis the canonical segment inventory: on the one hand, they are emblematic and thus attractive, like any other “alien” sound type would be for such a marked speech form; on the other hand, they facilitate the required manipulation of the lexicon by meeting the need for new sounds to replace sounds to be avoided. As a second step, it can be assumed that such a special register can affect in the long run the “normal” language; it would serve, so to speak, as a permeable mediator between the distinct sound inventories of paralinguistic and linguistic communication. As soon as there are click phonemes in the sociolinguistically unmarked register, an initially small click inventory can consolidate and even expand gradually, both in the phoneme system and the lexicon.

In general, the evidently rare emergence of clicks as phonemes could have resulted from complex, historically incidental interactions of different linguistic and non-linguistic factors. Since this must only be assumed in an exceptionally small number of cases (possibly only two: one in Africa and one in Australia), the cross-linguistic rarity of phonemic clicks falls out naturally from this scenario.

Coming back to the actual age of clicks as a phoneme type, it should be reiterated that the linguistic evidence by itself does not provide obvious support for an old-age hypothesis. To a certain extent, this must have been felt by previous scholars tackling the issue in that they often tied the presence of clicks to the old age of either the relevant linguistic lineage or the population type. Both solutions are problematic, though.

Linguistically, the time depth involved, namely tens of thousands of years, is incompatible with the possible historical evaluation of genealogical linguistic entities attested today; the rigor of even the most ambitious linguistic method presently available fades out from 10000 years backwards, that is chance, inheritance, and contact can no longer be securely distinguished in the case of a similarity. In the case at issue, there is no good reason for associating even the oldest linguistic lineages with clicks with some linguistic entity spoken, say, 20000, 30000, or 40000 years ago.

From a genetic perspective, the major population in southern Africa associated with click sounds is indeed also associated with old genetic markers. However, in view of the above data on non-genealogical click origin and the relevant time depth, the emergence of click phonemes within this population cannot be tied securely to its origin in genetic terms.

In conclusion, there is no good reason as yet to assume with any confidence that clicks were among the earliest phonemic speech sounds. The possibility is very real that the

emergence of clicks as phonemes in Africa represents a far later episode in the diversification of human speech. It must be kept in mind in this respect that a time depth of several tens of thousands of years invokes highly different connotations of “old”~”early” vs. “young”~”late”. If clicks in Africa had an age of, say, 20000 years, they would be a relatively “young” phenomenon vis-à-vis the identifiable time depths of human genetic profiles; in linguistic terms, they would be exceptionally “old” in the sense that available methods of this discipline are incapable of identifying such an early date.

Viewed from a purely synchronic perspective, click phonemes simply represent a linguistic-typological “quirk”. As such, they have a number of parallel cases in the universe of attested linguistic features.¹² These also warrant historical interpretations, which are likely to be as complex as that for clicks, but the hypotheses would probably be less spectacular.

6. Summary

The idea that the origin of click phonemes is of the same age as the origin of language, as has been proposed for a long time and is again entertained by Knight et al. (2003) on the exclusive basis of genetic data, is a possible hypothesis not falsified by the present discussion. However, against the unfounded claims of these authors, the available linguistic data do not single out this hypothesis in favor of other hypotheses. The idea that modern click phonemes have their ultimate origin in the linguistic feature of a very ancient human language remains just one among several speculative hypotheses. The above paper seems to be inspired by the outdated default assumption that linguistic, genetic, and cultural features correlate, and thus achieves first of all to perpetuate old stereotypes about the African groups speaking the relevant languages. Unspectacular as the conclusion of this paper may appear, whatever the genetic relations between the different populations with click languages are, we don't really know much more regarding clicks than before.

There is, however, another lesson to be learned from the present problem: the desirable integration of genetic and linguistic data is potentially confronted with a serious problem, namely the possible incompatibility of time depths. The enormous time depths that can be reached by modern genetic research have so far no counterpart in linguistic methodology. It is also necessary to appreciate the different historical dynamics of the primary research objects

¹² For example, there are other rare consonant types whose skewed geographical distribution is surprisingly similar to that of clicks: labiovelar stops are only found in a large Sub-Saharan African belt and in two small pockets in East Africa and East New Guinea (see Maddieson 2005); labial flaps are attested in one larger area in Central Africa and in a few isolated languages in Southeast Africa and Flores (Indonesia) (see Olson and Hajek 2003).

of the two disciplines: linguistic features, languages, and language groups on the one hand and genetic features and populations on the other hand. More reliable hypotheses about the early development of language can be reached only by truly interdisciplinary research in the disciplines concerned.

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Appendix: Click inventories of selected languages

(48)	Lt	Dt	Al	Pl	Lb
Plain			!	‡	
Voiced	g	g	g!	g‡	
Plain + Gl	'	!'	'	‡'	
Plain + As	'h	'h	!'h	‡'h	
Voiced + As	n h	n h	n!h	n‡h	
Plain + /x/	x	x	!x	‡x	
Voiced + /x/	g x	g x	g!x	g‡x	
Plain + /kx'/	k	k	!k	‡k	
Voiced + /kx'/	g k	g k	g!k	g‡k	
Plain + /kh/	h	h	!h	‡h	
Voiced + /kh/	g h	g h	g!h	g‡h	
Plain nasal	n	n	n!	n‡	

Table 1: The click system of Ju|'hoan (Ju-‡Hõa) (after Dickens 1994)

(83)	Lt	Dt	Al	Pl	Lb
Plain			!	‡	⊙
Voiced	g	g	!g	‡g	⊙g
Plain + Gl	'	!'	'	‡'	⊙'
Plain + As	h	h	!h	‡h	⊙h
Voiced + As	g qh	g qh	g!qh	g‡qh	g⊙qh
Plain + /x/	x	x	!x	‡x	⊙x
Voiced + /x/	g x	g x	g!x	g‡x	g⊙x
Plain + /kx'/	kx'	kx'	!kx'	‡kx'	⊙kx'
Voiced + /kx'/	g kx'	g kx'	g!kx'	g‡kx'	g⊙kx'
Plain + /qh/	qh	qh	!qh	‡qh	
Voiced + /qh/	G qh	G qh	G!qh		⊙qh
Plain + /q/	q	q	!q	‡q	⊙q
Voiced + /q/	G	G	!G	‡G	⊙G
Plain + /q'/	q'	q'	!q'	‡q'	⊙q'
Plain nasal	n	n	!n	‡n	⊙n
Voiceless nasal	n̥	n̥	!n̥	‡n̥	⊙n̥
Plain nasal + Gl	' n	' n	'!n	'‡n	'⊙n

Table 2: The click system of East !Xõo (Tuu) (after Traill 1985, 1994)

(52)	Lt	Dt	Al	Pl	Lb
Plain	k	k	k!	k‡	
Voiced	g,,	g	g!	g‡	
Plain + Gl	ŋ '	ŋ '	ŋ!'	ŋ‡'	
Plain + As	ŋ h	ŋ h	ŋ!h	ŋ‡h	
Plain + /x/	q χ	q χ	q!χ	q‡χ	
Plain + /kx'/'	q χ'	q χ'	q!χ'	q‡χ'	
Plain + /k'/'	k '	k '	k!'	k‡'	
Plain + /kh/	k h	k h	k!h	k‡h	
Plain + /q/	q	q	q!	q‡	
Voiced + /q/	G	G	G!	G‡	
Plain + /qh/	q h	q h	q!h	q‡h	
Plain + /q'/'	q '	q '	q!'	q‡'	
Plain nasal	ŋ	ŋ	ŋ!	ŋ‡	

Table 3: The click system of G|ui (Khoe-Kwadi) (after Nakagawa 1996a, b)

(15)	Lt	Dt	Al	Pl	Lb
Plain			!		
Voiced	g	g	g!		
Plain + Gl	'	'	!'		
Plain + As	h	h	!h		
Plain nasal	n	n	n!		

Table 4: The click system of Sandawe (after Elderkin 1989: 37)

(9)	Lt	Dt	Al	Pl	Lb
Plain	k	k	k!		
Plain + Gl	ŋ '	ŋ '	ŋ!'		
Plain nasal	ŋ	ŋ	ŋ!		

Table 5: The click system of Hadza (after Sands, Maddieson and Ladefoged 1996: 173)

(3)	Lt	Dt	Al	Pl	Lb
Plain		ŋ			
Voiceless		ŋ			
Voiceless labialized		ŋ w			

Table 6: The click system of Dahalo (after Maddieson, Ladefoged and Sands 1999: 66)

(15)	Lt	Dt	Al	Pl	Lb
Plain	x	c	q		
Murmured	gx	gc	gq		
Plain + As	xh	ch	qh		
Plain nasal	nx	nc	nq		
Murmured nasal	ngx	ngc	ngq		

Table 7: The click system of Zulu (Bantu) (after Poulos and Msimang 1998: 481)

(5)	Lt	Dt	Al	Pl	Lb
Plain			n!	rn!	m!
Plain + Re		nh!2	n!2		

Table 8: The click system of Dammin (after Hale and Nash 1997: 251)

Click symbols are taken over from the respective source. In spite of the considerable orthographic differences involved, the clicks themselves are arguably comparable in phonetic-phonological terms (hence the largely identical labels in the headings of columns and lines). The abbreviations are: Al alveolar, As aspiration, Dt dental, Gl glottalization, Lb labial, Lt lateral, Pl palatal, Re rearticulation.

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