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Mous, M.P.G.M.; Kennard, H.; Lindsay-Smith, E.; Lahiri, A.; Maiden, M.

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The history of numerals as a history of East African languages

Maarten Mous

Leiden University Centre for Linguistics

The paper discusses a shift in the number system of Proto-Tanzanian Cushitic from the word for “three” to mean “four”, and the one for “two” to mean “three”. This shift was brought about by contact between an incoming group of northern Cushitic speakers and the already present group of Tanzanian Cushitic speakers due to similarity in form between the words for “four” in Tanzanian Cushitic and “three” for in the incoming group. This shift pulled the word for “two” to fill the gap of the old “three” and triggered the innovation of a new internally derived word for “two”. This scenario provides a more intricate view on the Cushitic migration from Ethiopia to Tanzania. Kw’adza joins the rest of Tanzanian Cushitic undergoing this complex and unique set of shifts, but Aasa does not.

Keywords: Cushitic, numbers, semantic change, subclassification

1. Semantic shift in the Tanzanian Cushitic numerals

Several studies on the history of Cushitic numerals exist already: Plazikowsky-Brauner (1963), Zaborski (1987), Banti (1993), Zelealem (2003), Treis (2007); the most elaborate being Blažek (2018). I build on Blažek’s work. The West-Rift South Cushitic languages in Tanzania have a word for “three” that is cognate with the word for “two” in the East Cushitic branch; and a word for “four” that is cognate to the word for “three”, while the terms for “five” and “six” correspond regularly in form and meaning with the rest of Cushitic. This remarkable semantic shift in itself shows that the East-Rift South Cushitic language Aasa which has the regular (East) Cushitic reflex for “two” did not share this intriguing innovation, and is therefore not part of West-Rift; the other East-Rift South Cushitic language, Kw’adza, does share this 2 > 3 semantic innovation, and is better classified as West-Rift, which I propose to call Tanzanian Cushitic henceforth. But how did this shift in meaning come about?

I propose a scenario in which the Tanzanian Cushitic languages changed the shape of their inherited Cushitic word for “four” under the influence of an East Cushitic term for “three” and copied the East Cushitic term for “two” to be used for “three”.

Table 1 presents the reconstructed words for the relevant numerals. The second column provides Proto-Agaw (or Central Cushitic), as a primary branch of Cushitic spoken in Central Ethiopia; the data are taken from Appleyard (2006). The reconstructed Agaw forms serve here to show the correspondences of Proto-Tanzanian Cushitic with an early branch of Cushitic as reference for the original layer in Tanzanian Cushitic. Proto-Tanzanian Cushitic is taken from Kießling & Mous (2003); these are the Cushitic languages that are still spoken in Central North Tanzania and centre of discussion in this paper. The fourth column provides Proto-East-Cushitic; the data are taken from Sasse (1979), Black (1974) and Blažek (2018).¹ I propose influence from an East-Cushitic source on Tanzanian Cushitic. The map of Cushitic languages is provided in Appendix 2 and the reference classification in Appendix 1.

Table 1. The proposed schema of number shift in Tanzanian Cushitic

Number	Proto-Agaw	Proto-TzCushitic	Proto-East-Cushitic
2	*lāŋa/laŋa	*tsada	*lam(m)
3	*säy ^w a/səy ^w a	*tam	*seddeh
4	*säza (*sägya)	≈ *ts'igaha	≠ *ʔaf(a)r

The Tanzanian Cushitic form for “four” was inherited from a common early ancestor of Proto-Tanzanian Cushitic and Proto-Agaw. Blažek (2018:49) states that the “The more archaic Agaw proto-form *sägya “four” is compatible with Iraqwoid [Tanzanian Cushitic] *tsigaħa “four””. As can be seen in the reconstructions for Agaw, the forms for “three” and “four” were quite similar at an early stage. I propose a pull shift in which those speakers of the East-Cushitic that joined the Proto-Tanzanian Cushites started to use the dominant Tanzanian Cushitic numerical form for “four” as their number “four” and lost their original word for “four”. The gap of no longer having a word for “three” that those East-Cushitic

1. The item *lam(m) “two” is taken from Sasse (1979:21). Sasse (1979) provides the most precise reconstructions but he does not reconstruct the numbers “three” and “four” because of irregularities and other challenges. Black (1974)’s reconstructions are given for those numbers, but they are for lower levels. Proto-Lowland-East-Cushitic ʔaf(a)r “four” from Black (1974:103,153,311), Proto-Southern-Lowland, a sub-branch of Lowland-East-Cushitic, *seddeh “three” from Black (1974:111,147). Blažek (2018:45) suggest a reconstruction for Proto-East-Cushitic *sizh-/ *sazh-/ *šaz(zi)ħ- “three” but does not provide correspondences.

speakers shifting to Tanzanian Cushitic equated with the Tanzanian Cushitic word of “four” led to the shift of their number “two” for “three” and using the Tanzanian Cushitic word for “two” for “two”. The Pre-Proto-Tanzanian-Cushitic speakers copied the form for “three” in use by the numerically fewer East-Cushitic speakers who probably had a higher social status. There are in fact two possibilities for the East-Cushitic admixture and I present these in Table 2.

Table 2. The proposed schema of Cushitic influence on Tanzanian Cushitic*

Number	ProtoTzCushitic	Other Cush speakers	(Pre-)Oromo	Proto(Yaaku)Dullay
2	*tsada	<tsada>	lama	(lakki)
3	*tam <	lam(a)	sadii < sadi(h/h̄)	*(s)izzah
4	*ts'ig(y)a > *ts'igaha	<ts'igaha>	ʔafur	*salah

* The Dullay languages have *lakki* for “two” (Amborn et al. 1980: 211 for Dullay; Savà 2005: 95 for Tsamakko); and this is transferred into Konso (Black & Shako 1973: 84) which also still has the root *lam-* in *lam-m-aaw* “become two” and *lam-itta* (m) “eldest son of second wife”; and Diraytata *lakk^e* in (Black 1973: 73) or *lakki* (Wondwosen 2006: 65) but Oromo has *lamá* (Owens 1985: 267 for Harar Oromo).

One is a Pre-Oromo group. Kießling & Mous (2003: 38) already showed a number of remarkable resemblances between Proto-Tanzanian Cushitic and Oromo in both lexical items and grammatical forms, and list a group of 12 Tanzanian Cushitic roots that show a close connection to Oromo. In addition, there is the East-Cushitic root for “meat”, *so*, that is cognate with Proto-Tanzanian Cushitic *fuʔu-nay* showing the typical Oromoid innovation of *s>f*. They also point out to two nominal suffixes in proto-Tanzanian Cushitic that originate in Oromoid, as well as some other grammatical features. A second option has recently arisen in the proposal by Sands & Tosco (2022) of Yaaku-Dullay contact with Hadza. Hadza is spoken in roughly the same area as Tanzanian Cushitic languages and contact between Yaaku-Dullay and Tanzanian Cushitic cannot be excluded if we accept the proposal by Sands and Tosco.

If the East-Cushitic speakers were Pre-Oromo speakers, their word for “three” was the precursor of Oromo *sadii* “three”. Black (1974) reconstructs proto-Southern-Lowland East Cushitic **saddeh̄* “three”. Within Oromoid the vowel *e* regularly raised to *i* before a pharyngeal, and the final pharyngeal ends up as *h* or zero in the Oromoid languages. Proto-Oromoid would have been **saddiH* in which the realisation of H is uncertain which makes it difficult to know to what extent the Pre-Oromo speakers were triggered to use the Tanzania-Cushitic form for “four” for their “three” due to resemblance in shape and to lose their original word for “four”, *ʔafur*. If we assume that these other Cushitic speakers were

Yaaku-Dullay, their word for “three” is a better candidate for equation with the Tanzanian Cushitic word for “four”. Moreover, their loss of the word for “four”, *salah*, could have been due resemblance to their word for “three”, *sizzaḥ* and Tanzanian Cushitic *ts’igaḥa* “four”. However, it is less certain what their words for “three” and “four” would have been as there is no reconstruction of Yaalu-Dullay available, and the Yaaku numerals are quite deviant. Yaaku is a moribund language shifting to Maasai and, being former hunter-gatherers, they may have shifted from an earlier language to a Dullay-related language. Based solely on the Dullay languages, the Proto-Dullay word for “three” may have been something like **sizzaḥ* (based on Gawwada *ṛizzah* (Tosco 2022) and Ts’amakko *zeeḥ* (Savà 2005), Gobaase *sase*, Harsi *saso*) which is a better candidate than *sadi(h/h̄)* to trigger equation with **ts’igaḥa*. The Dullay *zz* may go back to *dd* (Black 1974: 274); some of the Dullay languages lost the initial *s* and Ts’amakko retained the final pharyngeal. Proto-Yaaku-Dullay may tentatively have been **siddah* which could have triggered confusion for those speakers in contact with Tanzanian Cushitic *ts’igaḥa*. But more research is needed to determine whether Proto-Yaaku-Dullay speakers were indeed in contact with Tanzanian Cushitic.

The form for the number “four” is very different between these two candidates, Pre-Oromo and Proto-Yaaku-Dullay. There are several roots for “four” in Cushitic. Most of the Lowland East Cushitic languages have a reflex of **ʔaf(a)r*. This form is old in Cushitic as it can be linked to Beja *faḍig* “four” (Blažek 2018: 49), and beyond in Afroasiatic. The Tanzanian Cushitic form, **ts’igaḥa*, however, is related to the forms found in the Agaw languages, **sägya*. A third root is the Highland East Cushitic word for “four” which is reconstructed as **shoole* by Hudson (1989) and to which the Dullay forms seem to be linked: Gawwada *salah* (Tosco 2022) and Tsamakko *salah* (Savà 2005). There is no regular correspondence in the medial velar consonant of Tanzanian Cushitic/Agaw *ts’igaḥa/sigya* on the one hand and the liquid *l* in HEC/Dullay *shoole/salah* on the other; these two roots are unrelated. However, the similarity in form between proto-Yaaku-Dullay “three” **siddah* and “four” **salah* have been a factor that contributed to the equation of these forms with the Tanzanian Cushitic **tsigaha*.

When it comes to the other shift, the reinterpretation of “two” as “three”, the proto-Yaaku-Dullay form is less good as a candidate, but again it is difficult to establish what the proto-Yaaku-Dullay form for “two” must have been. The Yaaku have a deviant word for “three”, *xaat*. Most Dullay languages have *lakki* for “two” (Amborn et al. 1980: 211 for Dullay; Savà 2015: 95 for Tsamakko). Neighbouring Konso has both roots: *lakki* “three” but *lam* in derivations such as *lam-atti* “both”, *lam-m-aaw* “become two” and *lam-itta* (m) “eldest son of second wife” (Black & Shako 1973: 84) where *lakki* is borrowed from a Dullay language, but Oromo has *lamá* (Owens 1985: 267 for Harar Oromo). Some of the Dullay lan-

guages have both roots: Gawwada has *lamm-e* “second wife” next to *lakki* “two” (Tosco 2022). It is conceivable that Proto-Yaaku-Dullay had inherited *lam* “two” from East Cushitic after all.

These East-Cushitic speakers started using their word for “two”, **lam(m)*, for “three” which was copied by the original Tanzanian Cushitic speakers and resulted in **tam* “three”. The $l \leftrightarrow t$ correspondence can also be found internally in East Cushitic as Muusiye has *taamo* “two” (Yibeltal 2018: 199); or *tammo* (Wondwosen 2015: 84).² There is some supporting evidence for the correspondence $l \leftrightarrow t$ if we consider the Somali impersonal marker *la* (Cabredo Hofherr 2008) to be cognate to the Iraqw impersonal *ta* connected to Yaaku *ti* by Kießling (2002: 364) and reconstructed as Proto-Tanzanian-Cushitic **ta*. A second set of potential cognates is formed by Konso *law-a* “arrow” cognate with Alagwa-Burunge **taf-iroo* (f) “arrow notch” (Kießling & Mous 2003). However, in fact there are conflicting correspondences of stem-initial *l* in Proto-East Cushitic with Proto-Tanzanian Cushitic: PEC **laal* “sing” PTC **raaʔ* “sing”; Oromoid *leʔ* “moon” and PTC **ʔah-araʔ*; PEC **liḥ* and PTC **ʔahooʔu* “six”. For these latter two, the most likely scenario is that that of a proto-Cushitic *ʔ* developing into *l* in PEC and retained in PTC.

The Tanzanian Cushitic form for “two” is most likely an internal innovative word formation based on the proto-Tanzanian Cushitic verb **tsat* “to cut” (Kießling & Mous 2003: 292). An alternative proposal is contained in Blažek (2018) who links the form **tsada* for “two” to an old form *sada* “two” in Arbore, as reported by Conti Rossini (1927). Present-day Arbore has the more common East-Cushitic root *laamá* for “two” (and *seezzé* for “three”) (Hayward 1984: 446). This form *sada* was collected in 1894 by a traveler, A. Donaldson Smith (1897). His other reported numerals correspond more or less to the ones reported by Hayward (1984) for Arbore but some of these numbers (and other lexical material) in Donaldson Smith contain a suffix *-da*, probably the current feminine predicative suffix *-ta* (Hayward 1984: 136, and noted by Black 1974: 276). Hence his form *sada* is actually just a root *sa-* which makes the correspondence with Tanzanian Cushitic **tsada* weaker; in addition to the fact that this *sa-da* is an unconfirmed form collected by a non-linguist and in only one language and I would rather not include this form in a proposal for cognancy.³

Aasa has *ʔam* or *laam* for “two” (Fleming 1969). If this is cognate with Lowland East Cushitic **lama* then the innovation of *lam/tam* to come to mean “three” is one separating Tanzanian Cushitic from Aasa. While Kw’adza has *tami* “three” (Claus 1910) like Tanzanian Cushitic and thus shared the putative Tanzanian

2. Muusiye is at the northern tip of the Sagan language area where Oromoid and Dullay show parallel sound correspondences and come together in Muusiye (a.k.a. Busa).

3. Blažek (2018) suggests a link with Yaaku *ce*.

Cushitic innovation “two” > “three”. Since this is unlikely to happen independently, the innovation would put Kw’adza and the rest of Tanzanian Cushitic together and separate from Aasa. Kruijsdijk (2024) comes to the same conclusion on other grounds. Likewise, Dahalo can be excluded from Tanzanian Cushitic because it has *liima* for “two”, confirming the suggestions by Tosco (2000). The voiceless lateral fricative in Aasa led Ehret (1980:208) to reconstruct *laama+* “two” for South Cushitic on the basis of Aasa *lam* “two” and Dahalo *liima* “two” and this forces him to reconstruct Proto-Cushitic *laama* “two” (Ehret 1995). Maguire (1927:258) reported *laam* for “two” but before him Merker (1904:248) has *χlam*. Merker (1904) is an ethnography of the Maasai based on his travels; in his part 3, he describes the Aramanik (Aasa) and provides a limited number of words. The sign *χ* only occurs in this instance in his data, which makes it difficult to interpret what was meant with *χl*; Ehret interpreted it as a lateral fricative. When Merker collected his data, Maasai was already the dominant language of the Aasa. No *l* was recorded in our data (Petrollino & Mous 2010), but we were far too late to have a glimpse of the original language. It is likely that Aasa had the lateral fricative, and it is conceivable that it occurred in the number “two” but the evidence is very scanty and is too uncertain to build a reconstruction on.

The numerals “five” and “six” in Tanzanian Cushitic are inherited from Cushitic without any semantic change. Proto-Tanzanian Cushitic **kooʔan* “five” corresponds to East Cushitic **kan* “five”. This root for “five” is common to nearly all branches of Cushitic. Appleyard reconstructs the Proto-Agaw root for “five” as **ʔank^wa* and remarks that “perhaps the Agaw root may be related (by metathesis: PC **CVN* > **NVC* > PA **VNC*) to PLEC **ken-/kon-* “five” (Afar *konoy*, Saho *koon*, Or. *san*, Konso *ken[i]*, Som. *san*, Rendille *can*, Bayso *ken*, Dhaasanac *cen*, etc.); also, PSC [Tanzanian Cushitic] **koʔan-* [Ehret 1980:245].” The Sandawe form *kwàʔáná* “five” must be a transfer from Tanzanian Cushitic into Sandawe.

Proto-Tanzanian Cushitic **lahooʔu* ‘six’ is cognate with East Cushitic **liḥ*. The root for “six” shows correspondence in the first and second radical between East and Tanzanian Cushitic. The numeral “six” in Proto-Agaw is complex consisting of “five” plus “one” (Appleyard 2006:107). The numbers 7, 8, 9, 10 in Proto-Tanzanian Cushitic are difficult to relate to roots in the rest of Cushitic. Blažek (2018) suggests that Tanzanian Cushitic **faanqw* “seven” is borrowed from Bantu as many EA Bantu languages have *fungate* “seven”; Mous & Rapold (2021) show that this is a Bantu internal innovation based on *funga* + (*g*)*ate* /close-middle/ reflecting the hand form for “seven”, closing the right hand in the middle (three fingers) leaving two; they consider the word to be unrelated to Tanzanian Cushitic **faanqw*. Blažek (2018) suggests that Tanzanian Cushitic **gwaleeli* “nine” can be linked to a root for “one” in Cushitic, reflecting subtraction [10]-1. There are no proposals for Cushitic links of Tanzanian Cushitic **dakaat* “eight” and **mibi*

“ten”. It is common for numerals 6, 7, 8, 9 to be innovated, as they are, for example, in Swahili (Greenberg 1978: 288).

2. A ‘Khoisan’ form for “four” in the Tanzanian Rift valley languages

A secondary interesting historical number story is that of *haka* “four”: some unrelated languages in the region have this root for “four”: Aasa and Kw’adza have *hak*. The mixed register of the Bantu language Inner Mbugu (or Mixed Ma’á) has *hai*.⁴ Sandawe has *haká* “four” which is a reflex of Khoekhoe **haka* “four” (Voßen 1997: 503). This points to a Sandawe transfer into Kw’adza, Aasa, and eventually Mixed Ma’á. These are all languages that are not directly related nor in direct contact presently. However, the word is also used in the register of diviners counting stones in Iraqw (own fieldnotes) and in Gorwaa (Andrew Harvey p.c.); showing that this form for “four” was more widely known in the area. This requires scenarios of earlier contact. The historical semantic shift in the numbers of Tanzanian Cushitic suggest a history that involves more than one Cushitic branch, and more than one language migration. The wide distribution of *haka* shows the earlier importance of Sandawe as a donor language with prestige.

3. Summary and conclusion

The Tanzanian Cushitic languages including Kw’adza changed the shape of their inherited word for “four” under the influence of the Late (Pre-Oromo or Proto-Yaaku-Dullay) Cushitic term for “three” and innovated the Late (Pre-Oromo or Proto-Yaaku-Dullay) term for “two” to be used for “three”.

This scenario suggests a classification of Kw’adza with Tanzanian Cushitic and not as part of a unit with Aasa. It also suggests a double Cushitic history for Tanzanian Cushitic with an early Cushitic group being influenced by a late Cushitic group.

It shows how similarity in form can lead to amalgamation in a situation of language contact with an intriguing shift in meaning of number forms as a consequence. As a consequence of their paradigmatic relationship to each other, number forms are prone to paradigmatic levelling. Sidwell (1999: 256) observes that

4. Ma’á is often claimed to be a rare specimen of a truly mixed language. Mous (2003) shows that the language is a regular Bantu language but has an extensive parallel lexicon, the mixed register, containing lexicon partly from Cushitic sources that recreates the memory of their original language after shifting to Pare, a Bantu language.

“analogy is a powerful factor in counting, in both alliteration and rhyme, such that regular sound laws can be broken”.

Because the use of numerals is often linked to certain trade relations and susceptible to influence from the language of a culturally dominant group, borrowing numerals beyond the most basic ones is very common cross-linguistically; Gvozdanovic (1999:106–7) mentions several cases; Sidwell (1999:253) remarks that higher numerals, above 4, are difficult to reconstruct for Austroasiatic. However, a shift in the basic numbers due to paradigmatic resemblance across involved languages, as is argued for in this case, is to the best of my knowledge rare.

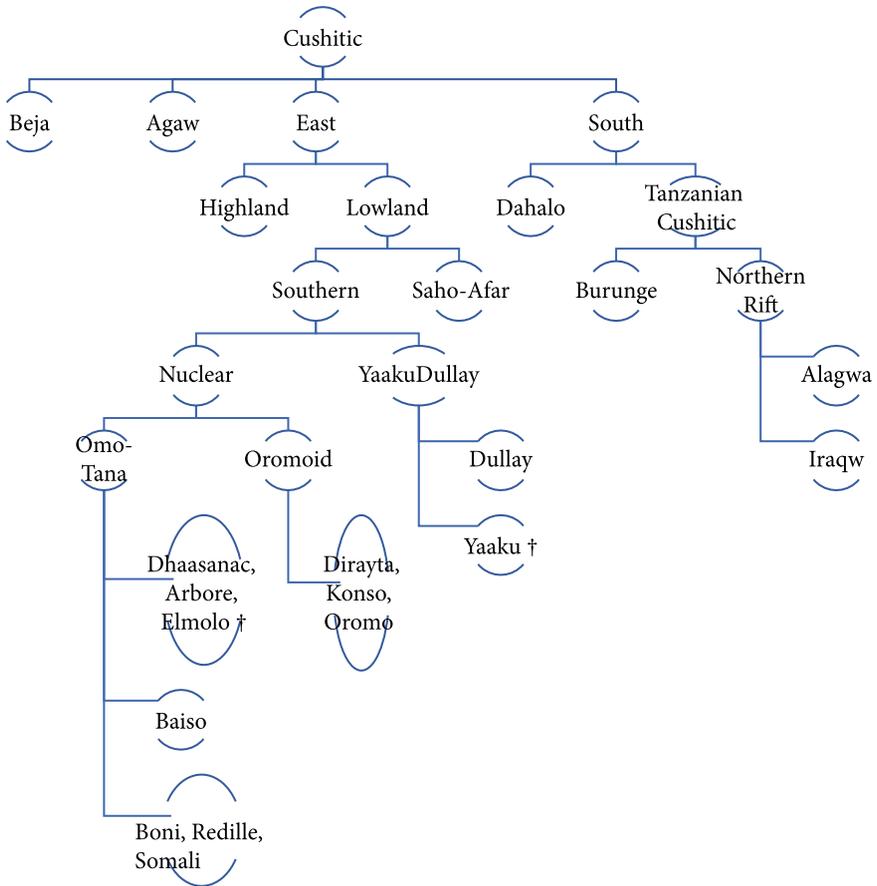
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**Appendix 1. Classification of the Cushitic languages
(adapted from Tosco 2000)**



Appendix 2. Map of the Cushitic languages
(adapted from Encyclopædia Britannica 2009)

