



# Functional pressures increase phoneme inventories: The case of click languages

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## Introduction

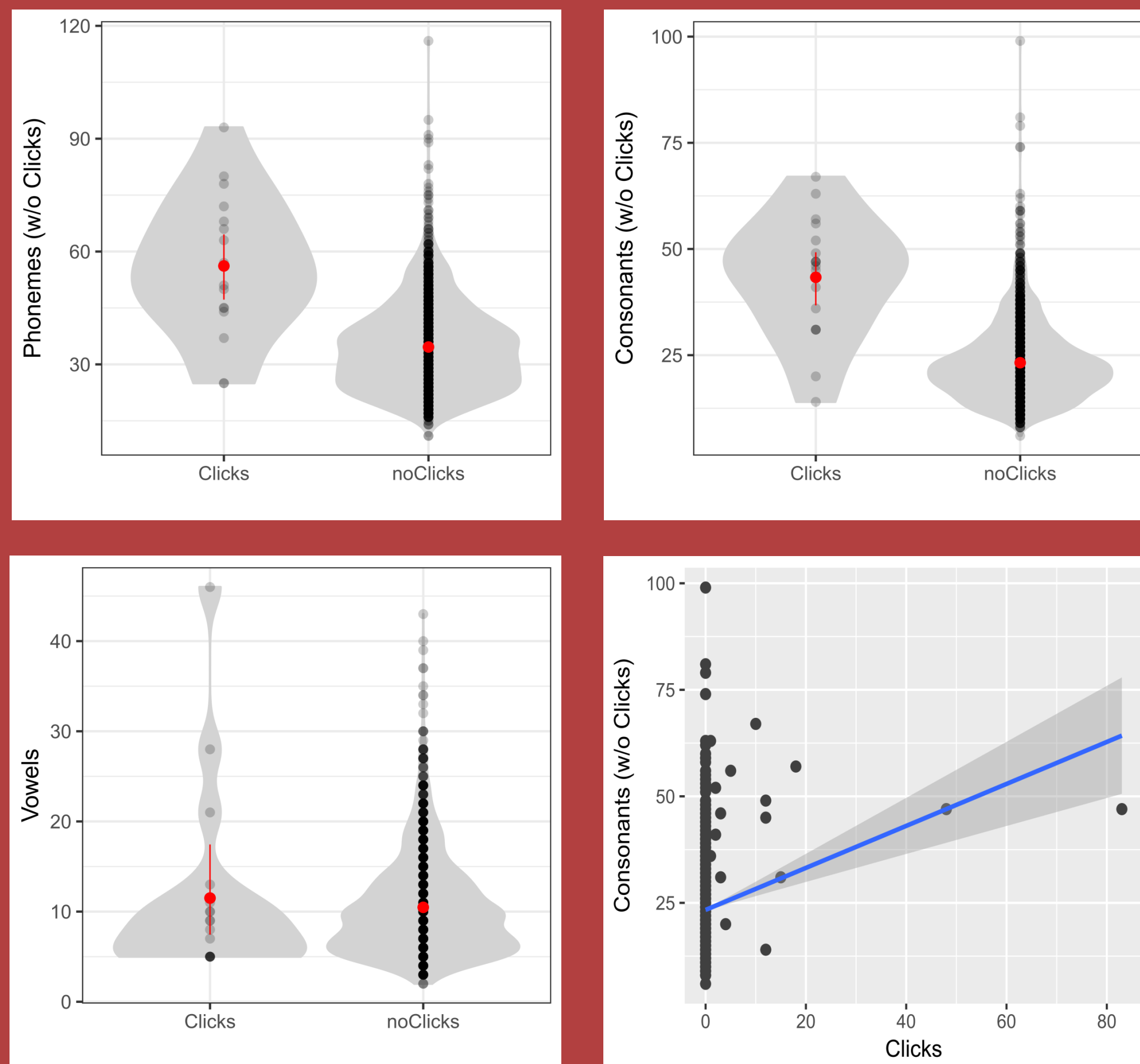
Languages in southern Africa with **phonemic clicks** have some of the **largest phoneme inventories** in the world. This has been attributed to the clicks themselves (Fleming 2017). Based on a sample of **1667 languages** of **159 families**, we investigate whether click languages also have larger than average phoneme and consonant inventories when **subtracting the clicks**, and whether this pattern holds for non-core click languages of the Bantu family. Our results shed further light on the discussion about click languages reflecting early human language (Güldemann 2007, Fleming 2017).

## 2a Results: Inventory Sizes

<sup>1</sup> Wilcoxon rank sum test; <sup>2</sup> Pearson correlation test

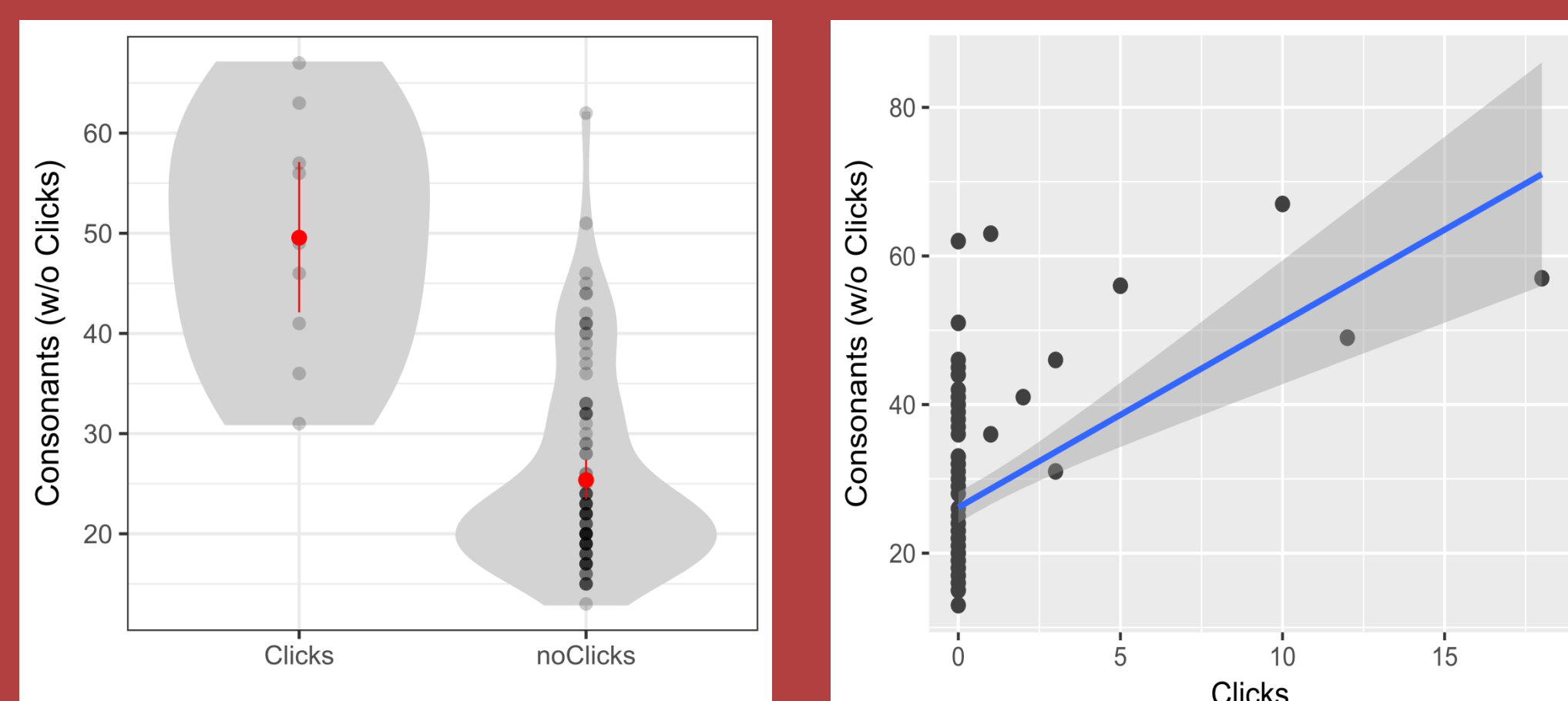
### All languages

Click languages have significantly larger phoneme ( $p < 0.001$ )<sup>1</sup> and consonant ( $p < 0.001$ )<sup>1</sup> inventories than non-click languages. There is no significant difference for vowels ( $p > 0.05$ ). The number of clicks is positively correlated with the number of consonants ( $r = 0.14$ ;  $p < 0.001$ )<sup>2</sup>.



### Within Bantu

The same effects can be observed within the Bantu family, where the 9 click languages have bigger consonant inventories ( $p < 0.001$ )<sup>1</sup> than the 93 non-click languages, and the correlation between clicks and consonants is positive ( $r = 0.63$ ;  $p < 0.001$ )<sup>2</sup>.



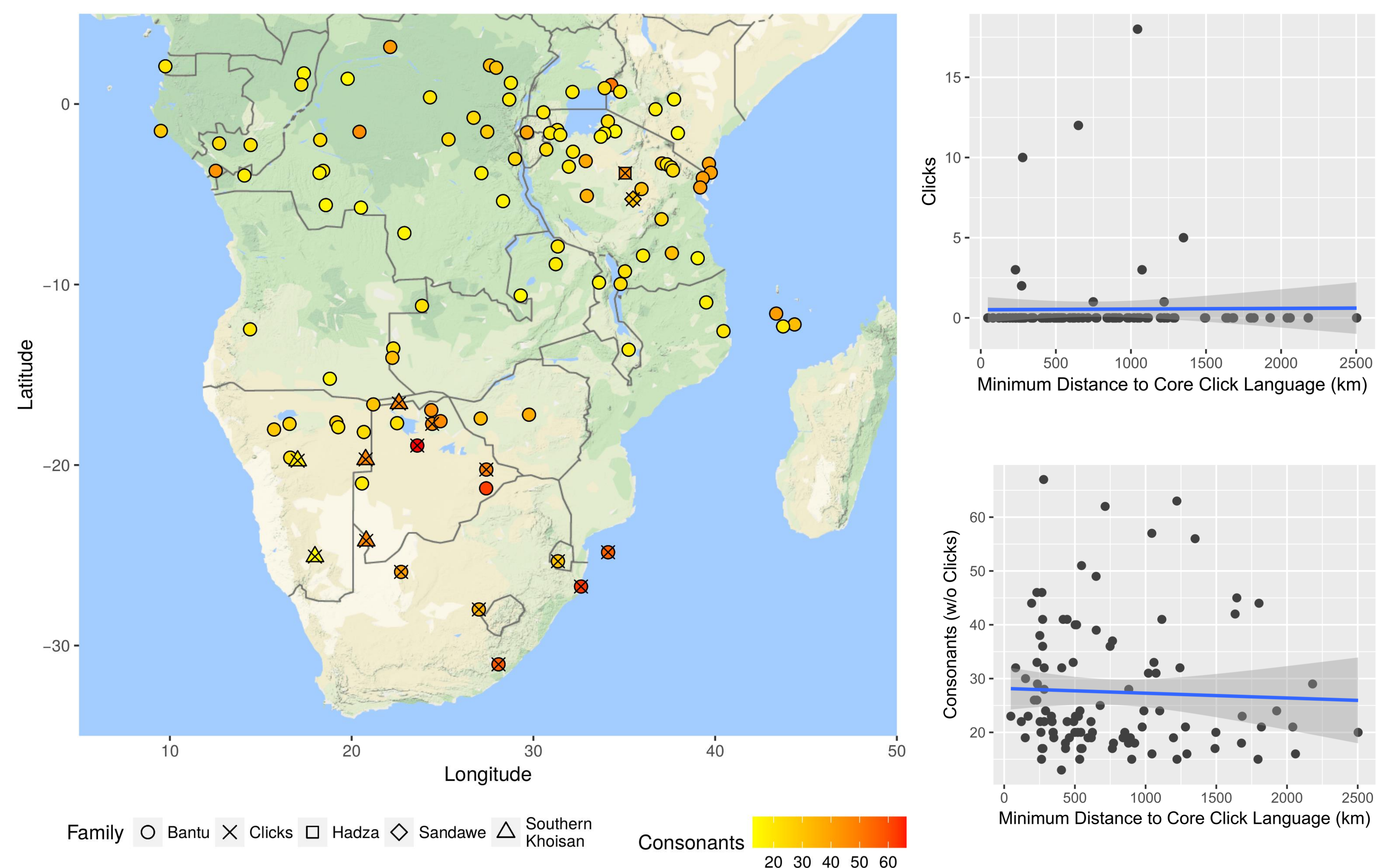
## 1 Data

### Click languages in PHOIBLE

- 7 Core click languages (clicks seem to be inherited; classification as in Güldemann 2007):
  - 5 from “Southern African Khoisan” group: 3 Khoe-Kwadi, 1 Ju-ǀda, 1 Tuu language
  - Sandawe (isolate/Khoe-Kwadi)
  - Hadza (isolate)
- 10 languages which borrowed clicks from core click languages:
  - 9 Bantu (Niger-Congo) languages
  - Dahalo (Afro-Asiatic)

## 2b Results: Distance Effects

The minimum distance to the closest core click language has no significant effect on the number of clicks ( $r = 0.01$ ;  $p > 0.05$ ) and consonants ( $r = -0.03$ ;  $p > 0.05$ ) in Bantu languages.



## 3 Implications

Languages with phonemic clicks have larger consonant inventories than non-click languages. There are several possible explanations for this pattern:

- Clicks have been regarded as **traces of a proto-human language**, especially since they only occur in southern and eastern Africa, where humans are assumed to have originated. Fleming (2017) argues that a proto-human language must have had a maximally large phoneme inventory. However, we also observe a correlation between inventory size and having clicks in the Bantu family, which did not inherit its clicks, but borrowed them from the languages of the “Khoisan” group.
- While clicks are used paralinguistically in languages all around the world (Gil 2013), they are extremely rare as phonemes, and thus seem to be somehow **marked sounds**. This might imply that they are more likely to emerge in a language that already has developed most alternative consonants under functional pressures to increase phonemic expressivity.
- Many Bantu societies employ a linguistic taboo called **“hlonipha”**, which prohibits individual speakers to pronounce certain syllables (Herbert 2004). One strategy to adhere to this taboo is to substitute sounds in the offending syllables. This suggests that there were social pressures to **borrow new consonants** in the respective Bantu languages and that clicks were just **some of these**. Similar social pressures could have led to the evolution of clicks in the first place.

## References

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