

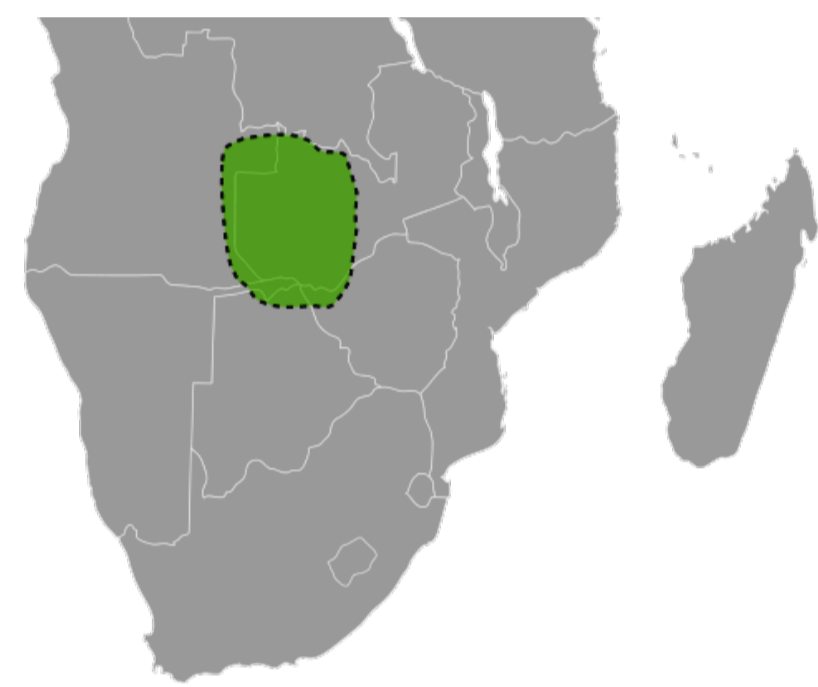
# VOWEL-PAIR FREQUENCIES AND PHONOTACTIC RESTRICTIONS IN LOZI

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## 1 INTRODUCTION

This poster presents a case study of vowel-pair frequencies in Lozi (K.21), a Bantu language spoken mainly in Zambia.

Figure 1: Location of Barotseland within southern Africa



Lozi is most closely related to Sotho, Pedi and Tswana but has also been heavily influenced by Luyana (see Cowlett 1989 for more information).

The results have implications for the formal analysis of phonotactic restrictions in the language.

The results suggest that the only phonotactic vowel co-occurrence restriction in Lozi is a part-of-speech-blind ban on the vowel pair /o.u/.

Within Bantu, height harmony is extremely widespread and is usually confined to the verbs (see Hyman 1999:§2, Odden 2015:§1).

By far the commonest variety is the canonical pattern found in, for example, Chichewa, Kinyarwanda, Luganda, Shona.

It is this that the vast majority of work has focused on (e.g. Katamba 1984, Mtenje 1985, Harris 1994, Beckman 1997).

Lozi, however, has been said to exhibit a non-canonical variety of height harmony.

/u/ is found after /i, u, e, a/ and /o/ is found after /o/ in verbs (see e.g. Cowlett 1967, Hyman 1999:245).

As a result, we see an alternation in the reversive suffix:

-tama	'to tie'	-tamulula	'to untie'
-leka	'to buy'	-lekulula	'to resell'
-longa	'to pack'	-longolola	'to unpack'

However, unlike in most other Bantu languages, a similar restriction is not found for the front unrounded vowels.

Thus, the causative suffix always surfaces with /i/ and the applicative suffix always surfaces with /e/:

-tamisa	'to help tie'	-tamela	'to tie for'
-lekisa	'to sell'	-lekela	'to buy for'
-longisa	'to help pack'	-longela	'to pack for'

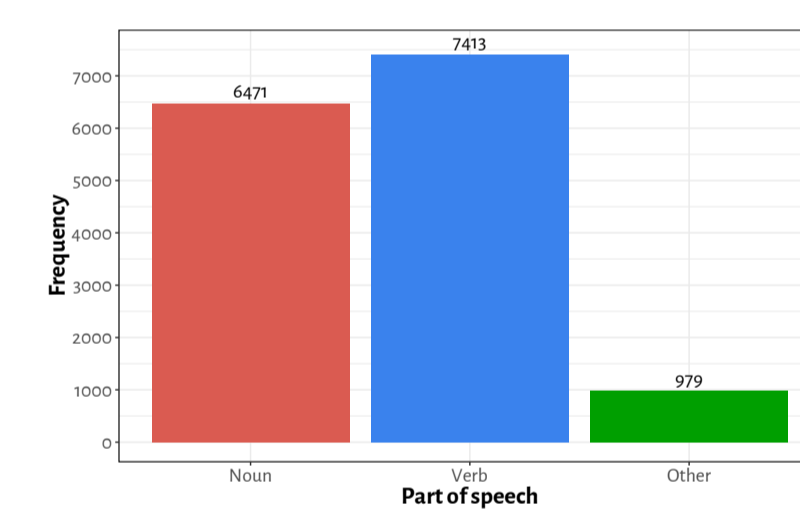
The preceding data are taken from Jalla (1982: *sub voce*).

## 2 METHODOLOGY

The data come from Jalla (1982), a Lozi-English database available on the Comparative Bantu Online Dictionary.

After corrections and processing, there were a total of 24,238 entries tagged for part of speech and, after perfective verb forms were removed, the final total was 14,863.

Figure 2: Number of entries per part of speech



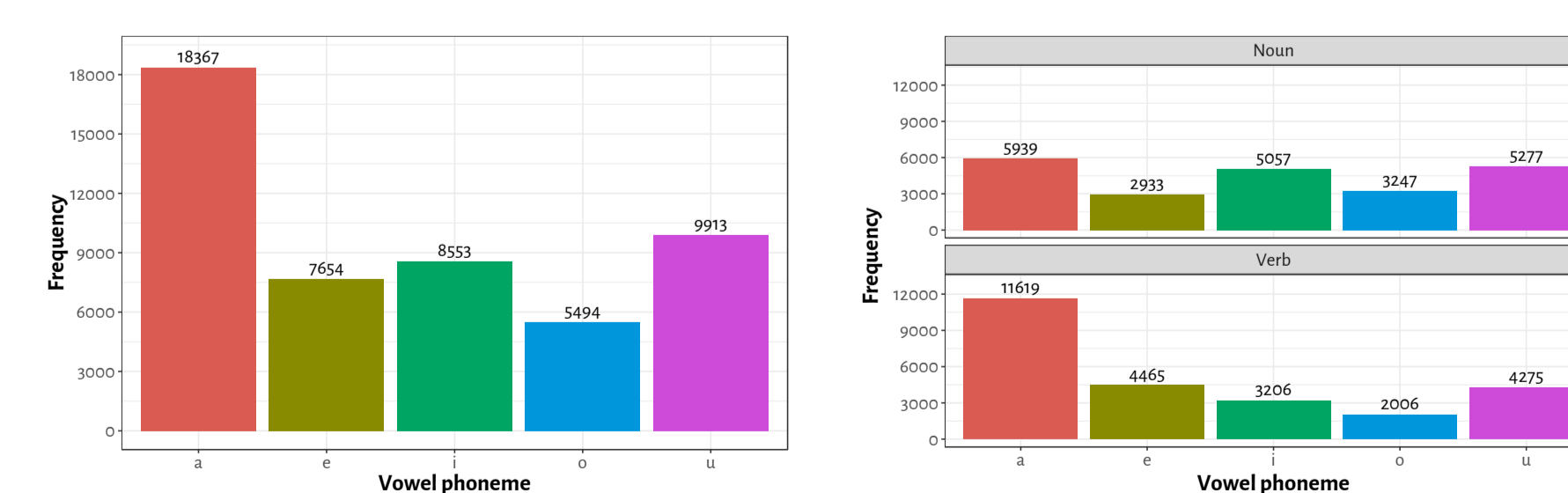
Orthographic long vowels were reduced to short vowels and intervening consonants were ignored.

Both the observed and expected frequencies of all 25 possible vowel pairs were then calculated, as were the corresponding observed-expected ratios.

## 3 RESULTS

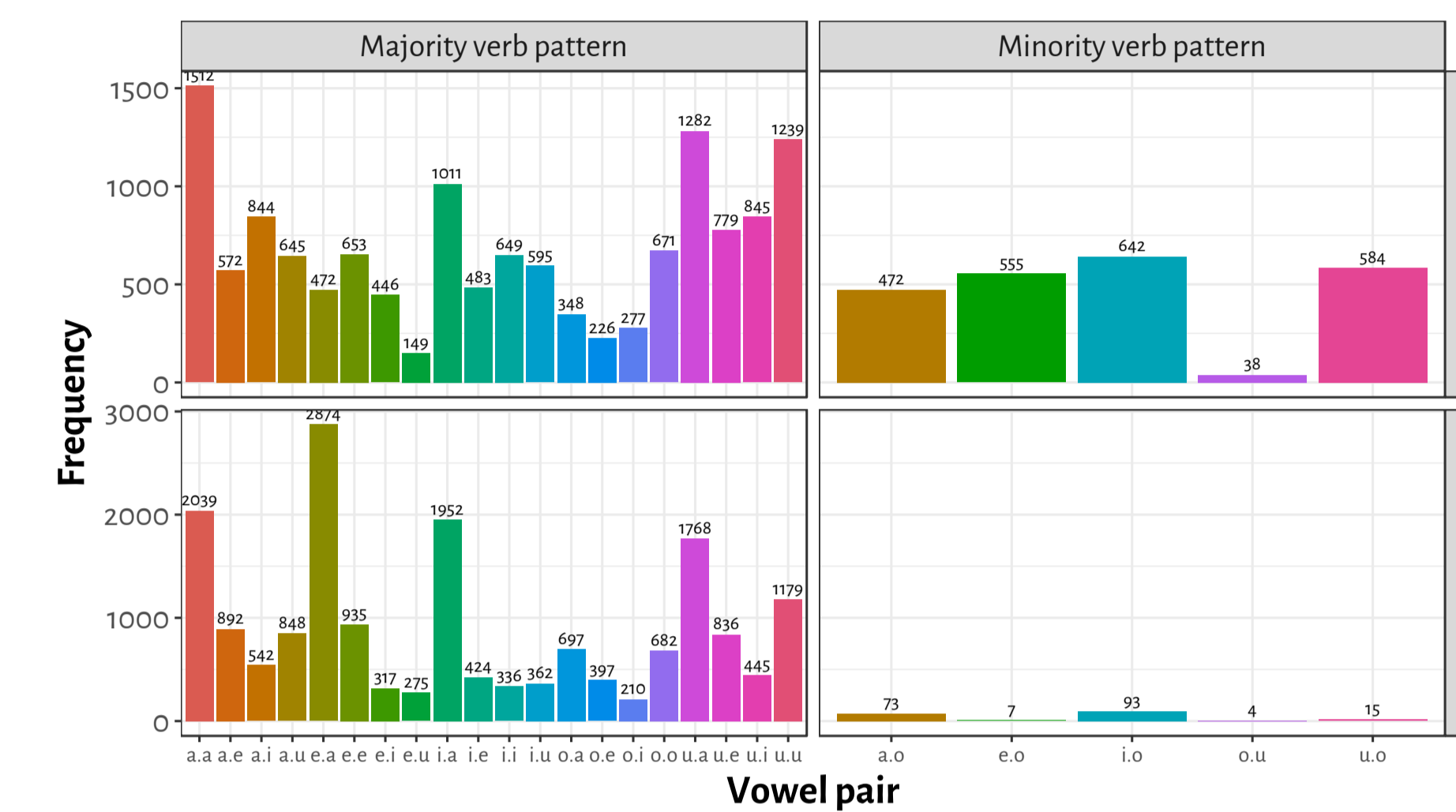
The frequencies for each vowel phoneme are provided below.

Figure 3: Observed vowel phoneme frequencies



The observed frequencies for each pair are given in Figure 4.

Figure 4: Observed vowel-pair frequencies



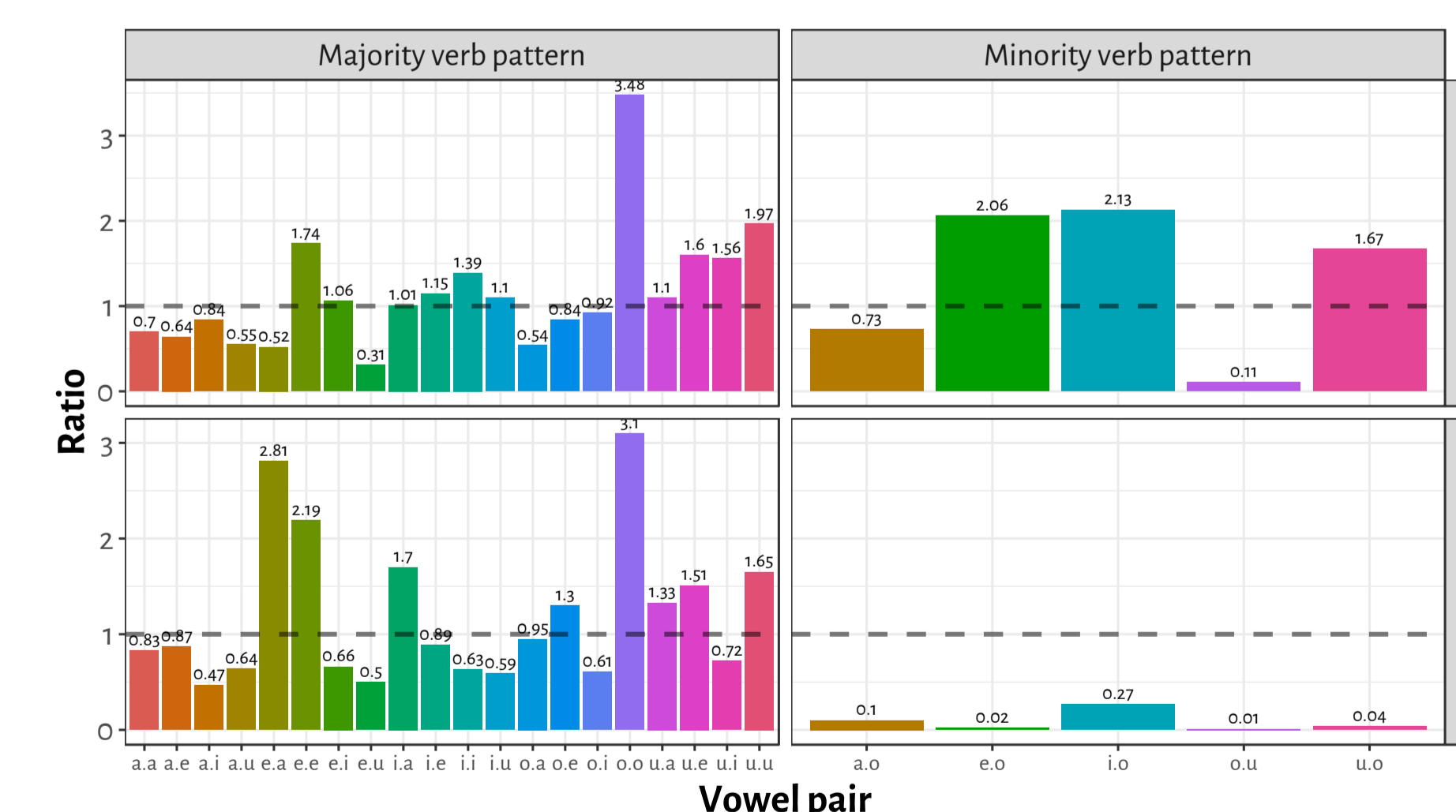
The top row of Figure 4 shows vowel pairs in nouns, the bottom in verbs. The first column shows pairs expected to be in the majority in verbs, the second those pairs expected to be in the minority in verbs.

As expected given prior descriptions of Lozi, the vowel pairs /a.o, e.o, i.o, o.u, u.o/ are all extremely uncommon in verbs.

The vowel pair /o.u/ is almost entirely absent in verbs and is also extremely infrequent in nouns. However, other minority-verb-pattern vowel pairs are uncommon in verbs but common in nouns.

This is not just an artefact of the frequencies of /o/ and/or /u/ are, as evidenced by the observed-expected ratios in Figure 5.

Figure 5: Observed-expected vowel-pair-frequency ratios



In Figure 5, a ratio of 1 would mean a pair occurred as often as predicted based on frequencies of the constituent vowels, 0.5 that it was half as frequent and 2 that it was twice as frequent.

## 4 DISCUSSION

The near-total absence of /o.u/ suggests that this is the only synchronically active phonotactic vowel co-occurrence restriction in the language and that this applies regardless of part of speech.

The reversive suffix would underlyingly be /-ulul-/ and undergo a regular phonotactically-governed change to [-olol-] when preceded by /o/ but elsewhere surface as [-ulul-].

It may have been that /a.o, e.o, i.o, u.o/ were once phonotactically disallowed throughout the language (in, approximately, the non-prefixal domain).

Examples of /a.o, e.o, i.o, u.o/ that previously existed would have been removed and new ones prevented from arising.

When this restriction was lifted, small numbers of innovative word forms containing these vowel pairs would have arisen.

And these vowel pairs may be more frequent in nouns because here is a higher rate of lexical innovation.

This may also explain why instances of /o.u/ are commoner in nouns than verbs.

To a certain extent, this may also be an artefact of the data set:

Whereas verbs have prefixless citation forms, nouns are usually included with a noun class prefix.

Taking this into account, although /a.o, e.o, i.o, u.o/ are less frequent, they are still not as strikingly infrequent as /o.u/.

Additionally, such instances are not entirely random: 63% have an intervening lateral and 16% an intervening lateral.

bishopu 'bishop' (En.)    bubofu 'blindness'    muholu 'stomach'  
ndopu 'elephant' (Lu.)    sitofu 'stove' (En.)    lubolu 'double chin'

There are therefore potential phonetic reasons that may lead to a limited number of violations of a ban on /o.u/.

But in the majority of cases where /o.u/ might occur, /o.o/ is found instead:

lubotola 'bottle' (En.)    kopola 'corporal' (En.)    -polofita 'to prophesy' (En.)

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