

### 3. Consonant–Vowel Ratio

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#### 1. Introduction

In previous chapters the size of the consonant inventory (chapter 1) and the number of distinct vowel qualities (chapter 2) have been discussed separately. In this chapter the ratio between these two properties of the sound systems of languages around the world will be considered. This is one way in which the complexity of different aspects of the systems can be evaluated. In chapter 2 it was noted that there is no overall correlation between consonant inventory size and the number of vowel qualities. By looking at the two aspects jointly a more subtle picture of their interaction can be obtained.

The ratio is calculated simply by dividing the number of consonants (C) by the number of vowel qualities (VQ) and will be referred to as the C/VQ ratio. The resulting numbers range from a low of only a little over 1 to a high of 29. The lowest value among the 563 languages for which it has been calculated is represented by Andoke (isolate; Colombia), which has 10 consonants and 9 vowel qualities. The highest number is represented by Abkhaz (Northwest Caucasian; Georgia), which is analyzed as having 58 consonants but only 2 vowel qualities. The ratio thus ranges between 1.11 and 29, but the more common values are nearer the lower end of the range: the mean is 4.25 and the median 3.5. The languages were grouped into five categories based on dividing the range into convenient steps below, near to, and above the median so as to create a histogram with approximately a normal distribution. Languages with a ratio equal to or below 2.0 were classed as having a “low” C/VQ ratio. Those with a ratio above 2.0 but below 2.75 were classed as “moderately low”. Those with a ratio of 2.75 or higher but less than 4.5 were classed as “average”, those with values of

4.5 or higher but less than 6.5 as “moderately high” and those with values above 6.5 as “high”. Only 10 languages have ratios of 12 or higher.

@	1. Low	59
@	2. Moderately low	97
@	3. Average	234
@	4. Moderately high	102
@	5. High	71
	total	563

## 2. Geographical distribution

The most common category shown on the accompanying map represents languages with an average C/VQ ratio. These languages — ones with roughly three or four times as many consonants as vowel qualities in their sound inventories — are particularly common in West Africa and are quite common in New Guinea and island Asia, Southeast Asia, Central America and the eastern side of South America, as well as in northern Eurasia. With the exception of the last area it is striking that these languages are mostly clustered relatively close to the equator.

The 156 languages with proportionately low numbers of consonants are shown on the map as the two categories having a “moderately low” C/VQ ratio or a “low” ratio. There are no particularly noticeable areas which are characterized by concentrated numbers of languages from only one of these categories, but there is a very strong overlap between the distribution of these two categories and that of the “average” category. Apart from a cluster mostly of Chadic languages the remainder of the languages of West Africa fall into one of these two classes. Similarly most of the other languages in the sample from New Guinea and island Asia, much of Southeast Asia as

well as the eastern side of South America have “low” or “moderately low” ratios.

On the other hand, the 173 languages with “moderately high” or “high” C/VQ ratios show marked clustering. Languages with higher than average ratios predominate in Australia, in most of eastern and southern Africa and along the western side of the Americas. There is a marked cluster of languages with “high” C/VQ ratio in the Caucasus, and another in southern Africa, but the most substantial group of languages of this class occurs in the north-west of North America. This is an area that is also distinctive with respect to many other measures of phonological typology, particularly ones relating to consonant systems (see, for example, chapters 7 and 8).

### **3. Discussion**

These observations suggest that the most important distinction to make from the geographical point of view with respect to C/VQ ratios is that between those languages which are average or below and those which are above the average ratio. Southern Africa, the Caucasus, and the North American Northwest Coast are characterized by large consonant inventories, and indeed most of the languages in the sample with large consonant inventories also have high C/VQ ratios and none has a C/VQ ratio below average. The facts which produce this result have probably led to the suggestion that it is a typical pattern for large consonant inventories to be counterbalanced by smaller vowel systems across the languages of the world. However, in the West African area, larger than average consonant systems occur together with larger than average vowel systems, leading these languages to mostly have average or below-average C/VQ ratios, and in Australia the languages typically combine small vowel inventories with smaller than average consonant inventories, resulting in a higher than average C/VQ ratio. Using the categories established in chapters 1 and 2 gives the

contingency table shown as Table 1. A sample of 559 languages is represented in the table.

**Table 1.** Co-occurrence of vowel quality and consonant inventory sizes

Consonant Inventory Size					
VQ size	<i>small</i>	<i>mod. small</i>	<i>average</i>	<i>mod. large</i>	<i>large</i>
<i>small</i>	11	19	27	22	11
<i>average</i>	51	71	80	53	31
<i>large</i>	29	31	73	40	10

There are 11 languages with small consonant inventories and a small number of vowel qualities, and 11 combining a large consonant inventory and a small number of vowel qualities. There are also 10 combining a large inventory of both vowels and consonants. A not very much larger number, 29, combine a large number of vowel qualities with a small inventory of consonants.

From these numbers it is apparent that the occurrence of a large consonant inventory with a small number of vowel distinctions is not part of a general pattern in languages but reflects a geographically restricted tendency that can be found in a few areas (primarily in southern Africa, the Caucasus and the American north-west). Moreover, there are other ways for a language to be ‘consonant-rich’, as in the case of Australian languages such as Diyari (Pama-Nyungan; South Australia), analyzed as having a very average 22 consonants but only three vowel qualities, giving a high C/VQ ratio of 7.33.