



The Root in Maltese

A large number of verbs in Maltese are composed of two basic derivational morphemes, a **consonantal root** and a **pattern** (*binyan*), interwoven within each other in a non-concatenative manner. **The root** is a **discontinuous morpheme of 3 or 4 consonants** in fixed sequence. The consonants, also known as radicals, form a skeleton on which the vowels are intercalated and affixes are added.

Repulsion of Likes

It has long been noted in studies on Semitic languages that **consonants with a similar place of articulation feature are avoided** in trilateral roots (cf. Greenberg 1950; Bachra 2001; inter alia). More recently, this principle of Similar Place Avoidance (SPA) has been confirmed for other (non-Semitic) languages (e.g., Pozdniakov & Segerer 2007; Mayer et al. 2010).

Moreover, a similar observation has been made for avoidance of successive consonants with **similar manner** features (e.g., Twaddell 1939 for German; Iverson & Salmon 1992 for Proto-Indo-European).

We intend to investigate whether such a tendency for the *repulsion of likes* can also be maintained for Maltese with respect to (i) place of articulation and (ii) manner of articulation features.

Data

We seek to answer these questions by investigating the phonological structure of an **exhaustive list of 1,958 verb-creating roots** in Maltese which we compiled using Serracino-Inglott (1975-1989) and Aquilina's (1987-1990) dictionaries as well as Mifsud's (1995: 272- 295) corpus of loan verbs which are fully assimilated into the root-and-pattern system.

The matrices show the results for the respective category successions (rows represent the first consonant, columns the second consonant). Each cell contains the counts for the **observed successions (obs)** and the calculation of the **expected frequency (exp)** under the assumption of independence between successive consonants. Additionally, we calculated the **discrepancy (diff)** between the observed and expected frequencies according to the formula in (1):

$$(1) \text{ diff} = 100 \cdot \frac{(\text{obs} - \text{exp})}{\text{exp}}$$

Place of Articulation

We divided the sounds of Maltese into **three major place of articulation categories**: labial (l), coronal (c) and dorsal (d). The tendency has been tested on successive consonants in all roots (left matrix) and only in triconsonantal roots (right matrix). No significant differences between both lists could be observed.

all roots			triconsonantal roots			
	l	c	d	l	c	d
l	exp: 225 obs: 107 diff: -52.44%	exp: 653 obs: 783 diff: 19.91%	exp: 176 obs: 166 diff: -5.68%	exp: 81 obs: 37 diff: -54.32%	exp: 223 obs: 269 diff: 20.63%	exp: 81 obs: 80 diff: -1.23%
c	exp: 493 obs: 606 diff: 22.92%	exp: 1430 obs: 1218 diff: -14.83%	exp: 386 obs: 487 diff: 26.17%	exp: 222 obs: 262 diff: 18.02%	exp: 607 obs: 513 diff: -15.49%	exp: 220 obs: 276 diff: 25.45%
d	exp: 221 obs: 227 diff: 2.71%	exp: 640 obs: 724 diff: 13.13%	exp: 173 obs: 84 diff: -51.45%	exp: 121 obs: 127 diff: 4.96%	exp: 331 obs: 380 diff: 14.8%	exp: 120 obs: 66 diff: -45.0%

Fig. 1: Results for all roots (left matrix) and trilateral roots (right matrix) with respect to place of articulation distinctions

Different Positions within the Trilateral Root

Pos 1 → 2			Pos 1 → 3			
	l	c	d	l	c	d
l	exp: 36 obs: 0 diff: -100.0%	exp: 94 obs: 126 diff: 34.04%	exp: 37 obs: 43 diff: 16.22%	exp: 35 obs: 10 diff: -71.43%	exp: 100 obs: 114 diff: 14.0%	exp: 33 obs: 45 diff: 36.36%
c	exp: 105 obs: 140 diff: 33.33%	exp: 273 obs: 188 diff: -31.14%	exp: 108 obs: 159 diff: 47.22%	exp: 101 obs: 109 diff: 7.92%	exp: 289 obs: 262 diff: -9.34%	exp: 96 obs: 116 diff: 20.83%
d	exp: 75 obs: 77 diff: 2.67%	exp: 195 obs: 250 diff: 28.21%	exp: 77 obs: 22 diff: -71.43%	exp: 72 obs: 90 diff: 25.0%	exp: 207 obs: 221 diff: 6.76%	exp: 69 obs: 38 diff: -44.93%

Pos 2 → 3			Pos 2 → 3, no identicals			
	l	c	d	l	c	d
l	exp: 45 obs: 37 diff: -17.78%	exp: 128 obs: 143 diff: 11.72%	exp: 42 obs: 37 diff: -11.9%	exp: 37 obs: 1 diff: -97.3%	exp: 106 obs: 143 diff: 34.91%	exp: 37 obs: 37 diff: 0.0%
c	exp: 117 obs: 122 diff: 4.27%	exp: 335 obs: 325 diff: -2.99%	exp: 111 obs: 117 diff: 5.41%	exp: 94 obs: 122 diff: 29.79%	exp: 267 obs: 217 diff: -18.73%	exp: 94 obs: 117 diff: 24.47%
d	exp: 46 obs: 50 diff: 8.7%	exp: 133 obs: 129 diff: -3.01%	exp: 44 obs: 45 diff: 2.27%	exp: 40 obs: 50 diff: 25.0%	exp: 115 obs: 129 diff: 12.17%	exp: 40 obs: 18 diff: -55.0%

Fig. 2: Matrices for the different positions in Maltese trilateral roots. For instance, the top left matrix represents the results from the first to the second consonant. The bottom right matrix shows the results for positions 2 to 3 ignoring identical consonants (which make up 171 out of 1005 in total for this position).

Manner of Articulation

We divided the sounds into **two major manner categories**: obstruents (o) and sonorants (s). The results in Fig. 3 confirm the tendency not only for place but also for manner of articulation distinctions.

Fig. 3: Results for all roots with respect to manner of articulation distinctions

all roots		
	o	s
o	exp: 1585 obs: 1377 diff: -13.12%	exp: 1342 obs: 1551 diff: 15.57%
s	exp: 798 obs: 1007 diff: 26.19%	exp: 675 obs: 467 diff: -30.81%

Conclusions

Although Maltese has been under intense language contact with Romance and English, its root consonants follow the constraints found in Arabic and Hebrew with respect to SPA. The more general principle of the repulsion of likes also holds for manner of articulation features (and, to a lesser extent, for voice features).

References

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