Weight effects in Greek? Insights from binomials

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Definitions

Binomials (Malkiel 1958)

A sequence of two words connected by a coordinator

End-Weight (Quirk et al. 1972)

The principle responsible for the ordering of clauses and their sub-parts within a sentence and the preference of final positions to be occupied by more “complex” structures

End Weight Manifestations (Ryan 2016)

	Order A	Order B
a. Particle verbs	picked X up	picked up X
b. Coordination	**X and Y**	**Y and X**
c. Dative alternation	gave X to Y	gave Y X
d. Heavy NP shift	revealed X to Y	revealed to Y X
e. Genitive alternation	X's Y	Y of X
f. Locative alternation	spray X with Y	spray Y on X

Some Examples

Particle verbs

Pick **it** up.

Pick up **the green book**.

Dative alternation

Give **it** to him.

Give him **the green book**.

Heavy NP shift

He revealed **the truth** to him.

He revealed to him **his complex and unexpected side of the story**.

Outline

- Aims
- End-Weight Parameters
- Experimental Study
- Analysis
- Conclusions and Future Research

Aims of Study

Does *End-Weight* have any manifestations in Greek binomial structures and their coordination considering the following **phonological** parameters?

Vowel Quality

Word Length/Syllable Count

Final Coda Presence

*For evidence from Greek, see p. 9 of presentation

End Weight Parameters

Cooper and Ross (1975)

In a binomial A & B, **item B** will have:

- More **syllables** (Panini's law)
- A **longer** vowel
- A vowel of **lower F2** (i.e. of a back quality)
- An onset comprising of more consonantal segments
  - A more obstruent onset if both members start with one segment
- Fewer final consonants
  - A less obstruent final segment if both members end in a consonant

Evidence from Greek

- Vowels

	gloss
tsaf tsuf	*train*
'pafa 'pufa	*smoking*
tik tak	*clock*
din don	*church bell*
tsiri'bim tsiri'bom	*happy/naïve*

- Syllable Count

pir ce ma'nia	*very angry*
pe'tsi ce 'kokalo	*very thin*
'iθi ce 'eθima	*customs*
'tipos ce ipoɣra'mos	*responsible*
'ipa ce e'lalisa	*I have spoken*

- Final Coda Presence

  Novel acronym stress assignment tests of Topintzi & Kainada (2012) & Revithiadou et al. (2015) found coda-bearing final syllables attracting stress.

Empirical Study

Research Questions

Do the following parameters influence word order in Greek binomials?

- Vowels
  - Quality (F2/F1)
  - Intrinsic length
- Syllable Count
  - Number of syllables
- Final Coda Presence
  - Singleton vs. null word-final coda

Methodology

Two forced choice/preference tasks administered online

Real word task: 68 items / 85 participants

Nonce word task: 86 items / 86 participants

Participants: 18-30 years
Native Greek Speakers
No linguistic experience

Methodology

Real word task: item #7, targeting **[i] versus [u]**

Τα γλυκά για το σχολικό πάρτι δεν πρέπει να περιέχουν ξηρούς καρπούς όπως…
[ta ɣli'ka ʝa to sxoli'ko 'parti ðen 'prepi na peri'exun ksi'rus kar'pus 'opos…]
The desserts for the school party should not contain nuts such as…

1. φιστίκι και φουντούκι.
   [fi'stici ce fu'duci]
   peanut and hazelnut.

2. φουντούκι και φιστίκι.
   [fu'duci ce fi'stici]
   hazelnut and peanut.

Methodology

Nonce word task: item #13 targeting **[e] and [a].**

Η αλυσίδα είχε σκουριάσει εντελώς, είχε γίνει σκέτη…
[i ali'siða 'içe sku'rjasi ede'los 'içe 'jini 'sceti]
The chain had rusted completely, it had become…

1. τέσα και τάσα.
   ['tesa ce 'tasa]
   tesa and *tasa*.

2. τάσα και τέσα.
   ['tasa ce 'tesa]
   tasa and *tesa*.

Methodology

Position tendencies: **Binomial Distribution**

test proportion percentage = 50%

Null hypothesis: equal distribution between the two "versions" of a binomial (Oden and Lopes 984:676, Benor and Levy 2006:251, Mollin 2012:93)

- Vowel quality (F1/F2) and Intrinsic Length
- Syllable Count
- Final Coda

Significant Results

first task (real words)

Binomial tests **appearing second**

- Syllable Count - longer words
  - 54% p = 0.001
- Final Coda - coda-bearing words
  - 53% p = 0.005

Significant Results

second task (nonce words)

Binomial tests **appearing second**

- Syllable Count – longer words
  - 64% $p < 0.001$
- Final Coda – coda-bearing words
  - 52% $p = 0.02$
- Lower F2 – words containing back vowels
  - 53% $p = 0.011$

Analysis

How can our findings be interpreted?

Analysis

- Bear in mind: Non-phonological accounts have been put forward in order to explain tendencies observed in word ordering, such as
  - Focus or emphasis (Horrocks 1983)
  - Logical order of things(Kiparsky 2009)
  - A speaker's personal experience (Cooper and Ross 1975)

- But, in this talk, we focus on the influence of phonology and consider two accounts:
  - Frequency (Fenk-Oczlon 1989)
  - Phrasal stress (Ryan 2019)

Analysis: Frequency

An account not purely based on phonology, yet tries to account for its possible influence (Fenk-Oczlon 1989)

Frequency

Main idea: Frequent linguistic structures are more readily accessible and easily recognized, so they can be "chosen" faster. Infrequent structures are thus disfavored in position A of a binomial and are more likely to appear in position B instead.

Applied to Greek

Good fit for the data

- **Vowels** (back vowels in 2nd position – nonce word task)
  - back vowels less frequent than front vowels in Greek (Nicolaidis et al. 2003)
- **Syllable count** (longer words in 2nd position – both tasks)
  - Longer words are less frequent cross-linguistically (Ryan 2019)
  - Derived forms are more complex (Benor & Levy 2006)
- **Coda** (coda-bearing words in 2nd position – both tasks)
  - Codas are limited/not frequent within the Greek lexicon (Holton, Mackridge, and Phillipaki-Warburton 1997, Kappa 2002)

Analysis: Phrasal Stress

An account unifying known phonological parameters of End-weight (Ryan 2019)

Phrasal Stress

Main idea: Heavier items are preferred later within a sentence so as to coincide with the most prominent position within a phrase:

nuclear stress

Thus, heavier structures, such as those having more syllables, codas and particular vowel quality, are better preferred in position B of a binomial

Applied to Greek

Good fit for the data

- **Vowels** (back vowels in 2nd position – nonce word task)
  - Intrinsic length correlates with vowel height; backness may play a role when height is comparable
- **Syllable count** (longer words in 2nd position – both tasks)
  - Longer words (more syllables) are associated with greater weight
- **Final Coda** (coda-bearing words in 2nd position – both tasks)
  - May render syllables heavy

Conclusions and Future Research

Conclusions

Greek does manifest (some) End-Weight effects

- The issue is how is this to be interpreted, since both the Frequency and the Weight-based accounts capture most of the facts
- For the weight-based account: Greek lacks categorical weight, but presents gradient weight, similarly to Brazilian Portuguese (Garcia 2017, 2019)
- For the frequency-based account: Weight (in Ryan's sense) is not really at stake here; frequency considerations just carry over to phonology

Conclusions

- Q: Can we tease apart the two approaches to decide which interpretation is best for Greek?
  - At present, probably not, but we do have some pointers where to look at…

Vowel backness

Words containing back vowels were more common in position B of the binomial (in nonce word experiment)

Vowel	Number out of 1.032	%
i	505	50%
e	496	43%
a	561	54%
o	717	69%
u	731	71%

Kikiopoulou (2020: 34)

Vowel backness (cont.)

In between comparisons: the table shows the % of the vowels in the **row** appearing **in position A** of a binomial over the vowels in the column

- * $p<0.05$
- Green: prediction of backness explains it
- Red: both height and backness explain it

appears first over vowels in vertical column in %

	i	e	a	o	u
i		49.6	49.6	50	46.5
e	50.4		*43.4	46.1	52.3
a	50.4	*56.6		*42.6	51.1
o	50	53.9	*57.4		*43.4
u	50.5	47.7	48.8	*56.6	

Vowel backness (cont.)

- Unexpected result in more recent literature
- Usually (cf. Ryan 2019 for details), vowel height is treated as decisive, due to cross-linguistic correlation of height & intrinsic length
- Greek also conforms to this correlation (Fourakis et al. 1999, Arvaniti 2000, Themistokleous & Logotheti 2016 a.o.)

  → a > e, o > i, u
- But does not replicate it in binomials!
- The backness effect was recognised in Cooper & Ross (1975), but later revised to height (Ross 1982) allowing for backness to be relevant only when height is held constant
- The backness effect is better explained in the frequency account

Lapse

- Binomials also show a small tendency to disfavour long stretches of unstressed syllables, at the expense of syllable count
  - Syllable count favours the order (a) over (b)
  - Lapse favours the order (b) over (a) → (b) has 2 unstressed syllables between stresses, (a) has 4

    a. 'fe.ci ce fi.ko.'re.ti

    b. fi.ko.'re.ti ce 'fe.ci
- The tendency to avoid lapse cannot be properly described by either account; future research could provide insights into whether one of the two accounts can describe this effect better than the other

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