Don't go breaking my sound (plural)

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DFG Research Unit FOR 2373: Project MALT

7th Lingwistika Maltija, 10 July 2019

Maltese Plurals

Maltese speakers are faced with a dichotomy in their morphological system:

- sound plurals are built concatenatively by adding a suffix to the singular
- broken plurals are formed non-concatenatively by changing the prosody of the singular stem
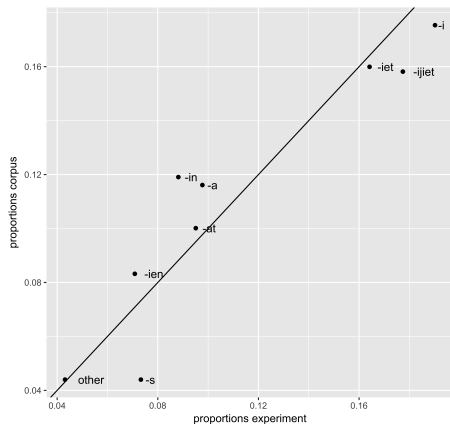
- Native speakers use the most common suffixes and CV patterns for generalizing to novel nouns
- Knowledge of Maltese native speakers of the singular-plural mappings is generalized to novel words on the basis of the similarity of the novel word to existing singulars, their associated plural form and the frequency of these forms
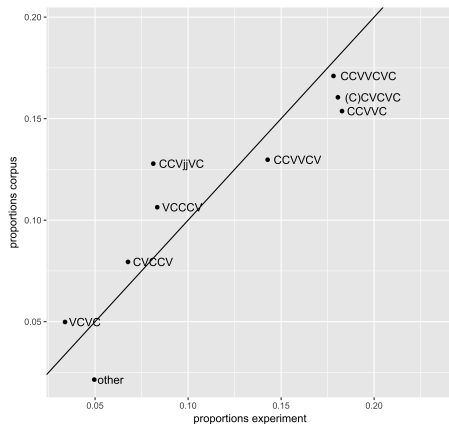
Maltese Plurals

Nieder et al. (subm)

Figure 1: Proportion of different sound plural suffixes in corpus and experiment and their correlation.

regression analysis: multiple R-squared = 0.86, adjusted R-square = 0.84, F(45.72, 1), df = 7, p = .0002

Maltese Plurals

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Figure 2: Proportion of different broken plural patterns in corpus and experiment and their correlation.

regression analysis: multiple R-squared = 0.82, adjusted R-square = 0.79, F(31.06, 1), df = 7, p = .0008

- overall we find more sound plurals than broken plurals in Maltese
- our data set: 2247 nouns in total
  - 1499 sound plurals = 67%
  - 758 broken plurals = 33%

- for nonce stems our participants used sound plurals more frequently:
  - 5404 sound plurals
  - 1262 broken plurals
- this is in line with the proportions we find in our data set

- similar processing: analogical mechanism that relies on frequency of patterns and morphophonological similarity
- **but: are there nevertheless differences in processing sound and broken plurals?**
  - are native speakers as confident about broken plurals as they are about sound plurals?

- study on English past tense formation
- participants show a preference for regular word forms
- implemented rule-based model prefers regulars, too
- data supports a model that contains generalizations about all morphological processes, not just the most productive ones

How does the variation found in the nominal system influence the intuitions of native speakers about Maltese plural forms?

- Eye tracking experiment with visual world paradigm

Why Eye-tracking?

- natural processing, there is no secondary task involved
- shows an early stage of processing
- can be used for auditory or/and visual processing

- words were recorded by a bilingual woman (Maltese-English)
- pictures were retrieved using Google image search
- spoken words had either a correct or an alternative plural form
- alternative plural forms were formed according to the rules of the language (e.g. for Maltese, following Azzopardi-Alexander & Borg (1997) the suffixes –i and –ijiet were used for non-semitic words)
- the decision what is a correct plural form was based on a dictionary (Aquilina, 1987) and an open lexicon for Maltese (Camilleri, 2013)
- in total, we tested 52 participants

- eye-tracking experiment with visual world paradigm
- Maltese native speakers heard spoken nouns and saw four pictures on a screen: 1. target, 2. phonological competitor with an overlap of initial phonemes, 3. unrelated distractor and 4. „stop"-sign
- pictures were presented in randomized order

dwal

dwett

„aghfas fuq l-stampa tal-dwal"
(,Click on the picture of the lights')

bezzun

- 217 trials (1,3%) had to be rejected because the eye tracker had problems tracking the eyes of the participants
- The majority of these trials were from participants whose eyes were difficult to calibrate due to their glasses

- A trial started at 200ms and ended at 1400ms after target onset
- The mean proportion of fixation for the targets over the whole trials overall greater relative to the proportion of fixation for the distractors and competitors

- we analyzed the data with a Generalized Additive Mixed Model with mgcv package (Wood, 2011) in the R environment

Eye-Tracking Experiment
Stimuli

broken plural correct
(e.g. kelb – pl. klieb ‚dogs')
broken plural incorrect
(e.g. kelb wrong pl. kelbi vs. correct pl. klieb ‚dogs')
sound plural correct
(e.g. garaxx – pl. garaxxijiet ‚garages')
sound plural incorrect
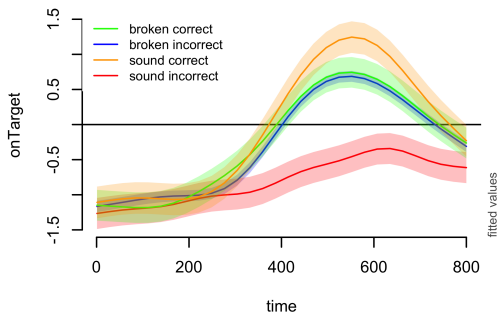(e.g. garaxx – wrong pl. graxex vs. correct pl. garaxxijiet ‚garages')

Figure 3: Proportions of fixation on targets

- overall participants show a preference for correct sound plural items
- for sound plurals with an alternative form (sound plural incorrect) – which is then a broken plural form – we find the least proportion of fixations and participants started to look at the competitors more often
- in the case of broken plurals we find the same amount of looks irrespective of the fact that the plural form is a correct or alternative one
    - as the alternative one is then a sound plural form, we find that sound plurals are as acceptable as the correct broken plural form

- a sound plural is an acceptable alternative to an existing broken plural, but a broken plural is not an acceptable alternative to an existing sound one
- Maltese speakers are more certain about sound plurals than about broken plurals: preference for regular processing

Grazzi ħafna!

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Acknowledgements