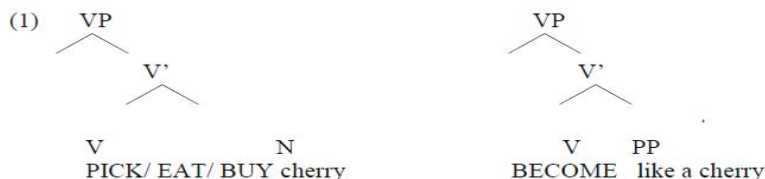


representations accounting for the creative variation in the interpretation of denominal verbs, thus opting for the view of a large lexicon, comprising all the possible interpretations, out of which the speakers choose:



References

- Hale, K. & Jay Keyser, S. 2002. *Prolegomenon to a theory of argument structure*. MIT Press. Cambridge.
- Harley, H. 2008. Bare roots, conflation and the canonical use constraint. Talk presented at the NORMS Workshop on Argument Structure, University of Lund: Lund/Sweden. February 6, 2008.
Available online: <http://dingo.sbs.arizona.edu/~hharley/PDFs/HarleyCUCLund02-05-08.pdf>
- Kelly, M. H. 1998. Rule- and idiosyncratically derived denominal verbs: Effects on language production and comprehension. *Memory and Cognition* 26 (2): 369–381.
- Kiparsky, P. 1997. Remarks on denominal verbs. In: A. Alsina, J. Bresnan & P. Sells (eds.) *Complex predicates*. 473–499. CSLI: Stanford.
- Lakoff, G. 1993. The contemporary theory of metaphor. In: A. Ortony (ed.) *Metaphor and thought* [2nd ed.] Cambridge University Press. 202–252.

Transparency and predictability in Modern Greek conjugation: Implications for models of word processing

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A transparent formal relation between any two paradigmatically-related forms (say *walk* and *walked*, or *love* and *loved*), combined with predictable affixation, is traditionally assumed to be a hallmark of morphological regularity. Non transparent relations (say between *fall* and *fell*), on the other hand, are much less predictable and are typically taken to be irregular. Such a systematic correlation between transparency and predictability in regular inflection motivates the subdivision of labour between rules and the lexicon hypothesized by the Declarative/Procedural model of word processing (Pinker & Ullman 2002). Accordingly, morphologically regular inflections are predictable and transparent and are assembled by rules. All other inflected forms are memorised and accessed in the lexicon as wholes.

It is widely acknowledged that cases of predictable stem alternation (such as English *ring-rang-rung*, *sing-sang-sung*, or German *schreiben-schrieben*, *bleiben-blieben*) are difficult to be accounted for in terms of dualistic models of word processing. Modern Greek conjugation adds a further dimension of complexity to this picture, offering an interesting exception to the purported strong correlation between morphological transparency and predictability. According to Ralli (2005, 2007), Greek verb paradigms can be classified on the basis of two criteria: a) presence vs. absence of the perfective sigmatic affix; b) phonological (predictable) vs. morphological (systematic, but unpredictable) stem allomorphy. In line with Ralli's criteria, we can define the following three verb classes (see also Tsapkini & al., 2001, 2002a, b, c, 2004):

- (i) an affix-based class, requiring the presence of the perfective marker *-s-* and a predictable phonological stem allomorph (e.g., *skoton-o* 'I kill' ~ *skoto-s-a* 'I killed', *ɣraf-o* 'I write' ~ *e-ɣrap-s-a* 'I wrote');
- (ii) an idiosyncratic verb class whose forms are based on non-systematic stem allomorphy (requiring usually either stem-internal change or suppletion) or no stem allomorphy at all, and no (sigmatic) aspectual marker (e.g., *pern-o* 'I take' ~ *pir-a* 'I took', *tro-o* 'I eat' ~ *e-fay-a* 'I ate', *krin-o* 'I judge' ~ *e-krin-a* 'I judged');
- (iii) a mixed class where active perfective past tense forms are produced by affixation of the aspectual marker *-s-* to an unpredictable morphological stem-allomorph (e.g., *ayap(a)-o* 'I love' ~ *ayapi-s-a* 'I loved', *xal(a)-o* 'I demolish' ~ *xala-s-a* 'I demolished', *for(a)-o* 'I wear' ~ *fore-s-a* 'I wore').

The three classes illustrate three different cases of interaction between formal transparency (degrees of stem similarity) and (un)predictability of stem allomorphy. Class (i) verb forms are predictable but not fully transparently related (+P, -T). Class (ii) verb forms are unpredictable and (mostly) formally opaque (-P, -T). Finally, class (iii) forms are unpredictable but fully transparent (-P, +T). In the present contribution, we consider experimental evidence of human processing for the three classes of Modern Greek verb forms, and assess the theoretical consequences of this evidence for word processing architectures.

We argue that the Greek evidence calls for a substantial revision of the clear-cut interaction between transparency/predictability and regularity, to make room for a more process-oriented notion of regularity. According to this view, regularity is no longer an epiphenomenon of the design of the human language faculty and the purported dualism between rule-based and memory-based routes, but the graded result of the varying interaction of several structural factors (Figure 1), concurrently affecting the human word processor. Since all these factors interact in a variety of ways, any processing architecture that assumes compartmentalized, independent processing routes for some specific combinations of these factors only (e.g. a rule-based route for a combination of transparency and predictability, on the one hand, and a memory-based route for all other combinations on the other hand) inevitably fails to capture the full range of complexity of Greek conjugation. To account for this complexity, we propose to focus on a different design of the human language processor, and on a more distributed computational architecture for its modelling.

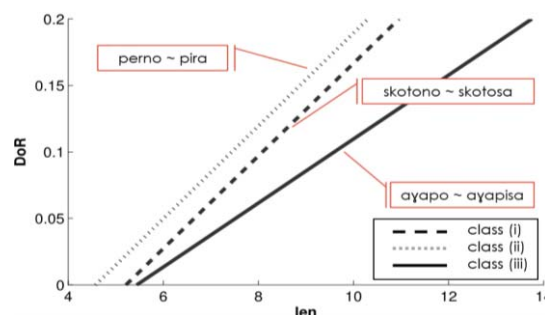


Figure 1. LME analysis of interaction effects between word length and classes of (ir)regularity on Difficulty in word Recall (DoR) by a TSOM (Ferro *et al.*, 2011, Marzi *et al.* 2012, Marzi & Pirrelli 2015, Pirrelli *et al.* 2015) trained on Greek verb forms (Bompolas *et al.* 2016). Type of stem allomorphy determines the different levels of morphological regularity in Greek. Stem transparency in the paradigm is perceived as a key facilitation factor for morphological processing. This seems to involve a regularity-by-transparency interaction, with predictability playing second fiddle. Random effects: TSOM instances ($n = 5$), paradigms ($n = 50$). Fixed effects: word log frequency, word length (len), verb class.

References

- Bompolas, S., Ferro, M., Marzi, C., Cardillo, F. A. V. & Pirrelli, V. 2016. Reassessing inflectional regularity in Modern Greek conjugation. In: A. Corazza, S. Montemagni & G. Semeraro (eds.) *Proceedings of CLiC-it '16*. Vol. 1749. Article n. 12. CEUR.
- Ferro, M., Marzi, C. & Pirrelli, V. 2011. A self-organizing model of word storage and processing: implications for morphology learning. *Lingue e Linguaggio* X(2): 209–226.
- Marzi, C., Ferro, M., & Pirrelli, V. 2012. Word alignment and paradigm induction. *Lingue e Linguaggio* XI(2): 251-274.
- Marzi, C. & Pirrelli, V. 2015. A neuro-computational approach to understanding the Mental Lexicon. *Journal of Cognitive Science* 16(4): 493–534.
- Pinker, S. & Ullman, M. T. 2002. The past and future of the past tense. *Trends in cognitive sciences* 6 (11): 456–463.
- Pirrelli, V., Ferro, M. & Marzi, C. 2015. Computational complexity of abstractive morphology. In: M. Baerman, D. Brown & G. Corbett (eds.) *Understanding and measuring morphological complexity*. Oxford: Oxford University Press. 141–166.
- Ralli, A. 2005. *Morphology* [in Greek]. Athens: Patakis.
- Ralli, A. 2007. On the role of allomorphy in inflectional morphology: Evidence from dialectal variation. In: G. Sica (ed.) *Open problems in linguistics and lexicography*. Milano: Polimetrica. 123–152.
- Tsapkini, K., Jarema, G. & Kehayia, E. 2001. Manifestations of morphological impairments in Greek aphasia: A case study. *Journal of Neurolinguistics* 14: 281–296.
- Tsapkini, K., Jarema, G. & Kehayia, E. 2002a. A morphological processing deficit in verbs but not in nouns: A case study in a highly inflected language. *Journal of Neurolinguistics* 15: 265–288.

- Tsapkini, K., Jarema, G. & Kehayia, E. 2002b. The role of verbal morphology in aphasia during lexical access: Evidence from Greek. In: E. Fava (ed.) *Clinical linguistics and phonetics: Theory, and applications in speech pathology and therapy*. Amsterdam/Philadelphia: John Benjamins. 315–335.
- Tsapkini, K., Jarema, G. & E. Kehayia. 2002c. Regularity revisited: Evidence from lexical access of verbs, and nouns in Greek. *Brain and Language* 81: 103–119.
- Tsapkini, K., Jarema, G. & Kehayia, E. 2004 Regularity re-revisited: Modality matters. *Brain and Language* 89: 611–616.

Variation in Polish phrasal lexemes

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This talk will discuss two kinds of variation concerning phrasal lexemes (Masini 2009, Booij 2010) in Polish, i.e. multi-word expressions with a naming function, which are referred to as “juxtapositions” by Polish morphologists (Jadacka 2001, Szymanek 2010).

One type of variation is the competition between phrasal lexemes and compounds proper, exemplified in (1)–(2). Instead of using the juxtapositions in (1), which consist of two fully inflected nouns (optionally) linked with a hyphen, speakers of Polish can employ the copulative compounds proper in (2), which contain two stems linked with the interfix *-o-*.

- | | | | |
|-------|--|----|---|
| (1) a | <i>barman-kelner</i>
bartender.Nom+waiter.Nom
'a waiter bartender' | b. | <i>kurs-konferencja</i>
training.Nom+conference.Nom
'a training conference' |
| (2) a | <i>barmanokelner</i>
bartender+o+ waiter.Nom
'a waiter bartender' | b. | <i>kursokonferencja</i>
training+o+conference.Nom
'a training conference' |

The existence of the forms in (1) and (2) violates the generalization that the coining of compounds is blocked by the occurrence of phrasal lexemes (see Booij 2009: 229). It will be shown that the formation of N+N juxtapositions is the preferred way of coining novel (and often reversible) coordinate expressions in Polish, while coordinate compounds proper are more conventionalized units. Moreover, N+N combinations which represent selected N+N semantic patterns, e.g. Kinship + Profession and Sex + Profession (cf. Olsen 2001), cannot be replaced by compounds proper, cf. *mąż prawnik* (lit. husband.Nom lawyer.Nom) 'lawyer husband' vs. **mężoprawnik*, or *kobieta pilot* 'woman pilot' vs. **kobietopilot*.

Another kind of variation concerns the order of constituents in juxtapositions which consist of a noun and an adjective (especially a relational adjective). The juxtapositions in (3) are syntactically fixed, as is expected of both derived words and phrasal lexemes, cf. Masini (2009), Nagórko (2016). The reordering of the constituents of the A+N unit in (3a) results in the loss of its idiomatic reading (in 4a) while the change of the word order of (3b) changes the meaning (and function) of the adjectival modifier, turning the whole unit into a regular syntactic phrase in (4b).

- | | | | |
|--------|---|----|---|
| (3) a. | <i>koński ogon</i>
horse.Adj.Nom tail.Nom
'a ponytail' | b. | <i>aktor komiczny</i>
actor.Nom comic.Adj.Nom
'a comedy actor' |
| (4) a. | <i>ogon koński</i>
tail.Nom horse.Adj.Nom
'a tail of a horse' | b. | <i>komiczny aktor</i>
comic.Adj.Nom actor.Nom
'an actor who is funny' |

However, the juxtapositions in (5) allow both N+A and A+N orders. The greater mobility of their constituents coincides with the compositionality of such phrasal lexemes (cf. Hüning and Schlücker 2015), yet it also depends on the semantic type of the adjectival modifiers.

- | | | | |
|--------|--|----|--|
| (5) a. | <i>sklep spożywczy</i>
shop.Nom food.Adj.Nom
'a grocery' | b. | <i>spożywczy sklep</i>
food.Adj.Nom shop.Nom
'a grocery' |
| (6) a. | <i>dyżur nocny</i>
duty.Nom night.Adj.Nom
'night duty' | b. | <i>nocny dyżur</i>
night.Adj.Nom duty.Nom
'night duty' |