Processing semantically opaque complex vs. pseudo-complex words in Modern Greek

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Background: The processing of semantically opaque complex words etymologically related to their constituent morphemes (e.g., *sneaker–sneak*) and pseudo-complex words incidentally related to their putative constituent morphemes (e.g., *corner–corn*) remains a controversial issue in the literature [1–4]. Rastle and Davis [5, 6] claim that semantically opaque complex words must not be distinguished from pseudo-complex words, as long as both are comprised of a surface morphological structure in a synchronic perspective. Indeed, Longtin et al. [7] conducted masked and cross-modal priming experiments in French reporting no significant differences between opaque complex and pseudo-complex words. However, Baayen and colleagues [8, 9] raise concern about this theoretical and methodological treatment arguing that semantically opaque complex words may comprise functional morphological units in the Discriminative Lexicon, as opposed to pseudo-complex words.

Method: Ninety-six university students, native speakers of Standard Modern Greek, participated in two lexical decision experiments with morphological priming (48 participants per experiment). The experimental design compared a complex condition (14 prime-target pairs consisting of a semantically opaque complex verb and its etymological base noun) and a pseudo-complex condition (14 prime-target pairs consisting of a semantically opaque pseudo-complex verb and a putative base noun), against an unrelated control condition (28 control primes being morphologically, formally, and semantically unrelated to the targets, though properly matched to the corresponding related primes; see, Table 1). Namely, prime morphological status (complex vs. pseudo-complex) was manipulated as a within-subject and between-target factor, and prime-target relatedness (related vs. unrelated) as a within-subject and within-target factor, in a split-plot design with two counterbalancing lists. The lexical decision task was combined with forward-masked visual priming (SOA = 50 ms; Experiment 1) to tap into early/peripheral morphological processing [7, 10, 11], as well as with immediate cross-modal priming (SOA = auditory prime duration; Experiment 2) to tap into late/central morphological processing [7, 11, 12].

Results: Reaction times were analyzed with linear mixed-effects models in R [13] (see, Figures 1 and 2). In Experiment 1, we found a significant effect of relatedness ($t = 3.709$, $p < 0.001$) but neither a significant effect of morphological status ($t = -0.368$, $p = 0.716$) nor a significant relatedness X morphological status interaction ($t = 1.464$, $p = 0.144$), indicating that forward-masked priming was statistically significant and equivalent between the complex (33 ms) and pseudo-complex (19 ms) conditions. In Experiment 2, we found no significant results for relatedness ($t = 0.301$, $p = 0.765$), morphological status ($t = -0.005$, $p = 0.996$), and their interaction ($t = -0.067$, $p = 0.947$), indicating negligible cross-modal priming in the complex (–3 ms) and pseudo-complex (3 ms) conditions.

Discussion: Our findings suggest that semantically opaque complex words and pseudo-complex words in Modern Greek are essentially processed the same irrespective of etymology, both yielding significant masked priming but null cross-modal priming. Therefore, in the absence of a semantic relationship, the apparent complex structure of a word either etymologically grounded or incidentally occurring seems to play an important role during early/peripheral morphological processing, though it is rather inconsiderable during late/central morphological processing [5–7]. Finally, regarding methodology, our results comply with the common practice not to distinguish between semantically opaque complex and pseudo-complex words in experimental designs with morphological priming [6, 14, 15].

	Related	Unrelated	Target
Complex	σαρκ-άζω /sark-azo/ ‘to jibe’	λιμν-άζω /limn-azo/ ‘to stagnate’	σάρκ-α /sark-a/ ‘flesh’
Pseudo-Complex	αρπ-άζω /arp-azo/ ‘to grab’	πιν-άζω /tin-azo/ ‘to shake out’	άρπ-α /arp-a/ ‘harp’

Table 1: Experimental conditions and stimuli examples.

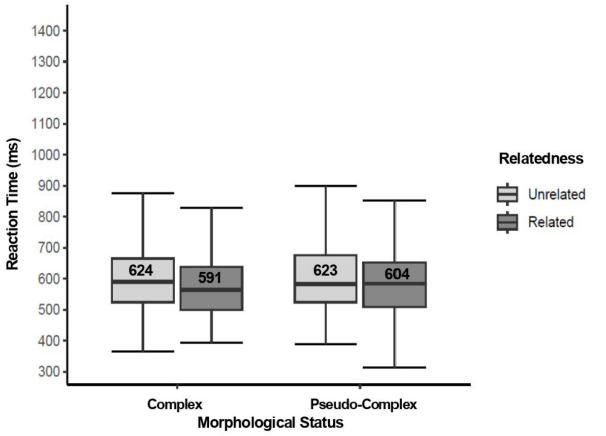

Figure 1: Reaction time boxplots and means, Experiment 1.

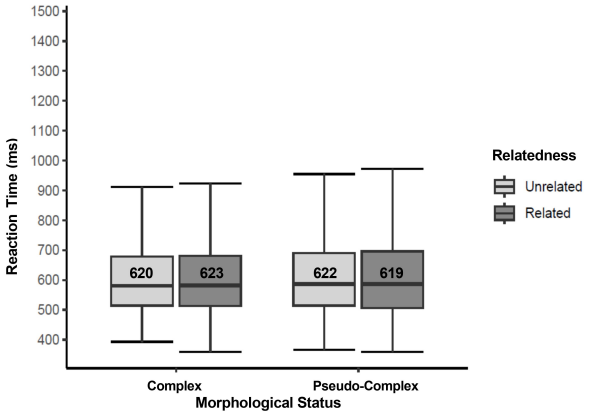

Figure 2: Reaction time boxplots and means, Experiment 2.

R Formulae:
(a) LogRT ~ Relatedness * Morphological Status + Trial Order + (1 + Relatedness | Subject) + (1 | Item);
(b) LogRT ~ Relatedness + Morphological Status + Trial Order + (1 + Relatedness | Subject) + (1 | Item) [final model].

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