Generalisation of 'pure' morphology: Dual-mechanism in native speakers, similarity in second language learners

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Much linguistic and psycholinguistic research has attempted to characterize the mental representations that account for morphological productivity. Various analogical and connectionist models assume that productivity is essentially determined by frequency and *similarity* [1,2]. In contrast, dual-mechanism models postulate that similarity-based generalisations have a role in the irregular periphery of morphology, but that truly productive knowledge is couched in the form of *context-free* operations, or rules [3,4].

Despite intensive investigation, the evidence still does not favour one side or the other. Two possible reasons are, firstly, that the focus of the debate has been on the generalisation of very simple inflectional operations, consisting of straightforward form-to-meaning mappings (e.g., the English past-tense); and secondly, that many of the examined test cases have compared rather different linguistic operations (e.g., for regular vs. irregular verbs), so that the morphological distinctions of interest are often confounded with other (non-morphological) factors.

In the present study, we examined an instance of 'pure' morphology, verbal conjugation classes in Portuguese. Conjugation classes are abstract features without meaning or function beyond their morphological properties, so that any experimental differences between them cannot easily be ascribed to non-morphological factors. In addition, the Portuguese verbal system makes a clear division between the 1st conjugation, which extends to novel verbs, and the 2nd and 3rd conjugations, which are not productive; thus, this system may present a contrast between context-free generalisations, and those that are more restricted and based on similarity.

We present a novel way of investigating the theoretical proposals above, by examining dissociations between two different populations on the same linguistic phenomena and materials. If indeed the language faculty allows for both context-free and similarity-based generalisations, and if these components can be found to be affected by individual characteristics, then it should be possible to find particular groups who rely more (or exclusively) on one type of generalisation. We envisaged that non-native (L2) speakers would provide the ideal test case for this hypothesis, since previous research suggests that late learners present difficulties with the structural aspects of language [5], and thus may show limited acquisition of fully-fledged morphological rules.

We investigated whether L2 responses to 78 novel verbs were predicted by a computational model that generalises conjugation classes on the basis of phonological similarity (the MGL model of [6]). Two identical elicited production experiments were conducted with advanced (late) learners of Portuguese (total n=46, Chinese L1). Participants had to produce conjugation-marked infinitives from unmarked forms, potentially making use of their phonological characteristics. The L2 responses were compared against those of a group of 54 native speakers (previously reported by [7]). The results showed tht native speaker responses were predicted by the MGL model, but only for the 2nd and 3rd conjugations; generalisation of the 1st conjugation to novel verbs was unaffected by phonological similarity. In contrast, in both experiments, the responses of L2 speakers were predicted by the MGL model for all three conjugation classes. That is, L2 speakers employed phonological information as a cue to conjugation assignment even in cases where native speakers did not (namely, for the 1st conjugation, see Fig. 1).

The results suggest that native speakers partition the space of conjugation classes by distinguishing between context-free and similarity-based generalisations, but that late L2 learners do not make such a principled distinction and rely exclusively on phonological similarity. We conclude that natively-acquired morphology is indeed organised along dual-mechanism principles, but that this organisation is not easily acquired and employed by adult learners.

References: **[1]** Rumelhart & McClelland (1986), in *Parallel distributed processing*, MIT Press. **[2]** Skousen et al. (2002), *Analogical Modeling*, John Benjamins. **[3]** Pinker & Ullman (2002), *TICS*, *6*. **[4]** Yang (2016), *The Price of Linguistic Productivity*, MIT Press. **[5]** Clahsen & Felser (2006), *TICS*, *10*. **[6]** Albright (2002), *Language*, *78*. **[7]** Veríssimo & Clahsen (2014), *JML*, *76*.

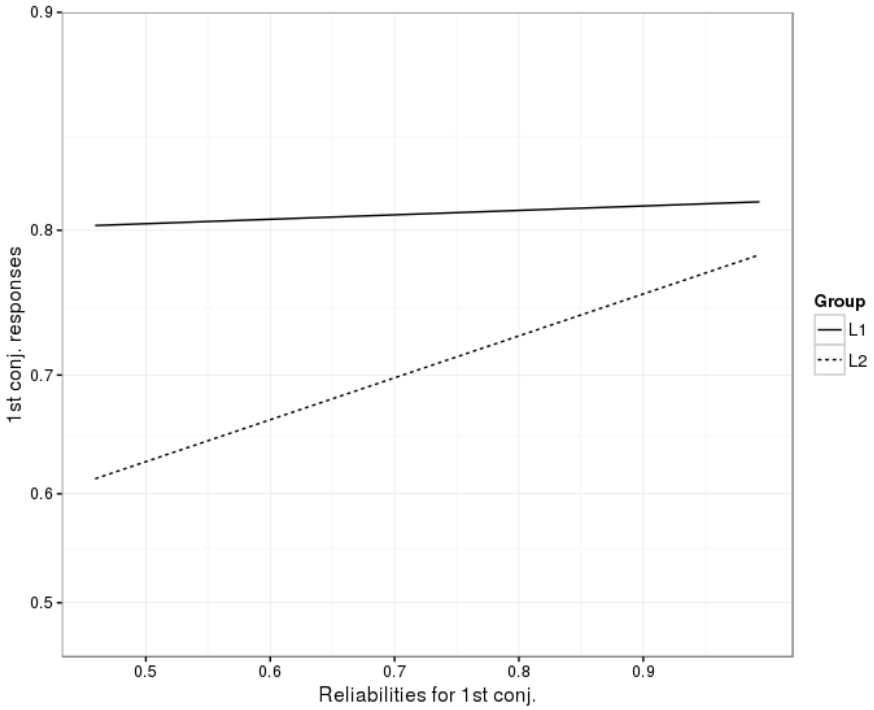

Figure 1: Effect of a measure phonological similarity to 1st conjugation verbs (i.e., of the 'reliabilities' for the 1st conjugation, as obtained by the MGL computational model) on the proportion of 1st conjugation responses, for L1 and L2 groups, estimated by a logistic regression model. The results showed a significant interaction between group and phonological similarity (in both experiments as well as in the aggregated data).