Structure and gradience in morphological processing

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In the 'classical' approach to morphology, knowing morphological relations is knowing *rules*, a set of context-free operations that create structured representations; in turn, processing morphology entails (de)composing complex forms into/from their constituents via the application of such rules (Pinker, 1999). Alternatively, within analogical, connectionist, and discriminative learning approaches, it has been proposed that the mechanisms that generalise and process complex forms are inherently graded, frequency- and similarity-sensitive, and do not explicitly represent constituent structure (Gonnerman et al. 2007).

In this talk, I will review work from our lab and others that aimed at adjudicating between these two broad theoretical positions. Rather than unambigously supporting one or the other position, the conclusions from such work indicate the need for an integrated approach that will unify the main principles of the two theoretical views. On one hand, many experimental results obtained with various experimental techniques (e.g., elicited production, masked and cross-modal priming) suggest that constituent structure is operative in speakers' minds, generalised by rules, and computed in the course of morphological processing (Veríssimo & Clahsen 2009). On the other hand, other phenomena and results (especially in derivational morphology, and especially with non-native speakers) cannot be easily accomodated by such a strict separation between structured and unstructured representations and appear to require more gradient notions of constituency (Veríssimo et al. 2018).

We have tackled this problem by making use of computational modelling, within various frameworks: minimal generalisation learning (Albright 2002), interactive activation models (McLelland & Rumelhart 1986), and Gradient Symbolic Computation (GSC) (Smolensky et al. 2014). We have modelled experimental results from different tasks (generalisation and priming), phenomena (conjugations and semantic transparency), and groups (L1 and L2).

Initial results indicate that these approaches provide novel and fruitful ways to represent and process morphology. The models, especially those in the GSC framework, can explicitly represent constituent structure, but also the intermediate, 'blended' representations that are formed in the course of processing. As such, these approaches may have a major advantage over the other theoretical contenders: they allow the integration of the symbolic/structural and the probabilistic/gradient aspects of morphology within one single architecture.

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