

Inflecting regular and irregular verbs: preliminary neuroimaging data from the three Italian conjugations

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The existence of differences in lexical processing for regular and irregular verbs is broadly documented [1-3]. Two main theoretical positions have been taken on this issue: dual vs. single mechanism accounts. The former approach [4] invokes different mechanisms for regular (rule-based procedures) and irregular forms (recovery of whole forms stored in an associative network). The latter account postulates a single procedure for regular and irregular forms [5]. Patterns of brain activity supporting both the theories have been also described [6, 7]. An alternative view states that the lexical access needs processes of morphological analysis going beyond the regularity/irregularity dichotomy and ascribes the observed differences to the existence of inflectional classes, groups of verbs exhibiting specific sets of inflectional realizations (paradigms). In a study on the acquisition of the past participle of Italian verbs it was demonstrated that school-age children use the thematic vowel of the infinitive form as a cue to the different conjugations to inflect verbs [8]. It has also been proposed that irregular inflection is not fully rule-free but it follows some kind of morphological principles [9].

In this study, we addressed the question by investigating the neural substrate of lexical processing of Italian verbs from 1st, 2nd and 3rd conjugation. Twelve undergraduate students took part in an event-related fMRI study. They performed an on-line inflection task: regular and irregular verbs from the three conjugations were visually presented in the infinitive form (e.g., MANGIARE, to eat) and participants were asked to generate aloud as fast as possible the past-participle form (e.g., MANGIATO, eaten). Irregular verbs showed increased activation when compared to regular verbs in the Left Inferior Frontal Gyrus and in Brodmann Areas (BA) 45. The reverse pattern was observed in Putamen. Mostly irregular and unproductive inflectional classes showed significantly increased activation in the Left Inferior Frontal Gyrus. A significant interaction between regularity and inflectional class was also observed in BA 06. The results are challenging for models of morphological processing, since they suggest that inflectional processing of verbs is not simply influenced by the regularity or irregularity of each single verbal form but it is also affected by morphological properties of the inflectional class they belong to: namely, the specific consistency, robustness, productivity and regularity distributions.

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