

## Stem and affix processing in Polish aphasics

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Converging evidence from lesion and neuroimaging studies suggests a possible dissociation between the neural systems that support the processing of stems and inflections. Stem access may primarily involve posterior temporal cortex (possibly bilaterally), while inflectional processes implicate a left-lateralised fronto-temporal circuit. This is consistent with different patterns of impairment in individuals with aphasia depending on anterior/posterior distribution of pathology. However, most of this research has focused on English, in which irregular forms contain a stem change but no affix (*dig/dug*) and regular forms contain no stem change but a change in affix (*walk/walked*). Thus, regularity is confounded with morphological complexity. Moreover, number of potential inflectional affixes that can be used to form a verb is small and competition between alternatives is minimal. It is uncertain whether the insights won from the study of English can be applied to languages with more complex morphology. In a language like Polish, in which majority of the verb forms are inflected, word production requires the access of potentially several different forms of stems and inflections as well as the selection of the correct combination between them. This allows us to examine stem and inflection processing in a way which would not be possible in English.

Various groups of non-fluent and fluent aphasic patients as well as healthy Polish native speakers were tested on several elicitation tasks. Subjects heard a sentence, e.g. ‘Oni wczoraj pisali, a teraz ty...’ [Yesterday they wrote and now you...] and were asked to complete it with the correct form of the same verb (here ‘piszesz’ [write]). This required the choice of the correct stem (which could include a stem alternation) and of the appropriate person/number/tense inflection. Stem and inflectional complexity varied across conditions.

The first study focused on stem and affix selection of verbs with and without alternations. The following studies examined further the influence of number of potential stems and affixes on performance level.

The results constitute cross-linguistic evidence for the separability of neural systems underlying stem-based and inflection-based processing. Non-fluent subjects, with predominantly left frontal damage, frequently used contextually inappropriate inflectional suffixes, as well as having problems in selecting grammatically appropriate stems, in cases of stem alternation. In contrast, the more posterior (left temporal) fluent aphasics primarily showed an impairment in verb stem retrieval, with substantial paraphasic errors, but made significantly fewer inflection errors.

This suggests that the neural representation of stems and inflections can vary according to the specific characteristics of each language, e.g. morphological complexity, presence of stem alternations, number of inflectional choices. Differences in neural representation and processing of words may be reflected in cross-linguistic differences in aphasic performance.