

# Stem-formation Processes in Portuguese: A Dual-Mechanism Account

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## Introduction

Say and Clahsen (2002) proposed an extension of the dual-mechanism model of morphology to stem-formation processes in Italian. According to this account, verbal stems belonging to the productive first conjugation can be rule-generated, while second and third conjugation stems are stored in the mental lexicon.

Another account of verbal stem-formation in Italian was proposed by Albright (2002), as a computationally implemented model (the Minimal Generalization Learner – MGL). During the course of acquisition, the model extracts a set of morphophonological rules that can generate stems belonging to any conjugation. Among these, the model also extracts the context-free rule, which adds the first conjugation theme vowel to any root, regardless of its phonological content. The rules are ordered by their reliability, which is calculated by dividing the number of verbal types that the rule generates correctly by the number of types to which the rule can apply. The probability of generating a particular stem should reflect the reliability value of the applied rule.

In the present experiment, a nonce-word elicited production task in Portuguese was used to distinguish between these accounts. In Portuguese, as in Italian, verbs fall into one of three conjugations. The first conjugation is the largest and usually applies to new verbs in the language.

If first conjugation stems are generated by multiple stochastic rules, the reliability values computed by the MGL model should correlate with the probabilities of production of first conjugation stems. However, if first conjugation nonce stems are rule-generated, but second and third conjugation stems are generated by analogy, the productivity of the first conjugation should have an effect over and above that predicted by the reliability values of the MGL model.

## Method

### Simulation

A simulation of the MGL model ran iteratively through the 1000 most frequent verbs in Portuguese, encoded in phonemic transcription. For each verb, the input was a pair of forms (1Sg Present and Infinitive). The model extracted 1854 generalized rules.

## Elicited Production Task

Seventy-eight nonce words in the 1Sg Present form (which does not contain a theme vowel) were created from the rules extracted by the MGL model. For 36 of these forms, the MGL model output a first conjugation Infinitive, for 19 a second conjugation Infinitive, and for 23 a third conjugation Infinitive. The forms were built such as to span a wide range of reliability values. Fifty-four participants were presented with these forms embedded in sentences, and completed a blank space in a second sentence that elicited an Infinitive form. Responses were categorized by the conjugation to which they belonged.

## Results

Correlations between the reliability values and the probabilities of production were moderate for all conjugations ( $r=.42$ , for first;  $r=.54$ , for second;  $r=.53$ , for third). This result supports Albright's (2002) account of stem-formation. However, the probabilities of production of a first conjugation form were very high, even for a subset of the 5 second and 5 third conjugation items with highest reliabilities (42% first, 51% second, for second conjugation items; 57% first, 39% third, for third conjugation items).

## Conclusion

The first conjugation in Portuguese shows unrestricted productivity and overrides similarity to other conjugations. The results suggest that these stems are rule-generated, but second and third conjugation stems are not. However, first conjugation stems also have to be associated with lexical entries in order to explain the obtained similarity effect.

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## References

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