

One of the current issues in psycholinguistics is how the frequency of syntactic structures influences the mental processing of sentences, especially in the case of ambiguous constructions. The present work attempts to shed light on this issue from the perspective of computational and corpus linguistics.

Existing theories of human sentence processing assign different roles to frequency, varying from certain 'principle-based' models that completely ignore it to 'experience-based' models relying on frequency alone. The present work develops a frequency-based parsing component that may be combined with other factors influencing disambiguation. This module, named the *Optimized Frequency Constraint* (OFC), addresses questions largely left open by existing frequency-based models: How are the frequencies of syntactic structures stored mentally? When does the human sentence processing mechanism access this stored information, and in what sequence?

OFC is then applied to a range of syntactic constructions in German (licensing, attachment of phrases and relative clauses, word order, etc.) that have been used in psycholinguistic experiments. The settings of OFC's parameters are determined by analyzing German corpus data. The predictions based on OFC are confirmed by the results reported in the psycholinguistic literature in most cases, indicating that OFC offers psychologically valid predictions of the influence of frequency in human parsing.