# Information theoretic approaches to phonological structure: the case of Finnish vowel harmony

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**Abstract** This paper offers a study of vowel harmony in Finnish as an example of how information theoretic concepts can be employed in order to better understand the nature of phonological structure. The probability assigned by a phonological model to a corpus is used as a means to evaluate how good such a model is, and information theoretic methods allow us to determine the extent to which each addition to our grammar results in a better treatment of the data. We explore a natural implementation of autosegmental phonology within an information theoretic perspective, and find that it is empirically inadequate; that is, it performs more poorly than a simple bigram model. We extend the model by means of a Boltzmann distribution, taking into consideration both local, segment-to-segment, relations and distal, vowel-to-vowel, relations, and find a significant improvement. We conclude with some general observations on how we propose to revisit other phonological questions from this perspective.

## 1 Introduction

### 1.1 Information theoretic phonology

Vowel harmony has been a constant concern of phonologists since Trubetzkoy's *Grundzüge der Phonologie* 1939/1968, because it has something to interest everyone.

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