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The Textsetting Problem: An Approach with Stochastic Optimality Theory

The **textsetting problem** was proposed by Halle and Lerdahl (1993). These authors observe that a singer who knows the rhythm of only the first line of (for example) "What shall we do with a drunken sailor?" will also know what to do with additional lines such as "Put him in a longboat till he gets sober." Singers can also accept, or reject as unmetrical, settings presented to them by an investigator.

To model the singers' ability, we seek a grammar that for any line of sung/chanted verse, can input its phonological representation (stress contour, syllable weights, phonological phrasing) and align it with the abstract rhythm of the song in which it appears. This abstract rhythm is assumed to take the form of a metrical grid (Liberman 1979, Lerdahl and Jackendoff 1983). A successful grammar constitutes a solution to the textsetting problem.

While it seem premature to hope for a fully effective grammar of this sort, I believe that progress is being made. This talk will describe my current efforts, carried out in collaboration with Abigail Kaun. Our grammar can, to some degree, predict native intuitions, taken in this case from a panel of consultants who for our earlier work (Hayes and Kaun 1995) chanted several hundred lines of folk verse. Our grammar relies on the following resources:

(1) Representations for stress, phrasing, and weight adopted from generative phonology;
(2) Metrical constraints from the research tradition in metrics (Jespersen, Halle and Keyser, Kiparsky, and others);
(3) Stochastic Optimality Theory (Boersma 1997, Boersma and Hayes 2001), used to generate multiple outputs with gradient preferences (to match the multiple outputs and gradient preferences of native speakers);
(4) The Gradual Learning Algorithm (same references), used to tune the rankings of the stochastic OT grammar to best match the data.

A fully adequate grammar will match native intuition, both for the tradition as a whole and in "fine-tuned" versions matching the judgements of individual singers or genres. I will discuss how close our approach has gotten to this goal, as well as its shortcomings and how they might be remedied.