Rhyme acceptability determined by perceived similarity

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1. Introduction. Rhymes are often imperfect (dream – mean), but people prefer some imperfect rhymes to others (home – bone >> home – dose). Previous research suggests that the acceptability of a rhyme is determined by the perceived similarity between the segments in the rhyme (Zwicky 1976, Steriade 2003, Kawahara 2007). Lacking a measure of perceived similarity, and assuming that acceptability can be gleaned from probability of attestation, previous research has focused on correlating the distribution of rhymes in poetry with (mis)matches in their feature values. In this paper, I provide direct measures of perceived similarity and rhyme acceptability, and I show how perceived similarity is a better predictor of rhyme acceptability than are feature systems based on articulation or acoustics.

2. Perceived similarity. Following Luce (1963), the perceived similarity $d$ between stimuli $x$ and $y$ can be measured from identification matrices with this formula:

$$d_{xy} = -\ln \left( \frac{p(r_x|x)p(r_y|y)}{p(r_x|y)p(r_y|x)} \right)$$

With the existence of identification matrices for coda consonants in American English (Cutler et al. 2004), we can calculate $d_{xy}$.

3. Experiment. 72 American English participants were given 77 randomly chosen and randomly ordered pairs of monosyllabic words with imperfect coda rhymes, and were asked to evaluate the goodness of the rhyme on a 1-7 scale – in total 5532 trials.

4. Model 1. A generalized linear mixed effects model was fitted to the data, with subjects and items as random effects. Three measures of the similarity between the imperfect rhyming consonants $x$-$y$ were included in the model. One measure is the perceived similarity $d$ between $x$ and $y$. The second measure sums the number of non-shared articulatory features in $x$-$y$ (Hayes 2009), and the third measure does the same for acoustic features (Jakobson et al. 1952). The strength of these three measures is measured by their $\chi^2$ values from LRT, and the t-values from their residuals in MCMC sampling. The higher scores for ‘Perceived similarity $d$’ show that this is the best predictor of participants’ responses:

![Graph showing perceived similarity, articulatory features, and acoustic features](image)

- Perceived similarity $d$:
  - Likelihood ratio test: $\chi^2(1) = 15.98 \quad p < .0001$
  - MCMC 1000 simulations:
    - t = -4.13 \quad p < .0001

- Articulatory features:
  - $\chi^2(1) = 5.27 \quad p < .05$
  - t = -2.29 \quad p < .05

- Acoustic features:
  - $\chi^2(1) = 5.23 \quad p < .05$
  - t = -2.28 \quad p < .05

5. Model 2. In the second model, a more sophisticated measure of similarity based on features was employed, in which the similarity between $x$ and $y$ is determined by their number of shared natural classes (Frisch et al. 2004, Albright 2006). Other aspects of the model remained the same as in Model 1. Also in this model, ‘Perceived similarity $d$’ is the strongest predictor:
7. Conclusion. With direct measures of perceived similarity and rhyme acceptability, this study provides strong evidence for the hypothesis that rhyme acceptability is determined by the perceived similarity between the segments in the rhyme.

8. Discussion. The importance of perception for both synchronic and diachronic phonology is acknowledged today, but this has had no consequences for the dominant feature system, which is based on articulation. This study shows that the simple 12-feature system of acoustic features (Jakobson et al. 1952), which was quickly abandoned, does much better in predicting rhyme acceptability than the rich system of articulatory features, which has developed for decades. A more informed system of acoustic features would probably be better able to reflect listeners’ perception of segments. The increasing body of evidence for the importance of perception in phonology warrants therefore an attempt to construct a feature system that incorporates articulatory, acoustic, and perceptual properties (Flemming 2002).

References
Zwicky, Arnold M. 1976. Well, This Rock and Roll Has Got to Stop, Junior’s Head is Hard as Rock. Chicago Linguistic Society 12:676-697, Chicago, IL.