The Role of Sound in Perceived Morphological Relatedness

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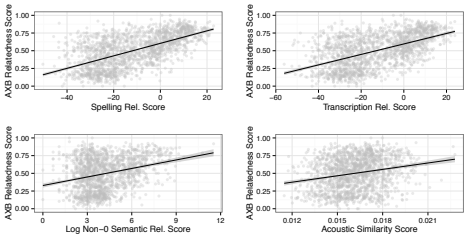
Hall et al. (2014) developed a metric for quantifying perceived morphological relatedness between words, a crucial measure for knowing whether any given pair of words can plausibly exemplify a morphophonological alternation in the minds of speakers. E.g., a phonologist might want to know what the role of the [s]~[ʃ] alternation is on English speakers, based on word pairs such as *press ~ pressure* or *face ~ facial*, but the existence of any such alternations depends on naïve speakers being able to identify the morphological relation between two words.

The experiment set up by Hall et al. (2014) showed that many of the relations that linguists assume have psychological merit: words that are inflectionally related to a key word were found to be perceived as being most similar to that word, followed by words that were derivationally related, semantically related, phonologically related, and unrelated, respectively. What was crucially lacking, however, was audio input: participants were simply shown triplets of a key word and two competitor words, written on screen, and asked to select one of the competitors as being more similar to the key. In natural language use, however, one would expect that the actual sounds of the words might play a larger role. In the current paper, we replicate the original study except that participants were given audio input. On each trial, they heard two pairs of words, the key word (e.g., *press*) with one competitor (e.g., the transparent derivationally related *pressure*) and then the same key word with a different competitor (e.g., the rhyme *mess*), and had to indicate which of the two pairs was more similar. All the key words were spoken by one female speaker of North American English, and all the competitor words were spoken by a different female speaker. All combinations of all pairs were presented, randomly, with a single participant seeing only two samples of any given key word in 360 total trials. Results here are based on 135 participants, not yet evenly distributed across combinations of words.

For each type of comparison word, the percentage of the time that that type was chosen when it was an option is given in the table below; the table shows both the non-audio results of Hall et al. (2014) and the current audio-based results. For most relations, the ordering is identical across the two tasks, confirming the original findings, but rhyming and cohort words show a marked increase in likelihood in the audio version. In particular, rhyming words were chosen just as often as relatively opaque derivationally related words and semantically related words. Particularly interesting is the fact that it is still spelling and transcription that do the best jobs of predicting perceived relatedness, rather than a measure of raw acoustic similarity; the R^2 values are 0.36 (spelling), 0.30 (transcription), 0.08 (semantics), and 0.05 (acoustics). A logistic mixed-effects regression model of the behavioural results (based on a principle components analysis of the predictors to eliminate collinearity) predicts the human behaviour accurately on 69% of trials. These results suggest that when determining morphophonological alternations, taking into account rhyming relations is particularly important; this is especially enlightening because in generating *predicted* perceived morphological relatedness scores for untested words, Hall et al. (2014) found that rhymes were over-predicted by their model; the current results suggest that this was not an error but rather an accurate reflection of what happens with audio stimuli.

Relation	*Non-Audio Percent*	*Audio Percent*
Inflected	83.3	77.4
Derived1	75.0	70.0
Derived2	62.2	56.5
Meaning1	61.6	56.0
Meaning2	52.9	48.9
Rhyme	**47.6**	**57.0**
Cohort	**36.9**	**44.5**
Unrelated	15.3	20.6



Reference:

Hall, K. C., Allen, C., Fairburn, T., McMullin, K., & Fry, M. (2014). *Quantifying perceived morphological relatedness*. Paper presented at the Canadian Linguistic Association Annual Meeting, Brock University.