What influences the cross-linguistic distribution of sound change? Word-final lenition and deletion processes affect different segments in different languages. American English deletes /t/ word-finally (Guy 1991, among others), several dialects of Spanish lenite or delete /s/ word-finally (Hochberg 1986, among others), and Indonesian lenites or deletes /k/ word-finally (Soderberg and Olson, 2008). Is it a coincidence that each of the three languages weakens a particular segment word-finally, a segment which is not weakened word-finally by the other two languages? I propose that the distribution of weakening processes is predictable from the relative informativity segments hold in different languages. I show that when the informativity of a particular segment is comparatively low, it attracts weakening processes. Thereby, relative low informativity licenses the actuation (in the Weinreich et al sense) of segment-specific sound-change processes.

Current models of sound change explain the articulatory, perceptual, and grammatical conditions that license sound change, and the mechanisms through which it spreads once actuated (Kiparsky, 1995; Pierrehumbert, 2001; Ohala, 2003, among others). But even if some sound change is phonetically plausible, current models do not predict which language is likely to be affected by which process. Recently several attempts used information theory to account for sound change (Hume, 2008; Wedel et al., 2013, among others). Cohen Priva (2008) showed that word-medial segment deletion rates are affected by segment informativity – the average or expected amount of information a segment holds in a given language. Does relative low informativity license language-specific weakening? I tested this hypothesis within American English using a corpus of spoken American English, and cross-linguistically by comparing the informativity of similar segments in languages with different weakening patterns. Both studies indicate that lower informativity promotes weakening.

In a controlled study I used the Buckeye corpus (Pitt et al., 2007) to predict word-final deletion of all post-vocalic pre-consonantal American English obstruents while controlling for phonological features, rate of speech and word frequency, and neutral word identity as a random effect. Low informativity significantly predicts likelihood of word-final deletion in English (p<0.001). The contextual predictability of segments did not contribute to predicting word-final deletion, providing support to the exceptionless properties of sound change. High frequency words were more likely to be reduced, suggesting that information affects production at more than one level.

In a cross-linguistic study I compared the relative informativity of sounds among three languages in which /t/, /k/ or /s/ weaken word-finally: American English, Spanish and Indonesian. The prediction is that in some language a segment weakens, its informativity would be lower than in languages in which it does not weaken. For American English, words were assumed to have their CMU pronunciation dictionary representation (Weide, R., 2008) and word counts were taken from the Fisher, Switchboard and Buckeye corpora. For Spanish I used the Callhome Spanish Lexicon (Garrett et al., 1996) for both word counts and dictionary representation. Due to the absence of spoken corpora of Indonesian, the informativity of Indonesian was estimated using publicly available texts. Informativity of phonemes was estimated as the expected value of the negative log probability of a segment given every preceding segment in the same word. Indeed, the informativity of /t/ was lowest in American English, the informativity of /s/ was lowest in Spanish, and the informativity of /k/ was lowest in Indonesian, mirroring word-final weakening patterns. The probability of having that pattern emerge by chance is (1/3)^3, with p<0.038. This study therefore provides converging evidence that relative low informativity does lead to the actuation of sound change in specific languages.

Both studies show that when a segment’s informativity in a given language is relatively low, that segment is more likely to weaken than in a language in which its informativity is high. By controlling for phonological factors in the first study, and by comparing identical segments in the second study, I could focus on the role of information in the actuation of sound change. The results suggest that higher information translates to stability, and low information translates to propensity to weaken.

References