Perceptual Grounding for Long-Distance Agreement

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Much of the phonological literature on harmony processes has taken *strict locality* to be axiomatic (Clements, 1977; Kiparsky, 1981; Archangeli and Pulleyblank, 1994, and many others). Nonetheless, there exist a non-trivial number of harmonic alternations whose outputs are non-adjacent on the surface, and a number of theories — including Agreement by Correspondence (ABC) — have questioned the principle of strict locality, modelling vowel and consonant harmony processes using explicitly non-local representations (Rose and Walker, 2004; Gallagher, 2010; Kimper, 2011, and others). One of the arguments in favour of strict locality is that it is phonetically grounded; if harmony is motivated by the resulting reduction in articulatory gestures, this motivation will only apply among articulatorily adjacent segments. I argue that adopting explicitly non-local representations does not require surrendering phonetic grounding — harmony confers perceptual as well as articulatory advantages, and these obtain both locally and non-locally.

Experiment 1 demonstrates that this is the case. 33 native speakers of North American English listened to trisyllabic nonce words followed by target vowels, and indicated whether the target vowel had been present in the preceding word. Two of the three vowels in each word either agreed or disagreed for colour features; in the local conditions, the two potential targets were adjacent, followed by [a]. In the non-local conditions, [a] intervened between the two potential targets. Figure 1 shows better performance on colour-harmonic items, regardless of locality.

However, non-local agreement is typologically marked — we therefore expect this perceptual advantage to diminish with increasing distance. **Experiment 2** demonstrates that this is the case; 38 native speakers of North American English took part in a similar task to that in the previous experiment. In this case, however, the potential target vowels were either adjacent, separated by a single [a], or separated by two [a] syllables. Figure 2 shows that, while harmony remained perceptually advantageous in all conditions, this advantage was mitigated by distance.

One possible explanation for this effect is *chunking* in working memory (Miller, 1956) — recall capacity is improved if individual items can be stored together in chunks rather than individually. Another possible explanation is auditory priming (Badgaiyan et al., 1999) — the first instance of a particular phonological feature facilitates the recognition of another instance. Both sources of explanation predict a stronger effect locally; chunking, however, predicts a stronger emphasis on *adjacency* than was observed, while priming is more compatible with the gradient temporal effects seen in Experiment 2. Both chunking and priming also make another prediction relevant to ABC: segments which are *more similar* to each other should show a stronger effect. (Results consistent with this prediction were found in both experiments, though they were not designed to directly address this question and confounding factors cannot be ruled out.)

The results of Experiments 1 and 2 lend empirical support to theories of harmony which use explicitly non-local representations, including ABC. The existence of a perceptual advantage for harmony which applies both locally and non-locally suggests that it is possible to eschew strict locality while maintaining phonetic grounding.

References

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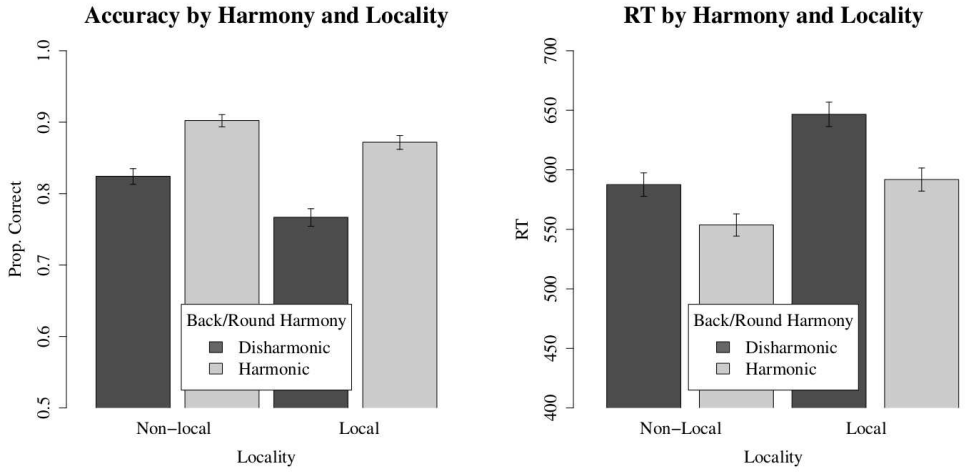

Figure 1: Accuracy: mixed logit model, harmony significant for both local ($p < 0.001$) and non-local ($p < 0.05$) conditions. RT: linear mixed effects model, harmony significant for both local ($p < 0.001$) and non-local ($p < 0.001$) conditions.

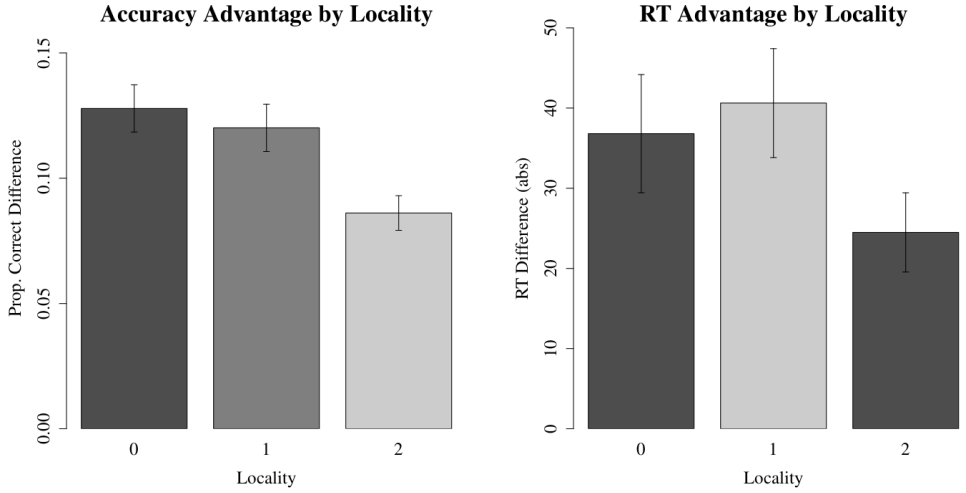

Figure 2: Accuracy: mixed logit model (Helmert), locality not significant at distance 1, significant at distance 2 ($p < 0.001$). RT: linear mixed effects model (Helmert), locality not significant at distance 1, significant at distance 2 ($p < 0.001$).