

Partial Height Harmony as Partial Transparency

Overview. Harmony refers to the spread of some phonological property (vowel height, rounding, nasality, etc.) throughout a domain; transparency refers to a situation in which a segment does not take on the harmonizing property but instead appears to have been skipped over. In this paper, I examine partial height harmony, in which a target vowel approaches the height of a trigger vowel, but does not necessarily take on its exact height specification. I analyze partial height harmony as a type of partial transparency within Smith's (2018) gestural model of harmony. In this model, transparency is the result of the overlap of articulatory gestures specified for antagonistic goal states, resulting in competition for control of the vocal tract.

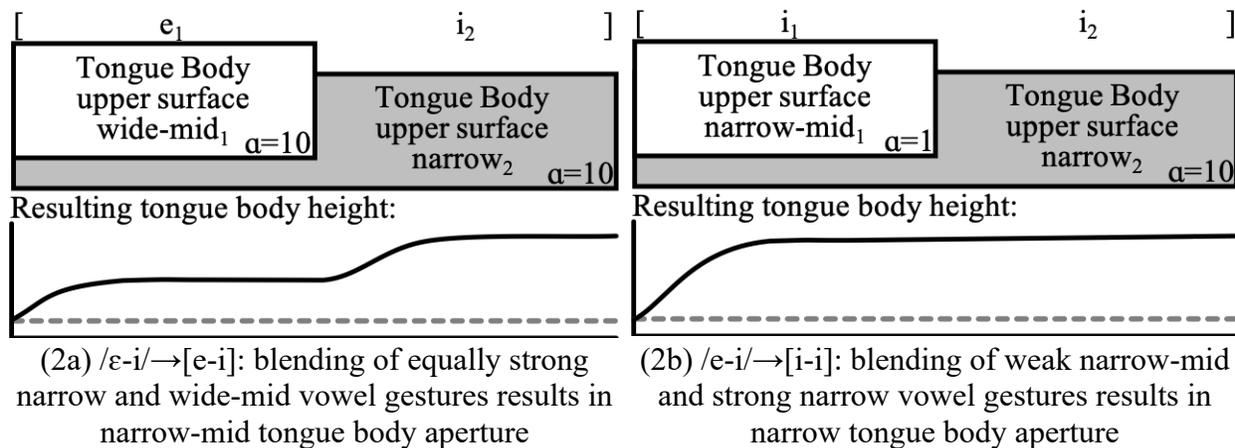
Background. A gesture is a unit of sub-segmental representation that is specified for an articulatory goal to be carried out during its period of activation (Browman & Goldstein 1986). Smith (2018) proposes a model in which harmony is the result of a gesture extending its period of activation, resulting in temporal overlap with the gestures of preceding and/or following segments. Transparency arises when an overlapped gesture's goal articulatory state is directly antagonistic to that of a harmonizing gesture, resulting in intergestural competition. The outcome of this competition to determine which gesture's articulatory goal is met is determined by the overlapped gestures' relative blending strengths (Saltzman & Munhall 1989). In a typical case of full transparency, a strong transparent gesture's articulatory goal is favored over that of a relatively weaker harmonizing gesture, whose effect on the vocal tract is temporarily counteracted during the production of the transparent segment.

One prediction of this theory of transparency via gestural competition is that antagonistic gestures may have intermediate strength values that would render a segment only partially transparent to harmony. This is because gestural strength does not simply specify gestures as either 'strong' or 'weak;' instead, gestural strength is specified on a continuous scale. I claim that this prediction is borne out in cases of partial height harmony.

Partial Height Harmony. I extend Smith's gestural blending analysis of transparency to cases of partial height harmony. In partial height harmony involving vowel raising, a non-high vowel target approaches the height of a high vowel trigger, but does not necessarily surface as a high vowel. This is exemplified by Servigliano Italian metaphony (Nibert 1998; Walker 2011), in which low-mid vowels raise to high-mid vowels (/ɛ/→[e], /ɔ/→[o]) and high-mid vowels raise to high vowels (/e/→[i], /o/→[u]) before a high suffix vowel ([i] or [u]), as in (1e-h).

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|-----|----|-------------------------------|----|-------------------------------|
| (1) | a. | [kréd-o] 'I believe' | e. | [kríd-i] 'you believe' |
| | b. | [fjór-e] 'flower (masc. sg.)' | f. | [fjúr-i] 'flower (masc. pl.)' |
| | c. | [pétten-e] 'comb (masc. sg.)' | g. | [péttin-i] 'comb (masc. pl.)' |
| | d. | [mór-e] 'he dies' | h. | [mór-i] 'you die' |

I analyze this raising pattern as the result of the blending of antagonistic trigger and target vowel gestures specifying different heights of the tongue body. In particular, the blending of the gestures of a low-mid vowel target and a high vowel trigger are viewed as a case of *partial transparency* to height harmony. Vowel height is represented by a gesture that specifies some degree of constriction between the tongue body and the upper surface of the vocal tract. The blending of equally strong tongue body gestures specifying narrow constriction (for high vowels /i/ and /u/) and wide-mid constriction (for underlyingly low-mid vowels /ɛ/ and /ɔ/) results in the production of a vowel whose height is intermediate between the two, as in the gestural score in (2a). This can be compared with the blending of a strong tongue body gesture specifying narrow constriction (for /i/ and /u/) and narrow-mid constriction (for underlyingly high-mid vowels /e/ and



/o/), which results in the production of a high vowel with a narrow constriction, as in the gestural score in (2b). (Gestural scores represent time along x-axis; gestural strength is denoted by α .)

Alternative Analyses. The current analysis of partial height harmony as partial transparency via gestural blending has several advantages over analyses within featural phonology. First, partial height harmony often involves apparent synchronic chain shifts; this is the case in Servigliano Italian metaphony, which produces raising patterns $\varepsilon \rightarrow e \rightarrow i$ and $\circ \rightarrow o \rightarrow u$. One advantage of adopting a gestural analysis of harmony is that cases of partial height harmony need not be analyzed as chain shifts. Instead, blending produces the articulatory effect of vowel raising, but the individual gestures of each vowel are still present and unaltered in the gestural score, as seen in (2) above. Therefore, while an underlying /e/ and an [e] derived by blending are articulatorily the same, their gestural makeups are distinct. This approach avoids the need for additional grammatical architecture, such as constraint conjunction (Kirchner 1996) or comparative markedness (McCarthy 2003), to account for derivationally opaque chain shifts in a constraint-based phonological framework.

Another issue that arises in featural analyses of partial height harmony centers on how to featurally represent a multi-height vowel inventory. When a language contrasts more than two vowel heights, as in Servigliano Italian, a single binary feature such as [\pm high] is not sufficient to distinguish all the different heights from one another, necessitating an appeal to additional features such as [\pm low] and/or [\pm ATR]. Assuming such a set of binary features for height, a single partial height harmony system would involve the spread of two or more different features in a single harmony process. Such an analysis misses a generalization about the harmony process: that it involves a change along a single scale of vowel height. This generalization is captured by the gestural analysis, in which vowel height is represented by a single scale: the degree of constriction between the tongue body and the upper surface of the vocal tract.

References

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