

Comparing positional licensing patterns in HG and OT

Phonological elements are often observed to be limited to specific positions. Such position-limited elements are said to be *licensed* in (or by) those positions. Within violable constraint-based theories such as Harmonic Grammar (HG; Legendre et al. 1990) and Optimality Theory (OT; Prince & Smolensky 2004), proposals accounting for licensing of an element x in a position \mathcal{P} are of two general types.

- (1) **Positional Markedness.** Element x is penalized when in a position other than position \mathcal{P} .
Positional Faithfulness. Element x is penalized when not faithfully preserved in position \mathcal{P} .

There are key differences between the sets of patterns predicted by the two types of constraints in (1); see e.g. Lombardi (2001), Zoll (2004). More recently, Jesney (2016) has demonstrated a difference that depends on whether these constraints are weighted as in HG or ranked as in OT, concerning how two (or more) different licensing positions \mathcal{P}_1 and \mathcal{P}_2 can license in concert.

- (2) **Disjunctive Licensing.** Element x is licensed either in position \mathcal{P}_1 or in position \mathcal{P}_2 .
Conjunctive Licensing. Element x is licensed only where positions \mathcal{P}_1 and \mathcal{P}_2 coincide.

If x is licensed either in \mathcal{P}_1 or in \mathcal{P}_2 , whether or not these positions coincide, then x is *disjunctively licensed*. If on the other hand x is licensed only when \mathcal{P}_1 and \mathcal{P}_2 coincide, then x is *conjunctively licensed*. What Jesney (2016) shows is summarized in (3), where a ‘system’ refers to a set of constraints and a set of candidate sets that the constraints evaluate (Alber et al. 2016). In OT, systems whose only positional constraints are markedness constraints predict conjunctive licensing patterns but not disjunctive licensing patterns (3a), while those with only positional faithfulness constraints predict disjunctive licensing patterns but not conjunctive licensing patterns (3b). In HG, systems (3a) and (3b) predict both types of licensing patterns, as does the system with both types of positional licensing constraints in both OT and HG (3c).

(3)	<i>system</i>	<i>licensing predicted with OT ranking</i>	<i>licensing predicted with HG weighting</i>
a.	positional markedness	conjunctive	conjunctive \cup disjunctive
b.	positional faithfulness	disjunctive	conjunctive \cup disjunctive
c.	positional markedness \cup positional faithfulness	conjunctive \cup disjunctive	conjunctive \cup disjunctive

In this talk, we articulate precisely how the three different systems in (3) make the different typological predictions that they do when the constraints in the system are ranked as in OT, and we explain how the three systems make the *same* typological predictions when the constraints in the system are weighted as in HG. The overall greater expressiveness of the three systems with weighted HG constraints is of course due, as it often is, to the potential for *ganging cumulativity* in HG (Legendre et al. 2006, Jäger & Rosenbach 2006, Pater 2016, Shih 2017), whereby violations of two or more lower-weighted constraints overcome the violations of a single higher-weighted constraint. The key question we address is: how does ganging cumulativity within each of the two systems in (3a,b) add up precisely to the predictions of the third, unioned system in (3c)?

Our main goal is to determine how the typological predictions made by all three systems with weighted HG constraints are the same as those made by system (3c) with ranked OT constraints. We interrogate here with the help of Mai & Baković’s (2020) *equalizer algorithm*, which takes a system for which ranked and weighted constraints make divergent typological predictions and returns a minimally augmented constraint set for that system for which ranking and weighting make the same typological predictions. Consider Jesney’s (2016) example of *h*-licensing in English,¹ with general markedness and faithfulness constraints and the sets of positional markedness and faithfulness constraints in (4) and (5).

- (4) **m.h- $\bar{\text{I}}$** – Assign a violation for every *h* that is not in an initial syllable.
m.h- $\bar{\text{O}}$ – Assign a violation for every *h* that is not in a syllable onset.
- (5) **f.h-I** – Assign a violation for every *h* that is not faithfully preserved in an init. syllable.
f.h-O – Assign a violation for every *h* that is not faithfully preserved in a syllable onset.

As already noted in (3), a system with only the positional constraints in (4) predicts conjunctive licensing (*‘h* is only licensed in an initial syllable onset’), a system with only the constraints (5) predicts disjunctive licensing (*‘h* is licensed in an initial syllable or in a syllable onset’), and a system with both sets of constraints predicts both types of licensing. Applying Mai & Baković’s (2020) equalizer algorithm to either (4) or (5) results in a minimally augmented system with a conjoined constraint:

- (4’) **m.h- $\bar{\text{IO}}$** – Assign a violation for every *h* that is neither in an initial syllable nor in a syllable onset.
(5’) **f.h-IO** – Assign a violation for every *h* that is not faithfully preserved in an initial syllable onset.

m.h- $\bar{\text{IO}}$ (4’) imperfectly mimics the joint behavior of f.h-I and f.h-O (5), assigning violations to ill-placed *h* regardless of whether there is a need for faithfulness to *h* in the initial syllable onset. Similarly, f.h-IO (5’) imperfectly mimics the joint behavior of m.h- $\bar{\text{I}}$ and m.h- $\bar{\text{O}}$ (4), assigning violations to ill-advised unfaithfulness to *h* in initial syllable onsets regardless of whether *h* surfaces in other positions.

This is how a set of positional markedness constraints behaves *almost* exactly like conjunctions of the members of a corresponding set of positional faithfulness constraints and vice-versa, mimicking most but not all of the effects of applying the equalizer algorithm to a system with only one or the other set of licensing constraints — and hence also the effects of ganging cumulativity.

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¹For which there is a third licensing position, not discussed here.