Formally mapping the typologies of interacting ABCD systems

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The theory of ***surface correspondence*** has been the focus of much recent work (e.g. Shih & Inkelas 2014, Faytak 2014, Akinlabi & Iacoponi 2015, etc.). Most of this work on '**ABCD**' falls along two avenues: analyzing consonant harmony as ***A****greement* ***B****y* ***C****orrespondence* (Rose & Walker 2004, Hansson 2010, etc.), and using the same mechanism to handle ***D****issimilation* (Walker 2000, Bennett 2013). Using recent advances in the understanding of formal OT typologies (Alber, et al. 2015), this talk analyzes the typologies of three ABCD systems, as a step towards a generalized solution to how any combination of ABCD systems can interact.

Surface correspondence was initially proposed to explain long-distance consonant agreement patterns (Walker 2000, Rose & Walker 2004, Hansson 2010). The guiding intuition is that non-local consonants agree because they are similar. This intuition is formalized as a correspondence relation over surface consonants. Consonants that are similar are required (by a family of CORR constraints) to correspond. Further restrictions are imposed on segments that correspond; for instance, by CC·IDENT(F) constraints that require corresponding consonants to agree with each other for [±F]. The combined effect is that consonants which have the same value on one feature are spurred to agree on another feature. The same constraints also produce dissimilation, because segments can satisfy CORR constraints by losing their essential similarity rather than undergo assimilation (Bennett 2013).

The correspondence relation at the core of surface correspondence theory has been a point of debate in some recent literature. Bennett (2013) explicitly argues for a single relation that is transitive and symmetric, in contrast to non-symmetric or non-transitive formulations used in previous analyses (e.g. Walker 2000, Hansson 2010). Also, subsequent proposals by Hansson (2014) and Walker (2015) argue that correspondence-based patterns must be indexed to the particular feature driving the correspondence – necessitating multiple SCorr relations.

The main locus of difference between various formulations of correspondence is their predictions about how ABCD patterns can interact. For example, Walker (2015) argues for multiple feature-indexed correspondence relations, on the grounds that Pasiego vowel harmony shows overlap between two harmonies in a way that isn't expected from a single-relation definition of correspondence. Previous arguments of this sort have tended to proceed in piecemeal fashion, by finding various empirical cases of interest and arguing that they are not predicted by other competing models of correspondence.

This talk approaches the same question from the other end: before comparing different formulations of the correspondence relation, we first must determine *what each one's typological predictions actually are*. We use OTWorkplace (Prince et al. 2015) to calculate and analyze the typologies of three constraint systems: **'2rt-vlessdiss'**, **'2rt-sibharm'**, and **'2rt-2f'**.

These three ABCD systems are defined with a common GEN component – a GEN which is simple enough for the candidate space to be considered exhaustively. Inputs and outputs consist of CV.CV forms, containing two Cs and a syllable boundary in between. The consonants are drawn from the set {t d s z}, allowing free combinability of two features – [±voice] and [±sibilant]. The syllable boundary approximates the effect of a domain boundary. The set of inputs consists of all possible combinations of two segments (n=16); the set of potential outputs consists of all such combinations, plus all possible surface correspondence structures for each.

The CON components of the three systems are defined in (1). Systems 2rt-vlessdiss and 2rt-sibharm are analogs of real-world assimilation and patterns: voiceless dissimilation in Kinyarwanda (Bennett 2013), and voicing harmony between sibilants in Berber (Hansson 2010). The former contains CORR·[-voice] and a CC·EDGE constraint: a pair that can produce voiceless dissimilation across the edge of a syllable (ta.ta→[da.ta]). The latter has CORR·[+sibilant] and CC·IDENT(voice): a pair of constraints that can favor voicing harmony among [+sibilant] consonants (sa.za→[za.za]). The third system, 2rt2f, combines the other two: it tests what

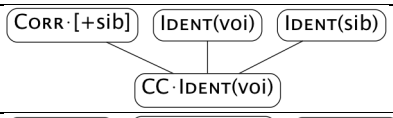
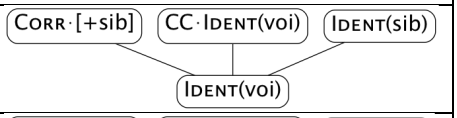
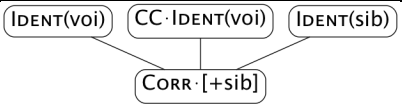
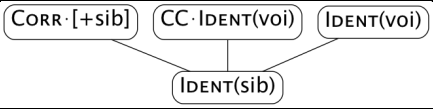
novel types of interactions emerge from the interaction of the constraints used in the analysis of two distinct correspondence-driven patterns.

(1) CON of the three ABCD systems considered

	2rt-vlessdiss	*2rt-sibharm*	*2rt2f*
SCorr constraints (markedness)	CORR·[–voice], CC·EDGE-(σ)	CORR·[+sibilant], CC·IDENT(voice)	CORR·[–voice], CORR·[+sibilant] CC·EDGE-(σ), CC·IDENT(voice)
Input-output faithfulness constraints	IDENT(–voice)	IDENT(voice), IDENT(sibilant)	IDENT(voice), IDENT(sibilant)
Size of typology	3 lgs.	4 lgs.	16 lgs.

The typologies of systems 2rt-vlessdiss and 2rt-sibharm offer an extremely small range of choices. For example: system 2rt-sibharm has 4 constraints, and therefore 4!=24 total orders, yet these fall into only four sets producing distinct combinations of input-output mappings. These 4 languages can be characterized as a single 4-way choice, illustrated in (2).

(2) Typology of 2rt-sibharm illustrated

	Sibilants are Faithful	Unfaithful
Correspondence		
Non-correspondence		

Though these grammars share some extensional characteristics (e.g. faithfulness, or correspondence), there is no common structure between any of the rankings: none share any ERCs, because the choice of pattern is determined solely by the constraint on the bottom. ***This essential 4-way choice is a basic feature of ABCD systems in general.*** (The 2rt-vlessdiss typology make the same distinctions, modulo a gap straightforwardly due to GEN).

The more complex typology of 2rt2f contains both of its simpler progenitors. Inputs with two sibilants show precisely the same range of choices in 2rt2f as they do in 2rt-sibharm, and inputs with two voiceless Cs show exactly the same 3-way choice as in 2rt-vlessdiss. This generalizes to an important conclusion: ***if ABCD constraint systems freely interact, the distinctions from the typologies of each sub-system recur in the combined typology.***

Free combinability of the properties from 2rt-vlessdiss and 2rt-sibharm explain most of the patterns in the typology of 2rt2f. ***The novel interactions that emerge are distinguished only by differences in where the same basic 4-way choice can be made.*** For instance, CC·EDGE can spur dissimilation of sibilants as well as voiceless Cs. So, while dissimilation in 2rt-sibharm can arise only between disagreeing sibilants (i.e. just where correspondence would *violate* CC·IDENT), 2rt2f allows a further choice: sibilant dissimilation can apply just to disharmonic sibilants, or to any sibilants in different syllables. This interaction is formalized as the emergence of an additional intensional typological ***property*** (in the sense of Alber et al. 2015), whose values reflect a choice of which constraint drives the dissimilation.

Selected References

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