Laryngeal (dis)harmony, perception and the Dispersion Theory of Contrast

In this talk, I extend the Dispersion Theory of Contrast (Flemming 1995, 2004, 2006) to cases of harmony and disharmony in laryngeal features between stops in a root. The central argument is that the driving force behind the three patterns of laryngeal (dis)harmony established in the literature is a restriction on contrasts between forms in a language, not restrictions on isolated forms or structures. Combinations of laryngeal features are only marked with respect to the other combinations with which they contrast.

**The phenomena:** Previous work on laryngeal harmony and disharmony has established three types of restrictions on ejectives, aspirates and implosives. MacEachern (1999) surveys what I call dissimilatory restrictions, languages where stops in a root must disagree in laryngeal features (1). Assimilatory languages, addressed by both Hansson (2001) and Rose and Walker (2004), show exactly the opposite pattern of dissimilatory languages: stops in a root must agree in laryngeal features (2). The third type of restriction, discussed in MacEachern (1999) as well as Hansson (2001) and Rose and Walker (2004), combines assimilation and dissimilation. Pairs of otherwise identical stops must agree in laryngeal features (3a). All other pairs of stops must disagree (3b). I refer to this type of restriction as mixed.

**The analysis:** I argue that the unifying factor between assimilatory, dissimilatory and mixed restrictions is neutralization of the contrast between forms with one and two instances of a laryngeal feature (* k'-p' v k'-p). While assimilatory and dissimilatory restrictions are compatible with other analyses, mixed restrictions provide striking support for a unified, contrast neutralization approach. At first glance, mixed restriction languages look like dissimilatory languages with an identity exception: all pairs of ejectives (or aspirates or implosives) are ungrammatical except for identical pairs. Upon closer examination, however, the difference between dissimilatory and mixed restrictions is more principled. Languages that allow identical consonants with the same laryngeal feature to cooccur ( √ k'-k') systematically disallow pairs of consonants that contrast only for that feature ( * k'-k). Similarly, languages that don’t allow identical consonants ( * k'-k) systematically do allow pairs of stops that contrast only in a laryngeal feature ( √ k'-k). The trading relation in (4) holds for all ten languages in MacEachern’s 1999 survey. Missing from the typology is a language that shows dissimilation in laryngeal features between non-identical consonants (i.e. has a laryngeal cooccurrence restriction), but either disallows (5a) or allows (5b) both identical consonants and consonants contrasting only in a laryngeal feature.

The hypothesis, (6), is that a 1 v 2 ( k'-p' v k'-p) contrast in laryngeal features is perceptually weaker than either a 1 v 0 ( k'-p v k-p) or 2 v 0 ( k'-p' v k-p) contrast. If the hypothesis is correct, subjects should perform better on a discrimination task when presented with a pair of words exhibiting a 1 v 0 or 2 v 0 contrast than with a pair of words exhibiting a 1 v 2 contrast. Pilot results from a study of native English speakers listening to CVCV stimuli spliced from recordings of Quechua ejectives support the hypothesis.

The analysis is cast within the Dispersion Theory of Contrast, which formalizes the idea that less perceptible contrasts are more marked, and thus more prone to neutralization than stronger contrasts. All three types of languages neutralize the 1 v 2 contrast yet preserve either the 1 v 0 or 2 v 0 contrast.

Neutralization of the 1 v 2 contrast is driven by the systemic constraint LARDIST (7), which penalizes sets of forms that contrast one and two instances of a laryngeal feature. Preservation of the 1 v 0 or 2 v 0 contrast is accomplished by the systemic, anti-neutralization constraint *MERGE (8) (Padgett 2003). *MERGE ranks below LARDIST but above the contrast independent markedness constraints which determine the outcome of neutralization, like *ejective. The tableau in (9) gives a sample analysis of dissimilatory restrictions, and shows how the systemic constraints in (7) and (8) are evaluated.

**Improvement on previous analyses:** The analysis improves on previous work (MacEachern 1999; Hansson 2001; Rose and Walker 2004) in providing a unified and restrictive account of three types of phenomena established in the literature. MacEachern analyzes dissimilatory and mixed restrictions as OCP effects, while Rose and Walker and Hansson account for assimilatory restrictions as consonant harmony. Neither analysis, however, can account for all three types of restrictions, though there are important similarities between the three phenomena. Furthermore, no analysis proposed thus far can account for the trading relation in (4), thus ruling out (as yet) unattested languages like those in (5). Unlike the current analysis, previous proposals are not adequately restrictive.
(1) Dissimilatory restrictions: Shuswap (MacEachern 1999)  k’-p *k’-p’

s-k’lep ‘coyote’ *s-k’lep’

(2) Assimilatory restrictions: Chaha (Rose and Walker 2004) *k’-p  k’-p’

ji-t’ak’ir ‘he hides’ *ji-t’ak’ir

(3) Mixed restrictions: Chol (Coon and Gallagher 2007)
   a. otherwise identical consonants  k’-k’ *k’-k
      k’ok ‘health’ *k’ok
   b. all other consonants  k’-p *k’-p’
      tj’ip ‘to open’ *tj’ip’

(4) a.  k’-k’ ← *k’-k
   b.  *k’-k ← k’-k

(5) a.  *k’-p’  k’-p  *k’-k  *k’-k
   b.  *k’-p’  k’-p  k’-k’  k’-k

(6) Hypothesis: The contrast between roots with 1 v 2 ejectives is weaker than the contrast between roots with 1 v 0 or 2 v 0 ejectives, e.g. k’api-k’api are less distinguishable than k’api-kapi.

(7) LARYNGEAL DISTANCE Forms with 1 and 2 instances of a laryngeal feature do not contrast.

(8) *MERGE No output word has multiple input correspondents.

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References
Coon, Jessica and Gillian Gallagher. 2007. Similarity and correspondence in Chol Mayan. Talk presented at NELS 38, Ottawa, ON.
Flemming, Edward. 2006. The role of distinctiveness constraints in phonology. Ms. MIT.