Save Harmony! – Rebellious roots troubling GP

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There is general consensus on the existence of external (suffix) harmony in Turkish (henceforth, EVH), a phonological process where suffix vowels agree with the last stem vowel in terms of frontness (high vowels also agree in rounding, but rounding harmony is irrelevant to the current analysis). However, a total number of 317 roots in Turkish seem to trigger *disharmonic suffixation*. The last stem vowel in such rebellious roots seems to be back, but any suffix attached is realized with a front vowel. Some examples are saat 'hour' > saat-i 'hour-Acc', gol 'goal' > gol-ü 'goal-Acc', dikkat 'care' > dikkat-siz 'care-less'. (The reverse situation never happens in Modern Turkish, i.e. no root with front vowels is followed by a suffix with back vowels, except in a few non-alternating suffixes.) This presentation aims to show that the behavior of such roots is predictable, once standard -and generally unquestioned- assumptions on the phonological system and especially on the vowel inventory of Turkish are abandoned.

In a Government Phonology (GP) analysis (Charette & Göksel 1996), Turkish suffixes are assumed to be of two kinds: those that are underlyingly empty ({ }_) and those that are underlyingly low, ({ }A). EVH is then explained by spreading of the I element (and also of U in the case of rounding harmony) from the stem onto the suffix vowel. However, in rebellious roots, an additional I element seems to emerge in the suffix vowel unexpectedly, i.e. not spreading from the preceding stem vowel. This seems to pose a problem for any theory that wishes phonological processes to be both non-arbitrary and exceptionless, such as GP. Most accounts prior to GP have proposed that the exceptional behavior of rebellious roots is due to their final -palatalized- consonant, which harmonises with the vowel. A detailed analysis of such roots, however, reveals that it is the vowels of such roots which makes them rebels.

Turkish is traditionally assumed to have eight vowel phonemes, which was recently challenged by Pöchtrager (2010). The analyses of spectrograms of rebellious roots support this challenge. The last vowels in these roots are spelled as a, o, or u in the orthography, and are assumed to correspond to the set of back vowels in Turkish phonology, leaving ı aside. Sound analyses, however, prove this assumption wrong. Spectrograms of pairs like kat 'layer', which regularly receives back vowel suffixes, and the rebellious root dikkat 'care' show that the final vowels in those words are different, while the final consonants are the same, hence refuting the main assumption forming the basis of previous analyses. Similar analyses with samples containing orthographic o (kol-u 'arm+Acc' vs. gol-ü 'goal+Acc') and u (kul-u 'servant+Acc' vs. usul-ü 'manner+Acc') show that Turkish has at least three more vowels than the standardly assumed eight, by including the fronted versions of a, o, and u, which contain an I element yet are different from the truly front vowels e, ö, and ü. (The final l in rebellious roots is palatal, which regularly occurs in the environment of front vowels.)

Charette & Göksel (1996) proposed the licensing constraints (LCs) active in Turkish to preclude certain combinations of elements: 1) Operators must be licensed. 2) A cannot license operators. 3) U must be head. Their analysis could account for the eight vowels in Turkish: a, e, ı, i, o, ö, u and ü. In order to allow three more, a modification of the LCs is required. It will be argued that this can be done by combining the last two LCs into one: A cannot license U.

With this revision, a total number of eleven vowels can be accounted for in Turkish, which is the number necessary to render the rebellious roots as obedient to the rules of EVH. The challenging status of Turkish Vowel Harmony for Government Phonology (GP) is, however, not yet overcome. According to GP, a phonological process must follow the two requirements: It must be non-arbitrary and it must be exceptionless. Hence, the challenge continues for GP due to the consequence derivable from the following factual premises:

1) Harmony, in general, is considered to be a non-arbitrary operation in that a clear connection can be established between the process and the environment it occurs in. In other words, harmony is expressible by spreading of elements between adjacent positions.
2) As is shown above, the so-called *External* Vowel Harmony in Turkish is exceptionless, once we agree that there are more vowels in Turkish than the traditionally assumed eight.
3) Internal Vowel Harmony (IVH), or Root Harmony, is assumed to be governed by the same principles as EVH, but is quite different from it in that there seem to be plenty of disharmonic roots in Turkish.

It is incompatible with GP to claim that EVH is phonological while IVH is not, if we want to hold on to the central assumption called *Minimality Hypothesis* (MP) requiring phonological processes to apply *whenever* their conditions are met (Kaye, 1992). Furthermore, although it is a fact that the overwhelming majority of disharmonic roots and rebellious roots are loanwords, MP does not allow for a phonological phenomenon to apply to native words only, without having any affect upon loans. Hence there seem to be two possible options without giving up the two central principles (non-arbitrariness and MP) lying at the heart of GP. Either we can give up on harmony altogether, even though it is non-arbitrary and regularly applies in suffixes; or we may try to show that the so-called exceptions to IVH can be handled in a similar fashion to the rebellious roots seemingly resisting EVH. This option thus requires an in-depth analysis of the quality of vowels found in words that are considered to be exceptions to harmony. Thus the next step towards a comprehensive account of Turkish Vowel Harmony will be to investigate whether the three fronted back vowels found in rebellious roots can save internal harmony from being ruled out as non-phonological by Government Phonologists.

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