Testing variability effects in Hungarian vowel harmony

Ágnes Benkő[1 4] Fanni Patay[2] Ágnes Lukács[3] Katalin Mády[1] Péter Rebrus[1 2] Miklós Törkenczy[1 2 4]

[1] Research Institute for Linguistics, Hungarian Academy of Sciences (MTA)
[2] Theoretical Linguistics Programme, Eötvös Loránd University, Budapest (ELTE–MTA)
[3] Department of Cognitive Science, Budapest University of Technology and Economics (BME)
[4] Department of English Linguistics, Eötvös Loránd University, Budapest (ELTE)

In Hungarian backness harmony several effects occur which modify the basic pattern of transparency. While the neutral vowels i and iː are totally transparent ([Bi]**B**, e.g. forint-n**ɑ**k), other neutral-like vowels are variably transparent: [Be]**B**/**F** (e.g. ɑrzeːn-n**ɑ**k/n**ɛ**k) and [Bɛ]**F**/**B** (e.g. hotɛl-n**ɛ**k/n**ɑ**k). This is called the *Height Effect* by Hayes et al. (2006, 2009). An additional effect obtains when two neutral vowels follow the back vowel [BNN]: in this case either variable transparency or non-transparency occurs: e.g. [Bii]**B**/**F** (ɑspirin-n**ɑ**k/n**ɛ**k) or [Biɛ]**F** (sɑnitɛr-n**ɛ**k). This is called the *Count Effect* by Hayes et al. (2006, 2009).

It is not sufficiently explored what the *combined effect* of the Count and the Height Effect is for those stems that end in a back vowel followed by two neutral vowels (BNN-stems). Rebrus and Törkenczy (2015, 2016) reformulate these two effects in terms of a measure of variability: the F-ratio (the ratio of front-suffixed forms to all harmonically suffixed forms) increases (i.e. the transparency decreases) between the relevant forms as defined by the Height and the Count Effects. The transparency of [Bi] stems is greater than the transparency of [Be] stems, and the same holds between [Be] and [Bɛ] stems, too; with F-ratios: [Bi]<[Be]<[Bɛ]. For the Count Effect this means that if either neutral vowel is fixed while the other varies, transparency decreases in accordance with the Height Effect: e.g. [Bi]<[Bie] (fixed N_1) and e.g. [Bɛ]<[Beɛ] (fixed N_2). For BNN-stems the *Cumulativity Effect* holds, according to which the Height Effect applies to the positions of the first and the second neutral vowel (N_1 and N_2 in BN_1N_2): e.g. [Bii]≤[Bie]≤[Biɛ]≤[Beɛ]≤[Bɛɛ] (a non-strict relation is required here). The order of the two neutral vowels is a further factor: the *Locality Effect* states that given two neutral vowels in different orders in a [BN_1N_2] stem, transparency decreases in accordance with the Height Effect applying to N_2: e.g. [Bei]≤[Bie].

Although a corpus study has shown these effects with some remarkable exceptions (Rebrus & Törkenczy 2016), the empirical testing of these variability effects in corpora is problematic because of data sparseness: these classes represent stems whose harmonically suffixed forms can be extremely rare. This is the main motivation for psycholinguistic testing, i.e. for collecting information about the variants from native speakers directly. We want to find answers to the following questions: in which case(s) is (i) the Height Effect, (ii) the Count Effect, (iii) the Cumulativity Effect and (iv) the Locality Effect satisfied or violated? Furthermore: (v) are the stem classes homogeneous in their harmonic behaviour: do consonant-final and vowel-final stems behave in the same way?

In the experiment we use real words (and plan to run wug tests at a later stage). We set up 14 classes of stems representing the relevant groups. For BN-stems there are 2 bisyllabic stem classes [Be] and [Bɛ] (we do not test class [Bi] because it shows no variability). There are 2 additional trisyllabic stem classes for each final BN string: [BBe], [NBe] and [BBɛ], [NBɛ]. For BNN-stems each neutral vowel quality in each position is represented (except for [Bee], which is practically empty): [Bii], [Bei], [Bie], [Bɛi], [Biɛ], [Bɛe], [Beɛ], [Bɛɛ]. The number of stems in each class roughly corresponds to the real size of the class (all the stems in the class) and in each one we have a balanced sample, e.g. we include both consonant-final and (different) vowel-final stems in each class where relevant. See the simplified table of comparisons below (those cells are shadowed where no restrictions).

	Be	Bɛ	Bii	Bei	Bie	Bɛi	Biɛ	Bɛe	Beɛ	Bɛɛ
Bi=0	**<**	(**<**)	<	<	<	<	<	(<)	(<)	(<)
Be	≈	**<**		<	<	(<)	(<)	<	<	(<)
Bɛ		≈				<	<	<	<	<
Bii			≈	≤	≤	≤	≤	(≤)	(≤)	(≤)
Bei				≈	**≤**	≤		(≤)	≤	(≤)
Bie					≈		≤	≤	(≤)	(≤)
Bɛi						≈	**≤**	≤		≤
Biɛ							≈		≤	≤
Bɛe								≈	**≤**	≤
Beɛ									≈	≤
Bɛɛ										≈

Notations: **<** Height Effect, < Count Effect, (<) corollary of the previous two, ≤ Cumulativity, (≤) transitive corollary of Cumulativity, **≤** Locality, ≈ internal homogeneity of the group,

Data will be collected from adult participants in an elicited production task disguised in the form of sentence completion. Each target word+suffix combination will be presented acoustically, as part of a digitally prerecorded sentence. The target inflections in each sentence will be masked by a carefully inserted cough that prevents the participant from hearing the inflection, but not the stem or the remaining portions of the sentence, as illustrated below:

Valamiért sosem voltam híve az aszpirin~~nak/nek~~.
'For some reason I have never been devoted to aspirin-~~DAT~~.'

The audible parts of the sentence make it clear which inflection is missing, but provide no cues to its frontness. After hearing the sentence, participants will be asked to complete the written form of the sentence with the missing information that they heard (with the target inflection). The dependent variable is the frontness of the inflection the participants produce. In this design, participants are usually unaware that the inflections are missing, which allows us to examine the differences in variability in production without relying on metalinguistic awareness and conscious decision about the front/back variants. Crucially, it also allows us to collect data for stem+suffix combinations that are rarely or never attested in the corpus, thus providing new sets of data for systematically testing the above hypotheses.

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