

TWO PATHS – ONE GOAL: VOWEL HARMONY IN THE ACQUISITION OF HEBREW

Introduction: I discuss the role of universals in acquisition as seen in the production of harmonic forms. I show that vowel harmony, unsupported by native Hebrew grammar, nevertheless plays a role during acquisition. While children acquiring a language all reach the same target language, the harmony paths they follow, resulting from different initial rankings of the same constraints, may differ. The arguments presented are based on corpus data, and organised according to the developmental periods laid out in Adam and Bat-El (2008), which reflect the size of the child's acquired lexicon as an indicator of the developmental stage, rather than the child's age. I conclude with a formal model within Optimality Theory (OT; Prince and Smolensky 1993/2004).

The Data: All harmonic (=identical vowels) disyllabic productions of two children, SR and RM, were analysed from the onset of speech until the end of the 8th period (a lexicon of ~350 words). After this period, the presence of harmony in both children's productions was the same as that of the ambient language (Hebrew). Harmonic productions were compared to the inputs (=adult forms).

Data Description: Data analysis exposes several issues. Although both SR and RM reach the same target language, in which ~20% of the disyllabic forms in the lexicon are harmonic, the paths they follow are different. SR's harmonic forms display significant selectivity (Ben-David 2001:342, Lustigman 2007), as SR attempts harmonic input forms over 60% of the time during the first stage. This selectivity fades as SR approaches the target language. However, alongside the drop in selectivity, the percentage of disharmonic forms which undergo harmony gradually increases, peaking during the 4th period. RM, on the other hand, displays no selectivity whatsoever regarding harmonic forms. Similarly to SR, the percentage of RM's disharmonic forms undergoing harmony increases, peaking during the 4th period. This peak drops for both children to 2-3% by the 8th period. The primary difference between SR and RM is the patterning of the harmony, their harmony grammar, in the disharmonic forms which undergo harmony. The vowel harmony observed is shown to interact with three factors: **stress** (Revithiadou et al. 2006), **directionality** (Kiparsky 1997, Zoll 1998), and **vowel quality** (Cohen 2011).

Directionality plays a role for both RM and SR, both preferring the anchor on the right side, a preference well supported in the literature (Smith 1973, Ben-David 2001, Adam 2002 inter alia).

Stress has a crucial effect on RM's production of harmonic forms. From the 3rd period onwards, stressed anchors were preferred, gradually rising and peaking during the 6th period, after which the language specific patterns (i.e. no harmony) began to emerge. For SR, on the other hand, there appears to be no obvious interaction between harmony and stress.

Vowel quality seems to crucially influence SR's productions, displaying a clear preference for *a* as anchor, and *o* as target. For RM, however, quality seems to have no effect on anchor selection. Closer observation of RM's data, however, shows that segmental considerations *do* play a role. In the event of a clash between the preference for stressed anchors and the preference for righthand anchors (e.g. in forms with penultimate stress), the anchor is selected according to segmental considerations, with *a* being preferred.

To sum up, SR shows a harmony pattern determined primarily by segmental considerations, the quality of the anchors and the targets. RM, on the other hand, shows a harmony pattern focusing on prosodic considerations (stress vs. unstressed syllables).

The Analysis: The differences between the grammars of SR and RM can be accounted for within an OT framework by different rankings of the markedness and faithfulness constraints controlling the production of harmonic forms. For both children, the constraints setting up the harmonic domain, "requiring" productions to be harmonic, are initially ranked above the constraints requiring input-output identity (faithfulness), otherwise, there would be no harmony. This changes during acquisition (re-ranking) as the faithfulness constraints end up ranked above the constraints requiring harmony, resulting in Hebrew, a non-harmony language. Additional constraints account for the

differences between the children: (a) IDENTF(STRV) – stressed vowels are faithful to their underlying features, (b) MARKEDNESS - $*o \gg *e \gg *i \gg *u \gg *a$, a constraint violated by the selection of the more marked (between two) vowel, and (c) ALIGNR (when ranked above ALIGNL) – harmony domains cannot spread rightwards.

For SR, MARKEDNESS outranks the other two constraints. However, there are cases in which MARKEDNESS and ALIGNR clash and in which ALIGNR wins. In all these cases, MARKEDNESS also clashes with IDENTF(STRV). This suggests that the combined effect of ALIGNR and IDENTF(STRV) may be greater than that of MARKEDNESS. MARKEDNESS can only be violated by the winning candidate only if *both* stress *and* directionality are satisfied. This could be achieved formally via two different mechanisms, constraint weighting (Pater 2009, Smolensky and Legendre 2006) or constraint conjunction (Kirchner 1996, Moreton and Smolensky 2002). Without advocating either approach, I demonstrate this interaction via constraint conjunction:

bakbúk	ALIGNR&IDENTF(STRV)	MARKEDNESS(*u>>*a)	ALIGNR	IDENTF(STRV)
☞ bubúk		*		
babák	*!		*	*

For RM, there is a clear preference for preserving stressed vowels rather than satisfying MARKEDNESS, accounted for by ranking IDENTF(STRV) above MARKEDNESS. Therefore, RM's constraint ranking differs from SR's. For RM, ALIGNR and IDENTF(STRV) outrank MARKEDNESS, however, the combined effect of MARKEDNESS with either of the other two constraints outweighs the effect of any single constraint:

pérax	ALIGNR&MARKEDNESS(*e>>*a)	IDENTF(STRV)	ALIGNR	MARKEDNESS(*e>>*a)
☞ háwa		*		
héwe	*!		*	*

Conclusion: Vowel harmony, unsupported by the native grammar, is a reflection of a universal principle preferring harmonic forms. During acquisition, children appeal to such universal principles, although the precise initial rankings of the various constraints may vary, resulting in various paths adopted by children en route to the target language.

Selected references

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