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The role of phonology in Vata adjectival agreement

1. Introduction: In *realizational* theories of morphology, different opinions exist on the relationship between phonology and Vocabulary Insertion. On the one hand there are *separationist* theories like Distributed Morphology (Halle and Marantz 1993), which assume that Vocabulary Insertion applies independently from phonology. These theories predict that the properties of a language's phonology never play a role when vocabulary items (VIs) are inserted. The opposite view is held by *integrational* theories as for instance proposed in Wolf (2008). These theories assume that the general phonology of a language can influence Vocabulary Insertion.

Based on adjectival agreement in the language Vata, I propose an integrational model which assumes that Vocabulary Insertion applies in an Optimality-theoretic (Prince and Smolensky 2004) phonology, where regular phonological constraints are active. I propose that the phonology consists of two levels: one level where VIs are inserted and one level for regular phonology.

2. A phonologically determined agreement mismatch: Adjectival agreement in Vata depends on the number of the noun, in that there are different agreement classes for singular and plural nouns. Plural nouns fall in two agreement classes. Nouns in class A trigger the agreement marker [ɪ] on adjectives.

(1) a. *fil-i* *zal-**ɪ*** b. *ɓl-a* *zal-**ɪ***
rat.A-PL red-AGR:A.PL buffalo red-AGR:A.PL

Class B nouns trigger the agreement marker *-wa* on the adjective.

(2) a. *dɔlj-a* *zal-**wa*** b. *pɛli-ŋwa* *zal-**wa***
mouse.B-PL red-AGR:B.PL priest.B-PL red-AGR:B.PL

However, when adjectives with the stem-vowel [ɔ] like *pɔp* 'white' or *wɔt* 'cold' agree with class B nouns, they take the class-A agreement marker [ɪ] under agreement with class B nouns as shown in (3).

(3) *dɔlj-a* *zal-wa* *pɔp-**ɪ*** *wɔt-**ɪ***
mouse.**B**-PL red-AGR:B.PL white-AGR:**A**.PL cold- AGR:**A**.PL

The stem vowel [ɔ] thus seems to cause an agreement mismatch: the adjective takes **A**-agreement with **B**-nouns.

3. Against a syntactic analysis: Agreement is treated as a syntactic phenomenon in generative syntax and a syntactic analysis would be to assume that the adjective's phonology influences syntactic computation in so far that the presence of the stem-vowel [ɔ] triggers class-A agreement features in the context of class-B nouns. There would thus be a mismatch in syntactic features. This assumption goes against the observation that segmental information in general does not play a role under syntactic computation, which is in line with the claim that syntactic computation is never determined by phonological information, as stated in the Principle of Phonology-Free Syntax (PPFS) (Zwicky & Pullum 1986: 71). As shown in the following section, a realizational model on the other hand can account for such an agreement mismatch without violating the PPFS.

4. Analysis: I propose a realizational model in which vocabulary insertion is determined within an optimality theoretic subcomponent of phonology. I propose two levels for the phonological component: a *Morphophonological Level,* which is the level of Vocabulary Insertion and a *Phonological Level*, where regular phonological processes apply (vowel-harmony, assimilation, etc). The Morphophonological Level provides the input to the Phonological Level. Both levels are phonological in the sense that they feature regular phonological constraints. The assumed VI for A-agreement is given in (4a). The VI for regular B-agreement in (4b).

(4) a. [AGR:PL ⇔ ɪ] b. [AGR:B.PL ⇔ wa]

The Morphophonological Level takes an abstract morphosyntactic input as in (5a, 6a) and maps it to a string of VI as in (5b, 6b). At this level, GEN can only generate candidates consisting of a string of VIs as the outputs (5b, 6b). The restriction of GEN to the insertion of VIs is crucial, as it could otherwise create Vocabulary Items by inserting VIs and change their phonological content within one evaluation. EVAL selects the most optimal candidate from the set of candidates using both general phonological constraints and faithfulness constraints on feature realization.

(5) A-agreement: a. Input: √red-AGR:A.PL → b. Output: [√red ⇔ zal]-[AGR:PL ⇔ ɪ]

(6) B-agreement: a. Input: √red-AGR:B.PL → b. Output: [√red ⇔ zal]-[AGR:B,PL ⇔ wa]

When an adjective contains the stem-vowel [ɔ], however, B-agreement is realized by the VI in (4a). The mismatch as in (3) is thus not created in the syntax but at Vocabulary Insertion as shown in (7).

(7) Agreement mismatch: a. Input: √white-AGR:**B**.PL → b. Output: [√white ⇔ pɔp]-[**AGR:PL ⇔ ɪ**]

I adopt the concept of morphological faithfulness proposed in Wolf (2008): Constraints of the type Faith-M(F) demand that the features in the output of morphosyntax are realized by VIs. This type of

faithfulness is evaluated based on correspondence relations (McCarthy & Prince 1995) between features in the morphosyntax and features in VIs. Two types of faithfulness constraints are assumed: MAX-M(F) and DEP-M(F). MAX-M(F) demands that if a syntactic feature is contained in the input, it must be realized by a VI in the output. Realization of a feature is here understood as correspondence of the relevant input feature to an identical feature in a VI that is realized in the output.

(8) MAX-M(F) (Wolf 2008: 26): For every instance φ of the feature F at the morpheme level, assign a violation-mark if there is not an instance φ′ of F at the morph level, such that φℜφ′.

DEP-M(F) demands that a VI should not be specified for a feature which is not contained in the input:

(9) DEP-M(F) (Wolf 2008: 26): For every instance φ′ of the feature F at the morph level, assign a violation-mark if there is not an instance φ of F at the morpheme level, such that φℜφ′.

The tableau in (10) illustrates regular class-B agreement as in (2).

(10)

input: √red-AGR:B.PL	MAX-M(F)	DEP-M(F)
a. *[√red ⇔ zal]-[AGR:PL ⇔ ɪ]*	*!	
b. ☞ *[√red ⇔ zal]-[AGR:B.PL ⇔ wa]*		
c. *[√red ⇔ zal]-∅*	*!*	

Candidate (a) is ruled out, since it does not realize the B feature in the input, violating the constraint MAX-M(F). Candidate (c) does not realize the agreement features B and PL at all, violating MAX-M(F) twice. Candidate (b) realizes both the B and the PL feature and is therefore optimal. DEP-M(F) is not violated. The constraint DEP-M(F) is decisive under A-agreement: As shown in (11), it rules out candidate (b), which features a class-B feature without an input correspondent. Therefore, candidate (a) emerges as the winner. Again, candidate (c) is ruled out as it violates MAX-M(F) twice.

(11)

input: √red-AGR:A.PL	MAX-M(F)	DEP-M(F)
a. ☞ *[√red ⇔ zal]-[AGR:PL ⇔ ɪ]*	*	
b. *[√red ⇔ zal]-[AGR:B.PL ⇔ wa]*	*	*!
c. *[√red ⇔ zal]-∅*	**!	

The agreement mismatch as in (3) is determined by a high-ranked **phonological** constraint of the OCP family which is given in (12).

(12) OCP[+round, +voc]: Assign a violation mark to each combination of segments which are both specified as [+round, +voc].

This constraint rules out the combination of a rounded vowel as [ɔ], and a rounded glide as [w]. Constraints of the OCP type militate against the cooccurrence of identical phonological elements and have been employed to cover a wide range of phonological phenomena (Meyers 1997). The OCP constraint in (12) dominates MAX-M(F). As shown in (13), candidate (a) is the winner, as the combination of [ɔ] and [w] in candidate (b) fatally violates OCP [+round, +voc]. Due to the ranking OCP >> MAX-M(F), the violation incurred by MAX-M(F) to candidate (a) is not fatal in this context.

(13)

input: √white -AGR:B.PL	OCP	MAX-M(F)	DEP-M(F)
a. ☞ *[√white ⇔ pɔp] -[AGR:PL⇔ ɪ]*		*	
b. *[√white ⇔ p**ɔ**p]-[AGR:B.PL ⇔ **w**a]*	*!		
c. *[√white ⇔ pɔp]-∅*		**!	

The outputs of (10), (11) and (13) then constitute the input to the Phonological Level, where regular phonological processes apply.

5. Conclusion: Under the assumption that phonological constraints are active at Vocabulary insertion, the agreement mismatch can be attributed to Vocabulary Insertion, where phonological constraints overrule faithfulness constraints on feature realization and the less specific VI *[AGR:PL ⇔ ɪ]* is inserted to avoid a violation of the OCP constraint in (12). It will be shown, how the proposed model extends to related phenomena as agreement systems that are determined by the noun's, phonology (see Sande 2018).

6. Selected references: Halle, M & Marantz, A. 1993. Distributed morphology and the pieces of inflection. In *The view from Building 20: Essays in honour of Sylvain Bromberger*. • Wolf, Matthew. 2008. *Optimal interleaving: Serial phonology -morphology interaction in a constraint-based model*. • Zwicky, Arnold M. & Geoffrey K. Pullum. 1986. The principle of phonology-free syntax: introductory remarks. *Ohio State Working Papers in Linguistics*. • Sande, H. 2018. Phonologically determined nominal concord as post-syntactic: Evidence from Guébie. *Journal of linguistics*.