

Nothing is a phonological fact: Gaps and repairs at the phonology-morphology interface*

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Abstract

The paper discusses phonologically motivated gaps in inflectional paradigms and builds further on the analysis in Rice (2005). In that paper, we see an approach to modeling gaps based on a tension between markedness constraints, faithfulness constraints, and constraints which require the expression of morphological categories. Here we explore the prediction that constraints requiring the expression of different categories can vary in their relative ranking to faithfulness. Hence the approach predicts that the same phonotactic problem may be solved by a repair in one morphological context and by a gap in another. This prediction is illustrated and further implications are explored.

1 Introduction

The result of a word-formation process must be phonologically well-formed. If it is not, the phonology will respond to modify the expected result. A description of this situation when viewed through optimality theoretic spectacles is one in which the fully faithful candidate is not the optimal candidate. That candidate violates a highly ranked markedness constraint and is thereby suboptimal.

This situation usually leads to the optimization of an unfaithful candidate—what we might informally dub a ‘repair’. Because the fully faithful candidate is in violation of a highly ranked markedness constraint, the grammar will instead choose a candidate which

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respects this markedness constraint, even at the cost of violating faithfulness. One might think of this as the normal situation whereby word formation creates an environment in which phonology applies.

But there is another option which the grammar might take. Instead of repairing the offending output, the grammar may instead leave the word unformed. When an attempt at word-formation fails, the result may be a paradigm with a gap. The grammar abandons the attempt for a synthetic expression of the relevant morphological categories, leaving periphrasis or circumlocution as the only options for expressing the notion.

Our working hypothesis is that gaps are ‘produced’, i.e. a synchronic process of word formation can be thwarted by the phonology and result in no output. In this light, we claim that a model of synchronic grammatical knowledge must include a strategy for representing phonologically grounded crashes in the morphology.

2 Examples of gaps

As an example of the kind of gap under consideration, consider imperative formation in Norwegian (Kristoffersen 1991; Rice 2003, 2005). Norwegian imperatives are identical to the root, while infinitives (for consonant-final roots) show affixation of a final schwa. As a result, we find infinitive-imperative pairs of the variety seen in (1).

- (1) *Well-formed Norwegian imperatives*
- a. å spise – spis! ‘(to) eat’
 - b. å snakke – snakk! ‘(to) talk’
 - c. å løfte – løft! ‘(to) lift’

However, when a root ends in consonant cluster with rising sonority, there may be a gap for the infinitive, as in (2). The expected result from the morphology is an imperative identical to the root. However a monosyllabic expression of the root will be ill-formed. As noted in Rice (2003), there is dialectal variation in the response to this situation, but the most common situation, to which we attend here, is that the attempt to form an imperative fails.

- (2) *Ill-formed Norwegian imperatives*
- a. å åpne – *åpn! ‘open’
 - b. å padle – *padl! ‘paddle’
 - c. å sykle – *sykl! ‘bike’

The appearance of a gap in an inflectional paradigm reflects a speaker’s synchronic knowledge, and it will therefore be incumbent upon a theory of grammar to speak to these cases. In the case of Norwegian imperatives, there is some evidence that the phenomenon is properly construed as synchronic, beyond our anecdotal claim that speakers clearly try to construct a candidate imperative, before simply abandoning the task. Evidence motivating a synchronic model includes the fact that these imperatives can actually surface when followed by a vowel initial word. In a discussion about phonology selecting between

syntactic options, Rice and Svenonius (1998) note that the negative imperative has two possible word orders. The negator *ikke* can come either before or after the imperative, as in (3).

(3) *Negative imperative syntactic optionality*

- a. Hopp ikke på møblene.
jump not on the.furniture
'Don't jump on the furniture!'
- b. Ikke hopp på møblene.
not jump on the.furniture
'Don't jump on the furniture!'

However, when the imperative is of the type in (2), only one of the two syntactic possibilities is well-formed. In this case, *ikke*, 'not', must follow the imperative if it is to be uttered. Otherwise, the imperative is followed by a consonant initial word and is therefore unutterable, as in (4).

(4) *Phonology selects among syntactic options*

- a. Klatr ikke på møblene.
climb not on the.furniture
'Don't climb on the furniture!'
- b. *Ikke klatr på møblene.
not climb on the.furniture
'Don't climb on the furniture!'

Note that this is not a fact about negated imperatives; these simply form a convenient example because *ikke*, 'not', is vowel initial. The point could just as well be made with the examples in (5), where the contrast is elicited through prepositions which differ in being vowel initial or consonant initial.

(5) *Phonology can forbid a consonant initial preposition*

- a. Sykl opp bakken.
bike up the.hill
'Bike up the hill!'
- b. *Sykl ned bakken.
bike down the.hill
'Bike down the hill!'

Indeed, both options for the negated word order return if the subsequent preposition is vowel initial, as in (6).

(6) *Negative imperative syntactic optionality recovered*

- a. Klatr ikke opp på møblene.
climb not up on the.furniture
'Don't climb up onto the furniture.'

- b. Ikke klatr opp på møblene.
 not climb up on the.furniture
 ‘Don’t climb up onto the furniture.’

The point here is the synchrony of the phenomenon. Speakers can form the imperative, even when the root has a cluster of rising sonority. They just can’t utter it, except in the right environment. The gaps under consideration here are not merely the reflex of a diachronic development. They are the result of a process in the grammar, and a model of the grammar therefore must offer a representation of such a process.

Turning away from Norwegian, we briefly note one additional example which is intended to underscore the synchronic nature of gap formation. Specifically, we offer for consideration one specific detail of English *schm*-reduplication, based on Nevins and Vaux’s (2003) creative elucidation of this phenomenon. Greatly oversimplifying the careful descriptions given by Nevins and Vaux, this process takes inputs, and reduplicates them, replacing a consonant or consonant cluster with the cluster *schm*. Some examples are given in (7).

- (7) *English schm-reduplication*
- a. Oedipus-schmoedipus
 - b. Holiday-schmoliday
 - c. Pedro-schmedro

The meaning associated with this process is discussed by Nevins and Vaux; here we refer to the process as formation of the *ridiculative mood*. Ridiculative formation is productive and at times subtle in its realization. A particular challenge is met when applying the process to targets which begin with *schm*. For many speakers, such targets lead to gaps. That is, no ridiculative can be constructed on the basis of such stems. Examples are given in (8).

- (8) *Gaps in schm-reduplication*
- a. Schmidt: *Schmidt-Schmidt
 - b. Schmooze: *schmooze-schmooze
 - c. Schmuck: *schmuck-schmuck

We assume here that on the basis of relatively limited exposure, speakers generalize and are able to apply this process to novel forms and structures. The gap for *schm*-initial words reflects that generalization, and modeling the process entails also modeling the inability to form the ridiculative for stems such as those in (8).

Gaps of the type sketched here would seem to present a fundamental challenge to optimality theory. The architecture of OT is such that every input must be mapped onto some output. Because constraints in OT are violable, there is no requirement that the optimal output be perfect, such that a ‘repair’ (i.e. unfaithful candidate) can easily be the best output. There is no possibility of a ‘crash’ in OT whereby some input is mapped onto no output. Yet, gaps would appear to be just this situation. The architecture of OT must allow a strategy to model gaps; it must allow something to be mapped onto

nothing.

This problem has been recognized from the start and various solutions have been proposed over the life of this theory. The first proposal is found already in Prince and Smolensky (1993) where an approach invoking the *null parse* is developed. The null parse is a candidate which is in some crucial sense incomplete, e.g. it lacks a morphological category, and therefore violates the constraint MPARSE, which requires an output to have a morphological parse. When MPARSE is sufficiently low-ranked, the null parse may nonetheless be optimal. When it is, its ill-formedness makes it “uniquely unsuited to life in the outside world” (Prince and Smolensky 1993: 51).

McCarthy (2002) offers a development of the Prince and Smolensky’s proposal. The *null output* is described as having “no structure whatsoever” (McCarthy 2002: 197). This candidate “always and only” violates MPARSE. Since the usual definition of MAX would lead to an awarded violation for \odot , the restriction to only violating MPARSE is a stipulation. For a recent illustration, cf. Klein (2005).

The other major proposal for modeling gaps is Orgun and Sprouse’s (1999) CONTROL theory. CONTROL is posited as a component of the grammar with ‘hard’ constraints. The candidate which wins in EVAL is then submitted to the control component. If that candidate violates the hard constraint(s), there is no output for the given input. Our core objection to this approach is that it conflicts with the core aspiration of optimality theory, namely modeling a grammar as a ranked hierarchy of ‘soft’ constraints. Additional evaluation of the CONTROL strategy is found in Fanselow and Féry (2002) and Raffelsiefen (2005).

We aspire here to develop an approach which preserves the core architecture of OT and which allows us to eliminate candidates such as \odot and the constraint MPARSE, at least insofar as it is stipulated as being violated by only the null output.

3 Optimal gaps

The framework to be used here for analyzing gaps build’s on McCarthy’s (2005) optimal paradigms theory, as further developed in Rice (2005). The core development in optimal paradigms theory is the idea that candidates are paradigms. Analyses carried out in this approach compare candidate paradigms which vary along familiar parameters, achieving conformity with or violation of various markedness and faithfulness constraints.

One natural point of variation among candidates, given this approach, will be in the number of members of a paradigm. If a paradigm, for example, should express six different morphological categories, then alongside a candidate paradigm which does indeed express all six of those categories, we can consider a candidate paradigm which fails to express some of them. In other words, some candidate paradigms will show gaps.

This approach requires including in our theory constraints which punish gaps. To this end, we use MAX{CAT} constraints, which require the expression of some morphological category. A grammar which selects as optimal a complete paradigm—even if some members of the paradigm have undergone repair—is one in which the MAX{CAT} constraints for the categories to be expressed are relatively highly ranked, at least with respect to

faithfulness. When a $\text{MAX}\{\text{CAT}\}$ constraint is dominated by markedness and faithfulness, then it may be the case that the least costly imperfection is the non-realization of a category, if this allows a candidate to achieve superior performance on the markedness and faithfulness constraint.

The situation in which a candidate paradigm with a gap may be optimized is illustrated with the simple tableau in (9).

(9) *Optimizing a defective paradigm*

	sykl/inf./imp.	SONSEQ	ID(VOI) _{IO}	MAX{IMP.}
a)	sykle _{inf.} , sykl _{imp.}	*!		
b)	sykle _{inf.} ,sykl _{imp.}		*!	
☞ c)	sykle _{inf.} ,			*

We imagine with this tableau a situation in which the root /sykl/ should be used to create a paradigm with two members, specifically an infinitive and an imperative. Three candidates paradigms are considered. In candidate (a), the infinitive appears, having undergone the usual process of schwa-affixation, and the imperative appears, having undergone the usual process of zero-affixation. This candidate is perfectly faithful and it expresses both of the morphological categories. The candidate therefore satisfies the faithfulness constraint ID(VOI)_{IO}. Since the infinitives are unproblematic, we leave MAX{INF} out of the tableau, and focus instead on the requirement that the imperative be expressed. This requirement is satisfied by candidate (a).

The problem with candidate (a) is a markedness problem. When the stem ends with a cluster with rising sonority, the attempt to form a monosyllabic imperative will yield a form which violates SONSEQ. Given that this constraint is highly ranked in the grammar, its violation proves fatal.

With candidate (b) we explore a strategy to satisfy the markedness requirements of SONSEQ. The sonorant of the cluster is devoiced, which apparently is sufficient to avoid violation of this constraint. Indeed, as discussed in Rice (2003), this is in fact a strategy which some speakers use to avoid a gap for the imperative, when the consonant preceding the sonorant is itself voiceless. We assume here that the sequence [k̥] satisfies SONSEQ. Of course, by devoicing the [l], a violation of ID(VOI)_{IO} is earned. With the grammar under consideration, this violation is fatal.

Candidate (c) illustrates an attempt to avoid the markedness violation of the fully faithful candidate while simultaneously avoiding a faithfulness violation. This is achieved by offering a defective paradigm as a candidate. Specifically, the paradigm lacks an expression of the imperative morpheme. Such a gap must be punished; this is achieved by awarding a violation of MAX{IMP.}. With the ranking in this tableau, priority is given to the satisfaction of both faithfulness and markedness. This grammar allows one to go so far as favoring a defective paradigm in order to respect the requirements of faithfulness and markedness.

Representing this situation schematically in (10), our core argument and illustration here have focussed on a situation in which a defective candidate paradigm is punished

by a $\text{MAX}\{\text{CAT}\}$ constraint. The dominance of this constraint by both markedness or faithfulness may lead to a situation—if the fully faithful candidate violates markedness—in which a candidate paradigm with a gap is nonetheless the most harmonic option.

- (10) *A ranking which favors gaps*
 $\text{MARKEDNESS, FAITHFULNESS} \gg \text{MAX}\{\text{CAT}\}$

This approach to gaps emphasizes that gaps arise at an interface. The gap is a result of the interaction of morphology and phonology. Yet it is characterized with a candidate which is ‘nothing’, as in McCarthy’s (2002) null output approach. This is achieved without a place holder, e.g. \odot , and no row in the tableau which has ‘nothing’ as its only content. Instead, ‘nothing’ is accounted for as a phonological fact via the defectivity of a paradigm. Our suggestion is that the strategy offered above gives an account in a way which captures the insight that gaps happen at the interface, but without the challenging ontology of the null output.

4 Same problem; different solutions

The *optimal gaps* approach posits a constraint for each morphological category, requiring its expression. A complete paradigm will be optimal when these constraints are relatively highly ranked, as noted above. But the various $\text{MAX}\{\text{CAT}\}$ constraints need not be moved as a block. These constraints may instead find themselves spread throughout the constraint hierarchy. (Cf. Rebrus and Törkenczy (2005) and McCarthy and Wolf (2005) for related discussion.)

The particular ranking to be considered here is one in which a faithfulness constraint is flanked by two $\text{MAX}\{\text{CAT}\}$, as schematized in (11).

- (11) *Reranking $\text{MAX}\{\text{CAT}\}$ constraints*
 $\text{MARKEDNESS} \gg \text{MAX}\{\text{CAT}_1\} \gg \text{FAITHFULNESS} \gg \text{MAX}\{\text{CAT}_2\}$

Assume that CAT_1 and CAT_2 both encounter the same markedness problem, such that in both cases, the fully faithful candidate will violate the highly ranked markedness constraint. Under these circumstances, the grammar in (11) identifies different fates for the two categories.

For each category, we will consider the relative merits of phonological unfaithful expression and nonexpression. Because CAT_1 dominates faithfulness, the category should be expressed, even when doing so requires some modification of the fully faithful candidate. However, CAT_2 is itself dominated by faithfulness, such that unfaithfulness is more costly than silence. Hence, we expect CAT_1 to be realized and we expect a gap in the paradigm for CAT_2 .

The architecture of the proposed theory is such that this situation is easily described, and we can be heartened in our adoption of this approach since we are indeed able to find examples of exactly this situation. Here we focus on one such example, which arises if we extend our study of Norwegian morphology to the realm of the noun.

For some roots in Norwegian, it is possible to form both nouns and verbs. The singular form of the noun has no suffix, such that the singular in the nominal paradigm and the imperative in the verbal paradigm should be identical. This is indeed the case, as seen in (12).

- (12) *Identical singulars and imperatives in Norwegian*
- a. *skriv!* ‘write!’, (*et skriv* ‘(a) document’)
 - b. *kost!* ‘sweep!’, (*en kost* ‘(a) broom’)
 - c. *dans!* ‘dance!’, (*en dans* ‘(a) dance’)
 - d. *kast!* ‘throw!’, (*en kast* ‘(a) throw’)

As we have already seen, some roots end in clusters with rising sonority. These are going to be the roots which are of interest here as well. When both singulars and imperatives are formed by zero affixation, we will find two different morphological categories encountering the same phonological problem, in this case violation of SONSEQ. A few relevant roots are seen in (13).

- (13) *Roots ending in clusters with rising sonority*
- a. /sykl/ ‘bike’
 - b. /adl/ ‘nobility’
 - c. /hindr/ ‘hinder’
 - d. /ordn/ ‘arrange’

When one of these roots is selected for singular formation, we find a result which shows epenthesis. The particular examples in (13) are realized as *sykkel*, *adel*, *hinder*, *orden*. (For discussion of Norwegian quantity, including the gemination on *sykkel* cf. Rice (in press).)

Since it is crucial for the present analysis to assume that the nouns just given are indeed formed from the roots in (13) and do not have the schwa in the underlying form, we briefly address this point here. There are at least two reasons to conclude that the root of the singular nouns *sykkel* is /sykl/ without the schwa we see in the singular. One of these is that other forms using the same root lack the schwa. The indefinite plural suffix is +*er* such that ‘bikes’ is expressed as *sykler*, and not **sykkeler*. The definite plural ending +*ene* gives *syklene*, not **sykkelene* and the nominal derivation meaning ‘cyclist’ is *syklist* and not **sykkelist*. Given this variation within the paradigm, we need either an explanation for the presence of the schwa in the singular or an explanation of its absence in the other forms.

There are words which preserve the schwa throughout the paradigm. The noun *kjøkken*, ‘kitchen’ has the definite plural *kjøkkenene* and not **kjøknene*, to take just one example. This is by far a smaller class, and includes only a few words, although it also includes all proper names with this structure. So, several guys named *Mikkel* are the *Mikkeler* and not the **Mikler*. The size of the class notwithstanding, it is nonetheless the case that there are words which do not lose the schwa in the plural forms. An analysis of *sykkler* has having lost the schwa between the [k] and the [l] is therefore dispreferred to

an analysis in which the schwa is inserted in the singular.

Putting it succinctly, we see two different classes of nouns. The differences are masked in the singular, where both show a schwa between two consonants of rising sonority. However, the classes differ in other forms of the paradigm. One straightforward way to represent this difference is to include the schwa of *kjøkken* in the root while leaving the schwa of *sykkel* out of the root.

We have now argued that the roots in (13) undergo epenthesis to form the singular. What happens when these roots become verbs and we attempt to form the imperative? In a word, nothing. These are the cases where no imperative is possible for the class of speakers under consideration.

Hence we see that we have the same phonological ill-formedness in two different classes, and the grammar responds to these differently. In one case, the ill-formedness is repaired; in the other case, it is not, and a gap instead emerges. In the approach we are advocating here, this situation is a consequence of a grammar with two $\text{MAX}\{\text{CAT}\}$ constraints flanking a faithfulness constraint, as in (11).

To model the contrast between Norwegian nouns and verbs, the relevant $\text{MAX}\{\text{CAT}\}$ constraints are $\text{MAX}\{\text{INF.}\}$ and $\text{MAX}\{\text{IMP.}\}$. These constraints flank DEP , which of course punishes epenthesis. In (14), we present a paradigm consisting of four morphological categories: singular (noun), plural (noun), infinitive (verb), and imperative (verb). The tableau is presented in this way not to make any particular argument about nouns and verbs being part of the same paradigm, but simply as a convenient way to demonstrate that one grammar can lead to a repair for the nouns and a gap for the verbs.

Since the singular (noun) and the imperative (verb) are both derived from the root by zero derivation, and since the root under consideration ends with a cluster with rising sonority, but the singular and the imperative will violate $\text{SONORITYSEQUENCING}$. Hence, a paradigm with a fully faithful candidate for each of these categories will incur two violations of the markedness constraint, as seen in candidate (a).

(14) *Different solutions for the singular and the imperative*

	sykl _{sg.} /pl./inf./imp.	S.SEQ	$\text{MAX}\{\text{SG.}\}$	DEP	$\text{MAX}\{\text{IMP.}\}$
a)	sykl _{sg.} , sykler _{pl.} sykle _{inf.} , sykl _{imp.}	*!*			
b)	sykler _{pl.} , sykle _{inf.} ,		*!		*
☞ c)	sykkel _{sg.} , sykler _{pl.} , sykle _{inf.} ,			*	*
d)	sykkel _{sg.} , sykler _{pl.} sykle _{inf.} , sykkel _{imp.}			**!	

Candidate (b) in (14) improves on candidate (a) by eliminating both of the SONSEQ requirements. This considerable improvement is achieved through the radical move of eliminating both of the offending members from the paradigm. In other words, for a paradigm which should express four categories, candidate (b) is noteworthily defective, lacking fully half of the paradigm.

While candidate (b) improves on candidate (a) by eliminating the SONSEQ violations, it nonetheless incurs a violation of the next most highly ranked constraint, MAX{SG.}. This, too, can be improved upon, as seen in candidates (c) and (d). Candidate (c) shows the effects of the ranking MAX{SG.} \gg DEP whereby expression of the singular with an unfaithful form showing epenthesis is preferred to its non-expression. This candidate also shows the effect of ranking DEP over MAX{IMP.} insofar as respect for faithfulness compels a gap for the imperative.

Candidate (d) simply illustrates the consequences of disrespect for the latter ranking. when an unfaithful candidate showing epenthesis is instead offered for both the singular and the imperative, DEP will be violated twice; given the grammar under consideration, a candidate paradigm incurring two DEP violations is less harmonic than a candidate incurring just one, even if that is achieved at the cost of a MAX{IMP.} violation.

5 Discussion and conclusion

The *optimal gaps* strategy of Rice (2005) is developed to account for apparent blockage of a morphological process by the phonology, a situation known as *ineffability* (Pesetsky 1997) or *absolute ungrammaticality* (Ackema and Neeleman 2000; Törkenczy 2002). The approach has a number of advantages over previous approaches. For example, we are relieved of the requirement to include in a tableau a row in which there is no candidate, no stuff, no phonological material to evaluate. We are concomitantly allowed to eliminate the stipulation that such a candidate violates exactly one constraint, as well as the stipulation that the grammar includes one constraint which is there only to be violated by the null output, namely MPARSE.

A more recent proposal to deal with absolute ungrammaticality is found in McCarthy and Wolf (2005). It remains a task for future research to explore a revised version of the theory advocated there, but we note here that their theory engages in a proliferation of null items, including at least three of them, which they represent as \odot , ϕ and $\#$. These null items all have different properties, whereby one may be in a correspondence relation with some element in an input, while another may not. The optimal gaps approach avoids such proliferation, which the anti-nihilist might include in the final tally of its relative merits.

Another merit of the optimal gaps approach is the revelation of *same problem, different solutions* phenomena. Hand in hand with the introduction of constraints which require the expression of particular categories comes the possibility that different MAX{CAT} constraints can have different relationships to some particular faithfulness constraint. Given two different morphological domains in which one and the same markedness constraint is violated, the possibility of MAX{CAT} constraints flanking a faithfulness constraint suggests that the same problem in these two different domains can have different solutions. This particular merit is shared with *string-based correspondence theory*, where McCarthy and Wolf (2005) use morpheme specific MPARSE constraints to introduce the same formal possibility.

In the present paper, one case has been analyzed which illustrates the *same problem*,

different solutions phenomenon. Specifically, a syllabification problem faced by certain roots in Norwegian is resolved by epenthesis in the nominal (portion of the) paradigm, while it results in a gap in the verbal (portion of the) paradigm. Our proposed analysis of these facts offers one grammar which yields both of these different solutions.

There are at least two specific directions in which the project reported on here requires extension. First of all, there are inputs from the realm of derivational morphology which also seem to map onto no output. To the extent that the optimal gaps approach as presented here is limited to inflectional paradigms, the derivational cases remain lacking for a solution.

A second area for future work on this topic involves additional aspects of the analysis of Norwegian. Our discussion here has been limited to cases in which the solution for the verbs is a gap. However, the presentation of the data in Rice (2003) makes clear that there are several other solutions which various groups of speakers employ to deal with the challenge of imperative formation. When a solution other than a gap is selected, then we have the interesting case of a *same problem, different solutions* situation in which neither of the solutions is a gap. Initial consideration of such a situation might suggest that a single grammar is not up to the task of providing an analysis of this because both of the problems (e.g. noun and verb) face the same constraint hierarchy and should therefore have the same solution.

Preliminary consideration of this challenge suggests however that a solution may be possible. A situation in which a noun gets one solution (e.g. epenthesis) and a verb gets a different one (e.g. devoicing of the sonorant), invites us to explore formal options for treating nouns and verbs differently. One relevant formal strategy is that developed in Smith (2001), where constraints may be identified as applying just to nouns. Some such notion will have to be more explicitly embraced in an analysis of a dialect with two different solutions. In this way, the present issue may form the basis for further contributions to the development of strategies for treating the phonology of nouns and verbs differently.

In addition to specific points requiring further investigation, such as those just noted, perhaps an even more fundamental concern deserves our attention. Leaving a gap in a paradigm instead of repairing a phonologically ill-formed output is a dramatic solution for a grammar to offer. The literature on gaps cited here, along with the present work, makes clear that this option is at times taken. And as such it reveals something about grammar, and places on any model of grammar the burden to facilitate a gap as an output.

For Optimality Theory, this burden is being addressed and the success of such research is of crucial importance given the core architectural properties of the theory discussed in §2 above. Nonetheless, we might like to go beyond the modeling of gaps, beyond the claim that ‘nothing’ is a synchronic fact. We might like to understand the diachronic appearance and disappearance of gaps in paradigms (cf. related discussion in Albright (2003)). Why should a grammar come to optimize a situation in which some particular morphological category is inexpressible as a function of the phonological properties of a root? What extragrammatical factors are relevant? Why is a gap the best we can do, when the grammar abounds in plausible repair strategies? The answers to these questions might give us some insight into the synchronic status of gaps. We can hope that these

answers will emerge from the uncovering and careful study of additional cases, along with much more detailed exploration of the behavior of the speakers who produce them.

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