Haplological Dissimilation at Distinct Stages of Exponence

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Abstract: This paper classifies the typology of morphological dissimilation effects into four distinct stages of the mapping from syntax to exponence: linearization, initial prosodic phrasing, M-Word formation, and allomorph selection, in that order. Each module has its own properties, structure-sensitivities, and suite of potential repair operations; for example, the earliest stage is insensitive to adjacency and phonological form, while the latest stage is sensitive to strict adjacency and aspects of phonological form. A modular architecture for exponence allows one to distinguish the properties of each type of dissimilation, thereby enabling predictive correlations between structural sensitivity and possible repair.
Keywords: Modular approach to exponence, haplology, repairs, linearization, impoverishment, allomorph selection

1 Introduction: Haplology along a Modular Road to Exponence

Morphological dissimilation, also called repetition avoidance, haplology, anti-homophony, or the morphological Obligatory Contour Principle (terms I will all use fairly interchangeably below) may operate on both form and content of morphemes, banning adjacent identity within a circumscribed domain. One of the reason that such terms abound for apparently similar phenomena is because they sometimes describe the constraint alone (e.g. anti-homophony, repetition avoidance) and sometimes describe the repair (morphological dissimilation, haplology). I will use these terms fairly interchangeably, always to describe the basic constraint against relativized adjacent identity within a particular domain. This chapter is an overview article that brings together a range of such phenomena as described and analyzed in diverse places in the literature, and attempts to organize them in terms of an articulated and modular computation of the exponence of terminal nodes in the syntax. My specific goal will be to hypothesize four stages of the mapping from syntax to phonology at which haplological constraints may apply (and trigger repairs): 1) linearization of syntactic terminals within a Spell-Out domain; 2) prosodification of linearized elements within a Spell-Out domain; 3) M-Word formation (the combination of distinct syntactic terminals into a morphological word), and finally 4) Allomorph Selection (i.e. Vocabulary Insertion).

In addition to the inherent interest of cataloguing how morphological dissimilation may be categorized into four distinct types of effects, differing in their structure-visibility and their inventory of repairs and enabling predictive correlations – a strategy similar to that pursued by Bermúdez-Otero (lume) for the modularity in the organization of the computation itself – there are some broader questions of theoretical interest that will arise during the discussion of 'avoiding' adjacent identity. These include the question of communication between linguistic modules (i.e., is there lookahead, or is there indeed a 'phonology-free' syntax), the question of nongeneration (i.e. avoidance of a generating a haplological structure in the first place vs. failing to realize it), and the functional 'groundedness' of certain haplological restrictions.

The overarching issue of most relevance to the current volume revolves around the architectural consequences of haplology effects. For example, do haplology effects force us to adopt necessarily parallel architectures of exponence, in which syntax, morphology, and phonology are all dealt with in a single module? The view of syntax in the 1970s, as exemplified in the work of Perlmutter (1971) and Radford (1977), was that syntactic transformations were responsible for everything related to exponence: which allomorph of a morpheme was chosen, prosodic readjustments such as clitic placement, whether the trace of a moved element was pronounced or not, and whether deletion (e.g. ellipsis or dissimilatory deletion) occurred. In

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this view of syntax as a monolithic module responsible for deriving all aspects of morphosyntactic exponence, the architectural consequences of haplology had very different consequences than they do under current models in which syntactic assemblage may precede exponence procedures such as allomorphic determination, node- or feature- deletion, and non-pronunciation of structure. For example, Radford 1977's entire discussion of "counter-filtering rules" (such as insertion of *se* instead of *le* in the Spanish 'spurious *se*' case, whereby expected *le lo* appears as *se lo*) views such operations as 'contingency rules' that apply in a derivation early enough to *prevent* later filters from ruling out a structure. Bonet's (1991) approach to the spurious *se* phenomenon entirely reversed this chain of events, and in doing so also seriously altered the causal structure of the derivation in ways that rendered obsolete Radford's notion of derivational "peeking".[1] Radford's 'counter-filtering rules', intended to prophylactically apply in order to prevent subsequent grammaticality crashes, consisted of a rather limited set of operations, whose limitations can now be understood precisely in terms of the limitations of a realizational morphology.

With the shift in architectural perspective whereby syntax is no longer responsible for all aspects of exponence, rules that apply in order to deal with haplological or dissimilatory pressures are viewed as *repair* operations subsequent to detection of constraint violation (similar to those first systematically investigated by Yip (1988) for the OCP in phonology, and by Neeleman and van de Koot (2007) for the OCP in morphosyntax) instead of prescient lookahead. In what follows, therefore, we will view every case of haplology effects in terms of an OCP-type constraint (stated over varying levels of structure), followed by potential repair operations.

While the preceding discussion focused on the fact that a realizational morphology that succeeds, rather than precedes, evaluation of morphological OCP constraints thereby avoids many of the derivational lookahead concerns raised by Radford, a similar, though distinct concern remains in relation to the consequences of haplological repair for fully parallel models. Golston (1995), in a fully parallel model of exponence in which syntactic, morphological, and prosodic constraints are all vying for optimal realization in tandem, concludes that a meta-ranking holds whereby 'syntax outranks phonology', meaning that phonology can only delete adjacent-identical elements when the syntax has been otherwise generated fully correctly – in other words, phonology's ability to exert pressures on the realization of morphosyntactic form is limited by a meta-priority of syntactic generation over phonological pressures. Crucially, Golston goes on to claim that prosodic phrasing concerns can also trump and/or dictate how morphological exponence should proceed, and ends up with the fully parallel metaranking SYNTAX >> PROSODY >> MORPHOLOGY. Strikingly, this ordering "in space" exactly mirrors the order in derivational sequencing of modular computation "in time" proposed in articulated models of realizational morphology adopted here (and in kindred proposals, such as Henderson (2009)), in which syntactic assemblage precedes prosodic structure-building which in turn precedes Vocabulary Insertion. As globalized meta-rankings of whole modules of the form SYNTAX >> PROSODY >> MORPHOLOGY within a parallelist architecture coincidentally converge with research into cascaded serial architectures, our discussion of haplology in what follows will discuss the phenomena below with respect to the support they provide (and the challenges they pose) for the latter. We henceforth assume a strict division of labor between syntax, which precedes prosodic structure-building, which in turn precedes morphological operations such as impoverishment, which finally precede in turn Vocabulary Insertion. The model thus follows the general architecture of separationist models of morphology such as Halle and Marantz (1993), Ackema and Neeleman (2003), Arregi and Nevins (2008), Henderson (2009), and Rezac (2011), among many others.

It should emerge as fairly clear to the reader that the phenomena discussed below – in particular their structure-sensitivity to macro-level syntactic categories versus adjacent terminals versus individual syntactic features versus syllable structure – necessarily presuppose an item-and-arrangement model of morphology, in which the input to morphological computation and the operations such as allomorph selection require distinctly organized morphological terminal nodes. While some of the phenomena could surely be

[1]The theoretical foundations of "peeking" itself, based on Hill 1970's treatment of Cupeño foot templates, are themselves rather obsolete given current approaches to prosodic morphology. Specifically, Hill assumes a derivational rule of reduplication that will keep on applying in order to fill a bisyllabic template associated with habilitative morphology. In Prosodic Morphology approaches in which a morphological category first provides a prosodic template that must subsequently be filled, there is no "peeking" ahead to the target: the target ontologically precedes the operations that satisfy it. See Bye and Svenonius (lume) for relevant discussion.

handled by purely item-and-process models, a full comparison of these possibilities cannot be explored in depth in the present discussion, though this is no doubt an important task for future work.

Finally, before delving into the phenomena themselves, I remind the reader that Radford (1977, p.43) and other researchers have pointed out that what is most relevant in understanding haplological restrictions is their *accidental* nature as the product of syntactic assemblage. Clearly reduplication, found all over natural language, is not banned by haplological constraints, because it is an *intentional* exponence target.

The structure of this paper is as follows: four major sections are devoted to characterizing and exemplifying haplology at four distinct stages along the syntax-to-phonology mapping. In these sections, as my goal is to identify the defining properties of dissimilation at these levels, I draw on some fairly well-known cases of haplology from the literature, pointing the reader, where possible, to places that more elaborate discussion of the phenomena may be found in the literature.

Section 2, drawing on recent work by Richards (2010), examines dissimilatory phenomena occurring specifically during the first step of Spell-Out: linearization of syntactic terminals, using a modified version of Kayne's (1994) Linear Correspondence Axiom. As the domain of dissimilation is the Spell-Out domain, and this step necessarily precedes Vocabulary Insertion, the core properties of this stage are the following:

(1) **Stage 1: Linearization-Level Dissimilation**

- •Phonologically-insensitive
- •Operates across distinct prosodic/morphological words
- •Reference to macro-level syntactic categories
- •Potentially non-local (items need not be adjacent, but must be in same Spell-Out domain)
- •Possible repairs: syntactic operations (movement, preposition insertion) – which may be preemptive, rather than repairs

In section 3, we turn to the next level of exponence, at which dissimilatory phenomena have quite a different set of properties. Following in large part Ackema and Neeleman (2003), if an initial mapping of syntactic constituency to prosodic phrasing precedes any further morphological operations, then cross-word haplology will have the following properties:

(2) **Stage 2: Prosodic-Phrase-Level Dissimilation**

- •Prosodically-sensitive (with gradient acceptability due to pauses)
- •No reference to individual features: requires total identity of affected terminal
- •Strict adjacency required
- •Possible repair: complete deletion of a node, or complete deletion of all features under a category node

Section 4 then turns to dissimilatory operations at the more morphological level, such as impoverishment and obliteration, drawing on the work of Arregi and Nevins (2007). While more sensitive to fine details of morphosyntactic structure than preceding stages, haplological phenomena at this level in fact need not respect linear adjacency, thus differentiating it from both the stages that precede and follow it.

(3) **Stage 3: M-Word Internal Dissimilation**

- •Phonologically-insensitive
- •Reference to individual features
- •Not necessarily adjacent with M-Word
- •Cross-linguistic variation in which element is the target of deletion
- •Possible repairs: deletion of individual features, even when these are potentially orthogonal to the triggering identity

Finally, the last stage of haplological phenomena, at the level of pure phonological form, represents some of the most well-trodden turf within the literature. Unlike all of the preceding stages, dissimilation at this level is sensitive to phonological form (unlike stages 1-3), and to linear adjacency (unlike Stage 1 or 3). These phenomena are discussed in Section 5.

(4) **Stage 4: Vocabulary-Insertion-Level Dissimilation**

- •Phonologically-sensitive
- •No reference to individual features
- •Operates under adjacency
- •Possible repairs: alternate allomorph selection, zero-insertion, coalescence

In characterizing these distinct levels at which haplology can occur, I have identified core differences not only in their structural descriptions (i.e. how much and what kind of structure they are sensitive to), but also in their structural changes – specifically in limitations on the kinds of repairs that they can effect.

In section 6, we turn to a few cases that present interesting challenges for future research, as they contain nuanced restrictions on haplology that require elaboration of the basic model presented here. Finally, in section 7, we turn to a consideration of some of the potential 'grounded' explanations for haplology in terms of psycholinguistic and acquisition pressures that diachronically funnel languages into haplology avoidance, particularly in regards to Vocabulary-Insertion-level haplology.

2 Stage 1: Dissimilation during Syntactic Linearization

The first stage on the road to exponence during which haplology effects can kick in is during the linearization of syntactic terminals. By hypothesis, syntactic terminals that are not sisters are unordered with respect to each other, and require an algorithm of linearization in order to establish a total order among all terminals within a linearization domain (henceforth, a Spell-Out domain, often identified as coincident with the minimalist syntax concept of a phase).

Richards (2006, 2010) develops a Distinctness principle, based on the Linear Correspondence Axiom of Kayne (1994). Two categories, e.g. <DP, DP> – which are by hypothesis phonology-free before linearization – cannot be linearized with respect to each other, and hence cause a crash.[2] This occurs when the two terminals in question are in the same Spell Out Domain, which include the categories CP, vP, PP, and KP (a Kase Phrase, i.e. the projection of a specific type of syntactic case). Note that copies that will not be pronounced (because they are the residue of movement) do not enter into this problem. Richards also mentions that this 'unlinearizability' problem that yields a type of haplology generally applies only to functional categories.[3]

For example, if ellipsis remnants and material that is postverbal in residual V2 constructions are in the same spell-out domain, then the ban on multiple adjacent DPs in English in the relevant examples below may be straightforwardly understood:

(5)
a. *Sluicing*: *I know someone insulted everyone, but I don't know who whom
b. *Exceptives*: *Every man admired every woman, except John Mary.
c. *Quotative Inversion*: *"It's raining," told John sadly Mary.
d. *Locative Inversion*: *Into the room kicked a man a ball

Lest these examples should cause one to think that all instances of adjacent DPs should be banned, recall that what specifically matters is the syntactic, not linear distance between these elements. This distance can be diagnosed by certain means, and reveal that, for example, the goal and theme in English double object constructions are in fact separated by a relevant boundary. In double object constructions in English, verb

[2]Moro (2000) also develops a theory in which grammatical operations, such as movement, are motivated by considerations of linearization, though not specifically distinctness of identical syntactic categories.

[3]By adopting the ordering whereby Lexical Roots undergo Early Insertion, followed by syntax, followed by Linearization, followed by Late Insertion of functional morphemes, one expects this to be the pattern.

particle constructions allow one to diagnose the fact that the goal argument is further away from the theme than in an NP-PP construction (Richards, 2010):

(6) The secretary sent the stockholders out a schedule
(6) *The secretary sent out the stockholders a schedule
(6) The secretary sent (out) a schedule (out) to the stockholders

In certain languages where two DPs in a row might be potentially unlinearizable given what we know about English, it turns out that Case morphology is sufficient to render them distinct, as in Greek (Richards, 2010):[4]

(7) Kapjos idhe kapjon, alla dhen ksero pjos pjon
Someone.nom saw someone.acc, but not know.1sg who.nom whom.acc
'Someone saw someone, but I don't know who whom'

Somewhat similar to multiple wh- remnants in sluicing is multiple- wh- fronting. In Serbo-Croatian multiple wh- movement (8) is blocked when it would result in both wh- phrases in the same domain (9) that have the same case.

(8) Ko koga vidi
who whom sees
'Who sees whom?'

(9) Šta uslovljava šta?
What conditions what?
'What conditions what?'

In fact, when two wh- phrases are the same case but different gender, the ban still holds (Richards, 2010), demonstrating that case (i.e. KP) is what is relevant at the level of category-level linearizability, and not gender.

(10) *Kojem je čovjeku kojoj ženi mrsko pomogati
which.dat aux man.dat which.dat woman.dat. boring help.inf
'Which man doesn't feel like helping which woman'?

The same ban can be found with the elements *D* or with the elements *v*. For example, Richards (2010) argues that (11-a) is out because it contains two Ds within the same spell-out domain. By contrast, insertion of a preposition (11-b) creates a new spellout domain in its complement.

(11) a. [*the destruction the city]
b. [the destruction [of the city]]

In the case of *v*, assuming that passive little *v*s do not head a strong phase, the (12-b) examples include two *v*s in a spell-out domain, leading to a Distinctness violation.[5]

(12) a. We saw John leave / we made John leave
b. *John was seen leave / *John was made leave
c. John was seen to leave / *John was made to leave

The repair operations for avoiding two XPs of an identical category within the same domain are limited: they involve either moving one of the XPs out of the domain (which is, perhaps not a repair, but precisely a "pre-emptive" rule in Radford's (1977) sense), or, inserting a prepositional phrase, which will trigger the

[4]This would mean that English *whom* in (5)[a] does not count as having enough case morphology to render the two DPs distinct, perhaps a welcome conclusion given the discussion in Lasnik and Sobin (2000).

[5]In *John was seen to leave*, the claim is that the preposition *to* introduces a new spell-out domain.

formation of a domain boundary between the two identical elements (again, this is arguably a decision made early in the numeration, rather than a repair triggered "after" detection of a linearization problem).

In short, Richards's (2010) proposal provides an implementation of haplology between syntactic categories, with the following properties:

(13) **Properties of Linearization-Level Dissimilation**

- •Phonologically-insensitive
- •Operates across distinct prosodic/morphological words
- •Reference to macro-level syntactic categories
- •Potentially non-local (items need not be adjacent, but must be in same Spell-Out domain)
- •Possible repairs: syntactic operations (movement, preposition insertion) – which may be preemptive, rather than repairs

We turn to exemplification of the ban on two terminals of identical syntactic category in various configurations below.

2.1 Ban on Two Accusative Case KPs in the Same Domain

In this subsection we examine the Japanese ban on multiple accusative NPs within the same *v*P in more detail. This discussion follows the arguments in Poser (2002) that the double-*o* constraint in Japanese is syntactic in nature. Given the facts, a Distinctness account, like that of Richards (2006, 2010), above, would explain the impossibility of two identically-cased NPs within a spell-out domain (in this case, *v*P).

Japanese causative verbs allow either an accusative or dative causee, where the dative variant involves more of a semantics of non-coercive causation or permission.

(14) Taroo-wa Hanako-o ikaseta
Taro-topic Hanako-acc caused-to-go
'Taro made Hanako go'

(15) Taroo-wa Hanako-ni ikaseta
Taro-topic Hanako-dat caused-to-go
'Taro had/let Hanako go'

When the embedded verb is transitive and takes an accusative object, only the dative option is allowed, and the non-coercive semantic contrast goes away:

(16) Taroo-wa Hanako-ni/*Hanako-o kusuri-o nomaseta
Taro-topic Hanako-dat/Hanako-acc medicine-acc caused-to-drink
'Taro had/made/let Hanako drink the medicine'

This constraint operates at the level of *vP*, as it is not improved by separating the two NPs by an adverb:

(17) *Taroo-wa Hanako-o tikarazukude kusuri-o nomaseta
Taro-topic Hanako-dat forcibly medicine-acc caused-to-drink
'Taro forcibly made Hanako drink the medicine'

Thus, accusative KPs cannot be linearized within the same domain. Importantly, the ban on two accusative KPs within the same Spell-Out domain holds regardless of intervening material or their later movement attempts.

2.2 The Double-*ing* Filter

Perhaps one of the most well-known cases of aspectual markers undergoing an OCP involves the double-*ing* filter (Berman, 1973; Milsark, 1988; Ross, 1972). What has puzzled researchers is why some instances of

adjacent *-ing* are tolerated (e.g. *I'm enjoying reading this book*) while others are decidedly awkward (such as *I'm starting reading this book*).

Much like the fact that *wanna*-contraction being blocked by an intervening trace, the double-*ing* filter is blocked by intervening PRO (Milsark, 1988); as the examples in (18-b) and (19-b) show, when a pronominal possessor of the gerund is possible, PRO is by hypothesis, also possible, and it is precisely in these environments that two verbs suffixed with *-ing* can be phonologically adjacent:

(18) a. John was enjoying PRO reading the book
b. John was enjoying his reading the book

(19) a. *John was starting reading the book
b. *John was starting his reading the book

While it may be unusual to think that a phonologically silent PRO could serve as a buffer to block a phonologically-dependent dissimilation rule, in reality it is probably not the phonology of PRO, but the fact that it introduces more syntactic structure (arguably a CP, if control involves a CP boundary between the selecting verb and its complement), thereby potentially placing the two instances of *ing* into separate domains, that is relevant.

2.3 Comparative Morphemes

Radford (1977) notes the ungrammaticality of double comparatives, which should of course be semantically perfect:

(20) *John is more more intelligent than Bill than you are

While (20) is out, interestingly so is (21), which uses the synthetic rather than analytic form of the comparative:

(21) *John is more taller than Bill than you are

Given that *more* and *-er* appear to be separate exponents, this demonstrates that the OCP effect here is phonologically insensitive. If no phase-boundary is present between the comparative morpheme and its complement, the ban on more than one of them within the same Spell-Out domain is understandable in terms of Richards's (2010) unlinearizability constraint.

In summary, the set of syntactic OCP effects we have reviewed in this section have a number of distinguishing properties: the affected elements need not be phonological identical nor linearly adjacent; rather, what matters is that they are syntactically close (i.e. within the same Spell-Out domain) and have the same macro-level syntactic category.

3 Stage 2: Dissimilation during Initial Prosodic Phrasing

In the architecture envisioned above, after linearization is a stage of initial prosodic phrasing, the purpose of which is to align syntactic phrases with prosodic phrases. Work such as Truckenbrodt (1999) develops mapping rules that require that the right edge of an XP be aligned with the right edge of a prosodic phrase (ϕP). (Nonetheless, certain language-specific effects (such as cliticization) may alter this strict isomorphism, yielding a set of constituency relations in the prosodic phrases which are different from those of the syntactic phrase.) One effect of creating ϕPs, according to Ackema and Neeleman (2003), is that they can create a domain in which certain context-sensitive operations may apply. Of particular interest are the operations they identify as 'agreement weakening', which we can characterize as a kind of haplology effect.

In particular, both Ackema and Neeleman (2003) and Benmamoun and Lorimor (2006) propose that when inflection and agreement are adjacent (i.e. VS contexts), the latter is 'redundant', and hence not spelled out. In order to pin down what it might mean to not be spelled-out, let us specifically state that, in such configurations, the terminal corresponding to the 'redundant' agreement features within the same

prosodic phrase is simply deleted from the representation (see also Grimshaw's (1997) ban on sequences of identical adjacent functional heads).

The prosodic phrasing approach can account for Classic SV vs. VS asymmetries of the sort found in Dutch and Arabic. Thus, in (22), if the verb and the subject are phrased together, which is the default phrasing of a VS order, they constitute a domain in which the two 2nd person features need not, and in fact must not, both be spelled out.[6] The prosodic phrasing is shown by curly brackets.

(22) { dagelijks } { loop(*t) jij } { met een hondje } { over straat }
{ daily } { walk.(*2sg) you } { with a doggy } { in.the street }
'Daily you walk with a doggy in the street'

(23) { Jij } { loopt dagelijks } { met een hondje } { over straat }
{ You } { walk.2sg daily } { with a doggy } { in.the street }
'You walk daily with a doggy in the street'

By hypothesis, the terminal corresponding to the 2sg ending *-t* is completely deleted prior to any possibility of Vocabulary Insertion. This operation thus resembles *obliteration*, a terminal-deleting procedure we will discuss in Section 4, with two key differences: the present operation, and by hypothesis, all redundant-terminal deletion operations in the prosodic phrasing component, require strict featural identity, while the latter (in the M-word component) are able to operate on partial identity.

The case above occurs, by hypothesis, prior to Spell-Out, and hence is not phonologically sensitive, but rather sensitive to complete morphosyntactic identity under adjacency in a prosodic phrase. Quite often the cases involving deletion in prosodic phrasing operate across different words, which are banned only when they are completely identical. For example, two instances of *que* in French are disallowed (Radford, 1977). Even though they do not form a single morphological word, prosodic phrasing of weak complementizers would put them in the same ϕ-phrase. A rule of deletion removes one of them completely:

(24) Je préfère que tu restes, plutôt que (*que) tu t'en ailles
I prefer that you remain, rather than (*that) you cl go.away

In sum, the model proposed by Ackema and Neeleman (2003) accounts for haplology effects at a particular stage of the derivation, namely after linearization occurs. Phrases that are affected must be linearly adjacent for deletion to occur, and must be completely featural identical.

(25) **Properties of Prosodic-Phrase-Level Dissimilation**

- Prosodically-sensitive (with gradient acceptability due to pauses)
- No reference to individual features: requires total identity of affected terminal
- Strict adjacency required
- Possible repair: complete deletion of a node, or complete deletion of all features under a category node

We turn to a number of specific cases that illustrate haplology across distinct prosodic words. These cases share the fact that, unlike the linearization-level cases in Section 2, they require adjacency among the affected words, and have a clear post-syntactic repair.

3.1 Romanian Article-Case Marker Haplology

There is a type of configuration quite similar to the Dutch case of agreement weakening in VS orders, though it occurs within the DP, in Romanian. Similar to the haplology found between verb inflection and pronoun, there is a haplology under complete featural identity between nominal inflection and a pronominal case assigner found in the Romanian DP (Ortmann and Popescu, 2001). The possessive marker / case assigner *al* with masculine singular features in the following examples shares features with the nominal suffix *-ul*.

[6] See Zonneveld (2007), however, for a discussion of certain complications to this basic picture.

(26) un prieten al băiat-ul-ui
a friend poss.m.sg boy-def-dat
'a friend of the boy'

(27) prieten-ul (*al) băiat-ul-ui
friend-the.m poss.m boy-def-dat
'the friend of the boy'

Similar dissimilation effects occur with the masculine plural suffix and case marker combinations *i/ai*, feminine singular *a/a*, and feminine plural *le/ale*. The morphemes in question are not phonologically identical, and hence this is pre-Vocabulary Insertion. Nonetheless, the deletion is only operative under strict adjacency this cannot be during the Linearization stage. Similarly, these are distinct words, and hence it is not during the M-Word-internal stage either. In fact, given the fact that the possessive marker *al* is prosodically weak, it will be phrased together with the preceding noun. An 'anti-redundancy' constraint against spell-out of linearly adjacent identical feature bundles is repaired by suppressing the second one. Note crucially that it survives when there is an intervening adjective (29):

(28) prieten-ul nebun al băiat-ul-ui
friend-the crazy poss.m boy-def-dat
'the crazy friend of the boy'

This case demonstrates definitively a case in which haplology is too local to be subsumed under the Linearization module but nonetheless operates across words, and hence is not within the M-Word-formation module. The fact that its resolution involves outright deletion upholds the correlation that only certain repairs are available at given stages of the mapping to exponence.

3.2 Chinese Sentence-Final Particle Haplology

A case of haplology across two adjacent (but prosodically weak) identical words is found in Mandarin Chinese, which has two *le*s (Yip, 1998): one which is perfect aspect (29), and another which is a discourse-related morpheme describing a 'currently relevant state' (CRS) (30). Arguably, these are morphosyntactically identical, though two distinct instances may be syntactically licensed (as the two can indeed occur when non-adjacent). The case in (29) is familiar perfect, while the case in (30) is something like 'Next month I will have been in Japan', where the use of the perfect is only relevant with respect to another event (which may be contextually future or not; cf. Iatridou et al. (2001)).

(29) Wo wang le ta-de dizhi
I forgot perf 3sg-gen address
'I forgot his address'

(30) Xia-ge yue wo jiu zai Riben le
Next-CL month I then at Japan CRS
'Next month I'll be in Japan'

While these two *le*s can occur within the same sentence, particularly when an object noun phrase interrupts their linear adjacency (31), when the verb has no material following it, the two instances of the perfect would end up next to each other, leading to the impossible sequence **le le*, which instead yield a single *le* (32):

(31) Wo he le san bei kafei le
I drank perf three cups coffee CRS
'I drank three cups of coffee'

(32) Bing dou hua le (*le)
Ice all melted perf/CRS
'The ice all melted'

As *le* is a toneless syllable in Chinese, we may conclude that it is prosodically weak, and that two instances of *le* would be phrased together. The haplology effect is thus outright deletion under adjacent identity within the same ϕ-phrase.

3.3 Dutch Complementizers

Complementizers are notoriously allergic to each other, as Ackema (2001) shows for Dutch, where the expected sequence *of of* becomes *of dat*:

(33) *Vroeg je nou of die plaats vrij is of of-ie bezet is?
asked you now if the seat free is either if-it taken is?
'Did you ask whether that seat is free or if it's taken?'

(34) Vroeg je nou of die plaats vrij is of **dat**-ie bezet is?
asked you now if the seat free is either if-it taken is?
'Did you ask whether that seat is free or if it's taken?'

Ackema argues that these cases involve an OCP effect between two adjacent identical complementizers. The repair involves replacement by a morphosyntactically inappropriate complementizer – one which is declarative, even though the context is interrogative. In terms of our current model, this would involve wholesale deletion of *all* of the features under the second C node at this stage of exponence, leaving only a bare / featureless C node, which will then eventually be realized by the elsewhere/default complementizer *dat*.

3.4 Ancient Greek Determiners

Golston (1995) contrasts the possibility of adjacent identical determiner morphs in German (35)-(36) with the fact that Ancient Greek does not allow such sequences.

(35) die, die die Blumen gekauft haben
those, who the flowers bought have
'those who have bought the flowers'

(36) dass das das Problem ist
that this the problem is
'that this is the problem'

In order to understand the relevant constructions in Ancient Greek, we must first introduce the fact that it allowed center-embedding, like 'the the face's nature':

(37) teèn tóu prosoópou phúsin
the.f the.gen.m face.gen.m nature.f
'the nature of the face'

(38) tées tóon himatíoon ergasías
the.gen.f the.gen.pl clothing.gen.pl. production.gen.f.
'of the production of the clothing'

Of nine possible combinations of two instances of *tées*, *tóu*, *tóon*, all of the ones that would involve identity are completely unattested "in all of Ancient Greek literature from Homer (mid-8th century BC) to Chares (3rd to 2nd century BC)" (Golston, 1995, 352):

(39) **tées tées*, **tóu tóu*, **tóon tóon*

We do not know what the specific repair strategy was (perhaps periphrastic, perhaps deletion), only that Golston suggests that this constraint is not due to a processing effect, as center-embedding itself in Ancient

Greek is fine, only not when it involves formally identical morphs. Golston notes that lexical content words that are adjacent cause no such problem, citing examples such as

(40) ho éroos éroos estìn oudenòs eè tinós?
the.m Desire.m desire.m is nothing.gen.n or something.gen.n
'Is Desire desire of nothing or of something'

Rather than ascribing this specifically to a function-word versus content word difference, Golston argues that they differ in prosody: adjacent function words are bundled together into ω, the phonological word, while adjacent content words are not. The relevant domain for haplology, then, is prosodically determined, and the relevant constraint is against total featural identity.[7]

Summing up, this case demonstrates another instance avoidance of identical morphosyntactic terminals, even when the two do not form a single complex word, but when prosodic phrasing places them within the same domain. Determiners are prosodically weak, and hence phrased together, and haplology can operate at this stage of exponence.

4 Stage 3: Dissimilation within the M-Word

Anti-identity effects can also be observed at the level of abstract morphological features in the domain of the morphological word (M-word), but they have at least two crucial properties that distinguish them from their phonological analogues: (i) partial identity: cooccurrence of a single identical feature in two morphemes is sufficient to trigger deletion at this level; and (ii) orthogonal repair: deletion does not necessarily target the offending feature. Specifically, cooccurrence of two morphemes with the same feature results in a marked configuration in the M-Word component, which like other marked structures, triggers deletions (Impoverishment) that reduce overall markedness. The result can thus be deletion of (i) the offending feature, (ii) one of the morphemes, or (iii) some other feature. These deletions can be observed in neutralizations that arise in these marked contexts. Some illuminating comparative evidence comes from *3/3*-effects, which arise in clusters with two [−Participant] clitics in Spanish (spurious *se*), Barceloní Catalan, Standard Italian, Romanian, Tavullia (Northern Italian), and Ondarru (Western Basque).

In Spanish 3/3 clitic clusters (41), neutralization of person results in insertion of the impersonal clitic *se* in place of syntactically motivated dative *le(s)* (Nevins, 2007). In Barceloní (42), the same configuration leads to realization of the dative clitic as a locative (analyzed as neutralization of person features in Bonet (1995)). In Italian (43), gender is neutralized in the dative clitic (Pescarini, 2010). In Romanian (44), number is neutralized in the dative clitic (Radford, 1977)

(41) El libro, se lo dí a élla.
the book CL.IMP CL.ACC.3SG.M I.gave to her
'I gave the book to her.' Spanish

(42) [əlz] [i] donaré demà.
CL.ACC.3PL.M CL.LOC I.will.give tomorrow
'I'll give them to him tomorrow.' Barceloní

(43) [ʎe/*le] -lo presto.
CL.D.3SG.M/*CL.D.3SG.F -CL.ACC.3SG.M I.lend
'I lend it to him/her.' Italian

(44) *li/i le dai.
*CL.DAT.PL/CL.DAT.SG cl.acc.fem give.2sg
'You give them (f.) to them/him/her'

[7] While Golston argues that the non-occurrence of (39) is due to morphophonological identity based on the fact that the determiner *tóu* is syncretic between masculine and neuter, one could clearly appeal to underspecification and the shared feature [−fem] as the conditioning factor for which adjacent identity is banned.

All four cases involve adjacent configurations of 3rd person dative and accusative clitics. In response to the constraint, both Spanish and Barceloní Catalan effect a type of person neutralization, but the surface effect is different, which is related to the existence of a locative clitic only in Catalan. Meanwhile, Italian neutralizes gender, and Romanian neutralizes number.

Such effects are also found with subject clitics. In Tavullia, a third person (singular) subject clitic is deleted in the context of a third person object clitic (Manzini and Savoia, 2007):

(45) (*ɛl) la 'cɛma
CL.SBJ.3SG.M CL.ACC.3SG.F calls
'He calls her.' Tavullia

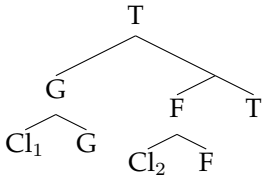
In Ondarru Basque, number in a third person dative is neutralized in the context of a third ergative (see Preminger (2009) for evidence that these morphemes are clitics, not agreement):

(46) Emongo do -tz (*-e) -∅. (>tza/*tze)
will.give AUX -CL.DAT.3 (*-CL.DAT.PL) -CL.ERG.3SG
'He'll give it to him/them.'
Ondarru

(The presence of a null ergative clitic is diagnosed by the effect it has on the form of other morphemes: in the absence of an ergative argument, the auxiliary/clitic cluster is *ga-ko(-e)*.)

In these cases, what is happening is that feature identity within the M-word leads to morphological markedness, which triggers feature/morpheme deletion (Impoverishment). This occurs even in cases where relevant feature is [−Participant], which on its own is not marked (as opposed to [+Participant]). In 3/3-effects, the generalized Impoverishment rule is (48), where further specification accounts for language-particular repairs). Like all Impoverishment rules, the domain of 3/3-Impoverishment is the M-word, a complex head generated in the syntax. Let us assume that clitics adjoin to separate functional heads, which undergo Head Movement to T to form the verb/clitic cluster (47). This tree is in fact the relevant domain for what is called an M-Word (Embick and Noyer, 2001): the highest terminal projection not dominated by any other terminal projection.

(47)



Clustering under a complex head creates a domain for postsyntactic Impoverishment, which targets marked structures, including those where two morphemes share some feature. Notably, however, three of the languages we have considered delete the offending feature, while the other 3 languages delete orthogonal features.[8]

(48) **3/3-Impoverishment**: Given two [−Participant] morphemes M_1, M_2 within a single M-word:
a. Delete person features in M_1 (Spanish, Barceloní).
b. Delete gender features in M_1 (Italian).
c. Delete number features in M_1 (Ondarru, Romanian).

[8]It may be interesting to attempt to derive which features are deleted in terms of faithfulness constraints. In his analysis of this type of variation, Radford (1977) appeals to a hierarchy which one might translate into faithfulness, where languages prefer to change features lowest-ranked on the scale REFLEXIVITY >> NUMBER >> GENDER. Thus, Italian goes for switching the lowest ranked (gender), while Romanian cannot, as its dative clitic is already gender-neutral, so switches number. Finally, Spanish dative clitics are also gender-neutral, and it switches 'reflexivity'. Subsequent research (e.g. Bonet (1995)) has cast doubt on the idea that *se* is an exclusively 'reflexive' clitic (being used also for impersonal contexts). For this reason, the fact that the Italian sequence of reflexive *si* and impersonal *si* cannot co-occur, yielding instead *ci si* (Wanner, 1977), may in fact be due to dissimilation under morphosyntactic identity between two instances of identically underspecified argumental clitics. Nonetheless, the idea of a faithfulness hierarchy governing possible repair operations is an intriguing one.

d. Delete the entire terminal M_1 (Tavullia).

Note that 3/3-effects in Romance have been argued to be purely phonological dissimilation phenomena (e.g. Gerlach (2002)), based on the fact that the two clitics in the cluster typically have *l-* stems. Ondarru provides decisive evidence against this view, since the two clitics involved do not share phonological features (*-tz*, *-∅* in (46)). 3/3-effects thus provide crucial illustration of identity-induced markedness at the level of abstract morphological features in the postsyntactic component: (i) identity in a single feature triggers deletion; (ii) the target of deletion can vary, but the result is always a less marked configuration, and (iii) the relevant domain is the M-word.

Finally, we turn to one of the most intricate cases of 3-3 dissimilation, found in certain varieties of Catalan (Bonet, 1995), where two dissimilation rules can feed each other. The ablative clitic *en* (49-a) and the neuter clitic *ho* [u] (49-b) undergo impoverishment when preceding other third-person forms. Thus (49-c) shows the locative clitic *hi* [i] in isolation, and (49-d) shows that the ablative clitic surfaces as locative [i] when in combination with a third-person accusative.

(49) a. De l'armari en trauré això després
from the.closet abl will.take.out this later
'I will take this out from the closet later'
b. Això, ho trauré de l'armari després
this, neut will.take.out from the.closet later
'I will take this out from the closet later'
c. A Sabadell, hi portaré això demà
to Sabadell, neut will.bring this tomorrow
'I will bring this to Sabadell tomorrow'
d. El jersei, del calaix, li trauré després (l+**i**, *l+**en**)
the sweater, from.the drawer, acc+ablt will.take.out later
'I will take the sweater out from the drawer later'

Following Bonet, we can understand this impoverishment as deletion of case features, specifically, as the loss of the [+genitive] features on the [−part, +obl] clitic when it precedes another [−part] clitic. The result is that the expected ablative shows up as the underspecified oblique locative *hi* [i].

A second, independent impoverishment rule affects the neuter clitic. Thus, when preceding the locative, it shows up as plain third-person accusative *l*, instead of neuter *ho*. This can be understood as a deletion of gender features when two 3rd person elements are adjacent:

(50) Això, a Sabadell, li portaré demà (**l**+i, ***ho**+i)
this, to Sabadell, neut+loc will.bring tomorrow
'I will bring this to Sabadell tomorrow'

These two impoverishment rules, one affecting the case of the ablative and one affecting the gender of neuter can be combined, and mutually feed each other, by combining an ablative with a neuter:

(51) Això, de l'armari, li trauré després (**l**+**i**, ***ho**+**en**)
this, from the.closet, abl+neut will.take.out later
'I will take this out from the closet later'

Summarizing, in Catalan, ablative, neuter, locative, and accusative clitics are all [−participant], and thus any of them is sufficient to provide a dissimilatory *trigger* for 3-3 dissimilation. Notably, however, only the first two are potential targets of the feature-deletion rules; the others merely trigger the rules. Finally, notice that like many of the configurations discussed above, the targets of deletion may not necessarily be the features incurring adjacent identity themselves, but rather orthogonal features (a point discussed at length in Nevins's (2011) distinction between markedness-triggered and markedness-targeted impoverishment rules).

By now it should be clear that M-Word internal dissimilation shares few properties with the dissim-

ilatory deletion rules encountered above in the section on haplology during prosodification. First of all, the clitics are deterministically within the same M-word, as they share a syntactic relation with the finite verb, unlike the cases in which two elements are merely adjacent due to accidental placement within the same prosodic phrase. Second, the variation in repair is much greater, often to the point where the marked configuration of adjacent identity triggers deletion on a feature orthogonal to the one shared by the two items, and in fact does not necessarily wholly remove the identity violation. Like the haplological effects in the preceding sections, however, we may observe that haplological impoverishment is insensitive to phonological form.

(52) **Properties of M-Word Internal Dissimilation**

- •Phonologically-insensitive
- •Reference to individual features
- •Not necessarily local with M-Word
- •Cross-linguistic variation in which element is the target of deletion
- •Possible repairs: deletion of individual features, even when these are potentially orthogonal to the triggering identity

We turn now to the discussion of examples that specifically demonstrate that the two triggering elements within the same M-Word need not be linearly adjacent for dissimilatory deletion to occur.

4.1 The g-/z- Constraint in Bizkaian Basque dialects

Similar to the dissimilation among [−Part] elements in the languages observed above is a dissimilation rule among [+Part] elements within the same M-Word found in Bizkaian Basque (Arregi and Nevins, 2007). As we will see, there is significant dialectal variation in the application of this rule; however, one can provide a unified analysis for all varieties involved by separating the structural description (triggering context) of the dissimilation rule from the structural change (repair) it effects.

Dialectal variation can be witnessed in both parts of the rule. We begin with the structural description, of which there are two types: (i) 2 ergative and 1Pl dative/absolutive (**you-us*), and (ii) 1Pl ergative and 2 dative/absolutive (**we-you*). The ban, therefore, is on domain-internal identity for the feature [+Participant].[9] In terms of the features involved, this can be schematized as follows:

(53)

	Erg	Dat/Abs
	[+Participant]	[+Participant]
and either		
	[−Author]	[+Author, −Singular]
or		
	[+Author, −Singular]	[−Author]

What is common to all dialects is that the structural description contains two adjacent [+Participant] features, which is what triggers dissimilatory repair. The structural change triggered by this structural description is also of two different kinds. It can be either impoverishment or obliteration:

(54) The *repair* to the g-/z- constraint involves *deleting* either:

a. [+Participant] *feature* on one of these terminals (impoverishment),
b. *or* one of these *terminals* entirely (obliteration).

Which specific terminal is affected by it is also subject to dialectal variation. For instance, the context 2 Erg – 1Pl Abs (**you-us*) triggers impoverishment of 2 Erg in Maruri, but impoverishment of 1Pl Abs in Ondarru (with concomitant changes in allomorph selection in the root):

[9]Note that the case of full identity, namely two clitics with identical values for [± author], would trigger reflexivization, which would therefore circumvent adjacent identity altogether.

(55) *(Suk gu ikusi)* g- aittu- **su** → g- aittu- ∅.
(You us seen) 1PL.ABS- TR- **2SG.ERG** → 1PL.ABS- TR- **3SG.ERG**
"You saw us." (Maruri, de Yrizar (1992, vol.1: 651))

(56) *(Suk gu ikusi)* **g**- aitxu- su → **d**- o- su.
(You us saw) **1PL.ABS**- TR- 2SG.ERG → **3SG.ABS**- TR- 2SG.ERG
"You saw us." (Ondarru)

In summary, across all Bizkaian dialects, Arregi and Nevins (2007) document three different implementations of **you-us*, which apply whenever the auxiliary contains a 1Pl Dat/Abs and a 2 Erg terminal: obliteration of 1Pl Dat, impoverishment of 1Pl Abs, and impoverishment of 2 Erg in the context of 1Pl Abs.

The constraint **we-you* (1Pl Erg with 2 Abs/Dat) triggers two different types of repair across Bizkaian dialects: in the context of 2 Abs, 1Pl Erg is impoverished or obliterated, and in the context of 2 Dat, 1Pl Erg is obliterated, as shown below for Gallartu and Zamudio:

(57) *(Guk suek ikusi)* s- **aittu**- e- **gu** → s- **ara**- e.
(We you saw) 2PL.ABS- **TR**- PL.ABS- **1PL.ERG** → 2PL.ABS- **INT**- PL.ABS
"We saw y'all." (Gallartu, de Yrizar (1992, vol.2: 127))

(58) *(Guk su ikusi)* s- **aitu**- **u** → s- **ara**.
(We you seen) 2SG.ABS- **TR**- **1PL.ERG** → 2SG.ABS- **INT**
"We saw you." (Zamudio, Gaminde (2000:373))

(59) Obliterate the Erg node containing [+Author, −Singular].

Even though the triggering context and the terminal affected are the same as in many other dialectal cases, the changes in the auxiliary are clearly more radical. In particular, the auxiliary root changes from the expected transitive *aitu* to intransitive *ara*. This shows that the ergative terminal is completely deleted, since a transitive form of the auxiliary is only possible if this terminal is present. In other words, the ergative terminal is obliterated, not simply impoverished. In the case of impoverishment, the ergative terminal is still present (even though it is realized as ∅), which triggers the insertion of the transitive auxiliary form.

In Zamudio, 1Pl Erg is also obliterated in the context of 2Dat:

(60) *(Guk hiri emon)* d- **o**- tzu- **u** → d- **a**- tzu.
(We you gave) 3SG.A- **TR**- 2SG.DAT- **1PL.ERG** → 3SG.ABS- **INT**- 2SG.DAT
"We gave it to you." (Zamudio, Gaminde (2000))

(61) *(Guk hiri emon)* d- **o**- tzue- **u** → d- **a**- tzue.
(We y'all gave) 3SG.ABS- **TR**- 2PL.DAT- **1PL.ERG** → 3SG.ABS- **INT**- 2PL.DAT
"We gave it to y'all." (Zamudio, Gaminde (2000))

(62) Obliterate the Erg node containing [+Author, −Singular].

As in the previous case, the main cue that the ergative terminal is completely gone is the change in the auxiliary root, which takes the intransitive form *a* instead of the expected transitive form *o*.) If the absence of an overt exponent for 1Pl Erg where analyzed as impoverishment followed by insertion of elsewhere ∅, we would not be able to explain the change in the form of the auxiliary. This is thus a "spurious unaccusative".

Summarizing the evidence from this subsection, we observe that impoverishment (feature-deletion) or obliteration (terminal-deletion) operate in response to haplological constraints for the feature [+part], even when the two elements are not strictly adjacent. This illustrates a property of M-Word dissimilation that distinguishes it from haplological processes occurring at the stages both before and after it.

5 Stage 4: Dissimilation during Vocabulary Insertion

In this final stage of exponence, haplology is sensitive specifically to phonological form. This stage of the computation involves allomorph selection (Vocabulary Insertion) operating with the ability to reference

syntactic skeleta, and respecting cyclic vocabulary insertion (whereby certain terminals undergo VI before others).

Let us first examine the case of allomorph selection with determiners in Italian. Determiners may be fused with a preposition where *de* 'of' + *gli* 'def.masc.pl' yields the contracted form *degli*. Similarly, for the allomorph *i*, chosen before consonant-initial nouns in Italian, the contracted form is *dei*.

(63) a. gli amici 'the friends'
b. degli amici 'of the friends'

(64) a. i cani 'the dogs'
b. dei cani 'of the dogs'

Interestingly enough, the plural of the noun 'god' is also *dei*, a form whose phonology we may assume to be present prior to allomorph selection of the determiner. In this case, an inappropriate / unexpected allomorph for the definite article is chosen (Brentari, 1998):

(65) a. i dei 'the gods'
b. degli dei (*dei dei) 'of the gods'

This case of haplology looks clearly phonological in nature, and its repair, choice of an allomorph usually chosen entirely on a phonologically-determined basis, supports this classification. The determiner allomorphs *dei* and *degli* do not differ in their featural content; they are ordinarily differentiated on the basis of phonological environment (C-initial vs. V-initial). In the case of (65-b), a phonologically unexpected use of the allomorph is recruited to avoid total identity.

A similar case can be found in Pashto, which a set of subject clitics, also used as possessive clitics (Tegey, 1975). In this case, the 1st/2nd plural clitic has two allomorphs, which are normally in free variation, with a stylistic/dialectal preference for one of them.

(66)

me	1sg
de	2sg
ye	3sg,pl
am/mo	1,2pl (henceforth [+participant, +pl])

In Western/literary Pashto, *mo* is the preferred form of the [+participant, +pl] clitic (examples below follow Tegey's transcription):

(67) motar mo/*am rAwostə
car part.pl bought
'We/y'all brought the car'

Possessive and subject clitics can be combined, leading to ambiguity:

(68) wror me de wahi
brother 1sg 2sg hits
'my brother is hitting you / your brother is hitting me'

However, when two instances of *mo* would be adjacent, the first one assumes the special form *am*:

(69) motar *mo/am mo rAwostə
car part.pl part.pl bought
we/y'all brought our/y'alls car

Given that *mo* and *am* share the same features, this case of morphological dissimilation seems irreducibly phonological: it is an instance of allomorph selection whose effect is to render the form of the adjacent morphemes non-identical, without any change in featural content.

Similarly, in Serbo-Croatian, both the object clitic and the auxiliary happen to be *je*. According to Radford (1977), when they occur next to each other, the repair involves a wholly new allomorph *ju* for the object, regardless of whether it precedes or follows the auxiliary.

(70) On je čita
He it.f reads
'He reads it'

(71) On je čitao knjigu
He has read book
'He has read the book'

(72) On ju je čitao
He it.f has read
'He has read it'

(73) Nije ju čitao
Not.has it read
'He has not read it'

In this case, a specialized allomorph, bearing the exact same features as its normally-used counterpart, is kept 'in reserve' only for those cases in which two phonologically identical elements would end up next to each other.

Haplology at this level of exponence, therefore, has no ability to operate on individual morphosyntactic features. Instead, it is sensitive to linearly-adjacent phonological identity, and avoids such identity by insertion of an otherwise unused allomorph.

(74) **Properties of Vocabulary-Insertion-Level Dissimilation**

- •Phonologically-sensitive
- •No reference to individual features
- •Operates under adjacency
- •Possible repairs: alternate allomorph selection, zero-insertion, coalescence

Similar considerations between heteromorphemic sibilants arise in the interaction between the English plural and possessive. As (75-a-b) show, choosing *'s* is ungrammatical with a pluralized head noun in *-s*, though not with other plural forms (75-c). As (75-d) shows, this is the result of a dissimilatory pressure between two *affixes*, not just a stem+affix pair, with identical segmental content: when both affixes are [-s] (or more likely, when both are [-z]), one of them – in this case, the outermost – has to go unexpressed

(75) a. the cats' feet are dirty (kæts, *kætsɪz)
b. the pigs' hooves are clean (pɪgz, *pɪgzɪz)
c. the oxen's hooves are dirty
d. Katz's deli

The case in (75-d) demonstrates that the English haplology is not between stem and affix, but specifically between two affixes.[10]. This case of haplology illustrates insertion of a zero-allomorph for the possessive, an operation whose nature we will return to in the discussion below.

Similarly, Stemberger (1981) cites impossible plurals due to adjacent identity, such as Swedish *kemik-er* 'chemist', which cannot take the plural *-er*. In this case, the agentive affix *-er* is identical to the plural suffix. The form *kemiker* takes a zero allomorph for the plural, and hence is compatible with both singular and plural readings.

Yet another case with a similar profile is found in Arabic, where the feminine and imperfect prefix are both *ta* (de Lacy, 1999). In this case, expected *ta* + *ta* + *kassaru* surfaces with only one of the expected pre-

[10]Nonetheless, haplology between possessive *'s* and stem is sometimes enforced in orthography, e.g. *Marantz'* or *Nevins'*

fixes, as *takassaru* 'it (fem.sg) breaks'. The analysis of this phenomenon by de Lacy (1999) in an Optimality-Theoretic framework implements the intuition similar in spirit to researchers such as Stemberger (1981), Menn and MacWhinney (1984), Russell (1997), and Yip (1998). Taking the case of *takassaru* as a representative example, these authors propose that a single *ta* represents an instance of *coalescence* in the output that corresponds to both input *ta*s. The implementation of this idea is that an "affix-checker" on the output involves direct statement of constraints like "feminine forms must begin with *ta*" and "imperfect forms must begin with *ta*". Both of these constraints can be satisfied with the two-for-one single morph in the output, leading to a type of coalescence analysis sometimes called ambimorphemicity or superposition.[11] In other words, there may not be a zero-allomorph for one of the two identical affixes; rather, there might be literally only one affix, whose function is to expone both of the morphemes delivered by the morphosyntax. We return to discussion of this possibility below, flagging for the moment the fact that zero-allomorphy and coalescence are two seemingly very similar implementations of the response to haplology among adjacent affixes.

5.1 Stem-Affix Haplology

In the preceding section, we have examined allomorph selection – sometimes in the form of a zero morpheme – for two adjacent affixes whose phonological form is identical. In this case, the question of zero-insertion is brought into sharper relief as we consider haplology between identical phonological sequences between an affix and (part of) an open-class stem.

One of the most well-known cases in which the stem ends in a phonological sequence that happens to overlap with the phonology of a concatenated suffix is the one Bloomfield (1933, 391) cites from Latin: *nu:tri-trix* 'nourish+agentive.fem > *nu:trix* 'nurse' . Such cases raise the question of whether the stem's *tri* is deleted in the presence of the affix, or whether some more sophisticated mechanism *tricks* – if the pun may be tolerated – the affix-checker (e.g. 'does the phonology of the stem include *nu:* followed by *tri*?' zdoes the feminine agentive form include *trix*?').

The overwhelming majority of stem+suffix haplology cases involve either straight deletion (or coalesence), or ineffability. Alternative allomorph selection, as seen above for the case of the Italian determiner, is rarely an option for the *stem* in these cases, perhaps precisely because it is the stem itself, rather than an affix, that is being targeted. In terms of a derivational timing mechanism, if Vocabulary Insertion for all open-class morphemes precedes Vocabulary Insertion for all closed-class morphemes, then there will be no way to perform alternative allomorph selection for the stem, as opposed to the affix, in response to stem-affix haplology.

As alluded to at many points in the preceding sections, the immediate question that arises given a coalescence analysis – in which a single output *ta* is able to satisfy both the requirement that feminine forms begin with *ta* and that imperfect forms begin with *ta* – is how to distinguish coalescence of two inputs into one output from straightforward deletion of one output. de Lacy (1999) brings suggestive evidence to the table that coalescence is an empirical possibility, at least for some cases of stem-affix haplology.

In Japanese, the predicative morpheme *-si* does not appear after stems whose phonology includes *si* (in fact [ʃi]). Thus for example, the predicative form of *kanasi* 'sad' is identical to the stem itself, appearing to be a case of zero-allomorphy – save for a change in accent. This is because the predicative suffix *-si* causes a pitch accent to appear on a preceding syllable, e.g. *aká+si* 'red+pred'. As the stem *kanasi* is unaccented, wholesale deletion of the suffix would lead to *kanasi*. However, as the predicative form is actually *kanasí*, it looks like what happened is *kanasi+si*, with the preaccenting property of *si* preserved before deletion/coalescence occurs.

This example is compatible with in principle with deletion of the stem's phonology. Interestingly, however, haplology occurs even when the stem ends in the sequence *zi*; thus, the result of haplology with expected affixation of /imiʒí+si/ is [imiʒî] 'extreme+pred'. As the root sibilant's voicing is preserved, de Lacy argues that this case cannot be handled with root-syllable deletion, and, coupled with the preaccent-

[11] Dressler (1977) attributes the idea of "syllabic superposition" – that the single output syllable can be seen as a representative of both morphemes – to Grammont (1895, 111ff).

ing facts, call for a coalescence analysis: the output sequence [ʒi] serves as a correspondent to both the stem's and affix's input phonology.

Additional cases involving suffixes whose phonology overlaps with *part* of the stem can be found in French *-iste* formation: de Lacy (1999) discusses the fact that even partial overlap can lead to coalescence, such as *deixis+iste*, which leads to [deiksist], where one instance of the input sequence *is* does not make it into the output.

Some of the stem-internal cases seem to target identical syllabic sequences when they are already 'weak'; witness for example the case of the ban on adjacent *-er*s in Swedish above. In this same vein, Plag (1998), discussing *-ize* formation with nouns and adjectives that end in C_iVC_i sequences, contrasts *feminine, *femininize, feminize* with *strychnine, strychninize*. The difference is that **fémininíze* would have two adjacent identical unstressed VC sequences, while *strýchninízе* would not.

In fact, Cardona (1968, 48) identifies the major context for haplology as VCVC sequences with identical Cs, such as **fish-ish* or German **honig-ig* 'honey-y'. Dressler (1977) contrasts German *Zauber-er* 'sorcerer' with *Zauberin, *Zauber-er-in* 'sorceress', specifically because the final /r/ will delete in the coda in the masculine forms, but would be in an onset in the feminine form, and hence lead to the illicit sequence [ərər]. Dressler (1977) also points out that stem-affix haplology is virtually unattested across prefix-stem boundaries, because in all of these cases, the repeated syllables are more salient.[12] These formulations emphasize the syllabic 'weakness' of many of the cases in which stem-internal sequences are accidentally identical with suffixes. A wide range of stem-internal + suffix haplology cases may be found in Stemberger (1981) and Menn and MacWhinney (1984), and further research may uncover that a larger-than-accidental number of these cases fall into the classification of involving phonologically weak sequences. We return to the potential role of salience as one of the diachronic and psycholinguistic foundations for Vocabulary-Insertion level haplology in Section 7 below.

5.2 Reduplicative Haplology

As mentioned in the introduction, virtually every researcher working on haplology, especially Dressler (1977), emphasize that it is a constraint against accidental, rather than intentional repetition, and thus stands in stark contrast to reduplication, where there is a deliberate instruction to repeat a (morpho)phonological sequence, including even cases such as double diminutives for intensification. Of great interest to the discussion, therefore, are cases where haplology *does* step in during reduplication. One set of cases where this occurs involves stems that themselves look 'already reduplicated'.

Samoan reduplication involves a prefixal reduplicant that is usually two syllables (more precisely, a foot) (de Lacy, 1999). Thus, examples (76-a-b) illustrate the usual pattern of reduplication. However, when the stem already contains two identical syllables, the result of reduplication is a single (lengthened) syllable, rather than a full copy of the stem.

(76) a. fiti-fiti 'flick-pl.'
b. maʔa-maʔai 'sharp-pl.'
c. le:-lele 'fly-freq.'
d. ni:-nini 'apply-freq.'

The result of doing 'normal' reduplication here would be four wholly identical syllables in a row. The alternative, lengthened single-syllable reduplication, leaves the stem intact with no fully identical copies preceding it.[13] This case can be understood as a type of allomorph selection that again, does not change the basic content of a morpheme, but merely provides an alternative output for its phonological form (in

[12] A discussion of suprasegmental haplology, e.g. affixes with a polar tone, opposite from the stem, is outside the scope of the current paper, though they may be relevant to the question of prefix-stem haplology. See Trommer (2005b), among others, for an analysis of such phenomena.

[13] A similar case, albeit suffixing, and without vowel lengthening, can be found in Manam cases such as *ragogo-go, *ragogo-gogo* 'be warm'. The analysis in Fitzpatrick and Nevins (2004) of this case involves a 'nucleus-counter' that, somewhat like the 'affix-checker', is fooled by the structure of the representation.

a manner that can perhaps be understood if reduplication or lengthening both satisfy a requirement of an extra mora; see Bye and Svenonius (lume) for discussion).

In Tagalog, the morpheme *pa-* is a causative marker, and the morpheme *pag-* is a transitivity marker. These two can occur in combination, in forms such as *makapagpahintay* 'I am able to be the one to make another wait for me'. However, in the other order (*pa-pag*), their occurrence is limited, for the following reasons. The future tense in Tagalog is accomplished by optional CV reduplication of any noninitial or nonfinal syllable (Samuels, 2006). Thus, (77-a) could in principle trigger the CV reduplications in (77-b-d):

(77) a. magsipagtrabahoh 'some people work together'
b. mag**si**sipagtrabahoh 'some people work together (fut.)'
c. magsipag**ta**trabahoh 'some people work together (fut.)'
d. *magsi**pa**pagtrabahoh 'some people work together (fut.)'

Despite the interesting general optionality of which syllable can be reduplicated, Samuels (2006) argues that the option of CV reduplication in (77-d) is blocked because it creates a form ambiguous between reduplication and addition of the *pa-* affix. In this instance, therefore, an optional process of reduplication is blocked in case it would indeed 'accidentally' result in an existing – but unintended – morphological sequence.

Continuing with the theme of reduplication that 'accidentally' creates an exact copy — without intending to, one finds cases of consonantal fixed-segmentism and spontaneous 'avoidance' that occur with echo word formation. For example, English *shm-* reduplication results in a reduplicant whose onset is *shm-*, e.g. *flowers, shmowers*. Nonetheless, as a large-scale survey by Nevins and Vaux (2003) shows, speakers do not tolerate such reduplication when the base itself begins with this sequence. Thus, the name *schmidt* must undergo alternate attempts, such as *schmidt-shpidt, schmidt-flidt*, etc. Surprisingly, this phenomenon extends to practically every case of echo reduplication that exists: in Turkish *m-* reduplication (e.g. *kitap-mitap* 'books and the like'), echo reduplication with *m*-initial bases (e.g. **masa-masa* 'tables and the like') is simply impossible; in Hindi *v-* reduplication, *v*-initial bases take a special allomorph, [ʃ-], and many other cases can be found in the relevant languages. Fitzpatrick and Nevins (2002) present a formal account of this long-distance dissimilation in terms of the multiple precedence representations of Raimy (2000).

One of the more intricate cases can be found in Halh Mongolian (Svantesson et al., 2005), Nouns can form echo reduplication, with an associative plural semantics (X and such things, X and people like him/her, with a slightly pejorative flavor). This is formed by an *m-* prefix that appears in the onset of the reduplicant (78-a), unless the base begins with *m*, in which case it is /ʦ/ (78-b). However, this process cannot be treated as complete overwriting of the onset in the reduplicant, because of the interesting fact that palatalization is transferred from the corresponding consonant in the base when *m-* is chosen, resulting in m^j (78-c). However, as /ʦ/ has no palatalized counterpart, no transfer occurs when m^j is the base (78-d).

(78) a. aɮx maɮx bread and such'
ɢɔiməŋ mɔiməŋ 'noodles and such'
ontəg montəg 'egg and such'
b. maɮtsaɮ 'cattle and such'
miɮxi tsiɮxi 'frog and such'
c. p^jasɮəg m^jasɮəg 'cheese and such'
x^jaam m^jaam 'sausage and such'
d. m^jaɢmər tsaɢmər 'Tuesday and such'
m^jaŋɢ tsaŋɢ 'thousand and such'

Such cases demonstrate that the anti-identity effect of the echo word formation actually seeks to preserve the subsegmental feature of secondary articulation, and raise important questions about the exact dimensions of the dissimilatory nature of echo word formation. It clearly cannot be an instruction to "create a word that echoes / rhymes, but is not identical", as preservation of palatalization complicates such a statement. Moreover, patterns of reduplicative overwriting involving the *vowels* suggest that 'echo formation' is in fact specifically about avoiding accidental identity, when possible, and within limits, among the two copies. For example the overwriting segment found in prefixal reduplicants in Javanese is an [a] that

overwrites the final vowel of the reduplicant (79-a-d). However, when the stem itself contains an [a], the reduplicant follows a wholly different pattern of vowel overwriting (79-e-f):

(79) Javanese Hab-Rep prefixation (Yip, 1995):
- a. elaŋ-eliŋ 'remember'
- b. tuka-tuku 'buy'
- c. udan-uden 'rain'
- d. tak-tek 'tap'
- e. lola-lali 'forget'
- f. odas-adus 'bathe'

We thus see that fixed-segment reduplication, whose normal purpose is to create *non-identical* copies, must itself face a type of allomorph selection when it would otherwise result in total identity. Interestingly, as virtually every language that has echo reduplication also has some form of total reduplication (Moravscik, 1978), even if only of the canonicalizing type (e.g. English SALAD-salad, described by Ghomeshi et al. (2004)), the avoidance of "accidentally" identical reduplicants can be grouped under the umbrella with the Tagalog cases above: what is avoided is an output that would be ambiguous between the intended morphosyntactic exponence and an alternate, accidentally identical but unrelated construction. This is in fact the explanation of Mayerthaler (1975): haplological deletion is a way of avoiding the appearance of opaque "overapplication" of a reduplicative rule where it should not apply. The identity-avoidance in overwriting reduplication is so pervasive across languages, and so easily found in spontaneous judgements of naïve native speakers, it really seems to hit upon a deep dispreference in linguistic structure: against accidental, unintended repetition. We return to this issue in Section 7.

6 Haplological phenomena requiring further theoretical elaboration

In this section, we turn to two phenomena that pose interesting challenges for the basic model above. The first are cases that are phonologically sensitive (and can be avoided by allomorph selection), but are not strictly adjacent, perhaps necessitating the need for a kind of relativized adjacency in Stage 4. The second are cases that enrich the typology of potential repairs at the M-Word stage.

6.1 Phonologically-Sensitive with Relativized Adjacency

In Section 2.1, we discussed the Japanese double-*o* constraint, which did not require strict adjacency of the KPs involved, thereby placing it squarely in the realm of Linearization-level haplology. A similar, although arguably phonologically-sensitive case (with also some syntactic sensitivity) can be found in the Hindi double-*ko* constraint (Yip, 1998), which bans instances of the dative/accusative case marker *-ko* under adjacency and identical phonological form, under the condition that both elements are true syntactic arguments.

(80) *Raam-ko baccõ-ko samhaalna paḍaa
R-Dat children-acc take.care.inf fall.perf
"To Ram fell the taking care of the children"

(81) Raam-ko kal baccõ-ko samhaalna paḍaa
R-Dat yesterday children-acc take.care.inf fall.perf
"Yesterday to Ram fell the taking care of the children"

(82) Raam-ko raat-ko Ravii milaa
R-Dat night-at Ravii met
"Ram met Ravi at night"

As the ban on two argumental *ko*-phrases is similar to the Japanese double-*o* constraint, the former, unlike the latter, is obviated by an intervening adverb, thus excluding it from Stage 1 (Linearization-Level) dis-

similation. Importantly, one other way of obviating the constraint is by choosing another allomorph for *-ko*, namely the allomorph *-e*, which is possible with pronominal arguments in Hindi:

(83) Ham-e/*Ham-ko baccõ-ko samhaalna paḍaa
We-Dat/We-Dat children-acc take.care.inf fall.perf
"To us fell the taking care of the children"

The repair in terms of alternative allomorph selection resembles Pashto clitics, which, in Section 5. However, the two instances of *-ko* are not linearly adjacent. This would seem to call for an analysis of the Hindi double-*ko* constraint in terms of allomorph selection in the Vocabulary-Insertion stage, but with a relativized notion of adjacency: the host NPs to which these case markers attach do not seem to 'count' for determining strict adjacency. Arguably, this relativization could take into account the closed-class/open-class distinction, and relativize adjacency in terms of this parameter, employing the relativized visibility framework of Calabrese (1995); Nevins (2010) used in phonology: the constraint against identical affixes would then evaluate adjacency in terms of containing hosts, still allowing the adverb obviation. Whether or not this particular alternative proves feasible, it should be clear that at present, the existence of cases like the Hindi double-*ko* constraint pose challenges for a division of labor of haplology effects, as they are not strictly adjacent, and are sensitive to syntactic category, but are reparable by allomorph selection.

6.2 M-Word Dissimilation resolved by Portmanteaux

The discussion of haplology effects in Stage 3 included a case study of [+participant] dissimilation in Bizkaian Basque (Section 4.1), which were repaired by deletion – either of a feature or a terminal. In addition, there are cases of haplology among two [+participant] arguments that can also be resolved by insertion of a portmanteau morpheme that expones both arguments.

Thus, an alternative repair to deletion of one of the participating morphemes in an OCP-violating configuration is to fuse the two into one – essentially the morphosyntactic equivalent of what we identified as coalescence at the phonological level. For example, in Huastec (Edmonson, 1987), there is a set of pronouns used for objects and unaccusative subjects (84), and a set of pronouns used for ergative agents (85). Third person objects are typically zero.

(84) ʔin k'alel
1.abs go.thematic.incompletive
'I go'

(85) ʔa hapiyal
2pl.erg open.thematic.incompletive
'You open (it)'

However, when the combination of two [+participant] pronouns would be expected, instead, a specialized portmanteau pronoun, expressing the features of both agent and object, is found:

(86) tin kʷaθaʔ
2plerg/1abs hit.thematic.completive
'You hit me'

The two clitics arguably form an M-Word with the finite verb, and portmanteau insertion is arguably a repair strategy for avoiding adjacent morphosyntactic features. The use of portmanteaux in such cases is well-documented in Heath (1998), who provides a similar example from Caddo, whereby *yah-ku* expresses 2ag > 1obj, 1st person agents are usually *ci*, and 2nd person objects usually *si*. However, 1ag > 2obj, rather than expected *ci si*, is instead the fused portmanteau *t'a*.

The specific implementation of portmanteau insertion,c however, is a matter that requires further discussion and development. One possibility, for example, is that a portmanteau represents literally the case of deletion of one morpheme and a specialized allomorph in the other, as proposed by Trommer (2005a).

Another possibility is that the two terminals are literally fused prior to Vocabulary Insertion, with some modification of their (contradictory) non-identical features that feeds the possibility of insertion of a highly specific Vocabulary Item. While we can perhaps safely place feature-level haplology-avoiding portmanteaux as part of Stage 3 of exponence, theoretical elaboration of its mechanism remains as an open challenge.

7 Grounded Morphology: Foundations of the Haplological Instinct?

A basic conclusion of this chapter is that haplology phenomena can – and arguably should – be considered along various dimensions: phonologically-sensitive vs. phonologically insensitive, feature-level vs. category-level, and adjacency-requiring vs. within-same domain, and in terms of a typology of repair operations. Having elaborated a number of these formal distinctions in the structural description and structural change of haplological phenomena and having situated them at distinct points within the architecture of exponence, we now turn a more speculative discussion of the persistent question that lurks in the study of all OCP phenomena: why do they exist?

As the emphasis of this chapter has been that there are four classes of phenomena that benefit from a division of labor and hence should not receive a single formal account, one can turn to the question of whether indeed they should all receive a unified functional account. In fact, since few authors have considered all of these various phenomena at once, none of the existing functional explanations have been devised to encompass them all. Many more of the functional explanations have been developed for the phonologically-sensitive (i.e. less abstract) cases of haplology.

While it is my contention that functional explanations cannot substitute the formal accounts of haplology phenomena (and indeed, often do not even have the same strength of empirical coverage as corresponding formal accounts), I would like to nonetheless investigate the potential role of functional pressures (usually of a psycholinguistic basis) in slowly, over repeated usage, diachronically filtering grammars in the direction of 'morphologizing' these pressures into formal constraints and repairs.

At the root of certain haplological constraints may be a pressure for ambiguity avoidance, where nonetheless discussion of the specific type of ambiguity is crucial (and in which the distinct types of ambiguity may have distinct functional reflexes). Note, for example, that Richards's (2010) implementation of haplology based on unlinearizability has a clear formal basis in the irreflexivity of linearization relations: a linearization statement <D,D> simply fails to provide the relevant instructions for how to order two terminals. One could thereby seek functional parallels with linguistic and cognitive phenomena that avoid 'lethal ambiguity' – the paralyzing paradox known as Buridan's ass (after the parable of a donkey stuck between two equal choices, developed by the philosopher Jean Buridan, a student of Ockham). In this specific case, ambiguity avoidance would arise in the production system of language at the interface between two linguistic modules. This is to be contrasted with the type of ambiguity avoidance discussed below in the comprehension system, in the process of parsing a sequence of syllables into their consituent morphemes. Finally, turning to the fact that phonological haplology may be avoided specifically because of its 'accidental', rather than intentional nature, recall that Mayerthaler (1975) argues that haplology constraints exist specifically to avoid the ambiguity of whether a form with adjacent repetitions is a case of intended reduplication.[14]

Haplology operative with Stage 2 specifically seeks avoidance of identical terminals within the same prosodic domain, though they need not be phonologically identical (as in the case of Dutch VS agreement weakening). A functional basis for this type of haplology would involve an appeal to non-redundancy, which arguably may arise through a generalized ban against excess structure, as encoded by *STRUC constraint in the OT literature (e.g. Russell (1995)). Stemberger (1981) develops a model of the haplology bias

[14] A proposal that is highly performance-oriented in nature, in a way that seems by nature irreconcilable with morphologization, is that of Wurzel (1976), who capitalizes on the fact that stem-affix haplology is precisely a sporadic and inconsistent phenomenon. Wurzel argues that the sporadic nature of morphophonological haplology is evidence for hypercorrection – known to be sporadic – against self-aware childlike sounding of repetition. Wurzel's (1976) proposal is that children's template-filling productions with gratuitous reduplication, such as *lokomotitive* instead of *lokomotive* and *papapagei* instead of *papagei* 'parrot' gradually lead to suppression of repeated syllables. This self-censoring pressure eventually fossilizes into an overzealous anti-repetition pressure in the adult grammar that rules out too many otherwise morphologically transparent combinations, such as *ɦonig-ig* 'honey-y'.

in terms of feedback between the production system and the comprehension system, whereby a feedback monitoring system is faultily affected by 'memory masking': the fact that memory (and checking whether the correct output was produced) may be obscured by adjacent identity. Walter (2007), in a broad study of OCP effects in grammar, cites Kanwisher (1987) and Soto-Faraco and Spence (2001), among others, as describing instances of psychophysical parallels of 'repetition blindness' and 'repetition deafness' across broad cognitive domains.

In terms of a potential functional basis, morphosyntactic dissimilation of the type found in Stage 3 arguably is a grammatical response to excessive syntagmatic markedness. In describing a case of dual-dissimilation in Warlpiri similar to the M-Word impoverishment phenomena of Section 4, Noyer (2001, 769) remarks: "Evidently, the combination of two such [dual] features in Warlpiri surpasses a language-specific limit on informational richness"). While the functional basis for excessive markedness within a single word is arguably difficult to pin down, the intuition shared by many researchers is that more than one instance of the same feature within the same M-Word – even when not 'redundantly' cross-referencing the same argument – may lead to an overload of grammatical information in a single lexeme, a phenomenon we return to below.

Dressler (1977) argues that morphophonological haplology, of the type described in Section 5, arises from an attempt to improve the perceptual separability of morphemes, a kind of parsing-oriented pressure. Avoiding heteromorphic but phonologically identical VC-VC sequences avoids the misalignment of morphological and syllable boundaries and aims for correct identification of the underlying morphosyntactic structure. In essence, the idea is that there is a sometimes faulty system of performance, and that exponence is best 'decoded' by the listener when there is a clear separation of exponents into phonologically distinct syllables. This functional pressure may in fact be related in a generalized manner to the ban on syntagmatic identity within the M-Word at Stage 3, as multiple instances of the same feature (e.g. [+participant]) in a form cross-referencing multiple arguments may be difficult for the listener to unpack in terms of which feature belongs to which argument.

A production-oriented pressure that leads to morphophonological haplology, argued to be operative especially in the developmental phases of acquisition of a morphological system, is developed by Menn and MacWhinney (1984). These authors explicitly develop the notion of an affix-checker in production that, as we have mentioned above, contains statements like 'If this is a pluralized form, it should end with a -z. If this is a possessive form, it should end with a z'. This checker can thus be 'fooled' by forms like [pɪgz], where a single segment does double-duty. In terms of OT implementations that capture the intuition of an 'affix checker', the most straightforward way to do this is to have exponence constraints requiring statements such as REALIZE THE POSSESSIVE WITH AN -S. Russell (1995) uses alignment constraints combined with segmental underspecification to analyze some thorny problems in Nisgha haplology, which involves 'deletion' (or coalescence) under partial identity. In this language, 3sg *-t* does not appear before or after other coronal obstruents, even if they are part of the stem:

(87) a. limx -t 's/he sings'
b. naks (-*t) 's/he marries'

Russell's analysis is that morphemes are constraints, and thus that the 3sg is actually exponed by a constraint saying 'Align the 3sg exponent with a coronal obstruent' and 'Align the 3sg's righthand boundary with the stem's righthand boundary', which accomplishes perfect alignment if the *[s]* in *naks* manages to satisfy the exponence constraint that a 3sg should be realized by a coronal obstruent. A more spectacular example of the effects of this overlapping exponence interacting with dissimilatory constraints on expression can be found in these Nisgha examples, with three instances of haplology in a single form:

(88) ɬa naks -(*t) =(*s) =(*t) Peter
now marry -3sg =erg =det
'Peter is married now'

The affix-checker would thus be operating at a fairly fine-grained level of featural requirements on exponence (e.g. coronal obstruent), and, according to these models, would lead to the eventual morphologiza-

tion of haplology constraints on repeated partially-identical segments belonging to different morphemes.

Let us now summarize broadly over the types of accounts discussed above. We have reviewed performance-based accounts that appeal to (a) perceptually-oriented delivery of clear parsing of the phonological sequence into morphemes, including avoiding forms ambiguous with reduplication; (b) production pressures, whereby memory limitations lead to a repetition-blindness that feeds into acquisition, or feedback-based, in which an affix-checker is fooled by output forms that satisfy exponence constraints; (c) production-oriented, in failing to deliver linearizable structures, or in surpassing generalized bans on excessive structure. In fact, all of these proposals, perhaps in combination, would be compatible with a vision of 'grounded' morphology, whereby performance pressures ultimately become morphologized into formal constraints, much like the view of Hawkins (2004), in which parsing pressures shape formal grammars over time.

It is important to continue investigation of these dissimilatory phenomena over these 'longer timescales', and how biases in processing and acquisition may lead learners to eventually arrive at grammars that exclude haplological configurations present in the input. Arguably, artificial grammar experiments – particularly of the 'iterated learning' variety, with multiple generations of learners providing input to the next, as in Smith and Wonnacott (2010), would provide promising and powerful methodologies for investigating many of these specific questions.

From the general perspective of a theory of exponence within synchronic grammars, the distinct formal restrictions on structure-visibility and on the types of repairs shed light on a division of labor at various points within the mapping from a phonology-less, unlinearized syntactic structure all the way to a linear and phonologically contentful exponence. The architecture of haplology is thus best understood in terms of modular components, with distinct well-formedness requirements and repair operations, and arguably, either formalist or functionalist attempts to conflate all four levels into some kind of generalized ban on repetition will obscure their independent natures.

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