

**DERIVING ASYMMETRY IN  
SWEDISH AND ICELANDIC  
INFLEXIONAL PARADIGMS**

**CHARLES H. BUCHANAN**



*Supervisor/Vegleiar* **Dr Curt Rice**

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## Abstract

The present thesis sets out to address explicanda which appeal to a notion of gaps *vis-à-vis* inflexional paradigms and further pose a challenge of modelling within contemporary generative phonology. Albright (2006) discerns *phonotactically-motivated* and *lexically-arbitrary* paradigm gaps. The former case serves as a repair strategy mandating circumvention of a surface-illicit configuration (i.e., ill-formedness); whereas the latter case sees the emergence of gaps alongside structurally analogous forms wherein no such gaps occur. Enquiry into the aforementioned phenomena will draw empirically on Swedish *-ddt* clustering and Icelandic imperative formation, respectively. A generalised phonological account will be pursued *ad rem* in the Swedish case study such that constraints relativised to morphosyntactic properties will be argued as conceptually inferior to the purely phonological model of grammar put forth. Upon analysis of Icelandic imperative formation, an approach appealing stringently to phonological properties will prove infeasible in light of data neutralising any such phonological triggers; requiring rather lexicalisation and the utility of a transderivational constraint, as incited by the uniformity effects of paradigm levelling. The cogency of these analyses will further suggest that analytic disparities distinguishing between Swedish and Icelandic gaps are irreconcilable in that the systematicities driving phonotactically-motivated and lexically-arbitrary paradigm gaps are markedly at odds.



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## LIST OF (NON)STANDARD SYMBOLS & ABBREVIATIONS

→	<i>yields</i>
~	<i>supports</i>
¬	<i>not</i>
≅	<i>corresponds to</i>
✓	optimal surface form
#	[PLACE]-boundary
$S^1+S^2$	<i>Segment<sup>2</sup> is suffixed to Segment<sup>1</sup></i>
§	devoiced Segment
ǃǃ	monomoraic diphthong
∅ (⊙)	null output (tableau format)
μ	moræ
X	skeletal timing slot (autosegmental)
⊖	crashed derivation: felicitous candidate (tableau format)
⊗	crashed derivation: infelicitous candidate (tableau format)
2	grammatical person: 2 <sup>nd</sup>
ADJ	adjective
[ASP]	[±aspiration]
BVA	bidirectional voicing assimilation
COR	coronal (consonant)
IMP	imperative
IPA	international phonetic alphabet
INF	infinitive
N(EUT)	grammatical gender: neuter
OCP	obligatory contour principle
PART(S)	verb participle(s)
Pl	grammatical number: plural
Sg	grammatical number: singular
[s.g.]	[±spread glottis]
V	vowel





## §1 INTRODUCTION<sup>1</sup>

### §1.1 DEFINING THE NOTION OF INFLEXIONAL PARADIGM

The term *paradigm* stems from Greek *παράδειγμα* (transliterated: *parádeigma*) loosely meaning an “example of pattern”. The notion of paradigm in modern linguistics has not strayed far semantically from its Greek cognate. Under its most rudimentary definition, paradigm expresses a set of similar word forms. Relative to the present context is a notion of *inflexional paradigm* wherein grammatically-inflected word forms are built around single lexeme; resulting in a network of morphologically-related words. Each inflected word form is thus the expression of a given morphological category. The exponents expressing such grammatical inflexion constitute *inflexional morphology*, which Trosterud (2004) defines as the realisation of morphosyntactic properties through bound forms. Inflexional paradigms are *symmetric* when for every morphological category (i.e., cell) of a paradigm there exists a correlated cell such that two or more inflected word forms are correspondingly expressed. When a cell of a given inflexional paradigm lacks a word form, this asymmetry is referred to as a *gap* within the respective paradigm.

As observed by Rice (2005), gaps are morphologically selective in that they occur in cells of paradigms which are computed *vis-à-vis* other cells within the same paradigm. Within a framework of generative phonology – specifically, OPTIMALITY THEORY (OT) (Prince & Smolensky 1993) – paradigm gaps are attributed to a crashed mapping between a Base form and a derived form; rendering what is commonly called *absolute ungrammaticality* in that an absence of form surfaces in place of an overt form. Albright (2006) discerns *phonotactically-motivated* and *lexically-arbitrary* paradigm gaps. The emergence of ungrammaticality in the former is a repair strategy mandating circumvention of some surface-illicit configuration (i.e., ill-formedness); whereas ungrammaticality in the latter emerges alongside structurally analogous forms wherein no such gaps occur. It follows, *ex hypothesi*, from the nature of phonotactically-motivated gaps that their exposition be

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<sup>1</sup> I am indebted to Curt Rice, Gunnar Hrafn Hrafnbjargarson and Jan Helge Bergheim for their invaluable feedback on erstwhile drafts of this thesis. The present paper was further presented to audiences at Universitetet i Tromsø in February and June of 2007. I am similarly obliged to the aforementioned audiences; particularly to Patrik Anders Bye, Martin Krämer and Jardar Eggesbø Abrahamsen. Needless to say, any inaccuracies and/or errata are my own.

purely phonologically grounded, whilst lexically-arbitrary gaps being explicable only by appealing to degrees of extraphonological conditioning. These latter generalisations will serve as premises in concluding that the aforesaid types of ungrammaticality are analytically incompatible.

#### §1.2 MODELLING UNGRAMMATICALITY: STRATEGIES FOR GAP OPTIMISATION

The architecture of OT presupposes that for every input there exists an output. Gaps are therefore intrinsically problematic because in such cases *no* output is mapped to an identifiable input. In the course of this discussion, three strategies for optimising gaps will be brought to attention: (i) NULL PARSE (ii) OPTIMAL GAPS and (iii) CONTROL theory.

At the centre of a *null parse* model of grammar (Prince & Smolensky 1993) is the *null parse* – a gap candidate – whose sole purpose is to violate only one constraint, MPARSE:

##### (1) NULL PARSE: GAP-TARGETING CONSTRAINT

MPARSE

*Morphemes are parsed into morphological constituents*

Within this model, the optimality of the gap candidate is predicated upon the dominance of MPARSE within a given ranking argument (in EVAL). Assuming MPARSE outranks all other constraints, the gap candidate will, by definition, be eliminated; whereas imagining a scenario where all other constraints outrank MPARSE, the gap candidate will then, by definition, emerge as the winner. Thus, MPARSE sets a standard whereby any surface-viable candidate incurring a violation by a constraint, which outranks MPARSE, will be eliminated. Any constraint ranked higher than MPARSE is thereby rendered inviolable.

The OPTIMAL GAPS (OG) approach (Rice 2005) evaluates candidates as variegated realisations of inflexional paradigms. The optimal candidate is thus the most well-formed paradigm. A central goal of OG is the evaluation of *incomplete* paradigms such that at least one vying candidate will express an absence of some paradigm member.

Proponents of this approach argue OG as superior to the null parse model in that a violation incurred under the gap-targeting constraint, MAX{CAT}, is not a stipulation:

(2) OG: GAP-TARGETING CONSTRAINT

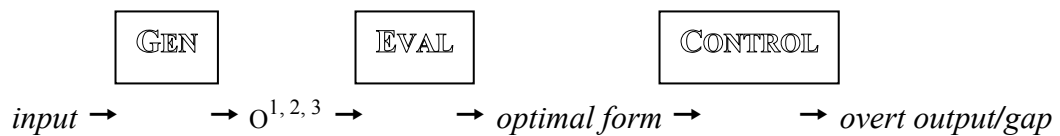
MAX{CAT}

*Expression of a morphological category is required*

The incomplete candidate will thus inevitably incur a violation under MAX{CAT} for failure to express (i.e., deletion of) a (morphological) member within its paradigm. Not dissimilar from the inviolability standard set by MPARSE, the emergence of the incomplete paradigm candidate corresponds to the degree of dominance of MAX{CAT} within a given ranking argument.

The third strategy for optimising gaps is CONTROL theory. (Orgun & Sprouse 1999) Within the CONTROL model, there exists a supplementary checking module following OT's EVAL. The candidate optimised by the grammar in EVAL is further evaluated in this additional domain – called CONTROL – whereupon it faces an inviolable (i.e., “hard”) set of one or more constraints to determine output felicity. This model is schematised below:

(3) CONTROL THEORY SCHEMATISED



The output of the grammar is thus submitted to CONTROL upon optimisation in EVAL. The output of CONTROL as either an overt form or a gap depends upon whether the output from the grammar incurs any violation in CONTROL. With “hard” constraints operative within this module, any violation is fatal and will result in no output for a given input (i.e., a gap emerges).

### §1.3 THESIS OBJECTIVE & FORMATTING

Whilst appealing empirically to cases of paradigm gaps in both Swedish and Icelandic, the desiderata underpinning the present thesis are (i) what role extraphonological information plays in explicating the behaviour of phonotactically-motivated versus lexically-arbitrary paradigm gaps and (ii) how both types of ungrammaticality, in the present context, can be modelled from an Optimality-Theoretic perspective.

Swedish *-ddt* clustering betokens phonotactically-motivated paradigm gaps insofar as the obstruent sequence *-ddt* is an ill-formed cluster and will be unexceptionally avoided by the grammar. Of interest to us is that repairing or crashing the cluster appears to correspond to the morphosyntactic category of the ill-formed word; leaving analysis to have the phonology hinge upon extraphonological information in accounting for the data. Furthermore, an example of lexically-arbitrary paradigm gaps will be drawn from allomorphy operative in Icelandic imperative formation wherein any phonological triggers, such as phonotactic shape, in determining either *or* neither allomorph will be shown to be neutralised by conflicting data; forcing an analysis to appeal to extraphonological conditioning in explicating seemingly paradoxical circumstances.

The remainder of this thesis breaks down as follows: §2 presents a Swedish case of phonotactically-motivated paradigm gaps wherein disparate treatment of *-ddt* clustering across morphosyntactic categories is argued to be purely phonologically motivated, despite previous analyses concluding the contrary; §3 discusses an Icelandic case of lexically-arbitrary paradigm gaps wherein suffixation of the imperative morpheme results in a paradoxical display of allomorphic regularity, irregularity and ungrammaticality which further necessitates exploiting some degree of extraphonological information; and §4 concludes.

## §2 SWEDISH ASYMMETRY: NEUTER ADJECTIVAL INFLEXION

### §2.1 INTRODUCTION

This section serves the empirical task of introducing the reader to absolute ungrammaticality within Swedish inflexional paradigms; as observed *ad rem* in the neuter declension of certain adjectives. Introduction to pertinent data will necessitate both a formalisation of our objective here and formatting for the remainder of the discussion.

#### 2.1.1 THE EMPIRICAL FACTS: LAYING THE GROUNDWORK FOR ANALYSIS

Swedish singular, indefinite (i.e., strong) adjectives agree in gender with the nouns they modify. Nouns are declined for either *uter* (common) or *neuter* gender whereupon the latter of the two requires suffixation of /-t/ to any attributive (or predicative) adjectives, as shown in (4b):

#### (4) SYMMETRIC ADJECTIVAL UTER-NEUTER DECLENSION

(a) en rysk pojke  
‘a Russian boy’

(b) ett rysk-t barn  
a Russian-NEUT child  
‘a Russian child’

Ungrammaticality conversely arises when adjectives terminating in *-dd* are declined for neuter agreement. Iverson (1981) remarks that only two Swedish adjectives meet these coda conditions: *rädd* ‘frightened’ and *fadd* ‘bland’. The former of the two is exemplified below:

#### (5) ASYMMETRIC ADJECTIVAL UTER-NEUTER DECLENSION

(a) en rädd pojke  
‘a frightened boy’

(b) \*ett rädd-t barn

Data in (4) show a fully-declined gender paradigm for *rysk* in that both uter and neuter cells are occupied with an overt word form (i.e., *rysk-ryskt*). To the contrary, data in (5) indicate an empty neuter cell in the inflexional paradigm for *rädd* (i.e., *rädd-Ø*).<sup>2</sup> The nature of the stem *-dd*, whereto *-t* fails to suffix, incites the following generalisation: *-ddt* is phonotactically ill-formed. This generalisation further posits a restriction in Swedish against obstruent clustering. Predictions at this point would have us claim that a gap, or empty neuter cell, exists in all gender-declined paradigms for words terminating in *-dd*. Consideration of further data, however, proves this claim premature.

Swedish verbal morphology forms the past participle by /-d/ suffixation to the verb stem, as exemplified below with *förbereda* ‘prepare’:

(6) SYMMETRIC VERBAL UTER-NEUTER INFLEXION

(a) *förbered-a*

prepare-INF

‘prepare’

(b) *måltid-en är förbered-d*

meal-the is prepare-PART

‘the meal is prepared’

When modifying a neuter noun, /-t/ will be suffixed to the participial stem (here, *förberedd*); thereby yielding the obstruent sequence *-ddt*. Dissimilar from the emergence of ungrammaticality in (5b), the verb undergoes rather a process of repair to avoid the phonotactic ill-formedness of the cluster:

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<sup>2</sup> Periphrasis or a more circumlocutory syntax would be alternatives to the attributive construction in (2b), e.g., *ett ängsligt barn* ‘an anxious child’ or *ett barn som är skrämt* ‘a child who is scared’.

(c) \*tal-et är förbered-*d-t*

(d) ✓tal-et är förberett

speech-the is prepare.PART.NEUT

‘the speech is prepared’

The *phonological neutralisation* of the obstruent sequence *-ddt* to *-tt* is explicitly shown in (6d). Data in (6), then, show a fully-declined gender paradigm for *förbereda* with both uter and neuter cells occupied with an overt word form (i.e., *förberedd-förberett*). At this stage, two generalisations capture the data: (i) *-ddt* is an infelicitous consonant cluster and will be avoided by the grammar, and (ii) avoidance is here defined as repair in verbs and ungrammaticality in adjectives.

The case of Swedish *-ddt* clustering appears to be a paradox: a similar phonological environment is observed to behave differently in two distinct morphosyntactic categories; that is to say, disparity in treatment of *-ddt* clusters appears to be contingent upon extraphonological information. The grammar explicitly disallows repair of the neuter form of the adjective and by doing so yielding a gap in its place, whilst conversely opting for repair of the neuter form of the verb participle.

#### 2.1.2 DISCUSSION OBJECTIVE & FORMATTING

The nature of our quandary here incites an investigation of (i) the word-specific processes triggering either ungrammaticality or repair, and (ii) how the synchrony of such processes can be modelled in an Optimality-Theoretic framework. Drawing on evidence from an autosegmental presentation of the data, it will be argued that the *-ddt* clusters of the neuter adjective and past participle are in fact phonologically distinct; and moreover that their dissimilarity is driven rather by principles of consonant length than morphosyntactic properties.<sup>3</sup> Approaching *-ddt* clusters from a phonological perspective (i.e., irrespective of lexical category) will allow for (i) a single ranking argument to account for global

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<sup>3</sup> See, however, Johansson (1996) for an explanation endorsing recourse to relevant diachrony.

treatment of *-ddt* clusters and (ii) general constraints which void the need for extraphonological conditioning.

The formatting of this discussion breaks down as follows: §2.2 reviews two analyses in the literature of data presented hitherto, as appearing in McCarthy & Wolf (2005) and Rice (2005); §2.3 provides the reader with an alternative autosegmental analysis of the facts which inspires a model of phonological grammar in opposition to either of the two prior analyses; §2.4 sees an expansion in data; and thereafter necessitated revision in §2.5 of the analysis previously proposed; whilst §2.6 concludes.

## §2.2 PREVIOUS ANALYSES

In this section, two recent analyses of the Swedish data will be presented. It will be shown that the MPARSE approach (McCarthy & Wolf 2005) employs MARKEDNESS impositions over a morphologically-conditioned MPARSE constraint to tackle both repair in past participles and ungrammaticality in adjectives within a single ranking argument. To the contrary, Rice (2005) opts for a cophonological approach wherein constraints are general. In this case, the antagonistic treatment of *-ddt* clusters boils down to an ambiguity in FAITHFULNESS violations.

### 2.2.1 McCARTHY & WOLF (2005)

McCarthy & Wolf (2005) approach the Swedish data from an MPARSE model of grammar. They argue that the gapping behaviour of *-ddt* clusters in adjectives warrants indexing the gap-targeting constraint, MPARSE, to the adjectival neuter suffix, i.e., MPARSE<sub>/-t/</sub>. The reparative processes active in the past participle, however, are here a result of MARKEDNESS interaction.

The MARKEDNESS constraints driving repair in the past participle are as follows:

#### (7) CONSTRAINTS (McCARTHY & WOLF 2005)

##### (a) OCP(COR)

*Do not have a cluster of coronal obstruents*



- (b) UNIFORMITY  
*No coalescence*

By explicitly prohibiting a coronal cluster, OCP(COR) motivates the grammar to contrive a means of dealing with infelicitous *-ddt*. Ultimately, ranking OCP(COR) high presents the grammar with two choices: repair the corresponding neuter form, or licence ungrammaticality (i.e., a gap) in its place. The ranking argument for the past participle is clear should repair *via* coalescence prevail:

(8) PAST PARTICIPLE RANKING ARGUMENT

OCP(COR) » UNIFORMITY

Ranking OCP high characterises UNIFORMITY as a violable property of the grammar. The ranking argument in (8) thus ensures that repairing the past participle *via* coalescence is the optimal means of repair:

(9) REPAIR IN THE PAST PARTICIPLE<sup>4</sup>

/re:d <sub>3</sub> +d <sub>4</sub> +t <sub>5</sub> /	OCP(COR)	UNIFORMITY
→ ret: <sub>3,4,5</sub>		2
a. ~ red <sub>3</sub> d <sub>4</sub> t <sub>5</sub>	2 W	L
b. ~ red <sub>3</sub> t <sub>4,5</sub>	1 W	1 L

Consideration of the gap in the adjective calls for revision to the ranking argument in (8). For a gap to surface, UNIFORMITY must outrank a gap-targeting constraint. Such a ranking will eliminate candidates which exhibit either coronal clustering or coalescence whilst rewarding those which exhibit neither clustering nor coalescence. Reconciling this state of affairs with that of the participle requires relativising the gap-targeting constraint to neuter adjectival declension. Thus, neuter inflexion of the past participle applies vacuously in the context of such a constraint to the extent that the well-formedness of

<sup>4</sup> Integers tally violation marks. For further clarification on the *comparative tableau format*, see authors' original work for relevant sources.

(förlä)rett remains unchallenged. McCarthy & Wolf's gap-targeting constraint is given below:

(10) GAP-TARGETING CONSTRAINT (McCarthy & Wolf 2005)

MPARSE

*Morphemes are parsed into morphological constituents*

Confinement to neuter adjectival declension prompts indexation of neuter /-t/ to MPARSE as such: MPARSE<sub>/-t/</sub>. The ranking argument for both repair in the past participle and a gap in the adjective is formally expressed below:

(11) ADJECTIVE & PAST PARTICIPLE RANKING ARGUMENT

OCP(COR) » UNIFORMITY » MPARSE<sub>/-t/</sub>

It is shown in (12), for the adjective, that ranking MPARSE<sub>/-t/</sub> below OCP(COR) and UNIFORMITY results in the gap (⊙) emerging as the most well-formed candidate:

(12) ABSOLUTE UNGRAMMATICALITY IN THE ADJECTIVE

/räd: <sub>3</sub> +t <sub>4</sub> /	OCP(COR)	UNIFORMITY	MPARSE <sub>/-t/</sub>
→ ⊙			1
a. ~ räd: <sub>3</sub> t <sub>4</sub>	1 W		L
b. ~ rät: <sub>3,4</sub>		1 W	L

Regarding evaluation of candidates for the adjective, anything ranked above MPARSE is effectively *inviolable* in that any violations incurred will be fatal. Furthermore, it is worth acknowledging the contextualisation (i.e., dual nature) of UNIFORMITY: inviolable in the environment of adjectival declension, albeit violable in that of participial inflexion. This state of affairs models the seemingly irreconcilable treatment of *-ddt* clusters by the grammar proposed here.

### 2.2.2 RICE (2005)

Rice (2005) understands the paradoxical behaviour of *-ddt* clusters as an inconsistency in FAITHFULNESS violations. Two ranking arguments are invoked with each configured to a word-specific lexical category; namely, past participle and adjective. The trade-off for relinquishment of a single ranking argument is a constraint repertoire free of morphologically-conditioned constraints.

The author employs the following MARKEDNESS and FAITHFULNESS constraints:

#### (13) CONSTRAINTS (RICE 2005)

(a) OCP(COR)

*Do not have a cluster of coronal obstruents*

(b) IDENT-IO(VOI)

*Input and output correspondents must have the same value of the feature [voice]*

(c) MAX{CAT}

*Expression of a morphological category is required*

Rice follows McCarthy & Wolf in observing the necessity of a MARKEDNESS constraint prohibiting clusters of coronal obstruents, (13a). The remaining two constraints are FAITHFULNESS constraints penalising change in [voice] between input and output segments, (13b), and deletion of a morphological category, (13c).

The ranking arguments are clear if we anticipate repair *via* devoicing in the past participle (*-ddt* → *-tt*) and a gap in the adjective (*-ddt* → ∅): render MAX{CAT} violable in the former scenario albeit inviolable in the latter. These generalisations are formally expressed below:

## (14) ADJECTIVE RANKING ARGUMENT

OCP(COR) » IDENT-IO(VOI) » MAX {ADJ-N}

## (15) PAST PARTICIPLE RANKING ARGUMENT

OCP(COR) » MAX {PART-N} » IDENT-IO(VOI)

An inversion of FAITHFULNESS constraints discerns ranking arguments (14) and (15). The ensuing OP tableaux serve to illustrate how Rice's analysis accounts for the data:

## (16) UNGRAMMATICALITY IN THE ADJECTIVE

	rädd <sub>ADJ</sub>	OCP (COR)	IDENT-IO (VOI)	MAX {ADJ-N}
a)	rädd / räddt	*!		
b)	rädd / rätt		*!	
☞ c)	rädd /			*

Tableau (16) shows that the adjective ranking argument correctly selects the gap candidate, (c), for the adjective. The suffixation of neuter /-t/ results in a violation of OCP(COR), as shown in candidate (a). To circumvent an OCP violation, candidate (b) fuses the cluster, but the resulting voicing assimilation attracts IDENT-IO(VOI) and leaves the candidate fated for elimination. Ranking IDENT-IO(VOI) over MAX {ADJ-N} results in repair being blocked, as previously argued *ex hypothesi*, and thereby allowing a gap to surface in the adjective. IDENT-IO(VOI), in this regard, is an inviolable property of the grammar in that any such violation will result in suboptimality.

## (17) REPAIR IN THE PAST PARTICIPLE

	-redd <sub>PART</sub>	OCP(COR)	MAX {PART-N}	IDENT-IO (VOI)
a)	-redd / -reddt	*!		
☞ b)	-redd / -rett			*
c)	-redd /		*!	

Tableau (17) shows that the inversion of IDENT-IO(VOI) and MAX{CAT} successfully selects the repaired candidate, (b). By ranking MAX{PART-N} over IDENT-IO(VOI), the grammar reads that it is better to avoid penalty under OCP(COR) *via* fusion of the *-ddt* cluster than to have no output at all.

### 2.2.3 LOCAL SUMMARY

The analyses of McCarthy & Wolf and Rice characterise an ongoing debate in OT-based theories of grammar; namely, what Inkelas & Zoll (2003) summarise as “indexed constraints vs. cophonologies”. The former approach, adopted here by McCarthy & Wolf, entails a single ranking argument made up of one or more morphologically-conditioned constraints; whilst the latter approach, put forth here by Rice, employs generalised constraints on the condition that their ranking is not fixed.

In considering the Swedish paradox presented in §2.1, we have thus far looked at an indexed-constraint and cophonology approach. McCarthy & Wolf’s MPARSE model of grammar and Rice’s OP approach both succeed in accounting for the data. Enforcing an OCP constraint against coronals, as adopted in both approaches, prohibits *-ddt* from surfacing across-the-board. The resulting options for the grammar are either to opt for a gap or repair the cluster (by some means). At this stage, McCarthy & Wolf argue that an interplay between the constraints UNIFORMITY and MPARSE<sub>*v*</sub> can yield repair in the past participle whilst determining ungrammaticality in the adjective. To the contrary, Rice defines the problem of *-ddt* treatment in terms of an ambiguity in FAITHFULNESS violations, i.e., expression of morphological category versus voicing properties, and by invoking two ranking arguments correctly accounts for both adjectival and participial surface-licit forms.

Both analyses require a gap-targeting constraint and this is for all intents and purposes the desideratum of MPARSE and MAX{CAT}. The empirical utility of both approaches, however, hinges upon word-specific (i.e., morphosyntactic) properties of *-ddt* clusters in that both ungrammaticality and repair attribute neuter suffixation to lexical category. In other words, a single phonological environment undergoes radically dissimilar treatment

in two lexical categories whereupon constraint indexation and antagonistic ranking arguments reflect the authors' efforts in accounting for this fact.

### §2.3 REANALYSIS: AUTOSEGMENTAL DECOMPOSITION OF *-ddt* CLUSTERS

The desiderata of reanalysis here are to (i) establish a single ranking argument to account for the data whilst (ii) keeping my constraint repertoire free of any measure of morphologically-conditioned application. Meeting these conditions requires reassessing the data on an autosegmental level and thereby substantiating *-ddt* clusters in adjectives and past participles as in fact phonologically heterogeneous environments.

#### 2.3.1 AUTOSEGMENTAL REPRESENTATIONS

Here, it will be shown *via* autosegmental representation that Swedish grammar performs opposing operations in circumvention of the same cluster on grounds of its phonological composition. From an exposition of both ungrammaticality and repair as purely phonologically-driven processes, it will be argued that extraphonological information plays no role in elucidating the divergent behaviour of *-ddt* clusters.

Autosegmental phonology models speech sounds (i.e., segments) as a collection of parallel tiers. In the present context, a two-tier schema of autosegmentation suffices: a topmost segmental tier and a bottommost timing tier – called the *skeleton* – representing the underlying organisation of segments into temporal units, which we will further call *skeletal (timing) slots*.<sup>5</sup> In view of the parameters of our model, autosegmentation thus serves to diagram the number of temporal units allotted to a given segment in sound production (i.e., audible segmentation).

Without further digression, in (18) the reader is presented with autosegmental representations of utter forms *rädd* 'frightened' and (förbe)*redd* 'prepared':

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<sup>5</sup> For a recent survey on autosegmental theory with introduction, see van Oostendorp (2005).

(18) AUTOSEGMENTAL REPRESENTATION OF UTER FORMS<sup>6</sup>

(a) *rädd*<sub>adj.uter</sub>

<b>r</b>	<b>ä</b>	<b>d</b>	
			\
X	X	X	X

(b) *-redd*<sub>part.uter</sub>

<b>r</b>	<b>e</b>	<b>d</b>	<b>d</b>
X	X	X	X

(18)(a) and (b) are readily discernible by their disparate allotment of skeletal slots amongst word-final segments. Above we see that the target *-dd* environments are in fact not the same. Root-final [d:] in the adjective, (18a), maps onto two skeletal slots, whilst root-final [d] and participial suffix /-d/, (18b), each map onto one slot. In autosegmental terms, this “double-linking” property of (18a) is called *multiple association* and furthermore models a geminate *d* in *rädd* whilst indirectly attributing singleton status to *d* in *-redd* (i.e., *-red+d*).

In proceeding, (19) diagrams the corresponding neuter /-t/ suffixation to uter forms *rädd* and *-redd*:

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<sup>6</sup> For purposes of accentuation, root segments will consistently appear in boldfaced font whilst suffixed segments will similarly appear set in lightface font.

(19) AUTOSEGMENTAL REPRESENTATION OF NEUTER /-t/ SUFFIXATION

(a) *räddt*<sub>adj.neut</sub>

<b>r</b>	<b>ä</b>	<b>d</b>		<b>t</b>
			\	
X	X	X	X	X

(b) *-reddt*<sub>part.neut</sub>

<b>r</b>	<b>e</b>	<b>d</b>	<b>d</b>	<b>t</b>
X	X	X	X	X

Unsurprisingly, neuter /-t/ is allotted one skeletal slot in both the adjective and past participle. The skeletal structure preceding /-t/ furthermore remains unaltered, in both examples, from that of (18). The level of segmental representation entertained here appears to dichotomise segments into *free* versus *bound* (or inflexional) morphemes in that root *dd* is segmentally analysed as a lengthened singular segment albeit allotted two conjoining skeletal slots; whereas adjacent root and affix *dd* are segmentally disassociated and consequently allotted two disjointed skeletal slots. The importance in identifying the number of skeletal timing slots allotted to singleton versus geminate segments will recur upon consideration of further data; however, let us see at this stage how our new understanding of *-ddt* clusters fares in an Optimality-Theoretic framework.

### 2.3.2 FROM AUTOSEGMENTAL TO OPTIMALITY-THEORETIC

I follow McCarthy & Wolf (2005) and Rice (2005) in needing a well-formedness constraint disallowing clusters of coronal obstruents; rendering OCP(COR) an invaluable resource. Recall that with *-ddt* marked as surface-illicit, Swedish grammar must either crash or repair the cluster. Encoding the preceding observations on consonant length into an OT analysis requires that our next constraint be configured to discern geminate and singleton segmental properties. In order to prevent geminate *d* in *rädd* from reduction to *-tt*, as seen in the past participle repair *-reddt* → *-rett*, I require a FAITHFULNESS constraint which enforces IDENTITY between input and output geminate correspondents.



Such a constraint will be formally expressed in the fashion of ID-IO[GEM], as is defined in (20):

(20) PROPOSED GEMINATE CONSTRAINT

IDENT-IO [GEMINATE]

*Input and output geminate correspondents must*

- *have the same value of the feature [voice]*
- *not be coalesced*
- *not share features with adjacent segments*

Furthermore, to rule out the gap in the candidate set for the past participle, I need a gap-targeting constraint. For all intents and purposes, McCarthy & Wolf's MPARSE suffices. Our gap-targeting constraint, however, need not exploit any degree of morphosyntactic relativity, i.e., indexation to either neuter /-t/ or lexical category, because of the preceding autosegmental analysis establishing a context wherein *-ddt* clusters can be argued to undergo purely phonologically-motivated processes. Now equipped with both empirically-motivated and economically-defined constraints, we need to develop a ranking argument which models the behaviour of the data up to this point.

MPARSE must be outranked by ID-IO[GEM] in order to eliminate candidates which coalesce geminate structures to circumvent OCP. This scenario determines the gap as the most well-formed candidate for the adjective. Crucial, however, is that repair *via* reduction to *-tt* in the participle will not violate ID-IO[GEM] as participial *-ddt* is a cluster comprised of singleton segments, as shown in (19b). Furthermore, there exists no *prima facie* evidence to argue for a fixed ranking between OCP(COR) and ID-IO[GEM]. The ranking argument proposed here, then, is formally expressed in (21):

(21) GEMINATE *d* ADJECTIVE & SINGLETON *d* PARTICIPLE RANKING ARGUMENT

OCP(COR), ID-IO[GEM] » MPARSE

The tableau in (22) evaluates potential output forms for the adjective in candidate set (1) and similarly for the past participle in candidate set (2). I have made a point to consider the same candidates as in both McCarthy & Wolf (2005) and Rice (2005) – (a) candidates surface with *-ddt* intact; (b) candidates coalesce and devoice *-ddt* to surface as *-tt*; and (c) candidates are gaps. An evaluation of similar candidates facilitates comparison with the previous analyses; and moreover illustrates how the autosegmentation of *-ddt* clusters has allowed for a single ranking argument free of extraphonologically-conditioned constraints to account for the data:

(22) UNGRAMMATICALITY IN THE ADJECTIVE & REPAIR IN THE PARTICIPLE

		OCP (COR)	ID-IO [GEM]	MPARSE
(1)	/rædd + t/			
(a)	ræddt	*!		
(b)	rætt		*!	
☞(c)	⊙			*
(2)	/-red + d + t/			
(a)	reddt	*!		
☞(b)	rett			
(c)	⊙			*!

OCP rules out *-ddt* candidates across-the-board, (1a) and (2a).<sup>7</sup> Candidate (1b), undergoing reduction of adjectival *-ddt* to *-tt*, violates ID-IO[GEM] and as such is eliminated; leaving the only remaining candidate, the gap, as the winner. ID-IO[GEM], however, crucially rewards *-tt* reduction in the participle, (2b), and thereby allowing this candidate to satisfy all three constraints. With MPARSE now inviolable, because of (2b) incurring no violations, the gap candidate, (2c), is eliminated; leaving the coalesced participle the winner by default.

<sup>7</sup> Ensuring *-tt* candidates go unpunished under OCP requires either defining *clusters* as a sequence of three or more consonants, or postulating a phonetic gemination of adjacent identical segments. I presume Rice to have assumed the same, see (16) and (17). Cf. footnote 10.

### 2.3.3 FROM OPTIMALITY-THEORETIC TO CROSS-LINGUISTIC

The most salient point made in this section has been to identify and argue for *-ddt* clusters as constituting phonologically dissimilar environments. This dissimilarity has been shown to be driven by discernible properties of consonant length, i.e., singleton versus geminate structures, as illustrated *via* an autosegmental re-examination of the data. Explicitly, it has been shown that the *ddt* sequence in adjectival *räddt* is a geminate consonant followed by the neuter suffix */-t/*; whereas the same sequence in *-reddt* is composed of a root-final *d* and two processes of morphological inflexion – participle formation, */-d/*, and neuter agreement, */-t/*. Two observations capture the data at this point:

#### (23) OBSERVATIONS ON GEMINATE VERSUS SINGLETON BEHAVIOUR

(a) *Swedish prefers to preserve geminate consonants rather than to devoice, coalesce or share their features*

(b) *Swedish prefers singleton consonants to devoice, coalesce and share features rather than be preserved*

These observations on the behaviour of geminates are not obscure and are in fact cross-linguistically attested. Evidence is provided by Schein & Steriade (1986) wherein they claim that “geminate structures cannot allow one half of the cluster to undergo a rule that the other half does not undergo”. This claim is consistent with the analysis proposed here in that it further explains why a two-step coalescent-devoicing effect is a form of repair which geminate *d* cannot undergo. From this generalisation follows the prediction that geminate structures in language typically do *not* change. Hayes (1986) moreover remarks that there exists a long tradition of research in phonology showing the exceptional behaviour of geminate consonants. His observations regarding the inalterability of geminate structures result in establishing a notion of *geminate integrity*. Supporting my analysis of the data has necessitated showing that cross-linguistic generalisations on geminate behaviour are further observed and upheld in Swedish.

## §2.4 JUXTAPOSING MARKED PHONOLOGICAL ENVIRONMENTS

This section tests our analysis upon consideration of further admissible data. Minor revision to our constraint repertoire will become paramount as an analytic consequence to undertaking the current task.

### 2.4.1 EXPLOITING CONSONANT LENGTH ACROSS MORPHOSYNTACTIC CATEGORIES

The data hitherto have been characterised by a geminate consonant in an adjective root and singleton consonant in a verb root. These data have been accounted for by the constraints proposed in the preceding section. The current section strives to test these constraints against new data. I am at this stage particularly concerned with exploiting a geminate *d* consonant in a verb root, as in *rädda* ‘rescue’, and a singleton *d* consonant in an adjective root, as in *röd* ‘red’. To the best of my knowledge, these data have heretofore never been discussed in the context of the previous data.

Our present understanding of the *-ddt* cluster in past participles entails reduction to *-tt* (i.e., *ddt* → *tt*); whilst the *-ddt* cluster in adjectives entails promoting *no* output (i.e., *ddt* → ∅). Considering generalisations drawn from the inalterability of geminate structures, it follows *ex hypothesi* that geminate *d* in verbs will similarly resist change. The question, then, is whether such verbs will also surface as a gap, or rather repair by some means with leaving the geminate intact. The verb *rädda* ‘rescue’ bears the geminate *d* environment and as such provides an ideal testing ground in seeing how geminate *d* structures cope with verbal inflexion.

Upon suffixation of both participial */-d/* and neuter agreement */-t/*, *rädd(a)* will result with a substantial obstruent sequence of word-final *-dd+d+t*. Dissimilar to what we saw with *förbereda* in (6), concerning *-red+d+t* → *-rett*, the verb here is repaired rather by a deletion of participial suffix */-d/* and insertion of a vowel to break up the remaining *-ddt* cluster: *rädd+d+t* → *rädd+a+t*, as in *ett räddat barn* ‘a rescued child’.<sup>8</sup> The resulting fully-declined gender paradigm for *rädda* raises two concerns: (i) what is the impetus behind avoiding repair *via* a two-step coalescent-devoicing effect and (ii) how can

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<sup>8</sup> The utter equivalent being *räddad*, as in *havsörnen är räddad (från utrotning)* ‘the White-tailed Eagle (lit. Sea Eagle) is saved (from extinction)’.

epenthetic repair be both modelled and explained in autosegmental terms whilst translating such facets into the Optimality-Theoretic model already proposed.

The issue in (i) is clear: the motivation for circumvention of reduction to *-tt* was stated in (23a) – *Swedish prefers to preserve geminate consonants rather than to devoice, coalesce or share their features*. This explains why geminate *d* in *rädda* does not undergo reduction and surface as *\*rätt*, but leaves open the question of why epenthesis and not ungrammaticality.

Regarding the latter of two concerns mentioned above, I believe autosegmentally decomposing the inflexional stages of *rädda* to be the most economic means of beginning a formal evaluation of our new datum. Below in (24) the reader finds an autosegmental representation of neuter participial inflexion for *rädda* prior to the effect of any morphophonological operations:

(24) AUTOSEGMENTAL REPRESENTATION OF *rädddt*<sub>part.neut</sub>

<b>r</b>	<b>ä</b>	<b>d</b>		<b>d</b>	<b>t</b>
			\		
<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>

Again, Swedish grammar has two choices at this stage: crash or repair the surface-illicit obstruent cluster. We have deduced that singleton *d* repair *via* coalescent devoicing is here inapplicable on grounds that root *d* in *rädda* constitutes a geminate structure (i.e., *-dd+d+t* → *¬-tt*). Our empirical experience would have us then postulate that a gap arises, but this is not the case as another means of repair is implemented: epenthesis.

#### 2.4.2 *-dd* BEHAVIOUR SCHEMATISED

Our goal here is to schematise *-dd* behaviour with relation to its morphosyntactic category; specifically, within and between that of past participles and adjectives.

#### 2.4.2.1 *-dd* PARTICIPLES: EPENTHESIS VERSUS COALESCENCE

Upon further evaluation and comparison of the epenthesis in *räddat* with the coalescence of *(förbe)rett*, there exists two phonological processes which require formal identification: *bidirectional voicing assimilation* and a notion of *deletable segments*.

The empirical fact that singleton root *d* devoices to *t* in *-rett* is evidence that the two consonants are structurally adjacent, i.e., that there is no intervening material between root-final *d* and neuter suffix */-t/*. Support for this argument comes from a well-known phenomenon in Swedish involving two-way spreading of the feature [-voice]; formally known as *bidirectional voicing assimilation* (BVA).<sup>9</sup> In order for root-final *d* to assimilate to *t*, the intervening participial */-d/* suffix must be deleted. Enquiry at this stage poses a question of what evidence there exists to argue that it is participial */-d/* which deletes *contra* root *d* or even neuter */-t/*. First and foremost, the fact that *-tt* surfaces requires the presence of a voiceless segment within the cluster; for otherwise BVA could not apply (in the absence of a voiceless trigger) and *-dd* would surface in its place. Secondly, deletion of root segments is neither empirically nor theoretically consistent with earlier observations on how inflexional morphology (i.e., affixed segments) interacts with root-bound structure; particularly with that of geminates, as formally expressed in (23a). By way of inductive reasoning, we have motivation to argue that participial */-d/* can behave as a *deletable segment* in Swedish morphology.<sup>10</sup> Such inferences lead me to argue here that it is in fact participial */-d/* which deletes in both cases of epenthesis and coalescence.

With intention of illustration, the inflexional stages of forming *-rett* are autosegmentally diagrammed in (25)(a)-(c) below:

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<sup>9</sup> See Lombardi (1995) for thorough description of this phenomenon.

<sup>10</sup> Given, of course, that conditions are met to drive deletion.

(25) AUTOSEGMENTAL STAGES OF NEUTER PART. FORMATION *-reddt* → *-rett*

(a)	<b>r</b>	<b>e</b>	<b>d</b>	<b>d</b>	<b>t</b>	Underlying representation
	<b>x</b>	<b>x</b>	<b>x</b>	x	x	
(b)	<b>r</b>	<b>e</b>	<b>d</b>	∅	<b>t</b>	OCP-driven deletion
	<b>x</b>	<b>x</b>	<b>x</b>	x	x	
(c)	<b>r</b>	<b>e</b>	<b>t</b>	<b>t</b>		Environment conducive to BVA
	<b>x</b>	<b>x</b>	<b>x</b>	x		

Stage (a) illustrates the most basic level of inflexion with simply a root morpheme and any affixed material; stage (b) shows the OCP-driven deletion of participial /-d/ to avoid ill-formedness violations; and stage (c) is where BVA applies in that deletion of participial /-d/ results in an infelicitous juxtaposition of root *d* and neuter *t*. Moreover, stage (c) illustrates that the skeletal slot for participial /-d/ has been deleted. A logical explanation is that the deletion is BVA-driven in order for *t* to assimilate singleton *d*.<sup>11</sup> The neuter past participle for (*förbe*)*reda* is thus determinately (*förbe*)*rett*.

Proceeding in illustration, the inflexional stages of forming *räddat* are autosegmentally diagrammed in (26)(a)-(d) below:

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<sup>11</sup> In theory, and beyond the scope of this discussion, a stage (d) could be posited where now adjacent *tt* segments undergo a means of concatenative restructuring and further yield a derived geminate structure [t:], i.e., a geminate is formed by the resulting adjacency of identical segments and the phonological grammar subsequently imposing a single feature matrix upon the restructured segments. Cf. footnote 6.

(26) AUTOSEGMENTAL STAGES OF NEUTER PART. FORMATION *rädddt* → *räddat*

(a)	<b>r</b>	<b>ä</b>	<b>d</b>		<b>d</b>	<b>t</b>	Underlying representation
				\			
	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	
(b)	<b>r</b>	<b>ä</b>	<b>d</b>		∅	<b>t</b>	OCP-driven deletion
				\			
	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	
(c)	<b>r</b>	<b>ä</b>	<b>d</b>		∅	<b>t</b>	BVA blocked by geminate
				\			
	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	
(d)	<b>r</b>	<b>ä</b>	<b>d</b>		<b>v</b>	<b>t</b>	Repair by epenthesis
				\			
	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	

Again, stage (a) is the most basic level of inflexion showing a root morpheme and any affixed material; whilst stage (b) demonstrates the deletion of participial /-d/ as dictated by dominant OCP. Stage (c) here, however, differs from (25c) in that BVA is blocked by the preceding impenetrable geminate structure. Motivation for the preservation of the skeletal slot – *contra* its deletion in (25c) – comes from the established inalterability of geminates and thus voiding any assimilatory processes of neuter /-t/. The skeletal slot is therefore preserved in an effort to save the participle from crashing and surfacing as a gap. Stage (d) completes repair *via* insertion of an epenthetic vowel where participial /-d/ was deleted.<sup>12</sup>

Note that the insertion of phonological content into an empty skeletal slot is *not* tantamount to adding additional structure. This is important because the means of repair

<sup>12</sup> I have neither space in this discussion nor research at this point in time to determine the quality of vowel which will be inserted, e.g., is *a*-insertion a reconstruction of the deleted infinitive marker or an arbitrary vowel quality on a par with *e*, *o*, *å et cetera*. What is relevant for our purposes is simply the process of repair by *v*-insertion, i.e., epenthesis in contrast to voicing assimilation with /-t/ or surfacing as a gap.



is *minimally* structure altering – a point to be addressed in revision to our constraint repertoire. Furthermore, it is clear from autosegmental description in (26) why epenthesis – *contra* coalescence – is a sensible means of repair in avoiding ungrammaticality. Now a question of theoretical significance remains: why *not* epenthesis in the geminate *d* adjective?

#### 2.4.2.2 GEMINATE *d* ADJECTIVE: GAP VERSUS EPENTHESIS

Autosegmental description of the geminate *d* adjective juxtaposed with that of the geminate *d* past participle reveals why epenthesis is not an economical means of repair in the adjective:

(27) (a) *räddt*<sub>adj.neut</sub>

<b>r</b>	<b>ä</b>	<b>d</b>		<b>t</b>
			\	
<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	x

(b) *rädddt*<sub>part.neut</sub>

<b>r</b>	<b>ä</b>	<b>d</b>		<i>d</i>	<b>t</b>
			\		
<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	x	x

Upon juxtaposition of (27)(a) and (b), the critical point of structure to note is the absence of a participial suffix in the former; specifically, the absence of an additional skeletal timing slot in which a vowel may be inserted to break up the *-ddt* cluster upon deletion of that additional segment. Epenthesis in geminate *d* adjectives thus requires an insertion of a skeletal timing slot, i.e., a means of structural adjunction which was not underlyingly present. An epenthetic vowel is therefore not an economical means of repair and the grammar instead opts for a gap in place of restructuring the adjective.

### 2.4.3 SINGLETON *d* ADJECTIVE: CANONICAL COALESCENCE

The adjective *röd* ‘red’ bears a root-final singleton *d*:

(28) (a) *röd*<sub>adj.uter</sub>

<b>r</b>	<b>ö</b>	<b>d</b>
<b>x</b>	<b>x</b>	<b>x</b>

From the analysis sketched hitherto, the predicted neuter form would be *rött* (i.e., *röd+t* → *rött*). The neuter form following from the analysis is in fact the correct form: *röd-✓rött*. The two-step process of neuter formation is then presented below in (29):

(29) *rödt*<sub>adj.neut</sub>

(a)	<b>r</b>	<b>ö</b>	<b>d</b>	<b>t</b>	Underlying representation
	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	
(b)	<b>r</b>	<b>ö</b>	<b>t</b>	<b>t</b>	Environment conducive to BVA
	<b>x</b>	<b>x</b>	<b>x</b>	<b>x</b>	

In stage (a), neuter inflexion sets up an adjacency between root-final *d* and *t*. With no intervening consonants, the resulting *-dt* environment is ideal for BVA to apply, as is shown in stage (b) with *-tt*.<sup>13</sup>

### §2.5 ANALYTIC REVISION

New data in the form of a geminate *d* in a past participle and singleton *d* in an adjective elicit a number of shortcomings in our proposed constraint repertoire. Consequently, these data incite a means of revision to the OT analysis initially put forth in §2.3.2.

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<sup>13</sup> See footnote 10.

### 2.5.1 OT REVISITED: CONSTRAINT RÉPERTOIRE & TABLEAU REFORM

The datum resulting in epenthetic repair (*räddat*) obligates us to consider epenthesis in all candidate sets. In order to maintain the already proposed constraints and their respective ranking, an additional constraint needs to be invoked whereby the insertion of structure is penalised. Recall that *structure* was autosegmentally defined as skeletal timing slots. Such a constraint would punish epenthesis in the geminate *d* adjective whilst rewarding epenthesis in the geminate *d* participle. Problematic, however, is the resulting disadvantage in evaluating the singleton *d* participle wherein participial /-d/ is also deleted, as in geminate *d*, albeit BVA is not blocked by a geminate structure and instead coalescence applies. In order to now eliminate epenthesis within the singleton *d* participle, a constraint prohibiting insertion of anything into a skeletal slot is necessitated.

I therefore propose appending our constraint repertoire with the following two constraints:

#### (30) ADDITIONAL CONSTRAINTS

- (a) DEP-IO[TIME SLOT]

*Do not insert a skeletal timing slot*

- (b) DEP-IO[S]

*Do not insert a segment*

Maintaining our initial ranking argument of OCP(COR), ID-IO[GEM] » MPARSE requires us to rank DEP-IO[TIME SLOT] above MPARSE so as to eliminate epenthesis in both singleton and geminate *d* adjectives. DEP-IO[S], on the other hand, must be ranked below MPARSE in order to ensure epenthesis surfaces in the geminate *d* participle and not a gap. This ranking moreover optimises the coalesced candidate in the singleton *d* participle as this candidate satisfies all constraints. The final ranking argument is formally expressed in (31):

(31) RANKING FOR NEUTER GEMINATE *d* ADJ/PART & SINGLETON *d* ADJ/PART  
DEP-IO[TIME SLOT], OCP(COR), ID-IO[GEM] » MPARSE » DEP-IO[S]

The ensuing tableau in (32) models the ranking argument proposed above:

(32) TABLEAU FOR NEUTER GEMINATE *d* ADJ/PART & SINGLETON *d* ADJ/PART

		DEP-IO [TIME SLOT]	OCP (COR)	ID-IO [GEM]	MPARSE	DEP-IO [S]
(1)	/rädd + t/					
(a)	räddt		*!			
(b)	rättt		*!	*		
(c)	rätt			*!		
☞(d)	⊙				*	
(e)	räddat	*!				*
(2)	/-red + d + t/					
(a)	reddt		*!			
(b)	rett		*!			
☞(c)	rett					
(d)	⊙				*!	
(e)	redat					*!
(3)	/rädd + d + t/					
(a)	rädddt		*!			
(b)	rätttt		*!	*		
(c)	rätt			*!		
(d)	⊙				*!	
☞(e)	räddat					*
(4)	/röd + t/					
(a)	rödt		*!			
☞(b)	rött					
(c)	⊙				*!	
(d)	rödat	*!				*

Whilst no motivation exists to argue for a fixed ranking amongst DEP-IO[TIME SLOT], OCP(COR) and ID-IO[GEM], ranking MPARSE above DEP-IO[S] is paramount. In candidate set (3), where *räddat* is the output proper, the gap must be eliminated before our anti-epenthesis constraint penalises *räddat* for inserting a vowel to break up the *-ddt*

cluster. The result is that the gender-declined paradigm for *rädda* is symmetric: ✓*räddad-räddat*, and not asymmetric: \**räddad-Ø*. The case of the singleton *d* adjective is similar to that of the singleton *d* verb in that the candidate having undergone coalescence (*rött*) satisfies all constraints and, with its competitors incurring respective violations, emerges optimal by default.

#### §2.6 INTERMEDIARY CONCLUSION

In this discussion I have argued for and provided evidence that Swedish grammar employs four phonologically-motivated strategies in avoiding surface-illicit *-ddt* clusters, as is summarised in chart format below:

#### (33) DATA BREAKDOWN

SEGMENTAL VALUE	UTER FORM	NEUTER <sub>/-v/</sub> TREATMENT	NEUTER FORM
Singleton <i>d</i>	röd	BVA	rött
	-redd	PART deletion – BVA	-rett
Geminate <i>d</i>	rädd	*BVA – Crash	Ø
	räddad	PART del. – *BVA – Epenthesis	räddat

Two goals were declared at the outset of this discussion: (i) develop a single ranking argument to account for global treatment of *-ddt* clusters and (ii) employ constraints which are free from exploiting either lexical category or morphological effects. As the ranking argument in (31) and tableau in (32) confirm, both of these goals have herein been met.

### §3 ICELANDIC ASYMMETRY: PRÆTERITE- & IMPERATIVE-STEM FORMATION

#### §3.1 INTRODUCTION

The current section presents peculiar morphophonological properties of präterite and imperative formation in Modern Icelandic; specifically, the *linmæli* (cf. *harðmæli*) dialect spoken in and around Reykjavík.<sup>14</sup> Immediately ensuing discussion serves to lay a groundwork whereby the reader is introduced to the nature of {/T/, /T<sup>h</sup>/} allomorphy operative in both präterite (i.e., past tense) and imperative morphemes. Consequently, any established patterns of inflexional regularity will be undermined with the emergence of irregularity. *Prima facie* cases proving problematic will come in the form of erroneous allomorphic selection and absolute ungrammaticality. Hansson (1999) provides the only available analysis of the aforesaid phenomena and one in which a CONTROL model is ultimately pursued. (Orgun & Sprouse 1999) This analysis will be argued to be unsatisfactory on grounds of conceptual and empirical inelegance. Observation of trans- and intraparadigmatic cues will largely incite a *nonfixed* model (Ichimura 2006), where grammar indeterminacy elicits a restrictive inversion of antagonistic constraints, *in lieu* of Hansson's CONTROL approach. Two main points of argument will be that any successful analysis of the Icelandic data will have to (i) exploit some measure of morphophonological conditioning and (ii) reflect a restrictive notion of *paradigm* as defined by morpheme-specific levelling effects.

#### 3.1.1 THE EMPIRICAL FACTS: LAYING THE GROUNDWORK FOR ANALYSIS

There are three ways of forming the Icelandic imperative,<sup>15</sup> as is illustrated below with *sýna* 'show':

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<sup>14</sup> Dichotomising the language as such is driven by disparate realisations of [spread glottis]; specifically, sonorant devoicing (*linmæli*) versus aspirated stops (*harðmæli*) in unstressed syllables. (Morén 2001)

<sup>15</sup> 'Imperative' will be used in strict reference to the 2Sg form. Formation of the 2Pl imperative is irrelevant in the present context.

(34) OVERVIEW OF ICELANDIC IMPERATIVE FORMATION: *sýna* ‘show’

(a) ROOT IMPERATIVE (bare root)

/sin+Ø/      *sýn* (*þú*)      ['si:n ('θu:)]      ‘show ...!’

(b) FULL IMPERATIVE (root + {/T/, /T<sup>h</sup>/} + pro. clitic /-Y/)

/sin+T+Y/      *sýndu*      ['si:ntʏ]

(c) CLIPPED IMPERATIVE (root + {/T/, /T<sup>h</sup>/})

/sin+T/      *sýnd þú*      [si:nt 'θu:]      ‘you show ...!’

The root imperative, (34a), undergoes only deletion of the infinitive marker *-a* without {/T/, /T<sup>h</sup>/} allomorphy; and as such will not further concern us here.<sup>16</sup> The verbal root<sup>17</sup> in both the full imperative, (34b), and clipped (emphatic) imperative, (34c), takes a coronal suffix whose unaspirated and aspirated allomorphs are (debatably) governed by the phonology – a point which will recur throughout the remainder of this discussion. The full imperative additionally undergoes cliticisation of the 2Sg pronoun (resulting from contraction of *þú*), i.e., *sýn+d+u*. The quality of the coronal suffix, however, in the full and clipped imperatives will be our focus here such that morpheme-final vowels will be omitted from presentation, e.g., [si:ntʏ] ≅ [si:nt-].

Furthermore, the präterite (or past tense) of weak verbs in Icelandic is similarly inflected for with {/T/, /T<sup>h</sup>/} allomorphy such that the coronal suffixes of past tense and imperative forms are *de facto* isomorphic. Einarsson (1973) similarly observes that realisation of imperative desinences “depends upon much the same rules as govern the formation of the preterite suffix”. From this generalisation follows that the conditions under which either allomorph applies are identical for both past tense and imperative suffixes. Thus, the aspirated *-t<sup>h</sup>* allomorph, which for our purposes realises as regressive devoicing of a preceding consonant, is markedly selected by verbs with stem-final sonorants followed

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<sup>16</sup> Root imperative formation is for all intents and purposes an artefact of Old Norse conjugational patterns. See Strömberg (1982) (*in German*) and Halvorsen (1990) (*in Norwegian*) for further exposition of Old Norse verbal grammar.

<sup>17</sup> Following Þráinsson *et alii* (2004), I will use *root* when referring to the core phonemic composition of the word, whereas *stem* will refer to the word ending whereto any suffixation may apply.



by /t/; whereas the unaspirated *-t* allomorph, which under certain conditions further lenites to *-ð*, applies in “elsewhere” environments:

(35) HOMOPHONOUS ALLOMORPHY IN WEAK PAST & IMPERATIVE SUFFIXES

ROOT – STEM		SUFFIX UR <sup>18</sup>	PAST	IMP.
(a) <i>haf(a)</i> – /haP/ <sup>19</sup>	‘have’	/haP+T-/	<i>hafði</i> [havð-]	[havð-]
<i>fel(a)</i> – /fel/	‘conceal’	/fvl+T-/	<i>faldi</i> <sup>20</sup> [falt-]	[fɛlt-]
<i>mæℓ(a)</i> – /mail/	‘measure’	/mail+T-/	<i>mæℓdi</i> [mäilt-]	[mäilt-]
<i>sýn(a)</i> – /sin/	‘show’	/sin+T-/	<i>sýndi</i> [si:nt-]	[si:nt-]
<i>heyr(a)</i> – /heir/	‘hear’	/heir+T/	<i>heyrði</i> [hěĩrð-]	[hěĩrð-]
<i>nefn(a)</i> – /nePn/	‘mention’	/nePn+T-/	<i>nefndi</i> [nɛmt-]	[nɛmt-]
(b) <i>geld(a)</i> – /geℓT/	‘geld’	/geℓT+T <sup>h</sup> -/	<i>gelti</i> [g̊ɛ̯t-]	[g̊ɛ̯t-]
<i>hend(a)</i> – /henT/	‘throw’	/henT+T <sup>h</sup> -/	<i>henti</i> [hɛ̯nt-]	[hɛ̯nt-]
<i>hrind(a)</i> – /h̥rɪnT/	‘jostle’	/h̥rɪnT+T <sup>h</sup> -/	<i>hrinti</i> [h̥rɪ̯nt-]	[h̥rɪ̯nt-]
<i>synd(a)</i> – /sɪnT/	‘swim’	/sɪnT+T <sup>h</sup> -/	<i>synti</i> [sɪ̯nt-]	[sɪ̯nt-]
<i>herð(a)</i> – /herT/	‘harden’	/herT+T <sup>h</sup> -/	<i>herti</i> [hɛ̯rt-]	[hɛ̯rt-]
<i>myrð(a)</i> – /mɪrT/	‘murder’	/mɪrT+T <sup>h</sup> -/	<i>myrti</i> [mɪ̯rt-]	[mɪ̯rt-]

The sonorant+/t/ stem endings of verbs in (35b) select for the aspirated allomorph; whereas any other stem endings, (35a), take the unaspirated form. The intention behind data in (35) is to show that (i) there exists some degree of phonological predictability behind which allomorph applies and (ii) the shape of allomorph in the weak past tense will never disagree with the shape of allomorph in the imperative.

<sup>18</sup> Underlying Representation.

<sup>19</sup> Following Hansson (1999), input obstruents in Icelandic will be lexically underspecified for the feature [continuant]; thereby establishing a flexibility between surfacing as either a plosive or spirant. For example, the environment of /P/ determines whether it realises as [p], [f] or [v]. The implications of obstruent underspecification will become clearer as we proceed.

<sup>20</sup> Root-vowel ablaut accompanying allomorphy.

The established conditions, under which either allomorph applies, break down upon consideration of further data. Below the reader is presented with verbs whose selection of allomorph is exceptional in that it undermines the distributional patterns in (35) above:

(36) EXCEPTIONAL ALLOMORPHY IN WEAK PAST & IMPERATIVE SUFFIXES

ROOT-STEM		UR	PAST/IMP.	Cf.
(a) <i>mæla(a)</i> - /mail/	‘speak’	/mail+T <sup>h</sup> -/	[mǎĩlt-]	<i>mæla</i>
<i>meina(a)</i> - /mein/	‘mean’	/mein+T <sup>h</sup> -/	[mēĩnt-]	<i>sýna</i>
(b) <i>send(a)</i> - /sent/	‘send’	/sent+T-/	[sent-]	<i>henda</i>

Data in (36) show verbs with stem endings that, according to discussion hitherto, *should* take the opposite allomorph. Interesting is that when the “wrong” allomorph applies, it applies in both past tense and imperative morphemes; thereby upholding the generalisation that the shape of allomorph will *never* disagree between the two word forms. Informally stated, it is clear that some form of correspondence exists between weak past tense and imperative morphemes.

{/T/, /T<sup>h</sup>/} allomorphy is also active in the imperative suffix of strong verbs; though, in exclusion to the formation of the past tense:<sup>21</sup>

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<sup>21</sup> For readers interested in an authoritative and explicit phonological description of both weak and strong verbal inflexion in Modern Icelandic, see Einarsson (1973) (*in English*) or Rögnvaldsson (1990) (*in Icelandic*) with supplementary phonetics discussion appearing in Rögnvaldsson (1993) (*in Icelandic*).

## (37) ALLOMORPHY IN STRONG-VERB IMPERATIVES

ROOT-STEM		UR	IMP.
(a) <i>sof(a)</i> – /sop/	‘sleep’	/sop+t-/	[sɔvð-]
<i>vef(a)</i> – /vep/	‘weave’	/vep+t-/	[vɛvð-]
<i>drag(a)</i> – /trak/	‘pull’	/trak+t-/	[trayð-]
<i>hnig(a)</i> – /hnik/	‘succumb’	/hni:k+t-/	[hni:γð-]
<i>stel(a)</i> – /stel/	‘steal’	/stel+t-/	[stɛlt-]
(b) <i>hald(a)</i> – /halt/	‘hold’	/halt+t <sup>h</sup> -/	[halt-]

An interesting fact of strong verbs is that the weak-verb conditions under which an allomorph usually applies, i.e.,  $-t^h$  after stem-final sonorants followed by /t/ and  $-t$  elsewhere, are never undermined by erroneous allomorphic selection, as in (36). The absence of allomorphic “irregularity” in strong-verb imperatives suggests that the only way a weak imperative can take the erroneous allomorph is to import it from a past tense suffix. Thus, we have reason to infer that there exists an intraparadigmatic dependency in weak verbs such that the shape of allomorph in the imperative suffix *depends* on the shape of allomorph in the past tense suffix. Such an inference is further supported when recalling the observation that the allomorphs in weak past tense and imperative morphemes *never* disagree.

Exceptionality, however, goes beyond data in (36) in that exceptional allomorphy (i.e., cases where the erroneous allomorph applies) in verbs with /ll/ and /nn/ stem endings outnumbers unexceptional allomorphy. Hansson (1999), in citing research from Gislason (1996), states that out of 1735 weak verbs, 33 meet the /-ll/ and /-nn/ stem conditions; and moreover that 27 of these 33 verbs select the aspirated  $-t^h$  allomorph. With only 6 verbs selecting for the expected allomorph, the gravity of this pattern calls our earlier observations into question. A sample from these data is given below:

## (38) ALLOMORPHY IN WEAK STEM-FINAL /-ll/ &amp; /-nn/

(a) UNEXCEPTIONAL /-ll/, /-nn/ CLASS (totalling 6 verbs)

ROOT-STEM		UR	PAST/IMP.
<i>fell(a)</i> – /fell/	‘fell’	/fell+T-/	[fɛlt-] <sup>22</sup>
<i>rell(a)</i> – /rɛll/	‘nag’	/rell+T-/	[rɛlt-]
<i>toll(a)</i> – /tʰoll/	‘stick’	/tʰoll+T-/	[tʰɔlt-]
<i>brenn(a)</i> – /prenn/	‘burn’ <i>trans.</i>	/prenn+T-/	[prent-]
<i>kenn(a)</i> – /kʰenn/	‘teach’	/kʰenn+T-/	[cʰɛnt-]
<i>renn(a)</i> – /renn/	‘unloosen’	/renn+T-/	[rent-]

(b) EXCEPTIONAL /-ll/, /-nn/ CLASS (totalling 27 verbs)

<i>grill(a)</i> – /krill/	‘descry’	/krill+T <sup>h</sup> -/	[krɪlt-]
<i>hell(a)</i> – /hell/	‘pour’	/hell+T <sup>h</sup> -/	[hɛlt-]
<i>skell(a)</i> – /skell/	‘slam’	/skell+T <sup>h</sup> -/	[skɛlt-]
<i>vill(a)</i> – /vill/	‘beguile’	/vill+T <sup>h</sup> -/	[vɪlt-]
<i>brynn(a)</i> – /prinn/	‘water’	/prinn+T <sup>h</sup> -/	[prɪnt-]
<i>inn(a)</i> – /inn/	‘enquire’	/inn+T <sup>h</sup> -/	[ɪnt-]
<i>minn(a)</i> – /minn/	‘remind’	/minn+T <sup>h</sup> -/	[mɪnt-]
<i>nenn(a)</i> – /nenn/	‘manage’ <sup>23</sup>	/nenn+T <sup>h</sup> -/	[nɛnt-]
<i>þinn(a)</i> – /θinn/	‘thin’	/θinn+T <sup>h</sup> -/	[θɪnt-]
...	...		

Data above in (38) show that the majority of weak /-ll/, /-nn/ verbs take the erroneous *-t<sup>h</sup>* allomorph, (38b), whilst only a minority take the expected unaspirated *-t* allomorph,

<sup>22</sup> Icelandic /-ll/ and /-nn/ degeminate when preceding a consonantal segment. (Einarsson 1973) This will be assumed orthogonal to the task at hand.

<sup>23</sup> This verb is semantically peculiar in that it can only be used either in an interrogatory or negated context and as such proves difficult to translate accurately, e.g., *hann nennir ekki að lesa* ‘he cannot manage/be bothered to read’, *nennir þú að lesa þetta?* ‘can you manage/bother to read this (for me)?’ and so forth.

(38a). To further obfuscate matters, Hansson (1999) brings to light cases of strong stem-final /-ll/ and /-nn/ verbs which select for neither allomorph in forming the imperative; and opt rather for ungrammaticality, i.e., a gap surfaces:

(39) IMPERATIVE GAPS IN STRONG STEM-FINAL /-ll/ & /-nn/ VERBS

<b>ROOT-STEM</b>		<b>IMP.</b>
<i>vinn(a)</i> – /vinn/	‘work’	*[vɪnt-] *[vɪnt̩-] ✓[∅]
<i>spinn(a)</i> – /spinn/	‘spin (yarn)’ <i>trans.</i>	*[spɪnt-] *[spɪnt̩-] ✓[∅]
<i>fall(a)</i> – /fall/	‘fall’	*[falt-] *[falt̩-] ✓[∅]

In the above cases, neither allomorph is selected and an absence of form prevails, as I indicated with the symbol ‘∅’. There exists, however, one strong /-nn/ verb, *finna* ‘find’, which does have an overt imperative:

(40) EXCEPTIONAL IMPERATIVE IN STRONG STEM-FINAL /-nn/ VERB *finna*

<b>ROOT-STEM</b>		<b>IMP.</b>
<i>finn(a)</i> – /finn/	‘find’	✓[fɪnt-] *[fɪnt̩-] *[∅]

In summary, establishing any inflexional pattern of “regularity”, where one allomorph applies in exclusion to the other, is markedly undermined by cases of “irregularity”. Irregularity comes in two types: erroneous allomorphic selection and ungrammaticality. A point of interest in the former type of irregularity is that in a certain subclass of verbs – phonologically characterised by /-ll/ and /-nn/ stem endings – the vast majority systematically take the wrong allomorph; leaving a minority of verbs to pattern after regular allomorphic selection. Two generalisations to be drawn from the data at this point are that (i) the behaviour of certain verb stems can be characterised by a susceptibility to one allomorph over another and (ii) an undefined relation exists between

weak past tense and imperative morphemes such that the latter behaves parasitically on the shape of allomorph in the former.<sup>24</sup>

### 3.1.2 DISCUSSION OBJECTIVE & FORMATTING

The objective of this discussion is to devise a system of grammar which models allomorphic selection in both weak past tense-imperative and strong imperative suffixes.

The remainder of this discussion breaks down as follows: §3.2 presents an analysis of these facts from a perspective of CONTROL theory, as implemented in Hansson (1999); §3.3 explores theoretical shortcomings of this analysis; whilst in §3.4 reanalysis is proposed in the form of a nonfixed model of grammar; and §3.5 concludes the discussion.

### §3.2 PREVIOUS ANALYSIS: HANSSON (1999)

In this section, Hansson's (1999) analysis will be presented in two stages. The first stage (§3.2.1) serves to account for cases of allomorphic regularity from an Optimality-Theoretic (OT) perspective; whereas the second stage (§3.2.2) copes with both cases of allomorphic irregularity and ungrammaticality. Consequently, the OT analysis initially put forth undergoes reform in the fashion of constraint revision and the addition of a CONTROL checking module.

#### 3.2.1 AN OPTIMALITY-THEORETIC PERSPECTIVE OF ALLOMORPHIC REGULARITY

Hansson's goal at the outset is to invoke constraints which constrain the unexceptional allomorphy (as introduced in (35)). Explicitly, he requires constraints which control for  $-t^h$  in verbs with stem-final sonorants followed by /t/ whilst awarding  $-t$  in all other environments. He characterises the presence or absence of aspiration between the two allomorphs as a featural contrast in [spread glottis] (henceforth [s.g.]).<sup>25</sup> He argues that a ranking chiefly empowering MARKEDNESS over FAITHFULNESS constraints captures the distribution of the unexceptional allomorphy. Said constraints are listed below:

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<sup>24</sup> In Icelandic, there additionally exist a number of *indeterminate* verbs, so-called for their stems neutralising either allomorph by imposition of greater phonotactics. The allomorphy in such cases is then, by definition, not subject to the "schizophrenic" properties relevant to us here and as such will not be included in this discussion. For readers interested in said verbs, see Einarsson (1973).

<sup>25</sup> As is customary in Icelandic phonology. (Ringen 1999) See also Lombardi (1994) for [aspiration] as an equivalent means of expressing featural contrasts of this sort.

(41) CONSTRAINTS (HANSSON 1999)

- (a) PREASP *Cover term for* MULTLINK [s.g.], \* $\mu p^{h,h}k^h$ , MAXASP(STOP)<sup>26</sup>
- |                    |   |
|--------------------|---|
| MULTLINK [s.g.]    | <i>The feature [s.g.] must be linked to more than one consonant</i> |
| * $\mu p^{h,h}k^h$ | <i>A [s.g.] stop may not be moraic</i>                              |
| MAXASP(STOP)       | <i>The output correspondent of an input [s.g.] stop is [s.g.]</i>   |
- (b) MARKED *Shorthand for a set of high-ranked phonotactics-defining markedness constraints, esp. with respect to the distribution of [ $\pm$ cont] in non-[s.g.] obstruents*
- (c) IDENT[s.g.] *Correspondent segments in the input and output have identical specifications for the feature [s.g.]*
- (d) MAX[F] *Every feature (autosegment) in the input has a correspondent in the output*
- (e) DEP[F] *Every feature (autosegment) in the output has a correspondent in the input*

In further explaining MULTLINK [s.g.], Hansson, in citing Ringen (1998), states that “in clusters of a [spread glottis] segment and an unaspirated stop, the [spread glottis] feature is actually doubly-linked”. This is diagrammed below:

(42) OUTPUT REPRESENTATION OF [spread glottis]-RELATED EFFECTS

{ <b>h</b> t}	{ <b>s</b> t}	{ <b>ŋ</b> t}
\ /	\ /	\ /
[s.g.]	[s.g.]	[s.g.]

Above, we see that the aspiration of  $-t^h$  must either realise as preaspiration or devoicing of the preceding consonant; and as such is “linked” to a preceding segment – an important factor in determining the presence or absence of the aspirated allomorph in

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<sup>26</sup> See Hansson (1999) for original sources of constraints in (41a).

outputs. Appearing in ensuing tableaux under the rubric PREASP, this constraint plays a definitive role in Hansson’s evaluation of FAITHFULNESS to the feature [s.g.] in that aspiration *spreads*; thereby not deleting and moving onto adjacent segments.

Below the reader is given tableaux for “elsewhere” cases *sýna* ‘show’ and *sníða* ‘cut’ – two instantiations of selection of /T/ over /T<sup>h</sup>/:

(43) TABLEAUX FOR /T/ OVER /T<sup>h</sup>/

(a) PAST & IMPERATIVE STEM<sup>27</sup> FOR *sýna* ‘show’

	/sin{T, T <sup>h</sup> }/		MARKED	PREASP	MAX/DEP[F]	IDENT[s.g.]
a.	/sin-T/	sinð	*!			
+ b.		sint				
c.	/sin-T <sup>h</sup> /	sint <sup>h</sup>		*!		
d.		sint		*!	*	*
e.		sint̥				*!
f.		siht			*!	*

(b) PAST & IMPERATIVE STEM FOR *sníða* ‘cut’

	/snei{T, T <sup>h</sup> }/		MARKED	PREASP	MAX/DEP[F]	IDENT[s.g.]
a.	/sneiT-T/	sněiðð	*!			
+ b.		sněitt				
c.		sněiðt	*!			
d.	/sneiT-T <sup>h</sup> /	sněiðt <sup>h</sup>	*!	*		
e.		sněiðt	*!	*	*	*
f.		sněitt		*!	*	*
g.		sněiθt	*!			*
h.		sněiht			*!	*

<sup>27</sup> Hansson uses “stem” to refer to the *coronal consonant* in past tense and imperative morphemes.



To accommodate the nature of allomorphy from an OT perspective, Hansson has each allomorph generating its own candidate sets, as is illustrated above with identical candidates referring back to different (i.e., unaspirated and aspirated) inputs. Thus, vying candidates (b) and (f) (in (43b)) are identical albeit with disparate violation profiles which further determine the suboptimality of (f) and optimality of (b). Although in the tableaux neither optimal candidate incurs violations, Hansson states that the motivation for the above ranking argument is (in theory) that optimal candidates, based on the *-t* allomorph, will never violate MAX/DEP[F] or IDENT[s.g.] because the unaspirated allomorph does *not* trigger [s.g.]-related effects. Furthermore, ranking PREASP and MARKED high ensures that any candidate, based on the *-t<sup>h</sup>* allomorph, which deletes [s.g.]-related effects will be eliminated.

In handling stem-final sonorant+/t/ cases, where the aspirated allomorph prevails, Hansson understands a principle of phonological exponence of morphemes to be driving the alternation. Explicitly, when /T/ yields an output identical to the Base (or root), a violation is incurred on grounds of absence of a distinguishable morpheme. This argument translates into the following constraint, MORPHEME REALIZATION:

(44) MORPHEME REALIZATION CONSTRAINT (HANSSON 1999)<sup>28</sup>

MORPHEME REALIZATION

*Realize morphemes in an overt and detectable manner*

Similar to the format above, the following tableaux illustrate *herða* ‘harden’ and *henda* ‘throw’ – two instantiations of selection of /T<sup>h</sup>/ over /T/:

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<sup>28</sup> See author’s original work for sources on similarly proposed constraints in the literature.

(45) TABLEAUX FOR /T<sup>h</sup>/ OVER /T/(a) PAST & IMPERATIVE STEM FOR *herða* ‘harden’

	/herT{T, T <sup>h</sup> }/ BASE: [hɛrð-]		MARKED	PREASP	MAX/DEP[F]	M.REAL	IDENT[s.g.]
a.	/herT-T/	hɛrð				*!	
b.		hɛrt	*!				
c.		hɛrt̚			*!		**
d.	/herT-T <sup>h</sup> /	hɛrt <sup>h</sup>		*!			
+ e.		hɛrt̚					*!
f.		hɛrt	*!		*		
g.		hɛrð			*!	*	
h.		hɛht			*!		*

(b) PAST & IMPERATIVE STEM FOR *henda* ‘throw’

	/henT{T, T <sup>h</sup> }/ BASE: [hɛnt-]		MARKED	PREASP	MAX/DEP[F]	M.REAL	IDENT[s.g.]
a.	/henT-T/	hɛnð	*!				
b.		hɛnt				*!	
c.		hɛnt̚			*!		*
d.	/henT-T <sup>h</sup> /	hɛnt <sup>h</sup>		*!			
+ e.		hɛnt̚					*
f.		hɛnt			*!	*	*
g.		hɛnð	*!		*		
h.		hɛht			*!		*

Since stem-final sonorants are not underlyingly specified for [+s.g.], the “linking” property of aspiration to a preceding segment (i.e., sonorant) guarantees IDENT[s.g.]

violations. Hansson must therefore eliminate all candidates before the sonorant-devoiced (e) candidates incur a penalty. Ranking IDENT[s.g.] low ensures that such violations are superfluous. Two salient cases of violations to note are (i) candidates (c) versus (e) under MAX/DEP[F] and (ii) Base-duplicating violations under MORPHREAL. In the former case, candidates (c), based on the *-t* allomorph, incur MAX[F] violations for devoicing stem-final sonorants; whereas no such violation incurs in (e) candidates, based on the *-t<sup>h</sup>* allomorph, because the devoicing is a surface effect of aspiration. This state of affairs crucially allows (e) candidates, [hɛɾt-] and [hɛɾt<sup>h</sup>-], to elude punishment under MAX/DEP[F]. In the case of MORPHREAL, well-formed and FAITHFUL candidates (i.e., candidates with no additional violations) are eliminated seeing that they mirror the Base. In principle, these Base-duplicating violations force the grammar to opt for the most well-formed candidate based on *-t<sup>h</sup>*. On a final note, Hansson remarks that aside from administering /T<sup>h</sup>/ over /T/ in past-imperative formation, MORPHREAL is completely inactive in the grammar of Icelandic.

### 3.2.2 OT REVISITED: OO-CORRESPONDENCE & CONTROL THEORY

At the outset of this discussion, irregular allomorphic selection was defined as the application of the wrong (i.e., opposite) allomorph. It thus follows, *ex hypothesi*, that the OT analysis sketched hitherto crashes in predicting the (erroneous) allomorph in such cases. Consequently, the author's analysis must undergo revision to accommodate both irregular allomorphic selection and gap emergence.

Recall the following problematic data from §3.1:

## (46) EXCEPTIONAL ALLOMORPHY IN WEAK PAST &amp; IMPERATIVE SUFFIXES

ROOT-STEM		UR	PAST/IMP.
(a) <i>mæɫ(a)</i> - /mail/	‘speak’	/mail+T <sup>h</sup> -/	[mäɪlt-]
<i>mein(a)</i> - /mein/	‘mean’	/mein+T <sup>h</sup> -/	[mɛĩnt-]
(b) <i>send(a)</i> - /sent/	‘send’	/sent+T-/	[sɛnt-]
(c) <i>grill(a)</i> - /krill/	‘descry’	/krill+T <sup>h</sup> -/	[krɪlt-]
<i>hell(a)</i> - /hell/	‘pour’	/hell+T <sup>h</sup> -/	[hɛlt-]
<i>skell(a)</i> - /skell/	‘slam’	/skell+T <sup>h</sup> -/	[skɛlt-]
<i>vill(a)</i> - /vill/	‘beguile’	/vill+T <sup>h</sup> -/	[vɪlt-]
<i>brynn(a)</i> - /prinn/	‘water’	/prinn+T <sup>h</sup> -/	[prɪnt-]
<i>inn(a)</i> - /inn/	‘enquire’	/inn+T <sup>h</sup> -/	[ɪnt-]
<i>minn(a)</i> - /minn/	‘remind’	/minn+T <sup>h</sup> -/	[mɪnt-]
<i>nenn(a)</i> - /nenn/	‘manage’	/nenn+T <sup>h</sup> -/	[nɛnt-]
<i>þinn(a)</i> - /θinn/	‘thin’	/θinn+T <sup>h</sup> -/	[θɪnt-]
...	...		

Above, we see cases of the erroneous allomorph applying in that where one allomorph is expected, the converse allomorph appears. Further problematic data arose in the form of strong stem-final /-ll/ and /-nn/ verbs which opted for ungrammaticality. Recall further data duplicated here from §3.1:

(47) IMPERATIVE GAPS IN STRONG STEM-FINAL /-ll/ & /-nn/ VERBS

ROOT-STEM		IMP.
<i>vinn(a)</i> – /vinn/	‘work’	*[vɪnt-] *[vɪnt-] ✓[∅]
<i>spinn(a)</i> – /spinn/	‘spin (yarn)’ <i>trans.</i>	*[spɪnt-] *[spɪnt-] ✓[∅]
<i>fall(a)</i> – /fall/	‘fall’	*[falt-] *[falt-] ✓[∅]

Further undermining the gapping cases above, however, is one strong stem-final /-nn/ verb, *finna* ‘find’, which does surface with an overt imperative:

(48) EXCEPTIONAL IMPERATIVE IN STRONG STEM-FINAL /-nn/ VERB *finna*

ROOT-STEM		IMP.
<i>finn(a)</i> – /finn/	‘find’	✓[fɪnt-] *[fɪnt-] *[∅]

Momentarily setting the two types of irregularity (i.e., erroneous allomorphic selection and ungrammaticality) aside, Hansson explains that the verb *finna* bears a particular root allomorphy where the substring [f...nt] is found elsewhere in the paradigm. His claim is that this potentially sets up a surface correspondence between forms through which the imperative construction [f...nt-] is licenced. Hansson contends that this “support model” is lacking in any of the gapping verbs. Conjugational data I have compiled from Einarsson (1973) evince Hansson’s claim. These data are shown below:

(49) GAPS LACK INTRAPARADIGMATIC SUPPORT FOR IMPERATIVE STEM

<i>vinna</i> – ∅ [vɪn:a – vɪn: – van: – vɪn:ɣm – vɪn:ɪn – vɪn:ið]
<i>spinna</i> – ∅ [spɪn:a – spɪn: – span: – spɪn:ɣm – spɪn:ɪn – spɪn:ið]
<i>falla</i> – ∅ [fatla – fɛtɿ – fɛtɿɿ – fɛtɿɿɣm – fatlɪn – fatlið]

But:

<i>finna</i> – <i>fɪnt</i> [fɪn:a – fɪn: – fan: – fɪntɣm – fɪntɪn – fɪntið]
---

Alternating inflexional patterns for *finna* thus licence the existence of an overt imperative [fɪnt-], whilst an absence of such phonological information from the paradigms of *vinna*,

*spinna* and *falla* prohibit any one form from surfacing over another. Albeit fortuitously, note that the *-t* allomorph selected here follows from the preceding OT analysis.

Returning to problematic cases of erroneous allomorphy in (46)(a) and (b), the author proposes a “subcategorisation” requirement which has the shape of allomorph in these verbs specified in the lexicon; thereby relieving them of derivation by the grammar. The 27 aberrant cases of weak stem-final /-ll/ and /-nn/ verbs, however, constituted a striking majority in view of the 6 unexceptional cases. Hansson in fact argues that “this constitutes a clash between the grammar (phonology) on the one hand, and the lexicon on the other ...”. His claims are that (i) the phonology in fact predicts /T/ to be selected (as in (38a)), but (ii) a “scan” of real verbs in the lexicon turns out to favour /T<sup>h</sup>/ (as in (38b)). In the absence of any formal expression, I can only conjecture that this notion of lexical “scanning” is analogous to a referencing of “statistical distribution of exceptionality across the lexicon”.

At this stage, Hansson breaks down the data into five generalisations:

(50) COMPREHENSIVE DATA REVIEW

- (a) *The imperative stem never contains a different allomorph from the past stem*
- (b) *The imperative stem is only exceptional when there is an exceptional past stem*
- (c) *Paradigm gaps are found in imperative formation, never in past formation*
- (d) *Paradigm gaps do not occur where a potentially supporting surface string occurs elsewhere in the paradigm*
- (e) *Paradigm gaps only emerge when the verb root has a phonotactic shape which usually is indicative of exceptionality in allomorph selection*

Generalisations (50)(a)-(e) are fairly straightforward; and ultimately serve as a starting point from which to revise the previous OT analysis respective of what challenges new data have brought forth. With the aim of constructing a synchronic phonological grammar of the Icelandic data, Hansson proposes (i) an OUTPUT-OUTPUT (OO)-CORRESPONDENCE constraint in deriving both regular and irregular allomorphic selection and (ii) a supplementary CONTROL component of the grammar (Orgun & Sprouse 1999) to derive ungrammaticality in *vinna*, *spinna* and *falla*.

On deriving intraparadigmatic dependency in weak verbs, Hansson proposes the following OO-CORRESPONDENCE constraint:

(51) OO-CORRESPONDENCE CONSTRAINT (HANSSON 1999)

IDENT[s.g.]O-O

*The output correspondence (of the suffix {T, T<sup>h</sup>}) must agree in terms of the feature [s.g.] with a stem-final coronal obstruent in some closely related form*

The author stipulates the constraint must either be relativised to *imperative* formation or ranked accordingly in an imperative cophonology. The constraint is further indexed to the feature [ $\pm$ spread glottis] because Hansson requires that aspiration be identical in both past tense and imperative suffixes, lest an imperative stem surfaces with an allomorph dissimilar from a past tense stem. “[S]ome closely related form” refers both to the past tense suffix in weak verbs and, if possible, supportive root allomorphy in strong verbs, as in *finna* and I presume *halda* ([\*halt-,  $\checkmark$ halt-]<sub>IMP</sub>  $\rightsquigarrow$  [halta – hɛlt – hjeɪlt – hjeɪlym – haltɪn/ið]).

Concerning development of a ranking argument, Hansson puts forth MAX  $\gg$  IDENT[s.g.]O-O  $\gg$  MORPHREAL to drive allomorphic selection across-the-board. The author claims dominant MAX prohibits deletion of any material in circumvention of IDENT[s.g.]O-O violations; whereas IDENT[s.g.]O-O outranking MORPHREAL reads that it

is better to agree in allomorphy than to be distinct from the Base, as would presumably be the case in *senda*–[✓sɛnt-, \*sɛnt-]<sub>PAST/IMP</sub> (cf. *henda* in (45b)).<sup>29</sup>

On deriving ungrammaticality in strong verbs *vinna*, *spinna* and *falla*, Hansson resolves the problem by proposing an inviolable constraint which demands that speakers analogically “check” outputs from EVAL with what allomorphic patterns exist in the lexicon. The resulting constraint,  $\text{DOUBLECHECK}_{\text{IMPERATIVE}}$ , is given below:

(52) INVIOABLE CONTROL CONSTRAINT (HANSSON 1999)

$\text{DOUBLECHECK}_{\text{IMPERATIVE}}$

*When computing the imperative of a verb, use the grammar and analogical computation. The results of the two must be mutually supporting.*

The author states that “when  $\text{IDENT}[\text{s.g.}]_{\text{O-O}}$  is unavoidably violated (as in most strong verbs), the constraint is violated only if the phonotactic shape of the root is such that most verbs in the lexicon with that shape are exceptional (in taking /T<sup>h</sup>/)”. “[A]nalogical computation” appeals to the aforementioned notion of lexical “scanning” whereby distributional patterns (of which verb stems take which allomorphs) are retrieved and computed to determine the “actual” felicity of the most well-formed candidate in EVAL.<sup>30</sup> The implications of this constraint are left open to interpretation, but the argument seems to be that should the phonology and lexicon “disagree” in the imperative form of a verb, then, in cases of strong /-ll/ and /-nn/ verbs, ungrammaticality (i.e., a gap) emerges *in lieu* of an overt imperative. Addressing the “bizarre” nature of this constraint, Hansson remarks nothing intrinsic to the CONTROL model requires constraints in CONTROL to be of a similar nature to those of CON (i.e, the phonology proper). With no inherently theoretical restriction on well-defined constraints,  $\text{DOUBLECHECK}_{\text{IMPERATIVE}}$  can therefore be assumed active in CONTROL.

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<sup>29</sup> No tableaux appear upon revision of the initial OT analysis. Any speculation on my part on how Hansson envisages these tableaux to look and function will appear in §3.3.

<sup>30</sup> See author’s original work for a psycholinguistic reference in support of this claim.



### §3.3 ON EXAMINING ACCOUNTABILITY: HANSSON (1999)

Albeit an important analysis in its empirical contribution to gap phenomena in recent literature, there exist analytic properties of Hansson’s approach which deserve our attention. Specifically, I refer to properties suggesting conceptual inelegance, such as constraint inadequacy and fallacious argumentation.

#### 3.3.1 LACKLUSTRE CONSTRAINTS

Of initial concern is Hansson’s constraint *répertoire*; explicitly, the nature of his gap-inducing constraint `DOUBLECHECKIMPERATIVE`, which emulates core attributes of an interface constraint – insertion into a single ranking argument and relativisation to some morphological class, process or construction.<sup>31</sup> Supplemental to interface properties, `DOUBLECHECKIMPERATIVE` comes endowed with a “scanning” mechanism which establishes an elusive relation between a given output and analogically-comparable statistical information across the lexicon.

There are two chief arguments against such a constraint: one, is its inherent parochialism, and, two, is its empowerment in reference to potentially indefinite lexical access. Indexing a constraint to imperative formation as such comes at the price of serving as more a description than explanation of the facts. It would moreover not be unsubstantiated to assert that whilst the empirical application of the constraint is too narrow, its theoretical scope is too wide. It is a well-established tenet of OT that the sole duty of a constraint is to evaluate candidates by virtue of its parameterisation.<sup>32</sup> Endowing constraints with the prowess to transcend grammar and reach into pockets of the lexicon is counterintuitive within the theoretical confines of OT. That is not to say that phonology proper cannot interface with the lexicon, but rather that any interplay between the two should be *maximally* discriminatory.<sup>33</sup> Whilst arguing that the CONTROL module relieves the constraint of such criticisms, it also evokes scepticism on the constraint’s intrinsic inviolability. A widely held view in the literature on inviolable constraints is that gaps emerging as “crashed derivations” in CONTROL come at the price

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<sup>31</sup> As defined by Inkelas & Zoll (2003).

<sup>32</sup> See Prince & Smolensky (1993/2002), amongst others.

<sup>33</sup> See Antilla (2002) for detailed discussion against “overly powerful” interface constraints.

of sacrificing another core tenet of OT: *competition*. With an output form emerging in the absence of vying candidates,  $\text{DOUBLECHECK}_{\text{IMPERATIVE}}$  is essentially a non-optimising constraint.<sup>34</sup> Discussion on the empirical predictions following from such a constraint will be addressed in §3.3.2.

Furthermore, obstruent-final weak verbs prove  $\text{IDENT}[\text{s.g.}]_{\text{O-O}}$  to be too vague in its parameters. The constraint is effective in eliminating the infelicitous allomorph (i.e., the allomorph which clashes with a corresponding past tense suffix), but ineffective in further determining the surface realisation of the felicitous allomorph. Thus, once any candidate realising /T<sup>h</sup>/ is eliminated, the problem lies explicitly in penalising remaining /T/ candidates in that the grammar is mute in selecting a winner between voiced and voiceless realisations of stem-final /-P/ or /-K/ preceding coronal suffix /T/. With the utility of  $\text{IDENT}[\text{s.g.}]_{\text{O-O}}$  confined only to discerning aspirated and unaspirated allomorphs, the grammar's indeterminacy in imposing surface realisations of underspecified segments extends, by hypothesis, to weak and strong obstruent-final verbs alike. This is illustrated below with weak *hava* 'have' and strong *sofa* 'sleep', respectively:

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<sup>34</sup> See Raffelsiefen (2004) for cogent arguments against CONTROL theory which lie beyond the scope of this discussion.

## (53) DUBIOUS IDENT[s.g.]O-O

(a) INDETERMINACY<sup>35</sup> IN OBSTRUENT-FINAL WEAK VERBS: *hava* ‘have’

	/haP{T, T <sup>h</sup> }/ <i>past</i> [havð-]	MAX	IDENT[s.g.]O-O	MORPHREAL
	/haP-T/			
⊖(a)	havð			
☠(b)	haft			
	/haP-T <sup>h</sup> /			
(c)	havð	*!		
(d)	haft		*!	

(b) INDETERMINACY IN OBSTRUENT-FINAL STRONG VERBS: *sofa* ‘sleep’

	/soP{T, T <sup>h</sup> }/ <i>past</i> [sva:v]	MAX	IDENT[s.g.]O-O	MORPHREAL
	/soP-T/			
⊖(a)	sɔvð			
☠(b)	sɔft			
	/soP-T <sup>h</sup> /			
(c)	sɔvð	*!		
☠(d)	sɔft			

In explicating the above tableaux, we see in (53a) that the grammar favourably penalises candidate (c) for deleting [s.g.] and candidate (d) for realising  $-t^h$  as it disagrees with the [s.g.] value in the past tense suffix [havð-]. There exist, however, no means of distinguishing between vying  $-t$  candidates (a) and (b); leaving the grammar at a standstill in promoting one surface realisation over another. A similar scenario unfolds for strong verb *sofa* in (53b) albeit with candidate (d) further obfuscating matters. Without a corresponding past tense form to impose one shape of allomorph over another, an

<sup>35</sup> ‘Frown’ denoting what *should* win and ‘skull & crossbones’ denoting what *should not*.

aspirated imperative form – where voiceless realisation of /-P/ is a surface effect of [s.g.] – also surfaces unscathed. Note that this problem was resolved in (53a) with candidate (d) violating IDENTITY with a past tense form in terms of aspiration.

Retracing our steps, Hansson’s initial ranking argument (in (43)) deriving allomorphic regularity similarly fails to recognise problematic candidates. The Hansson-modelled tableau below with *hava* demonstrates this problem:

(54) STILL INDETERMINACY IN OBSTRUENT-FINAL WEAK VERBS: *hava* ‘have’

	/haP{T, T <sup>h</sup> }/		MARKED	PREASP	MAX/DEP[F]	ID[s.g.]
⊕a.	/haP-T/	havð				
b.		havt	*!			
⊗c.		haft				
d.	/haP-T <sup>h</sup> /	havt <sup>h</sup>	*!	*		
e.		havð		*!	*	*
f.		haft				*!
g.		haht			*!	*

These data appear to discredit the utility of Hansson’s constraint repertoire and by doing so undermining any ranking arguments put forth. Drawbacks of this nature indicate that the explicit nature of verbs has been overlooked.

On an empirical note, both my research and consultation with two informants confirm that whilst *falla* and *vinna* indeed lack an imperative, *spinna* does not; yielding rather [spɪŋt-] instead of [Ø].<sup>36</sup> Considering that Hansson is both a trained phonologist and native Icelander himself, it is not my intention to cast doubt on his review of Icelandic data. In light of this fact, however, I will proceed with this knowledge and henceforth consider *spinna* a strong /-ll/, /-nn/ verb bearing an overt imperative. Accordingly, this

<sup>36</sup> For official documentation of the imperative (i.e., *boðhátur*) of *spinna*, visit *Orðabók Háskólans: Beygingarlýsing íslensks nútímamáls* – a nationally recognised declensional dictionary of Modern Icelandic (in Icelandic) – located at: <http://www.lexis.hi.is/beygingarlýsing/>

has disastrous consequences in further maintaining Hansson's analysis considering that the output form from EVAL, [spɪnt-], inevitably crashes in CONTROL when the retrieval of allomorphic (-t<sup>h</sup>) information across /-ll/ and /-nn/ verb stems fails to "mutually support" the output from the grammar. Consequently, how [spɪnt-] emerges as optimal from a crashed derivation would be inexplicable.

On a final note, in his ranking to control for allomorphic regularity (i.e., MARKED, PREASP » MAX/DEP[F] » IDENT[s.g.]), Hansson's umbrella constraint, PREASP, and IDENT[s.g.] conjointly administer four requirements for the realisation of [s.g.] alone. The author's approach is markedly predicated upon exploiting aspiration. As a result, each candidate refers back to two inputs – one unaspirated coronal suffix and one aspirated – forcing carbon copies of candidates to be simultaneously evaluated by the constraint ranking. In terms of theoretical aesthetics and functionality, this can be argued as both discomposing and suspiciously laborious. The extensive legwork required by Hansson's analysis can further be interpreted as conveying more a theoretical liability than empirical asset.

### 3.3.2 FALLACY BY PRINCIPLE OF ANALOGY

Review of inflexional patterns in weak /-ll/, /-nn/ verbs prompts Hansson to conclude that the motivation for irregular allomorphic selection is a "scan" of real verbs in the lexicon. It is the privileged treatment of this subclass of verbs to which we now direct our attention.

The core tenet of the "scanning" hypothesis is word formation as a process of analogical computation; in that Hansson appears to be arguing that distributional patterns in the lexicon exert a relatively high degree of influence on how the grammar defines well-formedness. Previous heuristic studies on rule- versus analogy-based word formation, however, have shown that speakers in fact derive irregularity in "grammar-like ways" without appealing to analogical mechanisms. Very briefly, Albright & Hayes (2003), drawing on results from experiments exploiting English past tense morphology, argue that the "productivity in irregular subgeneralizations (i.e., the fact that /-ll/ and /-nn/ verbs

systematically select the “wrong” allomorph) is best modeled by stochastic rules, rather than by analogy.” The authors arrive at this conclusion by proving lexical analogy to be inferior in virtually every respect to a rule-based (i.e., grammar-driven) account in that analogical mechanisms are not nearly restrictive enough to appeal accurately to the *structured similarity* underlying sets of verbs which express a striking susceptibility to either regular or irregular morphological operations.<sup>37</sup> The predominant selection of the erroneous allomorph in stem-final /-ll/, /-nn/ verbs characterises the stems of these verbs – in terms of the Albright & Hayes study – as *islands of reliability* in that the phonotactic shape of these stems constitutes a phonological context in which a particular morphological operation “works especially well in the existing lexicon”. Thus, Hansson’s appeal to the probability of an /-ll/, /-nn/ verb taking the aspirated allomorph stands unchallenged, but the means by which this probability is integrated into his model of grammar (i.e., by positing a diacritical constraint which statistically references analogical information in determining output well-formedness) will be understood here as theoretically undesirable in light of current research.

The ineptitude of analogical computation to identify allomorphically regular or irregular verbs by any standard of structural description, as implied by Albright & Hayes, results in a number of problems were we here to adopt Hansson’s proposal. Whilst the scanning hypothesis, under a more charitable interpretation, holds for the /-ll/, /-nn/ subclass of verbs, where allomorphic irregularity constitutes a comparable majority, the cogency of this argument is jeopardised when further extended to the weak non-/-ll/, -/-nn/ subclass, where allomorphic irregularity is a narrow minority, cf. (38a) – (38b). Further instigating my enquiry here is the disproportionate allomorphic irregularity-to-regularity ratios between the two subclasses of verbs. Explicitly, the former subclass patterns 27:6 in favour of irregularity whilst the latter patterns 27<sup>x</sup>:3 in that 3 cases of irregularity exist

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<sup>37</sup> In fact, the method of lexical analogy utilised by `DOUBLECHECKIMPERATIVE` is what Albright & Hayes refer to as *variegated similarity* in that the comparison of phonotactic shapes of verbs is general enough to where it establishes analogies which go far beyond the *structured similarity* of the verbs in question; thus, casting doubt on speakers combing the lexicon and retrieving a uniform shape of allomorph when English nonce verbs such as *spling*, by the same means of analogy, can be inflected as *splinged*, *splang* and *splung*.

within an exponentially larger subclass (of approximately 1700 verbs).<sup>38</sup> Under its most earnest application, a lexical scanning of weak non-/-ll/, -/nn/ verbs would result in an absence of erroneous allomorphy; leaving cases in (46)(a) and (b) inexplicable.

An experiment of my own was conducted to test the claim that a scanning of verbs in the lexicon can be only moderately correct and in fact fallacious when applied outside of a subdomain of verbs. The experiment tested two native Icelandic informants – both of whom being *linmæli* dialect speakers – for which shape of allomorph Icelanders freely apply to nonce verbs in past tense and imperative suffixes. Methodologically speaking, points of interest are that (i) nonce verbs are structurally analogous to real verbs addressed in this discussion (ii) verbs were presented in a jumbled order such that phonologically similar words would exert minimal influence over the other and (iii) instructions were administered so as to constrain inflexion to {/T/, /T<sup>h</sup>/} allomorphy and thereby excluding use of the only remaining *productive* verbal suffix in the language, *-aði* – a weak class 4 suffix of no help to us here. The objective, initially unbeknownst to them, was to see if Icelanders applied the shape of allomorph which constituted the majority of verbs in each verb's respective subclass, i.e., if Icelanders conformed to patterns from the lexicon, as Hansson's analysis predicts, or rather the phonology in determining allomorphy.<sup>39</sup> This hypothesis is schematised below:

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<sup>38</sup> Statistics here have been calculated from the same dataset (Gíslason 1996) on which Hansson ultimately bases his scanning hypothesis. Numbers here should be understood as indicative, not conclusive.

<sup>39</sup> In fact, one of the two informants is an Icelandic syntactician whose erstwhile work concentrated on Icelandic phonetics and phonology. I mention this to call attention to the fact that, in his case, it may have been inferred for what I was testing from the very outset; though, I fail to see how this would depreciate his participation in the experiment.

(55) ALLOMORPHIC PREDICTIONS BETWEEN GRAMMAR & LEXICON

(a) STEM-FINAL -SON+/T/ (e.g., *synda*)

PHON.            →     /T<sup>h</sup>/

LEX.             ~     /T<sup>h</sup>/

(b) STEM-FINAL /-ll/, /-nn/ (e.g., *minna*)

PHON.            →     /T/

LEX.             ~     /T<sup>h</sup>/

(c) ELSEWHERE (e.g., *sýna*)

PHON.            →     /T/

LEX.             ~     /T/

Principally, the schema reads that all sonorant+/t/ and /-ll/, /-nn/ verbs are predicted (by the lexicon) to take the aspirated allomorph; whereas any verb not qualifying for these two groups is conversely predicted to take the unaspirated allomorph. Any data not conforming to these premises will resultantly call the (global) credibility of a scanning hypothesis into question.

The results of the experiment are listed below with a given cell first displaying informant no. 1's results (in *unitalicised* typeface) and subsequently informant no. 2's results (in *italicised* typeface):



## (56) ICELANDIC NONCE-VERB EXPERIMENT RESULTS

INF	/STEM/	PAST-IMP
kvéna	kvjen	kvjɛnt <i>kvjɛnt</i>
trauna	tröyn	tröýnt <i>tröýnt</i>
hlæra	hłair	hłäirt <i>hłäirð</i>
nola	nol	nɔlt <i>nɔlt</i>
meylga	meilk	měilt <sup>40</sup> <i>měilkt</i>
kurða	kyrt	kyrt <i>kyrð</i>
nilda	nirt	nilt <i>nilt</i>
renda	rent	rent <i>rent</i>
hralla	hrall	hralt <i>hralt</i>
þilla	þill	þilt <i>þilt</i>
frónna	frounn	fröünt <i>fröünt</i>
steinna	steinn	stěint <i>stěint</i>

<sup>40</sup> Preservation of /k/ (further leniting to [ɣ]) in the graphemic sequence <lgd>, as in non-nonce verbs *svelgja* ‘gulp’ [svɛl(ɣ)t-]<sub>PAST/IMP</sub> or *fylgja* ‘follow’ [fil(ɣ)t-]<sub>PAST/IMP</sub>, is not uniformly pronounced by speakers.

Concerning /-ll/, /-nn/ verbs, phonology prevails for informant no. 1 with an absence of sonorant devoicing in /-nn/ verbs, as was the case in (38a); whilst /-nn/ verbs for informant no. 2 and /-ll/ verbs for both informants uphold earlier generalisations that the lexically dominant allomorph is the more “accessible” allomorph, as was presumably the case in (38b). Thus following from Hansson’s analysis, roughly all /-ll/, /-nn/ verbs were in fact assigned /T<sup>h</sup>/ by conforming to a greater distribution of the aspirated allomorph within their subclass. The lack of unanimity in this subclass, however, serves only to amplify the scepticism in relying on lexical information to predetermine inflexional patterns.

On analysis of (55a) and (55c) verbs, *prima facie* evidence against globalising the application of Hansson’s scanning mechanism comes in the forms of *nola*, *nilda* and informant no. 2’s production of *kvéna*, *trauna* and *kurða*. The simple explanation for this is that, in these cases, statistical distribution (across the lexicon) fails to promote the dominant allomorph.

The nonce verb *nola* – a (55c) verb – was surprisingly assigned the aspirated allomorph for both past and imperative suffixes by *both* informants, [\*nɔlt- – √nɔlt-]<sub>PAST/IMP</sub>. Crucially, these circumstances are inexplicable should we adopt Hansson’s conclusion. In this case, lexical seniority is marginalised such that favour for /T/ from both its phonological shape, (55c), and analogous verbs *mæla* ‘measure’, *stela* ‘steal’ and *fela* ‘conceal’ fail to influence suffixation of the unaspirated allomorph. Reassuring any premature conclusions here is the minority verb *mæla* ‘speak’ – a homophone to *mæla* ‘measure’ – which similarly takes the aspirated allomorph and could very well have provided an inflexional template by which *nola* was inflected. Statistically speaking, disadvantageous to Hansson is the infrequent (i.e., irregular) inflexional pattern of *mæla* ‘speak’ such that its frequency should *not* have the statistical aptitude to override what a lexical majority commands.

Similar scenarios play out for (55a) verbs *nilda* and, for informant no. 2, *kurða* which both take the unaspirated allomorph despite overwhelming statistical analogues to the

contrary, cf. *gelda* ‘geld’, *halda* ‘hold’, *herða* ‘harden’, *myrða* ‘murder’ and so forth. Additionally, nonce verbs *kvéna* and *trauna* are aspirated by informant no. 2 notwithstanding pressure from its phonological stem to conform to a /T/ majority along with verbs akin to *sýna* ‘show’, [ $\checkmark$ si:nt- – \*si:nt-]<sub>PAST/IMP</sub>. Motivation for the aspirated allomorph in the latter case could have emanated from *meina* ‘mean’ which similarly takes /T<sup>h</sup>/, [ $\checkmark$ měĩnt- – \*měĩnt-]<sub>PAST/IMP</sub>. Recall that this case, however, parallels what was concluded for *nola* with *mæla* ‘speak’.

To the contrary, nonce verbs *meylga* and *renda de facto* support Hansson’s scanning hypothesis. Disparity between informant no. 1’s production of *kvéna*, *trauna* and *kurða* and informant no. 2’s production of *hlæra* additionally fall in favour of analogically exploiting lexically dominant allomorphy.<sup>41</sup>

Though not without counterevidence on either side of the argument, the two speakers seemingly relied neither on lexically-internal nor -external factors in any greater frequency than the other. Notwithstanding two speakers as hardly enough persons from which to draw any sound conclusions, their responses accommodate the scepticism expressed at the outset of this subsection nevertheless; specifically, that the scanning principle is unreliable in analogically retrieving only majority-governed allomorphic information. Naturally, no single verb or microcomparative experiment attests to much on its own merits, but I believe the results here justify reconsideration of Hansson’s generalisation on lexical scanning; and further characterise such a generalisation as both prematurely defined and in fact flawed when analogised across the Icelandic verbal domain. These results are an effective diagnostic in supporting my claim that Hansson is correct in arguing that verbs are receptive to what patterns constitute the lexicon, whilst incorrect in postulating that a principle of lexical scanning elucidates allomorphic selection in practise. Hansson’s conclusion in question here thus does not reflect allomorphic selection across-the-board and as such must be set aside if we are to succeed in presenting the problem in a clearer light.

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<sup>41</sup> No reference was made to informant no. 1’s production of *hlæra* because the devoicing of /r/ is a means of repair of infelicitous \*[-rt-]; rendering any argument on allomorphy versus phonotactics objectionable.

### 3.3.3 LOCAL SUMMARY

Allomorphy and ungrammaticality have hitherto been shown to be both problematic and inevitable properties in the formation of past tense and imperative suffixes. Whilst allomorphic realisation has proven to be largely unpredictable, there exists evidence in the phonology to infer that inflexional regularity and irregularity are neither coincidental nor unprincipled instantiations of Icelandic verbal behaviour. In light of these facts, we have reviewed an analysis by Hansson (1999) whose intention to elucidate the more enigmatic characteristics of past tense and imperative formation fails to come to fruition. Grounds for dismissal of this analysis resulted from both theoretical and empirical examination.

### §3.4 REANALYSIS: FOSTERING TRANS- & INTRAPARADIGMATIC CUES

In this section, an alternative nonfixed model of grammar is proposed *in lieu* of Hansson's CONTROL model. Two central points of argument will be that any successful analysis of the Icelandic data will have to (i) exploit some measure of morphophonological conditioning and (ii) reflect a restrictive notion of *paradigm* as defined by morpheme-specific levelling effects. Constraint configuration and implementation follow from the aforementioned points of argument.

#### 3.4.1 PROMOTING A MORPHOPHONOLOGICAL INTERFACE

It has been argued in preceding sections that phonology alone cannot capture the incongruous character of verbs under investigation. Greater empirical support for such argumentation comes in the following dataset, which illustrates adjectival declension by the nominative, singular, neuter suffix /tʰ/ wherein no allomorphy exists:

(57) ADJECTIVAL STEMS BEARING /T<sup>h</sup>/ INDISCRIMINATELY<sup>42</sup>

ROOT	STEM	UR		
<i>ljúfur</i>	/ljuP-/	/ljuP-T <sup>h</sup> /	[ljuft]	‘gentle’
<i>stór</i>	/stour-/	/stour-T <sup>h</sup> /	[stöũrt]	‘big’
<i>gulur</i>	/kyl-/	/kyl-T <sup>h</sup> /	[kylt]	‘yellow’
<i>viða</i>	/viT-/	/viT-T <sup>h</sup> /	[viht]	‘wide’
<i>jafn</i>	/jaPn-/	/jaPn-T <sup>h</sup> /	[jamt]	‘even’
<i>óþarfi</i>	/ouθarP-/	/ouθarP-T <sup>h</sup> /	[ouθar(f)t]	‘unnecessary’
<i>ungur</i>	/uŋK-/	/uŋK-T <sup>h</sup> /	[uŋt]	‘young’

The data above compare with weak /T/ verbs where identical stems take the converse allomorph, cf. *heyr(a)*–[✓hěirð – \*hěĩrt]<sub>PAST/IMP</sub> ‘hear’ / *stór*–[\*stöũrt – ✓stöũrt]<sub>NEUT.ADJ</sub>, *nefn(a)*–[✓nemt – \*nemt]<sub>PAST/IMP</sub> ‘mention’/ *jafn* – [\*jamt – ✓jamt]<sub>NEUT.ADJ</sub> *et cetera*.<sup>43</sup> These data betoken a number of phonological environments which can take both aspirated and unaspirated allomorphs. Thus, phonology alone cannot be relied upon in predicting allomorphic selection as the language is ambiguous in which stems can take which allomorphs. Within a framework of constraint-based theory, this generalisation suggests that adequate constraints cannot by definition be solely phonologically grounded. The role of allomorphy as a property shared between two morphemes further suggests that any extraphonological information must be of a morphological nature. These findings overall necessitate the emergence of a morphophonological interface in tackling the data.

<sup>42</sup> These data are found in Hansson (1999) (albeit with the motive of showing that allomorphy, in general, exists in Icelandic) and only slightly altered here with the addition of Icelandic glosses and minor changes in the English glosses.

<sup>43</sup> The verb chart in ensuing subsection §3.4.2 exhaustively lists relevant examples such that I see no need to further duplicate them here.

### 3.4.2 PROMOTING SUBPARADIGMATIC INFORMATION

A number of Hansson's generalisations of the data implicitly confine both allomorphy and ungrammaticality to a notion of *paradigm* as a set of morphologically-related outputs. I refer specifically to the following observations; duplicated here from preceding discussion:

(58) NOTEWORTHY GENERALISATIONS (HANSSON (1999))

- (a) *The imperative stem never contains a different allomorph from the past stem*
- (b) *The imperative stem is only exceptional when there is an exceptional past stem*
- (c) *Paradigm gaps are found in imperative formation, never in past formation*
- (d) *Paradigm gaps do not occur where a potentially supporting surface string occurs elsewhere in the paradigm*
- (e) *Paradigm gaps only emerge when the verb root has a phonotactic shape which usually is indicative of exceptionality in allomorph selection*

Further prompting the means of reanalysis here is an interplay of trans- and intraparadigmatic cues in that consideration of  $\{/T/, /T^h/\}$  allomorphy within a notion of paradigm ultimately serves to de-emphasise the role of [aspiration] in any word forms external to the past tense and imperative morphemes. It will be subsequently argued that a notion of *subparadigmatic* CORRESPONDENCE thereby emerges.

Explicitly, there exists a robust pattern across Icelandic verb paradigms: weak verbs selecting for /T/ in the past and imperative surface with a desinence which is phonologically distinct from the desinence of the neuter participle; whereas weak verbs selecting for /T<sup>h</sup>/ in the past and imperative surface with a desinence which is phonologically identical to the desinence of the neuter participle. From a perspective of participles, outputs of participles are thus uniform in properties of [aspiration] seeing that

only an aspirated morpheme exists. Understanding neuter participles will ultimately help us flesh out a definition of *paradigm* in the present context; however, as the remainder of section §3.4 makes clear, any attempt at calibrating the quality of allomorph in past tense and imperative forms *vis-à-vis* the neuter participle (or any other paradigm member) gives way only to fallacy. The reason for this is that any appeal to a generalised notion of paradigm will prove too unrestrictive with relation to the exclusive correspondence between past tense and imperative morphemes.

In addition to consolidating data hitherto presented with my own corpus, the following verb chart serves to illustrate the notion of paradigm mentioned above by listing past tense, imperative and neuter participle word forms. Methodologically speaking, the following chart can be used as an empirical reference point by the reader in that verbs are meticulously compartmentalised *via* stem composition and selection of allomorph. A point to note is asterisked (\*) cells denote irrelevant forms, i.e., where the allomorphy is inoperative, e.g., *sofa* ‘sleep’ bears imperative form *sofðu* [sɔvð-] whilst past tense form *svaf* [sva:v] and thereby rendering the past tense form of little benefit to us here:<sup>44</sup>

(59) EMPIRICAL DATA BREAKDOWN<sup>45</sup>

	INF. STEM	PAST STEM	IMP. STEM	NEUTER PART.	GLOSS
<i>selects for /T/</i>					
gefa	geP	*	gʝεvð-	*	give
hafa	haP	havð-	havð-	haft	have
sofa	sOP	*	sɔvð-	*	sleep
vefa	veP	*	vεvð-	*	weave
draga	traK	*	trayð-	*	pull
hníga	hñik	*	hñi:γð-	*	succumb

<sup>44</sup> Note that the scenario sketched here for *sofa* applies indiscriminately to all strong verbs.

<sup>45</sup> All data have been crosschecked with Einarsson (1973) and a native Icelandic informant. Irreconcilable conjugations were retrieved for some verbs, such as *sníða* ‘cut’ and *vinda* ‘wring’. In such cases, I have listed them in the informant’s favour over any texts’. This was done in part with the intention of modelling a synchronic grammar of the verbal system.

vega	veK	*	vεγð-	*	weigh
fela	fvI	falt-	fɛlt-	*	conceal
mæla	mail	mǣilt-	mǣilt-	mǣilt	measure
stela	stel	*	stelt-	*	steal
sýna	sin	si:nt-	si:nt-	si:nt	show
heyra	heir	hěirð-	hěirð-	hěirt	hear
meiða <sup>46</sup>	meiT	měit:-	měit:-	měi <sup>h</sup> t:	hurt
sníða	sniT	*	sněit:-	*	cut
syngja	siŋK(j)	*	siŋt-	*	sing
senda	sentT	sɛnt-	sɛnt-	sɛnt	send
nefna	nePn	nɛmt-	nɛmt-	nɛmt	mention
negla	nekl	nɛ(γ)lt-	nɛ(γ)lt-	nɛlt	nail
horfa	horP	hɔr(v)ð-	hɔr(v)ð-	hɔr(f)t	look
kemba	k <sup>h</sup> emp	c <sup>h</sup> ɛmt-	c <sup>h</sup> ɛmt-	c <sup>h</sup> ɛmt	comb
fylgja	filK(j)	fil(γ)t-	fil(γ)t-	filt	follow
<i>selects for /T<sup>h</sup>/</i>					
henda	hentT	hɛnt-	hɛnt-	hɛnt	throw
hrinda	hriŋT	hriŋt-	hriŋt-	hriŋt	jostle
lenda	lentT	lɛnt-	lɛnt-	lɛnt	traverse
synda	sintT	sɪnt-	sɪnt-	sɪnt	swim
vinda	viŋT	viŋt-	viŋt-	viŋt	wring

<sup>46</sup> Verbs bearing root-final -VT<sup>(h)</sup>, e.g., *meiða*, *sníða*, (*unlisted*) *ýta* ‘shove’, (*unlisted*) *gráta* ‘cry’, (*unlisted*) *láta* ‘let’ and so on, realise either a lengthened or preaspirated /t/ as the past tense and/or imperative suffix. Such surface effects of {/T/, /T<sup>h</sup>/} allomorphy are governed by greater phonological rules and as such will be assumed unproductive, i.e., external, to the task at hand. The absence hereto of *meiða* and like verbs from the subcategory of “indeterminates” is only a formality. See footnote 23.



gelda	gɛɾ	g <sub>j</sub> ɛɫ-	g <sub>j</sub> ɛɫ-	g <sub>j</sub> ɛɫ	geld
halda	haɾ	*	haɫ-	*	hold
herða	heɾ	heɾt-	heɾt-	heɾt	harden
myrða	miɾ	miɾt-	miɾt-	miɾt	murder
mæla	maɪ	mǣɫ-	mǣɫ-	mǣɫ	speak
meina	meɪn	měɪnt-	měɪnt-	měɪnt	mean
/-ll, -nn/ selects for /T/					
brenna <sup>47</sup>	prenn	prent-	prent-	prent	burn ( <i>transitive</i> )
kenna	k <sup>h</sup> enn	c <sup>h</sup> ent-	c <sup>h</sup> ent-	c <sup>h</sup> ent	teach
renna <sup>48</sup>	renn	rent-	rent-	rent	unloosen
fella	fell	fɛɫ-	fɛɫ-	fɛɫ	fell
rella	ɾell	ɾɛɫ-	ɾɛɫ-	ɾɛɫ	nag
tolla	t <sup>h</sup> oll	t <sup>h</sup> ɔɫ-	t <sup>h</sup> ɔɫ-	*	stick
/ll/ selects for /T <sup>h</sup> /					
fylla	fill	fɪɫ-	fɪɫ-	fɪɫ	fill
grilla	krill	krɪɫ-	krɪɫ-	krɪɫ	descry
hella	hell	heɫt-	heɫt-	heɫt	pour
skella	skell	skɛɫt-	skɛɫt-	skɛɫt	slam
stilla	still	stɪɫt-	stɪɫt-	stɪɫt	calm
villa	vill	vɪɫt-	vɪɫt-	vɪɫt	beguile
/-nn/ selects for /T <sup>h</sup> /					

<sup>47</sup> Not to be confused with homophonic strong verb *brenna* ‘burn’ (*intransitive*)

<sup>48</sup> Not to be confused with homophonic strong verb *renna* ‘run’

<sup>49</sup> Neither of the two remaining verb classes are listed exhaustively for sake of space. This technicality, however, makes no impact on the analysis as /-ll/, /-nn/ verbs pattern identically to one another. Thus in theory, one verb representative of each class suffices.

brynna	prinn	prɪnt-	prɪnt-	prɪnt	water
glenna	klenn	klɛnt-	klɛnt-	klɛnt	spread
inna	inn	ɪnt-	ɪnt-	ɪnt	enquire
minna	mɪnn	mɪnt-	mɪnt-	mɪnt	remind
nenna	nenn	nɛnt-	nɛnt-	nɛnt	manage
spenna	spenn	spɛnt-	spɛnt-	spɛnt	fasten
þinna	θinn	θɪnt-	θɪnt-	θɪnt	thin

Neuter participles thus unexceptionally devolve word-final segments – the presumable surface effect of an aspirated participial morpheme. This fact further emphasises a phonological similarity in [aspiration] between neuter participles and corresponding past-imperative forms in /T<sup>h</sup>/ verbs, whilst likewise affirming a dissimilarity between these participles and the past-imperative forms in /T/ verbs. Regarding the presence or absence of {/T/, /T<sup>h</sup>/} allomorphy, the distribution of [aspiration] across verbs becomes more intelligible in light of these facts. Abstracting away from disparate surface values, the following construct emerges in characterising the data:

(60) THEORETICAL DATA BREAKDOWN

INFLEXION	ALLOMORPH	PAST	IMP.	NEUTER PART.
<i>weak</i>	/T/	+	+	–
	/T <sup>h</sup> /	+	+	+
<i>strong</i>	/T/	–	+	–
	/T <sup>h</sup> /	–	+	–
	∅	–	+	–

This chart serves to accentuate the phonological relationships (leftmost columns) between morphological dimensions of verbs (topmost row) on a binary scale. Generalisations to be drawn from the chart are (i) asymmetric values of [aspiration] exist between past-

imperative and neuter participle forms in weak /T/ verbs (ii) symmetric values of [aspiration] exist throughout weak /T<sup>h</sup>/ verb forms and (iii) strong verbs exhibit neither type of symmetry found amongst weak verbs. In terms of designing a grammar with which both to generate data in (59) and arrive at the schema in (60), constraints tantamount to these generalisations must be invoked. Furthermore, the intrinsically positive and negative attributes, which dichotomise verbs based on properties of [aspiration], should also be translated into our analysis, so as to militate against overlooking the aforesaid allomorphic (a)symmetries.

### 3.4.3 UNIFORM EXPONENCE AS ALLOMORPH LEVELLING

It has been argued thus far that the data necessitate (i) an analysis exploiting some measure of morphophonological conditioning over one which is strictly phonological and (ii) careful theoretical consideration of both {/T/, /T<sup>h</sup>/} allomorphy and the degree of [aspiration] present within verbal paradigms. From these two analytic properties, parameters emerge by which intraparadigmatic relations may be defined; that is to say, morphemic interaction between members of verbal paradigms can be confined to a notion of phonological similarity. The parameters with which I define such relations manifest themselves in the following OUTPUT-OUTPUT (OO-)constraint; modelled after that of Kenstowicz (1996):

#### (61) ALLOMORPH LEVELLING CONSTRAINT

##### (a) UNIFORM EXPONENCE<sub>{/T/, /T<sup>h</sup>/}</sub>

*Minimise the differences in the realisation of imperative morpheme  
{/T/, /T<sup>h</sup>/} with relation to past tense morpheme {/T/, /T<sup>h</sup>/}*

The paradigm for a given weak verb is such that a pressure exists to level the realisation of {/T/, /T<sup>h</sup>/} allomorphy within that paradigm. The difference to be minimised between any two vying realisations of allomorphy is whether the allomorphs agree in the featural exponence (i.e., expression) of [aspiration]. Such levelling effects establish a marked relation (or phonological network) between any morphemes meeting these allomorphic conditions. The past tense and imperative morphemes within a weak-verb paradigm have

been shown to express  $\{/T/, /T^h/\}$  allomorphy exclusively and moreover interact in such a way that their behaviour is both systematic and uniform. The uniformity in shape of allomorph between these morphemes, however, is not bidirectional in that the source of levelling has been argued to be the past tense form and *not* the imperative. Recall an earlier observation that erroneous allomorphic selection is absent in strong verbs where no relevant past tense form exists from which to import a particular shape of allomorph. From this observation followed the generalisation that the only way an erroneous allomorph can appear in an imperative suffix is to import it from a corresponding past tense suffix. Thus, formation of the weak imperative stem is a non-derivational operation in that it must appeal to a morphologically-related past tense form. Such a state of allomorphic dependency of the weak imperative on a past tense form not only connotes, but necessitates establishing the OO-CORRESPONDENCE relation proposed above. Traditionally, OO-CORRESPONDENCE relations were in fact inspired by observed phonological similarities between morphologically-related outputs; including between that of surface allomorphs within inflexional paradigms. (Bradley 2006) Furthermore, confining UNIFORM EXPONENCE (UE) to weak verbs by way of definition (in that strong verbs form the past tense by means other than  $\{/T/, /T^h/\}$  allomorphy) is not sacrificing explanation for description, but rather reflecting an empirical fact of the Icelandic data: the shape of allomorph in the imperative stem of weak verbs *unexceptionally* agrees with the shape of allomorph in the past tense stem. UE, looked at in this light, is thus an empirically-grounded theoretical construct and is therefore neither tentative nor *ad hoc* in nature.

Invoking a more generalised PARADIGM constraint makes in fact erroneous predictions on the role of [aspiration] within the Icelandic verbal paradigm. Recall that two of three generalisations drawn from the data-breakdown chart in (60) were (i) asymmetric values of [aspiration] exist between past-imperative and neuter participle forms in weak  $/T/$  verbs whilst (ii) symmetric values of [aspiration] exist throughout weak  $/T^h/$  verb forms. Thus, the fact that all weak-verb participles undergo devoicing whilst all weak-verb imperatives do not is reason to argue that there does *not* exist a one-to-one CORRESPONDENCE in [aspiration] between the imperative and the neuter participle;

whereas, the fact that whichever value of [aspiration] exists in the past tense also exists in the imperative is reason to argue that there does exist a one-to-one CORRESPONDENCE between the [aspiration] in the past tense form and in the imperative form. The presence or absence of [aspiration] within a verbal paradigm is therefore not *per se* a paradigmatic property, but rather one of subparadigmatic measure in that it is only two cells – the past tense and imperative – which share this CORRESPONDENCE relation. Returning then to the proposition at the outset of this paragraph, positing broader constraints imposing paradigmatic uniformity in [aspiration], such as PAR(ASP) with counterweight administered by CON(ASP) (i.e., requiring contrast (or non-IDENTITY) in [aspiration]), albeit *ex hypothesi* capable of accounting for the data, would fail to capture any exclusory cellular CORRESPONDENCE between the past tense and imperative dimensions within a paradigm for a given weak verb.<sup>50</sup>

It is along these lines of reasoning that I argue for UE in {/T/, /T<sup>h</sup>/} allomorphy between the stems of past tense and imperative morphemes. It has also been put forth that any generalised PARADIGM constraint would be more a reflection of lacunæ than empirical facts. It will be shown in the following subsection that interplay between our OO-constraint and various IO-CORRESPONDENCES and well-formedness impositions will play a vital role in capturing the data.

Before proceeding to tableaux, additional constraints deserve brief introduction. The following MARKEDNESS and FAITHFULNESS constraints will also be adopted into our approach:

(61) FURTHER CONSTRAINTS INVOKED

(b) AGREE[VOICE]#

*Adjacent stem-final and suffixed consonantal segments must agree in the feature [voice]*

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<sup>50</sup> See, however, Rebrus & Törkenczy (Downing *et alia* 2005) for an analysis of Hungarian verbal paradigms wherein PAR constraints of this nature come into play.

- (c) AGREE[CONTINUANT]#  
*Adjacent stem-final and suffixed consonantal segments must agree in the feature [continuant]*
  
- (d) MAX/DEP[F]  
*The input correspondent of a distinctive feature is identical to its output; the output correspondent of a distinctive feature is identical to its input*
  
- (e) MAX{CAT}  
*Expression of a morphological category is required*

The constraint MAX/DEP[F] is familiar to the reader from preceding discussion on Hansson (1999); whilst recall the constraint MAX{CAT} (Rice 2005) was introduced in the Swedish case of *-ddt* clusters in §2. Here, CAT will be relativised to the IMPERATIVE such that any gap candidate expressing an imperative form incurs a penalty for absence of overt expression (i.e., deletion) of that morphological category. Furthermore, constraints (61b), (61c) and (61d) serve as “damage control”; essentially sweeping candidate sets for infelicity and preventing a number of suboptimal forms from prevailing victorious. MAX{IMP}, on the other hand, (61e), is scrupulously “gap control”. Throughout the remainder of this section the five constraints invoked hitherto will be further substantiated as both empirically and theoretically motivated such that their application will be argued as uncontroversial within the constraint-based theory of grammar pursued here.

#### 3.4.4 IMPLEMENTATION: THEORETICAL

The identification and subsequent compartmentalisation of Icelandic verbs based on the presence or absence of both {/T/, /T<sup>h</sup>/} allomorphy and [aspiration] can be accurately translated into constraint-based theories of grammar by invoking a cophonology – the

coexistence of two or more strata of grammar with fixed constraint rankings.<sup>51</sup> Supplemental to this, it will be argued that Icelandic verbs differ by the ranking of only one constraint – or rather, the inversion of an adjacent two – and that this fact further allows for an alternative, albeit related, approach to a cophonology; formally referred to as a *nonfixed* model. (Ichimura 2006) The definitive tenet of a nonfixed model of grammar is the *re-rankability* of one or more constraints on a single stratum, i.e., within a *single* grammar, such that one or more subgrammars emerge. Dissimilar to generalised cophonologies where speakers select one grammar at a time, the nonfixed model attributes “floating” to a given constraint such that it can occupy one of two antagonistic positions within a single ranking depending upon the input value. Furthermore, Ichimura remarks that whilst the rankings of cophonologies are “intrinsically unrelated”, the rankings comprising a nonfixed model correlate the degree of difference between variable output forms and the number of variable outputs; that is to say, the relationship between an output and its (sub)ranking is more intimate than with a cophonological approach. Similarly, subrankings available to a speaker control for (i.e., restrain) possible outputs so as to minimise dissimilarity between subrankings and maximise similarity within the grammar. Ultimately, the impetus behind establishing a system of subgrammaticality is a grammar’s indeterminacy in imposing the fixed ranking of a given constraint.

Extending the nonfixed model to the Icelandic data, the ambiguity with which Icelandic administers  $\{/T/, /T^h/\}$  allomorphy can be argued to exemplify the absence of a single fixed grammar, i.e., a situation in which not all constraints are fixed relative to a constraint hierarchy. This is on analysis of the fact that there exist stem-final minimal pairs of verbs where antagonistic allomorphs are selected; thereby undermining the likelihood of a rigid, one-dimensional grammar of verbal inflexion, e.g., *henda*–[ $\check{h}\epsilon\eta t$ -], but *senda*–[ $\check{s}\epsilon n t$ -] and *sýna*–[ $s i : n t$ -], but *meina*–[ $m\check{e}i\eta t$ -] and so forth. The nonfixed model further serves as an allomorphic “taxonomy” in that, contingent upon the input, one subgrammar is promoted over another by a nonfixed (i.e., marked) constraint floating to a position which derives a specific output form. Clearly, to apply this model to the

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<sup>51</sup> For further discussion on the advantages of cophonologies, which lie beyond the scope of this thesis, see Anttila (2002), Inkelas *et alia* (1997) and Inkelas & Zoll (2003), amongst others.

Icelandic data, a constraint rewarding realisation of /T/ whilst punishing realisation of /T<sup>h</sup>/, and *vice versa*, will have to be marked for floating, accordingly. The implications of the nonfixed model will become clearer as we progress.

Icelandic verbs morphophonologically decompose into the following categories:

(62) CATEGORICAL DECOMPOSITION OF VERBS

INFLEXION	ALLOMORPH	NON-/-ll/, -/-nn/ SUBCLASS	/-ll/, /-nn/ SUBCLASS
<i>weak</i>	/T/	<i>sýna</i>	<i>tolla</i>
	/T <sup>h</sup> /	<i>herða</i>	<i>nenna</i>
<i>strong 1</i>	/T/	<i>sofa / stela</i>	<i>finna</i>
<i>strong 2</i>	/T <sup>h</sup> /	<i>halda</i>	<i>spinna</i>
<i>strong 3</i>	∅		<i>vinna</i>

Crucially, it will be shown that the constraints MAX/DEP[F] and AGREE[VOI]# are in an antagonistic hierarchical relationship such that dominant MAX/DEP[F] derives *-t* in strong verbs whilst submissive MAX/DEP[F] conversely derives *-t<sup>h</sup>*.<sup>52</sup> The variable outputs of our subgrammars are thus correlated with the position of MAX/DEP[F] relative to AGREE[VOI]#. The tension between the aforementioned constraints, however, is neutralised in weak verbs on account of UE, in such cases, imposing one shape of allomorph over another by appealing to a past tense form. In overview, the proposed grammar is presented below:

<sup>52</sup> Of course, there exists nothing inherent to the data which mandates demotion of MAX/DEP[F] over promotion of AGREE[VOI]#. For expository ease, however, I adopt here the former viewpoint.



(63) PROPOSED SYSTEM OF SUBGRAMMATICALITY

$G_{\text{WEAK INFLEXION}}$

UE » MAX{IMP} » AGREE[CONT]# » MAX/DEP[F], AGREE[VOI]#

$G^1_{\text{STRONG 1 INFLEXION}}$

UE » MAX{IMP} » AGREE[CONT]# » MAX/DEP[F] » AGREE[VOI]#

$G^2_{\text{STRONG 2 INFLEXION}}$

UE » MAX{IMP} » AGREE[CONT]# » AGREE[VOI]# » MAX/DEP[F]

The base (i.e., unmarked) grammar,  $G$ , is configured for weak inflexion irrespective of allomorph shape selected, e.g., *sýna*, *tolla*, *herða* and *nenna*, and as such mandates dominant UE. Substrata to  $G$  are our subgrammars (i.e., marked grammars); denoted by numerical exponents which correspond to their conjugational subclass.  $G^1$  thus encodes strong inflexional *-t* behaviour of the *sofa*, *stela* and *finna* subclass into our grammar, whereas  $G^2$  performs similar duties albeit for contrastive *-t<sup>h</sup>* behaviour of the *halda* and *spinna* subclass. In unmarked cases of  $G$ , suboptimality will largely be shown to be predicated upon uniformity violations to the extent that any imperative form whose shape of allomorph disagrees with the shape of allomorph in the corresponding past tense form will be eliminated. Furthermore, an interplay of MARKEDNESS and FAITHFULNESS constraints – as dictated by the floating of MAX/DEP[F] to either side of AGREE[VOI]# – will be shown to control for aspiration, or a lack thereof, in marked  $G^1$  and  $G^2$  cases where no imperative form can be ascribed to a past tense form. Allowing our constraints to control for the aspirated allomorph relieves our analysis of stipulating variance in input allomorphy; thereby positing *de facto* /T/ as the underlying past tense and imperative suffix. Ensuing tableaux demonstrate the empirical implications of these subrankings.

3.4.5 IMPLEMENTATION: EMPIRICAL

3.4.5.1 G: WEAK IMPERATIVE INFLEXION

The immediately following tableaux, in (64)(a)-(d), implement base grammar  $G$  over the four subclasses of weak verbs, i.e., *sýna* (non-/ll/, -/nn/ selecting for /T/), *tolla* (/ll/,

/-nn/ selecting for /T/), *herða* (non-/-ll/, -/-nn/ selecting for /T<sup>h</sup>/) and *nenna* (/ -ll/, /-nn/ selecting for /T<sup>h</sup>/).<sup>53</sup> The verb *hafa*, which was previously shown to obfuscate Hansson’s analysis, will also be presented in (64e):

(64a) G – *sýna*

	/sin + T/ <i>past</i> [si:nt-]	UE	MAX {IMP}	AGREE [CONT]#	MAX/DEP [F]	AGREE [VOI]#
(a)	si:nǫ			*!		
☞(b)	si:nt					*
(c)	si:nt̚	*!			*	
(d)	⊙		*!			

Candidate (c) is eliminated under UE inasmuch as its shape of allomorph – realised as the devoicing of stem-final *n* – is aspirated, whereas the shape of allomorph in the past tense desinence is not; hence, the absence of uniformity between the desinences of the past tense form and imperative candidate (c). Ranking UE high conveys Hansson’s most robust generalisation; namely, that “the imperative stem never contains a different allomorph from the past stem”. Our gap-targeting constraint, MAX{IMP}, rules out candidate (d) whilst the *nǫ* sequence in candidate (a) violates a MARKEDNESS condition requiring root- and suffix-segments to agree in the value of the feature [continuant].

This latter violation is predicated upon a phonological notion of *ambivalent segments* – the cross-linguistic observation that certain speech sounds are more liable to express featural variation than others. Mielke (2005) claims that segments most susceptible to this ambivalence are *lateral liquids* and *nasals* in that their [continuant] specifications pattern with both continuants and noncontinuants alike. A contributing factor to this

<sup>53</sup> For sake of presentation, only phonologically-antagonistic (*contra vacuous*) candidates will be evaluated. For example, an analysis of the *linmæli* dialect presupposes a high-ranking MULTIPLE LINK[s.g.] constraint militating against aspirated plosives not sharing the feature [spread glottis] with an adjacent consonant, e.g., [\*nent<sup>h</sup>-✓neŋt]. (Ringen 1999) Additionally, hypothetical aspirated candidates realising [spread glottis] as preaspirating *h*, e.g., [si:nht] or [si:ht] cf. proper [si:nt], are presumed to violate various MARKEDNESS and FAITHFULNESS constraints such that their evaluation contributes nothing fruitful to the analysis here. See also footnote 45 for preaspirating *h* as an obligatory phonological process.

bidirectional patterning is the phonetic indefiniteness of such segments; insofar as languages discerning [+continuant] and [-continuant] segments consistently treat laterals and nasals as befogging the phonetic boundary between the two. Consequently, cross-linguistic observations disclose, for example, laterals patterning as continuants with spirants in one language and additionally as noncontinuants with plosives in another.<sup>54</sup> Mielke cites a large-scale study surveying 561 languages (including Faroese – the closest living relative of Icelandic) which showed that the “representational murkiness” (i.e., ambiguous expression) of continuancy in lateral liquids and nasals patterns with neither continuants nor noncontinuants in any greater frequency than the other.<sup>55</sup> Although an ongoing and heated debate, relative to the present context is that arguing for the continuancy of laterals and nasals to pattern with noncontinuants is a cross-linguistically attested point of view. Further evidence, albeit indirect, for arguing that lateral liquids and nasals pattern with noncontinuants in Icelandic will come to light in discussion of G<sup>1</sup>-patterning verbs; where properties of continuancy will be further shown to drive phonological behaviour.

In continuing with tableaux, similar scenarios to that of *sýna* play out for unmarked verbs *tolla*, *herða*, *nenna* and *hafa*:

(64b) G – *tolla*

	/t <sup>h</sup> oll + T/ <i>past</i> [t <sup>h</sup> ɔlt-]	UE	MAX {IMP}	AGREE [CONT]#	MAX/DEP [F]	AGREE [VOI]#
(a)	t <sup>h</sup> ɔlð			*!		
☞(b)	t <sup>h</sup> ɔlt					*
(c)	t <sup>h</sup> ɔ̥lt	*!			*	
(d)	⊙		*!			

<sup>54</sup> In terms of articulatory phonetics, these finds correspond to a deep-seated debate in whether continuancy is characterised as occlusion (i.e., closure) in the vowel or midsagittal region of the oral tract. A broader agenda indiscernibly associated with this discussion is how *phonetic* properties pattern *phonologically*. See Mielke’s original article for related resources in pursuing this topic as we will not further digress here.

<sup>55</sup> A number of linguists preceding Mielke have arrived at similar conclusions, including Chomsky & Halle (1968), Halle & Clements (1983) and Kaisse (2000), amongst others.

(64c) G – *herða*

	/herT + T/ <i>past</i> [hɛrt-]	UE	MAX {IMP}	AGREE [CONT]#	MAX/DEP [F]	AGREE [VOI]#
(a)	herð	*!				
(b)	hert	*!		*		*
☞(d)	hɛrt			*	*	
(e)	⊙		*!			

(64d) G – *nenna*

	/nenn + T/ <i>past</i> [nɛnt-]	UE	MAX {IMP}	AGREE [CONT]#	MAX/DEP [F]	AGREE [VOI]#
(a)	nennð	*!		*		
(b)	nent	*!				*
☞(c)	nɛnt				*	
(d)	⊙		*!			

(64e) G – *hafa*

	/haP + T/ <i>past</i> [havð-]	UE	MAX {IMP}	AGREE [CONT]#	MAX/DEP [F]	AGREE [VOI]#
☞(a)	havð					
(b)	havl			*!		*
(c)	haft			*!		
(d)	haft	*!			*	
(e)	⊙		*!			

It is worth acknowledging with *hafa* that vying candidates (c) and (d) differ in their realisation of allomorph such that (d) realises a voiceless stem-final /P/ (i.e., [f]) as a surface effect of the aspirated allomorph and as such violates a principle of uniformity with the corresponding past /T/ allomorph. Candidate (c), however, realises a voiceless

stem-final /p/ without [aspiration] mandating it and, with keeping to the unaspirated allomorph, is not vulnerable to UE violation. Underspecification, in other words, leaves /p/ free to surface as either *v* or *f* in this context without incurring UE, or additionally, MAX/DEP[F] violations. This point will recur in marked cases of strong *-t* inflexion.

### 3.4.5.2 G<sup>1</sup>: STRONG IMPERATIVE INFLEXION

Of noteworthy difference from base grammar G is a de-emphasis in G<sup>1</sup> (and G<sup>2</sup>) on the role of UE in candidate evaluation. The reason for this is that strong verbs form the past tense by means other than {/T/, /T<sup>h</sup>/} allomorphy such that a correspondence of morpheme realisation between the past tense form of strong verbs and an imperative form does not exist. UE, in other words, is vacuously satisfied by strong verbs. Moreover, G<sup>1</sup> requires MAX/DEP[F] to dominate AGREE[VOI] – whereas these two constraints were unranked in G – in an effort to eliminate candidates realising [ASP]-related effects, i.e., the devoicing of adjacent consonants. The dominance of FAITHFULNESS over MARKEDNESS in a subclass selecting for /T/ is a corollary to stipulating that the past tense and imperative suffix is underlyingly /T/.

The ensuing tableaux in (65)(a)-(c) implement G<sup>1</sup> over the two subclasses of strong /T/ verbs: *sofa*, *stela* and *finna*, which further break down into obstruent-, sonorant- and /-ll/, /-nn/-final verbs:

(65a) G<sup>1</sup> – *sofa*

	/soP + T/ <i>past</i> [sva:v]	UE	MAX {IMP}	AGREE [CONT]#	MAX/DEP [F]	AGREE [VOI]#
☞ (a)	sɔvð					
(b)	sɔvt			*!		*
(c)	sɔft			*!		
(d)	⊙		*!			

As was shown to be the case with *hafa*, the optimality of obstruent-final verbs is largely driven by agreement in [continuant] values. Furthermore, the imperatives of *sofa-*

patterning verbs, e.g., *gefa*–[g<sub>j</sub>εvð-], *vefa*–[vεvð-], *draga*–[trayð-], *hníga*–[hni:γð-], *vega*–[vεγð-] and so on, are observed never to opt for voiceless realisations of /-P/-K + T/, i.e., \*[sɔft-, g<sub>j</sub>εft- ...], where the continuancy of stem-final consonants clashes with that of a noncontinuant imperative suffix. My claim, then, is that the grammar unambiguously prefers one desinence shape (i.e., candidate (a)) over another (i.e., candidates (b) and (c)). The constraint AGREE[CONT]# thus models the grammar’s preference for [continuant] agreement between stem-final and -suffixed consonants. Visualisation of this concept is found below:

(66) [CONTINUANT] AGREEMENT IN (PAST-)IMPERATIVE SUFFIX SHAPE

	INPUT	[+cont]		[-cont]		OUTPUT
(a)	/-P + T/	/f	+	t/	→	*[-ft-]
	/-K + T/	/x	+	t/	→	*[-xt-]
(b)	/-P + T/	/v	+	t/	→	*[-vt-]
	/-K + T/	/γ	+	t/	→	*[-γt-]
(c)		[+cont]		[+cont]		
	/-P + T/	/v	+	ð/	→	✓[-vð-]
	/-K + T/	/γ	+	ð/	→	✓[-γð-]

Above in (66a), we see that voiceless realisations of /-P/-K + T/ result in a clash between [continuant] values and as such are avoided.<sup>56</sup> Repair *via* voiced realisations of /-P/ and /-K/ whilst maintaining voiceless /t/, (66b), are similarly avoided albeit with additional infelicity in [voice] disagreement. This feature-driven blocking of amalgamating the past tense allomorph /t/ with various realisations of stem-final consonants in *sofa*-verbs results in repair *via* opting for the only other surface realisation of /T/, [ð], which is both [+continuant] and [+voice], (66c). Consequently, interplay between standard Icelandic phonotactics and [continuant] agreement produces outputs [-vð-] and [-γð-] for strong

<sup>56</sup> The voiceless realisation of /-K/ in this context being [x], not [k]; analogous to /-P/ as [f] and not [p].

verbs terminating in *-fa* (-pa) and *-ga* (-ka), respectively. Further supporting my inference here, Einarsson (1973) states that the past tense suffix *-ði* unanimously occurs “after spirants (except *ð*) and soft nondental stops [i.e., /p/ and /k/]”. It has been substantiated in preceding discussion that the allomorphy operative in weak past-tense formation is the same for strong imperative formation. Thus, I argue here that both Einarsson’s phonological deductions on the target environment for *-ði* and the aforementioned observations of conjugational patterns in *sofa*-verbs support asserting the constraint AGREE[CONT]# to be active in Icelandic verbal grammar.

Below the reader finds a tableau for the second subtype of strong non-/ll/, /-nn/ verbs, sonorant-final stems; as in *syng(j)a* and *stela*, with the latter of the two being presented here:

(65b) G<sup>1</sup> – *stela*

	/stel + T/ <i>past</i> [sta:l]	UE	MAX {IMP}	AGREE [CONT]#	MAX/DEP [F]	AGREE [VOI]#
☞ (a)	stɛlt					*
(b)	stɛlt̥				*!	
(c)	⊙		*!			

Our ranking requirement in G<sup>1</sup> on FAITH to underlying features eliminates candidate (b) whose aspirated allomorph has devoiced stem-final *l*; whereas gap candidate (c) is unsurprisingly eliminated under MAX{IMP}. Candidate (a), [stɛlt-], thus emerges victorious.

In similar fashion, the tableau below shows [fint-] prevailing for strong /-ll/, /-nn/ verb *finna*:

(65c)  $G^1$  – *finna*

	/f <sub>inn</sub> + T/ <i>past</i> [fan:]	UE	MAX {IMP}	AGREE [CONT]#	MAX/DEP [F]	AGREE [VOI]#
☞ (a)	f <sub>int</sub>					*
(b)	f <sub>int̥</sub>				*!	
(c)	⊙		*!			

The fact that *finna* patterns naturally with other  $G^1$  verbs suggests that our system of strong-verb subgrammars is on the right track. The conditions of the grammar under which [f<sub>int</sub>-] is derived here depart from that of Hansson’s analysis in that, within the latter system, IDENT[s.g.]O-O licenced [f<sub>int</sub>-] by a fortuitous surface correspondence with “some closely related form”; leaving the output an unforeseen circumstance of the grammar. To the contrary, the optimality of [f<sub>int</sub>-] here follows from predictions made by the grammar in that  $G^1$  dictates a fatal violation to any candidate which undergoes deletion of features; thereby attributing suboptimality to [f<sub>int̥</sub>-] and, in theory, leaving nothing to chance.

Deriving the imperative of *finna* in such a way, however, challenges one of Hansson’s generalisations; namely, that “[p]aradigm gaps do not occur where a potentially supporting surface string occurs elsewhere in the paradigm”. This state of affairs begs the following question: does *finna* pattern after weak or strong inflexion? Weak inflexion has been argued to be defined as a marked relation between past tense and imperative morphemes such that their behaviour is both systematic and uniform within a given paradigm. The fact that the past tense of *finna*, [fan:], does not meet the allomorphic conditions to establish such a relation with the imperative formally characterises *finna* as a verb patterning after strong inflexion; and thus adhering to properties of  $G^1$  *contra*  $G$  – an unmarked grammar configured for verbs undergoing weak inflexion. As observed by Hansson, the empirical fact that the string *-nt-* exists elsewhere in the paradigm of *finna* is not irreconcilable with the model of grammar proposed here, but rather orthogonal.



Recall the following data compiled from Einarsson (1973):

(67) GAPS LACK INTRAPARADIGMATIC SUPPORT FOR IMPERATIVE STEM

*vinna* – Ø [vin:a – vin: – van: – yn:ym – yn:in – yn:ið]

*spinna* – Ø [spɪn:a – spɪn:– span: – spyn:ym – spyn:in – spyn:ið]

*falla* – Ø [fatla – fɛtɿ – fjɛtɿ – fjɛtɿym – fatlɪn – fatlið]

But:

*finna* – *fint* [fin:a – fin: – fan: – fɪntym – fɪntɪn – fɪntið]

We learnt by juxtaposing the paradigms of strong /-ll/, /-nn/ verbs that *finna* displayed fortuitous occurrences of the substring [f...nt] such that enough evidence existed for speakers to construct an imperative form and repair its inflexional/phonotactic fate as a gap. Kenstowicz (Downing *et alia* 2005) reports, *inter alia*, that seemingly contrastive and idiosyncratic morphophonological processes can sometimes reflect language use *contra* language structure. In such cases, speakers can be reluctant in adhering to properties of the grammar when said properties are undermined by “pragmatic maxims” where the use of language drives change that the grammar *per se* does not. Relevant in the present context is then the claim that speakers ignore the past tense form of *finna* and comb rather the entire paradigm to licence an imperative; and consequently deduce [fint-] upon detection of *-nt-*. The pragmatic maxim driving speakers to deduce an overt imperative can be argued to be the relatively high *lexical frequency* of a verb like *finna* ‘find’. The pressure for an imperative form to be supported in the absence of a past tense form thus corresponds to the practical utility of (semantically) having an overt imperative form for this particular verb. Kenstowicz refers to such circumstances as certain allomorphs in members of paradigms showing a “privileged status”. The reason why similar logic yields no overt imperatives for *vinna* and *falla* is because combing the paradigms of these verbs yields no evidence for promoting one shape of allomorph over another to indirectly licence an imperative construction. This latter point, alongside addressing circumstances giving rise to [spɪnt-] in *spinna*, will be discussed momentarily in greater detail.

3.4.5.3 G<sup>2</sup>: STRONG IMPERATIVE INFLEXION

Demotion of MAX/DEP[F] and subsequent promotion of AGREE[VOI] in G<sup>2</sup> signifies a power struggle between remaining faithful to underlying features or obeying surface voicing requirements. This power struggle is a theoretical repercussion to the ambiguity operative within the data. Recall that by opting for /T<sup>h</sup>/, the nature of G<sup>2</sup> verbs is modelled by our constraints as preferably obeying phonological surface conditions rather than preserving underlying featural attribution. This is illustrated below in (68) with strong non-/l/, /-nn/ and /-ll/, /-nn/ verbs *halda* and *spinna*, respectively:

(68a) G<sup>2</sup> – *halda*<sup>57</sup>

	/halT + T/ <i>past</i> [hjełt]	UE	MAX {IMP}	AGREE [CONT]#	AGREE [VOI]#	MAX/DEP [F]
(a)	halt				*!	
☞(b)	hałt					*
(c)	⊙		*!			

(68b) G<sup>2</sup> – *spinna*

	/spinn + T/ <i>past</i> [span:]	UE	MAX {IMP}	AGREE [CONT]#	AGREE [VOI]#	MAX/DEP [F]
(a)	spint				*!	
☞(b)	spınt					*
(c)	⊙		*!			

Optimality in G<sup>2</sup>-patterning verbs boils down to a trade-off in laryngeal features: maintain voiced root-sonorant with the unaspirated allomorph or devoice root-sonorant with the aspirated allomorph. With AGREE[VOI] dominating MAX/DEP[F], the former option (i.e., (a) candidates) is fatally penalised for having not devoiced the sonorant to

<sup>57</sup> There is no existing Icelandic grammar which lists *halda* as a weak verb; although, whether {/T/, /T<sup>h</sup>/} allomorphy exists in the past tense stem or not with [-]t- being rather fortuitous, is debatable. Regardless, neither interpretation of the past tense form threatens the outcome of candidate (b) as the winner.

agree with *t*. Violating AGREE[VOI] is thus indicative of a candidate having selected the erroneous allomorph, /T/, where no surface effect of aspiration elicits devoicing of the sonorant.

#### 3.4.5.4 G<sup>x</sup> VERSUS LEXICALISATION

Base grammar G and subgrammars G<sup>1</sup> and G<sup>2</sup> have been shown to successfully account for weak and strong inflexions respective of imperative formation. Gapping verbs *vinna* and *falla* will now be addressed.

Dissimilar to the Swedish case of *-ddt* clusters, the absolute ungrammatical forms in *vinna* and *falla* are peculiar in that the gaps are not phonotactically motivated, i.e., a gap in these verbs is not a form of repair of an irreparable, surface-illicit configuration. Hypothetical imperative forms [vɪnt-] and [vɪnt̥-] or [falt-] and [falt̥-] are well-formed and, *a fortiori*, by analogy with other verbs in fact expected. Albright (2006) refers to this type of ungrammaticality as *lexically-arbitrary paradigm gaps* for the obvious reason that it is arbitrary to opt for a gap when there is nothing preventing an overt and grammatical word form from surfacing. This begs a rather baffling question of why a word form seemingly avoids grammaticality.

Nonetheless, an important characteristic of these two verbs is their relative singularity; that is to say, their idiosyncratic means of inflexion, or lack thereof, is an isolating property. Assuming isolated occurrences prove problematic, i.e., nonconforming to greater patterns of inflexion, as is the case with *vinna* and *falla*, the most economic means of integration into a model of grammar is to relegate their exceptionality to lexical conditioning. This both maintains a phonology free of anti-phonological processes (i.e., surface exceptions which undermine the phonological grammar) whilst serving to reflect the selective phonological idiosyncrasies by which these verbs operate. The notion of lexicalisation addressed here will recur in §3.4.6.

Entertaining an analysis of gaps by the confines of our grammar, however, would necessitate a permutation of our constraints; specifically, demoting MAX{IMP} to the

bottom of the ranking argument. Demoting the gap-targeting constraint ensures that every other candidate will be eliminated before the gap; and thus, licencing a gap in the imperative of a given verb. Looking at this situation from another angle, it can be argued that a gap arises in correlation with the ill-formedness (i.e., suboptimality) of its competition. Under an interim subgrammar  $G^x$ , the following tableau shows how gapping verbs hypothetically synchronise with our nonfixed model of grammar:

(69)  $G^x$  – GAPS (*vinna/falla* (not shown; patterns identically to *vinna*))

	/vinn + T/ <i>past</i> [van:]	UE	AGREE [CONT/VOI]#	MAX/DEP [F]	MAX {IMP}
(a)	vint		*!		
(b)	vint̥			*!	
☞(c)	⊙				*

The teamwork of MARKEDNESS and FAITHFULNESS constraints, not dissimilar from  $G^1$  and  $G^2$ , are here shown to control for optimality. The compatibility of constraints in evaluating gapping and nongapping verbs is an alluring facet of this analysis, but ultimately a misleading one. The unyielding friction between MAX{IMP} and any violated constraint dominating it would force gapping verbs to establish a subgrammatical pattern of their own. This state of affairs echoes the inviolability standard intrinsically set by gap-targeting constraints; whereby, the degree of violability of a given constraint corresponds to its rank relative to the gap-targeting constraint. Accordingly, AGREE[VOI]# and MAX/DEP[F] are rendered inviolable such that neither [vint-] nor [vint̥-] are well-formed in comparison to the gap candidate.

The problem with positing a subgrammar  $G^x$  is not of a functional nature, but rather of a theoretical nature. Although  $G^x$  derives ungrammaticality in the imperative forms of these verbs – and additionally does so in traditional OT fashion – it does so only *descriptively* in that the ill-formedness of [vint-] and [vint̥-] (and similarly [falt-] and [falt̥-]) lacks a clear motivation other than the stipulation of an ordering of constraints.

The inflexional nature of these gaps as “nonconforming” to greater patterns throughout the verbal domain conveys the overall paucity of gap-patterning verbs in the language. Thus, accounting for the idiosyncratic inflexion of gapping verbs proves laborious, if we are then to define our model of grammar as a linguistic device built on notions of phonological “conformity” (i.e., patterns). With only two cases of absolute ungrammaticality and neither case phonotactically motivated, I find it theoretically appealing at the time of writing to have the imperative forms (i.e., the lexically-arbitrary paradigm gaps) of *vinna* and *falla* spelt-out in the lexicon.<sup>58</sup>

Whilst relieving the phonology of the responsibility of forming gaps in imperatives prevents our analysis from having to deal with such problematic data, it offers little in explaining why or how these gaps exist in the first place. From both a diachronic and synchronic point of view, *lexical frequency* plays an important role in whether a word form undergoes any degree of change. (Albright 2006) Thus, word forms with relatively high lexical frequency will typically resist change whereas word forms of relatively low frequency are more vulnerable to change. This inflexional variability of low-frequency word forms is predicated upon speakers’ uncertainty in how to inflect the word. Albright mentions past participles of irregular verbs in English to show that speakers are oftentimes uncertain in how to inflect lower-frequency word forms. For example, uncertainty arises when English speakers must inflect the irregular verb *stride* (past: *strode*) for the past participle: is it *strode*, *stridden* or *strided*? The verb *dive* (past: *dived* and *dove*) is another case and point with the past participle being subject to a wide range of variability: is it *dove*, *diven*, *doven*, *dived* or *doved*? Returning to Icelandic, an *a priori* judgement on *vinna* ‘work’ and *falla* ‘fall’ as verbs of higher frequency than transitive *spinna* ‘spin (yarn)’ would not be an unfounded assertion considering *working* and *falling* to be much more frequent activities to-day (in Iceland) than *spinning yarn*, which is in fact widely regarded as an antiquated activity in the modern Western world. Thus, the lower lexical frequency of *spinna* has rendered the imperative form vulnerable to change inasmuch as speakers are uncertain in how to inflect a word form which they seldom use.

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<sup>58</sup> The lexicalisation of aberrant morphophonological operations (MPOs) is a well-established linguistic notion in addition to being a heavily circulated topic throughout the phonological literature, see Brinton and Traugott (2005) for a recent survey of related research.

Consequently, the verb has taken on an overt  $-t^h$  imperative form – most likely *via* transparadigmatic levelling from the majority of  $/-nn/$  verbs, e.g., *bryнна*, *inna*, *minna*, *nenna*, *binna* and so forth – in place of a gap: *spinna*-[\* $\emptyset$ , \* $spɪnt-$ ,  $\checkmark spɪnt-$ ,]IMP. On the other hand, the higher lexical frequencies of *vinna* and *falla* have allowed these verbs a level of exposure which preserves their idiosyncratic inflexion. The gaps, in other words, remain “aggressive” within their respective inflexional paradigms. Whilst lexical frequency alone is seldom enough to break down the inflexion of word forms, it does address to some degree how gaps in the imperatives of *vinna* and *falla* synchronically exist.

The intuitive question of *why* these gaps exist can similarly be assumed a result of both diachronic and synchronic forces. Whilst a diachronic exposition lies far beyond the scope of this discussion, review and analysis of data hitherto can offer some degree of a synchronic explanation. It has been argued that formation of the imperative suffix in weak verbs is largely non-derivational in that it must appeal to a morphologically-related form (i.e., a past tense form) in addition to an input form. It has also been shown that  $/-ll/$ ,  $/-nn/$  verbs systematically select the aspirated allomorph in greater numbers than the “expected” unaspirated allomorph. Relative to our current query is then the claim that speakers prefer to maintain uniformity between past tense and imperative suffixes rather than derive a conflicting imperative suffix. A crucial (and intrinsic) property of strong  $/-ll/$ ,  $/-nn/$  verbs is that there exists no morphologically-related form to promote one allomorph over another; leaving only comparison to an input form (i.e., IO-CORRESPONDENCE) available. Therefore, with  $G^1$  and  $G^2$  deriving the unaspirated and aspirated allomorphs, respectively, speakers seem to be uncertain as to which subgrammar derives the “proper” form when other stem-final  $/-ll/$ ,  $/-nn/$  verbs can appeal to a past tense form (as in *tolla* and *nenna*) in “assuring” the speaker that, in such cases, the unmarked grammar,  $G$ , applies. Essentially, gaps in *vinna* and *falla* exist as a repair strategy for speakers’ incertitude in identifying one form, e.g., [ $vɪnt-$ ], as more “informative” than another, e.g., [ $vɪnt^h-$ ]. Equally important, Rice (2005) remarks that “gaps are a reflex of grammatical competence” in that speakers have an intuitive

awareness of gaps and this awareness reflects an understanding of their grammar. By hypothesis, phonologically modelling this state of affairs seems counterintuitive in that the phonology fails to equip speakers with data which are both abundant and unambiguous (i.e., conclusive) in determining either allomorph.

#### 3.4.6 LEARNABILITY IN INFLECTING FOR PAST TENSE

In the analysis sketched hitherto, the formation of the past tense in weak verbs has not been formally addressed. Explicitly, the problem is one of asymmetric dependency in the weak inflexion of past tense and imperative forms in that establishing a unidirectional CORRESPONDENCE relation between a past tense form and an imperative tautologically requires that there exists a past tense form. Enquiry into the formation of past tense forms is therefore paramount in establishing an OO-CORRESPONDENCE between past tense and imperative forms in weak verbs.

In overview, imperatives in weak verbs retrieve  $\{/T/, /T^h/\}$  allomorphic information from a past tense form (as administered by G with an OO-CORRESPONDENCE relation exploiting  $[\pm\text{aspiration}]$ ); whereas imperatives in strong verbs undergo  $\{/T/, /T^h/\}$  allomorphy independent of a past tense form and select for an allomorph *via* an antagonistic interplay of MARKEDNESS and FAITHFULNESS constraints (as administered by  $G^1$  and  $G^2$ ). The loophole following from all of this is how the past tense suffix is initially formed in weak verbs such that it precedes inflexion of the imperative. Again, the nature of OO-CORRESPONDENCE put forth here is vacuous without a past tense form.

The experiment conducted in §3.3.2, which tested for allomorphic inflexion of nonce verbs, suggests a solution to our quandary here. Results were oftentimes divided between informants with one informant applying one allomorph and the second informant applying its converse; as was the case for *kvéna*, *trauna*, *steinna* and *frónna*. These verbs bore contrasting inflexion with informant no. 1 preferring /T/ and informant no. 2 /T<sup>h</sup>/, as realised in the devoicing of all stem-final sonorants. This pattern, though not without counterevidence, can be argued to reflect the ambiguous nature of the grammar itself in that the past tense suffix of weak verbs is *not* predictable by the phonology. Analogous

to this claim would be a consideration of *wug* test<sup>59</sup> results in English. No native, or even proficient, English speaker would produce the plural form of nonce animal *strog* as *strog[s]*, or *bick* as *bick[z]*. This is attributed to the fact that plural forms are predictable based on principles extractable from English phonology. Relative to our predicament is that the phonological principles on voicing which govern production of plural forms are also operative across the English verbal domain; here specifically, präterite morpheme *-ed*, in that no native speaker would deduce the past tense form *froock[d]* from *froock* or *nalg[t]* from *nalg* and so forth. English phonology thus provides an unambiguous set of rules for deriving the past tense of weak verbs whilst Icelandic does not, as evinced in the informants' disparity in deriving nonce past tense and imperative forms from "wug stems". It can be deduced from these generalisations that there is no logical reason to presuppose that Icelandic grammar administers past tense inflexion.

Following from these generalisations is the argument that the past tense suffix in weak verbs is spelt-out in the lexicon. Albright (2006) remarks that speakers can memorise inflexional forms of unpredictable verbs such that they acquire a level of "confidence" that de-emphasises the need for a grammar with which to derive an output form. It is along these lines of reasoning that I propose the past tense of Icelandic weak verbs to be handled by the lexicon and not the phonology. In summary, imperative forms in weak and strong verbs are predictable by the constraint rankings of G, G<sup>1</sup> and G<sup>2</sup>. This notion of *predictability* conveys the role of grammar-driven principles in imperative derivation; similar to the realisation of *-ed* in English past tense morphology. To the contrary, with past tense suffixes of weak verbs having been shown to neutralise any phonological triggers, such as phonotactic shape, it has been argued that an arbitrary selection between allomorphs must be spelt-out in the lexicon. This argument is moreover in line with a traditional viewpoint of generative phonology that lexically-arbitrary information be memorised (i.e., stored) as part of an underlying form wherefrom more predictable forms can be derived. (Albright 2006)

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<sup>59</sup> I.e., experiments where speakers are prompted to produce morphologically complex forms of nonce words. The *wug* test is a widely employed psycholinguistic means of measuring morphological development in both children and adults. See Gleason (1958) for discussion on its inception.



From a standpoint of learnability, the “free-ranking” model put forth here offers a compelling scenario for the native (L1) learner. Variability in the weak past-tense suffix is finite; with a 50% chance of felicitous inflexion between two allomorphs.<sup>60</sup> As it has been argued that past tense formation is spelt-out in the lexicon, it can then be presumed that the L1 speaker acquires past tense forms *via* trial-and-error. Engaging in interlocution will incite the L1 learner to discern two types of verb formation: verbs which share homophonous morphophonological information within their paradigms (i.e., weak verbs) and verbs which do not (i.e., strong verbs). Exposure to present tense, participle and imperative forms are likely morphophonological cues for L1 learners to dichotomise verbs as such. The former weak-verb type will further pattern into two subclasses based on the presence or absence of [aspiration]-related surface effects, e.g., *senda*–[sɛnt-] patterning with /t/ weak verbs and *henda*–[hɛnt-] patterning conversely with /tʰ/ weak verbs. From this premise follows an argument that it is from these patterns of subclasses that adult speakers develop an intuition on how an unknown, or nonce, verb should be inflected.

Furthermore, the interspeaker variation exhibited in the experiment suggests that these patterns are not uniform across L1 learners – an observation reflecting a notion of unpredictability within Icelandic weak past tense suffixes. The L1 speaker’s verbal register thus immures an inflexional dichotomy wherein conflicting inflexion ultimately patterns as subtypes of regularity. The intrinsic nature of this dichotomy is precisely what the nonfixed model of grammar proposed herein aims to flesh out. Overall, a synthesis of guesswork, deduction and classification forge the L1 speaker’s verbal lexicon and from this point a base grammar (G) emerges wherefrom two subgrammars (G<sup>1</sup> and G<sup>2</sup>) develop in order to cope with principally discordant input.

### §3.5 INTERMEDIARY CONCLUSION

In closing, the Icelandic verbal data presented in this discussion ultimately break down into the following lexical (L) and grammatical (G) analytic correspondences:

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<sup>60</sup> Cf. the nonfinite means, from an L1 perspective, by which strong verbs can be inflected.

## (70) THEORETICAL DATA BREAKDOWN REVISITED

		NON-/-ll/, -/nn/ SUBCLASS		/-ll/, /-nn/ SUBCLASS	
INFLEXION	ALLOMORPH	PAST TENSE	IMPERATIVE	PAST TENSE	IMPERATIVE
<i>weak</i>	/T/	L <i>(lexically arbitrary)</i>	G	L	G
	/T <sup>h</sup> /	L	G	L	G
<i>strong 1</i>	/T/		G <sup>1</sup>		G <sup>1</sup>
<i>strong 2</i>	/T <sup>h</sup> /		G <sup>2</sup>		G <sup>2</sup>
<i>strong 3</i>	∅				L/G <sup>x</sup>

Concerning the system of grammar proposed here, it has been argued that both the configuration of constraints and unfixed nature of their ranking reflect the empirical facts rather than any theoretical shortcomings. The antagonistic conjugational patterns of Icelandic imperatives proved paradoxical for any single, one-dimensional grammar. The result was an introduction of a base grammar (G) under which substrata (G1 and G2) operate to control for verbs which otherwise contradict each other. Ultimately, this contradictory behaviour was reanalysed as in fact pattern-forming, and as such believed to signify the credibility of the nonfixed model of grammar proposed herein. Furthermore, the past tense form of weak verbs, which was argued to be the informational source of allomorph levelling within a given paradigm, was shown to arbitrarily select for an allomorph itself and as such was relegated to lexical conditioning (L) on account of expressing properties of unpredictability. Ungrammaticality of imperative forms in verbs *vinna* and *falla* entertained positing an interim subgrammar (G<sup>x</sup>), where low-ranking MAX{IMP} licenced gaps in both forms, but was argued to be theoretically uninspiring in its purely descriptive nature. Accordingly, these gaps were also argued to be spelt-out in the lexicon (L) on grounds that their idiosyncratic inflexion is neither phonotactically motivated nor phonologically predictable.

#### §4 COMPREHENSIVE CONCLUSION

In a more conservative approach to generative phonological theory, grammar acknowledges both properties and sequences of sound segments irrespective of extraphonological stimuli, such as, attributing lexical or morphological category to a set of one or more segments. Growing interest and observation on the role of paradigms in phonological theory, however, have inspired experimenting within a phonology-morphology interface whereat data markedly necessitate formalising variant degrees of phonological influence across morphologically-related word forms. At the time of writing, the culmination of such experiments has been, *inter alia*, an extension of traditional IO-FAITHFULNESS constraints in the fashion of OO-CORRESPONDENCE constraints – a formal expression of paradigm members building an exclusive network of phonological information; and in doing so essentially manipulating the “derivation” of one another. A prominent outgrowth of the interaction of morphologically-related word forms has been *paradigm levelling effects* wherein allomorphy undergoes a systematic generalisation in relation to shape and position within a given set of interacting morphemes. In this thesis, we have examined two instantiations of paradigm gaps with relation to what role extraphonological conditioning plays in elucidating their behaviour; and have arrived at seemingly adverse conclusions.

By way of autosegmental schemata, I have ultimately put forth a Swedish analysis wherein *-ddt* clusters comprise in fact two distinct phonological environments; which are further characterised by segmental properties of root-final consonant length. In appealing to a notion of conservative phonological theory, the proposed Swedish analysis derives phonotactically-motivated gaps by competition of canonical OT constraints within a single, fixed ranking argument without the aide of phonologically-external tools or technology. To the contrary, I have advocated a “free-ranking” phonological approach to the Icelandic data wherein a synchronic system of subgrammaticality has been proposed with principally coexistent and incompatible levels of (sub)grammar to derive conflicting data. Each respective grammar expressed a subordering (i.e., stratum-specific ranking argument) of constraints which further modelled antagonistic inflexional patterns. A conservative phonological analysis of the Icelandic data was argued to be liable to lacunæ

such that capturing lexically-arbitrary phenomena must, to some degree, appeal to extraphonological information. The simple explanation for this is that surface exceptions to phonological generalisations, tautologically, undermine the phonology and thus instigate seeking alternative means of explanation. This state of affairs ultimately evolved into both lexicalisation and OO-CORRESPONDENCE which allowed for morphologically-related outputs to interact in such a way such that their behaviour was both systematic and uniform.

Accordingly, Swedish and Icelandic gaps have been shown to exhibit theoretically opposing instantiations of *variation in grammar*. A positive aspect of having arrived at uncompromising conclusions is the presumption that *grammar* should reflect the nature of its content and serve neither to manipulate such content nor force generalisations which do not follow from the empirical facts. With relation to a notion of grammatical *predictability*, gaps which are phonotactically-motivated are discernibly derivable by principles of the grammar; whereas gaps emerging in the absence of any such phonological triggers appear to be ultimately a product of the phonology-morphology interface. Equally important is that such analytic disparities follow in fact from intrinsic properties of the nature of the gaps under investigation. Therefore, the data as such inspire little in the way of contriving a uniform theory for tackling gap phenomena cross-linguistically. As future research pursues greater competence of the role of inflexional paradigms in phonological theory, the concomitant notion of *gap* will similarly evolve such that any issues left hitherto unresolved will expectantly be cast in a clearer light.

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**APPENDIX A**

IPA chart of Swedish consonantal phones (Ladefoged & Maddieson 1996)

	<i>bilabial</i>	<i>labiodental</i>	<i>dental</i>	<i>alveolar</i>	<i>palatal</i>	<i>velar</i>	<i>glottal</i>
<i>plosive</i>	p b		t d			k g	
<i>nasal</i>	m		n			ŋ	
<i>spirant</i>		f v		s	ç j	ħ	h
<i>trill</i>				r			
<i>lateral approximant</i>			l				

**APPENDIX B**

IPA chart of Icelandic consonantal phones (Scholten 2000)

	<i>bilabial</i>	<i>labiodental</i>	<i>dental</i>	<i>alveolar</i>	<i>palatal</i>	<i>velar</i>	<i>glottal</i>
<i>plosive</i>	p <sup>h</sup> p		t <sup>h</sup> t		c <sup>h</sup> c	k <sup>h</sup> k	ʔ
<i>nasal</i>	m̥ m		n̥ n		ɲ̥ ɲ	ŋ̥ ɳ	
<i>spirant</i>		f v	θ ð	s	ç j	x ɣ	h
<i>trill</i>				ɾ r			
<i>lateral approximant</i>				l̥ l̥ <sup>x</sup> l l̥ <sup>x</sup>			