0. Introduction

In the preceding chapter we discussed the content and manifestations of grammatical and phonological markedness and we advanced the claim that there is a correlation between the two, instantiated by the Marked in the Marked (MIM) generalization. In accordance with MIM, as we have seen, inflectional or grammatical markedness corresponds to a higher or equal degree of phonological markedness.

As inflectional markedness is shaped by usage such as economy and frequency, MIM is per se a statement of the connection between language use (performance) and (phonological) grammars. The correlation is ultimately a matter of optimization in that actual linguistic systems tend to maximize economy in communication by allowing, other things equal, marked phonological structure in forms that are relatively infrequent (i.e. grammatically marked).

Optimality Theory (OT, Prince and Smolensky 1993/2004), where grammars emerge as a consequence of rankable, violable constraints, is superior to rule-based models in the analysis of MIM effects. It is the factorial typology orientation of the OT approach and the ‘homogeneity of target/heterogeneity of process’ (McCarthy 2002) feature that confer the superiority of OT to rule-based approaches to MIM (see §5.2 for a discussion of the factorial typology). This
second chapter of the dissertation is devoted to the optimality-theoretic modeling of MIM phenomena.

§1 discusses the content of the notion ‘markedness’ in OT and addresses the concept of functional grounding of constraints. §2 reviews licensing mechanisms represented by Positional Faithfulness and Positional Markedness. In §3 I discuss positive licensing in privileged positions and in §4 I propose a family of constraints that license marked phonological structure in outputs inflected for marked grammatical categories. §5 introduces the Marked in the Marked schema and the associated factorial typology. §6 is intended as a brief summary of the chapter.

1. Grammatical markedness and Optimality Theory

OT (Prince and Smolensky 1993/2004) distinguishes two types of constraints, dubbed faithfulness and markedness. Faithfulness constraints militate for the preservation and identity of input structures and relations in outputs and penalize input-output discrepancies. In contrast, markedness constraints are blind to input structure and “assign violation-marks to a candidate based solely on its output structure, without regard to its similarity to the input” (McCarthy 2002:14)\(^{37}\).

As already hinted in Chapter 2 (§3.2), in OT the only way to show that a structure is marked is to show that there exists a markedness constraint against that structure. In addition to that, the markedness constraint should lead to the right

\(^{37}\) See also Moreton’s (2004) formal definition of markedness constraints, where the same idea is emphasized, that markedness constraints look only at the output and ignore the input.
typological predictions. Although not decisive, functional considerations may help explain why Universal Grammar has a certain markedness constraint and, say, not its opposite. It is at this point that functional grounding assumes a role in the formulation of OT constraints. Although, as Hayes (1999) notes, the fact that an OT constraint is based on a functional principle does not make the constraint inviolable, the functional grounding of (certain) constraints increases the explanatory power of the theory. As the licensing constraint I propose in this thesis is grounded in functional factors such as frequency of occurrence of inflected forms, I will start with a discussion of the functional grounding of OT constraints.

**1.1 Functional grounding of OT constraints**

Due to the way it is defined, the notion of ‘markedness’ is used in a technical sense in OT. The legitimate question arises as to the extent to which there is a connection between OT markedness constraints in phonology and other types of markedness that exist outside of phonology, in syntax or morphology. As Haspelmath (2003) puts it, cross-linguistic processes stem from processing preferences (minimization of the coding/uncoding effort) and conceptual-pragmatic preferences like predictability or familiarity in use. In short, there is at least a tendency, if not a universal property, of OT constraints to be functionally grounded, and the connection between OT markedness constraints and other kinds of markedness can be expressed in functional terms. As we are going to see, this
applies not only to phonological OT, but also to constraints in optimality-theoretic morpho-syntax.

In its early statements, phonological OT does not make explicit assumptions as to the functional grounding of constraints. Expressed as phonological generalizations, constraints are assumed to be universal and languages differ with respect to the rankings of constraints. In short, a constraint is considered to be adequate to the extent to which its action is attested by cross-linguistic evidence\textsuperscript{38}.

Subsequent research has shown that many OT constraints are functionally grounded or rooted in the articulatory and perceptual systems (the idea is explicitly stated by Kager 1999). This is the position advocated, among others, by Flemming (1995), Steriade (1997, 2001), Beckman (1998/1999), Boersma (1998), Kirchner (1998), Haspelmath (1999), Hayes (1999), Côté (2000), Pierrehumbert (2000), Bye (2001)\textsuperscript{39}, Smith (2002/2005), Curtin (2002), Padgett (2003ab) and Walker (2005) or by the contributions in Hayes, Kirchner and Steriade (2004). For an important pre-OT contribution to the issue of functional grounding of phonological constraints, see Archangeli and Pulleyblank (1994) and the references therein.

To see how functional grounding works, consider, by way of example, a constraint like NoCoda (Prince and Smolensky 1993/2004), which enforces a ban on closed syllables:

\textsuperscript{38} Apart from this kind of descriptive adequacy, constraints were also thought to be to a large extent characterized by innateness (Prince and Smolensky 1993/2004, Tesar and Smolensky 1993, 1996).\textsuperscript{39} Bye (2001) calls the position according to which all OT constraints are functionally grounded ‘the strong enactionist hypothesis’.
The constraint in (41) can be said to be functionally grounded in the perceptual system, as coda consonants, which are unreleased, tend to lack the perceptual cues present in onset consonants (Ohala 1990, Steriade 1995c). NOCODA contributes to the understanding of an important typological universal on syllable inventories, namely the fact that open (CV) syllables are allowed in all languages, whereas closed (CVC) syllables are allowed only in a subset of the languages of the world. Moreover, assuming a constraint like NOCODA contributes to the understanding of processes of syllabification that disfavor closed syllables, even in languages with syllable codas.

In contrast, positing a constraint with a complementary activity (CODA), which requires syllables to be closed, would not only lack empirical adequacy (there are no languages where codas are required in all syllables), but would also fail to meet the grounding conditions of NOCODA. A similar argument can be made for other prosodic markedness constraints like ONSET (Itô 1989, Prince and Smolensky 1993/2004), which requires the presence of syllable onsets.

Functional grounding of markedness constraints in phonology is advocated by Smith’s (2002/2005) theory of augmentation in prominent positions. Smith notes that a number of phonological properties (like resistance to neutralization or prominence enhancement) can be accounted for if we consider markedness constraints that hold for prominent positions (M/str, labeled ‘augmentation
constraints’) rather than faithfulness to weak positions (F/wk). One of the key insights in Smith’s proposal is that not every logically possible M/str constraint can be assumed to be part of the constraint repository CON. Building on earlier work by Hayes (1999), she proposes a model of CON in which only a subset of imaginable M/str constraints are part of CON, namely those that are functionally (phonetically or psycholinguistically) grounded. This is achieved by imposing constraint filters, an issue which will be addressed in more detail in §4.

In general, many of the individual constraints or constraint families that have been acknowledged in phonological Optimality Theory are functionally grounded. For example, considerations of economy in output expression form the underpinnings of constraints of the *STRUC family (Prince and Smolensky 1993/2004, Zoll 1993, 1996), according to which various (and qualitatively different) amounts of phonological structure (features, segments, syllables etc.) are not allowed in outputs. Economy considerations underlie other markedness constraints as well. Another example in point is provided by Lazy (Kirchner 1997, 1998), which militates for minimization of articulatory effort. Faithfulness constraints associated with phonetically or psycholinguistically privileged positions as instances of functionally grounded constraints are discussed in more detail in §2.1.

In OT syntax, economy is enforced by Stay (Grimshaw 1993, 1997), a constraint that prohibits movement operations. Also, conceptual-pragmatic processing preferences have been claimed to find an expression in negative
markedness constraints of the *STRUC family in syntax, such as *DATIVE, *ACCUSATIVE, *NOMINATIVE or *OBJECT (Aissen 1999/2001, 2003; Woolford 2001).

In this dissertation I propose that the inventory of grounded constraints be enriched by a class of licensing constraints for which the licensors are the morpho-syntactic features of marked members of grammatical categories (defined as in Chapter 2). This brings further evidence to bear on the functional grounding of OT constraints and contributes to accounting for phonological asymmetries between categories on a grammatical markedness hierarchy. I claim that low(er) frequency of morpho-syntactic features correlates with a higher capacity of outputs inflected for those features to license marked phonological structure. This issue is discussed in detail in the following section, where the respective type of licensing constraint is introduced as part of the universal constraint repository CON (Prince and Smolensky 1993/2004) and arguments are put forth for the necessity of considering licensing constraints functionally grounded in usage frequency.

2. Licensing

In Chapter 2 I introduced the notion of grammatical and phonological markedness. I subscribed to the idea that frequency is the most reliable criterion for grammatical markedness40, while phonological markedness is best described as

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40 The frequency of occurrence of forms reflects pragmatic, conceptual and cognitive preferences encoded in language use.
articulatory and structural complexity and capacity to occur in phonological
inventories.

Asymmetries between the general behavior of phonological material and
the particular behavior of the same in particular contexts describable in terms of
language use or performance⁴¹ have been long documented. In particular, it has
been shown that positions that are perceptually salient (like word-initial position,
released consonants, root-initial syllables, onsets or stressed vowels) are privileged
in that they play an important role in terms of psycholinguistic processes
(perception, access, retrieval, storage) and resist neutralization to a larger extent
than their unprivileged counterparts. For earlier work on the ability of privileged
positions to preserve contrasts see Nooteboom (1981), Hawkins and Cutler (1988),
Ohala (1990), Ohala and Kawasaki (1984) etc.

Manifestations of the asymmetry between privileged and non-privileged
positions have been shown to be pervasive in the phonology of individual
languages (see Beckman 1997, 1998/1999 for a variety of examples). For instance,
in Shona (Beckman 1997, 1998/1999) vowel height is fully contrastive in root-
initial syllables, but subject to restrictions in non-initial syllables. Similarly, in a
large number of languages, vowel reduction, a process that potentially leads to
contrast minimization, does not affect vowels in stressed syllables (Crosswhite
relativized to those positions in the distribution of laryngeal features across

⁴¹ See Chapter 2 §1.2.2 for a discussion of the concept of performance.
languages. Privileged positions have been also shown to act as triggers of phonological processes such as vowel harmony, place assimilation, laryngeal feature assimilation, and dissimilation (Majors 1998, Beckman 1998/1999 and the references therein, Walker 2001a).


The particular behavior of privileged positions has been implemented as licensing. The concept of licensing in phonology predates Optimality Theory (see, for instance, Itô 1986/1988). Building on the notion of prosodic licensing that requires all segments to be members of higher level prosodic units (syllable constituents, syllables, feet), Goldsmith (1990) defines autosegmental licensing as a property of certain units of description (syllables, codas, word-final morphemes) to license certain autosegmental features.

Within the optimality-theoretic framework, two approaches to licensing have emerged, positional faithfulness and positional markedness. These approaches will be discussed in the following sections.
2.1 Positional faithfulness

Licensing of phonological structure in privileged positions (α) has been claimed to assume the form of specific positional faithfulness by a number of researchers (Alderete 1995/2001, Steriade 1995b, Beckman 1997, 1998/1999, Casali 1997, Lombardi 1999, Walker 2001a etc.). While the specific privileged position α for which positional faithfulness is implemented may differ, advocates of positional faithfulness propose that faithfulness constraints be relativized to privileged positions α, assuming the general form FAITH_α. Positional faithfulness constraints participate in schemas like the one in (42) below:

(42) Positional Faithfulness schema

FAITH_α » M » FAITH

What the Positional Faithfulness schema (42) shows is that faithfulness to input specifications can be over-ridden in the general case by well-formedness requirements enforced by the markedness constraint M, except in the privileged position α. A simple example is due to Zoll (1998), who considers the hypothetical case of a language where identity to a labial place of assimilation is observed only in (privileged) onset position. In (43) the Positional Faithfulness schema is instantiated for α = onset:
When enforced, the Positional Faithfulness schema for the privileged position ‘onset’ predicts that preservation of input specifications for syllable onsets is more imperative than satisfaction of well-formedness conditions and preservation of input specifications for segments in general. The schema in (42) successfully accounts for the faithful parse of the labial onset of the winner (43b.), although in coda position the place specification for an underlying labial can change, as in (43b.) and (43c.).

Although positional faithfulness has been used successfully in accounting for an important number of language facts, its adequacy and applicability have not remained unquestioned (see, for example, Zoll 1998). As an alternative, positional markedness has emerged as a second approach to licensing in privileged positions.\(^{42}\)

2.2 Positional markedness

The second approach to licensing in prominent positions is represented by Positional Markedness (Itô and Mester 1996, Majors 1998, Zoll 1996, 1998,

\(^{42}\) It should be noted, however, that the two kinds of licensing, positional faithfulness and positional markedness, do not necessarily stand in conflict and may be both needed (Walker 2001ab).
There are three kinds of positional markedness constraints that have been proposed in the literature: (a) constraints that prohibit a certain phonological structure (M) in non-privileged positions (*M/non-privileged, as in Crosswhite 2001), (b) constraints that imply the overlapping or containment of M within privileged position X (Zoll 1998, Walker 2005) and (c) constraints where a privileged position X implies the presence of M in that position (the ‘augmentation constraints’ of Smith 2002/2005).

Assuming a hypothetical privileged position $\alpha$, positional markedness can be implemented as a markedness constraints relativized to $\alpha (M_{\alpha})$. By analogy to Positional Faithfulness, we can define Positional Markedness schemas, shown in a general form in (44):

(44) Positional Markedness Schema

$$M_{\alpha} \gg \text{FAITH} \gg M$$

To understand how Positional Markedness works, consider again the hypothetical example discussed in (43). The privileged position is ‘onset’, and the structure against which markedness militates is the labial place of articulation. The category-neutral markedness constraint is *LABIAL and the positional markedness constraint ($M_{\alpha}$) is *LABIAL(CODA), violated in outputs that have segments with a
labial place of articulation and in a coda\textsuperscript{43}. Note that \texttt{*LABIAL(CODA)} has the effect of prohibiting labial segments from occurring in the non-privileged position ‘coda’. An analysis along these lines works well for the hypothetical case (43). This is shown in (45):

\begin{table}[h]
\centering
\begin{tabular}{|l|c|c|c|}
\hline
/pum\textsuperscript{a}sa/ & \texttt{*LABIAL(CODA)} & \texttt{IDENT[seg]} & \texttt{*LABIAL} \\
\hline
a. pum\textsuperscript{a}.sa & *!(m) & & **(m, p) \\
\hline
b. \textsuperscript{c}pun\textsuperscript{a}.sa & & *(n) & *(p) \\
\hline
c. tun\textsuperscript{a}.sa & & **!(t, n) & \\
\hline
\end{tabular}
\caption{Table 11 *LABIAL(CODA) $\Rightarrow$ IDENT[seg] $\Rightarrow$ *LABIAL}
\end{table}

As (45) shows, candidate (45a.) incurs a fatal violation of \texttt{*LABIAL(CODA)}, because it has a coda with a labial place of articulation, and loses early in the game. Candidate (45c.) loses due to excessive violations of \texttt{IDENT[seg]}. This allows candidate (45b.), in which the only violation of faithfulness is incurred by the coda of the first syllable, to emerge as the actual output.

It looks like both Positional Faithfulness and Positional Markedness can be used to achieve the same result. Nevertheless, as Zoll (1998) points out, not all instances of phonological asymmetries associated with privileged positions can receive a satisfactory account within a theory that relies on Positional Faithfulness. She shows that Positional Faithfulness is too limited in its scope and is primarily devised to deal with instances of reduction of (underlying) marked structure.

\footnote{\textsuperscript{43} As Zoll (1998) points out, this version of Positional Markedness constraint involves constraint conjunction. \texttt{*LABIAL(CODA)} is violated in outputs that simultaneously violate \texttt{*LABIAL} and \texttt{NoCODA}.}
Situations in which marked structure arises via addition of phonological material are not predicted by the theory. Positional Faithfulness can also make erroneous predictions, such as the one according to which marked structure resulting from augmentation would be necessarily attracted to non-privileged (or weak) positions (see the arguments in Zoll 1998 as well as the analysis she proposes for Guugu Yimidhirr). A similar position is expressed by Jun (2001), who states the advantages a Positional Markedness analysis has over a Positional Faithfulness one in rounding phenomena in some Altaic languages. The necessity for Positional Markedness is also discussed in Walker (2001b, 2005).

The situation illustrated in (45) above represents an instance of Positional Markedness where a well-formedness condition is imposed on a non-privileged position. It should be noted that there are other formulations of Positional Markedness in which marked phonological structure M is required in a privileged position ($\alpha$). This is the case of the ‘positive’ Positional Markedness constraints like COINCIDE(x,y) introduced by Zoll (1996, 1998) or positional augmentation constraints (Smith 2002/2005).

Returning to the MIM effects investigated in this dissertation, they represent instances of phonological asymmetry which manifest themselves between outputs inflected for marked versus unmarked grammatical categories. I claim that a word carrying the morpho-syntactic features of the marked grammatical category in its Morphological Structure represents a kind of ‘privileged position’ akin to the privileged positions described in phonology. To
account for the fact that marked phonological material (M) can occur in those positions I propose a class of positive Positional Markedness constraints LICENSE(M,g) that license M in the relevant outputs, inflected for the marked member g of grammatical category G.

In the literature, positive licensing as a context-specific markedness constraint has been proposed for capturing situations where features or phonological material are affiliated to strong or privileged positions (Zoll 1998, Crosswhite 2000, 2001, Walker 2001b, 2004, 2005). Before I lay out the specifics of my proposal, I discuss the issue of positive licensing in privileged positions in the following section.

3. Positive licensing in privileged positions

If positional faithfulness and markedness are both largely speaking licensing constraints in the respective positions, licensing constraints proper are positional markedness constraints that express positive well-formedness conditions to the effect that marked phonological structures are licit in licensed positions (and/or disallowed in the complementary set of positions). Zoll (1996, 1998) posits a family of positive licensing constraints that she labels COINCIDE(x,y), defined in (46)\textsuperscript{44}:

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\textsuperscript{44} Without developing a theory of positive licensing, Crosswhite (2001) implements a family of Lic-Q/β constraints that achieve the realization of the pertinent phonological property Q in the context β.
(46) \text{COINCIDE} (x,y)

(i) \forall x \ (x = \text{marked structure}) \rightarrow \exists y \ (y = \text{strong constituent} \land \text{Coincide} (x,y))

(ii) Assess one mark for each value of x for which (i) is false.

For example, if x is a mid vowel (a marked phonological structure) and y, a stressed syllable (a ‘strong’ or privileged position), the constraint \text{COINCIDE}(\text{MidV}, \sigma) is violated whenever mid vowels are not in stressed syllables, and satisfied in all situations in which mid vowels appear in stressed syllables. The interest of \text{COINCIDE} constraints for a theory of the relation between grammatical and phonological markedness lies in the fact that, apart from expressing licensing conditions, the constraints encapsulate a domain membership, rather than an identity relation (x is contained in the domain defined by y). Finally, it should be noted (following Zoll 1998) that the licensing constraints typified in (46) involve constraint conjunction (Smolensky 1995).

A development of Zoll’s positive licensing mechanism is provided by Walker (2001b, 2004, 2005). In her formulation of licensing, Walker proposes a family of LIC(F, S-Pos) constraints that demand the association of particular feature specifications (F) with perceptually strong positions (S-Pos). The formal definition of LIC(F, S-Pos) is given below:
Let 

\text{(47)} \quad \text{Lic}(F, \text{S-Pos})

i. \( f \) be an occurrence of feature specification \([F]\) in an output \(O\)

ii. \( s \) be an occurrence of strong position \(S\) in \(O\)

iii. and \( s \delta f \) mean that \( s \) dominates \( f \)

Then \((\forall f)(\exists s)[s \delta f]\)

In (47iii.), the domination relation \( \delta \) between \( s \) and \( f \) need not be immediate. For example, a phonological feature like \([\text{high}]\) can be licensed by a stressed syllable, although in a prosodic hierarchical representation \([\text{high}]\) is not directly dominated by the syllable.

Building on the above work on positive licensing by Zoll (1996, 1997, 1998) and Walker (2001b, 2004, 2005), I propose a family of constraints that license marked phonological structure \( M \) in the marked grammatical category \( g \) (\text{LICENSE}(M, g)^{45}). The proposal is presented in §4.

\footnotesize

\text{45 The licensing constraint LICENSE}(M, g) could be formulated as follows, by analogy with the work of Walker (2001b, 2004, 2005):

Let

i. \( m \) be an occurrence of phonological structure \( M \) in an output \( O \)

ii. \( \gamma \) be an occurrence of the morpho-syntactic feature(s) for a value \( g \) of a grammatical category \( G \)

iii. and \( m \mathcal{R} \gamma \) mean that \( m \) is associated with \( \gamma \)

Then \((\forall m)(\exists \gamma)[m \mathcal{R} \gamma]\)

Conditions on \( M \) and \( g \) as well as the precise nature of the ‘association’ relation \( (\mathcal{R}) \) holding between \( m \) and \( \gamma \) are discussed in §4.
4. Licensing of marked phonological structure in marked categories

The Marked in the Marked (MIM) generalization introduced in Chapter 2 associates marked phonological material (M) with a marked member (g) of an inflectional category (G). In licensing terms, this is tantamount to saying that M in Phonological Structure is licensed by the presence of the morpho-syntactic features of g in the Morphological Structure of outputs. The consequence of such a move is the fact that the universal constraint set CON contains licensing constraints LICENSE(M,g). Given the way positive licensing is conceived of in the literature (§3 above), the pertinent question at this point is to what extent such a move is theoretically justified.

The issue that needs to be addressed is that not any constituent or category can act as a licensor. Specifically, we have seen that licensors of marked phonological structure M should qualify as privileged positions, which are phonetically or psycholinguistically strong (or prominent). The properties of such positions are grounded in language use. Such factors have to do with production, perception, retrieval etc. and help to determine which structures serve as licensors of phonological structure.

I propose that the array of factors capable of determining the licensors of phonological structure be enriched so as to include frequency of occurrence of linguistic expressions. As shown in Chapter 2, if g1 and g2 are members of the grammatical category G such that g2 > g1 on the grammatical markedness hierarchy (g2 is grammatically more marked than g1), the relation between their
frequency of occurrence (ϕ) is ϕ(g₁) > ϕ(g₂). The lower frequency ϕ(g₂) pinpoints member g₂ of grammatical category G as a potential licensor of marked phonological structure M. The marked phonological structure (M) is therefore licensed in output forms that carry the morpho-syntactic specifications for g₂. It should be emphasized that not any category g₂ licenses every marked M, rather a constraint particular or language particular pairing occurs.

A terminological clarification is in place at this point. The fact that inflected outputs ‘carry’ or ‘are associated with’ the morpho-syntactic specification for a grammatical category G should be understood as the presence of the functional node (and syntactic projection) for that category in the Morphological Structure of that output (see Chapter 5 §1.2.2 for more on the notion ‘Morphological Structure’). For example, if an output O carries the morpho-syntactic specification ‘Plural’, there is a Number projection in the Morphological Structure of that output and the head of that projection has the ‘plural’ syntactic feature. The syntactic feature percolates and lends the whole output the plurality property from a morpho-syntactic and semantic perspective. This gives us an answer to the question ‘what counts as a grammatical category?’ A grammatical category represents a set of syntactic features that express meanings from the same conceptual domain (Bybee 1985, Crystal 1985, Hopper 1992). The fact that an output word is inflected for a particular category is represented by the presence of the morpho-syntactic features on the head of the

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46 See Chapter 5 §1.2.2 for more details and an illustration of Phonological Structure (PS), Morphological Structure (MS) and phonological exponence.
relevant syntactic projection in the Morphological Structure of the output. The working definition for ‘grammatical category’ can be easily applied for categories which have a precise semantic content, like Number, Gender, Tense etc.

In other situations, as for instance the category of Case, the definition of grammatical categories has to take into account more abstract conceptual and formal relations. According to Blake (2001), Case is a category which marks dependent nominals in relation to their heads (verbs, adjectives, prepositions). Once the category defined in this relational fashion, its individual members (Nominative, Accusative, Genitive etc.) can have more or less unitary semantic properties.

Determining the exact inventory of categories and syntactic projections is sometimes an empirical matter and it can sometimes be the case that syncretism phenomena exist. In Old Saxon47, for instance, the Nominative and Accusative on the one hand and the Dative and the Instrumental on the other hand pattern together to a large extent with respect to their morpho-syntactic behavior. The Nominative and Accusative are both ‘structural cases’, generally not associated with particular thematic roles in their semantic behavior. Syntactically, they meet similar requirements for case assignment on inflected nominals. Similarly, the Dative and Instrumental pattern together – they are ‘lexical cases’ associated with specific thematic roles and are require similar case assignment configurations. This parallel behavior underlies the traditional grouping into two case forms, ‘Direct’

47 The Old Saxon data are discussed in Chapter 4, where inflectional paradigms are presented.
(Nominative-Accusative) and ‘Oblique’ (Dative-Instrumental). Without going into details of case assignment mechanisms, the similar behavior of the Nominative and Accusative allows us to assume the presence of a unified morpho-syntactic feature ‘direct’ in the Morphological Structure of words inflected for these two cases, and, by analogy, of a morpho-syntactic feature ‘oblique’ for the Dative and Instrumental. In conclusion, lumping together the Nominative and Accusative and the Dative and Instrumental, respectively, is not simply an assumption made purely for expository convenience, but a consequence of the properties of these cases.48

Also, it is often the case that an output is inflected for two or several morpho-syntactic categories at the same time. The fact that in Morphological Structure morpho-syntactic categories have separate projections (and heads) allows for their individual treatment. For instance, one can compare nominal outputs simultaneously inflected for Case and Number by keeping one dimension constant and looking into the other dimension of morphological variation.

To return to the issue of licensing, for a member g of a given grammatical category G that occurs with frequency \( \phi \), the licensing constraint for a given marked structure M is LICENSE(M,g), defined informally in (48):

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48 As we shall see (Chapter 4 §4.2.1), the grouping of cases in Old Saxon on the basis of the criteria shown here is not only possible and motivated, but also necessary in order to make the licensing analysis work.
The licensing constraint (48) is subject to the condition that g is the (relatively) grammatically marked member of grammatical category G. To illustrate the proposal on a simple case, if category G is ‘number’ and its members \( (g_i) \), Singular and Plural, LICENSE(M,g) assumes the form LICENSE(M, PLURAL), as the Plural is more marked grammatically (and less frequent) than the Singular.

Let us turn to the formal statement of the licensing constraint (48). This definition is given along the lines of Walker (2001b, 2004, 2005) and has already been previewed in its essential lines in footnote 45 above. Recall that in that definition there was an ‘association’ relation \((\mathcal{R})\) holding between an occurrence \((m)\) of a phonological structure \((M)\) and an occurrence \((\gamma)\) of the morpho-syntactic features of a member \((g)\) of a grammatical category \((G)\). The definition in footnote 45 left the association relation unexplained. Also, we still have to clarify the status of \(M\) and \(g\). All these issues are discussed in the remainder of this section, in relation with the formal definition proposed for LICENSE(M,g) in (49):
(49)  LICENSE(M,g)

Let

i.  m be an occurrence of phonological structure M in an output O

ii.  γ be an occurrence of the morpho-syntactic feature(s) for a value g of a grammatical category G

Then m in the Phonological Structure (PS) of an output O implies γ in the Morphological Structure (MS) of same output O.

The licensing constraint in (49) is subject to filter conditions such that M is a marked phonological structure and g a marked member of a grammatical category G (for example, in a two-way Singular-Plural Number system, g is Plural). As regards the relation between m and γ (so far vaguely referred to as ‘association’ (ℜ) in footnote 45), it is one of material implication. This can be seen from the evaluation of the licensing constraint, which is violated only for instances (m) of the marked phonological material M in the Phonological Structure of an outputs (O) which are not inflected for the marked grammatical member g of G in their Morphological Structure. The filter conditions and the implication are discussed later in this chapter.

To sum up the discussion so far, consider the schematic illustration in (50) below, repeated from Chapter 1:
Figure 4 Licensing of marked phonological material in the marked category

Language use factors ('performance') \( \ldots \phi_2 < \phi_1 \ldots \)

Grammatical markedness hierarchy \( \ldots (g_2) > g_1 \ldots \)

Morphological Structure (MS) \( \text{MS}(g_2) \)

Phonological Structure (PS) \( \ldots [M \ldots] \) \( \text{Output inflected for } g_2 \)

The top tier of schema (50) relates a factor of language use (frequency of occurrence (\( \phi \))) and the grammatical markedness hierarchy. For a given grammatical category \( G \), the frequency of occurrence of inflected outputs determines the place of the members (\( g_1 \) and \( g_2 \)) of a morpho-syntactic category \( G \) on the grammatical markedness hierarchy. The bottom part of the schema represents the licensing of marked phonological structure (M) in output words that are inflected for the marked grammatical category (\( g_2 \)). The Morphological Structure (\( \text{MS}(g_2) \)) of those words contains the morpho-syntactic node that carries the specifications for \( g_2 \). If we consider the Phonological Structure (PS) of an output inflected for \( G \), a marked phonological structure within PS is said to be licensed by the marked member \( g_2 \) of \( G \) if the Morphological Structure (MS) of that word has the morpho-syntactic specifications for \( g_2 \) (\( \text{MS}(g_2) \))\(^{49} \). As already mentioned, the formal licensing relation that exists between the occurrence \( m \) of

\(^{49} \text{MS}(g_2) \) is a shorthand notation for the presence of a syntactic node carrying the features of \( g_2 \) (the marked category) in the Morphological Structure of the output.
the marked phonological structure M in an output and the occurrence (\(\gamma\)) of the features of the marked grammatical category is one of material implication in the sense that ‘m implies \(\gamma\)\(^{50}\). In other words, the presence of an instance m of marked phonological structure M in Phonological Structure implies the presence of the morpho-syntactic features for the marked grammatical category g in Morphological Structure, a relation symbolized as ‘M \(\supset\) g’.

Let us return to the issue of filters on possible licensing constraints. As shown in (50), a functional factor (frequency of use) determines the grammatical category whose morpho-syntactic features can license the presence of marked phonological structure in inflected outputs. The essential remark here is that not any member of a given grammatical category (G) can, via its morpho-syntactic features, license marked phonological material (M) in outputs inflected for that category. In fact, the constraint LICENSE(M,g) is defined only if M is a kind of marked phonological structure and g, a marked member of G (for simplicity, if g\(_1\) and g\(_2\) are members of G such that g\(_2\) is more marked than g\(_1\), the licensing constraint is defined for g\(_2\)). This raises the issue of imposing limitations or filters in the range of potential constraints that can be contained in the constraint repository CON which is part of the architecture of Optimality Theory.

\(^{50}\) For consistency of exposition, G represents a grammatical category. If G has n particular values or members, individual members are represented as g\(_i\) (i = 1, 2, ...n). For example, if G is the category of Gender in a three-way Gender system (Masculine, Feminine, Neuter), its members are symbolized as g\(_1\), g\(_2\) and g\(_3\) (i = 1, 2, 3). When used without a subscript, g is a marked member of G. \(\gamma\) is the particular occurrence of the morpho-syntactic features of a member of G. m is an occurrence of marked phonological structure M in an output O.
In this dissertation I propose a filter on licensing constraints LICENSE(M,g) which represents an application of the Schema/Filter Model of CON proposed by Smith (2002/2005). Smith discusses the issue of filters on constraints in relation to her ‘augmentation’ constraints (M/str). M/str constraints are markedness constraints that make specific reference to strong positions. According to Smith, not all logically possible augmentation constraints in strong positions (M/str) are part of CON. For example, M/str markedness constraints exist only if the markedness constraints (M) from which they are constructed refer to perceptually prominent properties. As an illustration, a constraint like ONSET/σ₁, which requires that initial syllables have onsets, is a legitimate M/str constraint in CON because the ONSET markedness constraint from which it is constructed enforces the presence of an onset, which is perceptually prominent. In contrast, following the same logic, a constraint like *MIDV/σ, which bans mid vowels in stressed syllables, is not part of CON, due to the fact that mid vowels are not perceptually prominent. In Smith’s model, illicit M/str constraints (M/str constraints for which M does not refer to a perceptually prominent property) are not allowed to be part of the constraint inventory due to the activity of substantive filters that block them.

The model proposed in this thesis applies the filter mechanism to LICENSE(M,g) constraints such that only those licensing constraints are allowed in CON for which g is a marked member of a grammatical category G. The filter mechanism is shown in (51), which represents an application of Smith’s Schema/Filter Model of CON:
(51) Figure 5 The Schema/Filter Model of CON applied to licensing

In the schematic illustration in (51), box (a) represents the potential range of licensing constraints for marked phonological structure (M) for two members of grammatical category G, a marked member (g) and an unmarked one (g'). The range of potential licensing constraints is subject to a filter (box (b)) represented by a functional factor such as frequency of occurrence ($\phi$). The filter eliminates the licensing constraint defined for g', whose frequency of occurrence is higher than that of g.\(^{51}\) As the outcome of the activity of the filter, only the licensing constraint LICENSE(M,g) emerges as part of CON (box (c)).

\(^{51}\) Recall that according to the frequency criterion for grammatical markedness, lower frequency of occurrence determines the marked character of g as compared to g'.
represented by members $g_1$, $g_2$ and $g_3$ such that $g_1 < g_2 < g_3$ with respect to grammatical markedness.

In such a case, it is in principle possible to make two cuts along the grammatical markedness dimension, one between $g_3$ and $g_2$ and one between $g_2$ and $g_1$. This leaves us with two possibilities of filtering out licensing constraints. First, it is possible that the filter rules out the licensing constraint for the least marked category ($g_1$), but allows the licensing constraints for the more marked members ($g_2$ and $g_3$) to be part of $\text{CON}$. Second, it is possible that both licensing constraints for $g_1$ and $g_2$ are excluded from $\text{CON}$, and only the top-ranked $g_3$ is allowed to have a licensing constraint. These two situations are presented in (52):

(52) Figure 6  Schema/Filter Model variants for a three-way category

If the activity of the filter is the one in (52a.), $\text{CON}$ will contain both $\text{LICENSE}(M,g_2)$ and $\text{LICENSE}(M,g_3)$ (and not $\text{LICENSE}(M,g_1)$), but if the filter has the activity in (52b.), only $\text{LICENSE}(M,g_3)$ will be part of $\text{CON}$. The two versions of the filter lead to different predictions. Indeed, if the filter assumes the shape in
(52a.), marked phonological structure M may occur only in the Phonological Structure of g2 and g3 and not in g1, or in all of them, or in none of the categories. If the activity of the filter is as in (52b.), M will occur only in g3, or in all categories or in none of them. The case studies discussed in this dissertation do not allow us to determine which of the two scenarios of the filter is the correct one, so this issue is left for further research. There is also the possibility, illustrated in Chapter 4, to group together values of a grammatical category, thus reducing the inventory of possible licensing constraints, and then define licensing constraints for the newly defined ‘lumped up’ categories. It is to be noted, however, that no matter which version of the filter we adopt, no situations are predicted in which marked phonological structure M is licensed in the least marked member (g1) of G, but not in g2 or g3. As we shall see, this is consistent with the factorial typology discussed on cases with two-member categories.

In sum, the functional factor represented by frequency of occurrence of inflected forms plays the role of a substantive filter on licensing constraints by allowing only those LICENSE(M,g) constraints to be part of CON for which g is a marked (and less frequent in usage) member of grammatical category G.

Furthermore, there are at least two important similarities between the MIM phenomena investigated in this dissertation and the augmentation in prominent positions discussed by Smith. In both cases the influence of functional factors on phonological grammars is indirect and manifests itself as a force that affects the
inventory of actual constraints rather than, say, the ranking of constraints on a hierarchy. Also, both models inevitably have to deal with the issue of gradient functional forces that have categorical effects in the phonology. For instance, in the case of augmentation in prominent positions, the initial syllable is phonologically ‘stronger’ in categorical terms than the rest of the word, although with respect to the functional, psycholinguistic aspect, strength can be said to decrease gradually as one moves farther away in the word. A similar situation is encountered with MIM effects, where a gradient parameter like frequency of occurrence has a categorical effect on the phonological grammar. Such facts justify the application of the Schema/Filter to MIM phenomena. Also, they call for an investigation of how MIM effects emerge in natural languages and how exactly phonological grammars can be shaped by functional factors like frequency of occurrence. These issues have been dealt with in §5 of Chapter 2.

What is the ontological status of the substantive constraint filters on licensing constraints discussed above? In particular, it is worth asking whether they are part of Universal Grammar and how they are acquired. These questions are part of a broader research agenda, which has to do with the status of constraint schemas and their constraint construction, and will be left open at this point. It should be noted, however, that grammatical markedness hierarchies are in all likelihood learned (see Dressler et al. 2002, Dressler 2003) rather than innate. It may well be the case that the constraint filters are also ‘learned’ in the sense that their outcome is a CON where only licensing constraints are allowed for higher-
ranked categories on the grammatical markedness hierarchy. Smith (2002/2005) favors an answer along similar lines (schemas, arguments and filters being acquired rather than innate) for her account of augmentation in prominent positions.

It should also be noted that as regards the relation between grammatical markedness and frequency (φ), categories $g_i$ on a grammatical markedness hierarchy are members of the same morpho-syntactic category. This means that cross-category markedness relations (like Case-Number or Tense-Voice) are not considered in this thesis. For example, no claims are made, based on relative frequency, that a verbal category is more marked than a nominal category, although the agenda for future research is open to exploring such relations.

Returning to definition (49), what it stipulates is a material implication of the type $M \supset g$. That is, the constraint is satisfied only when the marked phonological structure $m$ occurs in the grammatical category $g$ that is the marked member of $G$. The material implication relation which holds between $M$ and $g$ is not one of direct or indirect domination (as in Walker 2001b, 2004, 2005), but rather one of property assignment in the sense that the presence of $M$ in the Phonological Structure of an output $O$ entails that $O$ carries in its Morphological Structure the morpho-syntactic features for the marked member $g$ of category $G$. It should also be emphasized that the output $O$ is a word constituent, rather than a phrase or inflectional morpheme; marked phonological structure need not be associated with a particular affix. A good example for this property is the case of
marked metrical structure. For instance, in Old Saxon (Chapter 4), phonologically marked uneven trochees (HL) are licensed in words inflected for the marked Oblique case. Although one may assume that morpho-syntactic features percolate from the syntactic head to the word, it is the whole inflected output word that ends up carrying the morpho-syntactic feature ‘oblique’ in MS that licenses the marked metrical structure (HL) in PS.

In the definition of licensing of marked structure in the marked category, the material implication is asymmetric (if ‘m implies γ’ is true, the reverse, ‘γ implies m’, is not necessarily so). What (49) requires is not that all outputs inflected for g (i.e. outputs that have instances γ of the features for g in their Morphological Structure) contain instances m of phonological structure M, but that all instances of M be part of the Phonological Structure of outputs inflected for g in their Morphological Structure.

LICENSE(M,g) is satisfied whenever particular instances m of M occur in outputs carrying the morpho-syntactic features of the marked member g of G in their MS, and violated if m occurs in an output inflected for some other member of G that is less marked than g (and more frequent in usage) or it occurs in an output not inflected for G or in an uninflected output. Also, the statement of morphological exponence in relation with the percolation of morpho-syntactic features from syntactic heads to the word level has consequences for the way the licensing constraint is evaluated, specifically, for the domain within which the evaluation is done.
To see in more detail how these aspects play out in the assessment of LICENSE(M,g), consider the Plural Definite of certain Italian nouns that start in a vowel (Saltarelli and Calvano 1979). The feminine Italian Definite determiner has the form *la* in the Singular, and when attached to a vowel-initial noun the final vocalic segment of the determiner is deleted, in avoidance of hiatus (53a.). In the Plural, the determiner is *le*, but its final vowel is retained (53b.):

(53)

a. /laDef.+entita/ → [le.n.ti.tá]Sg. Def. ‘the entity’

b. /leDef.+entita/ → [le.en.ti.tá]Pl. Def. ‘the entities’

Setting aside the fact that the Plural of such nouns is expressed only in the determiner, we can note that in both situations the determiner and the noun form a word. The relevant marked grammatical category (g) is ‘Plural’ and the marked phonological structure (M) is ‘hiatus’\(^{53}\). If we examine the Phonological and Morphological Structure of the Singular and Plural definite output forms in (53), it can be seen that the Phonological Structure (PS) of the Plural word contains a sequence of two vowels (VV), while hiatus is resolved in the Singular by deleting the determiner vowel from PS. The relevant representations of Phonological Structure (PS) and Morphological Structure (MS) of the two output words representing the definites in (53) are shown below:

\(^{53}\) For ample discussion of hiatus as a marked structure and means of resolving hiatus see Casali (1997, 1998) and the references therein.
The relevant licensing constraint is \textsc{License}(VV, PLURAL). An examination of the representations in (54) shows that the Plural word (54b.) satisfies the licensing constraint due to the fact that the marked phonological configuration (hiatus) in PS entails the presence of the morpho-syntactic feature ‘plural’ of the marked grammatical category in the MS of the output word. Had hiatus been present in the PS of an output with the unmarked ‘singular’ features in MS, the constraint would have been violated.

So far we have seen the relevance of Phonological Structure (PS) in the definition and evaluation of \textsc{License}(M,g). However, we still need to define more precisely the phonological domain for which the PS in question is relevant. Failure to circumscribe PS to a well-defined domain would predict that marked phonological structure (M) may occur as licensed by morpho-syntactic features in MS which are not relevant. For example, if PS is understood, respectively, as a
phonological/intonational utterance, phonological phrase or clitic group etc.\textsuperscript{54}, the hiatus structure discussed above would potentially be licensed anywhere within the domain, even in for segments with no affiliation to the Plural, leading to odd typological predictions. This is why a restriction is necessary on PS. I propose that for the purpose of the phenomena discussed in this dissertation PS be defined as the smallest prosodic unit (including segments as prosodic units) which contains all of the surface segments whose underlying correspondents belong to the smallest morpho-syntactic unit properly containing some morpho-syntactic marker\textsuperscript{55}. As an application of the definition to the Italian case considered above, the smallest morpho-syntactic unit containing the ‘plural’ morpho-syntactic specification is /le+Plural/, but the smallest morpho-syntactic unit properly containing it is the DP (consisting by a determiner followed by an NP). The identification of the domain is straightforward: in the underlying representation, it is composed of all the segments belonging to the DP; in surface, it consists of all the correspondents of those segments. Now in the prosodic structure of the output, the minimal unit containing all the segments is the prosodic word (PrWd), so we can say that in Italian Plurals hiatus is licensed in the PrWd. This is a general procedure which works in other cases as well, as we shall see below.

To take a further example of licensing constraint evaluation, consider the hypothetical case of a language where the category of Number has two values, 

\textsuperscript{54} See Nespor and Vogel (1986) for categories in Prosodic Phonology. 
\textsuperscript{55} In this thesis the relevant unit considered is the segment. It should be noted, however, that sometimes it may be necessary case to consider sub-segmental units, as the case is for the autosegment approach to Italian and Romance Plural formation briefly discussed in Chapter 5 §3.
Singular and Plural, and palatalized consonants $C^j$ (cross-linguistically, a type of marked phonological structure) are attested only in the grammatically marked Plural\textsuperscript{56}. The distribution of plain and palatalized consonants is shown in (55):

(55) Table 12  Plain and palatalized consonants in Romanian Number

<table>
<thead>
<tr>
<th></th>
<th><strong>Singular</strong></th>
<th><strong>Plural</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>$C^j$</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>$C$</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

The instantiation of the licensing constraint in the case under examination is LICENSE($C^j$, PLURAL). The constraint is violated by output forms containing palatalized consonants that carry the morpho-syntactic feature ‘singular’ ($C^j$/SINGULAR). Outputs that contain only the unmarked phonological structure represented by plain consonants ($C$) do not fall under the scope of licensing. The evaluation of outputs on LICENSE($C^j$, PLURAL) is given in (56):

(56) Table 13  Assessment of LICENSE($C^j$, PLURAL)

<table>
<thead>
<tr>
<th></th>
<th>LICENSE($C^j$, PLURAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C^j$/SG.</td>
<td>*</td>
</tr>
<tr>
<td>$C^j$/PL.</td>
<td>✓</td>
</tr>
<tr>
<td>$C$/SG.</td>
<td>N/A</td>
</tr>
<tr>
<td>$C$/PL.</td>
<td>N/A</td>
</tr>
</tbody>
</table>

\textsuperscript{56} The hypothetical example represents a simplification, for expositional purposes, of the situation encountered in Standard Romanian, where the distribution of plain and palatalized consonants in Singulars and Plurals is essentially the one considered here. A detailed analysis of the Romanian data is provided in Chapter 5.
Returning to the locality issue in the assessment of LICENSE(M,g) already discussed for Italian, we note that this time the smallest morpho-syntactic unit properly containing the ‘plural’ specification is the NP (or, if Number projections are considered, NumP, as in Chapter 5, (100)). As for Phonological Structure, the smallest unit containing all the segments affiliated to the NP is again the prosodic word.

The assessment in (56) shows the benefit of using LICENSE(M,g) in instances of marked phonological structure occurring in a grammatically marked category. While prohibiting marked structure (C^l) outside the marked category, the constraint does not penalize the presence of unmarked material (C) in that category, which is a desirable result both empirically and theoretically. Indeed, if the directionality of the material implication relation in definition (49) were ‘γ implies m’, this would mean that LICENSE(M,g) is violated by outputs containing unmarked phonological material in the marked category, which is, in point of phonological typology, an odd result. In this regard, a short comparison with the FIAT-STRUC constraint family proposed by MacBride (2004) suggests itself.

Working within an output-oriented version of Optimality Theory where morphological generalizations are encoded by constraints (along the lines of Russell (1999))^{57}, MacBride introduces a SYN:PHON schema, according to which an output with syntactic property SYN displays the phonological property PHON. For instance, in a language where the Past Tense is the vocalic suffix -i, the

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^{57} Hammond (1995) makes a similar proposal by questioning the relevance of the input level in Optimality Theory.
The relevant \textsc{flat-struct} constraint is \textsc{past: }\textsc{stem}$^i$ and demands that all Past Tense forms consist of a stem plus the suffix \textsc{-i}. It appears that the \textsc{syn:phon} schema not only leads to an considerable proliferation of parochial constraints but is also less well equipped to deal with phonological asymmetries related to grammatical marking. Setting aside the theoretical implications of OT models where the burden of expressing morphological constituents is placed exclusively on constraints and the role of lexical representations is reduced to a minimum, the \textsc{syn:phon} schema can at best instantiate the \textquoteleft γ implies m\textquoteright relation and require the presence of a particular phonological structure in a grammatical category, a requirement that is not empirically supported. The licensing schema adopted in this dissertation does not demand that the marked phonological structure be present in the marked grammatical category, which would be too strong a statement. It allows for the presence of both marked and unmarked phonological structure in that category while forbidding marked phonological structure in the unmarked category, a result to which the language cases examined in Chapters 4-6 lend empirical support.

In this section I introduced a positive licensing constraint LICENSE(M,g) for marked phonological structure in grammatically marked categories as an essential ingredient of the Marked in the Marked (MIM) generalization. In the remainder of the chapter I will present the MIM constraint schema and the associated factorial typology.
5. The Marked in the Marked Schema

5.1 The emergence of the Marked in the Marked Schema

To see how the phonological asymmetry emerges between categories different with respect to their grammatical markedness status, let us discuss the interaction of LICENSE(M,g) with (context-free) faithfulness and markedness.

Several logical possibilities suggest themselves. First, undominated LICENSE(M,g) precludes the occurrence of marked phonological material M in the unmarked category\textsuperscript{58}. For example, let us imagine a scenario where M is attested only in the grammatically marked category Plural, and banned in every other category that is not Plural (in particular in the unmarked Singular or in items not inflected for Number), where only unmarked phonological structure occurs. The Plural-Singular asymmetry manifests itself in that the former category can contain both marked (M) and unmarked material, whereas the Singular does not contain M.

In terms of constraints, this result is achieved by the constraint hierarchy in (57), which I label Marked in the Marked (MIM) Schema:

\[
\text{(57) The Marked in the Marked Schema}
\]

\[
\text{LICENSE(M,g) » FAITH » *M}
\]

\textsuperscript{58} Undominated licensing is a necessary but not sufficient condition for the MIM effect. If context-free markedness dominates faithfulness, the outcome is lack of variation (§5.2)
According to (57), M cannot occur outside g (Plural), but there may be instances of outputs inflected for G that sponsor unmarked material. This does not preclude the existence of unmarked phonological structure in g, for instance due to the presence of such structure in the input.

The activity of the MIM Schema will be exemplified by the case studies in Chapters 4-6. For practical purposes, the types of marked phonological structure M are classified into metrical (foot structure, 58a.), segmental (segment makeup and complexity, 58b.) and phonotactic (segment sequences, 58c.) as follows:

(58) Table 14 Applications of the MIM Schema

<table>
<thead>
<tr>
<th>Marked structure (M)</th>
<th>Marked category (g)</th>
<th>LICENSE(M,g)</th>
<th>Language</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Metrical</td>
<td>Uneven trochee (HL)</td>
<td>Lic(HL, OBL.)</td>
<td>Old Saxon</td>
</tr>
<tr>
<td>b. Segmental</td>
<td>Consonant with secondary articulation (CSEC.)</td>
<td>Lic(CSEC., PL.)</td>
<td>Romanian</td>
</tr>
<tr>
<td>c. Phonotactic</td>
<td>Intervocalic stop (VTV)</td>
<td>Lic(VTV, PASS.)</td>
<td>Mayak</td>
</tr>
</tbody>
</table>

The classification of marked structure into metrical (58a.), segmental (58b.) and phonotactic (58c.) does not have an independent theoretical status and represents an expositional means of illustrating the applications of the MIM Schema at various levels of representation. As we discuss the individual cases, we will see that the MIM schema is part of the grammar of the respective languages.

59 The abbreviations in Table (58) are as follows: H = heavy syllable, L = light syllable, Obl. = Oblique case, Dir. = Direct case, Sg. = Singular, Pl. = plural, Act. = Active voice, Pass. = Passive voice. Marked members of grammatical categories are given in bold type.
and interacts with other OT constraints. Considerable complexity may arise when
the schema interacts with phonotactic requirements (as in Romanian, Chapter 5) or
allophonic variation (as in Mayak, Chapter 6), but the picture is essentially the
same, marked in the marked phenomena.

Before we spell out the factorial typology associated with the MIM schema
and the typological predictions it makes, it is worth considering an alternative
approach to MIM phenomena. If for the grammatical category G the marked
phonological pattern M occurs only in the Phonological Structure of outputs
inflected for the marked member g₂ of G and not in outputs inflected for the
unmarked member g₁ (g₂ > g₁ in point of grammatical markedness and \( \varphi_1 > \varphi_2 \) in
point of frequency), one could entertain the solution of replacing LICENSE (M,g) by
(negative) markedness constraints of the type \( *M/g₁ \).

For ease of exposition, consider the case where G is the category of Number and g₁ and g₂ are Singular
and Plural, respectively. The relevant \( *M/g₁ \) constraint is \( *M/Sg \) and is violated
for each occurrence of M in the Phonological Structure of outputs inflected for the
Singular. The main advantage of such an approach, which is essentially along the
lines of Smith (2004b), would rest in the fact that contextual markedness
constraints can be constructed in a straightforward fashion from instances of \( *M

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60 Thanks to Elliott Moreton for bringing this line of analysis to my attention.
and there is no need to demonstrate the markedness of the phonological structure involved\textsuperscript{61}.

If undominated, *M/Sg. (in interaction with faithfulness and category-neutral *M) leads to grammars in which M is prohibited in the (unmarked) Singular, but allowed in the (marked) Plural and also possibly in other grammatical categories or in uninflected words\textsuperscript{62}. Also, the alternative approach in question would still require a filter mechanism that legitimizes only *M/Sg. (and not *M/Pl.) as part of CON.

Finally, as already noted, the *M/g approach potentially predicts situations where M is prohibited in the unmarked member of G, but allowed in the marked one and also possibly in other grammatical categories or in uninflected words, for example, languages in which M is not allowed in the Singular, but allowed in the Plural and, say, in adverbs or uninflected adjectives. The positive licensing approach proposed in this dissertation is more constrained in the sense that it predicts languages where M occurs in the marked member of G, but not in the unmarked member of G or, say, uninflected forms. Such are the cases discussed in Chapters 4-6 as illustrations of MIM phenomena. This is not to say that cases like the ones which can be predicted by the *M/g model do not exist, but rather that there is no data at this point to document them. What needs to be emphasized is the

\textsuperscript{61} However, recall that in OT structure M counts as marked if it can be shown that there exists a markedness constraint against it, so the relativized markedness approach hinted at here would still require a demonstration of the adequacy of the *M constraints employed.

\textsuperscript{62} See §5.2 for detailed discussion of the factorial typology associated with MIM effects.
fact that the two approaches make slightly different predictions as to the occurrence of marked phonological material M in (un)inflected outputs.

Having discussed the formulation of the licensing constraints and the MIM schema, we can now turn to the predictions that follow from the factorial typology associated with it.

5.2 Factorial typology

The benefits of an optimality-theoretic approach to marked in the marked phenomena become apparent visible if we consider the factorial typology associated with the MIM Schema, which is a particular constraint configuration, not a fixed ranking. The three constraints that are part of the MIM Schema give rise to a factorial typology. The logically possible situations are presented below.

First, there is full contrast\(^{63}\) (marked structure M can occur both inside and outside marked category g, as long as it is underlying). Full contrast is seen in grammars where general faithfulness dominates both licensing and context-free markedness (*M):

\[(59)\] Full contrast

\[\text{FAITH} \gg *M, \text{LICENSE(M,g)}\]

---

\(^{63}\) For the concepts of full contrast and lack of variation, see Kager (1999, to appear).
A second possibility is represented by lack of variation, a situation in which marked structure M never occurs in a language, irrespective of the grammatical category for whose morpho-syntactic features outputs specified in Morphological Structure. Lack of variation ensues when context-free markedness (*M) dominates faithfulness (*M » FAITH). Lack of variation patterns emerge by freely ranking LICENSE(M,g) within the *M » FAITH hierarchy:

(60) Lack of variation

(LICENSE(M,g)) » *M » (LICENSE(M,g)) » FAITH » (LICENSE(M,g))

If context-free markedness (*M) is ranked over FAITH as in the constraint hierarchy (60), the occurrence of marked phonological structure (M) is banned across the board, regardless of grammatical category. Undominated LICENSE(M,g) has the effect that M is excluded from the unmarked category, but the fact that *M dominates general faithfulness will not allow M to surface in other situations either.

A third conceivable situation is represented by the MIM Schema proper, repeated in (61):

(61) The Marked in the Marked Schema

LICENSE(M,g) » FAITH » *M
To summarize, the MIM Schema and the associated factorial typology make the right predictions regarding the range of phonological structures that occur, under relatively similar conditions, in grammatical categories on a markedness scale. The following range of phenomena is predicted:

(62) Patterns predicted by the factorial typology of the MIM schema

(a) Marked in the Marked (M in \( g \), but not in the unmarked category)

(b) Full contrast (M both inside and outside \( g \))

(c) Lack of variation (M prohibited, irrespective of category)

What we do not see are situations where marked structure M occurs solely in the unmarked counterpart of \( g \). For example, we do not expect, under general similarity of phonological factors, to see a language where the Singular can sponsor marked material M that the Plural does not. It is at this point that the benefit of assuming Optimality Theory as the theoretical framework for analyzing MIM effects becomes apparent. The grammars that can be constructed on the basis of the three constraints (*M, FAITH and LICENSE(M,\( g \))) make the right typological predictions, thus justifying the line of analysis (see Chapter 5 §3 for an illustration of the factorial typology on the category of Number in Romance). In contrast, a rule-based approach does not yield this result in the same unitary fashion as factorial typology, which is intrinsic to Optimality Theory. Furthermore, optimality-theoretic analyses such as the ones proposed in this dissertation for
instances of MIM illustrate the principle labeled ‘homogeneity of target/heterogeneity of process’ (McCarthy 2002). According to this principle, there is a variety of processes that may occur in order to meet the requirements of a single output target, as expressed by a markedness constraint. The way in which the markedness constraint is satisfied hinges upon the ranking of faithfulness constraints and the structural conditions in the output under evaluation.

Specifically, configurations in which marked phonological material M occurs in outputs inflected for a marked grammatical category can emerge via diverse processes. For example, they can be created by foot construction processes (uneven trochees in the Old Saxon Oblique case, Chapter 4) or by faithful parsing of underlying segmental material (intervocalic voiceless stops in the Mayak Passive Voice, Chapter 6). The outcome of such processes is nevertheless unitary in that they yield ‘marked in the marked’ output forms. The success of the optimality-theoretic MIM Schema approach to such diverse cases stems exactly from the ability of OT tools to handle a variety of patterns that can be subsumed to one general property (‘marked in the marked’). In contrast, a rule-based approach would require a different rule apparatus for each situation and would be unable to capture the unifying factor behind the MIM property.

6. **Summary**

In this chapter I introduced the theoretical apparatus employed in the dissertation to investigate the phonological correlate of grammatical markedness. In particular, I discussed aspects of Optimality Theory, the theoretical framework assumed in
this work, that have to do with the functional grounding of constraints. This was necessary in light of the fact that the claim defended in the dissertation rests on performance-related phenomena.

Two approaches to licensing of phonological material in prominent positions were discussed, Positional Faithfulness and Positional Markedness. As for the specific mechanism responsible for the occurrence, other things equal, of marked phonological structure in marked grammatical categories, I proposed a positional markedness schema labeled ‘Marked in the Marked (MIM)’. As part of the schema, I introduced a family of functionally grounded positive licensing constraints LICENSE(M,G). The predictions of the MIM Schema were laid out by discussing the factorial typology associated with it.