

## Article

# Relativized Prosodic Domains: A Late-Insertion Account of German Plurals

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**Abstract:** In late-insertion, realizational models of morphology such as *Distributed Morphology* (DM), the insertion of Vocabulary Items (VIs) is conditioned by cyclic operations in the syntax. This paper explores whether an isomorphic relationship can be established between cyclic operations such as *phases* and prosodic domains. In the spirit of D'Alessandro and Scheer's (2015) proposal of a *Modular Phase Impenetrability Condition* (MPIC), we strive to provide an analysis in which prosodic boundaries in even smaller, word-level-like syntactic structures—the 'lexical domain'—can be identified solely within the syntax. We propose a DM-account for the distribution of nominal plural exponency in German, which reveals a dominant trend for a trochaic-foot structure for all but -s-plural exponents (Wiese 2001, 2009). Inspired by Gouskova's (2019) and Svenonius' (2016) work concerning the prosody–morphology interface, we argue that the index of a Prosodic Word  $\omega$  in non-s-plurals is associated with a specific feature configuration. We propose that only a  $n[+pl(ural)]$  configuration, in which the nominalizing head  $n$  hosts the SynSem-feature NUM(ber)[+pl(ural)], rather than a *general* cyclic categorizing phase head such as  $n$ , indexes a Prosodic Word  $\omega$  for nominal plural exponents in (Standard) German. Based on this empirical evidence from German plural exponency, we argue that (i) prosodic boundaries can be established directly by syntactic structures, (ii) these prosodic boundaries condition VI insertion during the initial stages of Spell-Out, and (iii) prosodic domains are based on individual languages' syntactic structures and feature configurations, and are thus *relativized* and language-specific in nature.



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## 1. Introduction

Theoretical explorations and analyses supporting the cyclic derivational properties of linguistic structure are a long-standing hallmark of the generative research program in both syntax and phonology, and go back at least to Chomsky and Halle's (1968) proposal of bracket erasure. Although the notions of cyclicity and the restriction of operations to occur within generalized local domains are quite commonplace now (see, e.g., Newell (2008, 2017, 2021) for an overview of this position), the debate continues to persist with respect to the shape of these aforementioned 'local domains' (Abels 2012; Bobaljik and Wurmbrand 2013; Gallego 2012). Since Chomsky (2001), units known as *phases* are generally considered to mark cyclic derivational material that has been fully interpreted, and which is no longer available for further syntactic computation (at higher and/or later levels of the cycle); this restriction is known as the PHASE IMPENETRABILITY CONDITION (PIC).

We adopt a non-lexicalist, late-insertion approach to morphology, *Distributed Morphology* (DM; Marantz 1997); "late-insertion" approaches presume that syntax operates without phonological content<sup>1</sup>, which becomes available only at Spell-Out, when morphosyntactic



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features are mapped onto the Phonological Form (PF) through the insertion of Vocabulary Items (VIs). DM thus places the responsibility of determining morpho-phonological patterns on (i) syntactic structures and (ii) a limited number of requisite post-syntactic operations at PF that condition exponency, i.e., phonological realization of morphosyntactic features through the operation of Vocabulary Insertion. Although locality as established by phases has been used extensively in the DM-literature to delimit and restrict Vocabulary Insertion, the relationship between the formation of and interaction between syntactic and *prosodic* domains is heavily under-researched.<sup>2</sup>

In this article, we explore the nature of cyclic computation with respect to determining the realization of exponency tied to prosodic conditioning from a late-insertion model. More specifically, we investigate the properties of plural allomorphy in (Standard) German, which ranges from various plural suffixes, to stem-umlauts, and a combination thereof. In this paper, we focus on the fact that the formation of all plural (suffix) exponents, except for the -s-plural, is conditioned by a prosodic requirement (Salmons 2018; Smith 2020; Wegener 1999; Wiese 2001, 2009). The broadest generalization that can encompass the various plural exponents of German nominals can be formulated as follows (Salmons 2018): under most circumstances, non-s-plurals in German nominals adhere to a word-final, syllabic trochaic prosodic pattern (as in (1a)). In other words, nominal plurals have a tendency to end in a right-aligned, syllabic trochaic foot, in which the penultimate syllable is stressed and the final syllable is unstressed (these trochaic feet are marked as [**syllable1**.syllable2] in the examples below). As indicated above, -s-plurals do not fall under this prosodic requirement (as in (1b)), although they might inadvertently also show a word-final trochaic pattern, as in the last two -s-examples, ‘Opas’ and ‘Kinos’:

- (1) German nominal plural data (in orthographic form); relevant trochaic feet are indicated in square brackets in *a*:
  - a. Trochaic Plurals: [**Ver**.b+en] ‘verbs’; [**Wör**.t+er] ‘words’; [**No**.men+Ø] ‘nouns’; Sub.[**jek**.t+e] ‘subjects’;
  - b. Plurals in -s: **Park**+s; ‘parks’; **Schal**+s ‘scarves’; **O**.pa+s ‘grandfathers’; **Ki**.no+s ‘cinemas’.

Factoring in the prosodic requirement in the exponency of (Standard) German nominal plurals presents an interesting theoretical challenge, as it forces us to test whether or not the local (cyclic) domains that demarcate these prosodic boundaries are identical with those that determine the insertion of Vocabulary Items (VIs). Can some version of *phases*—here meaning cyclic units derived from syntactic computation—be used to model German plural exponency? More explicitly, is there a unified structural way to capture the morphophonological properties of German plurals? How and when are prosodic domains determined? The generally accepted *modus operandi* in late-insertion models such as *Distributed Morphology* (DM; Marantz 1997) advocates for a ‘multiple step’ process (i.e., the ‘road to PF’, as suggested by Idsardi and Raimy (2013)) in which Vocabulary Insertion *precedes* prosodic requirements (Samuels 2011; Scheer 2010, 2011, 2012). Thus, the German data in (1) present an intriguing puzzle, since they suggest that prosody conditions the realization of (irregular) plural exponents. Moreover, the -s-plural exponent is not tied to prosodic conditioning, suggesting that the syntactic and prosodic boundaries differ with respect to the full range of productive plural exponents in German.

In our analysis of German plurals explicated below, we advance the proposal that individual languages can establish unique cyclic cut-off points (these could also be called *phases*) that determine prosodic conditioning and Vocabulary Insertion. Although we regard cyclicity to be a universal trait of human language, we propose that these cyclic domains are *relativized*, i.e., that they vary from language to language. Based on D’Alessandro and Scheer’s (2015) proposal of a *Modular PIC* (MPIC), we strive to provide an analysis where prosodic boundaries can be based on and identified directly in the syntactic structure. According to the MPIC, *iff* a prosodic boundary is established on morphosyntactic grounds,

it is available to be used during the process of Vocabulary Insertion, where morphosyntax interfaces with phonology.

Loosely inspired by previous proposals by Gouskova (2019) and Svenonius (2016) on the prosody–morphology interface, we propose—in a nutshell—that relativized cyclic domains are determined in (Standard) German by the SynSem-feature<sup>3</sup> NUM(ber) [+pl(ural)] in a particular node position, namely *n*. We argue that this specific feature configuration of *n*[+pl(ural)] generates a Prosodic Word diacritic  $\omega$ , which delimits the formation of Prosodic Words at Spell-Out. As such, our findings suggest that *phases*, headed by cyclic, categorizing heads such as *n* and *v*<sup>4</sup> are inefficient in establishing prosodic boundaries in German; instead, we argue for phases that are *relativized*, i.e., that phases are not based on the status of a cyclic head, but rather are based on individual languages’ syntactic structures and feature configurations.

The structure of this article is as follows: In Section 2 we provide a detailed overview of the structure and allomorphy associated with German nominal plurals. Here, we focus on the prosodic conditioning of plural exponents in German, highlighting the two categories of (i) prosodically bound plural allomorphs, and (ii) the non-prosodically bound -s-plural exponent. We briefly juxtapose nominal plural examples with nominal singulars, showing that the same prosodic requirements are not a condition in the formation of the latter. Building upon the underlying structure of German plurals introduced in the previous section, in Section 3 we flesh out our account of feature-based, relativized cyclic domains along the lines of Gouskova (2019) to capture both (i) prosodically bound plural exponents, and (ii) the non-prosodically bound -s-plural exponent in (Standard) German. We conclude this paper in Section 4.

## 2. German Nominal Plurals: An Overview

In this section, we provide a succinct overview of the general structural and prosodic properties associated with German nominal plurals, based largely on previous work by Wiese (2009). Although Standard German is the primary empirical focus of our analysis, we compare these data occasionally with other languages (such as English), as well as non-Standard German varieties, to illustrate key differences. As alluded to above, we adopt a non-lexicalist, late-insertion approach to morphology, *Distributed Morphology* (DM; Marantz 1997), which tasks syntactic structures with conditioning allomorphic distributions, while limiting the number of post-syntactic operations at the Phonological Form (PF).

The realization of nominal plurals in German falls into two prosodically based categories. On the one hand, some nouns in Standard German show the plural exponent -s (as in (2)), which does not require a specific prosodic context at PF. (Please note that **stressed syllables** are indicated with the stress marker ' in the following examples.) This -s plural exponent frequently occurs with roots of foreign origin and roots that end in a full vowel (Durrell 2011, p. 20):

- (2) No prosodic requirement on “low-frequency default” plural allomorph -s:
  - a. 'Park+s ‘parks’
  - b. 'Schal+s ‘scarves’
  - c. 'Auto+s ‘cars’

Most German nouns, on the other hand, form their plurals by adding one of the following exponents in (3):

- (3) Irregular plural exponents in German: -(e)n, -er, -e, -Ø

Unlike the -s plural exponent in (2), all of the irregular exponents in (3) follow a prosodic trend at PF: they show a strong tendency to end in a syllabic trochee, i.e., a foot composed of a stressed syllable (') followed by an unstressed syllable, whereby the right edge of the foot is aligned with the right edge of the word, as shown in Table 1 (Salmons 2018; Smith 2020; Wegener 1999; Wiese 2001, 2009). Here, the examples show that, independent of the specific plural exponent, and independent of the prosodic structure of the paradigmatically related

nominal singular form at PF, the nominal plural exponents end in a word-final trochee.<sup>5</sup> As will be discussed in Section 3.2.3 below, the choice *between* the different *irregular* plural allomorphs—e.g., whether *-(e)n*, *-er*, *-e* or *-Ø* is used as the plural suffix—is in part tied to the gender feature of the root; first, we will focus on the prosodic shape of the resulting plural nominals, before we account for the choice between the different irregular plural exponents below. The examples in Table 1 organize the plural forms in two columns, those with singular forms ending in a trochaic pattern (left column), and singular forms not ending in a trochaic pattern but instead ending in a final stressed syllable (right column). The singular form and the plural suffix are separated by the “+” morpheme boundary.

**Table 1.** Overview of German nominal plural exponency (in orthographic form) for all plural exponents except *-s*. All examples show nominal plural with a word-final trochee (marked as [syllable1.syllable2], indicating the prosodic form: (...)[ $\sigma$   $\sigma$ ]#), independent of the corresponding nominal singular form and the specific plural exponent used.

Singular: (...)[ $\sigma$ $\sigma$ ]# Plural: (...)[ $\sigma$ $\sigma$ ]#	Singular: (...)[ $\sigma$ ]# Plural: (...)[ $\sigma$ $\sigma$ ]#
[ <b>Tas</b> .se+n] ‘cups’	[ <b>Frau</b> .+en] ‘women’
[ <b>Win</b> .del+n] ‘diapers’	[ <b>Stif</b> .t+e] ‘pens’
[ <b>Wä</b> .gen+Ø] ‘cars’	[ <b>Kin</b> .d+er] ‘children’
Vio[ <b>li</b> .ne+n] ‘violins’	Bäcke[ <b>rei</b> .+en] ‘bakeries’
Apo[ <b>the</b> .ke+n] ‘pharmacies’	Pro[ <b>ban</b> .d+en] ‘subjects’
Com[ <b>pu</b> .ter+Ø] ‘computers’	Dia[ <b>gram</b> .m+e] ‘diagrams’

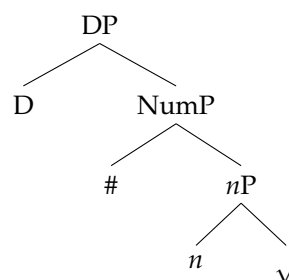
Table 1 also indicates that nominal singulars in German do not show any prosodic conditioning or requirement. Specifically, while some singular forms in German are inadvertently trochaic (4), many singular forms are monosyllabic, such as those found in (5).<sup>6</sup>

- (4) Trochaic singular German nouns  
(in orthographic form; trochees marked as [syllable1.syllable2]):
- [**Tas**.se] ‘cup’
  - [**Win**.del] ‘diaper’
  - [**Wa**.gen] ‘car’
- (5) Monosyllabic singular German nouns:
- Frau** ‘woman’
  - Stift** ‘pen’
  - Kind** ‘child’

Assuming a late-insertion model of morphology as is the case in *Distributed Morphology*, we assume that NUM(ber) is realized as a projection that dominates the categorizing head *n*. Although this component of the structure of ‘nouns’ is shared cross-linguistically, there is room for necessary parametric variation. We can illustrate this following proposals by Acquaviva (2008), Alexiadou (2011), Barrie (2011), and Wiltschko (2008) for English and German plurals.

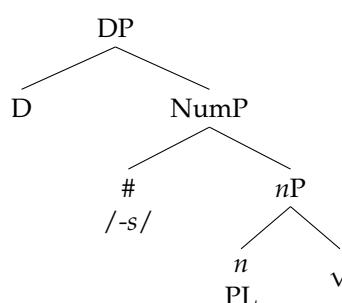
First, the *-s* plural exponent in both German and English is analyzed as an exponent of NUM(ber), which is postulated as a separate projection between *n*P and DP. This part of the syntax of nominals corresponds to a relatively canonical representation of plurality, especially for English (e.g., Wiltschko 2008, cited by Barrie 2011, p. 140). This is represented structurally in (6) and suffices for the analysis of productive English plural exponency.

## (6) Tree structure of English nominal plurals:



Although German and English share the *-s* plural exponent, the multiple exponents of German plural allomorphs have been proposed to reflect *two* different positions in the hierarchical structure of nouns (Acquaviva 2008; Alexiadou 2011; Barrie 2011). In addition to analyzing the regular *-s* plural exponent as an exponent of NUM(ber), we follow Barrie (2011) and Acquaviva (2008) in arguing that the other German plural exponents are analyzed as exponents of *n*. This analysis of German plural exponency is represented in the tree structure in (7) and further motivated below. This structure is taken from Barrie (2011, p. 141), who follows Acquaviva (2008).

## (7) Tree structure of German nominal plurals:



Importantly, the syntactic representation of German nominal plural in (7) shows a second syntactic head that carries [+pl(ural)] features: *n* (according to Barrie 2011). This [+pl] feature on *n* correspond to non-*s*-, *irregular* plural allomorph exponents. Barrie (2011, p. 141) provides a strong argument in support of two distinct syntactic nodes for nominal plurals in German: In particular, nominal compounds in German do not permit the first nominal element to contain a suffix exponent that corresponds to an *-s* plural exponent, e.g., *\*Auto-s-händler* ('car\*[PL] salesperson'); yet suffix exponents that corresponds to *irregular* plural exponents are allowed to appear as the first element in nominal compounds in German, e.g., *Lampe-n-geschäft* ('lamp[PL] store')<sup>7</sup> (see also, e.g., Clahsen 1999, p. 1009).

In addition, non-*s*-plural exponents found in German compounds are best understood as realizations of the *n* head rather than [NUM]. Note, for instance, that in Standard German, the inflectional exponents are not always interpretable: certain compounds, such as *Sonne-n-schein* ('sun[PL] shine') or *Kind-er-wagen* ('child[PL] stroller'), require exponents of the first nominal element to correspond to irregular plural forms; yet, these plural exponents are not interpretable (there is only *one* sun; the word for 'stroller' is not typically interpreted as a stroller for *multiple* children). In other compound forms, exponents corresponding to the genitive singular form of the first nominal in the compound might be used, as in *Freund-es-kreis* ('friend[GEN, SING] circle', 'circle of friends'). Thus, semantic interpretability of plurality is not a necessary precondition for the occurrence of such linking elements.<sup>8</sup> Barrie (2011), following an initial proposal by Harley (2009), advances an analysis of nominal compounds as being formed by bare *n*Ps. Overall, these insights support a differential analysis of regular and irregular nominal plural exponents in German. This analysis is



also in line with recent work arguing for the decompositionality of number (e.g., Harbour 2008; Kramer 2016). In particular, our analysis builds on Kramer's (2016) 'split-plurality' proposal of nominal plurals in Amharic that similarly provides evidence for the idea that [+pl] can be the realization of either the [NUM] or *n* head in some languages; we further assume in line with Kramer (2016) that gender is encapsulated on *n*. As our analysis also takes gender into account for determining irregular plural allomorph exponents (see Section 3.2.3), we show gender overtly in the tree representations in the remainder of this article for the sake of exposition.

To summarize, the distribution of the majority of non-s-plural exponents in German is subject to the requirement of being, at minimum, a disyllabic trochee at the rightmost edge of the nominal plural structure at PF. This requirement does not exist when the -s-exponent is realized. Determining exactly when and how prosodic requirements come into play is an unsettled issue. We argue that the two types of German plurals are due to the SynSem-feature NUM(ber)[+pl(ural)] being positioned in two different syntactic positions. In the following sections, we propose that only a *n*[+pl] configuration, in which the nominalizing head *n* hosts the SynSem-feature NUM(ber)[+pl], indexes a Prosodic Word  $\omega$  for nominal plural exponents in (Standard) German. With the establishment of a prosodic unit for these types of plural allomorphs, we further propose that there are *two* systematically ordered stages of VI (Vocabulary Item) insertion when allomorphs are prosodically conditioned, as in the case of irregular plural exponents in Standard German nominals. Below, we provide a detailed, step-by-step account of this proposal. In broad strokes, our analysis suggests that first, given the appropriate syntactic structure and feature combination, a Prosodic Vocabulary Item (PVI) is inserted, providing a prosodic structure or 'template', yet without specifying segmental information; this effectively achieves a trochaic template at the right-word edge for certain nominal plural forms in German. Thus, for these plural forms, PVIs build the prosodic foundation upon which, in a second stage of VI, Segmental Vocabulary Items (SVIs) are inserted. Both stages of VI (PVI and SVI) are inserted based on matching features in the licensing syntactic configuration. In the subsequent section, and in line with the general appeal to reduce the number of VIs stored in the grammar, we flesh out this analysis.

### 3. Relativized Cyclic Boundaries

Our treatment of German plural allomorphy above has more general theoretical consequences beyond the descriptive adequacy of one language. In fact, these data speak to a more general architectural issue that late-insertion models such as DM face, which concerns the complex relationship among syntactic structure, exponency, and prosodic boundaries. These data require taking a closer look at the nature of the interface between prosodic boundaries and syntactic structures. Any treatment that intends to address and make progress on these issues, including ours, which we explicate below, must contend with the following questions:

- Q<sub>1</sub>: Can prosodic boundaries be established by syntactic structures?
- Q<sub>2</sub>: At what point during the multi-level 'road to PF' do prosodic considerations condition Vocabulary Insertion?

Although those working within the DM-framework have postulated that something akin to *phases* can condition prosodic boundaries (D'Alessandro and Scheer 2015; Samuels 2011), these aforementioned studies have focused almost exclusively on *sentential*-level stress patterns and their allomorphical reflexes. Therefore, although our current proposal takes these works into consideration due to the fact that we share similar views regarding the syntax-(morpho-)phonology interface, our contribution is unique, in that our focus is one of the first to raise this question in relation to the syntax of the 'lexical domain' (or *l-syntax* in the sense of Hale and Keyser (2002)). At the same time, our proposal addresses an ongoing debate in generalized approaches to the syntax-phonology interface: Although some accounts argue that syntax-phonology interface theories must be able to appeal to independent prosodic constituents (Bonet et al. 2019), other accounts appeal to some

notion of *phase* and render prosodic constituents superfluous (D'Alessandro and Scheer 2015); instead, they argue that phrasal phonological domains can be identified directly in the syntax.

In what follows, we sketch out a proposal which shows that prosodic boundaries can be established by syntactic structures ( $Q_1$ ), and that the initial stages of Spell-Out build on the prosodic boundaries established in the syntax, thus conditioning the insertion of VIs ( $Q_2$ ). Overall, our proposal supports a relativized notion of prosodic domains through the generation of a prosodic constituent, a Prosodic Word  $\omega$ , which is based on a specific syntactic structure and features occurring in particular nodes in German in this framework. The approach to the Prosodic Word diacritic  $\omega$  is inspired by Gouskova's (2019) work, who builds on Svenonius' (2016) approaches to prosodic conditioning. Concretely, we argue that different languages can establish different cut-off points in the course of a derivation, or *phases* to adopt familiar terminology for phrase-structural level phenomena, which serve the function of establishing locality domains for computation. In this system, a particular SynSem-feature in a particular syntactic configuration, or perhaps a local set of SynSem-features that have undergone Morphological Merger (Marantz 1988), is identified as a *phase*. For German, we demonstrate that the feature configuration  $n[+pl]$  fulfills this role.

Building on recent proposals in the literature focusing on the notion of 'split plurality' (Barrie 2011; Kramer 2016; Wiltschko 2008) introduced in the previous section, we propose that the  $[+pl]$  features of regular and irregular plural nouns are situated on different heads of the syntactic configuration. Building on the mechanisms provided in work by Gouskova (2019) and Svenonius (2016), the differences in the resulting syntactic constituents then lead to different effects at the syntax-prosody interface.

### 3.1. Different Flavors of $n$

First, we turn our attention to the prosodically bound, irregular nominal plural exponents  $-(e)n$ ,  $-er$ ,  $-e$ ,  $-\emptyset$  in (Standard) German. The challenge here is to establish where prosodic boundaries intersect with syntax, and most importantly, what element(s) in the syntax are responsible for establishing prosodic boundaries. To achieve this, we adapt another existing proposal, one originally introduced by Folli and Harley (2004). In their work on resultatives in English and Italian, Folli and Harley (2004) suggested that the phase head  $v$  exhibits different 'flavors'. This original suggestion has carried over to treatments of allomorphic variation in connection with Voice-alternations in layering approaches such as DM (see Alexiadou et al. (2015) for an overview). We acknowledge that categorizing heads can be of different types; however, we extend this to the phonology-syntax interface, as well as the syntax-semantics interface. As in Alexiadou's (2011) early work on split plurality, we assume that  $n$  combines with specific roots; we propose two types of  $n$ , each of which combines with specific roots. Our proposal is summarized in (8) and further fleshed out below.

(8) The two flavors of  $n$  in Standard German nouns:

- a.  $n_{GRM}$ : selects roots which are part of or resemble the native stratum.
- b.  $n$ : default  $n$  which selects all other roots, i.e., roots which are *not* part of or do *not* resemble the native stratum, or roots which end in syllables with full vowels.

We propose that the  $[+pl]$ -feature associated with plural exponents in Standard German instantiates two different flavors of  $n$ . Extant research has established that the  $-s$ -plural is both a default exponent<sup>9</sup> and a minority allomorph in Standard German, which occurs predominantly with foreign words and words whose last vowel is a full (non-schwa) vowel (Durrell 2011, p. 20). Adult native speakers of German generalize all plural exponents to nonce-items (Köpcke 1988), yet children acquiring German as their first language have been shown to overuse the  $-s$ -plural (Sonnenstuhl et al. 1999, p. 214). This has led to the proposal by some linguists that the  $-s$ -plural is the "default" or "minority default" plural allomorph in Standard German (Sonnenstuhl et al. 1999, p. 213; Wiese 1996, p. 138).

The non-s-plural exponents,  $-(e)n$ ,  $-er$ ,  $-e$ ,  $-\emptyset$ , referred to as *irregular plurals*, on the other hand, tend to occur predominantly on the native stratum of nominalized German roots, i.e., non-foreign and nativized roots. Making use of these phonological and historical differences in the nominal roots, and how this determines or correlates with plural allomorph selection, we propose that Standard German espouses *two* different kind of *ns* as nominalizers/categorizers of different types of nominal roots, as shown in (8) above: (a)  $n_{GRM}$  and (b) a regular/default  $n$ , each of which combines with specific roots only. Descriptively speaking,  $n_{GRM}$  selects the roots which are part of or resemble the native stratum; they frequently have reduced vowels (*schwallables*) in the word-final syllable in the corresponding singular (and plural) forms at PF, e.g., [ $'wag.ən$ ] 'car' (see Itô and Mester (1999) for the proposal of stratification and sublexica). The regular  $n$  is treated as the default or 'elsewhere'  $n$ , which selects all other roots, i.e., roots that are *not* part of or do *not* resemble the native stratum, as well as morphologically derived forms, such as clippings (e.g., *Uni* for *University* 'university', or *Benni* for *Benjamin* 'Benjamin'). These roots differ from native ones in that they are more likely to show full vowels in the last vowel-position of these singular (and plural) forms at PF, e.g., 'Auto+s' 'car+s'.

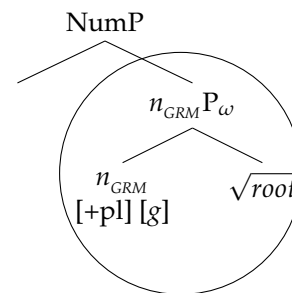
Descriptively speaking, as done above, different types of German numeral plural exponents could be tied to phonological information in the root, such as full versus reduced vowels in the final syllable, or strata-type information included with roots. However, it is also conceivable that co-occurrences or correlations between the types of plural suffix exponents and phonological details of the roots only surface at the last stage of the computation, at PF. It is beyond the scope of this paper to determine *why* the two different flavors of  $n$  select different types of roots. Instead, we hope to have motivated this basic mechanism in our analysis: different  $n$ 's categorize different roots, thus leading to different syntactic configurations, and eventually, different (types of) VIs being inserted 'on the road to PF'. We leave it for future research to determine which principles and selection procedures are employed by the different flavors of  $n$  to select the different types of roots.

### 3.2. Prosodically Bound, Irregular Plurals

Returning our attention now to the irregular plural exponents, the tree configuration in (9) is an expansion of (7) and represents number for the irregular plural exponents in (Standard) German. We assume with Kramer (2016) that gender is encapsulated on  $n$ ; as gender will be relevant in our analysis (see Section 3.2.3), gender is shown here overtly (as  $g$ ) for the sake of exposition and should not be misunderstood as a separate, unique projection. In our analysis, these irregular plural exponents obtain a unique syntactic configuration, circled in the tree in (9). We argue that it is precisely this unique syntactic and featural configuration ( $nP$  with  $n[+pl]$ <sup>10</sup>) which now establishes a prosodic boundary, a cyclic domain, that is relevant for determining the prosodic shape of most (i.e., irregular) nominal plural exponents in Standard German.<sup>11</sup> Specifically, we propose that only when the feature value  $[+pl]$  occurs on the node  $n$ , a Prosodic Word diacritic  $\omega$  is generated; this diacritic indexes a prosodic domain, namely a Prosodic Word. The premise of this analysis is loosely based on work by Gouskova (2019) and Svenonius (2016), who suggest that unique syntactic contexts conjure up Prosodic Word domains, marked by the diacritic  $\omega$ . Crucially, we analyze this as an instance of an *inherited cyclic boundary* (see, e.g., Newell (2008, 2017) for related arguments) at the level of exponents or smaller, word-level-like syntactic structures, rather than larger syntactic structures.



## (9) Proposed structure for prosodically bound, irregular plural exponents in German:



## 3.2.1. Varieties with Obscured Trochee Tendencies

Please note that while  $n_{GRM}$  and the Prosodic Word  $\omega$  both occur with irregular plurals in German, we argue that they are each separate, independent, and necessary pieces of the account: our analysis includes both  $n_{GRM}$  and the Prosodic Word  $\omega$  to account for some German varieties, such as varieties spoken in Nuremberg, Northern Bavaria (Wiese 2009, p. 167), where irregular plural forms do not show a strict trochee requirement (see Table 2 and Wiese 2009; Wiesinger 1990).<sup>12</sup> That is, such varieties frequently do not show a schwa in  $-n$  and  $-e$  plural exponents when phonotactically permissible, as shown in Table 2.<sup>13</sup>

**Table 2.** Standard German with trochee requirement versus optional schwa in colloquial German varieties (in orthographic form). Please note that in both varieties, the second example obtains an umlaut in the plural. (Trochees marked as [syllable1.syllable2].)

Standard German: Trochaic	Colloquial German Varieties: Monosyllabic Option
['Frau.+en] 'women' ['Hän.d+e] 'hands'	'Frau+n 'women' 'Händ 'hands'

In colloquial German varieties or registers, especially in the South, the schwa that appears in the irregular plural suffix exponents is optional; it alternates with *nothing*. (The general optionality of word-final schwa in German is discussed in Wiese (2009, p. 144ff.); see also Smith (2020) and references therein for the stance that the trochaic tendencies in some varieties have been obscured by other phonological developments, such as the *Laws of Finals*.) In sum, the Nuremberg variety and (southern) colloquial styles forgo the prosodic requirement in irregular plural exponents. As in Standard German, irregular plural allomorphs ( $-(e)n$ ,  $-er$ ,  $-e$ ,  $-\emptyset$ ) in such varieties and styles appear to be used for native and native-appearing roots; in our account, such roots are categorized by  $n_{GRM}$ , and by the [+pl] feature being situated on an  $n$ , namely  $n_{GRM}$ —rather than on NUM, as is the case for the *regular* nominal plural exponent  $-s$  (further discussed in Section 3.3 below). Most importantly, while the basic Vocabulary Items (VIs) for irregular plurals, referred to as “Segmental VIs” (SVIs) below, would be identical in Standard German and varieties where the trochaic tendencies have been reduced or obscured, the latter forgo the need for a Prosodic Word diacritic  $\omega$  in syntactic configurations such as in (9). Formally, we argue that varieties/styles in which the trochee requirement does not appear to be surface-true have undergone *impoverishment* (Bonet 1991; Embick 2010). Such impoverishment rules delete features in a particular context before VI insertion. Using long-standing machinery in the framework of DM, we adapt the notion of impoverishment here and apply it to the  $\omega$ -diacritic. Concretely, an impoverishment rule would delete  $\omega$  in this syntactic position when it occurs in particular sociolinguistic contexts, such as styles, registers, or dialects, that do not enforce the trochee requirement. Using impoverishment, our analysis uses the same core syntactic structure for all varieties of German discussed here, with the unique syntactic

and featural configuration ( $n_{GRM}P$  with  $n_{GRM}[+pl]$ ), which generates a  $\omega$ ; yet, especially in southern varieties, an impoverishment rule deletes  $\omega$ , which signals a Prosodic Word boundary. Without  $\omega$ , later VIs cannot make reference to the prosodic domain of Prosodic Words; specifically, the PVI proposed below in (11) will not be able to be inserted, thus the prosodic template will not apply in varieties where impoverishment rules delete  $\omega$ .

In short, our account suggests that some German varieties can maintain both irregular and regular plural suffix allomorphs, thus necessitating two flavors of  $n$ , while forgoing the prosodic requirement for the irregular plural exponents. Thus, while  $n_{GRM}$  and the Prosodic Word  $\omega$  both occur with irregular plurals in Standard German, we argue that they are each separate, independent, and necessary pieces of the analysis to account for some of the variation of (non-)prosodically determined irregular plural allomorphs we noted above; further research on dialects and varieties is warranted, especially with regard to the status of the  $-s$  suffix (see also Wiese 2009, p. 168, fn. 25) to further test the analysis developed here.

### 3.2.2. Prosodic Vocabulary Items (PVIs)

Now that we have established the two different flavors of  $n$  in our analysis of German (8), we continue to spell out the next steps of our analysis in a late-insertion model. In DM, features and feature configurations in a syntactic tree obtain their phonological content by process of inserting Vocabulary Items (VIs). The general format for VIs is shown in (10) and shows that SynSem-features in the syntactic tree correspond to particular phonological exponents that are inserted during Spell-Out, i.e., “on the road to PF”:

$$(10) \quad \text{General format for Vocabulary Items (VIs):}$$

$$\begin{array}{ccc} [\alpha\beta\gamma] & \longleftrightarrow & /X/ \\ \text{SynSem-features} & & \text{phonological exponents} \end{array}$$

The data from Standard German outlined in (1) in the Introduction showed that nominal plural exponency for irregulars is typically prosodically conditioned. We suggest that an appropriate method for analyzing prosodically conditioned exponency is to divide VI insertion into a *two*-step process on the road to PF, as alluded to above. Hitherto in the DM-literature, VI insertion was (predominantly) limited to segmental information on one side of the VI; we suggest that in some languages or language varieties, and for specific (morphosyntactic) aspects, the lexicalization of syntactic objects operates on a novel kind of VI, “Prosodic Vocabulary Items” (PVIs). We propose that PVIs are a special sub-type of VIs that provide the prosodic aspects of the phonological side of exponents. Only in a second step, in another dimension, do the classic VIs with *segmental* phonological exponents spring into action, here referred to as “Segmental VIs” (SVIs).

We thus propose that for prosodically conditioned exponents such as German nominal plurals, the list of VIs is headed by PVIs, which lay the foundation or first dimension of the phonological exponent of Vocabulary Insertion, namely the prosodic template. Crucially, this PVI-level is made possible by the syntactic and featural configuration ( $nP$  with  $n[+pl]$ ) that gives rise to a prosodic boundary and the Prosodic Word  $\omega$ . Vocabulary Insertion can now refer to a prosodic boundary, the Prosodic Word diacritic  $\omega$ , established within morphosyntax, and provide a specific prosodic template that refers to the Prosodic Word; again, we term VIs that provide segmentally empty but prosodically specified phonological information “Prosodic Vocabulary Items” (PVIs). Subsequent SVIs on the VI list constitute the second step of Vocabulary Insertion, which ensure that segmental phonological information will be added to, or on top of, the prosodic foundation provided by the PVIs in the first step. Below in (11), we propose the PVI for non- $s$ -plural exponents in Standard German, based on the prosodic generalization of a word-final trochee put forth in (Wiese 1996, 2001) and discussed above in Section 2.

$$(11) \quad \text{Prosodic Vocabulary Item (PVI):}$$

$$n_{GRM}[+pl]\omega \longleftrightarrow \omega[\dots F[\sigma\sigma]]$$

In brief, in the first step of VI, the PVI lays the foundation, a prosodic template, upon which, in a second step, SVIs can build and add segmental exponents of the plural suffix for specific feature combinations. SVIs are discussed in the following section.

### 3.2.3. Segmental Vocabulary Items (SVIs) and the Influence of Gender

Once the Prosodic Vocabulary Item (PVI) (11) is inserted and effectively establishes a trochaic template for irregular plural nominals, namely a word-final trochee, a second step of VI, what we term the “Segmental VIs (Vocabulary Items)”, adds segmental information into this prosodic template. The Segmental VIs are illustrated in (12) below, where the PVI from (11) is repeated for reference. The Prosodic and Segmental VIs are ordered; this order of the listed VIs is based on feature specificity, such that VIs that are specified for more features are ordered before VIs that are less specified (Embick 2010).

- (12) The second step of VI: *Segmental Vocabulary Items (SVIs)* for *n*, based predominantly on gender features. The first dimension PVI shines through (indicated in gray):

$$\begin{array}{lll} n_{GRM}[+p]_{\omega} & \longleftrightarrow & \omega[\dots F[\sigma\sigma]] \\ n_{GRM}[+fem] & \longleftrightarrow & /-n/ \\ n_{GRM}[-fem] & \longleftrightarrow & /-\emptyset/ \\ n_{GRM}[-fem, -masc] & \longleftrightarrow & /-r/ \end{array}$$

The specific gender features included in the SVIs in (12) are based on tentative agreements in the literature regarding how specific plural allomorphs can be tied to specific gender features. Although the list in (12) can by no means capture all nominal plurals in German, it represents the (differentially strong) tendencies for gender-based allomorphy selection among irregular plural exponents in German discussed in the literature. If other patterns can be established about which SynSem-features and perhaps other phonological features of the root interact with VIs and the specific exponents chosen for plural allomorphy, the basic paradigm in (12) could easily be updated. Further fine-tuning of the specific SynSem-features and phonological root-features that are associated with specific phonological exponents will not change the overall analysis presented here. Therefore, in accordance with Wiese (1996), we also assume that feminine plural nominals are typically associated with an *-n* exponent, which is realized at PF as *[-ən]* or *[-n]* depending on the prosodic context; masculine plural nominals are frequently realized as a zero-exponent ( $\emptyset$ ) or *-e* (i.e., *[-ə]*) (a provisional proposal in Wiese 1996, p. 138) at PF, again depending on the prosodic context. Finally, the most robust generalization for *-er* (*[-ər]*) seems to be that it occurs frequently with (monosyllabic) neuter plural nominals (Dykstra-Pruim 2003).<sup>14</sup> The proposed SVIs in (12) try to capture the core spirit of this distribution and do not claim to be without exceptions.

Applying (11) and (12) to two of our example irregular plural words above, we show below how the PVI and SVIs apply in the plural-formation of a disyllabic, trochaic root, such as [*Tasse*] ‘cup’ (in (13)), and in a monosyllabic root, such as in [*Frau*] ‘woman’ (in (14)), respectively. (Please note that syntactic configurations, including gender nodes and other functional features, are assumed to correspond to the tree in (9), although not explicitly visualized in a hierarchical tree structure in (13) and (14)). By process of Vocabulary Insertion, PVI is applied in both cases (assuming the relevant syntactic and featural combination specified below), i.e., a template with a word-final trochee in the plural exponents. Subsequent to PVI, gender features determine the insertion of the SVIs, i.e., the basic consonantal composition of the plural suffix. Once a Prosodic Word has been generated, the metrical computation of the word can unfold, including the composition of feet, syllables, and phonological processes such as allophony, that are based on these metrical structures. Thus, on the road to PF, the phonological information in the root and phonological information in the (P/S)VI is combined, triggering (i) the aforementioned prosodic template (through PVI), (ii) some segmental specifications about the plural suffix exponents (through SVIs), and (iii) a computation about whether the prosodic requirement of the word-final template, PVI, is met by the phonological content of the root and SVIs; we propose that this last step happens in the phonological component of grammar after

Spell-Out. (See below for a sketch of the ensuing phonological component; in (13) and (14), we mainly describe the main results achieved in phonology.) In our example of /'Tassə/ + /-n/ in (13), a word-final /ə+n/-sequence fulfills the PVI requirement. Yet, in our example of ['Frau] + /-n/ in (14), the prosodic requirement is achieved through the phonological process of default vowel epenthesis, the insertion of /ə/, in the word-final syllable (before the last consonant).<sup>15</sup> The last row in each of our example computations in (13) and (14) summarizes this final step.<sup>16</sup>

(13) Applying PVI and SVI to /'Tasse/ 'cup' + plural:

$$\begin{array}{ccc} \text{'Tasse/ 'cup' + plural} & & \\ n_{GRM}[+pl]_{\omega} & \longleftrightarrow & \omega[\dots_F[\sigma\sigma]] \\ n_{GRM}[+fem] & \longleftrightarrow & /-n/ \\ & & \text{'Tassə + n} \text{ (matches } \omega[\dots_F[\sigma\sigma]]) \end{array}$$

(14) Applying PVI and SVI to /'Frau/ 'woman' + plural:

$$\begin{array}{ccc} \text{'Frau/ 'woman' + plural} & & \\ n_{GRM}[+pl]_{\omega} & \longleftrightarrow & \omega[\dots_F[\sigma\sigma]] \\ n_{GRM}[+fem] & \longleftrightarrow & /-n/ \\ & & \text{'Frau + ən} \text{ (phonological /ə/-epenthesis} \\ & & \text{to match } \omega[\dots_F[\sigma\sigma]]) \end{array}$$

Note that we assume that both levels of vocabulary item insertion (PVI and SVI insertion) lead to plural exponents that are realized as *suffixes*, i.e., adjoined to the right of the root, rather than root-internally. To achieve a right-aligned trochee in plural forms, as specified by PVI's templatic requirement, we postulate that the /ə/-epenthesis is morpho-phonologically conditioned and will always occur *outside* the root. Thus, roots such as ['Helm] 'helmet' will insert the schwa word-finally (['Helm+ə] 'helmet+s') rather than root-internally (\*['Hel+ə+m] 'helmet+s'), although both would result in a trochaic plural form.<sup>17</sup>

We envision that the phonological schwa-epenthesis in our account could efficiently be captured in various phonological frameworks. In fact, questions at the interface of morpho-phonology are an active area of inquiry (see, for example, Inkelas 2014; Scheer 2010, 2011, 2012). For the sake of completeness, we briefly illustrate below how schwa-epenthesis in our account could be captured by a formalism akin to faithfulness to the prosodic template in the input in an OT- or Correspondence-type framework (Prince and Smolensky 2004). Here we provide the sketch of an OT-analytic account of phonological schwa-insertion in the following two tableaux (15) and (16), where we propose the following constraint ranking: IDENT-IO(Prosody) > DEP-IO(Root) > DEP-IO > ALIGN(PLURAL SUFFIX, R, PRWD, R).<sup>18</sup> As these tableaux show, the constraint requiring faithfulness to the prosodic shape in the input<sup>19</sup>—again, the prosodic shape is supplied through the PVI in our analysis—is highly ranked; this means that violations of DEP-IO through vowel epenthesis are preferred over violations of the prosodic shape in the input (IDENT-IO(Prosody) > DEP-IO), especially when segments are not inserted inside the root (DEP-IO(Root) > DEP-IO). Finally, a less highly-ranked Alignment-constraint (ALIGN(PLURAL SUFFIX, R, PRWD, R)) penalizes output candidates where the right edge of the plural suffix is not aligned with the right edge of the Prosodic Word, thus selecting candidate d. 'Frau.ən over candidate c. 'Frau.nə.

(15) Sketch of a possible OT analysis for phonological schwa-epenthesis in

['Frau + ən] 'women':

$\omega[\dots_F[\sigma\sigma]]$ /'Frau, -n/	IDENT-IO (Prosody)	DEP-IO (Root)	DEP-IO	ALIGN (PLSUFFIX,R,PRWD,R)
a. 'Fraun	*!			
b. 'Frau	*!			
c. 'Frau.nə			*	*!
d. 'Frau.ən			*	

- (16) Sketch of a possible OT analysis for phonological schwa-epenthesis in [**Helm**+ə] ‘helmet+s’:

$\omega$ [... F[‘ $\sigma\sigma$ ’]] /‘Helm/	IDENT-IO (Prosody)	DEP-IO (Root)	DEP-IO	ALIGN (PLSUFFIX,R,PRWD,R)
a. ‘Helm	*!			
☞ b. ‘Hel.mə			*	
c. ‘Hel.əm		*!	*	

Additional alternative phonological accounts of German nominal plural allomorphy could be explored, including derivational readjustment rules (Frampton 2009). Such a framework might be especially well-suited for accounting for both suffix allomorphy and umlaut changes, a type of multiple exponency, which we do not explore in detail in the current paper. An analysis along the lines of derivational readjustment rules was not pursued here since our analysis focuses on whether prosodic boundaries could be based on and identified directly in the syntactic structure, as argued for by D’Alessandro and Scheer’s (2015) MPIC (Modular PIC) proposal. According to the MPIC, once a prosodic boundary is established on morphosyntactic grounds—rather than inserted via a “t-juncture insertion” (Frampton 2009, p. 38) within phonology—it is available to be used during VI, where morphosyntax interfaces with phonology. Thus, we believe that we have introduced relatively small, innovative adjustments to current proposals in line with current DM-theorizing; specifically, we contend that we are progressing the notion of MPIC (D’Alessandro and Scheer 2015) through the generation of a prosodic domain—indexed by a  $\omega$ —within syntax (following Gouskova 2019 and Svenonius 2016); we further propose a division between Prosodic and Segmental VIs, where applicable, to account for prosodic template effects as discussed here. This concludes our overview and analysis of the trochaic requirement in irregular plural allomorphs in (Standard) German. We will now address how our analysis accounts for the regular plural exponent -s, which is not prosodically bound.

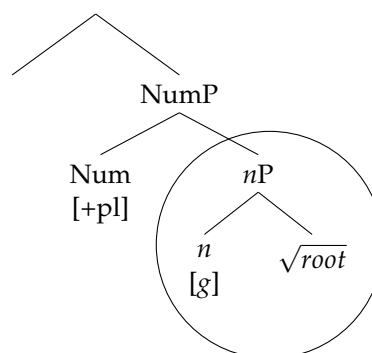
### 3.3. Non-Prosodically Bound, Regular Plurals

We now turn our attention to the *regular* nominal plural exponent -s, which, as indicated above, has been analyzed as the “default” plural exponent in German (Clahsen 1999, p. 995; Marcus et al. 1995; Wiese 1996, p. 138) or, more specifically, the “low-frequency default” plural exponent (Sonnenstuhl et al. 1999, p. 213). Unlike in our analysis for prosodically bound, *irregular* plural exponents in (9), we argue that the [+pl] feature of the *regular* plural exponent -s is situated on NUM rather than on the *n* head.<sup>20</sup> Again, we account for this by postulating different ‘flavors’ of *n*’s. Only  $n_{\text{GRM}}$  categorizing heads, which select for native, Germanic-based roots, allow [+pl] features on *n*. By default, all other roots—i.e., roots that are non-Germanic, do not resemble the native stratum, or end in syllables with full vowels—will be categorized by *n* (see (8), and Section 3.1, in general). Given this distinct set of *ns*, we propose that [+pl] features can only be in the *specialized*  $n_{\text{GRM}}$ , while the ‘regular’ *n* node blocks [+pl] features; instead, in tree configurations with *n*, the [+pl] feature occurs on NUM.

The tree configuration in (17) represents number for the regular plural exponent -s. Again, the [+pl] feature occurs on NUM rather than on *n*. Crucially, since there is no  $n[+pl]$ —or specifically, no  $n_{\text{GRM}}[+pl]$ —configuration in this syntactic construction, no Prosodic Word  $\omega$  is generated, and no PVI with a reference to a Prosodic Word can be inserted.



(17) Underlying structure for plural -s exponents:



Merely one (Segmental) Vocabulary Item is postulated in (18) below to capture the uniform exponent behavior of -s-plurals in German. Note that the -s-plural can occur with *any* gender in German. Thus, this provides corroborating evidence for the analysis that gender is the relevant contributing feature for the SVI of the irregular plural exponents discussed in (12) above. In our analysis, the SVIs for irregular plurals in (12) are not selected during Vocabulary Insertion for regular plurals since the SVIs in (12) for irregular plural allomorphs are specific to (gender features on)  $n_{GRM}$ . As detailed above, we propose that the syntactic configuration for regular plurals contains  $n$  rather than  $n_{GRM}$ , thus blocking insertion of SVIs for irregular plurals.

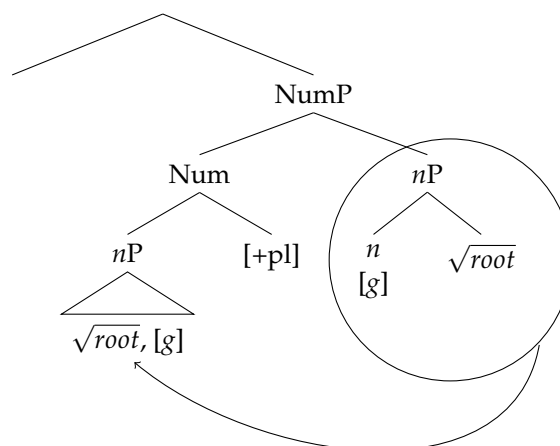
(18) Unary VI (an SVI) for NUM:

$$\text{NUM}[+pl] \longleftrightarrow /-s/$$

Unlike the tree structure for prosodically bound, irregular plural exponents in (9), the tree structure for -s-plural exponents in (17) does not establish a prosodic boundary and a Prosodic Word  $\omega$ . This state of affairs is in line with our call for relativized prosodic domains; again, we contend that the projection  $nP$  should not ubiquitously be identified as a cyclic domain/phase-based prosodic boundary exclusively on structural conditions. Crucially, this cyclic status is only granted to  $nP$  under the condition that it hosts the [+pl] feature, as in (9) above. Here, in (17), this combination of structural and featural aspects ( $nP$  with  $n[+pl]$ ) is not generated, thus no cyclic domain is identified. In sum, when  $n$  is empty, as in regular *s*-plurals illustrated in (17), or when  $n$  hosts the [-pl] feature for singular nouns,  $n$  does *not* establish a cyclic domain.

A modified version of the tree in (17) for regular -s-plural exponents is provided in (19), where we postulate a raising analysis. Raising of syntactic constituents is indicated with the arrow: the circled  $nP$  section of the tree is moved to Spec,NumP. This raising analysis is proposed under the assumption that the hierarchical tree structure reflects the sequential ordering of individual phonological exponents on “the road to PF” (Idsardi and Raimy 2013). Further analyses about how the syntactic hierarchy is turned into adjacencies, directed graphs, and phonological strings (e.g., Idsardi and Raimy 2013) could be explored in future work.

## (19) Structure for plural -s exponents with raising analysis:



Our proposal stands in contrast to the notion of explicitly tying the concept of phase domains directly to prosodic phrasing, as suggested by [Samuels \(2012\)](#) and others. As demonstrated throughout this article, the establishment of a prosodic phrase is not (always) isomorphic with traditionally accepted cyclic head/phase boundaries (i.e., categorizing heads such as *n* or *v*). In the case of German, the index of Prosodic Word  $\omega$  is associated specifically with *n*[+pl] in our analysis. It bears emphasizing once again that we are not claiming that some degree of isomorphism between prosodic boundaries and *phases* is impossible; rather, we show here that mismatches exist, casting doubt on any universal adherence to the required overlap of these derivational constructs (see [Weber \(2020\)](#) for similar arguments).

#### 4. Conclusions

The primary aim of this paper was two-fold: First, from an empirical standpoint, we sought to model prosodically conditional number allomorphy in German from a late insertion, DM-perspective. Second, from a more conceptual perspective, our concomitant goal was to investigate whether some notion of *phase* in the sense of [Chomsky \(2001\)](#) or [Embick \(2010\)](#) could be used in our analysis. Although cyclicity and its establishment of local domains had been called upon in previous literature to restrict and condition non-prosodically conditioned Vocabulary Insertion, it had been unclear whether these units (again, *phases*) are capable of simultaneously establishing both Vocabulary Insertion and prosodic boundaries. Following [D'Alessandro and Scheer's \(2015\)](#) proposal of a Modular PIC, we sought to account for prosodically conditioned German plural allomorphs by identifying relevant phonological domains directly in the syntax.

Our treatment of the distributive properties of German plural exponency argues that the local domains responsible for identifying prosodic boundaries for VI insertion are not universally isomorphic with cyclic heads ([Embick 2010, 2014, 2015](#)). Cross-linguistically, cyclic heads are generally held to be categorizing heads (e.g., *n* and *v*) in DM. In our account here, we make a unique theoretical claim that prosodic templates cannot be identified based solely on universal cyclic heads; rather, morphosyntactic features and syntactic feature configurations generate the Prosodic Word diacritic  $\omega$ , which delimits Prosodic Word formation at Spell-Out. In our analysis of Standard German nominal plural allomorphy, the Prosodic Word diacritic feature  $\omega$  is triggered only in specific structural configurations, i.e., *n*[+pl], where *n* is endowed with the [+pl]-feature. Thus, the Prosodic Word only conditions the insertion of Vocabulary Items (VIs) for a specific subset of German nominal exponents. We outlined an analysis according to which the general VI-process for such prosodically conditioned allomorphy proceeds in a two-step progression of (i) *Prosodic VI* (PVI) followed by (ii) *Segmental VI* (SVI).

Existing analyses that associate plural with  $n$  have discussed other predictions resulting out of this syntactic position of [+pl] (see, in particular [Kramer 2016](#)). Although it is beyond the scope of this article to discuss each piece of evidence [Kramer \(2016\)](#) brings to bear for the split-plurality analysis of Amharic, we would like to point out two potentially surprising facts: Unlike other languages with plural on  $n$ , Standard German does not exhibit pairs of regular and irregular plurals (such as [‘Tasse+n] ‘cup-s’ and \*[‘Tasse+s] ‘cup-s’), or double plurals such as \*[‘Tasse+n+s] ‘cup-s’). We explain the lack of such forms in Standard German through the use of different types of  $n$  in our analysis (see also Section 3.3): the regular  $n$ -node blocks [+pl] features; only the specialized  $n_{\text{GRM}}$  allows for [+pl] features to appear on  $n$  (i.e.,  $n_{\text{GRM}}$ ). Thus, the type of stem dictates which flavor of  $n$  selects for it and thus, which type of plural allomorph (regular vs. irregular) is selected during Vocabulary Insertion. Through this selection process, double realizations and pairs of regular and irregular plurals for the same root are effectively blocked in Standard German.

We leave it for future research to investigate whether other languages that have been argued to license plurality on  $n$  (see, e.g., [Acquaviva 2008](#); [Alexiadou 2011](#); [Kramer 2016](#)) might also index a prosodic domain at this node in the syntax through  $\omega$ .<sup>21</sup> It is conceivable that in other languages—rather than the specific  $n$ [+pl] configuration, which gives rise to the Prosodic Word  $\omega$  for irregular plurals in Standard German—other morphosyntactic feature bundles might introduce a Prosodic Word boundary  $\omega$ . That is to say, our analysis of Standard German plural allomorphs within the framework of the expanded DM-model proposed here *does* make the prediction that in other languages, the Prosodic Word boundary  $\omega$  *would* be generated in the syntax; however, there might be a variety of morphosyntactic feature bundles and thus a variety of morphosyntactic contexts besides nominal plural that might give rise to a prosodic boundary in different languages. In a related sense, future work should investigate how our proposal can be extended to other prosodic template effects, such as reduplication or truncation. We envision that, following the generation of a Prosodic Word  $\omega$  for a specific morphosyntactic feature (bundle), a PVI can be inserted; this PVI specifies which morphosyntactic feature (bundle) is realized as what kind of prosodic template, before segments are added through SVI insertion. It remains to be worked out whether or which specific morphosyntactic features would condition the generation of a Prosodic Word  $\omega$ , thus allowing for a PVI to be inserted, in other cases of prosodic template effects in morphophonology.

If our analysis is on the right track, it has potentially far-reaching consequences that require extensive testing with diverse sets of data; for example, see recent work by [Weber \(2020\)](#), who concludes that, although a sufficient amount of overlap exists between prosodic and syntactic boundaries, an isomorphic account between these domains is untenable to explain certain morphosyntactic and morphophonological properties of Blackfoot.<sup>22</sup> Furthermore, the flexibility in establishing prosodic domains cross-linguistically finds further support from [Schiering et al. \(2010\)](#), who conclude that the categorial distinction of Prosodic Word is a fluid notion that can vary cross-linguistically. On the surface, the approach developed here seems amenable to this line of thinking, although additional research is required to tease out essential details.

In conclusion, we have shown that prosodic boundaries can be established in the syntax through the indexing of a Prosodic Word feature  $\omega$  ([Gouskova 2019](#)), which allows for a different kind of VI—a Prosodic Vocabulary Item—to be inserted, thus accounting for prosodic conditioning of nominal plural allomorph exponents. Our survey of German plural exponency further reveals that a strict connection between *phases* and prosodic domains cannot be universally upheld. To reiterate, we do not abandon the importance of cyclicity *a priori* (see [Newell \(2008, 2017\)](#) for additional supporting arguments of the importance of cyclicity without being directly tied to the theoretical construct of *phases*).<sup>23</sup> This situation is expected to some extent, given the modular design of the Language Faculty in which ‘syntax’ and ‘phonology’ operate on different vocabularies and processes ([van Oostendorp et al. 2016](#)). Furthermore, the definition of which syntactic units constitute a *phase* versus those that do not remains the subject of debate and inquiry ([Bobaljik and](#)

Wurmbrand 2013; Newell 2017). Morphophonological outputs do not always align with *phases* in a ubiquitous manner, due likely to the primacy of semantic interface compatibility over phonological conditioning in determining and evaluating the well-formedness of representations. We argue here that local domains responsible for establishing prosodic boundaries at the word/1-syntax level are *relativized* and can vary from one language to another. In short, our adapted model of *Distributed Morphology* allows for language-specific prosodic boundaries to be established in the syntax, and can thus account for prosodically conditioned allomorphy, as illustrated here for Standard German.

**Author Contributions:** K.S.S. was the primary author of this manuscript and contributed to all aspects of its research and writing, including the literature review, the theoretical analysis, the drafting, and the writing of the article. M.T.P. contributed to the literature review, theoretical analysis, and the writing of this manuscript. All authors have read and agreed to the published version of the manuscript.

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**Conflicts of Interest:** The authors declare no conflict of interest.

## Notes

- <sup>1</sup> Only roots, the open class or “lexical” vocabulary, have underlying phonological representations and are not subject to late insertion of phonological material.
- <sup>2</sup> See works such as Scheer (2004), Shiobara (2009), Wagner (2010), Féry (2011), and Cheng and Downing (2021) as examples of research on the syntax-prosody interface that makes reference to some notion of *phases*.
- <sup>3</sup> In DM, SynSem-features are the widely accepted syntactico-semantic features, such as [past], [pl(ural)], [def(inite)], etc.
- <sup>4</sup> In DM, *n* and *v* are considered syntactic head nodes that function as “categorizers” of roots: they turn roots into ‘nouns’ and ‘verbs’, respectively (e.g., Marantz 1997).
- <sup>5</sup> The analysis of the word-final strong-weak syllable pattern in German nominal plurals as a trochaic foot is not uncontested (see Neef 1998; Trommer 2021). We leave it for future work to investigate how German plurals could be accounted for from a DM-perspective without a foot-template approach.
- <sup>6</sup> A potential minimal word requirement in German dialectal varieties is ignored here.
- <sup>7</sup> See the following paragraph and Meibauer et al. (2015) and references therein for further discussion about the status of these linking elements (*Fugenelemente* in German), and whether they are best analyzed as plural exponents in some or all cases.
- <sup>8</sup> For further discussion see Fuhrhop (1996), Fuhrhop and Kürschner (2015), and Meibauer et al. (2015), among others.
- <sup>9</sup> “I propose that this suffix [=the -s-plural marker] is a default plural marker, one that can be added on the final level of the lexicon, the word level” (Wiese 1996, p. 138).
- <sup>10</sup> Given the two flavors of *n* established above (see Section 3.1), this specific syntactic and featural configuration will only ever occur on  $n_{GRM}$  in our analysis of German; thus, the notation “ $n[+pl]$ ” throughout the paper is really short-hand for “ $n_{GRM}[+pl]$ ”.
- <sup>11</sup> Again, note that this combination of structural and featural aspects ( $nP$  with  $n[+pl]$ ) will only ever occur for  $n_{GRM}$ . Thus, in effect, the prosodic boundary that establishes the cyclic domain in our analysis appears only on this unique configuration of structural and featural aspects:  $n_{GRM}P$  with  $n[+pl]$ .
- <sup>12</sup> Importantly, such varieties exhibit both irregular and regular plural allomorphs. Although the status and extent of the -s-plural marker in the Northern Bavarian dialect is somewhat debated (Wiese 2009, p. 168), even this dialect uses -s-plurals for some lexical items that fit the description of a non-native strata (full final vowels, for example) (Kalau 1984). The plural allomorphy suffix selection in colloquial German varieties largely corresponds to Standard German for both regular and irregular plural exponents.
- <sup>13</sup> Please note that these data are based on the first author’s native speaker intuitions for varieties of (Standard) German spoken in a colloquial style or register, both in the Nuremberg area and generally in southern German varieties. Additional data for central and southern Bavarian can also be found in Wiesinger (1990, p. 453).

- 14 This corroborates [Kramer's \(2016, p. 537\)](#) analysis of *gender*-based plural exponency in Amharic irregular plurals; German irregular plural exponency follows this pattern. Kramer captures this with a *feature bundle* on *n* that espouses both gender and number for irregulars.
- 15 Our Prosodic VI applies to all irregular plural allomorphs; this allows our model to reduce the Segmental VIs to just the non-syllabic consonants in each case. The same phonological process of schwa-epenthesis for all irregular suffixes allows our model to reduce the number of Segmental VIs, a desideratum in DM ([Embick 2010, p. 166](#)), thus eliminating the need to list both the syllabic and non-syllabic options, for example, both /-ən/ and /-n/, as separate VIs.
- 16 Please note that in (13) and (14), the first row indicates the underlying phonological representation, hence the use of slanted brackets. The final step shows the output of the phonological component following Spell-Out, which provides schwa-epenthesis, where necessary; thus, the final forms are presented in square (near surface-form) brackets. Note, however, that we rely mostly on orthography rather than phonemic or phonetic transcription in the examples throughout the article.
- 17 See also [Wiese \(2009\)](#), who proposes a paradigm-uniformity constraint to capture this phenomenon.
- 18 Constraint definitions:  
 Ident-IO(Prosody): The prosodic shape in the output corresponds to the prosodic shape in the input.  
 Dep-IO(Root): Segments (in the root) in the output must have corresponding segments in the input.  
 Align(Plural Suffix, R, PrWd, R): For every plural suffix, there must be some Prosodic Word such that the right edge of the (plural) affix matches the right edge of the Prosodic Word.
- 19 The current Faithfulness-constraint to the prosodic template in the input, IDENT-IO(Prosody), could be further broken down into more basic constraints in a more elaborate analysis.
- 20 See [Harbour \(2014\)](#) and [Ackema and Neeleman \(2018\)](#) for evidence that number dominates person and gender.
- 21 A related Germanic language, Dutch, has a similar trochaic requirement to German for nominal plurals (cf. [Booij 1998; Smith 2009, 2020; Wiese 2001](#)), but to our knowledge, it has not yet been analyzed with regard to the split-plurality idea.
- 22 The lack of a universal isomorphic connection between *phases* and 'local interface boundaries' is not limited to the PF-interface; see [Pross \(2019\)](#) for recent challenges to a late-insertion model concerning the lexical semantics of German nominalizations.
- 23 See [Lowenstamm \(2014, 2017\)](#), who arrives at a similar conclusion in his analysis of English stress shift from a DM-perspective. Additionally, see [Creemers et al. \(2018\)](#), who adopt the strategy that some affixal units are best classified as heads, while others are best classified as  $\sqrt{\text{roots}}$ .

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