# Markedness in Distributed Morphology

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## 1 Introduction

The concept of morphological markedness goes back at least to the works of Jakobson and Trubetskoy in the 1930s and since then the term *markedness* has developed a wide range of possible senses.[1] This is arguably due to the fact that the concept itself has proven helpful in a lot of different areas of linguistic research and has thus been adopted by different groups of researchers with different research foci.

Unsurprisingly, a term with such a great number of possible interpretations can lead to confusion in a research community which strives for concreteness and scientific accuracy. This lead to a number of different attempts to define the concept of markedness in a scientific fashion or classify the different meanings of the term (see e.g. Moravcsik and Wirth 1986; Dixon 1994; Battistella 1990; Haspelmath 2006).

In what follows, I will add one more paper to this list which has a much narrower focus than the ones above as it only addresses the notions of the term markedness relevant in the context of the framework of Distributed Morphology (Halle and Marantz 1993, 1994; Halle 1997).

The literature on Distributed Morphology is not an exception in that the term *markedness* is also used for a number of related but still fundamentally different concepts. One of the goals of this paper is thus to try to shed some light on the different uses of the term *markedness*, how they relate and what the general expectations of the theory are as to whether different notions of markedness are supposed to pattern together or not. Naturally, the classification of different uses of the term *markedness* proposed here is in part similar to previous classifications mentioned above. Nonetheless, there are still a number of differences in terms of highlighting different aspects and drawing more fine-grained distinctions relevant to the focus and the architecture of the framework. In what follows, I will use the simple working definition of the term markedness in (1).

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[1] See Haspelmath (2006) for a summary of the history of the term and a classification of the different senses of markedness, many of which go beyond the ones discussed in this paper.

(1)    Markedness is the observation that there is a systematic asymmetry in the way grammatical rules refer to a proper subset of members of a grammatical opposition.

As we are in this chapter mostly concerned with the study of morphology, this working definition refers to cases where two or more morphological categories (e.g. singular and plural) seem to behave differently with respect to different grammatical processes.[2] While discussing the different notions of the term, I will, in passing, also introduce a more transparent terminology by distinguishing between marked exponents and marked features, which plays a crucial role in the framework at hand. In Section 2, I will further propose that markedness of exponents should be further subdivided into phonological diagnostics of markedness of exponents, morphological diagnostics or syntactic diagnostics; a division which goes beyond Dixon's (1994) classification into formal and functional markedness. I will show that, at least at first sight, these diagnostics between the different types of markedness do not necessarily align. Section 3 will then illustrate the step from language-specific diagnostics of marked exponents to the assumption of markedness of features, which is assumed to hold crosslinguistically.

The main part of this chapter will be about markedness of features (Section 4) and the operations that refer to markedness (Section 5). I will illustrate the major proposals as to how markedness can be implemented: By means of additional levels of featural abstractness; by means of feature geometries; or by means of structural containment. I will then go on to discuss the different operations in Distributed Morphology which make reference to marked or unmarked features.

Finally, while the main part of this chapter is mainly concerned with the questions how markedness can be diagnosed, modelled and used in morphological analysis, Section 6 will then briefly come back to the question what morphological markedness actually is. Does morphological markedness derive purely from semantic markedness; does it derive from frequency effects or a combination of both (plus other potential factors)? Section 7 concludes the discussion.

## 2  Diagnostics for Markedness

Distributed Morphology is a realizational framework that, in a sense, is built around the notion of Vocabulary Item. A Vocabulary Item is a mapping rule between a set of morphosyntactic features and a morphophonological exponent. A large amount of work has been done to figure out what these Vocabulary Items look like and what operations are necessary to modify the input as well as the output of these mapping rules in order to be compatible with syntacto-semantic as well as phonological representations. The term markedness can be used to describe asymmetries in both the input and the output of these mapping rules. Applying to the output, the term

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[2]As such the definition only includes instances of markedness, which play a role in the representation the core synchronic grammar. Of course, the term can also be used to refer to asymmetries in acquisition, diachrony, etc. I will not address asymmetries of this kind here.

markedness refers to asymmetries in the shape or the distribution of exponents. Building on observations about the markedness of exponents, we apply the term also to the input of the Vocabulary Item mapping rules. In doing so, we assume that there are markedness asymmetries between the abstract morphosyntactic features.

In this section, we will look at the markedness of exponents; i.e. markedness as applied to the output of a mapping rule. I will discuss the various empirical observations that are generally taken as diagnostics for featural markedness asymmetries. The focus of this discussion will be on the morphological diagnostics for markedness in Section 2.1. In Sections 2.2 and 2.3, I will briefly discuss phonological and syntactic diagnostics of markedness respectively and how morphological markedness relates to these.[3]

The discussion in this section will serve as the empirical foundation for the discussion about the markedness of features and the different ways to model them.

## 2.1 Morphological Diagnostics

In this section, we will take a look at some of the morphological diagnostics which have been used as the empirical basis in order to argue for a theory of morphological markedness. I will, in this section, largely restrict myself to the empirical observations. The actual formal implementations of markedness in Distributed Morphology will be discussed in Section 4 and the operations referring to markedness as concept will then follow in Section 5.

### 2.1.1 Elsewhere distributions

In its most straightforward notion, the markedness of an exponent can be read off of its empirical distribution which is assumed to be a reflection of its morphological complexity.

Vocabulary Items pair phonological content with morphosyntactic feature sets but crucially this pairing can be asymmetric in the sense that a given Vocabulary Item is not required to realize all the features present on a syntactic head. It follows that there are differences of morphological complexity between different exponents. Some exponent may realize only feature $F_1$ whereas another exponent may realize the features $F_1$, $F_2$ and $F_3$ whereas still another exponent may realize no features at all.

Due to the Subset Principle and Specificity, this difference in morphosyntactic complexity can be read off the distribution of the exponents. An exponent which is morphologically complex in the sense that it realizes many features will have a well-defined morphological distribution whereas a marker that is not morphologically complex will have a wide distribution, which is often negatively defined by the feature combinations in which it is blocked by more specific markers.

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[3]I will not attempt to discuss the notion and the diagnostics of semantic markedness in this chapter. See Sauerland (2008) for an excellent overview.

Consider the paradigm of case inflection in with singular nouns in Icelandic. Using a simple feature system [±Masc] and [±Fem], a reasonable set of Vocabulary Items could look like (3). In this system, the fully specified markers in (3-a) and (3-b) are morphologically complex (i.e. marked) and have a well-defined distribution. In contrast, the distribution of the ∅-marker does not have a well-defined distribution as it can only be defined negatively by means of the markers that block it. Thus, the marker is morphologically simplex, i.e. unmarked.

(2)  Icelandic nominal inflection:

|        | Masc | Fem | Neut |
|--------|------|-----|------|
| Nom.SG | -ur  | -∅  | -∅   |
| Acc.SG | -∅   | -∅  | -∅   |
| Dat.SG | -i   | -∅  | -i   |
| Gen.SG | -s   | -ar | -s   |

(3)  Vocabulary Items:

a. [+MASC,NOM,SG] ↔ /-ur/
b. [+FEM,GEN,SG] ↔ /-ar/
c. [−FEM,DAT,SG] ↔ /-i/
d. [−FEM,GEN,SG] ↔ /-s/
e. [SG] ↔ /-∅/

Müller (2004)

A related notion of markedness which also concerns the empirical distribution of an exponent is the question of contextual specification. Unlike other frameworks such as Paradigm Function Morphology (Stump 2001, 2016), Distributed Morphology allows for its realization rules to be sensitive to contextual information beyond the features that the rule realizes. In this notion, markedness concerns not only the features an exponent realizes but also the contextual features considered for an exponent to be realized.

This notion becomes relevant in the discussions of allomorphy. Vocabulary Items that are contextually restricted are used to model both phonologically conditioned allomorphy as well as morphosyntactically conditioned allomorphy. Both types of features are used to specify additional application restrictions on a Vocabulary Item mapping rule. In (4-a), the morphosyntactic feature $[+\alpha]$ is mapped to a phonological realization /abc/ in the context of the morphosyntactic feature $[+\beta]$. In (4-b), it is mapped to a different exponent /bcd/ in the context of the phonological features /e/.

(4)  a. $[+\alpha]$ ↔ /abc/ / $[+\beta]$
     b. $[+\alpha]$ ↔ /bcd/ / /e/

The assumption is that if the occurence of an exponent is contextually restricted, then it will count as morphologically marked as opposed to an exponent that is unrestricted. In the Vocabulary Items for the suppletive adjectival root √GOOD, the base form in (5-a) counts as unmarked as it is not contextually restricted.

(5)  a. √GOOD ↔ good
     b. √GOOD ↔ bett- / _COMP
     c. √GOOD ↔ best / _SUP

### 2.1.2 Allomorphy and its limitations

Even though the original observation that allomorphy can be used as a diagnostic for markedness is already found in Greenberg (1963), only in recent years, a large number of works have investigated the role of markedness with respect to the phenomenon of contextual allomorphy and suppletion. Building on the works by Embick (2010); Bobaljik (2012), it has been observed that in various different empirical domains, there are limitations on which features can trigger allomorphy on a root and which features cannot. And the overall consensus across the different domains seems to be that morphologically unmarked features have a much stronger tendency to trigger allomorphy/suppletion than marked ones.

In the domain of case, for example, Smith et al. (2018) found that it seems to be relatively a crosslinguistically robust pattern that the morphosyntactically unmarked cases (i.e. nominative or absolutive) trigger allomorphy/suppletion on the base they attach to. It is also possible for the structural cases to trigger allomorphy/suppletion while local or semantic cases, which are typically thought to be more marked do not. What we do not find, however, is that the unmarked case and the local/semantic cases trigger allomorphy whereas the marked structural case (i.e. the accusative or the ergative) does not. The tables in (6) and (7) illustrate some case-driven suppletion patterns of pronouns taken from Smith et al. (2018). As we can see, it is always adjacent forms in a given row that seem to use the same pronominal stem:

(6)

|  | Nom | Acc | Dat | Gen |
|---|---|---|---|---|
| Latin 1SG | ego | mē | mihi | meī |
| German 3SG.FEM | sie | sie | ihr | ihr |
| Khakas 3SG | ol | anɨ | aɣaa | |

(7)

|  | Abs | Erg | Dat |
|---|---|---|---|
| Wardaman 3SG | narnaj | narnaj-(j)i | gunga |
| Nen 1SG | ynd | ynd | ta |
| Itelmen 2SG | kəzza | kni-nk | kn-ank-e |

A similar pattern is found with number and clusivity contrasts (see Moskal 2015, 2018; Smith et al. 2018) of pronouns as well as of course with adjectival root suppletion in the context of comparative and superlative formation even though the latter is not typically thought of in terms of markedness (Bobaljik 2012).

The important thing for our purposes is that there is an implicational generalization that can be formulated in terms of markedness. A marked feature can only trigger allomorphy or suppletion of a stem if less marked features also do. In this way, allomorphy and suppletion can serve as a diagnostic for markedness.

### 2.1.3 Additive markedness effects

One of the empirical domains where Distributed Morphology has made use of the concept of markedness early on are what we can call additive markedness effects

(discussions of these kinds of effects are found in Bonet 1991; Noyer 1992; Halle 1997; Noyer 1998; Nevins 2008, 2011 and many others). The intuition behind this term is that, in many contexts, one marked feature is tolerated in a given domain but two or more are not. As a result, marked parts of the paradigm show less morphological distinctions than unmarked ones. Consider the famous case of the *amn't*-gap in English, i.e. the fact that the copula cannot include a contracted negation in the first person singular. Nevins (2011) argues that this is an additive markedness effect in the sense that each of the two marked features [+author] and [+negative] is tolerated on a copula in a given syntactic configuration but the combination of both is not.

(8)     *Amn't Ban*:
        *[+author] on the same node as [+negative] under $C^0$

Nevins argues that this requirement cannot be syntactic as we find different morphological repairs (e.g. *Aren't I lucky?*) in various dialects. Ultimately, such patterns indicate the marked nature of both of these features [+negative] and [+author] and he proposes an account in terms of impoverishment (see Section 5.1) which repairs this doubly marked structures.

A, in a sense, similar approach is pursued by Oxford (2018) who argues that much of the morphological complexity of inverse systems in Algonqian languages such as Nishnaabemwin are due to the double presence of [+participant] features in the same domain. He argues that due to the relativized nature on the higher of the two agreement probes, a situation can arise in which both probes agree with the direct object. This leads to a presence of two marked features in close proximity which is again repaired by means of Impoverishment. As a result, the radically underspecified $\phi$-invariant *"inverse"* marker is inserted.[4]

Ultimately, the observation of exceptional additive markedness effects are frequently repaired by morphological deletion rules relates to the discussion about empirical elsewhere distributions above. It is generally assumed that marked parts of inflectional paradigms show less morphological distinctions. In many cases, modellings in terms of impoverishment and modellings in terms of underspecified Vocabulary Items referring to natural classes are equivalent in their expressive power and explanatory adequacy.[5]

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[4]The feature combination repaired by this impoverishment operation instantiates both a additive markedness effect as well as what Nevins (2012) calls a morphological haplology effect (or morphological OCP effect). It seems plausible that these two phenomena can be derived from the same source, especially if markedness of a given feature is related to it being contrastive or not. I will not attempt to do so in this paper but this can be seen as an interesting direction for future research.

[5]In many cases, one can be technically be recast as the other, see e.g. Trommer (2003, 2006) proposed that impoverishment effects can and should be modelled by insertion of highly specified zero exponents.

### 2.1.4 Compounding and citation forms

The diagnostics discussed in the previous subsections are largely restricted to determining the markedness of functional elements such as case markers; with the exception of the allomorphy diagnostic, which if applied to stem suppletion also covers semantically contentful lexical material.

As for other form alternations, the toolkit available to determine the unmarked forms is often much more limited. Sometimes, citation forms or the ability to occur in compounding structures has been taken as evidence for the unmarked status of a given exponent. Thus, in order to determine which of the forms of a suppletive adjective or a suppletive noun is the unmarked one, we find that it is typically the unmarked positive form of the adjective or the singular form of the noun which appears in compounds.[6]

(9)   a.   a good-hearted woman
      b.   *a better-hearted woman

(10)  a.   a mouse trap
      b.   *a mice trap

Similarly, with suppletive verbs, we find that it is typically the present tense form which appears in compounds.

(11)  a.   He is a go-getter.
      b.   *He was a went-gotter.

## 2.2 Phonological Diagnostics

Phonological markedness is a complex topic on its own and the brief discussion here can do little more but refer to some of the relevant literature (see e.g. the overview papers in deLacy 2006; Hume 2011). However, if we abstract away from the many intricate details of markedness theory in phonology, we can at least observe that the notion of morphological markedness as established by the diagnostics above, often corresponds to a particular notion of phonological markedness or phonological complexity.

In other words, features which we believe to be morphologically marked are often realized by phonologically complex exponents. Above we saw that arguments from allomorphy are taken as evidence that nominative case is the unmarked option whereas accusative and semantic or local cases are increasingly more marked. This

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[6]An interesting case are the case of pronouns which, to the extent that they can be used in compounds productively, show a somewhat inconsistent behavior:

(i)   a.   a she-wolf
      b.   *a her-wolf

(ii)  a.   a little me-time
      b.   *a little I-time

often corresponds to the phonological complexity of these markers at least as a tendency. In the small portion of the Latin nominal declension paradigm below, we can see that all non-nominative markers contain a long vowel plus a coda. Genitive adds a complete syllable to the stem whereas dative and ablative are also arguably more complex than the nominative as they deviate from the theme vowel /a/ of the declension class.

(12)  Latin feminine plural declension of *poeta* 'poet':

| NOM | poetae |
|-----|--------|
| ACC | poetās |
| GEN | poetārum |
| DAT | poetīs |
| ABL | poetīs |

In cases like the Latin declension paradigm, it might be relatively straightforward to identify the one that is phonologically more complex in a given opposition. But it is also clear that we cannot really decide which marker is more complex without a concrete theory of phonological markedness. Nonetheless, it seems that at least as a tendency phonological complexity of an exponent and morphological markedness align to a certain extent.

This has been noted by many people and in the context of Distributed Morphology, it has been proposed by Müller (2004) who argues following Wiese (2004) that Vocabulary Items should ideally obey the Iconicity Principle, which states that the complexity of a the phonological form of an exponent should align with its morphosyntactic complexity (see also Keine 2010 for discussion).

(13)  Iconicity Principle:
Similarity of form implies similarity of function (within a certain domain, and unless there is evidence to the contrary).

(Müller 2004)

The set of Vocabulary Items used above (2) for the Icelandic paradigm is a straightforward illustration of how the Iconicity Principle guides the pairing of form and function. The fully specified markers /-ur/ and /-ar/ are also the phonologically most complex ones. The markers /-i/ and /-s/ are underspecified but not radically so and they are indeed of intermediate phonological complexity. Finally, the radically underspecified marker is also the phonologically simplest one: /-∅/.

It should be noted though that, apart from the guiding principle in (13), nothing in the architecture of Distributed Morphology actually enforces that phonological and morphological markedness always align. As has been noted by Nevins (2003), we find many cases where we have good reasons to believe that the zero-marker is not the radically underspecified default as it occurs in a specific, well-defined environment.

## 2.3 Syntactic Diagnostics

The final type of markedness of exponents refers to the distribution of exponents in different *syntactic* contexts. In recent years, a large amount of literature has provided a set of language-specific as well as crosslinguistic diagnostics that result in what could be argued to be unmarked inflection. Such diagnostics have been proposed in particular for case inflection (see e.g. Marantz 1984; Emonds 1986; Schütze 2001; McFadden 2004; Legate 2014) as well as for $\phi$-agreement (see e.g. Corbett 2006; Baker 2008; Preminger 2014). In both cases, the logic is as follows: In a configuration in which a syntactic relation between the controller and the target cannot be established, unmarked default morphology is observed.[7]

Such syntactic configurations typically include non-prototypical word order (see Schütze 2001; van Koppen 2007), non-prototypical case frames of the arguments in question (e.g. Bobaljik 2008). Further diagnostics are ellipsis of the controller of a relation (Schütze 2001) or coordination of the controller (Schütze 2001; Weisser 2019).

All of the examples in (14) result in default agreement on the verb due to (a) the postverbal position of the subject in (14-a) or (b) the unavailability of a nominative argument in (15). In (16), an example from the Cushitic language Qafar, we get third person feminine default agreement with conjoined noun phrases even when two conjoined nouns are masculine:

(14)     There is books on the table                                    Sobin (1997)

(15)     Kohli-ukku Meena-vai   pidi-t-atu
         Kohli-DAT   Meena-ACC like-PST-3.SG.NEUT
         'Kohli liked Meena.'                                 Tamil, Murugesan (2019)

(16)     woò  baacoytaa-kee k'ay toobokoyta t-emeete
         that poor.man-and  his   brother      FEM-came.3SG
         'That poor man and his brother came.'

                                            Qafar, Hayward and Corbett (1988)

Similarly, for case marking, all the examples in (17) have been claimed to be instances of default case. In (17), the two pronouns appear in default case as they are internal to the coordination. In (18), an example from Choctaw, which is a marked nominative language, it is possible to answer a subject wh-question either with either a fragment that is the subject and the repeated verb or only the subject. Note that the case marking on the subject changes from marked nominative to zero if the verb is elided as well. Similarly, in some languages, left-dislocated arguments appear in default case even if they relate to a non-default case position inside the clause. This is shown in (19) with an example from Icelandic.

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[7]Nevins (2007b) proposes a different syntactic diagnostic, namely syntactic agreement probes which are relativized to marked features only, i.e. which only collect marked features. The theoretical possibilities of such a system are certainly worth exploring but I will, for the purposes of this chapter not discuss them here.

(17)    Us and them are gonna rumble tonight.                    Schütze (2001)

(18)    a.    Q: Kata-sh   apa-tok?
             who.NOM eat-PST
        b.    A1: John-at    apa-tok
             John-NOM eat-PST
        c.    A2: John.
             John
             Q: 'Who at it?' A: 'John (did)'        Choctaw, Broadwell (2006)

(19)    þessi      hringur,  Òlafur    hefur lofað    Marìu      honum
        this-NOM ring-NOM Olav-NOM has    promised Maria-DAT it-DAT
        'This ring, Olav has promised it to Mari.'        Icelandic, Zaenen (1997)

As with phonological notions of markedness, we can ask ourselves whether the syntactic diagnostics briefly discussed in this section and the morphological and phonological ones actually align. And in many languages we find that they actually do. A language like Finnish has, like many others, zero marking on the verb in the third person singular present tense.[8] So, under the assumption that third person singular is the unmarked configuration, the phonological markedness and the morphological one align. And, as for syntactic markedness, we also find that the third person singular functions as some kind of default. The example in (20) shows a configuration where the subject is in the partitive and therefore cannot trigger $\phi$-agreement. The verb then shows third person singular:

(20)    Kad-ulla      on      auto-ja
        street-INESS be.3SG car-PART.PL
        'Cars are in the street.'                    Finnish, Karlsson 1993, 83

But it must of course be noted that not all languages pattern as nicely as Finnish. Most notably English also has what could be conceived of as third person singular default agreement (14) but this is clearly phonologically the most marked cell of the paradigm. In the area of case, the view that nominative is the complete absence of case features has been advocated by Preminger (2014); Preminger and Kornfilt (2015); Levin (2017). Levin (2017) argues for Korean that nominative is characterized by the absence of features but crucially nominative is phonologically marked with /-ka/ or /-i/ and it seems unlikely that the two allomorphs function as radically underspecified markers. Levin does not address the question how the realization of case markers is accomplished morphologically.

The question of whether syntactic and morphological markedness align is closely connected to the question whether we should allow for what Noyer (1992) calls *default insertion*. This issue is discussed in more detail in Section 5.3

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[8]There is a lengthening effect of the stem-final vowel or a consonant gradation effect with stem-final consonants (cf. Karlsson 1993, 62) indicating that the exponent is strictly speaking not completely zero. Still, in terms of phonological contrastiveness, it seems plausible to assume that the marker is phonologically less marked than the segmental counterparts in other cells of the paradigm.

# 3 Crosslinguistic distributions as a direct window into featural markedness

In the preceding section, we discussed different diagnostics of the markedness of exponents in a given language. The idea was that e.g. the empirical distribution of morphological exponents in a given language may indicate the markedness of the exponents and, by assumption, the markedness of the underlying features.

However, a crucial part of the theory of featural markedness is that it is generally assumed to hold crosslinguistically. Thus, only if we find robust crosslinguistic generalizations about the behavior of morphosyntactic categories, then, by assumption, we can potentially access the markedness asymmetries of the features itself abstracting away from concrete exponents in a given language. To my knowledge, at least two general strategies can be pursued in this regard.

The first of these strategies is about implicational generalizations about the existence of a given opposition. It has been known at least since Greenberg that, crosslinguistically speaking, there are cases where the existence of a morphosyntactic category in a given language asymmetrically implies the existence of another one. Many of these observations have been formulated as Greenbergian Universals (Greenberg 1963). An example is given in (21):

(21)    Greenberg's Universal 34:
        No language has a trial number unless it has a dual. No language has a
        dual unless it has a plural.

Such statements about implicational generalizations have long been taken to indicate relative markedness of the given categories (in the context of DM see especially Harley and Ritter 2002). In the example above, the generalization is taken as evidence that trial number is morphosyntactically more marked than dual which in turn is more marked than plural.[9]

The second strategy which makes use of crosslinguistic distributions to directly observe the markedness of the features is to apply one or more of the diagnostics reviewed in Section 2 from a crosslinguistic perspective. Again many of the observations in question are formulated as Greenbergian Universals but observations of this sort are also been found in Forchheimer (1953).

(22)    3rd person is often zero, 1st/2nd person agreement is overt.
                                Forchheimer (1953) as cited in Harley and Ritter (2002)

The statement in (22) makes a generalization about the crosslinguistic distribution of the diagnostic of phonological complexity discussed in Section 2.2. In line with

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[9]It should be noted that the assumption that dual is more marked than plural has recently been challenged by a number of people (see e.g. Cowper 2005 and Nevins 2007a for a critical review). In Harbour (2008, 2011), it has been observed that morphophonological complexity as a diagnostic suggests that languages differ as to whether they treat dual or plural as the marked option. In Smith et al. (2018), these findings are supported by pronominal suppletion patterns.

the general theory of markedness of person features, this statement is assumed to indicate that first and second person are featurally more marked than third person.

Another claim about the crosslinguistic patterning of a morphological diangostic discussed in Section 2.2.1 and 2.2.3 comes in the form of another one of Greenberg's Universals:

(23)     Greenberg's Universal 37:
         A language never has more gender categories in nonsingular numbers than in the singular.

The universal in (22) makes a statement about the crosslinguistic empirical distribution of singular vs non-singular oppositions. More concretely, the statement crosslinguistically relates the existence of one opposition (singular vs nonsingular) in cooccurrence with another one (e.g. masculine vs feminine gender). Assuming what we said about the diagnostic of additive markedness effects above, we can interpret (23) as a statement about the marked status of plural as opposed to singular. As [plural] itself is a marked feature, it will show an impoverished paradigm because other marked-unmarked oppositions will have a tendency to be neutralized in the context of [plural].

As for the diagnostic of allomorphy and suppletion, it was already mentioned that many works currently investigate the crosslinguistic robustness of implicational generalizations in this domain. The general consensus is that many different areas of morphology seem to exhibit robust patterns which might be used to reveal the underlying markedness asymmetries.

# 4 Implementations of Markedness

## 4.1 Markedness as the presence or absence of a feature

In its simplest implementation, the concept of markedness is directly incorporated into the assumed feature structure itself. A straightforward way to do this is by means of privative (or: unary) features. In this case, oppositions such as singular and plural are characterized by the presence or absence of a given feature, e.g. [plural]. This implementation straightforwardly derives the marked-unmarked asymmetry between the two values of an opposition. If a singular context is merely characterized by the absence of a [plural]-feature, then clearly rules cannot be specified to apply only in a singular-context. Thus Vocabulary Items for the number inflection of English nouns could look like in (24). Crucially, it would not be possible to have a noun which is marked in the singular but unmarked in the plural.

(24)     a.    [PLURAL] ↔ /-s/
         b.    [ ] ↔ -/∅/

But while this implementation of markedness is simple and elegant, it is usually abandoned as it has been argued to be too restrictive. The original motivation for

positing a difference in feature markedness of a given opposition is that many morphological rules (i.e. Vocabulary Items, Impoverishment Rules, etc.) seem to affect only the marked member of the opposition. However, typically, it is not possible to get away without reference to unmarked features at all (see Trommer 2006; Nevins 2007b for an elaborate discussion). In the case of the English present tense inflection, the paradigmatic distribution of the two markers (/-∅/ and /-s/) indicates that the former is some kind of unmarked elsewhere marker. But the latter is restricted to appear in third person singular contexts. We thus need to make reference to both third person and singular, both of which are generally taken to be unmarked values.

(25)  a.  [3SG] ↔ /-s/
      b.  [ ] ↔ /-∅/

## 4.2 Markedness as an additional level of abstraction

In response to the problem for privative feature systems, most works have adopted a binary feature system, where the unmarked member of an opposition is nonetheless characterized by a dedicated feature value. Sticking with our toy example about morphological number, the respective values used in such a system are [+PL] and [−PL].

(26)  a.  [+PL] ↔ /-s/
      b.  [−PL] ↔ /-∅/

In such a system, the unmarked case, which is typically the negative feature value, can be referred to by morphological rules. This solves the problem discussed above that the complete absence of features in the unmarked case is empirically too strong a claim. But of course, by using binary features, we lose the straightforward way of explaining the asymmetry between the marked and the unmarked member of the opposition. A priori, there is no reason why the positive feature value should be more prone to being affected by morphological rules.

   One version to reintroduce this observation is to formulate what one might call meta-principles of rule application as in (27). Statements of this sort are clearly not ideal because they are ultimately stipulations that, in a sense, merely restate the empirical observations (if on a relatively high level of abstraction).

(27)  Meta-Principles of Morphological Rule Application:
      a.  Impoverishment Rules do not refer to negative feature values.
      b.  Feature Specifications of Vocabulary Items do refer to negative feature values.

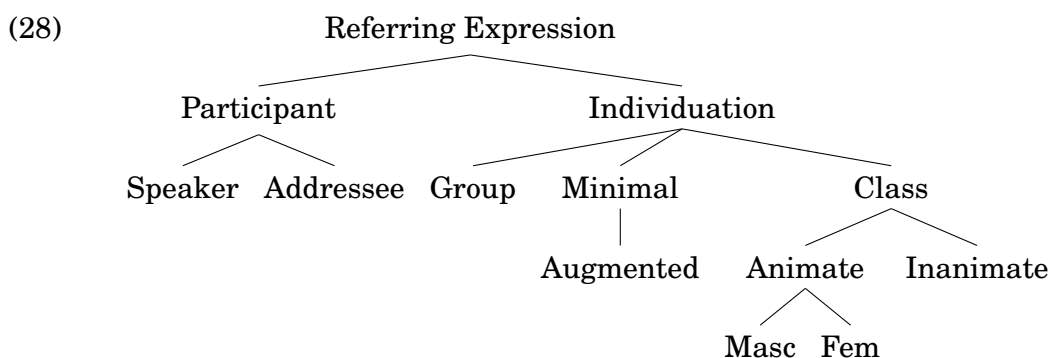Despite the fact that statements like (27) are stipulations (unless they can be derived from deeper principles), it seems that many people in fact assume meta-principles of this sort for reasons of restrictiveness. It has been pointed out by various people that the universal tendency of impoverishment to manipulate feature specifications towards unmarked configurations is ultimately the only thing

that sets it apart from more powerful concepts like Rules of Referral (Zwicky 1985; Stump 1993, 2001; see e.g. Noyer 1998; Bobaljik 2002 for discussion.).

What statements like (27) ultimately do is group certain sets of feature values together to the exclusion of others. This is, conceptually, not too different from feature decomposition itself. A given type of rules thus refers to special feature values only. Thus, using meta-principles like (27) thus requires adding one higher level of abstraction. Drawing on parallels to the concept of markedness in phonology, Nevins (2007b) for example argues in detail that a binary feature system is required and argues that markedness in such a system should be conceived of as an additional level of abstraction, i.e. a property of a given feature.
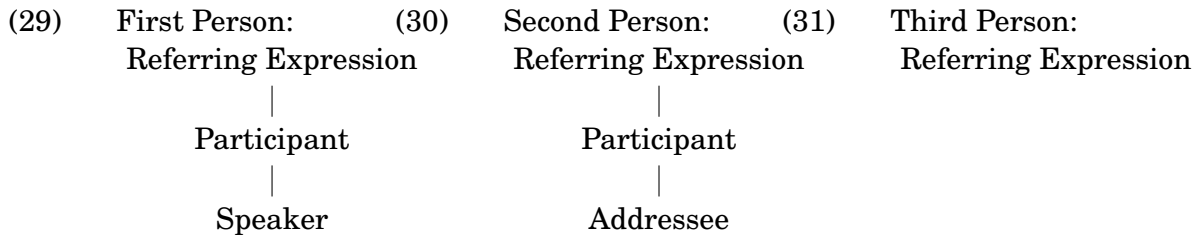
## 4.3 Feature Geometries

Another implementation of the notion of markedness is its incorporation by means of featural complexity. Starting with Bonet (1991); Noyer (1992); Harley (1994), a growing body of literature subscribes to the assumption that morphosyntactic features are not unstructured bundles but rather hierarchically ordered elements with internal structure. Feature geometries have been widely adopted for person, number and gender features.[10] (28) gives the well-known feature geometry by Harley and Ritter (2002):

(28)

```
                    Referring Expression
                   /                    \
          Participant                  Individuation
           /      \              /      |           \
      Speaker  Addressee    Group   Minimal         Class
                                      |            /      \
                                  Augmented    Animate   Inanimate
                                                /   \
                                             Masc   Fem
```

This feature geometry is used for various different purposes. It allows predictions about implicational generalizations about the distribution of exponents in a given language but also about the distribution of morphosyntactic categories across different languages of the type of many of the Greenbergian Universals. But it crucially also allows for a different metric of markedness, which can simply be read off the tree structure by counting nodes. The more nodes a given category expresses, the more marked it is. Thus, a first person counts as marked compared to a third person because it two more nodes. First and second person, however, will count as equally marked as both contain two nodes:

---

[10]However, see Wiese (2004); Weisser (2007); Müller (2011) for the use of geometries of case features.

(29)   First Person:         (30)   Second Person:        (31)   Third Person:
       Referring Expression          Referring Expression          Referring Expression
                |                             |
          Participant                   Participant
                |                             |
            Speaker                      Addressee

It should be noted that while the feature geometry in (30) makes use of privative features, this choice is formally independent of whether or not a feature geometry approach is used. As with the private approach discussed above, Harley & Ritter's (2002) privative feature geometry faces problems with highly specified markers for unmarked values. Consider the pronoun paradigm from Tok Pisin, which at first sight, looks like a poster child for a treatment in terms of a feature geometry of this type.

(32)   Pronoun Paradigm from Tok Pisin (Verhaar 1995):

|          | Singular | Dual          | Plural     |
|----------|----------|---------------|------------|
| 1st Incl | -        | yu-mi-tu-pela | yu-mi-pela |
| 1st Excl | mi       | mi-tu-pela    | mi-pela    |
| 2nd      | tu       | yu-tu-pela    | yu-pela    |
| 3rd      | em       | $\varnothing$-tu-pela | ol |

The inclusive is transparently constructed by combining the first and the second person pronouns and the dual is transparently constructed on the basis of the plural and a specific dual augment. All of this falls right out under the feature geometry by Harley and Ritter (2002). But even a highly transparent paradigm such as this one provides evidence that we need to be able to make reference to unmarked features in one way or another. The problem lies in particular in the 3rd person plural pronoun /ol/ which blocks the insertion of the regular plural affix and thus must necessarily be highly specified.
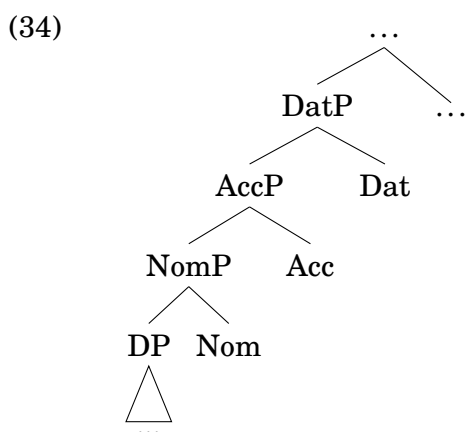
## 4.4 Containment

The final implementation of markedness proposed has emerged out of a series of works on allomorphy and suppletion. Following Bobaljik's (2012) seminal work on suppletive allomorphy of adjectival bases in the context of comparative and superlative formation, a number of accounts have proposed that limits of allomorphy and suppletion should be modelled straightforwardly as locality effects of Vocabulary Insertion itself. In such a theory, marked features are structurally more complex involving more morphosyntactic nodes.

One of the Bobaljik's core insights was that the superlative cannot trigger suppletion of an adjective unless the comparative also does. In line with the semantics of superlatives, Bobaljik thus proposed that superlatives are universally built containing comparatives. This allowed him to formulate the restriction on adjectival suppletion as a locality effect of Vocabulary Insertion. The superlative simply can-

not trigger suppletion of the adjective since it is outside of the locality domain of contextual features considered during Vocabulary Insertion:

(33)

```
              SupP
          ┌────────┐
       CompP      Sup
        ┌──┐
      Adj  Comp
```
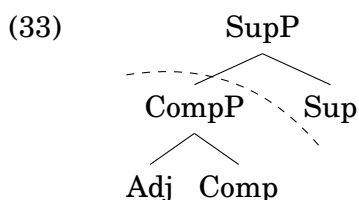
Building on this account, many subsequent accounts transferred the present analysis to other cases of allomorphy/suppletion patterns in inflectional morphology. Moskal (2018) looking at the suppletive pronoun patterns in the inclusive/exclusive distinction argued that the syntactic representation of the inclusive plural contains the representation of the exclusive. Similarly, Smith et al. (2018); McFadden (2018) and others use containment of case markers similar to the structures in the Nanosyntactic literature to account for limits of case-driven allomorphy. In these accounts, the Moravcsik hierarchy of case (see Moravcsik 1978; Bobaljik 2008) is translated into a hypothesis of structural containment:[11]

(34)

```
                        ...
                    ┌────────┐
                  DatP       ...
                ┌──────┐
              AccP     Dat
            ┌──────┐
          NomP     Acc
        ┌──────┐
      DP      Nom
      /\
     ...
```

In these approaches, the notion of markedness is equivalent to syntactic complexity. The marked member of an opposition is always syntactically more complex.

# 5 Operations referring to Markedness

In this section, I will briefly introduce the operations that are generally assumed to be sensitive to markedness asymmetries. As for the first two operations, Impoverishment and Vocabulary Insertion, I will only discuss them briefly in reference to markedness since both of these have their designated chapters in this volume.

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[11]Not all accounts assume the presence of a nominative projection above the DP. For some accounts, nominative is characterized as the absence of a case projection.

## 5.1 Impoverishment

The most important operation which is generally claimed to make reference to markedness of features is of course impoverishment.[12] The operation is specifically designed for markedness-induced deletion processes as it either levels morphological distinctions in marked environments or levels the marked-unmarked distinction in certain environments. Nevins (2011) thus introduces the distinction between markedness-triggered neutralization and markedness-targeted neutralization. He gives the definitions in (35):

(35)    For a marked feature $mF$ and its unmarked counterpart $uF$:

    a.   Markedness-Targeted Neutralization: The expression of $mF$ is identical to the expression of $uF$ in an environment $E$.

    b.   Markedness-Triggered Neutralization: A feature [±G], F≠G is not distinguished in the presence of $mF$ although it is distinguished in the presence of $uF$.

Thus, for an impoverishment rule of the type in (36), we speak of markedness-triggered neutralization if [B] is the marked feature and of markedness-targeted neutralization if [A] is the marked feature.

(36)    $[A] \rightarrow \varnothing \, / \, [B]$

The empirical results of impoverishment rules of this sort correspond to the diagnostics above that (a) marked categories display less morphological distinctions of other morphosyntactic categories (Section 2.1.1) and (b) marked categories are more likely to lose their morphological opposition themselves (Section 2.1.3).
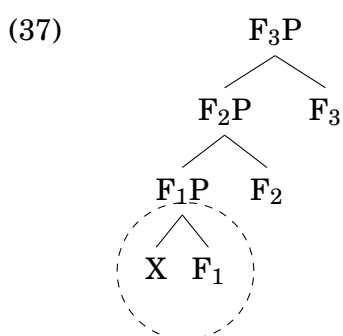
## 5.2 Vocabulary Insertion

It is generally assumed that the operation Vocabulary Insertion has access to markedness considerations. For one, the operation of course has access to the morphological complexity of the Vocabulary Items as the choice of the inserted item is regulated by its specificity, i.e. its featural complexity. A Vocabulary Item that is morphologically more complex blocks the insertion of less specified items.

It is an interesting question though how morphological complexity is determined. In the simplest case, it has been proposed that morphological complexity of a Vocabulary Item is simply determined by counting features, but quite a number of different measures of complexity have been proposed. It is not clear whether features of different categorial type count as equally complex (see Noyer 1992; Halle and Marantz 1993; Halle 1997 for discussion). Further, if contextual information is considered, it is not quite clear how the different information is compared (see Arregi and Nevins 2012 for discussion).

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[12]See e.g. Bonet 1991; Noyer 1992; Halle and Marantz 1993; Halle 1997; Bobaljik 2002; Nevins 2011. For more references see the respective chapter of this handbook.

The issue of contextual information considered for insertion is also crucial for the discussion of allomorphy. Above, we saw that it is generally agreed upon that less marked features are more likely to trigger allomorphy/suppletion. In other words, unmarked features are more readily referred to by contextual information of Vocabulary Items. A priori, this is somewhat surprising given that marked features are more likely to appear in the contextual information of an impoverishment rule.

For this reason, virtually all accounts on the crosslinguistic patterns of allomorphy make use of the containment approach to markedness. This allows you to capture the limits on allomorphy by means of locality restrictions on the contextual domain that can be considered during Vocabulary Insertion. The general idea is illustrated in (37).

(37)

$$
\begin{array}{c}
\text{F}_3\text{P} \\
\diagup\diagdown \\
\text{F}_2\text{P} \quad \text{F}_3 \\
\diagup\diagdown \\
\text{F}_1\text{P} \quad \text{F}_2 \\
\diagup\diagdown \\
\text{X} \quad \text{F}_1
\end{array}
$$

A feature $F_1$ which is in the domain of contextual information accessible at the point of Vocabulary Insertion into a head X can trigger allomorphy/suppletion on X. Features outside of the domain such as $F_2$ and $F_3$ cannot. They are, by assumption, too far away from X. Since the structural complexity of a constituent $F_2P$ indicates its markedness in these accounts, $F_2$ can be viewed as too marked to trigger allomorphy/suppletion on X.

## 5.3 Default Feature Insertion

The final operation that I want to discuss briefly, is the operation that is sometimes called *feature insertion* or *default feature insertion*. The operation is not part of the canonical set of the framework that is Distributed Morphology and it is is still unclear whether an operation like this should be allowed for in the postsyntactic component.

The operation *default feature insertion* (originally proposed in Noyer 1992 and argued for in Harbour 2003) inserts the unmarked features into an syntactic head prior to Vocabulary Insertion if the head in question is required to have a given feature. In its prototypical case, the operation is assumed in order to model mismatches between syntactically markedness and morphological markedness.

In Section 2.3, while discussing diagnostics for syntactically unmarked exponents, we saw that the verb in Tamil (as many other languages) shows default 3.SG.NEUT agreement when syntactic $\phi$-agreement has failed (see ex. (15)). While this exponent is clearly a syntactic default, it is far less clear that it is actually

a morphological default given that it occurs specifically in non-future contexts of a third person singular neuter subject. Given such a reasoning, we could assume that there is a rule that inserts third singular neuter features in the absence of any $\phi$-features on the relevant agreement head.

(38)    Agr { $\phi$:_ } → Agr { $\phi$:3.SG.NEUT }

Such a rule would relieve us of the necessity to have the third singular neuter exponent as the default exponent for Tamil. Given that the morphological diagnostics discussed in Section 2.1 suggest that morphologically speaking, it is not the unmarked exponent, this might be a good idea.

Clearly though, such an operation is very powerful and we need to restrict it in such a way that only unmarked features can be inserted. But even then, the expressive power of such rules is clearly significant. This can be illustrated even more clearly with the proposal made by Noyer (1992). He argues that default feature insertion can also be required as an operation following impoverishment. If impoverishment deletes the marked feature of a head, we might want to insert the unmarked value of the feature subsequently. Consider the following toy example in (39). If a head X undergoes impoverishment having its marked [+plural] feature deleted, a subsequent step of default feature insertion may insert the unmarked feature value [−plural]. What such a derivation amounts to essentially is that impoverishment can now change the feature values on a given head. It can only do so towards the unmarked features but still this is more powerful as we then can change the feature value from [+plural] to [−plural] rather than just deleting the feature alltogether.

(39)    Step 1: Impoverishment: [+plural] → $\varnothing$ / [$_X$ ]
        Step 2: Feature Insertion: [$_X$ $\varnothing$ ] → [−plural]

Given that assuming such an operation is indeed increasing the expressive power of the system significantly, we would like to have sufficient evidence that such a step is indeed warranted. In order to do that, it would be necessary to compare the different diagnostics of unmarked features in syntactic and morphological terms and see whether they show systematic mismatches that require the assumption of an operation like default feature insertion. At this point, I am unaware of any systematic study that presented evidence for or against this view but this is certainly an exciting topic for future research.

# 6  Is Markedness a derivative concept?

This chapter has largely been concerned with the diagnostics, implementations and uses of the concept of morphological markedness in the framework of Distributed Morphology. It has largely ignored the question what morphological markedness actually is and whether it is a concept that derives from (an interplay of) other factors. Due to space limitations, this section can do little more than mention the

different views in this respect.

On one view, morphological markedness is grounded in semantic markedness, which in turn can be measured on the basis of the presuppositions it introduces (see e.g. Sauerland 2003; Sauerland et al. 2005; Sauerland 2008). This view can be related to the Jakobsonian thinking about markedness as Jakobson (1971, 136) says that *"the meaning of the marked category states the presence of a certain property"*. In this sense, the semantics of a marked case feature value such as INSTRUMENTAL would make a statement about its associate being used as an instrument (and possibly being inanimate, etc.). Nominative case, in contrast, does not make a statement at all. The more statements an exponent makes, the more semantically marked it can be considered. Semantic markedness is generally assumed to translate directly into morphological markedness (see e.g. Koontz-Garboden 2007; Kiparsky and Tonhauser 2012 but see Sauerland 2008). Nonetheless, there are some tricky cases to consider and especially for the markedness of number, there has been an elaborate discussion as to whether singular or plural should be conceived of as semantically marked (see e.g. Krifka 2003; Schwarzschild 1996; Chierchia 1998; Sauerland et al. 2005; Sauerland 2008; Kiparsky and Tonhauser 2012; Alexiadou 2019) whereas at least in terms of morphological markedness, there can be little doubt that singular is the unmarked member of the opposition.

On another view, morphological markedness derives to a certain extent or completely from what Chomsky (2005) calls third factors, i.e. principles not specific to language faculty. Haspelmath (2006) argues, for example, that of the many different notions of markedness to consider, most are due to simple frequency effects. According to this view, the concept of morphological markedness is essentially superfluous and apparent asymmetries between a marked and an unmarked member of an opposition are completely reducable to the unmarked member being more frequent in discourse.

It is generally assumed to be true that frequency plays a role in these domains, especially when it comes to the phonological complexity of a given exponent. It has been known at least since Zipf (1935) that the length of a linguistic element corresponds to its frequency in discourse. The question is whether such an explanation readily carries over to other markedness effects discussed in Section 2. While signal length of an exponent can be related to its frequency by some principle of efficient coding or economy (see Hawkins 2004), it is not trivial to draw a similar relation between frequency of a given category X and the number of paradigmatic distinctions of a category Y in the context of X.

An interesting case study of the relation between frequency and morphological markedness effects is provided by Bobaljik and Zocca (2011) who look at oppositions in the domain of gender and whether the use of a gender-specific form allows mismatching referents in ellipsis contexts. And what they find is that, in all of the western European languages they look at, we find at least two classes, one which allows the mismatch asymmetrically from the unmarked member to the marked member (40) and one which disallows the mismatch in either direction (41).[13]

_____

[13]Interestingly, some of the languages in their sample such as Portuegues allow for mismatches in

(40) a. John is a waiter and Mary is ∅ too.
b. #Mary is a waitress and John is ∅ too.

(41) a. #John is a prince and Mary is ∅ too.
b. #Mary is a princess and John is ∅ too.

In order to explain the difference between (40) and (41) a frequency-based account could hypothesize that the ability of the masculine member to function as a cover term for both genders could be due the relative frequency of the masculine. And indeed the ratio of masculines to feminines between waiter and waitress is higher (2.85 as many masculine forms attested) than between prince and princess (2.17). However, Bobaljik and Zocca (2011) illustrate nicely that if more masculine-feminine pairs are considered, the correlation breaks down quickly. An opposition between priest and priestess with a very high ratio (30.04 as many masculine forms) behaves like prince and princess.

This argument shows relatively clearly that either a more complex notion of frequency must be involved in determining the marked member of an opposition or that other factors beyond frequency must also be considered. It is certainly an open question which other factors do play a role here and how they interact. It is, of course, a perfectly fine research hypothesis to say that frequency in discourse *as well as* semantic markedness (plus possibly other factors) determine what counts as marked together.

# 7 Conclusion

In this chapter, I discussed the notion of markedness as it is used in Distributed Morphology. I emphasized the distinction between markedness of exponents and markedness of features and illustrated various diagnostics to determine what counts as marked in a given configuration. Further, I discussed various theoretical implementations of the concept and the operations generally assumed to make reference to markedness as a concept.

The major goal of this discussion was to pave the way towards (a) a clearer terminology of the different types of markedness in works of Distributed Morphology and (b) make an argument for a restrictive use of the concept of featural markedness. Only if we have a reasonably well-defined sense of what it means to be a marked feature and what effects we expect from the postulation of a markedness contrast, then we can use the concept in an explanatory sense.

---

both directions:

(i) a. O   Pedro é médic-o      e   a   Marta também é ∅
       the Pedro is doctor-MASC and the Marta also       is
    b. A   Marta é médic-a      e   o   Pedro também é ∅
       the Marta is doctor-FEM and the Pedro also       is

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