

On the nature of crosslinguistic variation: Insights from anaphora

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Abstract

Do systematic interpretive contrasts across languages derive from the employment of universal grammatical building blocks, or do they stem from differing semantic specifications on simplex formatives that feed into (Neo-Gricean) pragmatic reasoning? Is evidence for grammatical features underlying a particular contrast in one language an argument for those features being universal and thus present in another language where such evidence is lacking? In this paper, we explore this complex of big-picture questions on the basis of so-called *ABA patterns, especially in the area of nominal pro-forms i.e. the various types of anaphors and pronouns. To sharpen the issues, we compare two radically opposed perspectives, which we dub **Rich Universal Base** and **Poor Universal Base**. We show that either one could in principle account for the basic *ABA facts, leaving the door open for an unsatisfying debate on conceptual and aesthetic grounds. We thus explore ways in which the debate can be put back onto an empirical footing by identifying distinct predictions that the two approaches make for the behavior of surface forms that are ambiguous between anaphoric and pronominal reference. We then use these to develop concrete diagnostics and give a preliminary demonstration of how they might be applied in languages with the right cluster of properties to empirically resolve the debate.

Keywords: universals; cross-linguistic variation; *ABA; anaphors; pronouns; Neo-Gricean reasoning

1 Background

The goal of this paper is to explore how the nature of language variation can be explored through the empirical lens of cross-linguistic patterns of morphological syncretism for nominal pro-forms, i.e. the various types of anaphors and pronouns. We begin here by expounding on the tensions concerning the proper analysis of language universals and variation and detail how patterns of cross-linguistic syncretism can help adjudicate the choice between different approaches to this issue while crucially also anchoring the debate on a solid and objective empirical footing.

1.1 Language universals and variation

A fundamental question for linguistic theory revolves around the tension between what is language-universal and what is language-variant. Concretely, what are fundamental building blocks of grammar, how are they organized and ordered relative to each other, how much of this is universal, and in what ways can languages vary in this respect? We can identify two extreme positions here, appropriating labels used in Wiltschko (2014). The **Universal Base Hypothesis (UBH)** propounds the idea (going back to Chomsky, 1965; Ross, 1970, a.o.) that “The deep structures of all languages are identical, up to the ordering of constituents immediately dominated by the same node” (Ross, 1970, 260). In other words, the ordering as well as the inventory of linguistic building blocks are cross-linguistically consistent. At the other extreme is the **No Base Hypothesis** (see e.g. Evans and Levison, 2009; Haspelmath, 2007) which postulates that universals are simply non-existent in the inventory and arrangement of building blocks. As such, languages can vary in arbitrary and potentially infinite ways in this area. But as Wiltschko (2014) discusses in detail, adjudicating the choice between what is language-universal and what is language-variant is far from straightforward. On the one hand, scopal effects with respect to adverb orderings, and the relative positioning of clause-peripheral morphemes show a surprisingly robust uniformity across languages (Cinque, 1999, a.o.). Similarly, the function and relative ordering of nominal categories cross-linguistically parallel those of clausal ones. Such observations support the idea that some linguistic categories are universal (see also Wiltschko, 2014, for discussion). At the same time, mismatches between categorial inventories and distributions across languages do exist. For example, languages differ on points like precisely which tenses or cases they distinguish and whether they have a clusivity distinction in the 1st-person pronouns. Indeed, it is arguably the case that languages can differ in whether a particular category is part of the grammar at all. For example, gender and honorificity play important grammatical roles in a number of languages, while in others they seem not to be involved in the grammar at all, though may be clearly relevant at lexical and semantic/pragmatic levels. These observations argue in favor of a language-specific, rather than a language-universal, categorial classification.

Within the framework of Minimalism (Chomsky, 2000, 2001, et seq.), the Strong Minimalist Thesis (SMT) provides a heuristic which can help adjudicate the balance between these extremes. The SMT is the idea that “The optimal situation would be that UG reduces to the simplest computational principles which operate in accord with conditions of computational efficiency.” (Chomsky and Berwick, 2016, 94). In other words, we should assume that Universal Grammar (UG) has an optimally economical universal base. The problem is that, short of an *independent* metric for what is “optimal” or “economic” or, even, what counts as a grammatical building block, the SMT doesn’t actually provide clear guidelines for resolving this issue. The question threatens to be an aesthetically subjective rather than a

scientifically objective one.

In this paper, we seek to sharpen these thorny questions of language universality vs. language variance *empirically*, via the lens of cross-linguistic patterns of form-meaning pairings involving nominal pro-forms. In particular, we will examine the implications of morphological patterns of syncretism across classes of anaphor and pronoun for two Minimalist-compatible, but nevertheless opposing, views of language variation which we will label the **Rich Universal Base (RUB)** and **Poor Universal Base (PUB)**.

1.2 Defining RUB vs. PUB

The **Rich Universal Base (RUB)** is the strong hypothesis that the grammatical base is (predominantly) universal. In particular, the basic building blocks of syntactic structure, as well as their relative ordering, are universal even at fine levels of detail. This implies that, to the extent possible, any differences in surface forms or meanings across languages must stem from language-specific processes of realization and interpretation that apply to the universal base. Language universals, on the other hand, stem from the universal base peaking through.

In contrast, the **Poor Universal Base (PUB)** is the equally strong opposing hypothesis that nothing about the inventory and ordering of basic building blocks should be assumed to be universal. Categories and structures should only be assumed to exist in a language if there is clear evidence for them in that same language, not on the basis of evidence from other languages. This means that the building blocks of syntactic structure are not necessarily universal, and can vary considerably across languages. Under this approach, language universals should be modelled, to the extent possible, via external factors, e.g. principles of efficient computation, general-purpose cognitive processes or the effects of language acquisition and use.

1.3 Defining a grammatical building block

RUB and PUB are framed in terms of the extent to which grammatical building blocks are universal, and critically evaluating them will require us to be explicit about what these are. Specifically, we will define grammatical building blocks as features, and we will take these to be the primitive units of structure building. Such a definition is concrete enough to get the discussion off the ground while allowing us to deliberately set aside the questions of how grammatical features map onto structural projections (i.e. syntactic heads) and onto grammatical categories. Those questions are indubitably interesting and have spawned their own rich research agenda and debate, but they are ultimately separate from the main concerns of this paper. For instance, the cartographic enterprise (Rizzi, 1997; Cinque, 1999, et seq.) in its strongest version, as within the framework of

Nanosyntax (Caha, 2009; Starke, 2009; Baunaz, Haegeman, de Clercq, and Lander, 2018) assumes a one-to-one mapping between features and heads. Cartographic approaches constitute a classic instantiation of RUB, advocating for a rich sequence of functional heads (or functional sequence/*fseq*) whose inventory and hierarchy is universal across languages.

But it is important to keep in mind that such approaches are not the only ones compatible with a RUB-based mindset. For instance, the head-bundling approach of Pytkänen (2002) and the more recent head-splitting idea of Martinović (2015) explicitly reject a one-to-one mapping of grammatical features to functional heads, but this point is orthogonal to our concerns here. Even if individual heads contain multiple features, one can still posit that their inventory and arrangement is universal across languages and thereby adopt a RUB-compatible approach. Defining grammatical building blocks in terms of grammatical features (rather than syntactic heads) thus constitutes a deliberate choice on our part to set aside this rich debate and focus, instead, on the questions of which building-blocks are universal and which language-specific, and how any cross-linguistic variation in the inventory and hierarchy of such building-blocks must be captured.

1.4 Exploring RUB and PUB via *ABA patterns

Let us illustrate the tension between RUB and PUB by comparing two approaches to cross-linguistic restrictions on patterns of syncretism. A great deal of attention has recently been devoted to the so-called *ABA constraint, which was characterized as follows in the introduction to a recent Special Collection of *Glossa* on the topic:

“Morphological paradigms can be ordered so as to observe the *ABA restriction, i.e. such that only contiguous cells in a paradigm are syncretic. Syncretisms thus reveal a hierarchy in paradigms, which is in turn accounted for in terms of a hierarchy of underlying features. Consequently, syncretisms can be used as a tool for the diagnosis of feature structures.” (Caha and vanden Wyngaerd, 2017)

Foundational discussions of *ABA patterns are found in Caha (2009) on case and (Bobaljik, 2012) on suppletion for comparative and superlative forms of adjectives. Some examples of the latter from Latin and English demonstrate the basic phenomenon nicely:

- (1) Suppletion for comparative vs. superlative adjective-forms:

	PATTERN	POSITIVE	COMPARATIVE	SUPERLATIVE	LANGUAGE
a.	AAA	small	small-er	small-est	English
b.	ABB	good	bett-er	be-st	English
c.	ABC	bon-us	mel-ior	opt-imus	Latin
d.	*ABA	good	bett-er	good-est	English'

Many adjectives in many languages, including English *good*, have one base in the positive and a second suppletive base found in both the comparative and superlative, the ABB pattern in (1b). A far smaller but non-trivial number of adjectives, like Latin *bonus* ‘good’, have distinct suppletive bases in all three grades, the ABC pattern in (1c). What is not attested is the scenario in (1d), where a hypothetical version of English, call it English’, has a suppletive comparative base for *good*, but reverts to the non-suppletive base to form the superlative, an ABA pattern.

*ABA patterns have interesting implications for the theoretical debate between RUB and PUB, and for approaches to language universality and variation more generally. On the one hand, *ABA patterns have been used to motivate proposals that paradigmatic orderings reflect structural *containment hierarchies*. For example, [Bobaljik \(2012\)](#) argues that the structure of the superlative *contains* the structure of the comparative, which in turn contains that of the positive. The restrictions on possible syncretisms are then derived from the workings of spell-out, whereby (underspecified) vocabulary items expone *contiguous* regions or *spans* of these hierarchies, as we will demonstrate with examples in Section 2.2. This crucially only works as an explanation of cross-linguistically consistent patterns of syncretism if the containment hierarchies, and thus the grammatical building blocks they are constructed out of, are universal. Thus to the extent that *ABA patterns are cross-linguistically robust, they can provide crucial empirical support for the RUB view that grammatical features are universal with respect to inventory and hierarchy, as we will discuss in more detail in Section 2.

On the other hand, as we will explore in Section 3, the existence of *ABA patterns is not necessarily incompatible with a PUB-based approach to language variation. Such patterns could potentially be derived in terms of (neo-)Gricean reasoning on the part of the language-learner. The idea here would be that whenever a form B stands in pragmatic competition with a form A, where B expones the interpretation β , A must either expone an interpretation α , that is weaker or that is stronger than β . This rules out *ABA patterns whenever α and β stand in an entailment relation.

Against this background, the fundamental questions this paper will try to address can be stated as follows. Do systematic interpretive contrasts across languages derive from the employment of distinct amounts of structure from universal feature hierarchies (i.e. from containment hierarchies)? Or do they stem from differing semantic specifications on simplex formatives that feed into (Neo-)Gricean pragmatic reasoning?

1.5 Nominal pro-forms as diagnostic testing ground

We will examine these questions by investigating *ABA patterns specifically in form-meaning patterns among nominal pro-forms, i.e. different types of pronouns and anaphors, cross-linguistically, based primarily on data reported by [Middleton](#)

(2020). In several languages there is clear morphological evidence that anaphors are structurally complex and built on top of pronouns. E.g. the English anaphor *herself* transparently involves the pronominal form *her* in combination with a morpheme *-self*. Moreover, there is evidence for a cross-linguistic *ABA pattern involving syncretisms between pronouns and two different classes of anaphors. The question is what consequences this should have for the analysis of a language like German, where the dedicated anaphoric form *sich* shows no evidence of being complex or related in any way morphologically to the pronominal *sie* ‘she’. And what about the even more morphologically impoverished pattern found e.g. in Brabant Dutch varieties like Mechelen Dutch where a single form *haar* (‘her(self)’) can be used both anaphorically and pronominally?

How we answer these questions speaks precisely to the debate between RUB and PUB approaches to language variation. Under RUB, the null hypothesis would be that English, German and Mechelen Dutch all have the same underlying feature inventory and hierarchy, presumably something like what is indicated by the English forms, where the anaphor is built on out of the pronoun plus something else. The morphological differences in the surface anaphor vs. pronoun paradigms across these languages would stem from language-specific Spell-Out rules for the exponents of identical features. Under PUB, on the other hand, the null hypothesis would be that distinct amounts of featural complexity for anaphors vs. pronouns are only warranted in a language like English where these correspond to distinct morphological forms. For German, a featural distinction would be warranted, but not necessarily one involving structural complexity, and for Mechelen Dutch, there would be no reason to posit an underlying distinction between anaphors and pronouns at all.

In Sections 2 and 3, we will showcase the analytic tension between RUB and PUB, respectively, with respect to the *ABA patterns for anaphors & pronouns reported by (Middleton, 2020). We will deliberately push the implications of the underlying premises in RUB and PUB to their logical extremes, so as to make the tension between them maximally clear. Once we have done this, in Section 4 we will explore to what extent an intermediate (and potentially more realistic) conceptual position between RUB and PUB is viable and what this might specifically look like. Most importantly, in Sections 5 and 6 we work to shift the debate between RUB and PUB from the conceptual to something more empirically grounded, and developing concrete diagnostics tailored toward the anaphor vs. pronoun distinction, and exploring how they can be applied in future research. This will be crucial to helping us avoid the afore-mentioned problem that such a debate could, otherwise, easily regress into an idle argument over aesthetic preference having to do with subjective valuations and definitions of what constitutes cross-linguistic economy.

2 The *Rich Universal Base Hypothesis* (RUB)

In order to sharpen the contrast with PUB which is at the heart of this paper, we adopt a the maximally strong definition of the RUB position in the following discussion, as laid out in (2).

(2) **Rich Universal Base:**

The basic building blocks of syntactic structure — the inventory and hierarchical ordering of grammatical features — are universal even at fine levels of detail. Structure for which there is overt morpho-syntactic evidence in one language should be assumed to be present (covertly) in all languages.

2.1 Illustrating RUB with a model

We can unpack the RUB position described in (2) by considering what it would mean to adopt it for a typical analytic scenario where we are comparing patterns in two languages X and Y. Language X shows evidence that a particular interpretive contrast — e.g. the contrast between anaphoric and non-anaphoric reference — is tied to a structural contrast. I.e. we can distinguish two interpretations I_1 and I_2 , and these are consistently associated with two distinct forms F_{1x} and F_{2x} , respectively. This suggests that there are distinct structures S_1 and S_2 which mediate the interpretive and formal contrasts (see Figure 1). In contrast, language

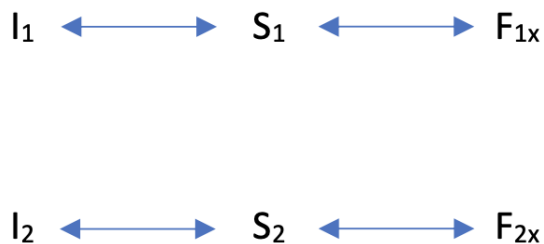


Figure 1: Language X

Y provides no morpho-syntactic evidence for such a structural contrast. The two interpretations I_1 and I_2 can still be distinguished, but there is a single form F_{1y} which is associated with both. What RUB amounts to is the thesis that, all other things being equal, we should nonetheless assume a structural contrast between S_1 and S_2 in language Y, mediating between the two interpretations and the single form (see Figure 2).

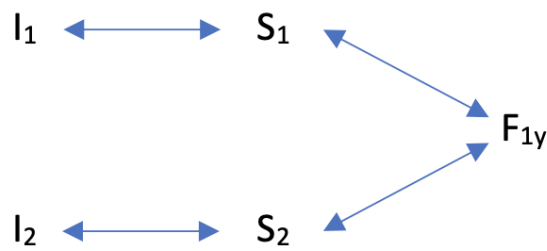


Figure 2: Language Y under RUB

2.2 The argument from *ABA in case

As noted in Section 1.4, one important class of evidence that has been adduced for RUB comes from *ABA patterns. To see how this works in more detail, let us consider one of the foundational examples of this argumentation, from [Caha \(2009\)](#)'s examination of case systems cross-linguistically.¹ Building on an idea from [Blake \(2001\)](#) and an extensive original cross-linguistic study, Caha argues that there is a universal ordering of case categories. A simplified version of the hierarchy is given in (3):

(3) Simplified Blake/Caha hierarchy

Nominative < Accusative < Genitive < Dative < Instrumental < Comitative

This hierarchy is motivated by observations about (at least) two sets of facts cross-linguistically.

First, if a language has a given category on the hierarchy as a morphological case (as opposed to, say, marking it with an adposition), it will also have all of the categories to the left in (3) as morphological cases. For example, Old French has a minimal two-case system N – A, Classical Arabic has a three-case system N – A – G, Modern German a four-case system N – A – G – D, and Old English has a five-case system N – A – G – D – I. What we do not find are languages that mark, say, instrumental relations with a morphological case, but genitive and dative ones solely by means of adpositions.²

¹In what follows, we elaborate on a particular class of RUB-based approach that derives *ABA patterns specifically in terms of structural containment hierarchies, as pursued by [Caha \(2009\)](#); [Middleton \(2020\)](#) among many others. It should be noted, however, that RUB merely requires that the featural differences posited to model the distinct forms for two interpretations in one language also be assumed to be underlyingly present in a language where those two interpretations are syncretic. There are certainly ways to do this such that the featural distinctions do not involve containment hierarchies in the functional structure, but rather differences stated over flat feature sets on individual functional heads. Universal containment hierarchies of the kind we discuss below entail RUB, but the reverse is not the case.

²Note that there is nothing to require that all categories will correspond to *distinct* morphological cases. So a language where there is a distinct instrumental case, but genitive and dative relations are always marked by a syncretic genitive-dative case would be consistent with this hierarchy, as long as this genitive-dative is a morphological case as opposed to an adposition ac-

Second, within any single language, syncretisms between case forms overwhelmingly involve contiguous regions of the hierarchy. This can be demonstrated most succinctly in a language with a three-case system like Modern Greek, with the examples collected in Table 1.³ The language has nouns like ‘word’ with

	‘word’	‘fighters’	‘fighter’	‘alpha’	[not attested]
Nom	λόγος	maxités	maxitís	άλφα	A
Acc	λόγο	maxités	maxití	άλφα	B
Gen	λόγου	maxitón	maxití	άλφα	A
	ABC	AAB	ABB	AAA	*ABA

Table 1: Modern Greek case syncretism patterns

distinct forms for nominative, accusative and genitive, ones like ‘fighters’ that syncretize nominative and accusative to the exclusion of genitive, others like ‘fighter’ that syncretize accusative and genitive to the exclusion of nominative, and still others that have a single form for all three cases. There are none, however, that have a syncretic form for nominative and genitive alongside a distinct form for accusative.

Now, one could object on the basis of this single example that the ordering of the cases has been chosen post hoc to fit the facts to the *ABA template. If we instead posited nominative < genitive < accusative, then we would indeed have ABA patterns, e.g. in ‘fighters’. In other words, we could argue that there is nothing special about “contiguous cells in a paradigm”, given that paradigms per se have no primitive status in the theory, so that the ordering of the categories in a paradigm is an arbitrary choice motivated by ease of presentation. This objection can, however, be defused by the fact that the syncretism effects are not about Modern Greek or any other single language, but instead involve a cross-linguistic pattern with two components. First, for any given language with morphological case, there is (at least) one ordering of the distinct case categories where there are essentially no non-contiguous syncretisms.⁴ Especially for systems with four or more cases, this in and of itself is a non-trivial result. Second, looking across languages, it is always some version of the same ordering of case categories that yields the *ABA pattern — the one given in (3). And furthermore, this same ordering is also relevant for the cross-linguistic inventory patterns. This suggests that the ordering of case categories is not arbitrary after all, but reflects some

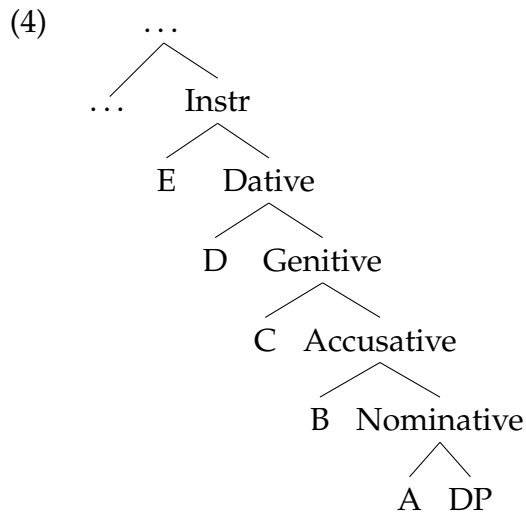
ording to whatever syntactico-morphophonological criteria are used to identify the instrumental as a morphological case.

³We are simplifying a bit here, as Modern Greek additionally distinguishes a vocative case in certain declension classes, but it does not present any difficulties for the analysis.

⁴We say ‘essentially’ because there are a small number of exceptions to this rule. They are, however, rare enough to justify treating them as cases of accidental homophony rather than principled syncretism, and in many instances there is even clear evidence for two distinct suffixes that happen to have the same phonological form. See [Caha \(2009\)](#) for extensive discussion and examples.

deeper property about the grammar of case, which itself is universal.

Caha (2009)'s proposal for how to model this universal ordering is specifically designed to deal with case categories, but it provides a template that can be applied to *ABA patterns more generally. The central idea is that case categories are articulated structures, each case *containing* the next case down the hierarchy in (3), as in (4).



The structure that is realized as dative case is built out of the structure that is realized as genitive case, plus one additional head, and so on down the line. This straightforwardly encodes the ways in which the various cases are related to each other, and in particular directly reflects markedness differences in terms of how much structure they involve. These underlying feature structures are, crucially, universal. Where languages differ is in how they expone these structures (and, relatedly, how they move things around). With suitable assumptions about the workings of morphosyntax, this allows Caha to derive the two sets of cross-linguistic facts. For the inventory effects, ‘having a case’ means that some morpho-syntactic operation leads the relevant heads to be more tightly associated with the noun (phrase) and thus realized via affixes or other morphology rather than as adpositions. This is the result of some morpho-syntactic operation (or series of operations) that leads the relevant heads to be more tightly associated with the noun (phrase). Whatever the details of this operation, the crucial assumption is that it must effectively apply successive-cyclically. So if it can apply to the larger structure defining, say, the dative, then it will also apply to the smaller intermediate structures defining the genitive and accusative, guaranteeing that these, too, will be morphological cases rather than adpositions.

For the syncretism patterns, the fact that the cases are in strict containment relationships with each other sets up structural implications connecting them as implied by the hierarchy in (3). The logic of underspecification and the Elsewhere Principle operating on the processes that expone these implicational structures will make it possible to get ABC, AAB, ABB and AAA patterns, but not ABA pat-

terns (again, aside from accidental homophony). The details depend on whether you deal with competition among possible exponents for insertion in a particular position in terms of Minimal Superset (e.g. Nanosyntax) or Maximal Subset (e.g. DM), but the basic results are the same. For concreteness, we will use Maximal Subset for the discussion here, whereby Vocabulary Items are potentially underspecified, and it is the item specified for the maximal subset of the features in a particular structural environment that wins out for insertion.⁵

Assume a language that has the set of VIs in (5), and recall the structures indicated the the case categories up to the instrumental in (6):

- (5) a. [A] \Leftrightarrow X
 b. [B [A]] \Leftrightarrow Y
 c. [E [D [C [B [A]]]]] \Leftrightarrow W
- (6)
- ```

 Instr
 / \
 E Dative
 / \
 D Genitive
 / \
 C Accusative
 / \
 B Nominative
 / \
 A DP

```

Clearly, X will be inserted in nominative contexts, and W will be inserted in instrumentals, as these VIs are perfect matches. Y is a perfect match for accusatives, but it will also be inserted for genitives and datives, because it has the Maximal Subset of relevant features. In both cases, W is ruled out because it is specified for features not present in the dative and genitive structures, i.e. it is not a subset at all. And X would be eligible for insertion, because it does have a subset of the features, but it is beaten out in the competition by the more highly specified Y. This yields a three-way syncretism for accusative, genitive and dative, and if we zero in on these three cases, that amounts to an AAA pattern.

How could we modify this system to try to yield an ABA pattern? We might think of adding an additional VI specified precisely to match the genitive structure. This would give us the updated inventory of VIs in (7) with the new exponent Z:

<sup>5</sup>This is to simplify the transition to the pronoun-anaphor discussion below, as [Middleton \(2020\)](#) adopts a DM-style Maximal Subset formulation. [Caha \(2009\)](#), operating within Nanosyntax, uses Minimal Superset, whereby items are potentially overspecified, and it is the item with the minimal superset of the features in a particular structural environment that wins out for insertion. There are real and important differences between the two approaches, but they are orthogonal to the concerns of this paper, so we can safely set them aside.

- (7) a. [A]  $\Leftrightarrow$  X  
 b. [B [A]]  $\Leftrightarrow$  Y  
 c. [C [B [A]]]  $\Leftrightarrow$  Z  
 d. [E [D [C [B [A]]]]  $\Leftrightarrow$  W

However, this will not actually lead to an ABA pattern, because the logic of underspecification will mean that we cannot keep Z restricted to the genitive. As before, X, Y and W are perfect matches for nominative, accusative and instrumental, respectively and will win out for insertion there. The new Z is a perfect match for the genitive, and will be inserted there. But what will happen in the dative? In the system laid out in (5), Y had the maximal subset of features and won out, but now it will be outcompeted by Z, which also has a subset of the relevant features, but is more highly specified and thus a better match. There is no way to add a VI for the genitive without having it spread to the dative in this way. The result is thus an ABB pattern (again zeroing in on accusative, genitive and dative), not an ABA one. Indeed, anytime we try to set up an ABA pattern we will have this outcome. If a single underspecified VI is the best match for two structures  $\alpha$  and  $\gamma$ , where  $\gamma$  contains  $\alpha$ , it will necessarily also be the best match for any structure  $\beta$ , such that  $\gamma$  contains  $\beta$  and  $\beta$  contains  $\alpha$ .

Returning now to the broader concerns of this paper, let us consider why such \*ABA patterns as analyzed by [Caha \(2009\)](#) furnish evidence for RUB. The restrictions on possible syncretisms among case categories are derived crucially from the implicational containment structure that defines them. Since these restrictions are cross-linguistically consistent, that containment structure and the ordering of the features involved has to be universal. Otherwise, individual languages could fail to display \*ABA at all, or they could each have their own \*ABA defined on language-specific case hierarchies. One can get a good sense of the issues here by considering earlier work on case syncretism patterns which, following [Hjelmslev \(1935\)](#); [Jakobson \(1936\)](#); [Bierwisch \(1967\)](#), decomposed case categories into component features, but packaged these in unordered feature bundles instead of containment structures. These systems can adequately describe the syncretism patterns found in individual languages, but struggle to constrain those patterns. They are simply not equipped to enforce cross-linguistically consistent \*ABA patterns without extra stipulations (see also [McFadden, 2004, 2007](#), for relevant discussion). In short, for any phenomenon where we observe cross-linguistically consistent \*ABA patterns, we have evidence that that phenomenon involves building blocks that are universal in their details and ordering.

### 2.3 \*ABA applied to pronouns & anaphors

Having seen the basics of applying RUB to \*ABA patterns, let us turn now to the empirical domain that will serve as the focus for our comparison of RUB with PUB. [Middleton \(2020\)](#) presents a detailed study of form-meaning patterns

involving nominal pro-forms across 80 languages. She reports that individual languages have dedicated forms distinguishing up to three distinct interpretations, as laid out in Table 2. To a first approximation, the anaphors in Middleton’s system

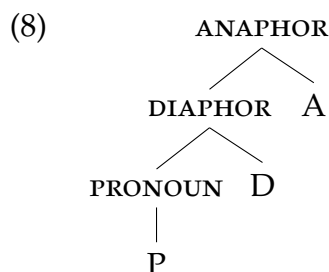
| Pro-form | Logical Function                                                           |
|----------|----------------------------------------------------------------------------|
| ANAPHOR  | Diana $\lambda x$ ( $x$ thinks only Charles $\lambda y$ ( $y$ loves $y$ )) |
| DIAPHOR  | Only Diana $\lambda x$ ( $x$ thinks Charles $\lambda y$ ( $y$ loves $x$ )) |
| PRONOUN  | Only Diana $\lambda x$ ( $x$ thinks Charles $\lambda y$ ( $y$ loves $z$ )) |

Table 2: Middleton’s three types of pro-form

correspond to locally bound reflexives, the elements that are subject to Condition A — i.e. they must be bound in a local domain — in classic GB-era Binding Theory (Chomsky, 1981, etc.). The diaphors are what are sometimes referred to as long-distance anaphors — elements that must be bound, but *not* within a local domain. The pronouns, in contrast, must not be bound at all.

Middleton shows that the association of these three interpretations with different forms crucially show a \*ABA pattern cross-linguistically. Some languages (including Icelandic and Yoruba) have three distinct forms, an ABC pattern. Others (like English and Balinese) have a single form for pronouns and diaphors, distinct from anaphors, an AAB pattern. Still others (e.g. Cantonese and Turkish) have a single form for diaphors and anaphors, which is distinct from pronouns, which is an ABB pattern. Finally, there are languages (like Kinyarwande and Samoan) that don’t make any distinctions, having the AAA pattern with a single form for all three interpretations. What does not occur in Middleton’s sample are languages with a single form for pronouns and anaphors that is distinct from that for diaphors — what would be the ABA pattern.

This is thus entirely analogous to what Caha (2009) described for case syncretism as well as to other \*ABA patterns like that described by Bobaljik (2012) for suppletion in comparatives and superlatives and those described by the various papers in the *Glossa* Special Collection on \*ABA.<sup>6</sup> The core of Middleton (2020)’s analysis is thus again a universal containment structure, shown in (8):



The structure of the anaphor contains that of the diaphor, which in turn contains that of the pronoun. There is a sense in which the structural complexity reflects

<sup>6</sup><https://www.glossa-journal.org/collections/special/aba/>

the degree of restrictedness of the interpretation. At the most basic level of the P we find whatever interpretive information is common to all nominal pro-forms. The D head that builds diaphors adds a restriction that this element must be bound by an antecedent, and the A head adds an additional restriction that this antecedent be local. Coupled again with suitable assumptions about spell-out, this structure can be used to capture the constraints on possible syncretisms that Middleton observes.

Consider a language with the VIs in (9), again assuming that competition for exponence is regulated by a version of Maximal Subset.

- (9) a. [P]  $\Leftrightarrow$  X  
 b. [D [P]]  $\Leftrightarrow$  Y

Clearly, X will expone pronouns, and Y diaphors, since they are perfect matches for the relevant structural contexts. To get an ABA pattern, we would have to set things up so that X would also expone anaphors. Now, (9a) taken on its own is eligible to spell out an anaphor structure, because it is specified for a subset of the [A [D [P]]] features. However, in the language characterized by (9) it will never be able to do so, because it is in competition with (9b), which is specified for more of the relevant features and so wins out by Maximal Subset. Y thus gets inserted for anaphors and we would get here an ABB pattern.

The only way to get a surface ABA pattern would be by accidental homophony, as with the inventory of VIs in (10):

- (10) a. [P]  $\Leftrightarrow$  X  
 b. [D [P]]  $\Leftrightarrow$  Y  
 c. [A [D [P]]]  $\Leftrightarrow$  X

This is just like the system in (9), but it has an additional VI (10c) specified to exactly match the anaphor structure. Crucially, the form that it inserts happens — purely by accident — to be identical to the form supplied by (10a) for the pronoun structure. This is clearly distinct from true syncretism, because we don't have a single exponent showing up for principled reasons in two distinct contexts, but rather two distinct exponents that happen to sound the same. Another way to put it is that this is really an ABC pattern masquerading as ABA. As a matter of principle, we can expect such things to arise occasionally by chance, but only quite rarely. We thus have an account for the observed \*ABA pattern (with the possibility to deal with occasional counterexamples).

Middleton shows furthermore that her containment analysis of pro-forms is motivated not only by syncretism patterns, but also by transparent morphology. As noted back in Section 1.5, in some languages the make-up of the surface forms directly reflects the proposed containment structure. E.g., in many languages the anaphor is transparently built out of the pronoun plus some additional element,

as in English *her-self*, *my-self*. In others, the anaphor is built on the diaphor, as in Icelandic anaphor *sjálfan sig* alongside diaphor *sig*, and in still others, like Peranakan Javanese of Semarang, there is transparent morphology corresponding to all three parts of the structure. In contrast, there does not seem to be transparent morphology suggesting any decomposition of pro-forms that would be inconsistent with the containment structure in 8. That is, we don't find languages in which the form of the pronoun transparently includes the form of the anaphor, like a reverse version of English where, say, *self* is the anaphor and *self-her* is the pronoun.

What is crucial for the purposes of this paper is that the cross-linguistic consistency of the patterns motivates positing the structure in 8 even in languages where it isn't transparently reflected in the morphology. That is, it supports RUB. Imagine hypothetically that languages could vary in how the different interpretations were mapped onto structure. In some languages the containment relationships would be different, e.g. with the diaphor built on the pronoun, which in turn is built on the anaphor. In others, the pronoun and anaphor interpretations would simply have no featural component in common. If this were the case, there would be no cross-linguistically consistent arrangement of the three interpretations associated with an \*ABA pattern, and we would expect cases of 'reverse' transparent morphology as in the alternative version of English with *self-her* described above. Assuming that universals are at work here along the lines of RUB explains why this is not what we find.

### 3 The *Poor Universal Base Hypothesis* (PUB)

As outlined in Section 1, an alternative to RUB is PUB, the Poor Universal Base Hypothesis, which states that the building blocks of syntactic structure — the inventory and hierarchical ordering of grammatical features — should not be taken to be universal:

(11) **Poor Universal Base:**

Only structure for which there is overt morpho-syntactic evidence in a language should be assumed to be present in that language.

#### 3.1 Background: PUB, UG and learnability

(11) amounts to saying that that (i) syntactic building blocks can vary considerably across languages; and (ii) to the extent that that there appear to be universal constraints on such inventories, alluding to UG should be thought of as a theoretical last resort. Only if such inventories cannot be explained otherwise can they be taken to be part of our genetic linguistic endowment.

To illustrate the differences between RUB and PUB, let's have another look at the analytic scenario presented in Section 2.1. Suppose again that Language X shows evidence that a particular interpretive contrast ( $I_1$  vs  $I_2$ ) is derived from a structural contrast ( $S_1$  vs  $S_2$ ), where the two structures  $S_1$  and  $S_2$  receive the exponents  $F_1$  and  $F_2$ , respectively. This is depicted in Figure 3 below. In contrast,

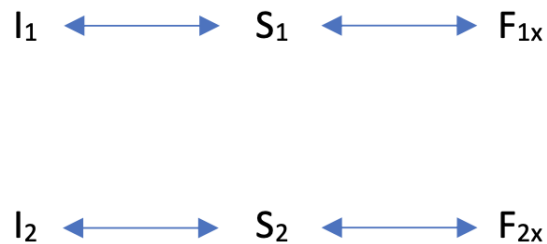


Figure 3: Language X, repeated

Language Y provides no morpho-syntactic evidence for such a structural contrast. I.e., there is a single form  $F_1$  which is associated with both interpretations  $I_1$  and  $I_2$ . Now PUB says that, *ceteris paribus*, the interpretive contrast does not reflect a structural contrast between  $S_1$  and  $S_2$ , but a single structure  $S_1$ , which mediates between the two interpretations and the single form  $F_1$ , as depicted in Figure 4.

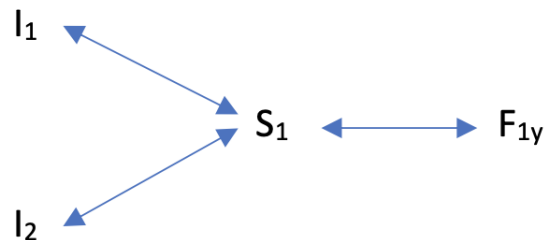


Figure 4: Language Y under PUB

Naturally, the question arises as to whether RUB or PUB is to be preferred on theoretical and/or empirical grounds. This boils down to the bigger question as to whether any featural hierarchies that can be attested in a particular language are determined by UG or whether they are acquired during the language acquisition process. The guiding intuition behind PUB is that the default answer to this question should be the latter. The reason for this is that the attribution of grammatical knowledge to UG should be based on Poverty-of-the-Stimulus (PoS) arguments: instances of grammatical knowledge that cannot be acquired solely on the basis of the language input.

As far as language-internal featural inventories are concerned, PUB assumes an emergentist view where a language-learning child postulates the existence of



certain syntactic features only if there is overt morpho-syntactic evidence for them in the language input. In other words, only those syntactic features of which there is a grammatical reflex — for instance, different parts of speech, involvement in agreement relations, triggers of movement — can be considered part of the formal feature inventory of the target language. Other potential syntactic features must taken to be absent, irrespective of whether they are active in other languages.

The same also holds for the internal structuring of syntactic features. Again, hierarchical relations between features are learnable, provided that the child has (innate) access to the fact that syntactic structures are hierarchical in the first place (cf. [Chomsky and Berwick, 2016](#)). As such, hierarchies reflect themselves in the language input by means of inflectional orderings, (certain) word order effects, scopal relations, etc.

### 3.2 Universal hierarchies within PUB

As the above shows, the primary reasons to take PUB as the null hypothesis are based in language-internal grounds: only PoS-considerations form a solid conceptual reason to postulate particular instances of innate grammatical knowledge. At the same time, such a perspective faces serious empirical problems in explaining why the same hierarchical relations are attested across languages. Emergentist perspectives would predict the possibility of substantial cross-linguistic variation in this respect, contrary to what is observed. In contrast, approaches like RUB can explain such universal hierarchies in a straightforward fashion by attributing them to UG. The central question, then, when it comes to evaluating between RUB and PUB is to what extent PUB is able to account for the various universal hierarchies that have hitherto been identified.

Note then that it is not a priori excluded that such attested hierarchies could be explained on extra-grammatical grounds. In that case, no allusions to UG have to be made. From the perspective of PUB, then, apparent universal featural hierarchies only provide evidence for a universal feature structure in the absence of any extra-grammatical foundation. Put differently, only if a particular observed universal feature hierarchy cannot result from extra-grammatical mechanisms should that hierarchy be taken to be part of UG.

Now, to what extent are such extra-grammatical explanations for universal feature hierarchies available? In light of the earlier discussion, here we aim at considering what kinds of explanations might be available for \*ABA patterns, like the ones observed by ([Caha, 2009](#); [Bobaljik, 2012](#); [McFadden, 2018a](#); [Middleton, 2020](#)). Again, we focus on the \*ABA pattern in the domain of nominal pro-forms as observed by ([Middleton, 2020](#)). Is it possible to explain this pattern in extra-grammatical terms? Below, we formulate a particular attempt to do so.

### 3.3 A neo-Gricean account of \*ABA for nominal pro-forms

One way to account for \*ABA patterns in an extra-grammatical way is by attributing them to existing pronominal entailment relations. To see this, let us look at Middleton's hierarchy again.:

- (12) ANAPHOR > DIAPHOR > PRONOUN

This makes it possible to explain what look like syncretisms not in terms of spell-out rules targeting different parts of structures, but rather single meanings. I.e., what look like syncretisms are actually cases of single structures with an under-specified meaning, not of different structures receiving the same exponent.

To clarify this, as a starter take a look at English, which morphologically distinguishes pronouns and diaphors from anaphors, yielding an AAB pattern. There are two ways to explain the semantic differences between the following examples:

- (13) Oprah thinks that only Meghan loves *herself*.  
 (14) Oprah thinks that only Meghan loves *her*.

The first is by assigning LFs in which it is encoded that *herself* must be bound by a local antecedent and that *her* may not be bound by a local antecedent (i.e., it is only non-locally bound or free). This is shown in (15) and (16):

- (15) Oprah thinks that only Meghan loves *herself*.  
 Oprah  $\lambda x$  (x thinks that only Meghan  $\lambda y$  (y loves y))  
 (16) Oprah thinks that only Meghan loves *her*.  
 Oprah  $\lambda x$  (x thinks that only Meghan  $\lambda y$  (y loves z)), where  $z \neq y$

The second way is by assigning LFs like those in (17) and (18), where only the meaning of *herself* is restricted:

- (17) Oprah thinks that only Meghan loves *herself*.  
 Oprah  $\lambda x$  (x thinks that only Meghan  $\lambda y$  (y loves y))  
 (18) Oprah thinks that only Meghan loves *her*.  
 Oprah  $\lambda x$  (x thinks that only Meghan  $\lambda y$  (y loves z))

The major difference between the meanings in (15)-(16) and (17)-(18) is thus that in (16), but not in (18), it is part of the meaning of *her* that it may not be bound by a local antecedent. That is, in (16) but not in (18) *her* may refer back to Meghan.

At first sight, the second approach appears empirically weaker than the first one, as in (18) *her* clearly *cannot* refer to Meghan. Note however that (17)-(18) stand in a unidirectional entailment relation: (17) entails (18), but not the other way round. Thus any form of (Neo-)Gricean reasoning — either in terms of Maximized Presupposition or the Maxim of Quantity (depending on whether the

meaning contributions of pronouns are presuppositional or assertive in nature, an issue that is orthogonal to our purposes here) — will ensure that whenever (14) is uttered, the hearer will be able to infer that the speaker did not intend to convey the stronger meaning expressed by the (13). Hence, the fact that in (18) *her* does not refer to Meghan is still guaranteed. The 'Principle B'-effect in (14) results then from pragmatic competition, not from underlying differences in feature structures.

That such Principle B effects are not directly syntactically/semantically encoded, but are rather indirectly triggered as a result of pragmatic competition comes with certain advantages. First, syntactic/semantic operations are generally not known to trigger distinctness effects, which is what a syntactic version of Principle B would ultimately boil down to.<sup>7</sup> Second, the existence of so-called Delay-of-Principle-B effects (the phenomenon that children acquire Principle B effects much later than Principle A effects) indicates that Principle B has a different grammatical status than Principle A. Indeed, Principle B effects are only acquired at the time when children have already acquired pragmatic, (Neo-)Gricean reasoning (Chien and Wexler, 1990, et seq.), something that is fully in line with PUB. Note that this more pragmatic nature of Principle B also reflects itself in examples like (19). Whereas Principle A effects are hard-wired and cannot fail to apply, Principle B effects can thus be overridden.

- (19) Talking about Suzanne, everybody likes her. Bill likes her. Peter likes her. Even Suzanne likes her.

### 3.4 Deriving Middleton's observation

The above-sketched mechanism opens up the way to account for Middleton's observation. The key here is that what appear to be syncretisms are not really instances of a single exponent corresponding to multiple structures, each with a meaning of its own, but rather cases where what underlies the single exponent really is one structure, which is associated with an underspecified meaning. For instance, in the absence of a morphological distinction between any (dia-/anaphoric) pronouns, there is simply one underlying lexical item rather than two that happen to be obscured by syncretism. Mechelen Dutch *haar* ('her(self)'), which can be used for all relevant meanings, is simply the spell-out of one pronominal structure that presupposes a feminine referent and has no further restrictions, thus yielding an AAA pattern.

<sup>7</sup>That is, there are familiar grammatical operations like reduplication, clitic-doubling and agreement that create copies or make two elements in a grammatical dependency more similar to each other. It is harder to come up with ones that make elements in a grammatical dependency *less* similar (though see Richards, 2010, for discussion of potential examples under the rubric of Distinctness).

Now let's see what happens if there is more than one relevant exponent. Crucially, under pragmatic competition, if a stronger B stands in pragmatic competition with a weaker A, there is no way that A can be the exponent of anything stronger than B. Three meaning constructs P, Q and R — where R entails Q and Q entails P — can never be realized by means of ABA, where A is the Spellout of P, B the Spellout of Q and A again the Spellout of R, except in the case of purely accidental homophony. To illustrate this, take the following renderings of the anaphoric, diaphoric and pronominal readings:

- (20) ANAPHORIC READING: Oprah  $\lambda x$  (x thinks that Meghan  $\lambda y$  (y loves z)),  
*where z is y*
- (21) DIAPHORIC READING: Oprah  $\lambda x$  (x thinks that Meghan  $\lambda y$  (y loves z)), *where*  
*z is x or y*
- (22) PRONOMINAL READING: Oprah  $\lambda x$  (x thinks that Meghan  $\lambda y$  (y loves z)),  
*where z is x, y or someone else*

Now, consider a language with the following spell-out rules for a pronoun and its corresponding diaphor:

- (23) Pronoun  $\Leftrightarrow X$   
 (24) Diaphor  $\Leftrightarrow Y$

Clearly, use of  $X$  will give rise to the pronominal reading, and use of  $Y$  to the diaphoric reading. Based solely on (23)-(24), both  $Y$  and  $X$  may in principle also be used when an anaphoric reading is intended: they are semantically compatible with that, given that they allow  $z = y$ . However, since the reading of  $Y$  is stronger than  $X$ , the use of  $X$  for an anaphoric reading is blocked. Similarly, since the reading of  $Y$  is stronger than that of  $X$ , use of  $X$  for a diaphoric reading is blocked as well. This together creates a \*ABA effect: use of pronoun  $X$  will never result in an anaphoric reading. The only way to get an ABA-pattern would be by accidental homophony as in (25), where the exponents introduced by (25a) and (25c) are clearly two different things, in spite of both being pronounced  $X$ .

- (25) a. Pronoun  $\Leftrightarrow X$   
 b. Diaphor  $\Leftrightarrow Y$   
 c. Anaphor  $\Leftrightarrow X$

Hence, \*ABA patterns can be derived for those elements, like pronouns, diaphors and anaphors, whose underlying meaning contributions stand in entailment relations. Consequently, such \*ABA patterns need not constitute evidence for a universal inventory of building blocks à la RUB. Rather, they are fully in line with the null hypothesis of PUB.

As a final remark, we note that the observation discussed in Section 2.3, that in many languages the anaphor is transparently built out of the pronoun plus

some additional element (as in English *her-self*) can be explained under PUB as well. Crucially, the meaning of an anaphor under PUB is based on the meaning of the corresponding pronoun. The meaning of an anaphor like *herself* necessarily makes reference to the meaning of a pronoun like *her*. It is not unnatural to assume that in certain languages (though not all) these meaning structures are reflected in morpho-syntactic structures. This explains why complex anaphors are often built on simplex anaphors. In this light, it is not surprising either that cases of ‘reverse’ transparent morphology (e.g. complex pronouns built on simplex anaphors where, say, *self* is an anaphor and *self-her* is a pronoun) are not attested cross-linguistically.

Naturally, it must be emphasized that this does not make any claims about the status with respect to the universal base underlying \*ABA patterns that cannot be reduced to pragma-semantic blocking. Hence, it remains to be seen whether these can also be analysed along the lines of PUB or provide evidence for RUB instead.

## 4 Intermediate solutions: between RUB and PUB

As mentioned at the outset, we have deliberately chosen to describe the strongest possible versions of RUB and PUB in the preceding sections so as to more clearly illustrate the analytic tension between them. But it is important to bear in mind that these are ultimately logical poles which stand at opposite ends of a *continuum* of possible ways to capture patterns of language variation. The perhaps more realistic question is not about a binary choice between RUB and PUB. Rather, we should ask where along the continuum we find the *optimal balance* between detailed empirical coverage of cross-linguistic variation and language universals without an overburdened UG. Below, we describe a few concrete scenarios that showcase what such an optional solution to language variation, intermediate between RUB and PUB, might look like.

### 4.1 Universally sparse, individually articulated base

Here we discuss two concrete strategies for one class of solution to language-variation that is intermediated between RUB and PUB, proposed in [Ramchand and Svenonius \(2013\)](#) and [Wiltschko \(2014\)](#), respectively. These both have in common the idea that a highly articulated featural base is not a part of UG, i.e. part of the innate endowment underlying all human languages. At the same time, they propose that there are grammatical principles which can *derive* the featural articulation required to capture robust empirical patterns (like \*ABA) across languages. Such an intermediate position has the advantage that it can capture language-specific peculiarities and categorial mismatches without abandoning the idea of a UG or universal categories wholesale.

### 4.1.1 Sortal domains (Ramchand and Svenonius, 2013)

The core idea of Ramchand and Svenonius (2013) is described in the following excerpt: “We adopt (as working hypothesis) the Minimalist conjecture that a fine-grained hierarchy of functional heads cannot be part of UG; that is, it cannot be innate and specific to language. We are persuaded that Cartographic work shows that there are fine-grained hierarchies of functional heads in each language, and that they are similar to each other . . . ” (p. 3). To this end, Ramchand & Svenonius propose a universal tripartition of the clause into a V-domain, a T-domain and a C-domain, but they ground this in terms of *sortal* domains based on conceptual primitives, themselves ordered as *Proposition* > *Situation* > *Event* due to how their meanings build on each other. Further articulation within these domains can be language-specific in its level of granularity at different points and its details, allowing for the real cross-linguistic variation that is found. However, since all of that articulation must be consistent with the basic semantics of the sortal domains, much of what is found even at the level of detail will be consistent across language. Finally, a residue of strict hierarchy effects that cannot be reduced to any of these factors is attributed to selectional restrictions.

### 4.1.2 The Universal Spine Hypothesis (Wiltschko, 2014)

The Universal Spine Hypothesis developed in (Wiltschko, 2014) is similar in spirit but varies in the details. Wiltschko proposes that (i) “language-specific categories ( $c$ ) are constructed from a small set of universal categories  $\kappa$  and language-specific UoLs [Units of Language]; [ $c = \kappa + \text{UoL}$ ]. (ii) The set of universal categories  $\kappa$  is hierarchically organized where each layer of  $\kappa$  is defined by a unique function.” (p. 24) In other words, just as in Ramchand & Svenonius’ model, we start with a sparse set of universal categories which can then serve as a universal base to construct language-specific categories with. Such an intermediate position has the advantage of being able to balance universality, in the form of  $\kappa$ , with language-specificity, in the form of  $c$ .

## 4.2 A case-specific intermediate solution to RUB vs. PUB

A different class of intermediate solution involves proposing that the kind of approach one adopts to language variation be relativized to the empirical phenomenon in question. This is equivalent to claiming that the choice between RUB and PUB is not an absolute one but must be made on a case-by-case basis.

This is not an unreasonable strategy. Specifically, RUB might well be more appropriate for empirical phenomena with an uncontroversially morpho-syntactic footprint. For instance, the distinctions among case categories, with the potential exception of the more oblique cases (e.g. the various types of local cases in a

language like Finnish), has often been observed to have, at best, a tenuous relationship with semantics. It is difficult to imagine how a neo-Gricean PUB-style account based on the interpretations associated with competing morphological forms could account for the \*ABA patterns in case syncretism, given that there aren't clear semantic entailment relationships between the cases that could serve as the basis for pragma-semantic blocking. As we have already seen in Section 2.2, a RUB-based account like that in [Caha \(2009\)](#) can readily deal with such patterns in terms of syntactic containment hierarchies. Conversely, a PUB-oriented approach might be better suited for contrasts which are primarily or exclusively supported by interpretive evidence, with clear (semantico-pragmatic) entailment relations holding between the meanings underlying forms A, B and C. The distinction between pronouns, diaphors and anaphors is largely defined in terms of interpretation, and this is what makes it reasonably straightforward to articulate a version of PUB to model the relevant patterns.

Note, incidentally, that a phenomenon-specific approach to language variation is by no means incompatible with the other class of intermediate strategies just described in Section 4.1, where language-specific featural articulation is derived by restricted grammatical principles applied to a sparse universal base.

## 5 The wheel-spinning problem & how to avoid it

In this section, we discuss the importance of grounding the choice between RUB and PUB, or indeed some intermediate variant that combines insights from both as just discussed in Section 4, by means of independent empirical diagnostics. We focus in particular on what such empirical grounding might look like for the specific phenomenon that has formed the bulk of the empirical background for the discussion in this paper, namely morphological paradigms of nominal pro-forms cross-linguistically.

As should hopefully be clear, RUB and PUB are both ultimately Minimalist-compatible in the sense that both are guided by the methodological heuristic of the SMT that the optimal solution to language variation is the one that posits the simplest possible grammatical machinery that is capable of accounting for the empirical landscape of language universals and variation. Where they differ is in where the emphasis is placed in the notion of simplicity. Per RUB, positing the same detailed syntactic structure for all languages allows for a simpler account of cross-linguistic universals. This is prioritized even if it comes at the expense of a richer UG and the frequent use of more complex abstract structures for the analysis of an individual language than that languages might itself provide direct evidence for. The guiding principle of PUB, in contrast, is that positing language-specific structural inventories allows for a simpler UG and transparent mappings between structure and form, on the one hand, and between structure and meaning, on the other in individual languages. This is seen as preferable,

even if it comes at the cost of positing significant variation in syntactic structures across languages, thereby necessitating an independent account of cross-linguistic universals.

The debate between two approaches thus ultimately reduces to one over which type of simplification should be prioritized. Given the absence of an *independently motivated* metric of parsimony, there is no objective way to resolve this tension, and the choice between the two regresses into an idle, *aesthetic* exercise in speculation and pontification. How do we resolve this wheel-spinning problem? Ultimately, the only valid solution is one that is scientifically, rather than aesthetically, motivated, thus guided by questions that can be settled empirically. Of course, it is not a trivial matter to sharpen competing high-level theoretical approaches sufficiently to derive unambiguously distinct empirical predictions, or to identify actual datasets with the requisite properties to test those predictions.

In this section, we will lay some of the groundwork for this undertaking by developing empirical diagnostics to tease apart the RUB and PUB approaches, specifically as concerns nominal pro-forms. Anaphors and pronouns have been observed to differ both syntactically and semantically in various ways across languages. We will look at two such differences here and discuss how they can help adjudicate the choice between RUB and PUB. It is important to bear in mind that these diagnostics, even if they are conclusive in favor of one approach or the other for nominal pro-forms, do not necessarily have any bearing on how variation for a distinct linguistic phenomenon — like syncretism patterns for case or suppletion of comparatives and superlatives — should be handled.

## 5.1 A syntactic difference: the Anaphor Agreement Effect

One fundamental distinction between anaphors and pronouns that has been discussed in the literature has to do with the so-called Anaphor Agreement Effect (AAE). This is the observation, originally made in Rizzi (1990) and discussed at length in (Woolford, 1999; Sundaresan, 2016; Preminger, 2019; Murugesan, 2019; Raynaud, 2020, a.o.) that an anaphor cannot trigger co-varying  $\phi$ -agreement. Pronouns, on the other hand, are capable of doing so. Rizzi’s original observation was motivated by minimal pairs like the one below, from Italian (Rizzi, 1990, 3):

- (26) A loro interess-ano solo i ragazzi.  
 to them interest-3PL only the boys.NOM  
 ‘They<sub>i</sub> are interested only in the boys<sub>i</sub>.’
- (27) \*A loro interess-ano solo se-stessi.  
 to them interest-3PL only them-selves.NOM  
 ‘They<sub>i</sub> are interested only in themselves<sub>i</sub>.’ (Intended)

$\phi$ -agreement in Italian is typically triggered by a nominative argument. In (26), the nominative object ‘the boys’ successfully triggers 3rd-person plural agreement



on the verb. But if we replace this object with a plural nominative anaphor, as in (27), the sentence becomes ungrammatical. When the anaphor appears in the genitive case, as in (28) (Rizzi, 1990, 33), ungrammaticality is obviated and the clausemate verb surfaces with default 3rd-person singular agreement, instead:

- (28) A loro import-a solo di se-stessi.  
 to them matters-3SG only of them-selves  
 ‘They<sub>i</sub> only matter to themselves<sub>i</sub>.’

Taken together, these patterns show that  $\phi$ -covarying agreement is disallowed just in case the agreement controller is anaphoric, leading Rizzi to conclude that “[T]here is a fundamental incompatibility between the property of being an anaphor and the property of being construed with agreement” (Rizzi, 1990, 28). Subsequent analyses (Woolford, 1999; Haegeman, 2004; Tucker, 2011) have verified the robustness of the AAE across languages with an array agreement and anaphor patterns. These have also shown that languages employ a range of parametrized strategies in order to avoid a violation of the AAE, for example, detransitivizing the verb, agreement-switch, default agreement or oblique case-marking the anaphor. Regardless of the specifics of these patterns, which are not our main concern here, the existence of a restriction like the AAE can be derived under the assumption that anaphors and pronouns differ featurally. These featural differences can in principle be mapped onto flat or hierarchically contained structures, and versions of both have been proposed in the literature.

Under the first approach, the distinction between anaphors and pronouns involves “flat” featural structures, i.e. different specifications in set-based feature structures, which have no bearing on the hierarchical structure of these elements (Sundaresan, 2016; Murugesan, 2019; Raynaud, 2020). For instance, Murugesan proposes that anaphors have unvalued but interpretable  $\phi$ -features. The syntactic correlate of anaphora is the valuation of these  $\phi$ -features on the anaphor by a local nominal with valued  $\phi$ -features, which is then understood to be its binder. Since the anaphor constitutes a  $\phi$ -probe in its own right, it cannot value the  $\phi$ -features on a  $\phi$ -probe involved in more conventional agreement like T or  $v$ , unless the anaphor has itself already been valued by its binder by the relevant point in the derivation. Murugesan convincingly argues that such a state-of-affairs requires a cross-linguistically quite unlikely combination of factors: in most languages, the anaphor is merged first, in object position while its intended binder is merged in subject position in Spec,  $v$ P. The  $\phi$ -probe responsible for object agreement is merged in an intermediate position between the anaphor and its binder, e.g.  $v$ . As such, assuming probing happens as soon as possible, the anaphor has no chance to be valued by its binder at the point  $v$  probes downward for  $\phi$ -values, because its binder will not yet have been merged in the structure. The AAE is the result of the anaphor’s failure to satisfy the needs of the  $v$  probe. The true test of the validity of Murugesan’s proposal lies in his demonstration that the few cases of apparent AAE-obviation, observed in languages like Standard Gujarati or Archi, indepen-

dently involve: (i) structural orderings where the  $\phi$ -binder is merged before the  $\phi$ -probe responsible for agreement; and (ii) the  $\phi$ -binder, despite being minimally closer to the downward probing functional head, is invisible to it. The anaphor is thus itself fully  $\phi$ -valued by the time the agreement probe seeks to be valued by it, and can successfully value this probe: an obviation of the AAE, far from being unexpected, is then precisely what is predicted by such a state-of-affairs.

The second approach builds on the containment hierarchy independently motivated in Middleton (2020) to explain \*ABA patterns in nominal pro-forms, as discussed in Section 2.3 above. Preminger (2019) argues that the hierarchical structure of the anaphor, which monotonically contains that of the diaphor and the pronoun, also makes it invisible as a goal for  $\phi$ -agreement. Specifically, he argues that the outer anaphor shell functions like a barrier, trapping the  $\phi$ -features of the pronoun under it. An anaphor is thus much like an oblique case-marked nominal, which has been argued to be analogously opaque to  $\phi$ -probing in many languages by virtue of the K(ase) or PP shell that underlies the case-marking, which traps the  $\phi$ -features of the nominal under it (see e.g. Rezac, 2008; McFadden, 2018b). This again has the result that the anaphor cannot value the  $\phi$ -features of a  $\phi$ -probing head like T or *v*, resulting in the AAE. To explain the absence of AAE-effects in languages like Standard Gujarati, Preminger must say that the anaphoric shell exceptionally allows the percolation of  $\phi$ -features to the root AnaphP node, which circumvents the barrierhood of that structural level.

Here, we will not dwell further on the pros and cons of one approach vs. the other. Rather, we will point out that both approaches involve positing featural differences in the syntax of anaphors vs. pronouns. The existence of such a featural distinction is assumed to be universal under RUB. But it is compatible with a PUB-based approach only where the featural distinction yields distinct effects at the morpho-syntactic interface. In other words, under PUB we would not assume an underlying anaphor/pronoun featural distinction in a language with an AAA paradigm for the morphological forms of these elements.

## 5.2 A semantic difference: strict vs. sloppy readings under ellipsis

Anaphors and pronouns also differ in their interpretive behaviors, beyond just the basic facts of coreference. Bound variable pro-forms have been observed to yield obligatorily sloppy identity readings when c-commanded by definite DPs such as R-expressions (Reinhart, 1983). In contrast, regular pronouns may take split antecedents and may have both bound-variable sloppy readings and strict readings under definite DPs, due to their ability to refer discourse-pragmatically. This is illustrated below for constructions involving obligatorily controlled PRO (which is an obligatorily bound variable) vs. a regular pronoun:

- (29) *Only Sue<sub>i</sub> wanted [PRO<sub>{i,\*j}</sub> to ride the roller-coaster].*

- a. BOUND-VARIABLE  $\checkmark$ :  $\forall x.[Want(x, RideRollerCoaster(x)) \rightarrow (x = Sue)]$   
 b. STRICT  $\times$ :  $\forall x.[Want(x, RideRollerCoaster(Sue)) \rightarrow (x = Sue)]$
- (30) Only  $Sue_i$  thought [ $she_{\{i,j\}}$  was riding the roller-coaster].  
 a. BOUND-VARIABLE  $\checkmark$ :  $\forall x[Think(x, RideRollerCoaster(x)) \rightarrow (x = Sue)]$   
 b. STRICT  $\checkmark$ :  $\forall x[Think(x, RideRollerCoaster(Sue)) \rightarrow (x = Sue)]$

Similarly, a string containing an elided bound variable can only yield sloppy readings, while an analogous string containing a free one can yield strict or sloppy readings.

An anaphor is conventionally understood to be an obligatorily-bound variable, with further internal sub-classifications having to do with whether this is also reflected in its syntactic structure or not (see e.g. Sundaresan, 2020, for discussion). A pronoun, in contrast, is an optionally bound one, as we have just seen. This means that an anaphor should yield only sloppy readings under ellipsis, while a pronoun should be able to yield strict or sloppy readings under ellipsis.<sup>8</sup>

### 5.3 Implications for the choice between RUB and PUB

Per RUB, there is a series of distinct syntactic structures for nominal pro-forms that is universal across languages, independent of the inventory and details of surface morphological realizations made available by each individual language. As such, regardless of what syncretism patterns are observed in their morphological forms (AAA, AAB, ABB or ABC), elements with particular interpretations should show characteristic syntactic and semantic behaviors. Concretely, under RUB, even a language that does not distinguish anaphors and pronouns in terms of their overt forms should nonetheless distinguish them featurally. Whether such distinctions are implemented in terms of flat or hierarchical feature structures, such a language should still obey the AAE: there should be anaphors which are unable to trigger  $\phi$ -covarying agreement alongside pronouns that are able to do so, even if they are pronounced the same. Similarly, the anaphor should yield only sloppy readings under ellipsis while the pronoun should be able to yield strict or sloppy readings under ellipsis.

PUB on the other hand explicitly favors a transparent mapping between syntactic structure, morphology and semantics. As such, a language with an AAA pattern (like Mechelen Dutch) must have a single, undifferentiated feature-structure, with an underspecified semantics which which can be used anaphorically or pronominally depending on the intended reading, and conditioned by pragmatic

<sup>8</sup>A different diagnostic which appeals to the same distinction has to do with the availability of *de se* vs. *de re* readings in the scope of an attitude. An anaphor should yield only *de se* readings under an attitude while a pronoun can yield *de re* or *de se* readings. However, we do not pursue this diagnostic further here. For one thing, such a distinction is notoriously difficult to test. For another, there is independent reason to doubt its cross-linguistic robustness: e.g. Pearson (2013) argues that logophoric pronouns in Ewe *can* be interpreted *de re* under attitudes in certain contexts.

well-formedness principles of language use. Under such a view, we should find no syntactic or semantic differences between the anaphoric and pronominal uses of this undifferentiated element. Concretely, this predicts that there should be no syntactic differences relating to the AAE associated with different readings of the unified pro-form, nor should there be asymmetries in the availability of strict and sloppy readings under ellipsis.

RUB and PUB thus make distinct empirical predictions with respect to these diagnostics for languages that do not morphologically distinguish anaphors from pronouns. In the next section, we will take a first step toward putting these predictions to the test. It should be noted that what we report here is necessarily preliminary. This is because, while the distinct predictions of the two approaches are reasonably clear, actually testing them is far from trivial. For one thing, the diagnostics require a number of properties to align in the right way, which severely restricts the set of languages in which the tests can be carried out. For another, even once appropriate languages have been found, constructing paradigms to properly run the tests while avoiding various confounding facts can be quite difficult, requiring deep familiarity with the structural properties and quirks of the particular language. Finally, these are complex patterns being tested, with multiple moving parts. This means that the analysis of results is not always straightforward, with individual patterns often susceptible to multiple interpretations. This is what what we do below is necessarily a first step. We describe the relevant tests and how things are predicted to turn out by RUB and PUB, note some specific languages with the requisite properties for the tests to be run, and give a preliminary view of the data. We leave it to future work to carry out the tests in full detail and analyze their results for specific languages.

## 6 Testing the predictions

### 6.1 Testing the AAE

Testing the AAE involves selecting languages from the Middleton survey that satisfy the following input conditions: (i) the language shows an AAA syncretism pattern for three categories of nominal pro-form: (ii) the language allows  $\phi$ -agreement with argument positions where forms with anaphoric interpretation appear, typically object position.

Of the 80 languages surveyed in [Middleton \(2020\)](#), only seven are reported to have AAA patterns. These are: Bislama (English-lexifier Creole), Fijian (Austronesian), Georgian (Kartvelian), Kinyarwanda (Niger-Congo), Madurese (Austronesian), Samoan (Austronesian), and Tongan (Austronesian). To this, we can add Brabant Dutch dialects like Mechelen Dutch and also Old English (see [van Gelderen, 2000](#), for extensive discussion of the latter, with its historical developments). However, while these languages all satisfy our first input condition, most

do not fulfill our second, either because they lack  $\phi$ -agreement entirely or because they only have subject agreement, whereas the anaphor is typically in object position, bound by the subject. We are left with two languages which, at least on the surface, seem to satisfy both input conditions, namely: Georgian and Kinyarwanda. We look at these in turn. As we will see, Georgian has to be excluded for independent reasons, but Kinyarwanda might ultimately allow the test to be run.

### 6.1.1 The AAE in Georgian

Closer inspection reveals that Georgian actually does have dedicated anaphoric and diaphoric pronouns after all. Middleton provides the examples in (31)-(32), suggesting that the expression *igi* may refer back to Kanga, Piglet or another person.

- (31) K'anga pikrobs rom mxolod piglet's uq'vars igi.  
 Kanga thinks that only Piglet loves IGI

ANAPHORIC:  $K \lambda x (x \text{ thinks that only } P \lambda y (y \text{ loves } y))$

- (32) Mxolod piglet pikrobs rom k'anga's uq'vars igi.  
 Only Piglet thinks that Kanga loves IGI

DIAPHORIC:  $\text{Only } P \lambda x (x \text{ thinks that } K \lambda y (y \text{ loves } x))$  PRONOMINAL:  $\text{Only } P \lambda x (x \text{ thinks that } K \lambda y (y \text{ loves } z))$

However, our informant tells us that for them only the diaphoric reading is available with *igi*. For the anaphoric and pronominal readings, a true anaphoric pronoun *tavisi tavi*, literally 'his head', and a regular pronoun *is* ('him') must be used, respectively. This means that the language does not show an AAA pattern after all. So even though Georgian is a language with object agreement, it cannot help us in evaluating between RUB and PUB — both approaches would posit distinct feature structures to go along with the three distinct surface forms, and so they make the same predictions for the language with respect to the AAE.

### 6.1.2 The AAE in Kinyarwanda

Given these considerations, Kinyarwanda emerges as our lone remaining candidate for testing the applicability of the AAE with syncretic forms. It is, as desired, an AAA language that allows object agreement and also has structures where the syncretic anaphor/pronominal form shows up in object position. This is illustrated below (Middleton, 2020, Ex. 232, p. 119):

- (33) Kanga y-i-bwi-ra ko Piglet ari we wenyine  
 Kanga 3SG-PRES-think-ASP that Piglet only WE WENYINE  
 w-i-kunda.  
 3SG-REFL-love-ASP  
 ANAPHORIC:  $K \lambda x (x \text{ thinks that only } P \lambda y (y \text{ loves } y))$
- (34) Piglet ni we wenyine w-i-bwi-ra ko Kanga  
 Piglet only WE WENYINE 3SG-PRES-think-ASP that Kanga  
 a-mu-kund-a.  
 3SG-OBJ-love-ASP  
 DIAPHORIC: Only  $P \lambda x (x \text{ thinks that } K \lambda y (y \text{ loves } x))$  PRONOMINAL: Only  
 $P \lambda x (x \text{ thinks that } K \lambda y (y \text{ loves } z))$

The question we must ask is the following: does the syncretic anaphor/pronominal form, which gets the anaphoric interpretation in (33), show evidence for the AAE? And is the relevant effect then absent in (34), where the same form receives a pronominal interpretation? If the answer to these questions is in the affirmative, we have a potentially strong piece of evidence in favor of RUB, since this speaks to the idea that the anaphor and pronoun are featurally distinct despite being morphologically indistinguishable.

Intriguingly, such evidence does seem to be present, at least on a first survey of these examples. The local anaphoric use of *we wenyine* in (33) does not trigger object marking on the verb. In contrast, the diaphoric and pronoun uses of the same form *do* trigger co-varying object marking (the verbal prefix *-mu*) in (34). These effects would follow automatically from the AAE under a RUB analysis of the facts. The reasoning would be that the anaphoric use of *we wenyine* in (33) corresponds to a dedicated anaphoric feature structure (whether flat or hierarchical) in the syntax, which renders it unable to value the object  $\phi$ -probe; but the pronominal use in (34) corresponds to a distinct pronoun feature structure which *can* value the object  $\phi$ -probe. In other words, this can be taken as initial support for a RUB-based approach to the anaphor vs. pronoun distinction, since we have evidence here from agreement-triggering possibilities for distinct feature structures underlying the surface-identical forms for the two interpretations.

At the same time, we should not be too hasty in reaching this conclusion. As pointed out to us by Banerjee (p.c.), reporting from (Kimenyi, 1980), the verbal prefix *-i-* in (33) is a noun class-invariant reflexive marker that takes the place of object agreement. For these patterns to constitute legitimate support for RUB, we still need to show that the object marking *-mu* in (34) does indeed instantiate a regular object agreement marker, whereas the reflexive marker *-i-* really is a kind of agreement marker that is specific to anaphoric objects. Only then do we have a genuine AAE pattern in Kinyarwanda. The alternative is that the object-marking distinction between (33) vs. (34) has to do with independent differences in the structural *environment* where the pronoun/anaphor is merged that don't actually involve proper agreement. For example, the reflexive marker in (33) could have

to do with the presence of a reflexive voice/*v* head, rather than any Agree dependency with the anaphoric object, and the presence of the object marker in (34) could instantiate clitic-doubling rather than agreement. In that case, these surface patterns would still be compatible with a PUB-minded approach. We thus see why running these tests is not a trivial matter and, in particular, requires deep analytic expertise with the languages involved. Still, to the extent that such alternatives are fully empirically testable, future careful investigation of Kinyarwanda could be probative for the RUB-PUB-debate, at least for the analysis of nominal pro-forms.

## 6.2 Testing the strict vs. sloppy distinction

The other empirical diagnostic relates to the behavior of pronouns vs. anaphors with respect to the availability of strict and sloppy readings under ellipsis. Here, we need languages which satisfy just one input condition: they should have an AAA syncretism paradigm for anaphor, diaphor and pronoun interpretations.

As a baseline, take the following minimal pair:

- (35) Mary defends *herself* and so does Edith Mary<sub>*i*</sub> defends herself<sub>*i*/*\*j*/*\*k*</sub> and so does Edith<sub>*j*</sub> defend herself<sub>*\*i*/*j*/*\*k*</sub>
- (36) Mary defends *her* and so does Edith Mary<sub>*i*</sub> defends her<sub>*\*i*/*j*/*k*</sub> and so does Edith<sub>*j*</sub> defend her<sub>*i*/*\*j*/*k*</sub>

For languages with an AAA pattern, RUB and PUB make different predictions for such ellipsis constructions. Under RUB, the two types of examples, despite being homophonous, would still involve two distinct structures corresponding to (35) and (36), containing an underlying anaphor and an underlying pronoun, respectively. This means that if the first conjunct has an anaphoric interpretation, the second conjunct should yield one as well, and thus only allow for a sloppy reading. A non-anaphoric interpretation in the first conjunct, on the other hand, should yield non-anaphoric behavior in the second conjunct as well, in particular allowing a strict reading and also triggering a Principle B effect.

By contrast, under PUB these languages only have one underlying element, with an underspecified semantics, that can be used with either anaphoric or pronominal reference. This means that the (non)-anaphoric interpretation of the first conjunct should not force (non)-anaphoric interpretation of the second one. In other words, under PUB, we do not predict a contrast whereby there is an obligatory sloppy reading in the second conjunct only when the first conjunct has an anaphoric interpretation.

Again, a proper test of these predictions will require an extensive and systematic investigation, based on language-specific expertise and taking measures to control for potential interfering factors (like the effects of the parallelism constraint on ellipsis sites, which might be expected to rule out certain readings

independent of whether one adopts a PUB or RUB approach). Nonetheless, to illustrate the test we have consulted with a Brabant Dutch informant, who speaks a dialect — Heusden Dutch — with an AAA pattern similar to that in Mechelen Dutch. They tell us that, for them, the example in (37), where the pro-form in the first conjunct is interpreted as locally bound, does not come with an obligatory sloppy reading in the ellipsis site, although the sloppy reading is the preferred one.

- (37) Marie<sub>i</sub> verdedigt *haar* goed en Suzanne ook Mary defends her well and  
Suzanne too Marie verdedigt haar<sub>i</sub> goed and Suzanne verdedigt ~~haar~~<sub>i/j/k</sub>  
ook goed

The facts in this case thus preliminarily point in the direction of PUB over RUB, since the latter would lead us to expect the sloppy reading to be required, not just preferred. Obviously, as in the Kinyarwanda case, more research needs to be carried out before any firm conclusion can be drawn for the analysis of nominal pro-forms, though. While this would have been the case regardless of how the preliminary results of the two tests came out, it is made especially clear by the fact that they seem to point in opposite directions.

## 7 By means of conclusion

It is a fundamental question for linguistic theory to explain which aspects of natural language are universal and which ones are language-specific. Such aspects concern, among other things, the inventory of grammatical building blocks (concretely, the set of grammatical features), the ways in which these building blocks can be combined, and how they are organized and ordered relative to each other. A number of different perspectives have been formulated in the literature on the balance of universality and cross-linguistic variation on these points.

In this paper, we have sought to sharpen these questions of language universality vs. language variance *empirically*, via the lens of cross-linguistic patterns of form-meaning pairings involving nominal pro-forms. In particular, we have examined the implications of morphological patterns of syncretisms across classes of anaphor, diaphors and pronouns for two Minimalist-compatible, but nevertheless opposing, views of language variation which we have labeled the **Rich Universal Base (RUB)** and **Poor Universal Base (PUB)** hypotheses. Under RUB, the basic building blocks of syntactic structure are universal even at fine levels of detail, such that structure for which there is overt morpho-syntactic evidence in one language should be assumed to be present (covertly) in all languages. By contrast, PUB states that only structure for which there is overt morpho-syntactic evidence in a language should be assumed to be present in that language.

As (Middleton, 2020) has shown, within the domain of nominal pro-forms, so-called \*ABA effects can be identified. That is, there is no language where a



pronoun and an anaphor have the same morpho-phonological form, but where a diaphor has a distinct one. \*ABA patterns like this can shed light on the debate between RUB and PUB and indeed have played an important role especially in motivating recent RUB proposals. Under RUB, the null hypothesis would be that all languages have the same underlying feature-inventory and/or functional-hierarchy for anaphors, diaphors and pronouns, irrespective of whether these receive different forms or not. Under PUB, the null hypothesis would be that distinct featural inventories and hierarchies for the anaphor vs. pronoun distinction are only warranted in languages where these correspond to distinct morphological forms. The question then arises whether the observed \*ABA pattern provides crucial empirical support for the RUB view that grammatical features are universal with respect to inventory and hierarchy, as is often assumed, or whether the existence of this \*ABA pattern is also compatible with a PUB-based approach to language variation.

Against this background, we shown here that (Middleton, 2020)'s observed \*ABA pattern can indeed be captured under a PUB-based approach as well, being derived in terms of (neo-)Gricean reasoning applying to elements in pragmatic competition. However, the fact that both RUB and PUB approaches could in principle cover the basic \*ABA facts does not mean that the choice between the two cannot be evaluated empirically. Rather, as we have shown, the two make distinct predictions about the behavior of surface-ambiguous nominal pro-forms with respect to the so-called Anaphor Agreement Effect (AAE) and strict vs. sloppy interpretations under ellipsis. Although our preliminary investigations here have not led to a particular outcome in the debate, we have laid the groundwork for seeking that outcome in future research by spelling out what exactly the different RUB- and PUB-based predictions are, and how they can put to test empirically.

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