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RESEARCH

Gender and classifiers in concurrent systems: Refining the typology of nominal classification

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Some languages have both gender and classifiers, contrary to what was once believed possible. We use these interesting languages as a unique window onto nominal classification. They provide the impetus for a new typology, based on the degree of orthogonality of the semantic systems and the degree of difference of the forms realizing them. This nine-way typology integrates traditional gender, traditional classifiers and – importantly – the many recently attested phenomena lying between. Besides progress specifically in understanding nominal classification, our approach provides clarity on the wider theoretical issue of single versus concurrent featural systems.

Keywords: canonical typology; classifiers; concurrent systems; gender

1 Introduction

As exciting new systems of nominal classification have been discovered, it has become increasingly clear that their typology needs a radical overhaul. In particular, the traditional division between gender and classifiers as fulfilling similar functions in languages of different types is ever harder to maintain. In part this is because the belief that languages might have either gender or classifiers has proved false: some languages have both. To make progress we focus specifically on languages where there is a plausible claim that they have more than one system of nominal classification. We do so adopting a canonical approach. We present a key language in some detail, and then give examples of the different typological possibilities.

1.1 Why focus on concurrent systems?

There are areas of linguistic analysis where it is normal and accepted to treat the data as representing two (possibly related) systems. For example, we analyse Italian as having gender and number, even though these two systems are realized together (through fused exponence) (see Maiden & Robustelli 2007: 46). There are excellent reasons for the traditional analysis of Italian, both language-internal and typological. However, the reasoning is rarely laid out. The languages we shall analyse are much more challenging in terms of the number of systems involved; however, this difficult issue typically receives little more attention in the literature than simple situations like that in Italian. Our focus is the typology of nominal classification (covering traditional gender and classifiers), and for this it is vital that we are clear and explicit about the analysis into one system or more than one in a given language. We return to this question in Section 2. It is worth flagging in advance, as we go through the data, that the key ideas in our typology are: (i) the degree

to which the semantics of the two (candidate) systems are orthogonal to each other, that is, the extent to which their sets of grammatical meanings cross-cut each other, and (ii) the degree to which their means of realization are distinct.

1.2 The canonical approach

Despite recent work on the typology of nominal classification systems (including Aikhenvald 2000; Grinevald 2000; Kilarski 2013) this area is still fraught with analytical problems. The key issue is that we cannot maintain an opposition between gender and classifiers, with languages having one type or the other. Languages have been identified which have both a gender system and a classifier system. And other languages have nominal classification systems which share significant properties of each traditional system type. Some of these issues have been pointed out in the literature but they have not been integrated properly into the theory and the typology of nominal classification systems. Instances of both types of language will be analysed below. Furthermore, difficulties of definition persist, as pointed out by Seifart (2010: 719–721). The study of nominal classification needs greater clarity of definition and analysis.

Corbett & Fedden (2016) suggest a way forward, adopting a canonical approach. They start by establishing the properties of a "canonical" or ideal feature and its values, and then take this as the baseline against which actual examples can be measured. Adopting a canonical approach means that if one looks at a system in a given language one is not forced to decide – in some cases arbitrarily – whether something is a gender or a classifier system; rather one can simply measure where an actual system is located in the typological space (as defined by the canonical ideal). The ultimate aim is to develop a typology in which the phenomena now treated as gender systems and classifier systems can be analysed together. The key ideas of CANONICAL TYPOLOGY have been laid out in various places. Brown and Chumakina (2013) offer an outline, followed by a varied set of applications of the approach by different researchers, mainly in the areas of morphology and syntax. More recently, Bond (forthcoming) provides a helpful overview. A working bibliography of this growing body of research is available.[1]

1.3 Gender and classifiers in opposition

Given the particular languages that were traditionally more widely studied, it used to be natural to think of gender and classifiers as two systems that were rather different, even opposed to each other. Thus the gender systems of Indo-European languages like French and German offer obvious contrasts with the numeral classifiers of the better known Sino-Tibetan languages. And such contrasts led to some helpful criteria for discussing the phenomena. As descriptions of more languages have become available, the traditional opposition has rather lost its empirical validity.

Italian can serve as an example of a gender system that is in many respects relatively close to canonical (cf. Corbett & Fedden 2016). The standard language has two gender values: masculine and feminine (examples from Pier Marco Bertinetto, p. c.):

(1) *Italian*

il	nuov-o	libr-o
DEF.M.SG	new-M.SG	book(M)-SG

'the new book'

[1] http://www.smg.surrey.ac.uk/approaches/canonical-typology/bibliography/.

(2) *Italian*

i	nuov-i	libr-i
DEF.M.PL	new-M.PL	book(M)-PL

'the new books'

(3) *Italian*

la	nuov-a	rivist-a
DEF.F.SG	new-F.SG	magazine(F)-SG

'the new magazine'

(4) *Italian*

le	nuov-e	rivist-e
DEF.F.PL	new-F.PL	magazine(F)-PL

'the new magazines'

These examples illustrate ways in which the Italian gender system is largely canonical. Most importantly, each noun has a single gender value: *libro* 'book' is masculine, while *rivista* 'magazine' is feminine. These gender values are fixed, not variable, and this is true of the great majority of Italian nouns (in the canonical world it would of course be true of all of them). Moreover, when we check the different agreement domains of Italian, they allow us to divide the nouns into two agreement classes, and these correspond directly to the two gender values, masculine and feminine. Nouns have a constant gender value across all domains: in our examples, the gender value is the same for the article and for the adjective, singular and plural. And in many (but not all instances), the gender of a noun can be read off its lexical entry (semantic and morphological information). Thus Italian, as suggested by these examples, has a gender system which is canonical to a great extent; for much more detail on canonical gender see Corbett & Fedden (2016).

Turning now to classifiers, the term "classifier" is commonly employed as a cover term for a wide range of nominal classification devices. Though they overlap, four broad types are often distinguished: numeral classifiers, noun classifiers, possessive classifiers and verbal classifiers.

Numeral classifiers occur in the noun phrase in the context of quantification. In Lao, for example, in order to count *lot1* 'vehicle' the classifier for vehicles *khan2* must be used.

(5) *Lao* (Enfield 2007: 124; the numbers after the Lao words indicate tones)

Kuu3	lak1	lot1	sòòng3	khan2.
1SG	steal	vehicle	two	CL:vehicle

'I stole two cars.'

Noun classifiers appear independent of quantification. In the following example (6) from Akatek the noun *txitam* 'pig' is collocated with the classifier *no'* for animals.

(6) *Akatek* (Zavala 2000: 137)

no'	txitam	tu'
CL:animal	pig	DIST

'those pigs'

Possessive classifiers are typically bound to the possessor and classify the possessed. Possessive classifiers which classify the functional relation between the possessed and the

possessor are also called relational classifiers (Lichtenberk 1983). An example for North Ambrym is given in (7).

(7) *North Ambrym* (Franjieh 2012: 239)

Te	kokou	a-n	bwehel.
NONRECENT.PST[3SG]	throw	CL:edible-3SG	bird

'He threw away his bird'

Unlike the three previous types, verbal classifiers do not appear in the noun phrase, but are part of the verb and classify a nominal argument (typically S or O). For more on verbal classification, see Passer (2016). If we are maximally inclusive, we can identify three subtypes of verbal classifier. In classificatory noun incorporation, a generic noun is incorporated into the verb to classify a specific noun, for example,*'treht-* 'CL:vehicle' in Cayuga.

(8) *Cayuga* (Mithun 1986: 388)

skitú	ake-'treht-áe
skidoo	1SG-CL:vehicle-have

'I have a skidoo'

Verbal classifiers can have the form of affixes as for example in Klamath (Barker 1964).

(9) *Klamath* (Barker 1964: 98)

l^{v}-igog-a
CL:round.object-put.into.container-INDICATIVE
'puts a round object into a container'

The concept of verbal classifiers has also been applied to suppletive classificatory verbs, in which categorization and predication are fused in a single unanalyzable verb form (Barron 1982). Examples (10) and (11) from Navajo show that the choice of verb depends on the class of the noun.

(10) *Navajo* (Unterbeck 2000: 403)

Bilasaana	si-ʔą́.
apple	PFV-lies.there.CL:small.round.object

'The apple is lying there.'

(11) *Navajo* (Unterbeck 2000: 403)

Naaltsoos	si-łtsóóz.
paper	PFV-lies.there.CL:flat.flexible.object

'The paper is lying there.'

Deictic and locative classifiers, which appear on determiners and adpositions, respectively, are usually considered minor types (Senft 2007: 685–686, and references there).

In this brief overview of nominal classification devices typically termed "classifiers" we have chosen examples which are as distinctive as possible; as we shall see when we look at a wider range of languages, "classifiers" are less clearly distinguished than the usual terms suggest.

	Gender	Classifiers
Size	• All nouns classified • Small number of classes (2 to around 20) • Noun-to-gender relation is one-to-one	• Some nouns not classified, almost always • Fair number, at least a score, with 100+ being common • Noun-to-classifier relation is one-to-many
Realization	• Always a closed grammatical system	• Always a free form
Scope	• Never entirely within the noun word • Little variation between speakers	• Never any reference to a classifier outside the NP • Classifier use often indicates style/mode differences
Semantics	• Affix has a fairly fixed meaning	• Classifier is a lexeme, with greater possibilities, context of use is important

Table 1: Dixon's (1986) criteria opposing gender and classifiers.

The idea of an opposition between gender and classifiers was presented clearly by Dixon (1982; 1986); this account merits discussion since it was influential in its time and because the distinct terms "gender" and "classifier" tend to maintain the opposition even as challenging evidence has accumulated. Dixon used varied sets of criteria to oppose gender systems and classifier systems, for which he employed the terms "noun class" and "noun classification", respectively. These criteria – listed in Table 1 – refer to the size, realization, scope, and semantics of these types of system.

While some of these criteria have stood the test of time, especially those for gender (for example, the criterion that all nouns are classified in gender systems), others have to be jettisoned or at least revised.[2] In particular we do not accept that the number of classes should be indicative of whether something is a gender or a classifier system. We believe that a linguistic phenomenon should not be defined by the number of instances. The definition of case as opposed to adposition does not refer to the number of instances, nor would definitions of tense or conjunction. Equally, it is fully appropriate to observe that, given a particular definition, a language has a number of case values or adpositions which is unusual for the languages of its family or its area, or that it stands out more generally for a high or low inventory of the phenomenon being investigated.

A different, and often cited, criterion is that a noun is lexically specified for a single gender, while a noun may take a whole range of classifiers if they are semantically compatible. However, this criterion is much less sound than it might have appeared initially. It is the canonical situation for gender systems to assign each noun to one and only one gender (Corbett & Fedden 2016), but there are examples of systems which most would recognize as gender systems yet which are further away from the canonical ideal because they allow – at least for a subset of nouns – more than one gender value. An example is Savosavo, a Papuan language of the Solomon Islands (Wegener 2012), where all inanimates are masculine but can be feminine, thereby indicating that the referent is small compared to the norm or that it is in some way special. Another is Mawng, an Iwaidjan language of the Northern Territory of Australia, analysed in detail by Singer (2016). A

[2] See, for example, the discussion by Seifart & Payne (2007: 383–384). For a review of the literature on gender see Audring (2011).

recent study of variable assignment in a large sample of African languages is Di Garbo & Agbetsoamedo (accepted). Conversely, highly flexible classifier systems as found in Burmese (Becker 1975) are only one possibility. Variable classification can also be found in Cambodian and Tzeltal, whereas it is practically absent in Chinese, Thai, and Hmong (Bisang 1993: 17). In other words, the choice of classifier can be relatively fixed.

We now turn to the realization of gender and classifier systems (as in Table 1). While gender systems are realized as closed grammatical systems, having a finite number of values which are in contrast with each other, this characteristic is not clearly opposed to classifiers always being free forms. The former is a statement about gender on the level of the system while the latter is a statement about classifiers which concerns morphological realization only.

In terms of scope, the criterion that the expression of gender must not be entirely within the noun is valid since we define gender through the presence of agreement, which is realized on words associated with the noun (Hockett 1958; Steele 1978: 610; Corbett 1991: 146–147); however, the occurrence of classifiers is not confined to the noun phrase. Dixon (1986: 107) acknowledges that verbal classifiers do not neatly fit into his typology because they invariably have a property typical of gender systems in that classification is always expressed on a category other than the noun in verbal classifier systems.

Dixon (1986: 109–110) pointed to a typological correlation according to which classifiers are typically found in isolating languages, whereas genders are typically found in inflecting languages. This looked convincing: it would be motivated by the suggestion that gender and classifiers perform similar functions, which are carried out differently depending on the morphological type of a language. However, new data and more recent analyses have shown this correlation to be problematic, in particular, the suggestion that a language can have both gender and classifiers, which is a key concern in this paper.

Indeed, recent research has uncovered more and more languages that combine gender and classifiers. These languages can be found mainly in South America, for example Tariana (Arawakan; Aikhenvald 1994; 2000), and Ayoreo and Chamacoco (Zamucoan; Bertinetto 2009; Ciucci 2013). Concurrent systems are also common in Algonquian languages, including Innu (Montagnais) (Algonquian; Drapeau & Lambert-Brétière 2011). In other parts of the world we find a sporadic distribution of languages that combine gender and classifiers, for example in the Papuan language Mian (Trans New Guinea; Fedden 2011) and in the Austroasiatic language Pnar (Ring 2015), spoken in the northeast of India.

A final reason why we cannot maintain a gender-classifier divide, is that classifiers can grammaticalize into gender systems, giving rise to a range of intermediate types (for an instructive example see Reid 1997 on Ngan'gityemerri). We therefore order the theoretical space of nominal classification by using the notion of canonical gender, following Corbett & Fedden (2016), and use "classifier" as a label of convenience for a wide range of phenomena which have been named as such by various scholars in the literature, but which are impossible to unify under a single definition. Classifier systems can then be treated as various systems of nominal classification which are typically further away in the theoretical space from canonical gender.

1.4 Previous attempts at dealing with concurrent classification systems

The problem of concurrent classification systems is most obvious in languages which appear to have both a gender system and a system of classifiers. Thus Derbyshire & Payne (1990), in their important contribution on noun classification in Amazonian languages, draw attention to the fact that a single language can have more than one system. They

give examples of languages with a gender system and numeral classifiers. Moreover, they go beyond this and acknowledge explicitly that the two systems can be of the same type, for example a language can have two distinct gender systems. These are positive points to retain. The idea of languages potentially having two gender systems, and whether an analysis as a single "combined" gender system is possible, is discussed in Corbett (2012: 174–180). The languages discussed there are Burmeso, Mba and Michif, each of which will be included in our typology below. And earlier Heine (1982) pointed to differences in the pronominal and nominal systems of gender in his account of gender in the languages of Africa. Aikhenvald's (2000) approach to combined classification systems is hampered by the typology that she uses for classification systems in general, which is based on the locus of marking. While this approach can distinguish numeral, verbal, or deictic classifiers from each other, depending on where the classifying formative appears in any given language, it runs into considerable difficulties for languages in which different parts of speech, for example numerals, verbs, and articles, each occur with a formally identical or very similar classifier. A locus-based typology of noun classification devices, as also advocated by Grinevald (2000), has to analyse such a language as having numeral, verbal, and deictic classifiers, while obscuring the agreement-like properties of such a system in the process, a point made by Seifart (2005; 2009).

1.5 The sample

Our sample consists of two parts. First there are the languages for which we have found at least prima facie evidence that they may contain two (or more) systems of nominal classification. There are rather few such languages, some 20, but this is more than many linguists would expect. In some instances the information available is rather sketchy. The languages highlighted in Sections 4–6 are chosen partly on the grounds of the depth of information available, and partly to illustrate different possibilities within the typological space. Second, while our initial focus was on languages previously analysed as having both a gender and a classifier system, our typology led us back to more familiar languages with complex gender systems, and there are several of them. These latter languages are all relevant to the typology which we develop. All languages in our sample can be found in the Appendix.

1.6 Approaching the typology

In constructing and evaluating a typology, designed to give clearer insights into challenging nominal classification systems, it is vital to be aware of our own predispositions. Even relatively simple gender systems have been analysed in different ways, and this may well reflect the researchers' various (unstated) views, rather than differences in the system being presented. For a clear illustration, see Dahl's helpful discussion of different approaches to the gender system of Swedish (2000: 585–587). Following this example, we the writers aim to be explicit about our underlying assumptions, and equally readers should be aware of their position, in order to be able to "translate" the typology and use it to best effect. When linguists find themselves at cross-purposes, whether discussing systems of nominal classification or more generally, a common cause is the problem of the morpheme (compare Anderson 2015). We take an inferential-realizational approach to morphology, which makes the morpheme superfluous. An inflected word (say, an adjective) has a morphosyntactic specification associated with it (e.g. **GENDER**: FEMININE, **NUMBER**: PLURAL) and this licenses the appropriate rules to determine its form (which might, for instance, involve the appending of the affix *-e*). There is no need here for the morpheme. (For a full account, including the different types of morphological theory, see Stump 2001: 1–30, and for more recent evidence supporting inferential-realizational

approaches see Corbett 2015: 147–149.) How is this relevant? Think of a language like Latin, in which one set of adjectives shows a three-way gender distinction (e.g. *bonus* 'good' with masculine, feminine and neuter forms) and another set shows a compatible two-way distinction (e.g. *tristis* 'sad', which has complete syncretism for masculine and feminine and a distinct set of forms for neuter) (Greenough et al. 1903: 46, 50). Our approach will suggest that the controller must make a three-way distinction (that is, there are three "controller gender values", Corbett 2012: 83), and that the morphological realization rules will account for the difference between the full set of distinctions (for adjectives like *bonus* 'good') and the systematic syncretism (for adjectives like *tristis* 'sad'). In other words, we shall be encouraged to look for single systems where others might be pushed in the other direction by their theoretical point of view. When we go on to examine elements that are more classifier-like, the situation becomes even more interesting. Some linguists treat them as (almost) free lexemes, listing them as instances of a similar type, hardly forming a system. And then it is natural to have different inventories for different syntactic positions (the analogue of treating different agreement targets as the basis for different gender systems). We find the typologies starting from this position have not been particularly productive. The alternative is to ask whether, in the languages we investigate, classifier-like elements can be seen as forming a system, perhaps even with some properties analogous to agreement. We invite the reader to evaluate the results of this approach.

1.7 Outline of the paper

We first examine, in general terms, the sort of argument we can employ in situations where it is not straightforward to determine whether we are dealing with a single system or with more than one (Section 2). Then we analyse an interesting language with evidence for two concurrent systems (Section 3). This leads to a fuller survey, in which we present examples of the different types in our typology (Sections 4–6), reviewed in Section 7. This leads to the general discussion (Section 8) and our conclusions (Section 9).

2 One system or two?

An important step in the argument is the issue of how we justify recognizing two (or more systems) as opposed to one. As we noted earlier, we need a consistent approach before we can set up a typology, but the question is typically not even raised. We mentioned Italian gender and number as a simple instance of two systems, and this will provide pointers for answering our question. Consider the adjectival paradigm in (12):

(12) Italian *nuovo* 'new'

NUMBER / **GENDER**	SINGULAR	PLURAL
MASCULINE	nuov-o	nuov-i
FEMININE	nuov-a	nuov-e

This is meant not just as a convenient representation, but rather as a claim that the analysis should indeed have two features, each with two values. The alternative would be this analysis, with a single feature (which we will call NUMGEN).

(13)

NUMGEN	value 1	value 2	value 3	value 4
	nuov-o	nuov-a	nuov-i	nuov-e

What are the arguments for choosing the analysis represented in (12) rather than that given in (13)? The first, and most important, is that the two proposed features are orthogonal to each other (they cross-cut). Nouns which take masculine agreement can be singular or plural, as can those which take feminine agreement. Equally, if we gather the nouns which take singular agreement they can be masculine or feminine, as equally for the plurals. Connected to this orthogonality is the point that generalizations may refer to a feature independently: thus synthetic verbs in Italian agree in number but not in gender.

While the two features are in principle orthogonal in Italian, this does not extend to full orthogonality. As just one instance, there are many singularia tantum nouns. Such instances do not negate the orthogonality of the features in principle. They do, however, give us an indicator as to canonicity here: it seems evident that if we had Italian´, like Italian but with fewer (or even no) singularia tantum nouns, the case for recognizing two systems would be if anything stronger.

The second argument concerns the realization of these systems. The adjectival forms given in (12) show cumulation of number and gender. As mentioned in terms of the first argument, however, there are number forms (of synthetic verbs) showing number without gender. Imagine, however, that we had another language similar to Italian but where the exponents of gender and number were always quite separate: in this language the case for two systems would be even clearer. In canonical terms, the more distinct the means of realization of the systems are, the more clearly different the two systems are.[3]

The third argument will have varying weight for different linguists; it is the typological argument. The number system of Italian is similar to other number systems we have seen; these other systems might have more values, and function slightly differently, but there are evident similarities. Equally the gender system bears various resemblances to other gender systems. For typological purposes we should treat number and gender separately, and compare each of them cross-linguistically. But here, we wish to go a step further: we will compare situations where there are (arguably) two systems with other situations involving two systems.

We have started from a deliberately clear example, and the data we have to address are considerably trickier. We therefore spell out the canonical extremes from the discussion of Italian, and then set up the canonical possibilities based on some fictitious dialects of "Italian". At one extreme, imagine we have a feature whose values have a unified semantics, showing no orthogonality between them, each realized by a form unique to that value (this would be a canonical morphosyntactic feature, Corbett 2012: 153–167). The lack of orthogonality leads us to analyse this as a single system; indeed it is a canonical instance of a single system. Contrast that with the situation where there is a second set of values, completely orthogonal to the first, and where the realization of these values is distinct (that is, with no overlap of form within the feature or across features). We would analyse this with equal confidence as constituting two features (and a canonical instance of two systems).

[3] In this respect the example we have chosen could be thought of as an unfavourable one; in fact, it makes the point quite strongly. Given the orthogonality of gender and number in Italian, we are not swayed one way or the other by the realization of the features. It is important to bear this point in mind as we consider a range of different systems, attempting to maintain a consistent viewpoint for all of them.

These two extremes can be found in the two most different hypothetical dialects under discussion, set up to make the issues as clear as possible. The two extremes are labelled Dialect A1 (canonically one system) and Dialect C3 (canonically two systems), with the less clear-cut examples lying between. For ease of exposition, we will concentrate on phrases consisting of numeral, noun, and adjective:

(14) Dialect A1 (semantics: same = A; form: same = 1)

a. un-i sester simpatic-i
one-ANIM sister nice-ANIM
'one nice sister'

b. un-e cos simpatic-e
one-INAN thing nice-INAN
'one nice thing'

In terms of semantics (the system of grammatical meaning), in Dialect A1 we find an animate-inanimate distinction, realized by the same forms on numeral and adjective. Abstracting away from any other related systems the dialect may have, we have every reason to postulate a single gender system here. Now contrast this with Dialect C3, the most different of our hypothetical dialects:

(15) Dialect C3 (semantics: different = C; form: different = 3)

a. un-i sester simpatic-u
one-ANIM sister nice-AUG
'one nice (big) sister'

b. un-e cos simpatic-u
one-INAN thing nice-AUG
'one nice (big) thing'

c. un-i sester simpatic-o
one-ANIM sister nice-DIM
'one nice (small) sister'

d. un-e cos simpatic-o
one-INAN thing nice-DIM
'one nice (small) thing'

In Dialect C3, the numeral is as in Dialect A1, but the adjective distinguishes augmented-diminutive. The two systems are orthogonal, that is all four possibilities are found, as exemplified in example (15). Moreover the realization of the animacy system and the size system is fully distinct. We would have no hesitation in saying we have two systems here. (We may well call them both gender systems, as allowed for by Derbyshire & Payne 1990 noted earlier, but the main point is that they are indeed two systems.)

We have "rigged" our dialects of Italian to keep the issues as clear as possible. The grammatical meanings involved are animacy and size, which can readily be imagined as separate or interrelated. (The reasons why real instances of Dialect C3 with augmented-diminutive are vanishingly rare are discussed in Corbett 2012: 145–150.)[4] Moreover, we

[4] This is a complication resulting from the special nature of gender, which makes our investigation particularly tricky. Contrasting gender and number in (12) works easily because of the different nature of the two features. Gender is special in that in the canonical instance we have one value per noun, and this value is predictable (Corbett & Fedden 2016). Distinguishing two sets of values of this type will naturally be more difficult than in situations like (12).

have two targets, numerals and adjectives, and we allow these to behave differently. For the purposes of understanding the issues, the reader can assume that there is no trickery going on in aspects of the dialect that we do not mention.

Having seen the idealized extremes (represented in Dialect A1, which is canonically one system, and Dialect C3, canonically two systems), the reader will suspect that there is, naturally, a good deal of reality lying between these extremes. This is indeed the case, and to help to calibrate the space we outline seven further hypothetical dialects below. For each one we present the key phrases followed by the values of animacy and size as appropriate.

(16) Dialect A2 (semantics: same; form: partial overlap)

a.	un-i	sester	simpatic-i	'one nice sister'	ANIM	ANIM
b.	un-e	cos	simpatic-o	'one nice thing'	INAN	INAN

In this dialect we have a clear distinction of animacy, as seen on the numeral and on the adjective. However, the situation is not as clear-cut as in Dialect A1. There the realization of the animate-inanimate distinction was the same on numeral and adjective. In Dialect A2 the forms are not identical in this way, but nor are they completely different; rather they overlap partially. We would not say that such a dialect has two systems, for numerals and adjectives; it has just an animacy distinction, but this is marked less canonically than in Dialect A1.

(17) Dialect A3 (semantics: same; form: different)

a.	un-i	sester	simpatic-u	'one nice sister'	ANIM	ANIM
b.	un-e	cos	simpatic-o	'one nice thing'	INAN	INAN

In Dialect A3, numerals and adjectives do not share any forms. However, the distinction they make is exactly the same. We clearly have one system here, animacy, which is realized differently on different targets. This is an instance where our canonical approach begins to highlight inconsistencies in previous typologies. It seems evident that we are dealing with one system in (17), and this is what is assumed when analyzing gender. Linguists typically would not suggest that there is a "numeral gender system" and an "adjective gender system" in this dialect. And yet for classifiers, analysts do sometimes adopt such an approach, often without arguing for it.

Let us now return to the other extreme, Dialect C3. Here we had different semantics (different sets of grammatical meanings) realized through different forms, and we consider this to be a canonical case of two systems. There are two further instances to consider, both characterized by different semantics, which we label Dialect C1 and Dialect C2. Working in from the canonically two systems of Dialect C3, we consider Dialect C2 first. Here the sets of forms are not fully distinct; rather there is a partial overlap of form.

(18) Dialect C2 (semantics: different; form: partial overlap)

a.	un-i	sester	simpatic-i	'one nice (big) sister'	ANIM	AUG
b.	un-e	cos	simpatic-i	'one nice (big) thing'	INAN	AUG
c.	un-i	sester	simpatic-o	'one nice (small) sister'	ANIM	DIM
d.	un-e	cos	simpatic-o	'one nice (small) thing'	INAN	DIM

Here the situation is also clear; we have two systems (animacy and size). They share their means of exponence in part, in that the *-i* affix is an exponent in both systems. The next dialect, Dialect C1, shows a further step away from the canonical ideal of Dialect C3:

(19) Dialect C1 (semantics: different; form: same)

a.	un-i	sester	simpatic-i	'one nice (big) sister'	ANIM	AUG
b.	un-e	cos	simpatic-i	'one nice (big) thing'	INAN	AUG
c.	un-i	sester	simpatic-e	'one nice (small) sister'	ANIM	DIM
d.	un-e	cos	simpatic-e	'one nice (small) thing'	INAN	DIM

In this dialect, we still have two systems of grammatical meaning. And yet the means of realizing these two systems are now the same. These same sets of forms have a different significance on numerals as opposed to adjectives; there is no hesitation in suggesting that there are two systems here, animacy and size.

The remaining three dialects, Type B, are the most interesting. They all have partial overlap in the grammatical meaning of the feature values. The particular overlap we use for illustration is that all animates are treated as augmentative (perhaps animates count as more important, and augmentative takes in important entities). This gives a three-way distinction: animate, inanimate augmentative, inanimate diminutive. Given this overlap in grammatical meanings, there are three possibilities for the sets of forms. They can be the same (Dialect B1), have a partial overlap (Dialect B2), or be different (Dialect B3).

(20) Dialect B1 (semantics: partial overlap; form: same)[5]

a.	un-i	sester	simpatic-i	'one nice sister'	ANIM	AUG
b.	un-e	cos	simpatic-i	'one nice (big) thing'	INAN	AUG
c.	un-e	cos	simpatic-e	'one nice (small) thing'	INAN	DIM

Here glossing is not straightforward. *Simpatic-i* can indicate augmentative, but only for inanimate nouns; for animate nouns there is no contrast augmentative/diminutive. On numerals and on adjectives, animate nouns always take the form in *-i*; this contrasts with *-e* (which for numerals gives an animacy contrast and for adjectives a size contrast). This overlap in forms leads us to suggest that we have a single system here, with three values (which we might label *animate*, *inanimate-augmentative*, *inanimate-diminutive*).

Compare that with Dialect B3 where the forms are distinct:

(21) Dialect B3 (semantics: partial overlap; form: different)[6]

a.	un-i	sester	simpatic-u	'one nice sister'	ANIM	AUG
b.	un-e	cos	simpatic-u	'one nice (big) thing'	INAN	AUG
c.	un-e	cos	simpatic-o	'one nice (small) thing'	INAN	DIM

Dialect B3 has a system of grammatical meaning fully comparable with that of Dialect B1; however, the system of forms is different. Each of the candidate features, and each value, is realized by a unique form. This difference in form would lead us to recognize two systems, animacy and size (though these are not as canonically two systems as Type C3).

Consider finally the dialect in which there is a partial overlap of form:

(22) Dialect B2 (semantics: partial overlap; form: partial overlap)[7]

a.	un-i	sester	simpatic-i	'one nice sister'	ANIM	AUG
b.	un-e	cos	simpatic-i	'one nice (big) thing'	INAN	AUG
c.	un-e	cos	simpatic-o	'one nice (small) thing'	INAN	DIM

[5] The unacceptable combination is ANIM and DIM: **un-i sester simpatic-e*.
[6] The unacceptable combination is again ANIM and DIM: **un-i sester simpatic-o*.
[7] The unacceptable combination is once again ANIM and DIM: **un-i sester simpatic-o*.

		Semantics		
		Same	**Partial overlap**	**Different**
Form	**Same**	A1	B1	C1
	Partial overlap	A2	B2	C2
	Different	A3	B3	C3

Table 2: Typology of single and concurrent systems.

This set-up is exactly mid-way between a canonically single system (as in Dialect A1) and canonically two systems (as in Dialect C3). Dialect B2 represents the canonical mid-point; one could say that it has 1.5 systems. (Of course, real systems are unlikely to be quite so perfectly balanced.)

The nine possibilities are set out in Table 2. We will discuss these in Sections 4–6.

It is essential to be clear about what is intended by Table 2; the laconic labels "same" and "different" need to be carefully interpreted. We discuss this briefly here, and then return to it in the light of the interesting data from Mian, presented in Section 3. "Same" in terms of semantics clearly covers systems where the possible semantic distinctions that can be made are identical for different targets. Recall that semantics here primarily concerns *grammatical* meaning. Given that the distinctions available are human vs. non-human, masculine vs. feminine, long vs. short, and so on, we are interested in whether different targets make the same distinctions, irrespective of whether controlling nouns are allotted these specifications on purely semantic grounds or by a combination of semantic and formal criteria.[8]

In addition to examples where the distinctions drawn are identical, we also include instances where two candidate systems are not identical, but where one subsumes the other. In other words, there is a many-to-one mapping between the two candidate systems: given one set of distinctions in grammatical meaning, the other is fully predictable.[9] Thus if the lexical entries of nouns included featural specification for the larger system, this would also be sufficient for the smaller system, since the latter is fully predictable (whatever the formal realization).

Let us turn to form. To justify postulating any gender system, we need to be able to point to differences in form on agreement targets, and not just differences between nouns (see Hockett 1958: 231; Steele 1978: 610; Corbett 1991: 146–147). In other words, there must be an inventory of agreement markers justifying the different gender values. That is just the prerequisite, and is not what is intended in Table 2. Rather we need to distinguish situations where two (or more) separate systems of nominal classification should be recognized from those where there is one system. So to qualify as different forms for

[8] That is, if the nouns in a given language are divided into, say, masculine and feminine for the purposes of agreement, our concern is whether the same classification (the semantics of the feature system) is maintained through the system, or is not. In our illustrations above, we ask whether animacy is similarly distinguished for numeral and adjective, or not. It is a separate question how these values are assigned to the nouns. As discussed at length in Corbett (1991: 7–69; 2005), gender always has a semantic core. Assignment may be purely semantic, predominantly semantic (that is, there are groups of perhaps partially justifiable exceptions), or it may be semantic and formal. The formal generalizations which supplement the semantic generalization may be morphological or phonological.

[9] Consider, for instance, a simplified and regularized version of English, in which the pronoun *he* was used for male humans only, *she* for female humans only, and *it* for the residue. The only relative pronouns were *who* for humans only and *which* for the residue. It is evident that the two candidate systems are not exactly, canonically, the same. But they are equally clearly not distinct, in that the relative pronoun system is a simple reduction of the personal pronoun system. In our terms, on the scale same-different, that counts as practically the same. This is different from the Italian dialects with semantic overlap (B1 to B3) since here one system is not a simple reduction of the other. All DIM nouns are inanimate, but AUG nouns can be either animate or inanimate; all animate nouns are AUG, but inanimate nouns are either AUG or DIM.

the purpose of Table 2, there must rather be different inventories of forms. Thinking back to our "Italian dialects" we might find a different inventory of forms with the numeral as compared to the adjective. If we do, we have one of the Type 3 systems, in which the formal realization is different, i.e. A3, B3 or C3.

In operational terms, we may say that "having inventories of forms" implies that we can find different forms appropriate for use for one and the same noun. These different forms may realize different systems, as in Dialect C3. However, different forms do not in themselves guarantee that we have more than one system. Consider, for example, the situation where different targets (such as numerals and adjectives) have different inventories of forms, but the forms to be used from one inventory are predictable from the forms to be used from the other. That is to say, given a particular noun, there is an appropriate form of the numeral and an appropriate form of the adjective, which are phonologically distinct but which realize the same value. That is, they are part of a consistent agreement pattern.[10] We would then say that we have a single system of grammatical meaning, realized differently according to the particular target. This is the situation that is illustrated in Dialects A2 and A3. In the clearest instances of Dialects A2 and A3, where different targets show different inventories of forms, we could simply disregard one target (just as we could in the simpler situation represented by Dialect A1). Concretely, in the sorts of situation we represent as Dialects A2 and A3 we could look just at the numeral or just at the adjective and infer the whole system. In such instances we would not say that there is a numeral-gender-system and an adjective-gender-system.

Consider now the problem of "overlap". Our canonical centre point, Dialect B2, is balanced in a way that may make it unlikely as a real system, but an excellent point to measure from, in that it is exactly at the mid-point between canonically one system and canonically two systems. This is true in terms of semantics (grammatical meaning) and in terms of form. In our example, there are two semantic distinctions but they are not fully orthogonal. Instead of the potential four values there is an overlap, such that only three values are found. We could treat this as two features, each with two values, and an overlap which gives only three values in total, or else we could suggest one feature with three values. Similarly the systems of forms are neither the same nor fully distinct. In the abstract, there is no clear reason for choosing one alternative or the other. This is a strong point of the approach: it forces us to be explicit about the reasons for our analytical choices. What would legitimately lead us to one decision or the other? This is a question that will be easier to tackle in the context of an actual system; we return to it in Section 3.2, when we have presented the facts about Mian.

3 Mian: The issue of orthogonality

We present a particularly interesting instance of a language with two candidate systems (Section 3.1), and we use this language to take further the question of orthogonality (Section 3.2).

3.1 Mian

The Ok language Mian (Trans New Guinea), spoken in Sandaun Province in Papua New Guinea by a population of 1,700, has been analysed as combining a four-term gender system with six verbal classifiers (Fedden 2011). The gender values are masculine, feminine, neuter 1, and neuter 2. Examples (23) and (24) illustrate how the clitic article agrees in gender with its noun and how the verb agrees in gender with subject and object.

[10] "A set of agreement target forms is a consistent agreement pattern if and only if it induces the largest agreement class, such that the agreement rules relating to this agreement class are simple and exceptionless." (Corbett 2012: 80 and discussion there).

	SINGULAR	PLURAL	Assignment
MASCULINE	*=e*	*=i*	Males
FEMININE	*=o*	*=i*	Females
NEUTER 1	*=e*	*=o*	Inanimates
NEUTER 2	*=o*	*=o*	Inanimates: locations, body decoration, weather phenomena, illnesses, abstract nouns, some tools, and weapons

Table 3: Agreement target: Mian clitic articles.

(23) *Mian* (SF fieldnotes)
ē unáng = o wa-têm'-Ø-e = be
3SG.M woman(F) = ARTICLE.SG.F 3SG.F.OBJ-see.PFV-REALIS-3SG.M.SBJ = DECL
'he sees the woman'

(24) *Mian*
ō naka = e a-têm'-Ø-o = be
3SG.F man(M) = ARTICLE.SG.M 3SG.M.OBJ-see.PFV-REALIS-3SG.F.SBJ = DECL
'she sees the man'

Agreement targets are articles, pronouns, and verbs (where the gender distinction is found in the third person singular). Subject agreement is found on *all* finite verbs, and in addition there is object agreement but on seven verbs only (Fedden 2011: 265–267). Table 3 sets out the four genders based on the forms of the clitic article, which agrees in gender with its controller. A characterization of gender assignment is also given. The other targets (pronouns and verbs) show different agreement forms but follow exactly the same pattern.

These are the four controller genders, that is genders defined by the agreements required by the controller. The corresponding agreements show an interesting pattern of syncretism. All Mian genders are nonautonomous values (Zaliznjak 1973[2002]: 69–74), which means that they have no agreement forms which are unique to them (and hence they are non-canonical in this regard). So the number of gender distinctions observable on the target (in other words, the number of target genders) is smaller, namely two: *=e* and *=o* in the singular, and *=i* and *=o* in the plural.

While the gender markers appear on various targets, the classifiers appear only as prefixes on the verb. They operate on an absolutive basis; most of them classify transitive objects and for just one verb ('fall') they classify the intransitive subject. They are restricted to occurring on about 40 verbs of object handling or movement, such as 'give', 'take', 'throw', and 'fall'. The use of the classifier *tob-* 'long object (SG)' for *fút* 'tobacco' is illustrated in example (25):

(25) *Mian* (Fedden 2011: 541)
nē fút = e tob-ò-n-i = a […]
1SG tobacco(N1) = ARTICLE.SG.N1 3SG.LONG.OBJ-take-SS.SEQ-1SG.SBJ = MED […]
'I take the long tobacco leaf and then I …'

The set of verbs which take object agreement (within the gender system) and the set of verbs which take a classifier do not intersect, so that we never meet a situation where a single verb would have a classifier and object agreement. Table 4 sets out the classifiers and the assignment rules.

	CLASSIFIER	Assignment
M-CLASSIFIER	*dob-*	Males; inanimates: plate, clothes, mosquito net, some bananas, some pandanus
F-CLASSIFIER	*om-*	Females; inanimates: all nouns of neuter 2 gender
LONG	*tob-*	Inanimates: arrow, pen, tobacco leaf, bone, tongs, bush knife, nail, belt
COVERING	*gam-*	Inanimates: skin, palm bark, blanket
BUNDLE	*gol-*	Inanimates: string bag, bundles
RESIDUE[11]	*ob-*	Animates: tortoises; rest of inanimates

Table 4: Mian classifiers.

	MASCULINE	FEMININE	NEUTER 1	NEUTER 2
M-CLASSIFIER	150, man, boy, boar	–	62, sleeping bag, plate, mosquito net	–
F-CLASSIFIER	–	129, woman, girl, sow	–	205, house, steel axe, money (kina note)
LONG	–	–	142, tobacco, eating implement, bush knife	–
BUNDLE	–	–	2, string bag, plastic bag	–
COVERING	–	–	4, blanket, band aid	–
RESIDUE	–	3, tortoise, scorpion	197, cassowary egg, plane, hat	–

Table 5: Mian gender and classifiers: orthogonality.

Interestingly, the classifiers also make a number distinction; there are complexities involved there that would take us too far afield; see Corbett, Fedden & Finkel (2017) for those issues. For present purposes we note that the classifier system is orthogonal to number, just as the gender system is. It is also worth pointing out that if we had presented the "classifier" system first, we could have described it as a gender system; it is the contrast with the more gender-like system that has led to its being called a classifier system. We would now suggest rather that it is a system of nominal classification that is overall less canonical as a gender system than the "gender" system of Mian.

Does Mian have one or two systems? Let us apply our typology developed above. The forms which are used in gender agreement and in the classifiers are completely different. On the other hand, and more importantly, there is considerable overlap in the semantics (grammatical meanings). In many cases, if we know the value of a noun in one system, we can predict the value it has in the other. For example, from the perspective of gender, all masculine nouns take the M-classifier. And all nouns of the neuter 2 gender take the F-classifier. From the perspective of the classifiers, all nouns which take the long, covering, or bundle classifier have neuter 1 gender. Thus the degree of orthogonality of the gender system and the classifier system in Mian is actually rather low. If we multiply four genders with six classifiers we get 24 theoretical possibilities of which only nine are attested. We see this in the system matrix (Table 5); the cells filled with examples are the

attested combinations. While we favour matrices in this paper, bipartite graphs offer an equally good representation (as seen in the representation of Mali in Figure 1 in Section 4.2.2 below). The total number of nouns is indicated in each cell.

When the data are laid out in this way, we see the interest and difficulty of Mian. How then does our typology apply? As Table 5 shows, the semantics (grammatical meanings) of the two possible systems overlap, but they do not coincide. In many instances, if nouns were specified with the value of either the gender or the classifier, the other value would follow. The forms, however, are quite distinct. We conclude that Mian has two systems, but this is far from being a canonical case of two systems. In terms of our typology the closest type is Type B3 (for which see example (21)).

Let us briefly address two additional reasons why we might want to say that we have two separate systems in Mian. First, there are lexical items which take part in both systems: some verbs mark the gender of the subject and also take classifiers. We might argue that if a single verb marks two different things they belong to two different systems. Second, the alignments are different. Gender in Mian operates on a nominative-accusative basis (all verbs show suffixal agreement with S and A and a small subset shows prefixal agreement with O), while the classifiers work on an ergative-absolutive basis (they classify S or O). However, neither of these are as compelling reasons for assuming two systems as one might think. In either case, if the semantics were the same we would never identify two systems here; this would hold even if only a single part of speech was involved in the marking, or if the alignment was different. This indicates that the orthogonality of grammatical meaning is more important than locus of marking or alignment in determining whether we are dealing with one system or two.[12]

3.2 The issue of orthogonality

In the two clear cases in our typology, the issue of orthogonality is straightforward: in Type C3 we have two fully orthogonal systems, while in Type A1 there is one fully consistent system, and there is no question of orthogonality with another system of the same type.[13] The issue, though, is the intermediate types. We might expect to refer to relevant discussion of the "degree of orthogonality", but we have not yet found anything helpful for this. We need to ask, therefore, "how orthogonal" two systems are, and then to discuss what we do about intermediate types; that is, we must identify factors that would point us to postulating one system or two. The data on Mian will prove an illuminating case study.

Consider again the matrix for the Mian systems, presented as Table 5. If all possibilities existed, that is, if each cell in the matrix were represented by Mian nouns, we would clearly have a Type C. At the other extreme, the minimum number of filled cells would be six, the number of values in the larger system (if there were not six different forms we would have no basis for saying that we had six different values in candidate system 2). A

[11] The residue classifier is in opposition to the other five classifiers, with its own set of nouns for which it is appropriate. It is not a default classifier, for example similar to Mandarin *ge*, which can replace a more specific classifier in many situations (Myers 2000; Zhang 2012: 46).

[12] This can be seen in two ways. First, consider the more familiar problem of how languages like French are analysed (see also Section 4.3 below); given the same system of grammatical meanings (masculine and feminine), but very different forms (as between article and adjective), no-one proposes two different gender systems, an "article gender" and an "adjective gender" system for such languages; this shows the accepted primacy of grammatical meaning. Second, what linguists generally do here makes perfect sense: in terms of the featural distinctions, the key is the number of distinctions necessary for controllers (nouns in our case), in order to permit an adequate account of agreement. Formal differences of particular targets are a matter of the morphology of (classes of) lexical items.

[13] The point about "of the same type" is a reminder that we are considering systems of the gender/classifier type; of course, they can be orthogonal to number, person, and case.

way of "scoring" the system of Mian would be to say that there are nine cells filled, from which we deduct the theoretical minimum (six) and divide by the theoretically possible maximum minus the minimum:

$$\frac{(\textit{cells filled} - \textit{minimum cells filled})}{(\textit{possible cells} - \textit{minimum cells filled})} = \frac{(9-6)}{(24-6)} = \frac{3}{18} = .17$$

This gives us a measure between 0 (no orthogonality or canonically one system) and 1 (full orthogonality or canonically two systems). An orthogonality score higher than 0 and lower than 1 tells us that the language belongs to Type B. The exact type within this range (B1, B2, B3) is determined by the degree of overlap in form.

There are two points to take from this calculation of orthogonality. It is clear that the two Mian candidate systems are far from being fully orthogonal. And equally, if we imagine a comparable variant of Mian in which *any* additional filled cell were attested, this variant would (all other things being equal) be closer to a Type C, canonically two systems, than Mian is.

And yet, while adding any cell increases the degree of orthogonality, it seems clear that not all cells are equal, something not recognized in our simple count. (In operational terms, we could remove a cell, add a different one, and end up with a "more orthogonal" situation.) Suppose we found a variant of Mian which was as in Table 5, except that there were also examples of nouns which were Neuter 1 and took the F-classifier. Intuitively, this makes relatively little difference. But if instead we found nouns which were masculine, and took any classifier except the currently attested one (the M-classifier), that would make the two systems orthogonal to a significantly greater degree. This is because there is no longer a prediction between masculine gender and the M-classifier. More generally, in terms of graphs, replacing a one-to-one mapping by a one-to-many mapping (or a one-to-many mapping by a many-to-many mapping) significantly increases the degree of orthogonality. Thus the more "many mappings" there are between the two candidate systems, the clearer the evidence for two systems (the closer we are to Type C).

Having discussed the issue of orthogonality, we move to the second point that we highlighted, namely how we handle the genuinely intermediate types, as found in languages like Mian. The simplest answer is that the system of forms guides us. Obviously, having the forms identical (in the canonical case, as in Type B1) pushes us to one system, while if they are different, this pushes us to two systems (Type B3, as is indeed the case in Mian).

There are two further factors here, **coverage** and **optionality**. For the first, Mian again gives a clear illustration. By "coverage" we mean the degree to which the systems are evidenced in the language. We can think of coverage in terms of controllers and in terms of targets. If we look back to Table 5 (the Mian system matrix), we recognize that this is a simplification in that cells are simply filled or not (in a sense, what is represented and counted is noun types). Yet some cells represent significant numbers of nouns, while others have very few (the cell which is the intersection of feminine and residue has just two nouns denoting tortoises and one for scorpion). The two candidate systems would be more fully orthogonal if this cell were better represented in terms of the number of nouns involved. Often, when considering the evidence of grammars, we do not have this level of detail. A second aspect of coverage is the possible targets. In terms of types we would look for more types being represented, and that those should be core (e.g. verbs) rather than more marginal (e.g. numerals). Our two candidate systems differ somewhat in this respect

in Mian, the first having several sorts of target, the second only verbs. Going on from that we should also consider the number of lexical items: the greater the coverage in terms of target lexical items, the more robust the (candidate) system. For the second system of Mian recall that the targets are just about 40 verbs. (Note that these are not new criteria, but rather they correspond to criteria 3 and 4 for canonical morphosyntactic features and their values; Corbett 2012: 162–167.)

The second factor is whether the assignments are obligatory or optional. Heine (1982: 198) contrasts "fixed" and "free" gender: nouns are generally assigned to one gender value, but there are languages where there are greater or lesser degrees of freedom to assign nouns to more than one gender value, with some semantic effect (and this is even more the case for some systems of classifiers). In Mian, we have nouns which require a given gender value and a conflicting classifier value: the fact that this conflict is obligatory (the values are fixed) carries more weight than if the conflicting assignments arose only optionally (the values were free), and there was another option with no conflict.[14] Here being obligatory is canonical; compare criterion 5 for morphosyntactic features (Corbett 2012: 191–192).

4 The languages and the typology: Type A

We now present key languages, chosen to illustrate different possibilities within the typological space. We present them according to the degree of orthogonality of their candidate systems.

In this section, we discuss languages in which the semantics (the sets of grammatical meanings) of the candidate systems are the same (Type A). We start with the canonical case of one system: same semantics and same forms (Type A1). We move on to weakenings of this canonical type, namely some difference (partial overlap) in the forms (Type A2) and different forms (Type A3). In subsequent sections, we treat languages in which the semantics of the candidate systems are different (Type C, discussed in Section 5), again treating the difference in form in turn. And then, in Section 6, we turn to the most interesting cases, in which we find a partial overlap in the semantics (Type B).

Recall that we are referring to the semantics of the systems, that is the grammatical meanings involved. Thus a system might have, for example, an opposition between masculine and feminine which, in this typology, covers both languages where assignment is based purely on the semantics of the noun and those where there are semantic and other criteria involved in assignment.

4.1 Same semantics and same forms: Canonically one system (Type A1)

In our first type, when we look at our two (or more) candidate systems, we find that the semantics are the same, and the formal realization is the same. There is obviously a single system. In our hypothetical examples (14) to (22), if we compare what we find on the numeral and what we find on the adjective, the distinctions made are the same, and the forms realizing these distinctions are the same – all the hallmarks of a canonical single system. We find numerous instances of real systems which come close to our Type A1, some extremely close, but a perfect Type A1 proves rare. We consider two instances: Lamnso and Kilivila. Other languages of Type A1 are Ngan'gityemerri

[14] In our exemplar language Mian, it is interesting to note that the instances where there are two possible classifiers are more frequent than those where there are two possible gender values. There is a small number of nouns which can have either masculine or feminine gender depending on the sex of the referent, e.g. *éil*(M) 'boar' vs. *éil*(F) 'sow'. The classifier system allows variable classification for a much larger set of nouns. For example, many inanimate nouns can appear with the BUNDLE-CLASSIFIER if any given referent has a handle or rope attached to it, e.g. some *gol-meki* [banana 3SG.BDL.OBJ-hang_up] 'Hang up the banana bunch (which has some string attached to it)!'

(Southern Daly; Reid 1997), Ocaina (Witotoan; Fagua Rincón 2014), and Bora-Miraña (Witotoan; Seifart 2005; 2007; 2009; forthcoming).

4.1.1 Lamnso

Since Type A1 is a system in which two (or more) types of target have identical forms and functions, we are looking for one part of a classic alliterative agreement system. In such a system, we find gender marked overtly on the noun and similarly on all targets (Corbett 1991: 117–119). For our Type A1, we need only the second part of that definition; still, it seems sensible to look in that linguistic area where we find systems approaching alliterative agreement, and the Niger-Congo family is a promising place. In fact we find numerous languages which come very close to representing Type A1. As a fine instance, we take Lamnso, a language of the Grassfields branch of Southern Bantoid (McGarrity & Botne 2001). Consider first these examples:

(26) *Lamnso* (McGarrity & Botne 2001: 57–58)

a. ki-soo **ki-**sə
SG-hoe(IV) IV.SG-that
'that hoe'

b. vi-soo **vi-**sə
PL-hoe(IV) IV.PL-that
'those hoes'

(27) *Lamnso*

a. ki-tam **ki**-moʔon
SG-elephant(IV) IV.SG-one
'one elephant'

b. vi-tam **vi**-taar
PL-elephant(IV) IV.PL-three
'three elephants'

These two examples suggest that if we compare the system of demonstratives (26) with that of numerals (27), we find the same agreement forms (in bold). Of course, we need to look more generally across the system, but these data would fit with our Type A1. (They also show the same marker on the controller noun, an instance of alliterative agreement, as discussed above.)

If we extend the comparison to possessives, we find similar but not totally identical forms:

(28) *Lamnso*

a. ki-daŋ **ke**-v
SG-table(IV) IV.SG-3PL.POSS
'their table'

b. vi-daŋ **ve-**v
PL-table(IV) IV.PL-3PL.POSS
'their tables'

It would seem reasonable, however, on the basis of the evidence so far to suggest that we are dealing with one system. Let us look at a more complete picture (based on McGarrity

GENDER	NUMBER	Bantu class	Possessive	Relative	Quantifier	Demonstrative	Adjective	Numeral
I	SG	1	w-	w-	wu-	və-	ø	ø
	PL	2	v-	v-	a-	vi-	-i	a-
II	SG	3	w-	w-	wu/yi	və-	-i	ø
	PL	10	s-	s-	si-	si-	-si	si-
III	SG	5	y-	y-	yi-	rə-	-i	ø
	PL	10	s-	s-	si-	si-	-si	si-
IV	SG	7	k-	k-	ki-	ki-	-ki	ki-
	PL	8	v-	v-	vi-	vi-	-vi	vi-
V	SG	9	y-	y-	yi-	rə-	ø	ø
	PL	10	s-	s-	si-	si-	-si	si-
VI	SG	19	š-	š-	ši-	ši-	-ši	ši-
	PL	6	m-	m-	mi-	mi-	-mi	mi-

Table 6: Lamnso agreement markers.

& Botne 2001: 57).[15] Lamnso has six main genders, which we indicate I–VI, while giving also the traditional Bantu numbering[16] for singular and plural classes (Table 6):

As implied by Table 6, there is one set of gender distinctions, which goes across the different targets. Consider now the forms. If our two "candidate" systems are those of the possessive and the relative, then we have a perfect instance of Type A1: the forms are used in identical situations, and the actual forms are phonologically identical across the two systems. If we continue with "two-by-two" comparisons, we find pairs that are very similar but not identical; that is they are close to our Type A1. Of course, in such circumstances analysts would typically simply say that we have one system here, rather than six, with various variations across the six agreement targets. Still, our aim is to be explicit, and so while we believe that the normal view is indeed the right one, we wish to stress that part of the system (two targets) form a perfect Type A1 in our typology, while the others are close to Type A1 but do not meet its requirements completely.

4.1.2 Kilivila

A comparable system is found in Kilivila, an Austronesian language (of the Papuan Tip Cluster), spoken on the Trobriand Islands. It is famous from Malinowski's classic work (1920) and from the detailed descriptions by Senft (1986; 1996); for discussion of its origin see Senft (1993). Kilivila is analysed as having at least 177 classifiers (Senft 1996: 16). They occur with various targets, as seen in this example:

(29) *Kilivila* (Senft 1986: 69)

mi-na-si-na	na-yu	na-manabweta	vivila
this-FEMALE-PL-this	FEMALE-two	FEMALE-beautiful	girl

'these two beautiful girls'

[15] There are important further issues discussed by McGarrity & Botne (2001), which are outside our concerns in this paper.

[16] See Corbett (1991: 45–49) for discussion of this tradition. Table 6 makes clear that not all the distinctions drawn in the singular are maintained in the plural. For the system to be fully canonical, gender would cross-cut number perfectly, with all gender distinctions being maintained (Corbett 2012: 158), as we saw in Italian (examples (1) to (4)). For a careful reanalysis of Wolof, a Niger-Congo language but of the North Atlantic branch, for which the analytical tradition is similar, see Babou & Loporcaro (2016).

As seen in (29), the relevant forms are found prefixed to numerals and to certain adjectives (some require the classifier, like *-manabweta* 'beautiful', some allow but do not require it, some do not allow it). They are infixed to demonstratives (all but one of them) and – though this is not illustrated in (29) – with one form of interrogatives (Senft 1996: 16–17). Example (29) is typical in that the form of the classifier, whether prefixed or infixed, is identical. Most of the large number of classifiers have a single shape; a very few change according to target (Gunter Senft, personal communications 3 and 18 May 2015). In fact (29) illustrates a small wrinkle in the system, in that the demonstrative is normally *ma-…-na*, but with this classifier it surfaces as *mi-…-na* (Lawton 1993: 152–153). Thus if we compare across targets in this huge system, we almost always find identical forms of the classifier, making Kilivila an almost perfect example of Type A1. Having seen a fragment of the data, we note that while these distinctions have traditionally been described as "classifiers" our typology handles them without difficulty. And there are doubts about their analysis as classifiers. They occur with different targets, they are affixal, assignment includes biological sex – all characteristics that some linguists would take as good indicators of a gender system. A factor that has probably contributed to their being treated as classifiers is that they are numerous; but as noted earlier the number of instances should not be part of a definition. In our terms, the system is close to a canonical gender system according to some of the criteria.

4.2 Same semantics and partial overlap in forms (Type A2)

In Type A2 we find a single system of grammatical meanings, but the forms are not completely identical on different targets, as they are in Type A1; rather they differ partially but not completely (there is a partial overlap). Our examples of Type A2 languages are Latin and Mali; others are Tatuyo (Tucanoan; Gomez-Imbert 1996; 2007) and Lao (Tai-Kadai; Enfield 2004; 2007; Fedden & Corbett 2017). Note that both traditional gender and traditional classifiers are represented by the languages in this list.

4.2.1 Latin

We can use Latin to illustrate this type. Latin assigns three gender values to its nouns, based on semantic and morphological criteria. The same gender values are realized on a variety of agreement targets. The forms require more attention; consider the following examples:

(30) *Latin*

a. Seneca (*Ad Lucilium Epistulae Morales*, 17, 108)

ill-a	anim-a	bon-a
that-NOM.SG.F	spirit(F)-NOM.SG	good-NOM.SG.F

'that good spirit'

b. Cicero (*De Oratore* 1.222)

summ-um	ill-ud	bon-um
extreme-NOM.SG.N	that-NOM.SG.N	good(N)-NOM.SG

'that supreme good'

The important targets in (30) are the forms of the demonstrative *ille* 'that' on the one hand and the *bonus*-type adjectives *bonus* 'good' and *summus* 'extreme' on the other hand. In (30-a), with a feminine controller *anima* 'spirit', agreement is realized on the demonstrative and the adjective by the same form (*-a*). In (30-b) however the controller *bonum*

	MASCULINE		FEMININE		NEUTER	
	SINGULAR	PLURAL	SINGULAR	PLURAL	SINGULAR	PLURAL
NOMINATIVE	bonus	**bonī**	**bona**	**bonae**	bonum	**bona**
ACCUSATIVE	**bonum**	**bonōs**	**bonam**	**bonās**	bonum	**bona**
GENITIVE	bonī	**bonōrum**	bonae	**bonārum**	bonī	**bonōrum**
DATIVE	bonō	**bonīs**	bonae	**bonīs**	bonō	**bonīs**
ABLATIVE	**bonō**	**bonīs**	**bonā**	**bonīs**	**bonō**	**bonīs**

Table 7: The forms of the adjective *bonus* 'good' (Greenough et al. 1903: 46).

	MASCULINE		FEMININE		NEUTER	
	SINGULAR	PLURAL	SINGULAR	PLURAL	SINGULAR	PLURAL
NOMINATIVE	ille	**illī**	**illa**	**illae**	illud	**illa**
ACCUSATIVE	**illum**	**illōs**	**illam**	**illās**	illud	**illa**
GENITIVE	illīus	**illōrum**	illīus	**illārum**	illīus	**illōrum**
DATIVE	illī	**illīs**	illī	**illīs**	illī	**illīs**
ABLATIVE	**illō**	**illīs**	**illā**	**illīs**	**illō**	**illīs**

Table 8: The forms of the distal demonstrative *ille* 'that' (Greenough et al. 1903: 66).

'good' (functioning as a noun) is neuter. In the neuter the demonstrative employs the form (*-ud*), while the adjective *summum* 'extreme' uses *-um*. The formal overlap between the demonstrative *ille* and *bonus*-type adjectives is considerable. In the following Tables 7 and 8, forms which are identical across the two tables appear in boldface.

These paradigms illustrate that the sets of forms are somewhat different, but that does not mean that we are dealing with more than one system. Although the forms of the demonstrative *ille* and the adjective *bonus* are distinct in some instances, they are predictable one from the other. The agreements *-ud* in *illud* 'that.NOM.SG.N' and *-um* in *bonum* 'good.NOM.SG.N' are phonologically different but realize the same values. They are part of a consistent agreement pattern (Corbett 1991: 176–179).

In summary, Latin has a Type A2 system. We would not want to say that Latin has two systems; it has a single gender system, with three values. The overlap of forms simply means that gender is marked less canonically than in a Type A1 language, where the set of forms is identical across agreement targets.

4.2.2 Mali

This language differs from Latin in that it has two candidate systems with different semantic distinctions but where the smaller system is fully predictable from the larger one. Mali is a Papuan language of the Baining family spoken by 2,200 speakers in New Britain Province in Papua New Guinea (Stebbins 2005; 2011). The first candidate system, which Stebbins calls a noun class system, distinguishes masculine, feminine, count neutral, diminutive, reduced, flat, excised, long and extended classes. Nouns referring to humans and animals which display salient sexual dimorphism are allotted to the masculine and feminine noun classes according to sex. The rest are distributed across all noun classes. Assignment of the masculine, feminine, and count neutral noun classes is governed by complex principles (Stebbins 2005: 92–108). Assignment of the remaining six noun classes is based on a single criterion each (i.e. diminutive, reduced, flat, cut-off, long, or extended). The second candidate system, which Stebbins calls a gender system, distinguishes masculine, feminine, and neuter.

An example of both systems is given in (31). The cross-referencing pronoun *ngē* agrees in neuter gender, while the numeral *asēgēvēs* agrees in the "flat" noun class (and singular number) with the controller *pepavēs* 'piece of paper'.

(31) *Mali* (Stebbins 2011: 65)

kama	pepavēs	ma	asēgēvēs	ngē	pe
ART	paper.FLAT.SG	REL	one.FLAT.SG	3N.PRS	there

'there is a piece of paper there'

The candidate systems are marked on discrete subsets of targets. The gender system (the three-way distinction of masculine, feminine, and neuter) is based on possessive pronouns and pronouns cross-referencing core arguments within the predicate, of which there are three series (A/S_A present tense, A/S_A past tense and O/S_O). The second system (the nine-way distinction) is realized on a larger number of targets. These are anaphoric pronouns, adjectival modifiers, the numerals 'one', 'two', and 'three', indefinite and contrastive pronouns and demonstratives.

The important point for our purposes is that the gender values can be fully predicted from what Stebbins calls the noun class values. All nouns in the masculine or feminine noun classes have masculine or feminine gender, respectively; and all nouns belonging to the count neutral, diminutive, reduced, flat, excised, long, or extended noun class have neuter gender.[17] The relationship between genders and noun classes is shown in Figure 1 (Stebbins 2005: 113).

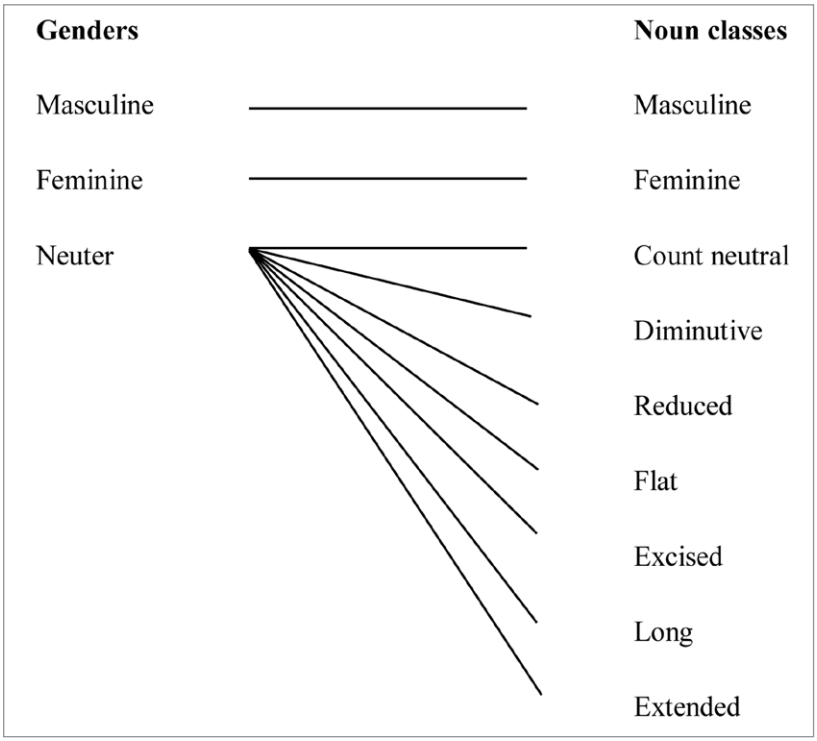

Figure 1: Relationship between Mali genders and noun classes.

[17] The assignment of nouns denoting humans to one of the size- and shape-based classes is limited to lexicalizations, for example *levop-ini* [woman-DIM.SG] 'old woman', and ad-hoc formations whose function is to make fun of the size of people. All of these are neuter so that full predictability from the larger to the smaller system is preserved (Stebbins 2005: 91).

	Masculine	Feminine	Neuter
Masculine	*matka* 'older brother'	–	–
Feminine	–	*likki* 'younger sister'	–
Count neutral	–	–	*bang* ' house'
Diminutive	–	–	*uratini* 'small basket'
Reduced	–	–	*srēvēm* 'dwarf'
Flat	–	–	*tēlēngves* 'leaf'
Excised	–	–	*amēngigl* 'board'
Long	–	–	*suchulvet* 'slender post'
Extended	–	–	*aupia* 'valley'

Table 9: Mali system matrix.

In the Mali system there is a clear correspondence from one system to the other. While the two candidate systems are not identical there is a many-to-one mapping between them: one system subsumes the other. Mali has nine noun classes, and exactly nine cells are filled in the matrix (Table 9).

There is complete predictability (in one direction) from one candidate system to the other; following the discussion in Section 2 of what we count as "same", this clearly matches the extended definition of one system, since one candidate system reduces perfectly to the other. Thus we conclude that Mali has a single gender system with nine values (though a less canonical single system than if there were no collapsing of values between the two types of target). Given the behaviour of the first set of agreement targets we can infer the behaviour of the second set of targets. The forms on the respective set of targets are largely distinct, but there is some overlap in that for both sets of targets masculine is marked by /ka/ and the masculine plural (for humans) is realized as /ta/. For the complete set of forms, see Stebbins (2011: 44–46, 137). Given this partial overlap of forms, we analyse Mali as a Type A2 language; it differs from Latin in that Mali has a many-to-one mapping between the systems and one system is predictable from the other.

4.3 Same semantics and different forms (Type A3)

In a Type A3 system there is a single unified system of grammatical meanings, but it is realized through quite different sets of forms. We find such a situation in French, which has a single gender system, distinguishing masculine and feminine values, but the forms expressing these values depend on the target. Consider the behaviour of the definite article and the adjective in the following two examples. (We add a phonemic rendition of French with segmentation, in order to avoid confusion induced by the orthography.)

(32) *French*

le	garçon	est	content
l-ə	gaʁsõ	ɛ	kõtã
DEF-M.SG	boy(M)[SG]	is	happy[M.SG]

'the boy is happy'

(33) *French*

la	femme	est	contente
l-a	fam	ɛ	kõtã-t
DEF-F.SG	woman(F)[SG]	is	happy-F.SG

'the woman is happy'

The different targets consistently mark a single set of grammatical meanings. The agreement markers on the definite article and the adjective are phonologically different, but they realize the same values. There is more variety than these examples imply, since several different consonants appear finally on adjectives when feminine. And yet surely no one would want to claim that French had two concurrent gender systems, one realized on the definite article and one realized on the adjective. We conclude that we have a system of Type A3.

5 Different semantics: Type C

To see the clearest contrast, we move to the other extreme, that is where there are two systems of grammatical meaning (Type C). Here we start with the canonical case of two systems: different semantics and different forms (Type C3). We go on to discuss weakenings with partial overlap in forms (Type C2) and same forms (Type C1), that is, our presentation "moves in" from the canonical extreme.

5.1 Different semantics and different forms: Canonically two systems (Type C3)

Our first Type C3 language that combines a gender system and a system of classifiers is Ayoreo (Bertinetto 2009; Bertinetto & Ciucci 2014). Another example of a C3 language is Michif, which has been discussed in various sources (Bakker & Papen 1997; Bakker 1997; Corbett 2006: 269–270), and so is only reported briefly here.

5.1.1 Ayoreo

The Zamucoan language Ayoreo (Bertinetto 2009; Bertinetto & Ciucci 2014), spoken by an estimated 4,500 people in Bolivia and Paraguay, has two candidate systems: a gender system with a masculine vs. feminine contrast and a system of at least five classifiers. These are analysed as possessive classifiers in the literature because they classify the possessed according to the functional relation it has to the possessor. Such classifiers are also called relational classifiers (Lichtenberk 1983).

Gender assignment is according to semantic criteria for humans, but more opaque for non-humans. There are some tendencies, for example vegetables tend to be feminine, whereas animals are predominantly masculine. Many tools are masculine or feminine depending on the sex that typically uses them. Agreement targets are adjectives (including numerals) and demonstratives. An example of an adjective and a numeral agreeing in gender with the head noun is (34).

(34) *Ayoreo* (Bertinetto & Ciucci 2014)

tɕ-imo	karatake	gare	keruṇa-ne
3-see	jaguar(M)	two[M]	big-M.PL

'he saw two big jaguars'

Only nouns that are not inherently possessed occur with a classifier in a possessive construction, which means that not all nouns participate in the classifier system. A significant point about Ayoreo is that the classifier agrees in gender with the noun. The most common classifier forms (singular) are given in Table 10. Examples of classifiers are given in (35) and (36).

MASCULINE	FEMININE	Assignment
-aṇ̊ej	-aṇ̊e	property
-atɕidi	-atɕide	pet, vehicle
-juj	-juge	haul (for picked vegetables and captured animals or enemies)
-akaj	-aka	plant

Table 10: Most common Ayoreo classifiers and their gender agreement (singular).

(35) *Ayoreo*
g-atɕidi tamoko
3-CL:pet.M.SG dog(M)[SG]
'his/her dog' (Bertinetto & Ciucci 2014)

(36) *Ayoreo*
j-ane̥ igide
1SG-CL:property.F.SG dress(F)[SG]
'my dress' (Bertinetto & Ciucci 2014)

The classifiers show agreement not only in gender, but also in number. In our examples, the agreement forms on the classifiers are *-i* for masculine singular (35) and *-e* for feminine singular (36), but there are additional complications with gender marking. The plurals are *-ode* (masculine) and *-(i)die* (feminine). For plants there are two classifiers available: one for living plants and one for those that have been picked (as shown in Table 10). Importantly, the two candidate systems are fully orthogonal. All combinations of gender values and classifiers are attested (cf. Table 10), yielding an orthogonality score of 1, and the forms are fully distinct as well, so we can analyse Ayoreo as a Type C3 language.

For a similar system in the Guaicuruan language Kadiwéu, see Sandalo (1997) and Ciucci (2014: 25).

5.1.2 Michif

This is a mixed language of Canada, which had formed by the early nineteenth century in the context of marriages of Cree speaking women and French speaking men (fur traders). The linguistic marriage involved (broadly speaking) Cree verbs and French noun phrases. And for our purposes, it unites an animate-inanimate Algonquian style gender system with a masculine-feminine Indo-European style gender system (which co-occur within the noun phrase). The key work on this language can be found in Bakker & Papen (1997) and Bakker (1997). The most relevant data are presented in Corbett (2006: 269–270) and the discussion of Michif as a combined gender system can be found in Corbett (2012: 176). Other Type C3 languages with two gender-like systems are Paumarí (Chapman & Derbyshire 1991; Aikhenvald 2010) and the related Kulina (Dienst 2014).

5.2 Different semantics and partial overlap in forms (Type C2)

To date we have not found a language with two noun classification systems where the semantics are different and there is a partial overlap in the forms. However, we believe that this is a plausible type. In fact, it is intuitively more plausible than Type C1. Type C1 has the surprising combination of different systems of grammatical meaning being realized by the same forms, and this type is attested, as discussed in the next section. In comparison, having different systems of grammatical meaning with only a partial overlap in forms would appear more likely (we could imagine it arising through the partial merger of markers as a result of attrition). Given this, we believe that Type C2 languages will be found, if rarely. Indeed we have evidence of a language almost becoming a language of this type. This is the North Halmaheran language Tobelo, spoken on Halmahera in Indonesia, as analysed by Holton (2014 and personal communication). Tobelo has a gender system, with marking on the verb (masculine versus feminine in the third singular, and human versus non-human in the third plural). In addition, Tobelo has a system of 16 numeral classifiers, concerned primarily with objects in the physical world (and none of these is a classifier for humans). In addition, there is an "incipient human/non-human distinction", whereby "[n]umeral predicates with human arguments employ the portmanteau pronominal prefix *ya-*, which derives from the third person human plural actor

prefix *yo-* and the third person undergoer prefix *a-*" (Holton 2014: 94). Holton calls *ya-* a "human numeral classifier". It is derived from a part of the gender system, but its combination with the undergoer prefix means that it is not a clear case. If it were, we would have an instance of gender and classifiers overlapping in form, to a small extent.

5.3 Different semantics and same form (Type C1)

At this point it will be helpful to reflect on what is meant by having the "same form". How would we differentiate two systems of grammatical meaning if the formal realization was the same? In our toy example of such a system (our Dialect C1 in 12 above) we had, for example, a marker *-i,* that signals ANIMATE in one system and AUGMENTATIVE in the other. We implied that the affix *-i* is interpreted differently, according to the part of speech of its host. More generally, the form is the same but it occurs in different "settings". There are various settings which could allow for the same realization to be interpreted differently. These include:

i. association with part of speech (as just discussed, and equally possible for free forms, as say a numeral classifier versus a possessive classifier);
ii. lexical specification (for example, some adjectives or some numerals might mark one system and others a different system);
iii. word order (this could be similar to (12), except that any pre-nominal element, irrespective of part of speech would mark one system and post-nominal modifiers the other);
iv. syntactic (for instance, attributive adjectives might mark one system and predicative adjectives the other).

Each of these is a theoretically possible "setting", and a full typology of nominal classification will need to establish which of these can differentiate concurrent systems.

In terms of these possible settings, we have found no instance of Type C1. This is hardly surprising. First, there are relatively few languages which have been claimed to have concurrent systems of any type. Second, Type C1 would be unexpected in functional terms: if a language has two systems (whether of nominal classification or of some other type) we would expect them to be formally differentiated. And third, the possible grammaticalization routes are not obvious.

There is, however, a weaker type of setting, and with this we have an instance of Type C1. This further type of setting is morphosyntactic: it involves just a part of the paradigm of the target (since we are dealing with nominal classification, a distinction with the noun itself is, of course, insufficient, as noted in Section 1.3). This seems a reasonable type of setting. After all, if we had a language in which gender is differentiated in the nominative but not in the oblique cases, we would accept this as a gender system (it would be covered by the accepted definitions of "agreement class"). But what if our concurrent systems depended on a similarly limited part of the paradigm?

We have an instance of this type. It provides a positive argument for the canonical approach, since it seems implausible, and yet it exists. Basing our typology on our canonical types forces us to look (yet) again at the fascinating issue of animacy in Slavonic languages. The essentials are as follows: Slavonic languages typically have three-gender systems, where assignment is based on semantics (male versus female) and morphology (inflectional class), as discussed in Corbett (1991: 34–43). In addition, a newer distinction has arisen, that of animacy. This is a genuine agreement category, not just a condition on agreement (Corbett 2006: 176–205). The animacy distinction is much more closely tied

to semantics than the older three gender values: entities treated as grammatically animate are those which live and move. Over time this distinction has become slightly less clear. The range of animacy varies across the family; it is least important in the south-west of the Slavonic area (Serbo-Croat) and most important in the north-east (Russian).[18] We will therefore concentrate on Russian. It fits here because: "On the one hand, the ANIMACY distinction is severely limited in that it is found within just one case value; it is non-canonical in this respect, and this is the part of its behaviour which makes it a sub-gender. On the other hand, it is a central part of the system, affecting nouns, pronouns, almost all adjectives (those that can occur in attributive function) and some numerals. It cross-cuts the main gender values ..." (Corbett 2012: 162).

Let us compare the two candidate systems. Russian shows substantial agreement evidence to justify postulating three gender values: masculine, feminine, and neuter. Now consider the paradigm of a typical adjective in Table 11.

Russian thus distinguishes three gender values. The feminine (first in Table 11) is better differentiated than the other two gender values. There is neutralization of gender values in the plural. What is important for the issue at hand are the syncretisms in the accusative. In the masculine singular, and in the plural for all gender values, the alternative patterns of syncretism are determined by animacy. The form of the accusative is identical to the nominative for inanimates, as in (37), and identical to the genitive for animates, as in (38):[19]

(37) *Russian*

ja	viž-u	star-yj	dom
I	see-1SG	old-M.INAN.SG.ACC	house(M.INAN)[SG.ACC]

'I see an old house'

(38) *Russian*

ja	viž-u	star-ogo	drug-a
I	see-1SG	old-M.ANIM.SG.ACC	friend(M.ANIM)-SG.ACC

'I see an old friend'

The animate form in (37) is not simply a genitive; we can see this by comparison with (38) where we find a noun which has a form which is uniquely accusative. The agreeing adjective, however, is specified as accusative, masculine, and animate: this specification has no unique form, the form is identical to the genitive.

(39) *Russian*

ja	viž-u	star-ogo	dedušk-u
I	see-1SG	old-M.ANIM.SG.ACC	grandfather(M.ANIM)-SG.ACC

'I see (my) old grandfather'

[18] There are interesting differences in the various Slavonic languages, for which see Huntley (1980), Doleschal (2014) and Krys´ko (2014). Animacy in Russian has aroused particular study; for the rise of animacy in Russian see Krys´ko (1994), and for the suggestion that animacy in Slavonic can be traced back ultimately to differential object marking see Eckhoff (2015). See Corbett (2012: 158–162) for a fuller definition, and further references, especially for treating animacy as a sub-gender. The notion of sub-gender is a reaction to the odd status of animacy in terms of its form: since it is much less well differentiated than the original three gender values. But if we take the comparison away, that is if we only had animacy, we would recognize it as a gender (see Dahl 2000: 582–583 and compare Nørgård-Sørensen 2014: 162 for discussion).

[19] We illustrate from the masculine singular but examples like (37) and (38) can be given for all the gender values in the plural.

		SINGULAR			PLURAL
		FEMININE	NEUTER	MASCULINE	
NOMINATIVE		novaja	novoe	novyj	novye
ACCUSATIVE	INANIMATE	novuju			
	ANIMATE				novyx
GENITIVE		novoj	novogo		
LOCATIVE			novom		
DATIVE			novomu		novym
INSTRUMENTAL			novym		novymi

Table 11: The paradigm of the Russian adjective *novyj* 'new'.

Given this, we look at the relevant "setting", which is the accusative case (in Table 11). Within this morphosyntactic setting, we have forms which are relevant to gender and do not distinguish animacy (*novuju* (F) and *novoe* (N)); and other forms which distinguish animacy but not gender, since gender is not distinguished in the plural, namely *novye* and *novyx*. Then we have those which distinguish animate from inanimate within the masculine singular (*novogo* and *novyj*). Within the setting of the accusative, then, there is an animate-inanimate distinction. However, all the forms used to realize this distinction are required elsewhere in the system. Animacy depends on syncretisms, and all its forms are shared.

As we noted, animacy cross-cuts the three gender values, giving six possibilities. (True, there are fewer neuter animates than masculine and feminine animates, but there are some, including *čudovišče* 'monster' and *mlekopitajuščee* 'mammal'.) We do not analyse Russian as having six gender values, rather we analyse it as having one gender system with three values (the traditional genders) and a cross-cutting gender system (animacy) with two values. There are no forms unique to animacy, and therefore we recognize Russian as being an instance of Type C1 in our typology ("different semantics and same form"), provided we restrict the "setting" to a part of the paradigm.

6 Partial overlap in the semantics (Type B)

We now turn to the most interesting cases, in which we find a partial overlap in the semantics (Type B). We start with the relatively clear case where the forms are different (Type B3) and finally deal with the more difficult situations where there is a partial overlap in the forms (Type B2) and where the forms are the same (Type B1).

6.1 Partial overlap in the semantics and different forms (Type B3)

We have already discussed Mian (Section 3.1). There are several other examples of this type. We begin with a strikingly clear example of a Type B3 language, Nanti, and then discuss Pnar, which is interestingly different from both Mian and Nanti. Other Type B3 languages are Tariana (Arawakan; Aikhenvald 1994; 2003), Baniwa of Içana (Arawakan; Aikhenvald 2007), Yagua (Peba-Yaguan; Payne 1986; 2007; Payne & Payne 1990), Innu (Algonquian; Drapeau & Lambert-Brétière 2011), and Khasi (Austroasiatic; Rabel-Heymann 1977; Temsen 2007).

6.1.1 Nanti

This language of the Kampan branch of the Arawakan family has 450 speakers in Peru (Michael 2008). The candidate systems we are interested in are two gender systems, one with an animate-inanimate contrast and the other with a masculine-feminine contrast.

	ANIMATE	INANIMATE
MASCULINE	+	-
FEMININE	+	+

Table 12: Nanti system matrix.

These systems are formally distinct but show an intriguing interaction. Nanti also has a set of classifiers which are suffixed to a wide range of targets as is typical of many languages of South America, but since our interest here is in the interaction of two candidate gender systems, we will say no more about Nanti classifiers.

The first candidate system distinguishes animate from inanimate. Agreement targets are a subset of adjectives, all numerals and quantifiers, and the existential verb. Assignment is semantic. Nouns referring to entities capable of independent motion are animate. This includes humans, animals, and celestial bodies, except stars. There is minimal "leakage": the nouns for soap, petrol, and one particular plant are grammatically animate.

The second candidate system distinguishes masculine from feminine. Agreement targets are the verb, possessed nouns, pronouns, demonstratives, and a very small subset of adjectives. The sets of targets for the two candidate systems are not entirely disjoint. A few dimensional adjectives, such as 'large' participate in both (*imarane* 'large (M, AN)' vs. *omarane* 'large (F, AN)' vs. *omarate* 'large (F, INAN)'; Michael 2008: 295–296, 312). Humans and animals are assigned according to sex: males are masculine and females are feminine. All inanimates are assigned feminine gender.

This is the same situation with slightly different values that we find in our hypothetical Italian dialect of Type B3. There is a partial overlap in the systems of grammatical meaning. All masculines are animate, whereas feminines can be either animate or inanimate; thus we end up with a three-way distinction: masculine, feminine animate, and feminine inanimate (see Table 12). The small matrix of 2x2 cells means that the attested combinations are mid-way between canonically one system (two cells filled) and canonically two systems (four cells filled). This gives us an orthogonality score of .5.

$$\frac{(\textit{cells filled} - \textit{minimum cells filled})}{(\textit{possible cells} - \textit{minimum cells filled})} = \frac{(3-2)}{(4-2)} = \frac{1}{2} = .5$$

We therefore turn to the forms. In Nanti the forms are different. There are two sets of agreement forms, *i-* 'masculine' vs. *o-* 'feminine' and *-n* 'animate' vs. *-t* 'inanimate'; this argues in favour of two systems. Therefore overall Nanti is closer to having two gender systems than one. It is a clearer example of Type B3 ("partial overlap in the semantics and different forms") than Mian, discussed in Section 3.1, since it has a higher orthogonality score than Mian (which has only .17).

For a similar system in the closely related language Matsigenka, see Van Epps (2010: 6–7) and O'Hagan & Michael (2015).

6.1.2 Mba

This language fits well here (it is one of the Mba (or Mbaic) languages, part of the Ubangian subgroup of Adamawa-Ubangian, within Niger-Congo). The data have been presented recently precisely in terms of the number of systems (Corbett 2012: 174–176), and so our discussion can be brief. The data are taken from Tucker & Bryan 1966: 110, 114–123, 131–140; Pasch 1985: 69–71; 1986). Looking at attributive agreement, we find six gender values. The pronouns (which also function optionally as an agreement marker) provide

three distinctions (male human, other animate, and inanimate, the latter indicated by the lack of an overt form). Of the eighteen theoretically possible combinations we actually find eleven, owing to the overlapping of the semantics of the two systems. The orthogonality score is .42. Since the forms are distinct, this is another instance of a Type B3. In Corbett (2012: 179) the choice was starkly "one system or two?", and the judgement was in favour of one system, with eleven values. Our current typology allows us to classify such instances more delicately. Note again how our typology cuts across the old gender/classifier divide, since with Mba the discussion concerns the number of gender systems.

6.1.3 Pnar

The Austroasiatic language Pnar is spoken by an estimated 400,000 speakers in the north-eastern Indian state of Meghalaya (Ring 2015). As a first candidate system, it has a three-term gender system with the values masculine, feminine, and neuter. In the plural all gender contrasts are neutralized.[20] Animates are assigned according to biological sex. To date the assignment principles for inanimates have not been determined, but we find inanimates in all three genders and Ring (2015: 99) reports that nouns referring to abstract entities are consistently neuter. Gender is expressed in the free pronouns, and agreement is obligatorily marked by a proclitic on demonstratives, numerals, and relative clauses. These proclitics are homophonous with the free pronouns. The forms are given in Table 13.

Gender is overtly expressed on nouns which are specific, using the same proclitics, while nonspecific nouns are unmarked. The verb is not an agreement target in Pnar. Agreement of a demonstrative and a numeral is illustrated in (40) and (41), respectively.

(40) *Pnar* (Ring 2015: 65)

ka = ni	ka = tʃnɔŋ
F = PROX.DEM	F = village

'this village'

(41) *Pnar* (Ring 2015: 320)

ɛm	jap	ka = wi	ka = kn̩t^{h}aj	tm̩mɛn
have	die	F = one	F = female	be.old

'an old woman died'

The second candidate system in Pnar consists of two numeral classifiers, namely *ŋut* '(living) human' and *tl̩li* 'non-human', occurring with numerals greater than 'one'. Classifiers are free forms and are obligatory. An example is given in (42). The plural marker on the noun, here *k^{h}ɔn* 'child', is obligatory, whereas it is optional on the numeral.

	Free pronoun		**Agreement clitic**	
	SINGULAR	**PLURAL**	**SINGULAR**	**PLURAL**
MASCULINE	u	ki	u=	ki=
FEMININE	ka		ka=	
NEUTER	i		i=	

Table 13: Gender contrasts in Pnar.

[20] A referee asks why we should not analyze a system like this as having four noun classes rather than three genders. The point is that gender and number are orthogonal, which is reflected in their different availability to nouns. Nouns normally have one gender value and all available number values (singular and plural in Pnar).

		Classifiers	
		HUMAN	NON-HUMAN
Gender	MASCULINE	+	+
	FEMININE	+	+
	NEUTER	–	+

Table 14: Pnar system matrix.

(42) *Pnar* (Ring 2015: 337)

ki = ni	tɔʔ	ki = san	ŋut	ki = k^hɔn	jɔŋ	ka
PL = PROX.DEM	be	PL = five	CL.human	PL = child	GEN	3SG.F

'these were her five children'

The Pnar gender and classifiers seem to be almost independent systems. Since the masculine and feminine genders include both human and non-human nouns, we cannot predict for either of these which classifier it takes. Likewise we cannot say which gender a noun will belong to given its choice of classifier. Only for neuter nouns can we make a prediction: they occur with the non-human classifier. The system matrix for Pnar is shown in Table 14.

The systems of Pnar are not entirely distinct in their semantics but they are largely orthogonal. The orthogonality score for Pnar is (5–3)/(6–3) = .67. We would want to say therefore that Pnar has two systems. When we turn to the forms, these are quite distinct. So Pnar is of Type B3. Like Mian, it is Type 3 in terms of form; in terms of semantics it is a Type B, near to a Type C, while Mian is a Type B closer to a Type A.

The neighbouring language Khasi has a very similar system (Rabel-Heymann 1977; Temsen 2007).

6.2 Partial overlap in the semantics and partial overlap in the forms (Type B2)

This is the system right in the middle of our canonical typology. The semantics of the two candidate systems are neither identical nor fully distinct. Equally, the formal realizations are neither identical nor fully distinct.

A fascinating example which fits here is Burmeso (of Western New Guinea), as described by Donohue (2001). The relevant data have been discussed in some detail, for example in Corbett (2012: 176–180). Verbs, belonging to one of two inflection classes (see below) and operating on an ergative-absolutive basis for agreement, distinguish six gender values;[21] the adjective distinguishes six different values. The matrix in Table 15 shows the possibilities, which will provide a valuable comparison with Mian.

For each cell we give the relevant number of nouns found in Donohue's representative word-list.[22] Before drawing the main conclusion, two notes are in order. First, while targets typically mark one of the two systems, there are three agreement targets ('one', 'all, many', and 'white') which inflect for both systems (they have the agreements normally found on verbs and those found on adjectives). The second point is that the gender value given as gender V could be considered inquorate since it contains only two nouns, and the agreements are simply an irregular combination: IV in the singular and VI in the plural. We stress that "inquorate" gender values are not simply those with few members; they are also characterized by having agreements

[21] We label these following Donohue; note that, as in more familiar systems, not all members of a given gender value match the semantic label.

[22] One effect of this is that we under-report the number of nouns in GENDER VI; this is because GENDER VI includes all terms for arrows (Donohue 2001: 102) but only one, the generic term *kasarar,* is in the representative word list.

		agreement on adjective					
agreement on verb		**MASCULINE**	**FEMININE**	**NEUTER**	**MASCULINE INANIMATE**	**FEMININE INANIMATE**	**NEUTER ANIMATE**
	I	44, plus all male kin terms	5, (4 birds)	–	1, neck	–	2, sea, wound
	II	–	7, plus all female kin terms	4	–	1, small goanna	2, sago rinser (lower), string shapes
	III	3	–	28, mainly inanimate	10, inanimate	1, goanna	–
	IV	9, inanimate	–	–	–	–	–
	V	–	–	–	2, banana, sago tree	–	–
	VI	–	–	1, arrow	1, coconut	–	–

Table 15: Burmeso system matrix.

which are a combination of agreements required elsewhere in the system. This means that the lexical items involved can be marked as lexical exceptions – there is no additional requirement in the agreement system, as there is if a gender value has a small number of nouns but has unique agreements associated with it (Corbett 2012: 84–85). If we were to eliminate this inquorate gender, the resulting matrix would show a greater degree of orthogonality of the two systems. It is very helpful that Donohue provides this level of detail: an important factor in assessing systems is "coverage", including the numbers of nouns involved (discussed in Section 3.2) but often we do not have sufficient data for such an assessment.

The matrix in Table 15 shows the interest of Burmeso. Of the theoretically possible 36 possibilities, just 16 are found. (It may be that a larger noun inventory would reveal more combinations but the distribution within the matrix shows a clear pattern.) In Section 3.2 we put forward a method of "scoring", based on the number of cells filled, minus the theoretical minimum and divided by the theoretically possible maximum minus the minimum. For Burmeso, the calculation would be (16–6)/(36–6) = .33. Recall that a score of 0 indicates no orthogonality (canonically one system) and 1 indicates full orthogonality (canonically two systems). If we chose to eliminate the inquorate gender V, the score would rise to (15–6)/(30–6) = .38. In terms of the semantics of the system, it is clear that we are dealing with a partial overlap. We can compare this with Mian, where the comparable score was .17; this suggests that the two systems of Burmeso are closer to being orthogonal than are those of Mian.

The other side of the question is the forms. As mentioned above, Burmeso has two inflection classes of verbs (Donohue 2001: 100–102), which are of great typological interest since they are closer to canonical than any other inflection classes yet described (Corbett 2009). Unlike Mian, the systems of forms show some overlap. Donohue (2001: 105) points out "the strong resemblances between the forms of the gender suffixes and the set II verbal class agreement prefixes". Specifically, the prefixal markers used in the second inflection class of verbs (Donohue's "set II") for genders I and II singular (namely *b-* and *n-*) are found suffixally on agreeing adjectives (not all agree) for the masculine and feminine gender values, namely *-ab* and *-an*. In addition, both sets also use an alveolar (*t* or *d*); for details see Donohue (2001: 105–106, 109). Thus the means of realization for

the two candidate systems overlap, in part. We thus find an overlap in both semantics and form, and hence the type to which Burmeso is closest is Type B2.

6.3 Partial overlap in the semantics and same forms (Type B1)

Like other Type B systems, B1 has two semantic distinctions which partially overlap. However, in Type B1 there is only one set of forms. Such systems usually remain under the radar, since they can be readily analysed as having a single system with simple assignment rules. We present an example of this type and contrast it with a Type B3 example to draw out the differences. Our data come from the Nakh-Dagestanian language Bagvalal, spoken in southwestern Dagestan by approximately 1,500 speakers:

(43) *Bagvalal* (Kibrik 2001: 64–66)
waša w-iRi
boy M.SG-stop
'the boy stopped'

(44) *Bagvalal*
jaš j-iRi
girl F.SG-stop
'the girl stopped'

(45) *Bagvalal*
ʕama b-iRi
donkey N.SG-stop
'the donkey stopped'

Agreement provides evidence for three gender values. Assignment is fully semantic: nouns denoting male humans are masculine; nouns denoting female humans are feminine; remaining nouns are neuter. Thus the neuter comprises all non-humans (whether animate or inanimate). We could reasonably leave the analysis here. However, our approach suggests a further step. In terms of the semantics of the system, we have a human vs. nonhuman opposition and a male vs. female one. Yet the sex-based distinction operates only for humans. In other words, the semantic oppositions would suggest four possibilities, of which only three are reflected in the gender system.

It is important to note that we are not simply dealing with different boundaries for sex-differentiability (Corbett 1991: 68). There is indeed cross-linguistic variation as to what counts as being sex-differentiable. For example, in Russian, sex-differentiability operates where it matters to humans, and involves domesticated animals and some where there is a striking difference between the sexes (*lev* 'lion' vs. *l'vica* 'lionness'). But this is a matter of lexis and derivational morphology, not of gender. The relevant lexical items are present in Bagvalal, which contrasts, for instance, *zin* 'cow' and *musa* 'bull'. Bagvalal differs from languages like Russian in that these nouns are both of neuter gender, along with inanimates like *awal* 'house' and *beq* 'apricot'.

There is a little more evidence for a human vs. non-humans divide in Bagvalal; consider the plurals of our previous examples:

(46) *Bagvalal* (Kibrik 2001: 64–66)
waša-bi b-iRi-r
boy-PL HUM.PL-stop-HUM.PL
'the boys stopped'

(47) *Bagvalal*
jaš-i b-iRi-r
girl-PL HUM.PL-stop-HUM.PL
'the girls stopped'

(48) *Bagvalal*
ʕama-bi r-iRi
donkey-PL N.PL-stop
'the donkeys stopped'

We have followed Kibrik in glossing the combination *b-STEM-r* as "human plural". The point is that in the plural we find syncretism of masculine and feminine, which produces a human vs. non-human divide (also reflected in the gender resolution rules, Kibrik 2001: 475–478). However, the agreement forms belong to one set of markers (prefixal in the singular, and prefixal and suffixal in the plural), with surprising syncretisms (*b-* shared by neuter singular and human plural, and suffixal *-r* marking human plural as opposed to prefixal *r-* indicating neuter plural). The adjectival forms are interestingly different, but they too combine masculine and feminine in the plural (Kibrik 2001: 64–65). An analysis recognizing the two semantic oppositions is given in the system matrix in Table 16.

This matrix clarifies what is going on. Our two putative features are not independently necessary. Given the three gender values, we can predict the human versus nonhuman value from them. A simpler analysis is therefore as in the following system matrix (Table 17).

System matrices of this type imply an analysis with one system. We therefore treat Bagvalal as having a single gender system, while recognizing that the semantic system underlying it, that is, the gender assignment, involves two overlapping parts. To clarify, it is useful to compare it with Nanti (Table 18), discussed in Section 6.1.

	HUMAN	NON-HUMAN
MASCULINE	+	–
FEMININE	+	–
NEUTER	–	+

Table 16: Bagvalal system matrix (two feature analysis).

MASCULINE	+
FEMININE	+
NEUTER	+

Table 17: Bagvalal system matrix (one feature analysis).

	ANIMATE	INANIMATE
MASCULINE	+	–
FEMININE	+	+

Table 18: Nanti system matrix (forms differ, hence Type B3).

Nanti has different formal means for realizing the masculine-feminine and the animate-inanimate divide, and so we treat it as Type B3. There are four theoretical possibilities, of which only three are realized: there are no nouns which control both the masculine and the inanimate agreement markers. There is a clear gap. Therefore we analyse Nanti as having two systems, partially overlapping. In Bagvalal there is no such gap. The overlap is only in the semantics of assignment (the male-female distinction does not extend to non-humans). Unlike in Nanti, there is no unused combination of markers, since in Bagvalal the markers make up one system.

The canonical perspective brings out the interest of Type B1; while such instances are usually treated as single systems (correctly we believe), there is one tradition which foregrounds the special semantic relations, namely Dravidian linguistics. Languages such as Tamil have systems resembling that of Bagvalal. The tradition recognizes a first split into rational and non-rational nouns (there are various terms for this divide) and a secondary split of the rationals into male and female (Asher 1985: 36–37; Corbett 1991: 8–9). As with Bagvalal, there is morphological support for the split in that there are two plural forms (for humans and non-humans), and the same distinction naturally applies for gender resolution (Corbett 1991: 269–270). For other Dravidian languages see Corbett (1991: 10–11); Krishnamurti (2003: 205–213); Dubjanskij et al. (2013) and references in all three.

7 Reviewing the typology

By looking at examples of each type, we have seen the key role of semantics (systems of grammatical meaning) in determining whether we are dealing with a single system or with concurrent systems (Table 19). We include languages discussed, in the cell to which they approximate most closely.

If there is a unified semantics we assume one system (Types A1–3). Conversely, if the semantics of the candidate systems are different, the language has two systems (Types C1–3). With both types, A and C, the language may be closer to or further from the canonical ideal. The particularly interesting cases are those in which the semantics of the candidate systems overlap. Here the forms are crucial. If they are the same we are closer to one system (Type B1), if they differ we are closer to two systems (Type B3); again a given language may approach these canonical ideals more or less closely. Right at the centre of our typology is Type B2, where both the semantics and the forms show partial overlap. Depending on the degree of overlap, a given language would be closer to having one system or two, hence the "?". If both were perfectly balanced, we would have a language with, in a sense, 1.5 systems.

		Semantics		
		Same	**Partial overlap**	**Different**
Form	**Same**	A1: 1 system Lamnso, Kilivila	B1: 1 system Bagvalal	C1: 2 systems Russian
	Partial overlap	A2: 1 system Latin, Mali	B2: ? systems Burmeso	C2: 2 systems [not yet found]
	Different	A3: 1 system French	B3: 2 systems Mian, Nanti, Mba, Pnar	C3: 2 systems Michif, Paumarí

Table 19: Typology of single and concurrent systems.

8 Discussion

We now take up the general issues that have arisen in our analysis of these significant systems. We start from the more specific, and move to the more general.

8.1 Gender and classifiers in their typological setting

We have focussed on languages which were plausible instances of languages with concurrent systems of nominal classification; several had previously been analysed as having both gender and classifiers. As we examined those examples, it became increasingly clear that it makes little sense to maintain a boundary between gender and classifiers. We have seen so many intermediate systems that any boundary would be artificial. It is a quirk of the history of linguistics that the systems that were studied first led to the sense of an opposition between gender and classifiers. It is time to move beyond the well-established classics, languages like French/German/Latin on the one side and Thai/Burmese/Mandarin on the other. Instead we must accept the rich diversity of systems that have since been described (including those of Mian, Pnar, and Ayoreo). Recalling just Mian (Section 3.1), its "classifiers" share properties with traditional gender systems and with classifier systems. Indeed, if we had presented them in isolation, we could have treated them as an unusual gender system. It is the presence of a more canonical gender system in the language which had led to their being called classifiers. And precisely by focussing on concurrent systems we have been able to highlight some of these "in between" types.

The issue of tradition has a trickier and more subtle effect: "gender" and "classifiers" are traditionally dealt with rather differently. The result is that when we meet difficult systems, the description is likely to be slanted according to the linguist's tradition. Linguists who are used to describing classifier-like systems are ready to assume multiple systems. Thus even when the forms are identical or nearly identical, classifiers are often treated as separate systems, while no one would analyse adjectival versus article gender agreement in this way, even though the forms may be distinct (as in French Section 4.3).

8.2 Single and concurrent systems

In general, the issue of whether we are dealing with one system or two in a given language needs careful argumentation. Of course, we may conclude that we have insufficient evidence to decide in a given case. But it is important to be explicit. It matters that descriptions, especially grammars, should consider the issue rather than simply assuming an answer. In part this is because of the importance for typology: if we are to achieve an adequate typology in this area we need argued cases to depend on. The issue is also of importance for psycholinguistics and the question of how speakers acquire and use feature systems: the exciting possibilities which are opening up for work on features, including the ability to work in fieldwork situations rather than only in the laboratory, mean that the difficult systems can be investigated further if they are clearly described.

While we have worked on the "one system or two" issue specifically for languages which have candidate systems in the gender/classifiers area, our analysis bears on the one/two system problem more generally. This issue is particularly acute for gender/classifiers, but it has been raised for other morphosyntactic features. An important paper here is Goddard (1982). That paper is focused on case, but it has interesting parallels with the current paper. First, it is clear that there are languages which have been described as having split ergativity (two case systems, e.g. one for pronouns and another for nouns) because they are found in Australia; the same systems would have been described differently in other traditions. Second, Goddard is keen to clarify the arguments for the particular analysis adopted. A subsidiary point is that the case systems discussed usually have several more

values in addition to the difficult core case values. Since these other case values show no differences in behaviour, it is less attractive to suggest there are two case systems, when most values are shared between them. Indeed, the argument is simpler in systems with larger inventories of values. (Compare Round & Corbett 2017 on tense-aspect-mood in Kayardild.) Some of the very small systems are problematic; the long-standing discussion as to whether gender and number should be treated as separate features in Cushitic languages, or treated as a single system, arises precisely because there are just three possibilities in play (masculine singular, feminine singular, and plural); Corbett (2012: 224–233) provides discussion and references, and claims that we do need to recognize gender and number as distinct features in Cushitic.[23]

8.3 Issues of data

At several points we have mentioned that to go further we would need information that most grammars do not supply. Typically this involves the interaction between the assignment rules for two candidate systems, to enable us to draw up a system matrix. And further, given the possibilities in terms of types, we would like information on tokens for each cell of such a matrix. This is not a criticism of the fieldworkers, to whom these questions did not occur; it is a positive sign of progress, that our typology generates new research questions.

Where, however, we were able to provide a system matrix, the results are significant (listed in the Appendix). The orthogonality scores address the relation of the grammatical meanings, and differentiate three types of situation: those with a single semantics, Types A (1, 2, and 3), which have the orthogonality score 0; also Type B1, which we treat as one system; compare this with Types B2 and B3, with scores ranging from .13 to .67 (see Appendix); and those with orthogonal semantic systems (Type C), where the score is 1.

9 Conclusions

We have clarified the typology of nominal classification systems by concentrating on languages with concurrent systems. These are of great interest in their own right, since until relatively recently they were believed impossible or at least very rare. These instances bring to the fore some particularly tricky systems, and allow comparison within one and the same language. The approach of canonical typology proved valuable here. Besides previous work which allowed us to analyse systems as being closer to or more distant from a canonical gender system, we developed a typology of concurrent systems of noun classification, with nine types. Though the sample of languages with concurrent systems and detailed description of them is relatively small, we found instances of almost all these possible types, as well as others which were more or less close to them. By pulling apart the different characteristics of these systems (rather than treating them as undifferentiated wholes to be forced into the gender or classifier mould), we revealed more of the rich diversity of these systems. Our approach offers the exciting prospect of a full typology of nominal classification systems, measuring them all in a similar way from the same baseline. Of course, it was right to treat French and Thai as different, but there is not a great chasm between them, rather a plethora of languages sharing some characteristics with one or other (or even both). All these belong in the same typological space. Who would have thought, after Royen's 1030 page study (1929), that there was still so much to be explored?

[23] While discussing small systems, we may note Muehlbauer (2012) on animacy and obviation in Plains Cree.

Abbreviations

1 = first person, 2 = second person, 3 = third person, I, II, III, IV, V, VI = genders I, II, III, IV, V, VI, ACC = accusative, ANIM = animate, AUG = augmentative, CL = classifier, COP = copula, DECL = declarative, DEF = definite, DEM = demonstrative, DIM = diminutive, DIST = distal, F = feminine, GEN = genitive, HUM = human, INAN = inanimate, M = masculine, MED = medial verb, N = neuter, N1 = neuter 1, NEG = negative, NOM = nominative, OBJ = object, PFV = perfective, PL = plural, POSS = possessive, PROX = proximal, PRS = present, PST = past, RPST = remote past, SBJ = subject, SEQ = sequential, SG = singular, SS = same subject

Additional Files

The additional files for this article can be found as follows:

- **Additional file 1: Appendix.** Appendix. https://doi.org/10.5334/gjgl.177.s1

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Competing Interests

The authors have no competing interests to declare.

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