Typology and the formal modelling of syncretism^{*}

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1 Introduction

Inflectional syncretism is the expression of two or more distinct morphosyntactic feature values by a single form,¹ as illustrated in the Macedonian example in (1), where 2SG and 3SG are identical in both of the past tenses, though not in the present. (Throughout this paper syncretized values are represented by ‘/’. Thus, we can represent the Macedonian pattern as ‘2SG/3SG’ syncretism.)

(1) Macedonian ‘fall’ (discussed in Stump 1993)

	present	aorist	imperfect
1SG	padnam	padnav	padev
2SG	padneš	padna	padneše
3SG	padne	padna	padneše
1PL	padneme	padnavme	padnevme
2PL	padnete	padnavte	padnevte
3PL	padnat	padnaa	padnea

The interpretation of such examples remains a disputed question in morphological theory. On the one hand, the collapse of these two values may be ascribed to some underlying affinity, on the assumption that they constitute a natural class. On the other hand, it may be treated as a purely formal relationship, arbitrarily stipulated in the morphology. It is probably fair to say that most scholars who have written on the topic have favoured the former approach, viewing syncretism as a reflection of the internal structure of morphosyntactic features. The pioneering works in this vein were Jakobson’s (1936, 1958) studies of Russian nominal inflection, in which case values were broken down into semantic components in the same way phonemes may be broken down into phonological features. Syncretic forms are thus

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¹ In general, the existence of a morphosyntactic distinction is determined on a language-particular basis. For example, in (1), it is clear that second and third person singular are potentially distinct values in Macedonian, because they are associated with distinct inflectional forms in the past tenses. Further, a distinction made in one number can be extended to another, as in German, where the distinction between first and third person in the singular (*ich mache* ‘I make’ versus *sie macht* ‘she makes’) justifies the assumption that they are distinct in the plural as well, even though they are always syncretic (*wir machen* ‘we make’, *sie machen* ‘they make’). For the purposes of the present paper, we have relaxed this morphological criterion, assuming a minimum of three person values (first, second and third) for the languages under consideration, even where inflection shows no more than two distinctions.

construed as realizations of the natural classes of semantic components that make up morphosyntactic features.

On this view, it is desirable that a formal model of morphological structure be inherently restrictive, allowing some syncretic patterns to be described while banning others. Examples of this approach include Bierwisch 1967, Carstairs 1987, 1998, Noyer 1997, 1998, Bobaljik 2002, Williams 1994, Neidle 1988, Blevins 1995, Calabrese 1998, Müller (forthcoming), Lumsden 1992 and Wiese 1996. However, though various constraints on syncretism have been proposed, either explicitly or implicitly, there has been no systematic attempt to assess these claims against the evidence of more than a handful of languages. It is the goal of this paper to evaluate some plausible claims against a large corpus of examples.

The scope of the present study is restricted to subject person marking on verbs. Person has been chosen because its possible values are constrained, allowing us to make more direct comparisons across languages than other features would allow. We assume that languages which mark person distinguish at least the three values of first (exclusive and inclusive), second and third person; additional distinctions (e.g. honorific versus familiar, proximate versus obviative, and same subject versus different subject) are limited, and for the most part will not play a role in what follows. The core sample used below is a corpus of 109 genetically and geographically diverse languages which evince person syncretism on verbal subject markers (see the appendix). Additional languages are adduced as needed. We only consider syncretism at the whole word level -- that is, where the identity obtains over the entire inflected word form, and is not restricted to one morphological component. In those examples where only inflectional affixes are cited (as in §3), it can be assumed that the other components of the word are invariant. We have also tried to eliminate instances where the identity of distinct forms is transparently ascribable to a synchronically active phonological rule.²

Below we assess two predictions that have been derived from formal constraints: (i) which person values can be combined in a single form, and (ii) do patterns of syncretism reflect markedness relations between the syncretized values?

2 Patterns of syncretism

If syncretism reflects underlying natural classes of feature values, then we should expect to find only those values syncretized which are licensed by feature structure. In order to assess this assumption, we shall take the model of person feature structure recently proposed by Harley and Ritter (2002). The feature person is analyzed as a hierarchy of three nodes. The dominant node, Referring Expression (RE), indicates the presence of pronominal features. The second node, Participant (PARTIC), is dependent on RE. The value +PARTIC marks a discourse participant, that is, speaker or addressee, while -PARTIC is interpreted as a third person by default. The third node, Addressee (ADDR), depends on +PARTIC, and marks the addressee, namely 2nd person. -ADDR is interpreted by default as the speaker, namely 1st person. Number is construed as a separate hierarchy.

² For example, the regular reduction of unstressed vowels leads to homophony of feminine and neuter in the past tense of Russian verbs where the endings are not stressed: *neslá* ~ *nesló* ‘carried.FEM ~ NEUT’ versus *pisál*[↔] ‘wrote.FEM/NEUT’. Such obvious instances are rare in our corpus, and we do not otherwise presume to distinguish between ‘systematic’ and ‘accidental’ homophony, for reasons which should be made clear by the Dhaasanac example discussed in §3.6; also see fn. 3 for an observation on the possible pitfalls of resorting to this distinction.

First and second person are construed as a natural class, subsumed under the node +PARTIC. Thus syncretism of first and second person is the only pattern licensed by feature structure. On a strict version of the hypothesis we are testing, this should be the only pattern we find; or, on a looser interpretation, it should predominate.

A superficial glance at the data in the appendix is not promising: not only does this pattern *not* predominate, no pattern does. However, we can bring some order to the apparent chaos if we distinguish between *complete* and *partial* syncretism, the results are less equivocal. By complete syncretism we mean that a given pattern is consistently found in all the paradigms in the language, while partial syncretism is restricted in scope, for example, to a particular tense or conjugation class. This is admittedly a crude division: where a language has only one set of inflectional markers, it achieves complete syncretism vacuously. Nevertheless, it proves to be a useful criterion, in that it allows some distinct patterns to emerge.

Where syncretism is complete, there is a sharp contrast between the behaviour of person in the singular versus non-singular. Complete syncretism of person solely in the singular is uncommon. Out of twenty nine examples of complete person syncretism in the sample (from twenty seven languages), only six are restricted to the singular. Of these, two come from languages where person is not distinguished in the plural, so that it is not so much the case that the syncretic pattern is restricted to the singular, but that person marking itself is restricted to the singular. In the non-singular, 1/2 and 2/3 both occur in roughly equal measures, while 1/3 is less common. A similar distribution is found where number is irrelevant, with examples of 1/2 and of 2/3 predominating.

(3) Examples of complete syncretism, by language

	singular	non-singular	number-neutral
1/3	Koiari*, Zoque	Aleut, German, Hindi	
2/3	Atakapa, Hindi, Nivkh*, Nubian	Amele, Kapau, Kewa, Kobon, Slovene	Chitimacha, Guambiano, Kiwai, Wambon
1/2		Burarra, Dogon, Manchad, Nubian, Prinmi Tetun	Hunzib, Ingush, Nez Perce, Sango Waskia

* Person distinguished in singular only.

Thus, cross-linguistically, there seems to be a preference for syncretism of first with second person, and of second person with third, in both cases restricted to non-singular or number-neutral contexts. Interestingly, this corresponds well with the sorts

of patterns found in free pronouns, as shown in (4). (The sample here is based on Cysouw 2003, with other examples added informally.)

(4) Compound person values in free pronouns

	singular	non-singular	number-neutral
1/3		Dakar Wolof	
2/3		Amele*, Kalam*, Kamoro, Kobon, Korafe*, Meyah, Mansim, Nez Perce*, Sango*, Warekena*, Wolof	Kawesqar
1/2		Awa*, Fongbe, Slave*, Yimas	Winnebago

*Examples from Cysouw (2003). Other sources: Dakar Wolof from Nussbaum et al. (1970), Fongbe from Lefebvre and Brousseau (2002), Kamoro from Voorhoeve (1975), Kawesqar in Clairis (1985), Mansim and Meyah from Reesink (2002), Winnebago from Lipkind 1945, Yimas from Foley (1991).

As with inflectional marking, nearly all the examples of combined person values in free pronouns involve 1/2 and 2/3 in the non-singular; none involve syncretism of singular person values alone. (Note that the evidence from number-neutral pronouns is exceedingly thin: we are aware of only two examples, the 1/2 emphatic personal pronoun of the Siouan language Winnebago (Lipkind 1945: 29) and the 2/3 pronoun of the Patagonian language Kawesqar (Clairis 1985: 465); the latter is only partial, in that there are distinct possessive forms for these two persons).

These patterns cannot be derived from the model of feature structure found in Harley and Ritter (2002). First, their model licenses only 1/2 syncretism, but not 2/3. However, not only does 2/3 syncretism occur, it is no less common than 1/2.³ Second, since number occupies a node separate from person, this model predicts that number will have no influence on patterns of person syncretism. .

If we choose to ascribe a semantic rationale to these patterns, it is probably significant that non-singular numbers favour syncretism, since this is precisely the context where there may be referential overlap, and hence ambiguity. Thus, in a language without an inclusive~exclusive distinction, first person plural may or may not include the addressee, so blurring the distinction between first and second person.

³ The aim of Harley and Ritter (2002) is specifically to account for the values of free pronouns, not the inflectional marking of person (though it does not appear that their model would distinguish between the two). They predict that if a language does display a 2/3 or 1/2 pronoun, that this is a result of accidental homophony, and will be disambiguated by verb agreement (p. 513, note 42). This prediction is contradicted by Amele, Kobon (dual only) and Nez Perce. Even if this prediction were true, it is curious that accidental homophony would be more frequent than systematic syncretism, which the data in (4) suggest.

Likewise, second person plural may or may not be construed as including some non-addressees, so blurring the distinction between second and third person. Nevertheless, there are reasons to be cautious about overemphasizing the semantic naturalness of such syncretic combinations, which are especially apparent when one considers the behaviour of the first person inclusive. Since semantically it overlaps with first and second person, we should expect syncretism with those two persons. While this does occur, instances of 1INCL/1EXCL syncretism are far more frequent than 1INCL/2, which is not readily accounted for if semantic overlap is deemed to license the syncretism; significantly, 1INCL/2 syncretism is no more frequent than 1INCL/3, which cannot be accounted for by the notion of semantic overlap (Cysouw forthcoming a). An example of such an ‘unnatural’ pattern comes from the Austronesian language Kwamera (5), where the first inclusive is syncretic with the third person in the dual, precisely the pattern one would expect not to find.⁴

(5) Kwamera verbal prefixes (Lindstrom and Lynch 1994: 10)

	SG	DU	PL
1(EXCL)	iak-	iak-rou-	iak-ha-
2	ik-	ik-rou-	ik-ha-
3	r-	k-rou-	ha-
1 INCL	-----	k-rou-	sa-ha-

Conversely, in the Australian language Burarra (see 20 below), the first person inclusive has a distinct form, while the first person exclusive and second person are syncretic in the dual and plural. Since the first exclusive and second person are mutually exclusive, there can be no question of a semantic or functional overlap between the values of the syncretic form (see Noyer 1997: 118-31 for discussion of a similar pattern in the Mayan language Mam).

3 Directional effects

Directional effects occur where the syncretic form looks as if it has ‘borrowed’ the form of one of its component values. Stump (1993) adduces the Macedonian paradigms in (1) as an example of this. The syncretic 2SG/3SG of the past tenses has the ending $-\emptyset$ in the aorist, which he identifies as a 3SG form on the basis of the present tense paradigm. In Stump’s analysis this effect is attributed to a purely morphological device, a rule of referral, whereby the 2SG takes the form of the 3SG (see also Zwicky 1985, Stump 2001, Corbett and Fraser 1993). On this approach, there is no way to predict which values will provide forms, and which values will receive them. However, there are other researchers who see directional effects as a reflection of underlying markedness relationships within feature structure. On this approach, the behaviour of directional effects should be predictable. Below we will

⁴ Note though that Kwamera has an impersonal marker *k-*, and a morphological relationship between impersonals and the first plural is known from other languages. Thus, in some Athapaskan languages, the unspecified person marker is used for the first plural (Rice 2000: 201), in Ngiti, the third person indefinite form is used for first person inclusive when preceded by a free pronoun (Kutsch Lojenga 1994), and, of course, the use of the French impersonal *on* for first plural is well known.

examine two proposals, namely Noyer's (1998) version of impoverishment, and Carstairs-McCarthy's lexical semantic constraint on syncretism.

In impoverishment theory (Noyer 1998), it is held some feature values are marked with respect to others. Under certain language-specific conditions, marked values may be deleted, in which case they are replaced by the unmarked value for that feature. This means that wherever we see directional effects, the form which prevails should be the one associated with the unmarked value. With respect to person, it is commonly assumed that third person is the default value. This is how Bobaljik (2002) analyzes the Macedonian example above: the value 2 is deleted in the singular of the past tenses, and replaced by the default person value, namely 3. This licenses the use of third person morphology even where second person should be expected.

Carstairs-McCarthy (1998) develops a somewhat different set of predictions concerning directional effects. The underlying principle is that inflectional meaning should be governed by the same constraints that obtain for lexical semantics, which leads to three relevant axioms, summarized below:⁵

- A. Lexical items do not contain meanings consisting of incompatible disjuncts, e.g. *'apple OR banana'. By the same token, inflectional meaning should not contain incompatible disjuncts consisting of competing values for the same feature, e.g. *'ablative OR locative'. (Carstairs-McCarthy assumes that feature structure is flat.)
- C. Lexical items may contain compatible disjuncts. For example, the different senses of *climb* in
 - (a) the boy climbed up the tree
 - (b) the boy climbed down the tree
 - (c) the snake climbed up the tree
 can be reconciled by characterizing its semantics as 'go, upward OR clambering'. Sentence (b) contains only the element 'clambering' and sentence (c) only the element 'upward', but the two meanings are compatible with each other, as witnessed by sentence (a). (Carstairs-McCarthy takes this example from Jackendoff 1985.)
- E. No rule can make overt reference to the unmarked value of a feature

Axioms A and E by themselves account for a subset of the phenomena allowed in Noyer's (1998) model, allowing directional effects that appear to involve the extension of the unmarked value in an unmarked context. Consider the singular person paradigm from the Chibchan language Ika, illustrated in (6). First and third person singular are syncretic in all tense paradigms except the distal past. The syncretic 1SG/3SG form has no overt person-marking affix, which makes it look like the 3SG form of the distal past.

⁵ There are two further axioms, but they are not of direct relevance in describing directional effects.

- (6) Ika (Franks 1990)

distal past			elsewhere
1SG	(stem)	- <i>rua</i> - <i>na</i>	(stem)
2SG	<i>n</i> $\emptyset$ -(stem)	- <i>na</i>	<i>n</i> $\emptyset$ -(stem)
3SG	(stem)	- <i>na</i>	(stem)

This distribution of the person markers can be accounted for by underspecification, as illustrated in (7), assuming that third person and ‘elsewhere’ are the unmarked values for person and tense, respectively. The ending *-rua* is specified as the first person distal past ending, *n* $\emptyset$ - as the second person prefix, unspecified for tense, and $\emptyset$ is the general default, unspecified for tense and person. The effect is the same as an impoverishment analysis in which the value 2SG was deleted, but axiom E imposes a further constraint. Since no overt reference can be made to unmarked values, the syncretism is predicted to occur only in the unmarked context; that is, one could not have 2SG/3SG $\emptyset$ in the distal past but not in the ‘elsewhere’ tenses.

- (7)
<i>-rua</i>	1, distal past
<i>n</i> $\emptyset$ -	2
$\emptyset$	

However, axiom C allows for a second type of directional effect, which Carstairs-McCarthy illustrates with an example from Hungarian conjugation, shown in (8). At issue is the distribution of the 1SG affixes *-k* and *-m*, which are isolated in (9). In the present, *-k* marks the indefinite and *-m* the definite, but in the past *-m* marks both. Thus, definite and indefinite are syncretic in the past, and it looks as if the form of the definite has prevailed.

- (8)
	present	past
1SG INDEF	vár-o-k	vár-t-a-m
1SG DEF	vár-o- <u>m</u>	vár-t-a-m

- (9)
	present	past
1SG INDEF	-k	-m
1SG DEF	-m	-m

Carstairs-McCarthy assumes that plural and past are the marked values for number and tense, respectively. He attributes the distribution of the affixes to the rules in (10). Since the values ‘past’ and ‘definite’ can co-occur, the value of *-m* contains a compatible disjunction; *-k* is simply an elsewhere form.

- (10)
<i>-m</i>	1, definite OR past
<i>-k</i>	1

Thus, the use of disjunctive feature values yields for Hungarian a pattern which is the mirror image of that found in Ika. In Ika, the form associated with the unmarked value

prevails in the unmarked context, while in Hungarian, the form associated with the marked value prevails in the marked context.

Thus, both Noyer (1998) and Carstairs-McCarthy (1998) predict that directional effects are constrained by markedness, but the actual predictions differ. Noyer predicts that directional effects will involve the extension of the unmarked form. Carstairs-McCarthy predicts a kind of markedness harmony: directional effects will involve either (i) the extension of the unmarked form in the unmarked context, or (ii) the extension of the marked form in the marked context.

In order to evaluate these predictions, we present below examples of directional effects in person syncretism. By necessity, this is an informal corpus. Quite simply, it constitutes all the reasonably convincing examples that we have come across; the corpus could be expanded or shrunk depending on what one considers to be a convincing example of directionality. We have limited ourselves to examples where the syncretism is realized by an overt morphological marker, rather than by a bare stem, as in the Ika example above (6). In so doing we eliminate instances which would be transparently interpretable as underspecification under practically any formal model.

Since both predictions that we propose to investigate crucially depend on markedness, we must first establish what the markedness hierarchy is between person values. Both Noyer and Carstairs-McCarthy concur that third person is the unmarked value, but the relationship between first and second person, if any, remains indeterminate. For the purposes of exposition we will assume the hierarchy implied by Harley and Ritter (2002), illustrated above in (2), where second person is marked with respect to first person. Note that only the inflectional affixes are given in the examples below; unless otherwise indicated, the stems are identical in all the forms.

3.1 First person / third person.

There are not many convincing examples of directionality involving these values. The Papuan language Koiari of the Trans-New Guinea phylum (11) seems to confirm the prediction that the third person form should prevail, in as much as the 1SG obligatory mood may optionally be identical to the 3SG (elsewhere, first and third person are always identical). Livonian (see below, 27) presents a diachronic example where the third person form prevailed.

(11) Koiari (Dutton 2003: 345, 351)

	obligatory mood		imperfect	perfect
	option 1	option 2		
1SG	-ahina	-ahima	-ma	-nu
2SG	-ihama	-ihama	-a	-nua
3SG	-ahima	-ahima	-ma	-nu
PL	-ihava	-ihava	-a	-nua

But there are also examples where the first person form seems to prevail. In the Nilo-Saharan language Murle (12), first person (inclusive) and third person are syncretic (in both numbers) in the subjunctive but not the perfect. In the perfect, the first person is characterized by prefixed *k-*, while the third person has no prefix. The syncretic

form in the subjunctive has a prefixed *k-*, just as the distinct first person of the perfect. Thus, it appears as if an overtly first person element is serving for third person as well.⁶

(12) Murle (Lyth 1971: 83)

	perfect			subjunctive	
1SG	k-	-a	→	k-	
2SG		-u		Ø	
3SG		(-un) ⁷		k-	
1INCL PL	k-	-it	→	k-	-it
1PL	k-	-da		k-	-da
2PL		-tu			-it
3PL		-it		k-	-it

3.2 Second person / third person.

Here there are rather more clear examples of directionality than with 1/3 syncretism, though the results are mixed. In some examples the third person form prevails, e.g. in Macedonian, as discussed in (1). Likewise, in the Nilo-Saharan language Nobiin (13), the 2SG appears to take the form of the 3SG in both tenses (present and past). In Dutch (14), the syncretic pattern is correlated with the position of the subject pronoun. When subject pronouns are preposed, 2SG takes the ending *-t*, identical to that of the 3SG. When the subject pronoun is postposed (as occurs in questions and in subordinate clauses), only 3SG takes *-t*; thus *jij kom-t* ~ *kom je* ‘you’re coming ~ are you coming?’ versus *zij kom-t* ~ *kom-t zij* ‘she’s coming ~ is she coming?’.⁸

(13) Nobiin present ~ past (Werner 1987)

	indicative	interrogative
1SG	-ir ~ -is	-re
2SG	-nam ~ -onam	-i ~ -o
3SG	-i ~ -o	-i ~ -o
1PL	-ir ~ -is	-ro ~ -so
2PL	-rokom ~ -sokom	-ro ~ -so
3PL	-inna ~ -sa	-inna ~ -sa

(14) Dutch ‘come’

	vb + pro	pro + vb
1SG	-Ø	-Ø
2SG	-Ø	-t
3SG	-t	-t
1PL	-en	-en
2PL	-en	-en
3PL	-en	-en

⁶ Note though that the related language Mursi (both members of the Surmic branch of Nilo-Saharan) has a similar pattern, in which the 3SG may have a stem alternant distinct from the others (Turton 1981: 344).

⁷ The suffix *-un* is found optionally in the perfect.

⁸ This pattern is not entirely systematic, as there is one verb which displays a stem alternation which disambiguates the 2SG and 3SG (*jij heb-t* ‘you have’ versus *zij heef-t* ‘she has’), and another verb where 2SG has *-t* even though 3SG does not (*jij ben-t* ‘you are’ versus *zij is* ‘she is’). Historically, the 2SG form descends from the 2PL, whose ending *-t* is cognate with the German 2PL seen in (28).

Although there are examples where the third person form prevails, there are even more which favour second person. For example, in Callahuaya, a Quechua-based creole, the original second person marker *-nki* is sometimes found with third person; contrariwise, 3rd person *-n* is *not* used for second person (Muysken 1997: 437-8). In the Bantu language Kongo (15), indicative subjects are marked by a prefix on the auxiliary, while subjunctive subject markers are prefixed to the main verb stem; note that the latter prefixes are asyllabic. The syncretic prefix *o-* of the indicative is the same as the distinct 2SG *w-* of the subjunctive, if one factors out the difference in syllabicity.⁹ In Old Icelandic (16), the syncretic 2SG/3SG ending *-er* of the present indicative is the same as the distinct 2SG ending found in the other tense-mood paradigms. (The indicative~subjunctive contrast is marked by a vowel alternation in the ending for all but 1SG and 2PL.)

(15) Kongo (Carter and Makoondekwa 1979: 6, 9, 11, 19-21)

	subjunctive		indicative
1SG	y-		i-
2SG	w-	→	<div style="border: 1px solid black; padding: 2px;">o-</div>
3SG	k-		<div style="border: 1px solid black; padding: 2px;">o-</div>
1PL	tw-		tu-
2PL	nw-		nu-
3PL	b-		be-

(16) Old Icelandic weak verb (Noreen 1923: 353-4)

	subjunctive, preterite		present indicative
1SG	-a		-a
2SG	-er	→	<div style="border: 1px solid black; padding: 2px;">-ar</div>
3SG	-e		<div style="border: 1px solid black; padding: 2px;">-ar</div>
1PL	-em		-om
2PL	-eþ		-eþ
3PL	-e		-a

The Papuan language Dani (Trans-New Guinea phylum) illustrated in (17) shows a syncretic 2PL/3 ending *-ep* in the hypothetical mood which matches the distinct 2PL ending *-ip* of the past. (The hypothetical mood is also characterised by a lowering of the vowel of the ending.) In Carib (Kalihna), shown in (18), the interrogative form of the copula distinguishes 2PL and 3PL, while elsewhere they are syncretic, displaying the form of the 2PL.

(17) Dani (Bromley 1981: 192)

	past		hypothetical
1SG	-i		-e
2SG	-in		-en
3SG	-e		<div style="border: 1px solid black; padding: 2px;">-ep</div>
1PL	-u		<div style="border: 1px solid black; padding: 2px;">-o</div>
2PL	-ip	→	<div style="border: 1px solid black; padding: 2px;">-ep</div>
3PL	-a		<div style="border: 1px solid black; padding: 2px;">-ep</div>

(18) Carib copula (Hoff 1968: 212)

	interrogative		present
1SG	waŋ		wa
2SG	maŋ		ma:na
3SG	naŋ		maŋ, na
1PL	kīta:toŋ		kīta:toŋ
2PL	mandonŋ	→	<div style="border: 1px solid black; padding: 2px;">mandonŋ</div>
3PL	nandonŋ		<div style="border: 1px solid black; padding: 2px;">mandonŋ</div>

⁹ The alternation between syllabic indicative prefixes and asyllabic subjunctive prefixes is phonologically regular: indicative prefixes attach to the (consonant-initial) verb stem, while the subjunctive prefixes precede the subjunctive marker *a-*, which is prefixed to the verb stem.

The Papuan language Suena (Trans-New Guinea phylum) presents a particularly striking example (19): the syncretic 2DU/3DU and 2PL/3PL of the remote tense have the same element *-w-* that is found in the 2DU and 2PL endings found in the other tenses. (The forms in the first column are used with the future, present, today's past, yesterday's past and past tenses. The vowel symbol *-V-* denotes the variable mood marker.)

(19) Suena (Wilson 1974: 59)

	default		remote
1SG	-n-V		-n-V
2SG	-s-V		-s-V
3SG	-i-V		-nu-V
1INCL DU	-n-V-ge		-n-V-ge
1EXCL DU	-n-V-to		-n-V-to
2DU	-w-V-to	→	-w-V-to
3DU	-r-V-to		-w-V-to
1INCL PL	-n-V-kai		-n-V-kai
1EXCL PL	-n-V-kare		-n-V-kare
2PL	-w-V	→	-w-V
3PL	-r-V		-w-V

3.3 First person / second person.

In the light of the failure of 1/3 and 2/3 syncretism to reflect any consistent morphological hierarchy between these values, we should not be surprised to find the evidence of 1/2 syncretism to be equally inconclusive. In some examples the second person form prevails. Thus, in the non-Pama Nyungan Australian language Burarra (20), 1/2 augmented (plural) and unit-augmented (dual) are marked by the same prefix *nyi-* which serves for second person in the singular.

(20) Burarra (Glasgow 1984, cited in Cysouw 2003)

	minimal	augmented	unit augmented
1INCL	arr-	ngu-burr-	a-rri-
1(EXCL)	ngu-	nyi-burr-	nyi-rri-
2	nyi-	nyi-burr-	nyi-rri-
3	(a-)	a-burr-	(a)birri-

In the Tungusic language Udihe (21), first and second person are syncretic both in the singular and plural in various paradigms, and the form corresponds to the distinct second person form as found in other paradigms.¹⁰

(21) Udihe (Nikolaeva and Tolskaya 2001: 212-13)

	past, past participle	present	permissive, subjunctive	perfect, conditional	future, converbs, present & future participles
1SG	-mi	-mi	-mi	-i	-i
2SG	-i	-i	-i	-i	-i
3SG	-ni	-ini, -ili	Ø	Ø	-ni
1INC PL	-fi	-fi	-fi	-ti	-fi
1PL	-mu	-u	-u	-u	-u
2PL	-u	-u	-u	-u	-u
3PL	-ti	-iti, -du-	-du-	-du-	-ti

In the Omotic language Shinassha (22), the 1PL subjunctive appears to be based on the 2PL form, in both the prefix conjugation and the suffix conjugation.

(22) Shinassha (Lamberti 2001: 149-53, 163-5)

	(prefix ~ suffix conjugation)	
	default	subjunctive
1SG	tì- ~ -è	ni- ~ -ee
2SG	ní- ~ -í	ni- ~ -ii
3SG MASC	bí- ~ -é	ni- ~ -ee
3SG FEM	bì- ~ -à	bi- ~ -aane
1PL	nò- ~ -ò	it- ~ -əte
2PL	ít- ~ - ə t	it- ~ -əte
3PL	bó- ~ -nóó	bo- ~ -noo

On the other hand, there are languages where first person form seems to prevail over second. Thus, Nobiin shows this pattern in the plural interrogative (23); note that second person is involved in a different directional effect in the singular (see above, 13). In literary Kannada (24), 1SG is distinguished from 2SG by the addition of the element *-nu* in the future. In the past, the *-nu* element is extended to 2SG.

¹⁰ Historically, the second person forms had the form *-sV*, with the *-s-* lenited to *-h-* in some varieties of Udihe (Sunik 1997: 238) and to Ø in others (including the variety illustrated here).

(23) Nobiin (Werner 1987)

	(present ~ past)	
	indicative	interrogative
1SG	-ir ~ -is	-re
2SG	-nam ~ -onam	-i ~ -o
3SG	-i ~ -o	-i ~ -o
1PL	-ir ~ -is	→ -ro ~ -so
2PL	-rokom ~ -sokom	-ro ~ -so
3PL	-inna ~ -sa	-inna ~ -sa

(24) Literary Kannada
(Sridhar 1989: 221-2)

	future	past
1SG	-enu	→ -enu
2SG	-e	-enu
3SG M	-anu	-anu
3SG F	-aŋu	-aŋu
3SG N	-uu	-itu

3.4 First / second / third person

In the future tense in Gujarati (25), 2SG has no distinct form: it is either identical to the 1SG or to the third person, the two forms being in free variation (Cardona 1964: 142). Note that Dutch displays a similar alternation, at least superficially (see above, 14); we do not treat this example as parallel to Gujarati because the 1SG/2SG pattern is transparently a default form.

(25) Gujarati future (Cardona and Suthar 2003: 682, 684)

	option 1	option 2
1SG	-iṣ	← -iṣ
2SG	-iṣ	-ṣe
3	-ṣe	→ -ṣe
1PL	-ṣ(i)ũ	-ṣ(i)ũ
2PL	-ṣo	-ṣo

3.5 Assessment of (1998) and Carstairs-McCarthy's (1998) predictions

The relationship of the examples from §3.4 to the markedness hierarchy $2 > 1 > 3$ is given in (26). The table is to be read as follows. 'U' indicates unmarked and 'M' indicates marked. The symbol to the left of the slash ('/') stands for the syncretized value, the symbol to the right of the slash represents the context. Thus U/U means 'the form associated with the unmarked person value is extended to a marked value in the unmarked context', M/M indicates that the form associated with a marked person value is extended to the unmarked value in a marked context', and so on. We have assumed that values such as singular, present tense, indicative and declarative constitute the unmarked values of contextual features; in a number of cases it is not obvious what markedness values to assume.

(26)

	1/2	2/3	1/3
a. Koiari			U/?
b. Literary Kannada	U/?		
c. Gujarati	U/?	U/?	
d. Nobiin	U/M	U/M	
e. Dutch		U/M	
f. Murle			M/M
g. Dani		M/M	
h. Suená		M/M	
i. Burarra		M/M	
j. Shinasha	M/M		
k. Udihe	M/?		
l. Callahuaya		M/?	
m. Kongo		M/U	
n. Old Icelandic		M/U	
o. Carib		M/U	

The results shown in (26) do not strongly favour either Noyer's (1998) impoverishment model or Carstairs-McCarthy's lexical semantic model. (26a-c) are compatible with both models, because the unmarked form prevails in what could be construed as the unmarked context. (26d-e) are compatible with impoverishment but not with the lexical semantic model, because the unmarked form is extended in the marked context. On the other hand, (26f-o) are not compatible with impoverishment, because they involve extension of the marked form. Of these, (26f-l) are compatible with the lexical semantic model, because the marked form is extended in the marked form, while (26m-o) appear to be incompatible with both models, because they involve the extension of the marked form in the unmarked context. Even those examples which would appear to comply with one or the other of the predictions may pose problems when subjected to a more detailed morphological analysis (as pointed out by a referee). Thus, the facts adduced in §3.4 suggest, at the very least, that the theoretical predictions should be reconsidered.¹¹

3.6 A note on diachrony

Directionality can also be observed in diachrony, where one form replaces another over time. A familiar example, adduced in Kurylowicz's famous article on analogy (1949), involves Old Icelandic, cited above in (16). These paradigms are interpreted as the result of the extension of the 2SG ending to the 3SG in place of the expected **-þ* (Haugen 1982: 129). The syncretic pattern itself is attributed to analogy with

¹¹ Further permutations of Noyer's and Carstairs-McCarthy's predictions are possible, but they do not improve matters greatly. In the case of Noyer's model, one can also allow for simple underspecification, without the device of impoverishment (as described in (7)). For example, the plural forms in Carib (18) could be analysed as *kita:toŋ* '1PL', *mandonj* 'PL' and *nandonj* '3PL interrogative', with 2PL/3PL syncretism due to the underspecification of *mandonj*. In this is allowed, Noyer's model makes no obvious predictions about directionality. On the other hand, Carstairs-McCarthy's model may be more restrictive than has been assumed here, since he assumes that feature structure is flat. Thus, there can be no markedness relation between marked values. The consequence of this would seem to be the prediction that directional effects should not obtain between marked values, which is contradicted by all the examples of 1/2 person syncretism.

consonant-stem verbs, where it was the result of a general phonological development (syncope of the theme vowel and assimilation of the ending into the stem-final consonant; Kuryłowicz 1949). As with synchronic directionality, various patterns are found.

Many examples involve extension of the third person form, which would follow from the assumption that third person serves as a default. For example, in Livonian (27), the 3SG present tense ending *-b* is found in place of the expected 1SG ending **-n* → *-∅* (Viitso 1997: 112). Compare the paradigm from the closely related Estonian, where the original 1SG ending is found.¹² Note that in monosyllabic stems in West Livonian dialects, vacillation was recorded between the original 1SG form and the innovative one, thus the verb ‘to be’ has the singular forms *uo* or *uob* ‘1SG’, *uod* ‘2SG’, *uob* ‘3SG’ (Kettunen 1938: lx). Kettunen (1938: lx-lxii) attributes this to analogy with the preterite paradigm, where 1SG and 3SG fell together as the result of regular sound change. Thus, as with Old Icelandic, the syncretic pattern was already established in the language by regular sound change. (Note that the 2PL/3PL pattern of the preterite was *not* extended.)

(27)	present		preterite	
	Livonian	Estonian	Livonian	Estonian
1SG	lugub	loen	lugiz	lugesin
2SG	lugud	loed	lugist	lugesid
3SG	lugub	loeb	lugiz	luges
1PL	lu'ggəṁ	loeme	lugizmə	lugesime
2PL	lu'ggət	loete	lugist(ə)	lugesite
3PL	lu'ggəbəd	loevad	lugist(ə)	lugesid

German likewise shows what appears to be the extension of third person forms. In Middle High German (MHG), all persons were distinct in the present tense plural; by the Early New High German (ENHG) period, four different syncretic patterns were found, varying according to dialect (28). In type I, the third person form has been extended to second person. In type II, it has been extended to all three persons. In type III (ultimately established as the literary norm), 1PL and 3PL are syncretic. Though the form looks like the original 1PL, the source is more likely to have been the *-n* found in the 3PL preterite, likewise *-n*. In IV, this *-n* is extended to all plural persons.

¹² Though note that the expected reflex of final *-n* should be *-∅* in Estonian as well. Its retention in 1SG forms is anomalous.

(28) Present tense endings in Early New High German (Wegera 2000: 1546, Grosse 2000: 1333)

	MHG	I	II	III	IV
1PL	-n	-n	-nt	-n	-n
2PL	-t	-nt	-nt	-t	-n
3PL	-nt	-nt	-nt	-n	-n

The third person also prevails in the Kumta dialect of Kannada (29), where, in place of the historically expected 1PL ending *-vV* (found in other dialects, as well as the literary language), the 3PL ending *-ru* is found. As in the German examples above (28), this same ending may replace the 2PL ending *-ri* as well.

(29) Kannada dialects ‘kept’ (Upadhyaya 1976: 130-2)

	Bellary	Kumta
1PL	i • •ive	i • •ru
2PL	i • •ri	i • •ru /- ri
3PL	i • •ru (masc., fem.) i • •uvu (neut.)	i • •ru

A similar development has been reconstructed for the plural passive of Gothic: 1PL and 3PL fell together by regular sound change, and the 2PL was analogically altered to match them, leading to the attested 1PL/2PL/3PL ending *-anda* (Szemerényi 1989: 255).

A particularly striking example of the extension of third person forms comes from the Oceanic language Anejom (30). In the nineteenth century, the auxiliary had distinct forms for first person (inclusive and exclusive), second and third in the dual, trial and plural. Between the nineteenth and twentieth century the language underwent catastrophic change (due in part to population loss). The result is a system with considerable variation, if not to say confusion. Lynch (2000) hypothesizes that it is moving in the direction of generalizing the third person plural for all non-singular persons.

(30) Anejom auxiliary (Lynch 2000: 91-5)

aorist (typical for all paradigms)		
	19th c.	20th c.
1SG	ek	ek
2SG	na	na
3SG	et	et
1INCL DU	intau	era
1DU	ecrau	
2DU	ekau	
3DU	erau	
1INCL TRI	intaj	
1TRI	ektaj, ektij	
2TRI	ahtaj	
3TRI	ehtaj	
1INCL PL	inta	
1PL	ecra	
2PL	eka	
3PL	era →	

However, not all such examples favour the third person. Thus, Romani shows evidence of multiple directionality. (31). In the present tense, syncretism of 2PL/3PL is common to all the dialects. (The origin of this pattern is unclear, so we take it as a given.)¹³ What is of interest to us is the extension of this pattern into the perfect, which occurs in a few dialects. Significantly, it is sometimes the 2PL ending which prevails (Sinti), and sometimes the 3PL ending (Northeastern Romani, and partly in Welsh Romani).

(31) Romani (Matras 2002: 145)

		perfect				
			Central, Finnish, Balkan,			
	present	reconstructed	Vlax	Sinti	Welsh	Northeast
1PL	-as	*-am	-am	-am	-am	-am
2PL	-en	*-an	-an, -en	-an	-e, -an	-e
3PL	-en	*-e	-e	-an	-e	-e

Thus, while there is some diachronic evidence that third person forms can replace others diachronically, it is hardly an exceptionless generalization. Especially striking are the examples that appear to show second person replacing third, for which no explanation readily comes. Nevertheless, there is one area where the default status of third person is more firmly established, namely the wholesale loss of person

¹³ The syncretic 2PL/3PL corresponds to what would be expected for the 3PL (Matras 2002: 143). This is unexplained, but it may be connected with the resemblance between the 2PL perfect ending *-an* and the 3PL present ending *-en*.

marking, as seen above in German, the Kumta dialect of Kannada and in Gothic; in all these examples it is the etymological third person form which prevails. A seeming counterexample to this observation comes from the present tense in Modern East Scandinavian languages (Swedish, Danish and Norwegian), where person distinctions have been eliminated, and there is but a single form in *-r* (see 16 above). The first stage in this development was shared with Old Icelandic, namely the extension of second person *-r* to the third person in the present indicative. However, it was only after it was extended to third person singular that this form ultimately predominated (32); that is, the form which was extended to *all* person values served as a third person form (among other things) immediately prior to its extension.

(32) Eastern Scandinavian (present indicative)

	proto-ES	Old ES	Modern ES
1SG	*-(V)	-(V)	-(V)r
2SG	*-(V)r	-(V)r	-(V)r
3SG	*-(V)þ	-(V)r	-(V)r

This suggests that two types of operation were at work: (i) an idiosyncratic, morphologically specified extension of the second person to the third, and (ii) a cross-linguistically unexceptional extension of the 3SG form.

In some of these cases, for example in Old (and Modern) Icelandic, the diachronic extension of a form has resulted in synchronic directionality, provided the extension did not affect all paradigms. However, there is another potential source for synchronic directional effects. Consider Nobiin (see 13 above), where the 3SG form appears to be the source for the syncretic 2SG/3SG interrogative, and the 1PL form appears to be the source for the 1PL/2PL interrogative. In the the ancestor of Nobiin, Old Nubian (first attested in the seventh century; Browne 2002: 1), 2SG/3SG and 1PL/2PL syncretism was characteristic of all paradigms (33).

(33) Old Nubian present indicative (Bechhaus-Gerst 1996: 237)

	SG	PL
1	-ire	-iro
2	-ina, -ena	-iro
3	-ina, -ena	-iran, -eran

In Nobiin, 2SG and 2PL suffixes were innovated and added to the indicative and negative paradigms, but not to the interrogative or conditional. Thus, the syncretic paradigms represent the older state of affairs, and the directional effect that results is a reflection of diachronic layering.

4 Conclusion

The contrast is often made between a restrictive theory, which is able to make predictions about possible and impossible structures, and a descriptive framework, which is open-ended. The question we have posed above is: to what extent can a formal model of syncretism serve as a restrictive theory? The results are not

encouraging. In §2 we reviewed a recent model of the internal feature structure of person, and showed that it does not allow us to predict the attested patterns of syncretism. In §3 we compared two different models which aim, among other things, to derive directional effects in syncretism, and showed that neither makes empirically verifiable predictions. In fact, the data are heterogeneous enough to make any prediction circular; at best, what the model cannot account for can be labelled ‘accidental’ (see fn. 3). This suggests that a formal model should not presume to make predictions.

However, it would be irresponsible to leave the matter there. There *are* some decided tendencies, for example, the prevalence of syncretism of 1/2 and 2/3 person in non-singular numbers (suggesting that these do constitute natural classes at some level), and the frequency with which third person serves as a default in diachronic change. The challenge for morphological theory is to allow the formal model to be open-ended, while still giving an account of the fact that some patterns are common, and others rare. Below we suggest that the statistical distribution of patterns is a reflection of diachronic processes.

Consider first the change undergone by Anejom, discussed above in (30). Though striking in its rapidity, the direction of change does not seem unexpected: third person substitutes for the other forms, and plural substitutes for dual and trial. The basis for the innovative system of twentieth century Anejom need not be sought in language-specific morphological quirks. Rather, it follows from quite widespread assumptions about the unmarkedness of the third person with respect to other person values, and of plural with respect to other non-singular number values.

Contrast this with the developments in the Cushitic language Dhaasanac, illustrated in (34). In the tense-aspect paradigms where person is marked (the perfect and imperfect positive, the dependent positive and the short past) there are two distinct stems, which Tosco (2001) labels ‘A’ and ‘B’ (following Sasse 1976). The contrast between the A and B forms is illustrated in (34). It takes a number of different shapes, depending on the verb stem, involving stem-final (a-e) or stem-initial (f) consonant alternations and vowel insertion (c) and alternation (d-e). The distribution of the A and B forms can hardly be described as reflecting any natural classes of morphosyntactic values: the A form is used for the first person singular, third person singular masculine, first person inclusive plural and the third person plural, while form B is used for the second person in both numbers, third person singular feminine and the first person exclusive plural. What is of interest here is that this morphologically systematic, morphosyntactically unnatural pattern is itself the product of a morphological innovation. The stem alternations descend from an older system of affixation: most verbs took person-number marking suffixes, a small handful took prefixes. This state of affairs is still found in other Cushitic languages, such as Somali. Crucially, the first person exclusive form in *-n* was distinct from the 2/3SG FEM form in *-t*. Under Sasse’s (1976: 219-20) reconstruction (35), forms in *-n* and *-t* fell together by regular sound change in stems ending in a resonant. This syncretism was then extended by analogy to all other stem classes, as well as to stems with person-number *prefixes*.

(34) Dhaasanac stem alternations (Tosco 2001: 123-206)

<i>examples of stem alternation</i>		
A	B	
a. leeΔi	leeti	‘fall down.PERF’
b. kufi	kuyyi	‘die. PERF’
c. guurma	guuranna	‘migrate. IMPERF’
d. ?uufumi	?uufeeni	‘cough. PERF’
e. seΔ	sieti	‘walk. PERF’
f. yes	ces	‘kill. PERF’

(35) Development of Dhaasanac endings (Sasse 1976: 219-20)

	attested state	original state
1SG	A	*Ø
2SG	B	*-t
3SG FEM	B	*-t
3SG MASC	A	*Ø
1INCL PL	A	*Ø
1EXCL PL	B	*-n
2PL	B	*-t
3PL	A	*Ø

Thus, the change in Anejom yielded a ‘natural’ result, while the change in Dhaasanac yielded an unnatural result. But in essence the two kinds of change are the same. The original paradigmatic space was reorganized according to a new template. The difference lies in the source of the template. In the case of Anejom, we can suppose its source lay in (universal?) properties of feature structure, whereby 3PL is unmarked with respect to other non-singular person-number values. Thus, this template is shared across most (all?) languages. In the case of Dhaasanac, the template was created by a phonological change that affected one stem class. By definition, this template is language-specific. The difference between natural (i.e. common) and unnatural (i.e. uncommon) syncretic patterns thus need not be reflected in the formal model. We suggest that contrast between these two diachronic routes is sufficient to account for the statistical predominance of morphosyntactically natural patterns, as argued also by Cysouw (forthcoming b). Paradigmatic templates based on common or universal elements of feature structure (i) are available to all languages, (ii) can arise spontaneously (as in Anejom), and (iii) are self-regenerating in case of disruptions. Templates based on phonological change, although they may be resistant to change, and even productive (Maiden 1992), nevertheless are still language-specific, and always in competition with templates based on feature structure. It only follows that the former type should be more widespread.

On this view, even if we manage to construct a comprehensive model of feature structure that will account for some syncretic patterns, the possibility still remains that patterns may be codified which are independent of feature structure. The crucial question here is whether there are any constraints on the production of *unnatural* syncretic patterns. At present we do not have enough information to decide

this question; as the discussion above will have shown, it can only be resolved empirically.

Appendix 1: Person syncretism in 109 languages

The core of the sample is based on the 200 language corpus used in Dryer et al. (forthcoming), which has been expanded. Complete syncretism (where the syncretic pattern is systematically found in all the paradigms of a language) is marked by ‘x’, partial syncretism (restricted in scope, e.g. by tense-aspect-mood, lexical class, gender or syntactic context) is marked by ‘(x)’. Syncretism of number that affects only one person value is not recorded here. For example, in Latvian, 2SG may be syncretic with third person, which does not distinguish number; this is recorded as 2/3 syncretism in the singular.

Language	singular			non-singular			number irrelevant			other patterns
	1/3	2/3	1/2	1/3	2/3	1/2	1/3	2/3	1/2	
Abipon							(x)			
Aleut				(x)						
Amahuaca							(x)	(x)		
Amele			(x)		x					
Arabic		(x)			(x)					
Atakapa		x								
Awa Pit							(x)	(x)		
Aymara									(x)	
Bagirmi				(x)		(x)				(2SG/1PL/3PL), (SG/1PL/3PL)
Barasano									x	
Beja	(x)									
Bulgarian		(x)								
Burarra						x				
Burushaski		(x)				(x)		(x)		
Canela-Kraho							(x)			
Carib					(x)					
Cayuvava										(1PL/1INCL PL)
Chichimec	(x)			(x)						
Chitimacha								x		
Daga	(x)									(1SG/3PL)
Dargi						(x)				
Dimili		(x)								
Diola-Fogny										(2SG/1PL), (3SG/1PL)
Dogon						x				
Ekagi	(x)									2SG/1PL
English										(1SG)/2SG/PL
Estonian										(2SG/3PL)
Ewe		(x)								
French		x		(x)						(1SG/2SG/3PL), (1SG/2PL)
German	(x)			x						(3SG/2PL)

Appendix 1, continued

Language	singular			non-singular			number irrelevant			other patterns
	1/3	2/3	1/2	1/3	2/3	1/2	1/3	2/3	1/2	
Gimira					(x)					(3SG/2PL/3PL/ 1INCL PL)
Guambiano								x		
Harar Oromo	(x)	(x)								
Hayu		x			x					(2DU/3DU/1INCL DU)
Hindi		x		x						
Hixkaryana				x						
Hunzib									x	
Ibibio								(x)		(3SG/PL)
Ika	(x)					(x)				
Ingush									x	
Iraqw		(x)							(x)	
Irish										(3SG/2PL), (2/3), (SG/2PL/3PL)
Kannada			(x)							
Kapau					x					(1SG/2PL/3PL)
Karok								(x)		
Kashmiri				(x)			(x)			
Ket							(x)			
Kewa			(x)		x					
Khanty					(x)					
Kiowa				(x)						(3SG/1PL)
Kiwai								x		
Kobon		(x)			x					
Koiari	x									
Kongo		(x)								
Koryak		(x)								
Krongo			(x)							
Kunama			(x)		(x)					
Kwamera				(x)						
Lak								(x)	(x)	
Lango										3PL/1DU
Latvian		(x)								
Lavukaleve						(x)				
Lower Grand Valley Dani					(x)					
Luvale		(x)		(x)						
Manchad						(x)				
Marind										(3SG/2PL)
Me'en		(x)								
Miskito									x	
Muna										(3PL/1inc DU), (2SG/1PL)

Appendix 1, continued

Language	singular			non-singular			number irrelevant			other patterns
	1/3	2/3	1/2	1/3	2/3	1/2	1/3	2/3	1/2	
Murle	(x)	(x)					(x)			
Nama		(x)								
Nez Perce									x	
Nganasan								(x)		
Ngiti				(x)						
Nivkh		x								
Nkore-Kiga				(x)						
Nubian (Dongala)		x				x				(SG/1PL/2PL)
Nunggubuyu						(x)				
Olo										(1PL/3DU)
Otomi								(x)		
Pumi						x				(2SG/3/1PL/2PL)
Rongpo		(x)				(x)				
Sango									x	
Sentani										(2SG/3DU)
Shuswap										3SG/1PL
Siuslaw										2SG/3PL
Slovene					x					
Spanish			(x)							
Suena					(x)					
Swahili		(x)								
Tanglapui								(x)		
Taos		(x)				(x)				
Telugu										
Tetun									x	
Tiwi		(x)				(x)				
Tlapanec										(1SG/3PL)
Tol		(x)	(x)							
Totonac										(3SG/1PL)
Udihe			(x)			(x)				
Usan								(x)		
Vanimo	(x)	(x)		(x)						(1SG/2PL)
Wambon								x		
Warekena					x					
Waskia									x	
Yele										(2SG/1DU), (1PL/2DU)
Yukaghir			(x)							(1SG/2SG/3SG/ 1PL/2PL)
Zoque	x									
Zulu		(x)								(3SG/1PL)

Appendix 2: Genetic affiliation of the languages in the sample

In general, the attribution of genetic affiliation follows that assumed in Dryer et al. (forthcoming).

Afro-Asiatic: Arabic, Beja, Gimira, Harar Oromo, Iraqw; **Altaic:** Udihe; **Arawakan:** Warekena; **Austronesian:** Kwamera, Muna, Tetun; **Aymaran:** Aymara; **Burarran:** Burarra; **Carib:** Carib (Kalihna), Hixkaryana; **Isolates:** Atakapa, Burushaski, Cayuvava, Chitimacha, Ket, Nivkh, Nunggubuyu, Tiwi, Tlapanec, Tol, Yukaghir; **Chibchan:** Ika, Miskito; **Chukoto-Kamchatkan:** Koryak, **Dravidian:** Kannada, Telugu; **East Papuan:** Lavukaleve, Yele; **Eskimo-Aleut:** Aleut; **Ge-Kaingang:** Canela-Kraho; **Guaicuruan:** Abipon; **Hokan:** Karok; **Indo-European:** Bulgarian, Dimili, English, French, German, Hindi, Irish, Kashmiri, Latvian, Slovene, Spanish; **Kordofanian:** Krongo; **Khoisan:** Nama; **Kiowa-Tanoan:** Kiowa, Taos; **Nakh-Dagestanian:** Dargi, Hunzib, Ingush, Lak, **Niger-Congo:** Diola-Fogny, Dogon, Ewe, Ibibio, Kongo, Luvala, Nkore-Kiga, Sango, Swahili, Zulu, **Nilo-Saharan:** Bagirmi, Kunama, Lango, Me'en, Murle, Ngiti, Nubian (Dongala); **Oto-Manguean:** Chichimec, Otomi; **Paezan:** Awa Pit, Guambiano; **Panoan:** Amahuaca; **Penutian:** Nez Perce, Siuslaw; **Salish:** Shuswap; **Sko:** Vanimö; **Tibeto-Burman:** Hayu, Manchad, Primi, Rongpo; **Tucanoan:** Barasano; **Torricelli:** Olo; **Totonacan:** Totonac; **Trans-New Guinea:** Amele, Daga, Ekagi, Kapau, Kewa, Kiwai, Kobon, Koiari, Lower Grand Valley Dani, Marind, Salt-Yui, Sentani, Suena, Tanglapui, Usan, Wambon, Waskia; **Tucanoan:** Barasano; **Uralic:** Estonian, Khanty, Nenets.

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