PERSON FEATURES AND SYNCRETISM: A CASE STUDY[1]

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In this paper we develop an analysis of the morphological realization of person agreement based on the following core assumptions. (i) In languages with person agreement, the person specification of the verb is identical to that of the subject, even where this is not reflected by surface forms. (ii) First, second and third person are composed of two features, one shared by first and second person, the other shared by second and third person (see Kerstens 1993, Halle 1997, Bennis and MacLean 2006, and Aalberse and Don 2010). (iii) Phi-features represent functions that operate on an initial set of possible discourse referents or on the output of other functions. Which combinations of phi-features are well formed and which are not follows from the properties of the functions they represent (see Harbour 2011b,c). (iv) Rules that operate on features (rules of impoverishment and spell-out rules) are sensitive to the order in which the functions represented by phi-features apply. We test our proposal through a case study of Dutch agreement. In different circumstances, this language displays syncretism of second and third person, of first and second person, and even of first and third person, and it therefore provides a challenge for any theory aiming to explain person syncretism. Our account is set up to capture the cross-linguistic generalization that syncretisms of first and third person forms are rarer than other types of person syncretism (see Baerman et al. 2005:59 and Baerman and Brown 2011).

Keywords: Syncretism, agreement, person features, impoverishment, Dutch.

1. INTRODUCTION

The aim of this paper is to develop a descriptively and theoretically adequate account of the morphological realization of person agreement in Dutch. Dutch is particularly interesting in this respect, because it displays several agreement alternations, leading to a situation in which different patterns of syncretism can be observed in different contexts.

We begin with a brief introduction of the data. In the singular, the general pattern of subject-verb agreement in Dutch shows a syncretism between second and third person (a 2-3 syncretism): second and third person singular subjects trigger a verbal *-t* ending, whereas first person is not marked overtly. In the plural, there is no person marking: the verb systematically ends in *-en*. We illustrate this using the regular verb *lopen* 'to walk' in (1) ('hon' stands for honorific):[2]

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[2] Unless stated otherwise, Dutch data are illustrative of the standard variant of the language. We will indicate explicitly where dialectal or historical variants are discussed.

The alternation between *lop* and *loop* in (1) does not indicate a difference in the quality of the vowel, but is one of the vagaries of Dutch orthography: long vowels are written twice in closed syllables.

(1)

	lopen
1sg	Ik loop
2sg	Jij loop**t**
2sg hon	U loop**t**
3sg	Hij loop**t**
1/2/3pl	Wij/jullie/zij lop**en**

Deviations from this general paradigm are conditioned by three factors: (i) subject-verb inversion, (ii) verb class, and (iii) politeness. Let us illustrate each in turn. In (2), we see that the verbal affix that encodes second person singular is omitted under inversion. This results in a syncretism between first and second person (a 1-2 syncretism), since the verb form that surfaces is identical to the first person form.

(2) a. Jij loop**t** dagelijks met een hondje over straat.
   you walk-2SG daily with a doggy across street
   'Every day you walk with a doggy in the street.'
   b. Dagelijks loop jij met een hondje over straat.
   daily walk you with a doggy across street
   'Every day you walk with a doggy in the street.'

In (3), we see that the modal verb *kunnen* 'can' has two distinct stems. Both can be used in the second person singular, giving rise again to an agreement alternation because only one stem allows an overt second person agreement ending. The same holds, with some variation, of some other modals. The result is that in the singular the relevant modals can be said to display an optional syncretism between first and third person (a 1-3 syncretism).

(3)

CAN	*Kan* **forms**	*Kun* **forms**
1sg	Ik kan	*Ik kun
2sg	Jij kan	Jij kun**t**
2sg hon	U kan	U kun**t**
3sg	Hij kan	*Hij kun**t**
1/2/3pl	*Wij/jullie/zij kann**en**	Wij/jullie/zij kunn**en**

In (4), we see that the verb *hebben* 'have' also has two stem allomorphs. One, namely *heb*, shows up in the first person singular, the informal second singular and all plural forms. The other, *heef*, appears in the third person singular. The polite second person singular verb form can be built on either, which suggests that it can alternate between second and third person singular agreement. In other words, although we see the regular 2-3 syncretism in the verbal endings, this verb distinguishes first and second person marking from third person marking through its stem form (a 1-2 syncretism).

(4)

HAVE	*Heb* **forms**	*Heef* **forms**
1sg	Ik heb	*Ik heef
2sg	Jij heb**t**	*Jij heeft
2sg hon	U heb**t**	U heeft
3sg	*Hij heb**t**	Hij heeft
1/2/3pl	Wij/jullie/zij hebb**en**	*Wij/jullie/zij hev**en**

These alternations interact in several ways. To give one example, it is striking that the

alternation illustrated in (2) is not found when the polite second person pronoun is used as subject:

(5)   Dagelijks loopt/*loop u met een hondje over straat.
        daily walk-2SG/walk you.HON with a doggie across street
        'Every day you (polite) walk with a doggie in the street.'

It will be clear that the alternations in Dutch between the basic 2-3 syncretism, the 1-2 syncretism found under inversion and the 1-3 syncretism found with certain modals form an ideal testing ground for theories that address the morphological realization of verbal agreement. In subsequent sections, we will develop a proposal that is descriptively adequate.

    However, for that proposal to be theoretically adequate as well, it must not only capture the Dutch data, but also provide an account of the person inventory in the singular (1, 2 and 3) and in the plural (1 inclusive, 1 exclusive, 2 and 3), and be compatible with what is known about the typology of person syncretism. From the literature one clear generalization emerges, namely the one given in (6).

(6)   1-2 and 2-3 syncretisms are far more common than 1-3 syncretisms.

Evidence for this generalization comes from work by Baerman and colleagues (see Baerman et al. 2005:59 and Baerman and Brown 2011). Admittedly, where it concerns person agreement, what Baerman and his colleagues considered in determining the frequency of syncretisms are whole verb forms, and not morphemes expressing person, which is what we are interested in here. The reason for this is that morphological decomposition is often a highly contentious issue and therefore unpractical in large-scale typological research. However, the null hypothesis must be that what is true of whole verb forms is true of inflectional endings, and this is what we will therefore assume throughout this paper. It would be very surprising if 1-3 syncretisms would be common when considering inflectional endings, but that this would be undetectable when looking at whole verb forms. This would require (i) that other types of morphological expression would show a typology of person syncretism very different from inflectional affixation, and (ii) that these other kinds of expression are so common that they significantly change the overall picture. Matthew Baerman (p.c.) informs us that his impression is that the null hypothesis is correct, but work on the issue by the Surrey Morphology Group is expected to take several more years. A cautious application of (6) to inflectional endings thus represents the current state of knowledge in the field. This strategy may find some support in another observation by Baerman et al. (2005:60), namely that the pattern in (6) extends to free pronouns.

    Our aim, then, is not just to develop an account of the Dutch data, but to make sure that this account is compatible with the null hypothesis that (6) holds beyond whole verb forms. This is certainly not trivial. As an example, consider the well-known system of Harley and Ritter (2002), who analyze first, second and third person as [PARTICIPANT (SPEAKER)] [PARTICIPANT ADDRESSEE] and [Ø], respectively.[3] Baerman et al. (2005:60-61) note that, although this system disallows 1-3 syncretisms, it also appears to disallow 2-3 syncretisms (given that second and third person have no features in common). As an anonymous reviewer points out, the predictions of the system are more subtle when one allows 'elsewhere' spell-out rules. In that case, a combination of a spell-out rule for [SPEAKER] and an elsewhere rule will give rise to a 2-3 syncretism, while a combination of a spell-out rule for [ADDRESSEE]

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[3] Harley and Ritter consider [SPEAKER] as the default interpretation of [PARTICIPANT], which implies that it may be absent in first person pronouns. We have placed the feature between parentheses to indicate this.

and an elsewhere rule will give rise to a 1-3 syncretism. It is not clear, however, why there should be an asymmetry between those two options.[4]

The paper is organized as follows. In section 2 we introduce our system of person features and derive restrictions on the inventory of persons in singular and plural. In sections 3 and 4 we will show that this system can account for the observation in (6) when embedded in a fairly standard model of 'late' lexical insertion/spell-out. In the remainder of the paper, we confront this proposal with the Dutch data. In section 5 we discuss the shift under inversion from the general 2-3 syncretism to a syncretism of first and second person marking. In section 6 we analyze the agreement paradigms of irregular verbs, including the 1-3 syncretism observed with some modals. In section 7, we turn to polite forms, discussing the alternation between second and third person agreement and the lack of agreement alternation with polite second person forms under inversion. Section 8 contains a summary and conclusion.

2. *THE DISTRIBUTION AND REALIZATION OF PERSON FEATURES*
2.1 *Person Features and their Interpretation*
As mentioned, verbal agreement frequently shows 1-2 and 2-3 syncretisms, while 1-3 syncretisms are relatively rare. We believe that this pattern cannot be explained unless second person has a feature in common with both first and third person, while first and third person share no features (see (7)).

(7)

| *First person*	*Second person*	*Third person*
$[F_1]$	$[F_1, F_2]$	$[F_2]$

Proposals that assume this distribution of features can be found in Kerstens 1993 and Halle 1997. Kerstens uses binary features (the features that correspond to F_1 and F_2 in (7) are underlined): first person is characterized as [+utterance, +speaker], second person as [+utterance, –speaker], and third person as [–utterance, –speaker]. The fourth logical possibility, [–utterance, +speaker], is ruled out as contradictory. Halle proposes essentially the same system, but labels the features differently (Kerstens' [±utterance] corresponds to Halle's [±participant], while Kerstens' [±speaker] corresponds to Halle's [±author]).[5]

The system we propose is similar, but based on privative features. The use of privative features is familiar from a number of publications, including Harley and Ritter 2002 and McGinnis 2005, and was discussed in phonology as early as in Trubetzkoy 1939. The features we will employ are [PROX] for 'proximate' and [DIST] for 'distal'. We interpret these features as functions, following insights in Harbour 2011b,c. Both operate on an input set to deliver a subset as output. The original input set for the person system consists of the set of all potential referents for a referential expression in a given context (S_{i+u+o} in (8)). It has two obligatory members, the speaker (notated as i) and an addressee (notated as u). The input set has a fixed structure: it contains a subset S_{i+u}, which itself contains a subset S_i. S_i has the speaker as an obligatory member; its other members, if there are any, are individuals that

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[4] The reviewer suggests that the asymmetry may be derived from the fact that [SPEAKER] is the default interpretation of [PARTICIPANT], while [ADDRESSEE] is a marked feature. However, this is unlikely to work. First, marked features tend to have specific realizations more frequently than unmarked features (see section 3.3.1), which would suggest, if anything, that an opposition between 1/3 and 2 should be more common than one between 2/3 and 1, exactly the wrong result. Second, the implication of Harley and Ritter's assumption that 'speaker' is the default interpretation of the [PARTICIPANT] node is that every language will have an addressee feature (given that, as far as we know, there is no language that lacks second person pronouns), while some may lack a speaker feature. This, too, would favour 1-3 syncretisms over 2-3 syncretisms.

[5] Kerstens' proposal was adopted by Bennis and MacLean 2006 and Aalberse and Don 2010 to deal with syncretism in Dutch dialects. These authors do not address the kind of data under discussion here, however.

belong to the speaker in some contextually given sense. S_{i+u} has one addressee as an obligatory member, in addition to all members of S_i; its other members, if there are any, are further individuals addressed by the speaker. Finally, S_{i+u+o}. contains all members of S_{i+u}; its other members, if there are any, are neither associates of the speaker, nor addressees.

(8)
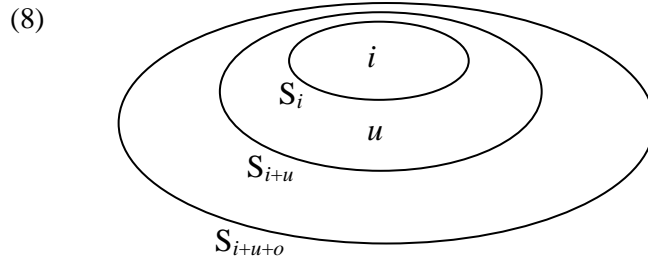
The feature [PROX] introduces a function that operates on an input set and discards its outermost 'layer'. Applied to S_{i+u+o} it delivers S_{i+u}. By contrast, [DIST] introduces a function that *selects* the outermost layer of its input set. Applied to S_{i+u+o} it delivers $S_{i+u+o} \backslash S_{i+u}$.

Formalizing these functions requires that the various sets in (8) are part of an ordered set R in which S_i is the predecessor of S_{i+u}, while S_{i+u} is the predecessor of S_{i+u+o} (in other words, R = $<S_i, S_{i+u}, S_{i+u+o}>$). If so, characterization of [PROX] and [DIST] is simple. The definitions in (9) and (10) express that both functions are defined only if their input set is layered (we use Pred(S) to refer to the predecessor of S in R). Given such an input set, [PROX] discards, while [DIST] selects, those elements that are part of the outermost layer of the input set:

(9) a.   Prox(S) is defined iff $\exists$S'[S'=Pred(S) $\wedge$ S'$\subset$S]
     b.   Prox(S) = S', S'$\subset$S, $\forall$x [x$\notin$Pred(S) $\rightarrow$ x$\notin$S']

(10) a.   Dist(S) is defined iff $\exists$S'[S'=Pred(S) $\wedge$ S'$\subset$S]
     b.   Dist(S) = S', S'$\subset$S, $\forall$x [x$\in$Pred(S) $\rightarrow$ x$\notin$S']

We now consider how first, second and third person readings are derived, starting with the singular (which we take to impose a requirement that the output set cannot contain more than one member; see below and section 2.4). The specification of the third person singular is straightforward: it should be [DIST], as this feature will derive $S_{i+u+o} \backslash S_{i+u}$, a set that excludes speaker and any addressees.

A second person singular reading can be generated by applying both [PROX] and [DIST]. Notice that there is only one order of application that yields an interpretation. If [PROX] is applied first, S_{i+u} is selected (a set containing the speaker, any associates of the speaker and any individuals addressed by the speaker). Applying [DIST] to this set removes S_i, leaving only addressees as potential members – the required result. The opposite order of function application is not coherent. [DIST] applied to S_{i+u+o} yields $S_{i+u+o} \backslash S_{i+u}$ (a set that includes neither the speaker, nor any associates, nor any addressees). But as this set is not layered, [PROX] cannot apply to it.

We assume that the order of function application is reflected in the syntax. The notation we use to represent this is borrowed from theories according to which φ-features occur in a so-called feature geometry (see Gazdar and Pullum 1982 and Harley and Ritter 2002, among others): features representing functions applied later are dominated by features representing functions applied earlier. Thus, our representation of the second person singular is as in (11b) below, where φ corresponds to S_{i+u+o}; [PROX] is the first function to be applied, and [DIST]

represents the function applied subsequently.[6]

In what follows, we will need to refer to the relative relationships of φ and the various features. To this end, we will use the terms host and dependent. Thus, in the second person, φ is the host of [PROX] and [PROX] is a dependent of φ. Similarly, [PROX] and [DIST] stand in a host-dependent relationship.

Consider finally the first person. Notice that in the singular just applying [PROX] to S_{i+u+o} will not do. This is because the output it delivers, S_{i+u}, is a set with two obligatory members: the speaker and an addressee. Such a set can obviously not be construed as singular. Therefore, at least in the singular, a first person reading requires that [PROX] is applied to the output of [PROX]. As this feature discards the outermost layer of its input set, this will deliver S_i, a set whose only obligatory member is the speaker and which therefore can be interpreted as singular.

(11)

	a. 1st person	b. 2nd person	c. 3rd person
Singular	φ | PROX | PROX	φ | PROX | DIST	φ | DIST

We now turn to plural readings. For our current purposes, plurality can be encoded using a single feature [PL] with the definition in (12).[7]

(12) $PL(S) = S'$, $S' \subseteq S$, such that $|S'| > 1$

On the definitions we have adopted, person and number features must apply to φ separately. It cannot be the case that they are part of a single sequence of function application. We can demonstrate this using the combination [PROX PL]. Applying [PL] to the output of [PROX] or [PROX] to the output of [PL] destroys the interpretive effects of the feature applied first. [PROX] delivers an output set that must contain the speaker, any associates and one or more addressees (see (9)). [PL] can make a random selection out of this set, including one that contains neither speaker nor addressee, but only associates of the speaker. This is so, because (12) only imposes a cardinality requirement on the output set. Therefore, [PL] need not deliver a set that is faithful to the person specification of its input. Applying the functions in the opposite order does not help: [PL] delivers an output set with a cardinality larger than one, but given the definition of [PROX] there is no guarantee that $PROX(PL(S))$ will not be a singleton set. For example, a possible output of [PL] is S_{i+u}. Applying [PROX] to this set wold give S_i, which has the speaker as its sole obligatory member. In other words, [PROX] need not deliver a set that is faithful to the number specification of its input.

If person and number features apply to φ separately, this problem can be circumvented. Of course we need to specify what interpretation is derived under separate application. The

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[6] Our proposal differs from standard feature-geometric approaches in rejecting the idea that there is a universal template that individual feature structures must adhere to. Rather, as discussed, feature structures reflect the order of function application, and grammatical feature structures are simply those in which each feature finds the input set it requires. Thus, features can attach to different hosts (both [PROX] and [DIST] attach to either φ or [PROX], and multiple occurrences of the same feature are admissible (in particular, [PROX] can be applied twice). Thus, we agree with Harbour 2011b,c that the interpretive properties of features are fundamental, while the inventory of feature structures (that is, the possible orders of function application) is derived from this.

[7] Of course, languages that distinguish duals and paucals will have additional features that apply to the output of [PL]. We cannot discuss these here, but see Harley and Ritter 2002 and Harbour 2011a,b for discussion.

simplest solution is to say that a pronoun must be interpreted in such a way that its reference meets the conditions imposed by both types of features. In other words, the set it denotes has the composition required by [PROX] and/or [DIST], and the cardinality required by [PL]. We can guarantee this by requiring that the output of the person system (S_{person}) and the output of the number system (S_{number}) are identical:

(13)   For any pronoun, $S_{person} = S_{number}$

As before, the interpretation of third person plural forms is trivial: [DIST] delivers a set that contains neither speaker nor addressees; [PL] requires that the cardinality of this set is two or more.

For second person plural forms, our proposal makes the straightforward prediction that the set selected will contain addressees only. We believe that this is correct, although it is not uncontroversial. An objection one might raise is that a second person plural pronoun can be used to refer to a person present when the speaker utters the pronoun, plus others persons not present. This might be taken to mean that the pronoun can denote a single addressee and one or more non-addressees (see, for instance, Daniel 2005). However, this objection is not convincing, since a person can function as addressee without being present. This is clear when we consider singular second person pronouns (which on anyone's account must refer to an addressee). When receiving an email from Bill, a particularly helpful colleague, one might exclaim: *Bill, you're brilliant!* Obviously, the speaker knows that Bill is not present and not aware of being addressed, but he can nevertheless function as the addressee. If this is true of singular second person pronouns, we see no reason in the case of plural second person pronouns to make a distinction between those present and those absent. All can function as addressees, leaving intact the simple system outlined above.

We finally consider first person plural pronouns. It is a long-standing observation that the reference of such pronouns is not a multiplicity of speakers (see Jespersen 1924, Benveniste 1966, Corbett 2000, and Daniel 2005, among many others). Instead, they refer to the speaker and one or more individuals associated with the speaker, with a possible addition of one or more addressees. The various readings follow without further assumptions. Suppose that the plural feature is simply added to the singular form, in which [PROX] applies twice (see above). Dual application of [PROX] delivers S_i, a set containing the speaker, no addressees, and any contextually given associates of the speaker. [PL] requires that the cardinality of the output set is two or more, so the pronoun in this case receives an exclusive reading: it refers to the speaker and at least one associate, but no addressees.

However, this is not the only possibility. Recall that in singular first person pronouns [PROX] had to apply twice because the output after one application contains two obligatory members, the speaker and an addressee, which is incompatible with a singular interpretation. But this consideration is obviously irrelevant in the plural. If [PROX] applies only once, its output will be S_{i+u}, a set containing the speaker, any associates and at least one addressee. In combination with [PL], this allows for a range of inclusive readings: the speaker and a single addressee, the speaker, one or more associates and a single addressee, the speaker and multiple addressees, and the speaker, one or more associates and multiple addressees. These are indeed the remaining readings that a first person plural pronoun can have.[8]

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[8] The analysis sketched here is based on the hypothesis that plural in pronouns is identical to plural in regular nouns, that is, [PL] makes the same semantic contribution whether it attaches to nouns or pronouns, namely that the output set must have more than one member. This can be contrasted with the proposal in Daniel 2005, according to which the plural in nouns is (typically) additive, while the plural in pronouns is associative. One problem we see with this approach is that there are many languages that have plural pronouns, but do not permit

We thus arrive at the following inventory of plural forms:

(14)

	a. 1ˢᵗ person incl.	b. 1ˢᵗ person excl.	c. 2ⁿᵈ person	d. 3ʳᵈ person
Plural	φ ╱╲ PROX PL	φ ╱╲ PROX PL | PROX	φ ╱╲ PROX PL | DIST	φ ╱╲ DIST PL

Note that there is no natural class in (14) that comprises the first person inclusive and the second person, but not the first person exclusive. This is important in view of a typological generalization proposed by Zwicky (1977). Zwicky observes that in languages that lack the distinction between inclusive and exclusive first person pronouns, the inclusive reading is systematically expressed by the first person, rather than the second person plural pronoun – this despite the fact that the inclusive reading covers both speaker and addressee. An account for this observation would be impossible if first person inclusive and the second person did form a natural class.

Note furthermore that the feature structures in (11) and (14) are the only ones that can be generated on the specifications of the features we have given. Recall that both [PROX] and [DIST] require a layered set as their input (see (9) and (10)). Given that S_{i+u+o} has only three layers, the number of possible feature combinations is restricted. (i) [DIST] always delivers an unstructured set as output, hence neither [PROX] nor [DIST] can be applied after [DIST] has applied. (ii) If applied to S_{i+u+o}, [PROX] delivers a layered set. This leaves open three possibilities: after [PROX] has applied either (a) [PROX] applies again, or (b) [DIST] applies, or (c) neither [PROX] nor [DIST] applies. The first two options yield an unstructured set and hence make any further application of [PROX] or [DIST] impossible. Option (c) delivers a set with two obligatory members and is hence only feasible in the plural. Consequently, the system we propose allows exactly the person interpretations attested and no others.

2.2 *Maximal Encoding*
The feature structures present in syntax must be spelled out at PF and interpreted at LF. Of course, both spell-out and interpretation are governed by what features are present or absent. However, where there are multiple possible interpretations or multiple possible phonological realizations, we assume that both interfaces are subject to the following general principle that regulates the mapping between representations at different levels.

(15)   *Maximal Encoding*
         A mapping R → R* is licit only if R* is the maximal expression of R at the relevant level of representation.

The definition of maximal expression is as follows:

(16)   R* expresses R maximally if there is no alternative R' such that the properties of R encoded by R' are a superset of the properties encoded by R*.

We first consider the phonological realization of pronouns in Dutch. For reasons of space, we restrict ourselves to the spell-out rules that insert the phonological forms of strong subject

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associative plural readings of regular nouns. It is not obvious how this reading can be blocked if the language in fact has a designated associative plural feature for pronouns.

pronouns:[9]

(17) a. [PROX] ⇔ /ik/ / [$_D$ __][10]　　　d.　[PROX PL] ⇔ /wij/ / [$_D$ __]
　　b. [PROX DIST] ⇔ /jij/ / [$_D$ __]　　e.　[PROX DIST PL] ⇔ /jullie/ / [$_D$ __]
　　c. [DIST] ⇔ /hij/zij/het/ / [$_D$ __]　f.　[DIST PL] ⇔ /zij/ / [$_D$ __]

The general effect of Maximal Encoding for spell-out is that where two or more rules may realize a syntactic feature structure, the rule that realizes the most features must be used. For example, if the syntactic input is the second person singular (see (11b)), then any of the rules in (17a-c) may in principle be applied, as the structural description of each of these rules is compatible with the input. (The rules in (17d-f) cannot be applied, as they mention the feature [PL], which is absent in (11b). Hence the structural description of these rules is not met.) The choice between (17a-c) is determined by Maximal Encoding: (17b) realizes a superset of the features realized by (17a) and (17c). Therefore, in the realization of a second person singular pronoun, the spell-out rule in (17b) blocks the spell-out rules in (17a) and (17c). It goes without saying that in the realization of, say, a first person singular pronoun, (17b) will not have this blocking effect, as it cannot spell out (11a).

　　With respect to the phonological realization of morphemes, it is in fact a classic idea that where there is a choice, the most highly specified form must be selected. The notion goes back to Panini and was introduced into generative grammar in the form of Kiparsky's (1973) Elsewhere Condition. It can be found in a range of models (Distributed Morphology, for example, implements it as part of the Subset Principle; see Halle 1997). The shared insight behind these proposals is that as much of the syntactic input as possible is encoded phonologically, which is of course also what Maximal Encoding requires.

　　Dutch does not have separate forms that express the inclusive and exclusive readings of the first person plural pronoun, although the distinction must exist in the syntax on the assumptions made above. This situation can be described as an underspecification of the set of spell-out rules available in the language. The rule in (17d) mentions [PROX PL]. Since there is no alternative form that marks dual application of [PROX] (that is, no rule of the form in (18a)), (17d) will be used to realize both the inclusive and exclusive first person pronoun.

(18) a. [PROX–PROX PL] ⇔ /a/ / [$_D$ __]
　　b. [PROX PL] ⇔ /b/ / [$_D$ __]

In languages that do make the distinction, Maximal Encoding will have the effect that rules of the form in (18a) will block rules of the form in (18b) when the feature structure present in syntax contains two instances of [PROX] (that is, in the exclusive reading; the dash used in (18a) indicates that the feature to its right is a direct dependent of the feature to its left.). Hence, in such languages, rules of the form in (18b) can only be used for inclusive first person plural pronouns. Conversely, rules of the form in (18a) can *not* be used for such pronouns, as their structural description (which mentions two instances of [PROX]) in that case does not match the pronominal feature structure (which has only one instance of [PROX]).

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[9] Most strong pronouns have a weak counterpart. This distinction is immaterial to our analysis. We also do not discuss object pronouns, which are well behaved, but not relevant to agreement in Dutch. Finally, we abstract away from gender distinctions in the third person singular (as represented by the contrast between *hij*, *zij* and *het* in (17c)), again because these are not relevant to agreement in this language.

[10] It could be the case that this rule mentions [PROX] twice in its structural description (given the feature structure for first person pronouns in (11a)). However, there is no obvious way to test this empirically, so here we adopt the most economical formulation of the rule.

As noted, we assume that Maximal Encoding is not only relevant to the realization, but also to the reference, of the various objects in (11) and (14). In theories that use privative features, the absence of a feature is by convention interpreted as the negation of that feature. For example, if a pronoun is not specified as plural, it will typically be interpreted as singular (in principle, the cardinality of the output set could also be zero, an issue to which we turn in section 2.4). This convention can be derived from (15) and (16), as long as we are prepared to consider syntax as an encoding of semantics (see Bobaljik and Wurmbrand 2012 for related discussion). If so, Maximal Encoding implies that given a particular semantic representation, a feature structure is licensed in syntax only if there is no alternative feature structure that encodes the relevant semantics more explicitly. The easiest way to illustrate this effect is to consider a series of syntactic representations that can all be associated with the same interpretation: $\{<R_1, I>, <R_2, I>, \ldots, <R_n, I>\}$. Maximal Encoding demands that given that interpretation, the syntactic representation chosen must be the one with the richest feature specification among $\{R_1, R_2, \ldots, R_n\}$. For example, in a language like Dutch (which has plural marking), an unmarked noun cannot receive a plural reference, simply because that interpretation is better represented by a noun that contains the [PL] feature.[11]

Maximal Encoding is an improvement on the convention that absence of a feature is interpreted as the negation of that feature, as it captures exceptions to it. It explains why the convention does not hold if the relevant feature cannot be hosted by the structure under consideration. For example, in languages that lack all means of marking plurality in nouns (see Haspelmath 2011), or even pronouns (see Daniel 2011), a nominal that does not carry a [PL] feature may nevertheless receive a plural reference, as there is no better syntactic representative for that interpretation.

2.3 Polite Pronouns

The system outlined in the previous two subsections is not quite enough to analyse the full pronominal paradigm of Dutch. For that, we need one additional feature, namely [HON] (for 'honorific'). [HON] is required to distinguish polite from familiar second person pronouns.

[HON] is different from the features discussed so far, in that it does not affect the reference of the pronoun in which it is present: it delivers the same set as it receives (see (19b)). However, it adds the information that members of that set are honourable (see (19c)). Since in Dutch only second person pronouns have a polite form, we need to impose an appropriate condition on the input of [HON] (see (19a)); obviously, there is no claim of universality associated with this input condition (other languages have third person honorifics).

(19) a. HON(S) is defined iff $S = S_{i+u} \backslash S_i$
b. HON(S) = S
c. If $x \in$ HON(S), then HONOURABLE(x)

With (19) in place, we can add two pronominal structures to those in (11) and (14):

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[11] Maximal Encoding has a clear affinity with Grice's (1975) Maxim of Quantity, which can be seen as an implementation of Maximal Encoding at the interface between pragmatics and semantics.

(20)

2nd person polite	a. Singular	b. Plural
	φ | PROX | DIST | HON	φ ／＼ PROX PL | DIST | HON

We will argue that Dutch indeed has both feature structures in its syntax, despite the fact that there is no distinct plural form of the polite pronoun *u*. In fact, this pronoun never triggers plural agreement, not even when it refers to a group:

(21) a.   U heeft natuurlijk alle vijf/allebei de troonrede gehoord.
You.HON has of.course all five/both the throne-speech heard
'Of course, you will all five of you/both have heard the queen's speech.'

    b.   *U hebben natuurlijk alle vijf/allebei de troonrede gehoord.
You.HON have-PL of.course all five of you/both the throne-speech heard

There are two possible accounts for this behaviour, which make use of underspecification and impoverishment, respectively. The first account simply states that Dutch does not have a pronoun specified as (20b). As a result, the polite pronoun would always be specified as in (20a), and would therefore be able to receive a plural as well as a singular interpretation. The singular interpretation is unsurprising. The plural interpretation is allowed because, in the absence of a pronoun specified as in (20b), it is not blocked by Maximal Encoding (see the discussion in section 2.2).

    The second account assumes that there *is* a pronoun specified as in (20b), but that Dutch has a rule of impoverishment that deletes [PL] in the context of [HON]. We may formulate this rule as in (22), with (23) as the relevant additional spell-out rule.

(22)   [PL] → Ø / [$_\varphi$ __ HON]
(23)   [PROX DIST HON] ⇔ /u/ / [$_D$ __]

The rule in (22) is intended to be maximally general: it targets any feature structure containing [PL] and [HON], whether present in a pronoun or in a verbal agreement ending. This implies that the phonological realization of the polite plural pronoun will be identical to that of the polite singular pronoun. It also implies that verbal agreement for this pronoun will appear to be singular, even though the relevant ending is syntactically specified as [PL].[12]

    The two accounts make different predictions with regards to the syntactic behaviour of polite pronouns with a plural interpretation. According to the underspecification account, a plural interpretation of *u* is purely semantic in nature and hence should not give rise to any syntactic effect. According to the impoverishment account, there should be effects of the syntactic presence of the [PL] feature.

    There are some data that support the view that *u* is syntactically plural if it has a plural interpretation. In the earlier example in (21a) the polite pronoun is associated successfully

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[12] An anonymous reviewer suggests that underspecification for the spell-out rule for the polite pronoun (as in (23)) might be sufficient. However, this would not account for the fact that *u* does not trigger plural agreement, not even when it has a plural reference.

with floating quantifiers like *alle vijf* 'all five' and *allebei* 'both'. The presence of these quantifiers is not licensed in the context of a DP-associate that is semantically plural but syntactically singular. This is illustrated by the examples in (24). The plural pronouns in the continuations in these examples indicate that the collective nouns *familie* 'family' and *stel* 'couple' receive a plural interpretation. Nevertheless, they cannot be associated with the quantifiers *alle vijf* or *allebei*.[13]

(24) a. De familie is (*alle vijf) naar huis gegaan. Ze waren het zat op het eiland.
        the family is (all five) to home gone. they were it enough on the island
        The family have (all five of them) gone home. They were fed up with the island.'
     b. Het stel is (*allebei) naar huis gegaan. Ze waren het zat op het eiland.
        the couple is (both) to home gone. they were it enough on the island
        'The couple have (both) gone home. They were fed up with the island.'

The fact that the floating quantifiers can be present in (21a) therefore indicates that *u* contains a [PL] feature in syntax when it has a plural interpretation. Therefore, we conclude that (22) is part of Dutch grammar.

2.4 *The Third Person as Default*
There is one remaining issue that is related to the interpretation of pronominal feature structures. This is that some pronouns can be used as dummies, for example where an A-position must be filled for syntactic reasons but a referential DP is not licensed. If a pronoun is used as a dummy, it is always a third person form. In Dutch, for example, the neuter pronoun *het* is used:

(25)   Het schijnt dat Jan ziek is.
        it seems that Jan ill is
        'It seems that John is ill.'

Any theory of person features should capture the fact that dummy pronouns are consistently third person forms. Any explanation must be rooted in the observation that dummy pronouns remain uninterpreted (they do not have a reference). We therefore assume that a pronoun can only function as a dummy if its phi-feature specification can deliver an empty set. The definition of [DIST], the feature that characterizes third person pronouns, indeed makes this possible. Recall that [DIST] selects the outer layer in (8) ($S_{i+u+o} \backslash S_{i+u}$). But given that the only obligatory members of S_{i+u+o} are the speaker and one addressee, which are contained in the rejected inner layers of (8), [DIST] may deliver an empty set.

Precisely because both inner layers of (8) contain an obligatory member, [PROX], which discards the outer layer of its input set, can never yield an empty set. Therefore, first and second person pronouns cannot be used as dummies.

The logic behind this proposal, namely that dummy pronouns must deliver an empty set, also explains why they must be singular. A plural specification would require the cardinality of the pronoun's output set to be greater than one, which is obviously not true of the empty set. We have analyzed singular as the absence of a plural specification. This allows the pronoun's output set to be a singleton set (in the normal case) or the empty set (in the case of dummy pronouns).

Our analysis of dummy pronouns extends to so-called default agreement. The relevant

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[13] Note that Dutch is unlike British English in that a plural interpretation of a collective noun does not trigger plural agreement on the verb.

observation is that in the absence of an agreeing argument any agreement affix that shows up on the verb must be third person singular. In Dutch, an example of default agreement can be found in the impersonal passive:

(26)   Nog jaren is/*ben/*bent/*zijn naar een oplossing gezocht.
        still years be-3SG/be.1SG/be.2SG/be.PL for a solution searched
        'People searched for a solution for many years.'

It is generally assumed that phi-features cannot be interpreted in verbs (compare the distinction between interpretable and uninterpretable features in Chomsky 1995). The rationale for this is that features that force a nominal reference are incompatible with verbal semantics. There are two ways to deal with a verb inflected for phi-features. The normal procedure is that the features are identified with features of the agreeing nominal argument (compare checking theory). But if there is no such argument, the structure can still be licit as long as the phi-features present in the verb need not be given any reference at all. As we have just seen, the only form that allows this absence of reference is the third person singular.[14]

3. PERSON AGREEMENT AND SYNCRETISM
We now turn to the phonological realization of agreement endings, and to the issue of person syncretism in verbal paradigms.

We assume that the syntactic φ-feature specification of an agreeing verb is the same as that of its subject (see Ackema & Neeleman, to appear, for some qualifications not relevant here). In other words, all languages that have person agreement at all have rich person agreement in the syntax (we will provide evidence for this claim in section 7). The fact that not all languages show rich agreement at an observational level is a matter of variation in phonological realization. Let us start by considering German, a language that does not show syncretism in the singular (we consider the plural later). The paradigm of the verb *kaufen* 'buy' is representative:

(27)

	kaufen
1sg	Ich kauf**e**
2sg	Du kauf**st**
3sg	Er kauf**t**

In this case, there is a distinct spell-out rule for each feature combination. The interaction of these rules is regulated by Maximal Encoding. In particular, the fact that (28b) must be used for the second person singular, instead of either (28a) or (28c), is because this rule mentions both features present in syntax rather than just one (see section 2.2).

(28) a.   [PROX] ⇔ /e/ / V-[__]
     b.   [PROX DIST] ⇔ /st/ / V-[__]
     c.   [DIST] ⇔ /t/ / V-[__]

With this much in place, we now turn to singular paradigms that show person syncretisms. We will ignore paradigms that do not show person distinctions at all, as such paradigms are

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[14] The proposal in this section may give a handle on 'Watkins' law', according to which it is relatively common for third person endings of verbs to be reanalyzed diachronically as part of the stem, leading to a new base for attachment of first and second person endings (see Fuß 2005 for discussion and references). Given that third person endings can occur in the absence of syntactic agreement, it is easy to see how they are prone to reanalysis by subsequent generations. We cannot work out this suggestion here.

accounted for by postulating a single spell-out rule that mentions only the φ-node.

3.1 *2/3 versus 1*
In Dutch, regular verbs display a 2-3 syncretism in the singular:

(29)

	kopen
1sg	Ik koop
2sg	Jij koop**t**
3sg	Hij koop**t**

Standard

Syncretism can of course always be analyzed as accidental homophony. That is, Dutch could have three spell-out rules (parallel to the German ones in (28)), which happen to realize both [PROX DIST] and [DIST] as *-t* (and [PROX] through a zero ending). Although accidental homophony doubtlessly exists, it would not be a very satisfactory account for this particular syncretism, given its relative cross-linguistic frequency (see (6)).

One way to account for the 2-3 syncretism in (29) is to assume that Dutch lacks any spell-out rule mentioning [PROX], but does have a rule that realizes [DIST] as *-t*. This rule applies in the third person, and also in the second person, given that there is no more specific rule mentioning [PROX DIST] (which would otherwise block this, as in German). However, such an account is insufficiently general, as it is not the case that in all languages with a 2-3 syncretism the first person lacks an overt ending. This even holds within Dutch, which has several dialects in which first person agreement takes the form of a schwa or schwa-*n* ending, but which do show the same 2-3 syncretism as the standard (see Aalberse 2007:134):

(30)

	kopen
1sg	Ik kop**e**(**n**)
2sg	Jij koop**t**
3sg	Hij koop**t**

Dialectal I

Such dialects must have the spell-out rules in (31a) and (31b) (which realize first and third person). By analogy, we assume that the standard language has the spell-out rules in (31a') and (31b). It does not have a designated spell-out rule for the [PROX DIST] specification of the second person, as German does (otherwise, the 2-3 syncretism would have to be analyzed as a case of accidental homophony; see above). The question, then, is why the second person, which after all carries both [PROX] and [DIST], is realized through application of (31b) (resulting in a 2-3 syncretism), rather than through application of (31a/a') (which would result in a 1-2 syncretism).

(31) a.   [PROX] $\Leftrightarrow$ /e(n)/ / V-[__]
    a'.   [PROX] $\Leftrightarrow$ Ø / V-[__]
    b.   [DIST] $\Leftrightarrow$ /t/ / V-[__]

Notice that the answer to this question cannot lie in Maximal Encoding, given that each of the rules in (31a,a') and (31b) mentions a single feature present in the second person. We propose instead that all rules that operate on phi-feature structures are subject to the condition in (32) (where a host feature is a feature applied first, while a dependent feature is a feature applied subsequently, see section 2.1).

(32) *The Russian Doll Principle*
Given a feature structure with a host and a dependent feature, it is not possible to apply a rule whose target is the host feature and whose structural description does not mention the dependent feature.

In other words, in a structure in which [F$_3$] applies after [F$_2$] and [F$_2$] applies after [F$_1$], rules that can apply must have a structural description that mentions [F$_3$], [F$_2$ F$_3$] or [F$_1$ F$_2$ F$_3$]. Rules that mention only [F$_1$], [F$_2$] or [F$_1$ F$_2$] cannot apply. (This is parallel to Russian dolls in that you can see an outer doll without seeing the dolls it contains, but not vice versa; for a somewhat related idea in a very different framework, see Caha 2009.)

In the feature structure that characterizes the second person, [DIST] is dependent on [PROX] (see (11b) and (14c)). Given the Russian Doll Principle, this means that second person agreement can be realized by (31b), but not by (31a/a'). This allows us to account for the common occurrence of 2-3 syncretisms as a simple case of underspecification in spell-out rules: such syncretisms occur whenever there is no designated spell-out rule for [PROX DIST], while there are spell-out rules for [PROX] and [DIST].

In cases of underspecification in the spell-out system, the Russian Doll Principle thus determines which way the syncretism goes. It is important that there is a principle that does so. In its absence, one would predict the possibility of optionality in the choice of which feature in a complex feature structure is spelled-out. This flies in the face of the fact that cross-linguistically such optionality never seems to be a property of the general paradigm of a language. We are not aware of any languages in which the second person can freely alternate (in the same syntactic context) between endings shared with first and third person. (The point obviously holds more generally for inflection; optionality in how number or gender is marked in a particular syntactic context is rare at best.)[15]

The Russian Doll Principle will turn out to have effects elsewhere, for instance in blocking certain rules of impoverishment.

3.2 *1/2 versus 3*

Given this account, how would 1-2 syncretisms arise? These are found in various languages (see Baerman at al. 2005; compare (6)), including a number of dialects of Dutch. Aalberse (2007:132) notes that in a few dialects first and second person both lack an overt ending, while third person is marked by *-t*; she also notes that in at least one dialect first and second person subjects both trigger a schwa ending:

(33)

	kopen
1sg	Ik koop/kop**e**
2sg	Jij koop/kop**e**
3sg	Hij koop**t**

Dialectal II

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[15] It is not obvious that such optionality is ruled out in alternative systems without the postulation of a similar arbitrating principle. Consider, for example, the feature system proposed by Kerstens (1993) and Halle (1997) (see section 2.1), where first person is characterized as [+PAR, +AUTH], second person as [+PAR, -AUTH] and third person as [-PAR, -AUTH]. This system can account for the 2-3 syncretism in (29) by assuming the following two spell-out rules (compare Bennis and MacLean 2006):

(i) a. [+AUTH] $\Leftrightarrow$ Ø / V-[__]
     b. [-AUTH] $\Leftrightarrow$ /t/ / V-[__]

However, languages that allow optionality in the realization of the second person can exist if no counterpart to (32) is assumed, namely if the language has a system of spell-out rules of the following form:

(ii) a. [+PAR] $\Leftrightarrow$ /a/ / V-[__]
      b. [-AUTH] $\Leftrightarrow$ /b/ / V-[__]

These dialects have the same spell-out rules as other versions of Dutch, namely those in (31). This must be so in view of the way first and third person are realized. Where these dialects differ, we propose, is in having an additional impoverishment rule that deletes [DIST] in the context of [PROX]:

(34)   [DIST] → Ø / V-[__ PROX]

As a result of application of this rule, the input for spell-out is [PROX] for both first and second person agreement. Hence, the rule in (31a/a') applies in both cases, yielding the paradigm in (33).

     If the Russian Doll Principle is correct, this account of 1-2 syncretisms must extend beyond Dutch. Whenever such a syncretism is found, it is predicted to be the consequence of a rule of impoverishment that deletes [DIST] (since the Russian Doll Principle forbids realizing [PROX DIST] using the spell-out rule for [PROX] if [DIST] is still present).

3.3 *1/3 versus 2*
3.3.1 The grammar of 1/3 syncretisms
As stated in (6), 1-3 syncretisms are rare, certainly less frequent than 1-2 and 2-3 syncretisms. The theory we propose appears to be in a good position to explain this asymmetry. First and third person have no features in common, and therefore – in the absence of any impoverishment – there can be no spell-out rule that assigns them the same form. However, 1-3 syncretisms do exist, and so there must be a way to generate them. Given our assumptions so far, the only way to do so is to reduce the first and third person feature structure to a bare φ-node by impoverishment, while leaving the second person feature structure intact. Such deletion requires two impoverishment rules of the following form:

(35) a.   [PROX] → Ø / V-[__]
    b.   [DIST] → Ø / V-[φ−__]

The rule in (35a) can apply recursively in the first person, stripping it of both its [PROX] features (or its single [PROX] feature in the plural inclusive). It cannot apply in the second person, because there [PROX] has a dependent feature [DIST] which blocks application of (35a) as a result of the Russian Doll Principle.[16]

     The rule in (35b) is intended to apply in the third person only. This is achieved by mentioning the φ-node in its structural description: in order to be a candidate for deletion, the [DIST] feature must be a direct dependent of φ, as is the case in the third person. (Recall that the dash used in (35b) indicates that the feature to its right is a direct dependent of the feature to its left.). The rule in (35b) cannot apply in the second person, because in the [PROX−DIST] feature structure that characterizes the second person [DIST] is not a direct dependent of φ.

     The overall consequence of (35), then, is that the feature structure of the second person remains intact, while first and third person end up with a bare φ-node after impoverishment, thus providing the basis for a 1-3 syncretism:

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[16] The literature contains several proposals in which deletion of a feature automatically implies deletion of the dependent features (see Bonet 1991, 1995, Noyer 1998 and Harley and Ritter 2002). If the Russian Doll Principle is correct, rules intended to have this effect must be reformulated in such a way that they mention the relevant dependent features. These may be mentioned as optionally present. Notice that this does not rob the Russian Doll Principle of content. The empirical effects of the rules $[F_1] \to Ø$ and $[F_1−(F_2)] \to Ø$ are different in the context of $[F_2]$ if the Russian Doll Principle exists, since in that context it blocks application of the former, but not the latter.

(36)	*Output of (35)*	a. 1ˢᵗ person	b. 2ⁿᵈ person	c. 3ʳᵈ person
		φ	φ | PROX | DIST	φ

Given this output, there are several combinations of spell-out rules that indeed give rise to a 1-3 syncretism. One possibility is that the only relevant spell-out rule in the language is the one in (37). This rule can apply to (36a) and (36c), but not to (36b), given the Russian Doll Principle. This leads to a realization of (36) as */a/–Ø–/a/*

(37) $[\varphi] \Leftrightarrow$ */a/* / V-[__]

A second possibility is that the language has one of the spell-out rules in (38), either as the only relevant spell-out rule or in combination with a rule like (37). In such a system, (36b) will be spelled out by (38a) or (38b), while (36a) and (36c) either will both be realized by (37) or – in the absence of (37) – not be realized at all, giving rise to */a/–/b/–/a/* or *Ø–/b/–Ø*.

(38) a.   [DIST] $\Leftrightarrow$ */b/* /V-[__]
     b.   [PROX DIST] $\Leftrightarrow$ */b/* / V-[__]

The first of these two spell-out systems (which consists of only the rule in (37)) is unlikely to be attested. In general, there is a tendency for more articulated feature structures to be associated with more articulated phonological realizations. In other words, morpho-syntactic markedness correlates with morpho-phonological markedness. The effect is discussed by many authors, sometimes under the rubric of 'iconicity' (see Zwicky 1978, Aissen 2003, Croft 2003 and Haspelmath 2006). For example, languages that make a distinction between past and present tense can mark either both or only the past tense, but will not mark the present tense only. Similarly, languages that distinguish singular and plural may mark both or just the plural, but they will not mark only the singular. We can describe this effect by saying that, for any paradigmatic opposition that results from the presence or absence of a feature, there must be a spell-out rule that mentions that feature in its structural description. Although the effect is perhaps not well understood, it is pervasive, and crucially the spell-out system that realizes (36) as */aaa/–Ø–/aaa/* goes against it: it is anti-iconic in that the morpho-syntactically marked feature structure in (36b) is exactly the one that remains morpho-phonologically unmarked. Indeed, as Cysouw (2003:57-64) notes, there are no languages known to exhibit a 1-3 syncretism in their inflectional system such that the second person is zero.

In sum, compared to 1-2 syncretisms, 1-3 syncretisms require an additional impoverishment rule, whereas 2-3 syncretisms do not require any impoverishment. The realization of 1-3 syncretisms will be as *Ø–/a/–Ø* or */a/–/b/–/a/*.

3.3.2 Why 1-3 syncretisms are relatively rare
The fact that 1-3 syncretisms require an additional impoverishment rule is not enough to explain why 1-3 syncretisms are very rare compared to 1-2 and 2-3 syncretisms. Our proposal is that this effect arises from the way spell-out systems for agreement endings are acquired (on the assumption that the child already has access to the featural make-up of verbs in syntax; this assumption is entailed by our hypothesis that if a language has person agreement

in the first place, then all phi-features of the subject are present on the verb in syntax). The general idea is that, over time, acquisitional difficulty leads to typological infrequency because acquisitional difficulty makes a grammatical subsystem prone to historical change. Therefore, if we can show that 1-3 syncretisms are harder to acquire than other syncretisms, we have an explanation for the attested typological pattern.

Indeed, it can be argued that for all paradigms, except those involving a 1-3 syncretism, there is a learning path that guarantees success and that minimizes the child's computational burden. What we mean by a successful learning path is one that arrives at the target system without ever requiring retraction of a spell-out rule once it has been postulated. In other words, in a successful learning path there is no backtracking (compare Dresher and Kaye 1990, Nyberg 1992, Bertolo, Broihier, Gibson and Wexler 1997, and Snyder 2007, 2008). Computational burden is defined in terms of the number of syntactic inputs that must be compared at any one point in order to acquire the correct spell-out rules that account for a given formal distinction. The child attempts to break down the task of matching distinct verb forms to syntactic inputs into comparisons of two inputs given any formal distinction. Comparisons of more than two inputs at once are, we assume, undertaken only when there is no alternative (because they impose a heavier memory load; compare Kapur 1994 and Frank and Kapur 1996).

The best strategy for a child when it first notices a formal distinction in agreement endings is to hypothesize that this reflects the syntactic feature bundles [PROX] versus [DIST] (rather than assuming that the feature bundle [PROX DIST] is involved). This strategy obviously will not work when the target grammar has a 1-3 syncretism (a point to which we will return below), but it is the only strategy that is successful (in the sense outlined above) in the remaining paradigms. All other strategies may lead to the necessity of retraction of spell-out rules, contra the ban on backtracking. In order to see why, consider first the grammars that according to our proposal underlie the various different output paradigms (impoverishment rules are given in compact format):

(39)	*Paradigm*	a. /*a*/–/*c*/–/*b*/	b. /*a*/–/*b*/–/*b*/	c. /*a*/–/*a*/–/*b*/	d. /*a*/–/*b*/–/*a*/
	Grammar	[PROX] ⇔ /*a*/ [DIST] ⇔ /*b*/ [PROX DIST] ⇔ /*c*/	[PROX] ⇔ /*a*/ [DIST] ⇔ /*b*/	[PROX] ⇔ /*a*/ [DIST] ⇔ /*b*/ [PROX-DIST] → [PROX-Ø]	[φ] ⇔ /*a*/ [(PROX) DIST] ⇔ /*b*/ [PROX] → Ø [φ-DIST] → [φ-Ø]

We assume that the information available to the child when acquiring person paradigms consists of a pair of verb forms and information about the semantics of the structure in which these were used. If the child's hypothesized spell-out rules are compatible with the semantics of the input structures, it will incorporate these rules into its grammar. If it is not, the child will simply not posit any spell-out rules on the basis of the input under consideration.

Suppose, then, that the child notices a formal distinction in agreement endings and hypothesizes that this represents a distinction in the realization of the inputs [PROX] and [DIST]. If this is in line with the semantics, it will postulate the two spell-out rules [PROX] ⇔ /*a*/ and [DIST] ⇔ /*b*/. Since these are indeed part of all grammars that have a distinction between first and third person, no backtracking will ever be required. If the target grammar is as in (39b), nothing further needs to be acquired. If the target grammar is as in (39a), the second person form can be acquired upon noticing a further formal distinction between either first and second or second and third person. If the target grammar is as in (39c), an impoverishment rule will be added to the grammar when the child notices that the form /*a*/ is used in semantically second-person contexts.

Consider an alternative strategy according to which a difference in form is initially taken to reflect a distinction between [PROX] and [PROX DIST] inputs. Even if this is in line with the semantics of the input, it is possible for the child to postulate spell-out rules that need to be retracted later. This is because a formal distinction between first and second person is compatible with the spell-out systems in (39a), (39b) and (39d). Crucially, these spell-out systems have different rules for the second person, and even for the first person. Therefore, a child could postulate spell-out rules for [PROX] and [PROX DIST], while the target grammar is (39b). Converging on the target grammar will then necessarily require retraction of the spell-out rule for [PROX DIST]. Alternatively, the child could postulate spell-out rules for [PROX] and [DIST] to capture the opposition between first and second person, while the target grammar is as in (39a). These spell-out rules would then have the following form: [PROX] $\Leftrightarrow$ /a/ and [DIST] $\Leftrightarrow$ /c/. Again, this will lead to retraction, because the spell-out rule for [DIST] in the target grammar associates it with a different form than the one hypothesized by the child (namely /b/).

Similar problems arise when the child adopts the strategy of initially matching a formal distinction to the inputs [PROX DIST] and [DIST]. Again, there are multiple spell-out systems that yield a formal distinction between second and third person, namely those in (39a) (39c) and (39d). If the child happens to make the wrong choice given its target grammar, retraction will be necessary. For example, a child may posit spell-out rules for [PROX DIST] and [DIST] in order to account for an opposition between second and third person. However, if the target grammar is (39c) it will later have to retract the rule for [PROX DIST].

In conclusion, we propose that a child adopts a strategy of matching formal contrasts initially to first versus third person inputs, given that alternative strategies are likely to put the child in situations that require backtracking. As a result, a syncretism between first and third person is harder to acquire than other syncretisms, which in turn explains its relative typological infrequency.

The fact that the best initial strategy fails for 1-3 syncretisms does not imply paradigms that have such a syncretism cannot be acquired at all. In fact, it can be done without backtracking. However, it is not possible, following the failure of the initial strategy, for the child to employ a secondary strategy according to which the relevant formal distinction represents either first versus second or second versus third person. This is because, as we have shown, this strategy may lead the child to postulate spell-out rules confirmed in the initial context that later have to be retracted when more input is taken into account. Instead, the child must try to match the two forms under consideration to three syntactic inputs (namely first, second and third person). Only then is it possible to set up a system of spell-out rules that is compatible with the input and will not require retraction. This is of course a more complex learning task than one that at any one point only requires comparison of two inputs given a formal distinction. Such complexity of the learning task might be an additional contributory factor disfavouring 1-3 syncretisms, but this must remain a speculation given that little is known about the computational capacity of children in domains of this type.

The account just outlined makes one clear prediction, namely that first and third person agreement forms will be acquired before second person agreement forms. Our impression is that this generalization is correct. The following acquisition studies confirm that, at least in the singular indicative present, the child starts using first and third person agreement before second person agreement.[17]

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[17] Notice that this table suggests a further generalization, namely use of third person agreement markers before first person agreement markers. A possible explanation for this is that third person agreement can be a default form that can be used in the absence of syntactic agreement (see section 2.4). We cannot explore this issue here.

(40)

Language	Reference	Order of acquisition
Basque	Austin 2012	3 < 1 < 2
Catalan	Grinstead 2000	1,3 < 2
Croatian	Katičić 2003	3 < 1 < 2
Estonian	Lipp 1977	3 < 1 < 2
Finnish	Laalo 2003	3 < 1 < 2
German	Clahsen 1988, Poeppel and Wexler 1993	1,3 < 2
Greek	Christophidou and Stephany 2003	3 < 1 < 2
Hebrew	Armon-Lotem 2006	1,3 < 2
Italian	Clark 1985	3 < 1 < 2
Lithuanian	Wójcik 2003	1,3 < 2
Northern East Cree	Terry 2009	3 < 1 < 2
Spanish	Grinstead 2000, Félix-Brasdefer 2006, Austin 2012	1,3 < 2
	Aguirre 2003	3 < 1 < 2
Turkish	Özden Ekmekci 1982	1,3 < 2

One would expect a similar pattern in the acquisition of pronouns, that is, acquisition of second person pronouns should follow acquisition of first person pronouns and at least one third person pronoun. Given that third person pronouns often also express gender and/or animacy, it is possible that some third person pronouns will be acquired later than second person pronouns because of late acquisition of the relevant gender/animacy distinction. The generalizations that Harley and Ritter (2002:500) make on the basis of a survey are in line with this. These generalizations are: (i) the first pronominal form to be acquired is the first person singular or the third person neuter/inanimate; (ii) second person pronouns are always acquired after first person pronouns; (iii) there is variability in the order of acquisition of second person pronouns and third person animate pronouns.[18]

We conclude that there is strong evidence for an acquisitional strategy according to which the initial assumption the child makes is that a formal distinction in the agreement paradigm expresses first versus third person. As a consequence of this, 1-3 syncretisms are harder to acquire, prone to language change and therefore typologically marked compared to 1-2 and 2-3 syncretisms.

4. SYNCRETISM IN THE PLURAL
In the first part of the paper, we have introduced a system of person features and spell-out rules that (i) explains the inventory of persons in singular and plural, (ii) can account for cross-linguistic patterns of syncretism, in particular the fact that all possible syncretisms are attested, but that there is a clear asymmetry between 1-3 syncretisms on the one hand and 1-2 and 2-3 syncretisms on the other. In the remainder of the paper, we continue to test the proposed system in a further case study of agreement patterns in Dutch. We show that the various shifts in agreement patterns in different contexts receive a straightforward account, which moreover captures observed restrictions on these shifts. We start by returning to syncretism in the plural.

As observed by several authors (see for instance Aalberse and Don 2010 and Nevins 2011), marked features are not only a typical target for impoverishment, but also a typical

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[18] The order of acquisition of verbal agreement is unlikely to be a result of the order of acquisition of pronouns, given that the person system seems to be in place for pronouns before agreement endings are acquired (see, for example, Armon-Lotem 2006). A different matter is that the acquisition of nominative pronouns may coincide with the acquisition of agreement.

context in which impoverishment takes place. If features are privative, the reason for this is that markedness equals the presence of features that are absent elsewhere. Something that is present can be mentioned as a target or a context of application for a rule, but something that is absent cannot. This means certain types of syncretism, namely those that rely on impoverishment, can be restricted to marked parts of the paradigm only, but cannot be restricted to unmarked parts only. For example, syncretisms may be restricted to the subjunctive (as opposed to the indicative) or to the past (as opposed to the present).

Another marked context is the plural (as opposed to the singular). Indeed, considering the Germanic languages, certain types of syncretism occur in the plural where they do not appear in the singular. We can illustrate this using data from German, in which first and third person plural are marked by *-en*, while a second person plural subject triggers a *-t* ending:

(41)

	kaufen
1pl	Wir kauf**en**
2pl	Ihr kauf**t**
3pl	Sie kauf**en**

In general, 1-3 syncretisms are generated through impoverishment rules of the type in (35). Given that all three persons are distinguished in the singular in German (see (27)), the relevant instantiation of the impoverishment rules in (35) in German must mention [PL] as part of their structural description. The paradigm in (41) is then generated through interaction of these impoverishment rules (see (42)) and the spell-out rules in (43).

(42) a. [PROX] → Ø / V-[__ PL]
    b. [DIST] → Ø / V-[φ– __ PL]
(43) a. [PL] ⟺ /en/ / V-[__]
    b. [PROX DIST PL] ⟺ /t/ / V-[__]

A similar situation exists in earlier versions of standard Dutch, as well as in some present-day Dutch dialects. There is one additional complication here that is absent in German: the second person plural is systematically identical to the second person singular. There is a historical explanation for this identity, as the original second person singular form was ousted by its plural counterpart. The latter was introduced in the singular as a polite form and spread subsequently (see Aalberse 2009 for discussion). A synchronic account of this syncretism between second person singular and second person plural requires a third impoverishment rule, given in (45) below. (Dutch shares with German the spell-out rule in (43a). The spell-out rule for [DIST] is given in (31b). In Dutch, this rule will apply in the second person plural after application of (45) (see section 3.1)).

(44)

	kopen	Historical/Dialectal IV
1pl	Wij kop**en**	
2pl	Jullie koop**t**	
3pl	Zij kop**en**	

(45)   [PL] → Ø / V-[__ PROX DIST]

Modern Standard Dutch has a more straightforward system. In the plural, no person distinctions are made:

(46)

	kopen
1pl	Wij kop**en**
2pl	Jullie kop**en**
3pl	Zij kop**en**

This implies that the grammar of Modern Standard Dutch has been simplified in two ways. First, the impoverishment rule in (45) has been lost. Second, the rule in (42b) has become more general, in that its structural description does not mention the φ-node as part of its context of application. Thus, Modern Dutch has the following two impoverishment rules.[19]

(47) a.　[PROX] → Ø / V-[__ PL]
　　 b.　[DIST] → Ø / V-[__ PL]

These rules do not only apply in the first and third person plural, but will also strip away person features in the second person plural. The [PROX–DIST] feature complex can be reduced to [PROX] by application of (47b) (given that the rule does not mention any particular host feature for [DIST]). After this, (47a) can apply (this does not violate the Russian Doll Principle once [DIST] has been removed). The result is that there is no longer a foothold in the plural for spell-out rules mentioning person features; rather the rule in (43a) applies to all persons.

5. *A SHIFT IN SYNCRETISM UNDER INVERSION*
As mentioned in section 1, depending on context and verb class, the regular 2-3 syncretism characteristic of the Dutch singular can make way for a 1-2 syncretism and even a 1-3 syncretism. In this section we will discuss the shift from a 2-3 to a 1-2 syncretism associated with subject-verb inversion.

　　Recall that in Dutch the agreement ending of a second-person singular verb is affected by its relative position with respect to the subject. If the subject precedes the verb, agreement is realized as *-t*; in structures with inversion, the verb does not carry overt agreement:

(48) a.　Jij leest het boek.
　　　　 you read-2SG the book
　　　　 'You are reading the book.'
　　 b.　Ik geloof dat jij het boek leest.
　　　　 I believe that you the book read-2SG
　　　　 'I believe that you are reading the book.'

---

[19] An anonymous reviewer suggests an alternative account of neutralization of person in the plural. The idea is that there is a single spell-out rule mentioning the feature [PL], along with a single stipulation that in the relevant neutralizing grammars number features win in competition with person features during spell-out. This might work for Dutch (and is compatible with our general approach). The theory would be very attractive if neutralization always had the same 'direction': in that case there could be a universal hierarchy of features determining which feature wins in cases of competition. This approach is in fact advocated by Noyer (1997), who uses a hierarchy 1 > 2 > ... > PL > .... to capture some clear typological tendencies in this domain. However, there is a certain degree of crosslinguistic variation incompatible with a universal hierarchy. The Dutch data, in particular, conflict with Noyer's hierarchy, as (as noted) [PL] must win out over first and second person in this language. Replacing Noyer's hierarchy by a universal hierarchy in which number outranks person cannot work either, not even if we restrict our attention to variants of Dutch. This is because of the pattern in (44), where second person wins out over [PL]. In other words, it must be stipulated as part of the grammar of Modern Standard Dutch (i) that person and number cannot both be realized, and (ii) that if both are present, number takes priority. This is of course exactly what the impoverishment rules in (47) express, making the two approaches equal in complexity.

c. Lees jij het boek?
   read you the book
   'Are you reading the book?'

In other words, the regular 2-3 syncretism changes to a 1-2 syncretism when there is subject-verb inversion. The upshot of the discussion in section 3.2 is that 1-2 syncretisms must be the result of impoverishment. This meshes well with the account of the agreement alternation in (48) given in Ackema & Neeleman 2003, 2004. There, it is argued that the data can be captured using a particular type of impoverishment rule, whose domain of application is phonologically defined, namely as the phonological phrase (or φ). Such PF rules can account for a variety of phenomena cross-linguistically. Agreement alternations like the one observed in Dutch arise in case the grammar of the language contains a PF rule that states that, if the target and the controller of a particular agreement relation are in the same φ, the feature content of one of them is reduced.

The effect of this process depends, of course, on how phonological phrases are constructed in a language. In this respect, we rely on independently motivated alignment rules, which state that edges of syntactic phrases must coincide with edges of phonological phrases (compare Selkirk 1984, 1986, McCarthy & Prince 1993, Truckenbrodt 1999). This can either involve left-alignment or right-alignment. In languages that are (predominantly) head-initial, such as Dutch, there is right-alignment (compare Selkirk 1986, Tokizaki 1999):

(49)   Align the right edge of a syntactic maximal projection with the right edge of a φ.

Two things must be noted in connection to (49). First, the rule mentions maximal projections, rather than heads. Hence, heads do not trigger φ-closure; only the right boundaries of full phrases do. Second, it is important to realize that this rule determines the initial prosodic structure at PF, that is, *before* spell-out. The final part of the mapping from syntax to phonology consists of the insertion of phonological material. The ultimate prosodic structure in phonology proper depends, of course, on the properties of this inserted material. For example, if an initial φ generated at PF contains too little phonological material to form a well-formed phonological phrase on its own, it will be adjoined to a neighbouring φ to ensure proper weight distribution. The ultimate prosodic phrasing will also depend on factors such as speech rate, pauses, etc. For motivation of such a two-step model of prosodic phrasing (initial domains determined by mapping from syntax at PF, later adjustments in phonology), see Ghini 1993, Monachesi 2005 and Dehé 2006.

The rule in (49) delivers the following initial prosodic structures for the examples in (48), where prosodic phrases are indicated by braces:

(50) a. {Jij} {leest het boek}.
        you read-2SG the book
     b. {Ik} {geloof dat jij} {het boek} {leest}.
        I believe that you the book read-2SG
     c. {Lees jij} {het boek}?
        read you the book

The impoverishment rule responsible for the agreement alternation in Dutch can be formulated as in (51); we will refer to it as 'agreement weakening'. What it expresses is that the [DIST] feature of an agreeing verb is deleted in the presence of [PROX], if that verb occurs in the same prosodic phrase as the DP with which it agrees (agreement is indicated here through coindexation of phi-feature bundles; no particular analysis of agreement is implied

by this):

(51)   *Agreement Weakening*
         [DIST] → Ø / {V-[PROX __]$_i$ [D φ$_i$]}

Given the prosodic structures in (50), this rule can apply in (50c), but not in (50a,b), as only in (50c) do verb and agreeing subject end up in the same prosodic phrase. Consequently the verbal agreement ending, whose syntactic specification is [PROX DIST], will only be specified as [PROX] at the point of spell out. The morphological form of the verb will therefore be homophonous to the first person singular, that is, there will not be an overt ending (see (31a')).

      In modern standard Dutch, the rule in (51) can only have an effect in the singular, as in the plural the impoverishment rules in (47) obliterate all person distinctions anyway. Recall, however, that in the older version of the standard language mentioned in section 4, the second person plural still had an ending *-t* distinct from the general plural ending *-en* (see (44)). In contexts where the subject appears right-adjacent to the verb, this *-t* ending disappears; instead the general plural ending *-en* surfaces (see Buitenrust Hettema 1891, Van Loey 1970, and Aalberse 2009), as predicted by the rule in (51). The phenomenon is illustrated in (52), where both *jullie heb-t* 'you(plural) have-2' and *hebb-en jullie* 'have-PL you(plural)' occur in the same sentence.[20]

(52)   Jullie hebt het aangevoeld en terecht hebben jullie ...   Historical
         you(PL) have-2 it felt and rightly have-PL you(PL)
         'You have felt it, and you have rightly ...'
         (http://www.rkdocumenten.nl/index.php?docid=203, accessed 25 July 2012. The source text dates from 1975. The text consistently shows the relevant agreement alternation in the second person plural. The general language in the text is formal and probably old-fashioned, even for the time.)

The account predicts that impoverishment will not take place if certain types of constituents intervene between the agreeing verb and an inverted subject. If an intervening constituent triggers a prosodic boundary aligned with its right edge, then verb and subject will end up in different prosodic domains, even if there is subject-verb inversion. We can illustrate this using the general possibility of fronting a contrastive topic to a position between a fronted verb and the subject. The examples in (53) show that this operation is neither blocked in the context of verbal agreement as such nor in the context of second person singular subjects (note that in the past tense there is no person agreement in Dutch).

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[20] The fact that a plural form *-en* surfaces under inversion indicates that at this stage second person verbs with a plural subject were still marked [PL] at the point of spell-out. This means that the impoverishment rule that deletes [PL] in the context of [PROX DIST] (see (45)) is ordered after the agreement weakening rule that deletes [DIST] in inversion contexts. Agreement weakening then destroys the context of application of (45), so that [PL] survives in the second person. In addition, rule (42a), which deletes [PROX] in the presence of [PL] must also be ordered after agreement weakening, so as to ensure that at spell-out *only* [PL] survives (note that application of (42a) in the second person is no longer blocked by the Russian Doll Principle once (51) has removed [DIST]). As we will see, an ordering in which agreement weakening precedes rules like (42) and (45) is as expected given the nature of these rules (see the discussion surrounding (75)).

      In an even older stage of the language, inversion led to complete loss of any marking in the second person plural (see Aalberse 2009:168), indicating that the agreement weakening rule targeted the entire φ-node, including its dependent [PL] feature, rather than just the [DIST] feature.

(53) a. Volgens mij leest [$_{DP}$ dat soort boeken] zelfs hij t_{DP} niet.
         according.to me reads that kind.of books even he not
         'I think even he does not read that kind of books.'
     b. Volgens mij las [$_{DP}$ dat soort boeken] zelfs jij t_{DP} niet.
         according.to me read.PST that kind.of books even you not
         'I think even you did not read that kind of books.'

However, examples in which the form of the verb used depends on the rule in (51) do not allow intervening fronted objects:

(54) a. Volgens mij lees zelfs jij [$_{DP}$ dat soort boeken] niet.
         according.to me read even you that kind.of books not
         'I think even you do not read that kind of books.'
     b. *Volgens mij lees [$_{DP}$ dat soort boeken] zelfs jij t_{DP} niet.
         according.to me read that kind.of books even you not

The initial prosodic structure of (54b), as generated by the alignment rule in (49), is as in (55). Crucially, the right edge of the fronted object triggers a prosodic boundary that separates verb and subject prior to spell out. As a consequence, the structural description of the rule in (51) is not met, so that it cannot apply in this case.

(55)   *{Volgens mij} {lees dat soort boeken} {zelfs jij} {niet}.
        according.to me read that kind.of books even you not

The situation with intervening modifiers is more subtle. There appears to be considerable speaker variation in the extent to which adverbials can intervene between an impoverished verb form and a following second person subject. In general, we can distinguish three classes of modifiers: (i) bare-head modifiers like *morgen* 'tomorrow', (ii) 'P-modifiers' like *op zondag* 'on Sunday', which consist of a preposition and a bare-head complement, and (iii) complex modifiers like *na elke maaltijd* 'after each meal' or *op de warmste dag van het jaar* 'on the hottest day of the year.' Our assessment is that speakers differ in which of these classes they allow to intervene between an impoverished verb and a following subject subject. Some speakers do not allow any intervening modifier (Hans van de Koot, p.c.). Others allow intervention of bare-head modifiers, but not others (this corresponds to XXX's intuitions). Still others accept intervention of both bare-head modifiers and P-modifiers (this corresponds to YYY's intuitions; see also Zonneveld 2007). We have not found speakers who accept intervening complex modifiers, but for another phenomenon possibly conditioned by initial prosodic phrasing in the same way as agreement weakening (namely complementizer agreement, see Ackema and Neeleman 2004), such intervention is accepted by Haegeman and van Koppen (2012). The overall picture that emerges is one of an implicational hierarchy:

(56)   bare head modifiers >> P-modifiers >> complex modifiers

Anyone who allows intervention by a particular type of modifier on this hierarchy also allows intervention by all elements to its left.

    Our take on these data is as follows. The alignment principle in (49) has the consequence that the right edge of any maximal projection will trigger φ-closure. This includes adverbial phrases, regardless of how much material they contain. Therefore, an adverbial phrase separating verb and subject will in principle destroy the context in which the agreement weakening rule applies, as illustrated in (57):

(57)   {Volgens mij} {loop **AdvP**} {zelfs jij} {naar het café}.
         according.to me walk AdvP even you to the pub

However, it is quite plausible that there are additional mapping principles mediating between syntactic and prosodic structure that are sensitive to the amount of structure that a syntactic phrase contains. For instance, in Ackema & Neeleman 2004 (pp. 187, 271), it is argued that prosodic boundaries between a modifier and the material it modifies are erased if induced only by the right edge of the modifier itself. One could imagine that this kind of rule is sensitive to the syntactic complexity of the modifier, so that larger modifiers do not permit such boundary erasure. Speaker variation would then result from variation in the cut-off point, as follows:

(58)   Boundary erasure between modifier and modifiee is
         (A) unconditional
         (B) blocked if the modifier consists of:
               (i) anything,
               (ii) more than just a bare head,
               (iii) more than a preposition and a bare head.

This gives rise to the following pattern of judgments, which is in line with our current impression of the empirical situation:

(59) a.   %Volgens mij loop morgen zelfs jij naar het café.   (* if (58Bi))
         according.to me walk tomorrow even you to the pub
     b.   %%Volgens mij loop op zondag zelfs jij naar het café.   (* if (58Bi/ii))
         according.to me walk on Sunday even you to the pub
     c.   %%%Volgens mij loop op zo'n warme dag zelfs jij naar het café.   (* if (58Bi/ii/iii))
         according.to me walk on such a warm day even you to the pub

More research is necessary to clarify the exact range of speaker variation. However, if there is indeed an effect of size on the acceptability of intervening modifiers, this clearly lends extra plausibility to an account of agreement weakening based on prosodic phrasing.

    In contexts where the rule in (51) cannot apply, we would expect that the regular agreement ending for a second person singular verb surfaces, as in (60). It is indeed the case that the speakers we have consulted find an example like (60) better than the same example with a verb form resulting from agreement weakening (that is, *loop* instead of *loopt*). Nonetheless, the sentence is not simply acceptable; judgments vary from 'not perfect' to 'quite bad.'

(60)   ?{Volgens mij} {loopt op de laatste avond van het jaar} {zelfs jij} {naar het café}.
         according.to me walk-2SG on the last evening of the year even you to the pub
         'I think even you will go to the pub on the last evening of the year.'

The same is true of examples involving fronted objects:

(61)   ?Volgens mij leest [DP dat soort boeken] zelfs jij t_{DP} niet.
         according.to me read that kind.of books even you not
         'I think even you do not read that kind of books.'

26

We speculate that the marginality of these examples is due to a parsing difficulty rather than to a principle of the grammar. Examples with a constituent between verb and inverted subject are relatively infrequent. This means that the presence of a *-t* ending on a verb in structures with subject-verb inversion is a statistically highly reliable indication that a third person subject will follow, rather than a second person subject. (Recall that, if there is no intervening material between verb and inverted subject, only third person singular subjects induce a *-t* ending on the verb). In general, it pays off in parsing to create predictive shortcuts. Hence, we speculate that if a speaker of Dutch encounters the string in (62), where XP is not the subject, they will expect a third person singular subject to follow, with the consequence that the continuations in (60) and (61) create a garden path effect.

(62)   XP V-*t* ...

We may note that the effect gets weaker with repetition or if more material intervenes between verb and subject, as expected if it is psycholinguistic in nature. Real mismatches in agreement, as in (63) for instance, are worse than (60) to begin with, and do not improve either with repetition or if the distance between verb and subject is enlarged.

(63)   *Volgens mij lopen op de laatste avond van 't jaar zelfs jij naar het café.
         according.to me walk-PL *on the last evening of the year even you.*SG *to the pub*

In conclusion, although some empirical questions remain, it is clear that in Dutch the 1-2 syncretism is limited to a special context (associated with inversion), whereas the regular 2-3 syncretism appears in all other contexts. This fits well with an account in which the latter is a direct result of underspecification in the spell-out system, whereas the former requires a rule of impoverishment. After all, such rules can specify a context of application, while there is no such thing as a context for underspecification.

As mentioned in the introduction, there is one exception to the rule of agreement weakening: polite second person subjects do not trigger it. We will address this issue in section 7.

6. *A SHIFT IN SYNCRETISM DEPENDENT ON VERB CLASS*
In the previous sections we have concentrated on inflection of regular verbs. Irregular verbs differ in two respects from the picture that has emerged so far: some of them show patterns of inflectional endings that differ from the one observed for regular verbs, and a few of those also show allomorphy in their stem forms. On the whole, verbal inflection is more impoverished, and there appears to be a degree of optionality in forms, in particular in the second person singular. As we will see, this is highly relevant to the agreement alternation under inversion discussed in the previous section. We will argue that there are specific impoverishment rules for irregular verbs, but that the agreement alternation under inversion with these verbs simply follows the rule in (51).

We start by discussing the two modal verbs that display stem allomorphy. These are *kunnen* 'can' and *zullen* 'will'. The agreement paradigms for these verbs are given in (64) and (65) (we leave out the polite forms for now):

(64)

CAN	*Kan* **forms**	*Kun* **forms**
1sg	Ik kan	*Ik kun
2sg	Jij kan	Jij kun**t**
3sg	Hij kan	*Hij kun**t**
1/2/3pl	*Wij/jullie/zij kann**en**	Wij/jullie/zij kunn**en**

(65)

WILL	*Zal* **forms**	*Zul* **forms**
1sg	Ik zal	*Ik zul
2sg	Jij zal	Jij zul**t**
3sg	Hij zal	*Hij zul**t**
1/2/3pl	*Wij/jullie/zij zall**en**	Wij/jullie/zij zull**en**

There are two stem forms in these paradigms: *kan*/*zal* and *kun*/*zul*. The former is obligatorily used in the first and third person singular, whereas the latter is obligatorily used in the plural. Strikingly, the second person singular can use either stem. Moreover, the *kan*/*zal* form never shows any agreement ending, which means that in the third person singular the usual ending is omitted, while in the second person singular it only appears when the *kun*/*zul* stem is used. The upshot is that in the singular, rather than the regular 2-3 syncretism, we find a 1-3 syncretism (*kan*/*zal* − *kunt*/*zult* − *kan*/*zal*), alongside a 1-2-3 syncretism with *kan*/*zal* for all persons.

As discussed above, 1-3 syncretisms are the result of impoverishment rules of the type in (35), and such impoverishment rules are restricted to marked domains if they mention a particular feature as part of their context of application. In the case at hand, the specific context in which the impoverishment rules apply consists of a specific verb class to which *kunnen* and *zullen* belong (we will designate this class by assigning it the feature [MODAL], even though some verbs traditionally classified as modals behave like regular verbs). Thus, the 1-3 syncretism observed with these modals is accounted for by the rules in (66), which are identical to (35), except that they mention [MODAL] as their context of application. These rules have the result that in the singular all φ-feature information in first and third person verbs is deleted, leaving just a bare φ-node. As there is no spell-out rule in Dutch that can realize bare φ-nodes (see (31)), no ending is inserted in the first or third person when these rules apply.

(66) a. [PROX] → Ø / [MODAL]-[__]
     b. [DIST] → Ø / [MODAL]-[φ−__]

In order to account for the alternation observed in the second person singular, we assume that there is a further rule of impoverishment in modals that targets [DIST] when dependent on [PROX]. In contrast to the two rules in (66), this third rule is optional:

(67)   [DIST] → Ø / [MODAL]-[PROX−__] (optional)

When (67) applies, it results in a feature structure [φ−PROX]. In this configuration, [PROX] will be targeted by the obligatory rule in (66a). The result is that the second person will also end up with a featureless φ-node, which will not be spelled out. However, when (67) does not apply, neither of the rules in (66) can apply either. The rule in (66b) cannot be applied, because in the second person, [DIST] is not dependent on φ, but on [PROX]. Hence the rule's structural context is not met. Because [DIST] cannot be removed, the rule in (66a) cannot be applied either, as the rule does not mention [DIST] while it mentions the [PROX] feature that [DIST] is dependent on, thereby violating the Russian Doll Principle in (32).

The stem allomorphy in (64)/(65) can now be accounted for if the factor regulating the distribution of the two stem forms is the presence or absence of content in the φ-node. We will encode this using spell-out rules that have a specific context of application, namely a φ-node with content. These are given in (68b) and (69b), where F is a variable over phi-features (compare Halle & Marantz 1993:151-152). The general spell-out rules for these modals are given in (68a) and (69a). Interaction between the rules is regulated by Maximal Encoding.

(68) a. CAN ⟺ /kan/
     b. CAN ⟺ /kun/ / __-[φ–F]
(69) a. WILL ⟺ /zal/
     b. WILL ⟺ /zul/ / __-[φ–F]

Consider how (66)-(69) account for the paradigms of *kunnen* and *zullen*. The first person singular loses both its [PROX] features as the result of application of (66a). This means the stems will be realized by (68a) and (69a), resulting in *ik kan* 'I can' and *ik zal* 'I will'. Similarly, application of (66b) results in loss of φ-features in the third person, so that the same stem allomorphs are selected: *hij kan* 'he can' and *hij zal* 'he will'. In the plural, the rules in (47) delete person features as usual. Given that there is a [PL] feature, however, the rules in (68b) and (69b) are triggered and the stems selected will be the *kun*/*zul*-forms. [PL] is spelled out by -*en*, so that we get *kunnen* 'can-PL' and *zullen* 'will-PL' throughout the plural.

What happens in the second person singular depends on whether the optional rule in (67) applies or not. As noted, if it does apply, so will (66a), so that we get the same result as in the first and third person singular: a verb form without any φ-features, hence realized by the stems mentioned in (68a) and (69a): *jij kan/zal* 'you can/will'. As also discussed, if (67) does not apply, neither can (66a,b). Hence, in this case a fully specified φ-node survives, so that the stems mentioned in (68b) and (69b) are selected and the regular -*t* ending is inserted: *jij kunt*/*zult* 'you can-2SG/will-2SG'.

The rules just introduced for modals interact with the process of agreement weakening discussed in section 5. This interaction results in forms that only occur in inversion contexts, namely the uninflected form of the *kun*/*zul* stem. Since this stem never occurs in the first person, it may seem that our account of agreement weakening, which reduces [PROX DIST] to [PROX], is misguided (a point made by Zonneveld 2007). However, as we will now show, the data are exactly as predicted. No adjustments to the rule in (51) are necessary to deal with modals in inversion contexts.

Because of the optionality of the rule in (67) there are again two derivations to consider. In case (67) and hence (66a) apply, there are of course no phi-features left to delete under inversion, and therefore what we find is the same bare form *kan*/*zal* that occurs in the absence of inversion. This option is illustrated in (70).

(70) a. Kan jij dat boek lezen?
         can you that book read
         'Can you read that book?'

     b. Zal jij dat boek lezen?
         will you that book read
         'Will you read that book?'

Now consider the case where (67) and therefore (66a,b) do *not* apply. If we assume that these rules are ordered before the agreement weakening rule in (51), the input to the spell-out

system will be a structure CAN/WILL-[φ PROX]. The CAN/WILL stems are hence realized by (68b) and (69b), while [PROX] is spelled out by the regular ending for this feature, namely zero. Therefore, the forms expected under inversion in this case are *kun* and *zul*. This option indeed exists alongside (70):

(71) a. Kun jij dat boek lezen?
       can you that book read
       'Can you read that book?'
    b. Zul jij dat boek lezen?
       will you that book read
       'Will you read that book?'

The *kun*/*zul* forms never appear in the first person, because [φ–PROX–PROX] is systematically reduced to a bare φ-node by (66a), so that the *kan*/*zal* stems must be selected. In the second person, the agreement weakening in (51) does result in a [φ–PROX] feature structure, but on the assumption already introduced that the rules in (66) are ordered before agreement weakening, (66a) can no longer target this structure.

In sum, the rule ordering required in this analysis is the following:

(72) a. Impoverishment in modal verbs (66, 67)
    b. Impoverishment in prosodic domains (51)
    c. Spell-out rules (including (17), (31), (68) and (69))

That this yields the correct results is demonstrated by the sample derivations for *kan jij* 'can you' and *kun jij* 'can you' in (73) and (74), respectively.

(73)   CAN-[φ PROX DIST]
        CAN-[φ PROX]   (67) applies
        CAN-[φ]   by (66a)
        {CAN-[φ] [DP [φ PROX DIST]]}   (51) is not applicable
        /kan/ /jij/   by (68a) and (17b)

(74)   CAN-[φ PROX DIST]
        CAN-[φ PROX DIST]   (67) is not applied
        CAN-[φ PROX DIST]   (66b) is not applicable
        CAN-[φ PROX DIST]   (66a) is blocked by (32)
        {CAN-[φ PROX DIST] [DP [φ PROX DIST]]}
        {CAN-[φ PROX] [DP [φ PROX DIST]]}   by (51)
        /kun/ /jij/   by (68b), (31a') and (17b).

Arguably, the necessary rule ordering need not be stipulated, but can be derived from the nature of the rules involved. That spell-out rules operate last, after any rules manipulating φ-features, follows in any model separating syntax and phonology. Spell-out rules map a feature bundle to a phonological form. The idea is that any subsequent rule is phonological in nature, leaving no room for further morpho-syntactic feature manipulation.

The ordering of rules that do manipulate phi-feature structures is – we assume – determined by the generality of their application, with more generally applied rules following less generally applied rules. How general a rule is in this respect can be determined by asking two questions. First, does the rule apply to all tokens of agreeing verbs? If the answer is positive, we are dealing with the most generally applied type of rule. Examples are rules that

implement feature co-occurrence restrictions in a language, such as the ones in (47) (which prevent co-occurrence of person and number features). If the rule does not apply to all tokens of agreeing verbs, the next question is whether it applies to all tokens in a particular context. If the answer to this is positive, as in the case of the agreement weakening rule that applies in prosodic domains, we are dealing with the next most generally applied type of rule. If the answer to this second question is also negative, we are dealing with the least generally applied type of rule. This final class includes optional rules and rules that target specific lexical items only (such as certain modal verbs). The resulting rule order is given below:

(75) a. Optional and item-specific impoverishment rules (such as (66) and (67))
     b. Agreement weakening in prosodic domains (such as (51))
     c. Impoverishment rules implementing feature co-occurrence restrictions (such as (45) and (47))

This correctly captures the crucial part of the ordering in (73) and (74) (item-specific impoverishment precedes agreement weakening).

The data discussed in this section cannot be used to empirically test the ordering of the agreement weakening rule in (51) and more general impoverishment rules like (47). However, the ordering given in (75b,c) matches the data in older stages of Dutch, where agreement weakening could be observed in the second person plural, resulting in a form only expressing the [PL] feature (see (44) and (52)). If the order of (75b,c) were inverted, [PL] would be deleted by (45), incorrectly yielding a zero ending after agreement weakening (see also footnote 20).

The patterns found with *kunnen* and *zullen* are the most complicated among the modals. One other modal, *willen* 'want' behaves exactly like *kunnen* and *zullen*, except that it does not display any stem allomorphy. The paradigm is therefore as below, and the analysis works as for *kunnen* and *zullen*, without the complication of there being two spell-out rules for the stem:

(76)

WANT	**Willen**	
1sg	Ik wil	
2sg	Jij wil/wil**t**	Wil jij
3sg	Hij wil	
1/2/3pl	Wij/jullie/zij will**en**	

A fourth modal, *mogen* 'may' is like *kunnen* and *zullen* in that it does show stem allomorphy. However, in the modern standard language at least, the rule in (67) applies obligatorily rather than optionally to *mogen*, with the result that the second person singular, like the first and third person singular, consistently surfaces as a bare stem. (In older versions of the language and in some dialects, (67) is still optional for this verb, resulting in an additional form *moogt* 'may-2SG'.)

(77)

MAY	*Mag* **forms**	*Moog* **forms**
1sg	Ik mag	*Ik moog
2sg	Jij mag	*Jij moog**t**
3sg	Hij mag	*Hij moog**t**
1/2/3pl	*Wij/jullie/zij magg**en**	Wij/jullie/zij mog**en**

All other verbs traditionally classified as modals (see, for instance, Van Bart, Kerstens & Sturm 1998:51) behave like regular verbs.

There are two more verbs that have an irregular agreement paradigm: *hebben* 'have' and *zijn* 'be'. The former has two stem forms whose distribution depends on the presence of a [DIST] feature directly dependent on φ. In other words, one stem form only appears in the third person singular, while the other appears everywhere else (recall that in the plural the [DIST] feature is deleted by the impoverishment rule in (47b) before spell-out takes place). The paradigm and the rules relevant for the stem alternation are given below:

(78)

HAVE	*Heb* forms	*Heef* forms
1sg	Ik heb	*Ik heef
2sg	Jij heb**t**	*Jij heef**t**
3sg	*Hij heb**t**	Hij heef**t**
1/2/3pl	Wij/jullie/zij hebb**en**	*Wij/jullie/zij hev**en**

(79) a. HAVE ⟺ /heb/
     b. HAVE ⟺ /heef/ / ___-[φ–DIST]

The second person singular undergoes the agreement weakening rule in (51) in the usual way when there is subject-verb inversion, resulting in *heb jij* 'have.1SG you' (instead of *hebt jij* 'have-2SG you').

The verb *zijn* 'be' has a more complicated paradigm, which we give in (80).

(80)

BE	**Zijn**
1sg	Ik ben
2sg	Jij ben**t**
3sg	Hij is
1/2/3pl	Wij/jullie/zij zijn

This paradigm shares one property with the one for regular verbs, namely that the second person singular form equals the first person singular form plus a *-t* ending. Moreover, this ending disappears under subject-verb inversion (it is *ben jij* 'are.1SG you', rather than *bent jij* 'are-2SG you'). The other forms in *be*'s finite paradigm cannot reasonably be analyzed as consisting of a stem plus an affix. The third person singular is clearly suppletive. The same is true, in present-day Dutch at least, for the plural form. If it were composed of a stem *zij* plus a plural ending *-en*, the phonological rules of Dutch would yield a surface form [zɛijən], rather than the actual [zɛin], on a par with a verb like *brei-en* 'to knit', which is realised as [brɛijən] rather than [brɛin]. The rules we propose to capture the various forms of the verb *zijn* 'be' are given below:

(81) a. BE ⟺ /ben/[21]
     b. BE-[PL] ⟺ /zijn/
     c. BE-[φ–DIST] ⟺ /is/

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[21] The rule in (81a) should perhaps be restricted to the context in (i). The reason for this is that there is further stem form *wees*, used in the imperative and in some non-finite forms. There is reason to believe that this is the basic stem form, but we cannot explore this matter here.

(i) BE ⟺ /ben/ / ___-[φ φ–PROX–F]

The main conclusion from this section is that there is no need to adjust the agreement weakening rule in (51) in order to capture the behaviour of irregular verbs under inversion. The rule operates in the same way for all verbs. The difference between regular verbs and irregular verbs is that the latter are subject to impoverishment and stem allomorphy rules that are motivated independently of (51). There are complications with the polite second person forms that we will discuss in the next section. However, we will argue that even these data do not require an adjustment of the rule in (51).

7. THE EFFECTS OF POLITENESS

Not all languages have polite pronouns, English being a conspicuous example. Among the languages that express politeness, the polite pronoun is often the second person plural form. It is an open question whether such pronouns are really plural or contain a [HON] feature. Current standard Dutch, however, has a dedicated polite pronoun, *u*, which is different from both the second person singular familiar pronoun and the second person plural pronoun. This pronoun must therefore have a [HON] feature (as already assumed in section 2). In this section we will show that the presence of a [HON] feature in the subject can have an effect on the realization of verbal agreement. This is remarkable, because the feature itself is never expressed on verbs in Dutch. The data will thus support the view that, if a language has person agreement, all person features contained in the subject are underlyingly present in the verbal morphology.

The fact that [HON] is never realized on verbs in Dutch can be accounted for by adopting the impoverishment rule in (82). In fact, such a rule prevents a potential problem with the realization of agreement for [PROX DIST] in the context of a polite subject. If [HON] were not deleted, its presence would block spell-out of the [DIST] feature that it is dependent on (see (20)), because of the Russian Doll Principle.

(82)   [HON] → Ø/ V-[__]

One may wonder how [HON] can have any effect on verbal agreement if it is systematically deleted in verbs. Note, however, that the rule in (82) is a general rule that implements a feature co-occurrence restriction: it prevents the co-occurrence of [V] and [HON]. This means that it will be ordered late in the sequence of impoverishment rules that operate between syntax and spell-out. This sequence was given in (75). As can be seen there, a rule of the type in (82) follows both item-specific impoverishment rules and impoverishment rules conditioned by prosodic domains. [HON] will therefore still be able to exert an influence on these earlier types of rules. Below we will provide some examples of this.

Before we can turn to the relevant data, we should deal with a complicating factor. As mentioned in the introduction, the agreement forms found with second person polite pronouns alternate between the expected second person singular and the third person singular. It is easiest to demonstrate this with the irregular verbs *hebben* 'have' and *zijn* 'be'.[22] In fact, this alternation is not only found with verbal agreement but also with anaphors, which alternate between *u*(*zelf*), the second person polite form, and *zich*(*zelf*), which is the third person form. Both alternations are illustrated in (83).

(83)a.   U hebt u waarschijnlijk vergist.
           you.HON have-2SG 2SG.REFL.HON probably erred
           'You are probably in error.'

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[22] Third person forms of *be* in polite contexts are considered old fashioned by many speakers. For these speakers, *be* must be marked as not being input to (84a).

    b.   U hebt zich waarschijnlijk vergist.
        you.HON have-2SG 3SG.REFL probably erred

    c.   U heeft u waarschijnlijk vergist.
        you.HON have-3SG 2SG.REFL.HON probably erred

    d.   U heeft zich waarschijnlijk vergist.
        you.HON have-3SG 3SG.REFL probably erred

Although there is some prescriptive pressure to be consistent in choosing either a second person form for both agreeing verb and anaphor or a third person form for both, all combinations in (83) are in fact grammatical and attested (as a simple Google search confirms). This means that the account of these data cannot be that the pronoun *u* is ambiguous between a second and third person specification. If this were the case, the 'mixed' examples in (83b,c) could not be generated. Rather we must be dealing, once more, with an optional impoverishment rule that operates after syntactic agreement has been established and that reduces the feature content of the agreement ending and the anaphor before spell-out. Given that such rules cannot take into account whether or not other elements have undergone similar impoverishment, the mixed patterns in (83b,c) are to be expected.

    The impoverishment rule in question can be formulated as in (84a). This rule feeds a second, obligatory, impoverishment rule that deletes [HON] in the context of [φ–DIST], with the net result that a regular third person feature specification obtains.[23]

(84) a.   [PROX] → Ø / [__ DIST HON] (optional)
     b.   [HON] → Ø/ [__ φ–DIST]

Let us first consider how the rules in (84) capture the alternation between reflexive *u* and *zich* (we mark reflexives as [+a(naphoric) –p(pronominal)] in order to set them apart from pronouns). The derivations are given below (/zich/ is the general spell-out of the third person anaphor, while the second person polite anaphor has the same form as the polite personal pronoun *u*).

(85)   [DP [+a -p] [φ PROX DIST HON]]   (84a) is not applied
       /u/   by (23)

(86)   [DP [+a -p][φ PROX DIST HON]]
       [DP [+a -p] [φ DIST HON]]   (84a) is applied
       [DP [+a -p] [φ DIST]]   by (84b)
       /zich/

The alternation between second and third person verbal forms is accounted for in the same way. The only difference with the case of anaphors is that there is no specifically polite agreement ending, as a consequence of the rule in (82). We give the derivations of *u hebt* and *u heeft* below, where deletion of [PROX] results in a different choice of stem.

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[23] Notice that (84a) does not violate the Russian Doll Principle. Even though it deletes a feature that hosts two dependent features, its structural description mentions these dependent features, as required.

(87) $[_{DP} [_{\varphi}$ PROX DIST HON]] HAVE-$[_{\varphi}$ PROX DIST HON] (84a) is not applied
      $[_{DP} [_{\varphi}$ PROX DIST HON]] HAVE-$[_{\varphi}$ PROX DIST] by (82)
      /u/ /heb-t/ by (23), (79a) and (31b)

(88) $[_{DP} [_{\varphi}$ PROX DIST HON]] HAVE-$[_{\varphi}$ PROX DIST HON]
      $[_{DP} [_{\varphi}$ PROX DIST HON]] HAVE-$[_{\varphi}$ DIST HON] (84a) is applied
      $[_{DP} [_{\varphi}$ PROX DIST HON]] HAVE-$[_{\varphi}$ DIST] by (84b)
      /u/ /heef-t/ by (23), (79b) and (31b)

As noted, (84a,b) apply to agreement endings and reflexives. Interestingly, they cannot apply to (non-reflexive) pronouns. If they did, we would expect polite forms to surface optionally as third person pronouns, something that is impossible:

(89)   *Hij hebt u waarschijnlijk vergist.
        He have-2SG 2SG.REFL.HON probably erred
        'You are probably in error.'

Rather than adjusting the rule to block its application in (89), we propose that there is a general principle according to which pronouns that retain their features in one context cannot be partially impoverished in another:

(90)   *Protected pronouns*
        No rule of feature deletion with a limited domain of application may target a proper subset of the φ-features in a pronoun.

The notion of pronoun used in (90) is meant to stand in opposition to reflexive expressions, much as in classical binding theory. The latter do permit partial impoverishment, as already shown. That there is a general ban on partial feature deletion in pronouns is motivated by an observation made in Ackema and Neeleman 2004. Cross-linguistically, there are several examples of verbal agreement weakening of the type in (51). These target different features. For example, modern standard Arabic shows reduction of the [PL] feature in the verb under inversion, which is arguably the result of a rule similar to the one motivated for person reduction in Dutch.[24]

In contrast, this type of rule never seems to target a subset of features in the agreeing pronoun. For example, there is no dialect of Dutch in which the second person singular pronoun surfaces as a first person pronoun under inversion, and there is no dialect of Arabic in which a plural pronoun is realised as a singular pronoun if it follows the verb. To the best of our knowledge, this asymmetry is universal. It cannot be that context-sensitive impoverishment rules are blocked from applying to pronouns in general, as certain instances of pro-drop are arguably the result of a rule of this type deleting the entire φ-content of the pronoun (leaving no features to be spelled out). These are instances of pro drop where a subject can only be omitted if it is in the same prosodic phrase as an agreeing verb, in other words in exactly the same context as mentioned by the rule in (51) (see Ackema and Neeleman 2004:222-229). It is even possible that a language has both prosodically conditioned impoverishment rules like (51) for verbs and prosodically conditioned pro-drop (Standard Arabic is a case in point). But what is impossible, even there, is partial impoverishment of pronouns.

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[24] This analysis of standard Arabic agreement weakening has been criticized by Benmamoun and Lorimor (2006). See Ackema and Neeleman 2012 for a reply.

In Ackema and Neeleman 2004:230-231, a functional background for (90) is suggested. The idea is that the primary clue the parser uses to determine the reference of an argument is the overt form of that argument, if present. Partial impoverishment results in an overt form that triggers an incorrect referent (say a first person pronoun where the referent is the addressee). Deletion of all φ-features leads to pro-drop, which means that there is no misleading clue. Instead, the hearer must use either the agreement on the verb or the discourse context to determine the reference of the argument.[25]

We now turn to the effects of [HON] on the realization of verbal agreement, beginning with the behaviour of polite forms in sentences with subject-verb inversion. The prediction is that such forms should never show agreement weakening. Consider why. Given the optionality of the impoverishment rule in (84a), there are two derivations to consider. If the rule applies (leading to a [DIST] feature specification after (84b)), the context for application of the agreement weakening rule in (51) is destroyed (as this rule mentions [PROX]). Hence, the verb will surface in its third person form, irrespective of word order. If the rule in (84a) does not apply, the verb is specified as [PROX–DIST–HON], and could therefore in principle be targeted by the rule in (51). However, application of (51) is blocked by the Russian Doll Principle in this case because of the presence of [HON]. Hence, the verb will surface in its second person form, irrespective of word order.

So, the prediction for regular verbs is that, whether there is inversion or not, the verb surfaces as a stem suffixed by -t, since -t is the proper ending for both third and second person verbs (it realizes [DIST] by (31b) in both cases; see section 3.1). This blocking of the agreement weakening rule, illustrated below, is a first illustration of the effects of [HON] on verbal agreement:

(91) a. U leest het boek.
         you.HON read-2SG the book
         'You are reading the book.'
     b. Leest/*lees u het boek?
         read-2SG/read you the book
         'Are you reading the book?'

The prediction for the verb *hebben* is that we will see two options under inversion. The verb either surfaces with its third person stem or with its second person stem, but the agreement ending in both instances will be the same as in the non-inverted order. That this is indeed the case is shown in (92) and (93).

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[25] This explanation may extend to an observation by Bennis (2006): in imperatives without an overt subject, polite reflexives cannot take a third person form. In our terms, they are protected from partial impoverishment in case their antecedent is not spelled out. We would argue that this is because in such a situation the hearer relies on the reflexive to recover the subject's features (including [HON]). Bennis discusses subject-less imperatives (see (ia)), but the same effect can be observed if the antecedent of a polite reflexive has undergone topic drop (see (ib,c)). This indicates that an explanation should not be based on properties of the imperative.

(i) a. Vergis u/*zich niet!
         make-mistake 2SG.HON/3.REFL not
         Do not make a mistake (polite)!
     b. U hebt u/zich een beetje vergist, hè?
         You.PL have.2SG 2SG.HON/3.REFL a bit made-mistake, TAG
         You have made a slight mistake, haven't you (polite)
     c. Hebt u/*zich een beetje vergist, hè?
         have.2SG 2SG.HON/3.REFL a bit made-mistake, TAG

(92) a.   U hebt het boek gelezen.
          you.HON have-2SG the book read
          'You have read the book.'

     b.   Hebt/*heb u het boek gelezen?
          have-2SG/have you the book read
          'Have you read the book?'

(93) a.   U heeft het boek gelezen.
          you.HON have-3SG the book read
          'You have read the book.'

     b.   Heeft/*heef u het boek gelezen?
          have-3SG/have you the book read
          'Have you read the book?'

For concreteness' sake, we give the derivation for *hebt u* 'have.2SG you.HON' and *heeft u* 'have.3SG you.HON' below.

(94)   HAVE-[φ PROX DIST HON] [DP [φ PROX DIST HON]]   (84a) is not applied
          HAVE-[φ PROX DIST HON] [DP [φ PROX DIST HON]]   (32) blocks application of (51)
          HAVE-[φ PROX DIST]   [DP [φ PROX DIST HON]]   by (82)
          /heb-t/ /u/   by (79a), (31b) and (23)

(95)   HAVE-[φ PROX DIST HON] [DP [φ PROX DIST HON]]
          HAVE-[φ DIST HON] [DP [φ PROX DIST HON]]   (84a) is applied
          HAVE-[φ DIST HON] [DP [φ PROX DIST HON]]   (51) is not applicable
          HAVE-[φ DIST] [DP [φ PROX DIST HON]]   by (84b)
          /heef-t/ /u/   by (79b), (31b) and (23)

The prediction we make for modal verbs is slightly more involved, because of the impoverishment rules that apply specifically to these verbs. Recall that such impoverishment is optional in the second person (see (67)). If no feature deletion takes place, the result is the same as for regular verbs. What appears under inversion is a fully inflected second person form, as the presence of [HON] implies that application of (51) is blocked by the Russian Doll Principle. This option is illustrated in (96). (Note that the stem form is also in accordance with modal impoverishment not having applied; see section 6.)

(96) a.   U kunt het boek lezen.
          you.HON can-2SG the book read
          'You can read the book.'

     b.   Kunt/*kun u het boek lezen?
          can-2SG/can you the book read
          'Can you read the book?'

One may think that the non-impoverished form of modals should in fact be the only option in polite contexts. Given that modal-specific impoverishment rules are ordered before rules of the type in (82) (see (75)), [HON] will be present at the point that the modal impoverishment rules are active and hence should block their application because of the Russian Doll Principle. This cannot be correct, as the uninflected modal form can appear with polite subjects:

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(97) a.　U kan het boek lezen.
　　　　you.HON can the book read
　　　　'You can read the book.'
　　b.　Kan u het boek lezen?
　　　　can you the book read
　　　　'Can you read the book?'

A simple repair would be to adjust the optional rule in (67), so that it does not only delete [DIST], but also [HON] when present:

(98)　　　[DIST(–HON)] → Ø / [MODAL]-[PROX–__] (optional)

But there is something more interesting to be said here, as for many speakers *u kunt* 'you.HON can.2SG' is preferred over *u kan* 'you.HON can' in formal registers. This cannot be explained by saying that *kunt* itself is somehow marked as formal. After all, it is perfectly generally used in combination with the familiar pronoun *jij* 'you', which in formal registers is avoided. A better explanation would be to say that there is a difference in the form of the relevant impoverishment rule in formal and informal registers, as in (99).

(99)　　a.　　[DIST] → Ø / [MODAL]-[PROX–__] (optional; formal)
　　　　b.　　[DIST(–HON)] → Ø / [MODAL]-[PROX–__] (optional; informal)

As just explained, this implies that the only form that will appear with the polite pronoun *u* in formal registers is *kunt*. If correct, this is a second effect of the presence of [HON] in verbs. In informal registers, the alternation between *kan* and *kunt* obtains irrespective of politeness.

　　In conclusion, the agreement patterns found with polite pronouns show that there is full underlying identity between the person/number specification of subjects and that of verbal agreement, which includes [HON]. We have also seen that the absence of agreement weakening with polite pronouns falls out from the Russian Doll Principle, without any adjustment of the rule in (51).

8. *CONCLUSION*

In this paper we have developed a theory of phi-features and their realization that accounts for observations in three domains:

(i)　It derives the possible person inventory of natural languages.
(ii)　It explains why crosslinguistically 1-3 syncretisms are rare compared to 1-2 and 2-3 syncretisms.
(iii)　It is instrumental for an account of the range of agreement alternations and, consequently, shifts in syncretism in Dutch, the language used as a case study in this paper.

The account is based on the following core assumptions:

(a)　In languages with person agreement, the person specification of the verb is identical to that of the subject, even where this is not reflected by surface forms.
(b)　First, second and third person are composed of two features, [PROX] and [DIST]. [PROX] is shared by first and second person, while [DIST] is shared by second and third person (compare Kerstens 1993 and Halle 1997, among others).

(c) Phi-features can be seen as functions. Possible feature structures (that is, possible sequences of feature application) follow from the semantic specification of the features involved (see Harbour 2011b,c).

(d) Rules that operate on features (rules of impoverishment and spell-out rules) are sensitive to the order in which the functions represented by these features apply. We have expressed this in the Russian Doll Principle.

The assumptions in (b) and (c) underlie our account of the inventory of persons in singular and plural. The patterns in Dutch can be accounted for if (a)-(d) hold. Finally, the typological observation that 1-3 syncretisms are relatively rare follows from the same assumptions, but indirectly. If these assumptions are correct, then the logic of acquisition dictates that the most efficient strategy for learning the spell-out rules that realize phi-features in a particular language is to hypothesize that formal distinctions represent a contrast between first and third person. This strategy disfavours 1-3 syncretisms, because it makes them harder to learn.

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