Morphology and pro drop

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Summary

This paper examines the claim that pro drop, the possibility to leave out an argument from a clause, is related to morphological properties of the language allowing it. The fact that subjects can be left out in Italian but not English might be related to the fact that Italian is inflectionally rich. We will discuss a couple of language types that make such a link less straightforward, at least on first view. However, even for languages that allow pro drop in the absence of agreement (radical pro drop) and languages that allow or disallow pro drop in specific person/number contexts, or only with specific subject types, morphological properties have been proposed as relevant. We will evaluate these empirical claims and see what can be made of them theoretically. The conclusion will be that it is hard to shake off the impression that morphological properties are related to the pro-drop phenomenon, but that we are still far removed from an overall explanatory theory that (i) leaves no empirical holes and (ii) relates the different types of pro drop in a meaningful way.

Keywords

Consistent pro drop, radical pro drop, partial pro drop, paradigm, rich agreement, *pro*, expletives, generic *one*.

1. Introduction

In a language like Italian, it is possible to leave out the subject. This is in contrast to English, as the following examples show.

(1)   a.   (Io) parlo
                I speak.1SG
                'I speak'
        b.   *(I) speak

Italian, then, is a so-called pro drop ('pronoun drop') – or null subject - language, whereas English is not. A straightforward and plausible intuition that formed the starting point of a theoretical investigation of the phenomenon is that leaving out or not expressing the subject is made possible in Italian by the fact that it has rich subject agreement encoded on the verb (cf. Perlmutter 1971, Taraldsen 1978, Rizzi 1982). The agreement affixes, then, allow speakers to reconstruct the missing subject. As a consequence, languages with poor agreement, like English, have to overtly express the subject in order to create a grammatical sentence. It is this claim that is put central in this article. It is important to establish how far reference to observable morphological properties gets us in understanding the pro drop phenomenon, since this hypothesis holds the promise of accounting for the difference between Italian and English in a way that is not arbitrary but derivable from independent properties of these languages.

The chapter is divided in two parts. In section 2, we will discuss when pro drop appears to be possible, focussing on empirical issues. We will establish to what extent generalisations can be made that can serve as the scaffolding for a theory of pro drop. In section 3, we will consider some key answers to theoretical issues that have arisen in the attempt to account for the distribution of null subjects.

2. Empirical issues

The central question in this section is to what extent we can account for the absence of overt arguments (focussing on subjects, as we will see) by referring to morphological properties of the languages in question (section 2.1). Since in many well-studied languages the missing argument is a subject, most attention will be paid to non-overt subjects. We will see in section 2.2 that there are two language types that make it difficult to formulate a theory of pro drop exclusively relying on refference to verbal agreement properties. First of all, there are languages that allow null subjects but have no agreement at all (section 2.2.1). Secondly, there are languages that only partially allow null subjects, either in certain person/number environments (2.2.2), or only with certain subject types (2.2.3) Section 2.3 will then set the stage for the theoretical section.

2.1 The relation between null subjects and rich agreement
The classical observation about null subject languages is that the verb (usually) carries morphological affixes that express enough features to allow reconstruction of the missing subject. Whereas Italian has six different finite verb forms in the present tense paradigm, English has two. Danish has even less distinct affixes than English (it has only one) and as expected it does not allow subjects to drop.

(2)

Italian	inf. parl-are ('to speak')		English	inf. speak		Danish	inf. hør-e ('to hear')
1SG	parl-o		1SG	speak-Ø		1SG	hør-er
2SG	parl-i		2SG	speak-Ø		2SG	hør-er
3SG	parl-a		3SG	speak-s		3SG	hør-er
1PL	parl-iamo		1PL	speak-Ø		1PL	hør-er
2PL	parl-ate		2PL	speak-Ø		2PL	hør-er
3PL	parl-ano		3PL	speak-Ø		3PL	hør-er

Now, the question arises if we can define a lower bound on agreement systems that allow for null subjects. Before embarking on a definition of richness, we note two general aspects of this definition: (i) not all features of missing subjects must be recoverable and (ii) richness must be defined over paradigms. Let us look at these in turn.

Although Italian allows null subjects, the verb is not encoded for all the missing features of the subject. In the 3rd person, for instance, pronominal subjects often carry a gender feature but finite verbs in Italian are not marked for gender. Moreover, subjects are often marked for nominative case, a feature that is not encoded on the verb in pro drop languages. Apparently, the marking of person and number features is enough to license null subjects (contra Rosenkvist 2007:171). This provides us with a first ingredient for a lower

bound: null subjects are possible if agreement forms express person and number. Of course, a language can exceed this lower bound, but that cannot be part of the minimal requirement.

Second, it is not the case that the null subject option depends on the recoverability of the missing subject in a specific person/number context. For many of the standard examples discussed in the literature, having pro drop or not is an all or nothing situation hinging on the richness of the paradigm *as a whole*. Take a look at English, Icelandic and Dutch.

(3)

Icelandic	inf. heyra ('to hear')		Dutch	inf. horen ('to hear')
1SG	heyr-i		1SG	hoor-Ø
2SG	heyr-ir		2SG	hoor-t
3SG	heyr-ir		3SG	hoor-t
1PL	heyr-jum		1PL	hor-en
2PL	heyr-ið		2PL	hor-en
3PL	heyr-a		3PL	hor-en

Although none of these languages generally allow pro drop of argumental subjects on a par with e.g. Italian, all of them have unique affixes that would in principle be able to identify the missing subject. Dutch has one in the 1st person singular and English in the 3rd person singular. In Icelandic, there are unique affixes in most person/number combination, with the only exception the syncretic form that appears in the 2nd and 3rd singular environments. Nevertheless, it is not possible to generally drop arguments in these languages.

What distinguishes Icelandic from Italian is that it has one syncretic form appearing in two paradigm slots. Despite its relative richness, Icelandic is not a pro drop language. What this suggests, then, is that the presence of one syncretic form in the paradigm is enough to destroy the option of generally omitting argumental subjects. We will see that Icelandic allows a generic subject to be null but it is not what Holmberg & Roberts (2010) call a 'consistent pro drop' language, like Italian. Under this conclusion, then, the lower bound is distinctive person/number marking in all slots of the agreement paradigm. Indeed, it seems to be the case that many null subject languages have the paradigm structure of Italian, in which every person/number combination has a unique affix.

But here is where the plot thickens. Standard European Portuguese (EP) has a paradigm with a syncretic form for 2nd and 3rd plural contexts (Costa 2004:169):

(4)

European Portuguese	inf. cantar ('to sing')
1SG	cant-o
2SG	cant-as
3SG	cant-a
1PL	cant-amos
2PL	cant-am
3PL	cant-am

Yet it is a *consistent* pro drop language, i.e. a language that allows null subjects in every person/number context. In order to rule in EP as a null subject language, a less strict lower bound is required. But since Icelandic also contains one syncretism, therefore displaying five distinctions, merely counting the number of distinct affixes (or syncretic forms) will not give us maximal empirical coverage. In order to make progress, we therefore have to think about the structure of these paradigms, and the features that the forms contained in it express. In short, we need a theory. Tamburelli (2006) observes that the Icelandic paradigm contains a form that coincides with the infinitive, whereas EP lacks such a form. For the sake of being explicit, then, let's take the descriptive generalisation in (5) to be the temporary culmination point of this type of research:

(5)   *Consistent pro drop generalisation*
        A language has consistent pro drop if it has rich agreement, where 'rich' is defined as having at most one syncretism in the paradigm of person/number marking and no form similar to the infinitival form.

This generalisation looks like a bit of a jumble of course, and the question is whether we can make theoretical sense of it, the topic of section 3.

2.2 Two problematic language types

We will now discuss two language types showing that reference to (subject) agreement properties on the verb does not appear to be sufficient for generalising across pro drop languages. Most prominently, there are languages that have pro drop in the absence of any agreement, known as radical pro drop languages (section 2.2.1). In addition, there are languages that only partially allow pro drop. This group is rather heterogeneous, as we will see, and agreement properties have been taken as relevant for at least some of these cases (section 2.2.2).

2.2.1 Radical pro drop
Languages like Japanese and Chinese have no verbal agreement. Yet, leaving out the subject does not lead to an ungrammatical sentence (examples are from Neeleman & Szendrői 2007):

(6)   a.   siken-ni   otita   Japanese
                exam.dat   failed
                '*pro* failed the exam.'
        b.   kanjian he le   Chinese
                see   he LE
                '*pro* saw him.'

Given these languages, there are three positions one could take: (i) the link between pro drop and agreement is misdirected altogether, (ii) there are two types of pro drop, agreement-based and non-agreement-based, and they have nothing to do with one another (iii) there are two types of pro drop, agreement-based and non-agreement-based, but they can be related. Since most scholars believe that an understanding of the data discussed in

2.2 is correct at least in some shape or form, the discussion is mostly between (ii) and (iii), and this section will focus on that.

Let us start with position (ii), and the line of research concluding that the counter-examples to the agreement-based account of pro drop involve languages that display a qualitatively different phenomenon (Huang 1984; cf. Neeleman & Szendrői 2007 for an overview). A prominent argument for this is that a language like Chinese also allows non-subject pronouns to drop, such as objects, in contrast to agreement-based pro drop languages like Italian. For this reason, Chinese-style pro drop is sometimes referred to as 'radical pro drop', or 'discourse pro drop'.

This suggests, then, that the way languages satisfy the recoverability requirement is fundamentally different, either holding at the level of the clause (Italian) or at the level of the discourse (Chinese). If clause-level recoverability is required, rich subject agreement should be there to ensure this. Since verbs in Italian do not show generalized person and number agreement with the object, object drop causes ungrammaticality. In languages like Chinese, on the other hand, the recoverability requirement holds at the level of the discourse, so that the presence of rich agreement within the same clause is irrelevant. As a consequence, subjects and objects can be dropped alike, as long as they are recoverable from the discourse.

Let us now consider position (iii) and try to relate the two types of pro drop in a meaningful way. As a first question, one may wonder if having agreement and clause-level licensing are two sides of the same coin. In other words, does the former imply the latter, or do we also find languages with agreement (either rich or poor) that nevertheless display discourse-level licensing of dropped arguments? The former is of course suggested by e.g. English: although the language is too poorly inflected to allow for clause-level licensing, the language does not resort to discourse-level licensing because of that. It is as if the presence of *some* agreement blocks discourse licensing altogether.[1] The intuition that pro drop is possible if the language has either rich or no agreement, but not if it has poor agreement, was first expressed by Huang (1989). If this is correct, the typology would look as in (7):

(7) *Pro drop typology based on agreement*

Language type	Agreement		No agreement
	poor	*rich*	
Consequence	No pro drop	Clause-level licensing of pro drop	Discourse-level licensing of pro drop
Example	English	Italian	Chinese

This typology is not without empirical problems. Mainland Scandinavian languages (Norwegian, Danish and Swedish), as well as Afrikaans, do not have any person/number marking on the verb. Like English, however, they do not resort to discourse-level licensing. This shows that it is too simplistic to take discourse-level licensing to be the option languages switch to in the absence of agreement.

Instead of arguing for a negative quality that licenses radical pro drop (lack of agreement), Neeleman & Szendrői (2007) argue for a positive one, namely the presence of

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[1] We will ignore 'diary-drop' cases like *Didn't do it*, since such cases are restricted to first position (witness the ungrammaticality of *Yesterday, didn't do it*) and can be considered a restricted option within non-pro drop languages, often analysed as topic drop (cf. Huang 1984, Cardinaletti 1990 and Ackema & Neeleman 2007 for discussion and references).

pronouns that are agglutinating for case, plurality or some other nominal feature. Consider the following examples:

(8)   a.   Kare-ga kare-o settokusuru   Japanese
             he.NOM he.ACC persuaded
             'He persuaded him.'
      b.   Ta-men kanjian ta le   Chinese
             he.PL   see he
             'They see him.'

Japanese has transparent, agglutinative case morphology on pronouns, and Chinese has agglutinative number marking. This is in contrast to e.g. English, in which case and plural marking is fusional (*she* vs. *her* and *she* vs. *they*). This is related, Neeleman & Szendrői argue, to the fact that Japanese and Chinese have radical pro drop, in contrast to English.

If this is on the right track, two conclusions are warranted. First of all, it entails that radical pro drop is also related to morphological properties but crucially those of the pronouns rather than verbal agreement. Second, languages without agglutinative morphology on pronouns are predicted to not have discourse-level licensing of dropped pronouns, and clause-level licensing is all they can hope for. The agreement properties of the language then in turn determine whether pro drop is possible or not, and the empirical plausibility of this revolves around the debate we have seen in section 2.1. This typology is depicted in (9):

(9) *Pro drop typology based on agglutinative pronouns and agreement*

Language type	No agglutinating pronouns		Agglutinating pronouns
	Poor agreement	Rich agreement	
Consequence	No pro drop	Clause-level licensing of pro drop	Discourse-level licensing of pro drop

Fortunately, the typologies in (7) and (9) makes different predictions. First of all, (9) does not predict that Mainland Scandinavian and Afrikaans should have pro drop, since these languages lack the required agglutinative morphology. Second, according to (7), agreement should block discourse-licensed pro drop and we therefore expect no languages with rich or poor agreement and discourse-licensing of dropped arguments, including subjects. The typology in (9), on the other hand, expects that languages with agreement can have radical pro drop too, as long as they have agglutinating morphology on pronouns. At least for languages with poor agreement (in which not all person/number contexts are uniquely marked morphologically), the empirical data seem to support the typology in (9). Neeleman & Szendrői mention Wichita (O' Grady 1997, citing Rood 1976) and Kokota (Palmer 1999) as cases in point. Kokota, for instance, only has person agreement with subjects and no agreement with oblique arguments, but given the right discourse all arguments can be dropped. The existence of these languages therefore argues against Huang's generalization and the attempt to unify agreement-based and radical pro drop by relating both to agreement properties.[2]

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[2] Sato (2010) argues that Colloquial Singapore English has radical pro drop in the absence of agglutinative pronouns and therefore constitutes a counterexample to N&S's generalisation. It is not entirely clear what to make of the examples provided. Consider the following data:

It remains to be seen, however, if there are languages with rich agreement and radical pro drop, a possibility excluded by (7) but not by (9). One potential case is Russian. This language has agglutinative morphology on pronouns but only partly so (cf. Neeleman & Szendrői, citing Wade (1992)). At the same time, the status of Russian as a pro drop language is debated, with some scholars arguing that it does not allow pro drop (Franks 1995, Avrutin & Rohrbacher 1997), others arguing that it allows pro drop on a par with Spanish and Italian (cf. Müller 2005 and references), and others arguing that pro drop is in fact discourse-licensed (Perlmutter & Moore 2002). It is not entirely obvious, therefore, that Russian fits the bill.

2.2.2   Partial pro drop languages

Next to languages that either allow or disallow pro drop in all person/number contexts, there are languages that allow or disallow pro drop in specific person/number contexts. Although these languages do not necessarily refute any correlation between pro drop and agreement properties, as we will see, they are unexpected from the perspective of a paradigm-oriented approach, in which the paradigm as a whole determines whether a particular language has pro drop or not. There are then two ways to proceed. One is to give up generalisations that refer to the whole paradigm. In that event, we should look for new, paradigm-independent generalisations. Alternatively, we could rely on the paradigmatic approach to tell us what the unexpected cases are, including the ones mentioned above, and study these languages more closely to see if there are additional factors interfering with the general pattern. The literature seems to have generally chosen the second option (but see section 3.4), and below the main findings will be reported.

Let us first look at language varieties that should lack pro drop, given the generalisation in (5), but that nevertheless allow it in some contexts. This pattern is attested in a subset of the Germanic varieties; Frisian (De Haan 1994; Hoekstra 1997), Bavarian German (Bayer 1984; Weiß 1998; Fuß 2005), Zürich German (Cooper & Engdahl 1989; Werner 1999), and varieties of Dutch (de Vogelaer 2007). The following two examples, taken from Cooper & Engdahl (1989) and De Haan (1997) respectively, show pro drop in 2SG contexts:

(10)   a.   Wänn nach Züri chunnsch, muesch mi bsueche.   (Zürich German)
             when to Zürich come-2sg must-2sg me visit
             'When you come to Zürich, you must visit me'

(i)   After get some sickness, can't help it ('After <u>one</u> falls ill, <u>one</u> can't help it')
(ii)   I never try before ('I never tried <u>this</u> before.')
(iii)   Head very pain ('<u>My</u> head is very painful.')
(iv)   I got very kind mother. (She) look after the kids. ('I have a very kind mother. She looks after the kids.')

Example (i) involves drop of generic *one*, which we will see can also occur in languages without consistent pro drop (see section 2.2.3). Example (ii) without an overt object is not ungrammatical in Standard English either ('I tried before.'). Example (iii) contains a body part that belongs to the speaker, so that the need for an overt possessor may not be so prominent. Example (iv) involves subject drop from a first position, which could be analysed as diary drop (see footnote 1).

b.   Miskien moatsts my helpe   (Frisian)
        Perhaps must.2SG help
        'Perhaps, you should help me.'

There seems to be a relationship between pro drop and agreement in these varieties, in the sense that pro drop occurs in environments where the verb carries a unique agreement affix, i.e. an affix that only occurs in that environment (cf. Rosenkvist 2007). The most robust person/number context allowing for pro drop is 2SG and the verb carries a unique affix -st, or some form related to it, in German, Dutch and Frisian varieties. In some Bavarian dialects, the verb carries a unique -ds affix in 2PL contexts and pro drop is possible. In Lower Bavarian, the verb carries a unique -ma affix in 1PL contexts, and pro drop is possible as well (cf. Bayer 1984). In varieties without these unique affixes, pro drop is impossible in the same contexts. Rosenkvist shows that the generalisation can be extended to Ölvdalian Swedish. Whereas Standard Swedish has no person/number marking, Ölvdalian has person/number marking in the plural, uniquely marking each person. Pro drop occurs in 1PL and 2PL contexts (the former with some positional restriction). The fact that pro drop is absent from 3PL context is due to the fact that the affix is similar to the infinitival form, according to Rosenkvist.

The generalisation, then, seems to be that partial pro drop in these varieties requires a unique affix. It is not the case, however, that every unique affix licenses pro drop. Rosenkvist observes that in some varieties, 3SG contexts are uniquely marked with -t (for instance because in 2PL contexts -ds occurs instead of the -t that looks homophonous with the -t in 3SG contexts in Standard German). Nevertheless, pro drop does not occur in these 3SG contexts. Rosenkvist therefore concludes that the correlation is uni-directional: pro drop is only possible if there is a unique affix, but not every unique affix gives you pro drop. Bohnacker (2013) shows that Swabian, an Alemannic dialect, only has pro drop in 2SG contexts and is not a general option in 1SG and 3SG contexts, even though 3SG contexts are uniquely marked by -t and only 1SG contexts are uniquely marked by the stem.[3] She suggests that the similarity between 1SG verbs and imperatives might obstruct pro drop in 1SG contexts, and the fact that -t also occurs on participles may do the same for 3SG contexts but she seems ambivalent to make too much of the link with morphology.

There is another generalisation to be made here, however: pro drop is only possible in these Germanic varieties if the unique affix *always* appears in that particular context. In other words, one needs to look across tense paradigms and/or verb types to establish whether a particular person/number context allows for pro drop.[4] Take Frisian as an example. Whereas the 2SG affix -st always returns in the past tense, the 1SG -ø and 3SG -t

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[3] Although subjects can remain absent in 1SG and 3SG contexts, Bohnacker shows that pro drop only robustly occurs in 2SG (occurring in 61% of 2SG contexts versus 1.3% in 1st and 2.5% in 3SG neuter contexts). Moreover, 1SG subject drop seems lexically conditioned, mostly occurring with the verb *glauben* 'to believe', whereas 3SG neuter subject drop is a phonologically conditioned reduction. We can safely conclude that only 2SG pro drop reflects a pro drop property of the grammar.

[4] Hoekstra & Smits (1997) argue that complementiser agreement only appears in contexts in which agreement in the present and past tense is marked by the same affix. They do not relate this generalisation to pro drop (perhaps rightly so: recall in this respect that pro drop exists in varieties without complementiser agreement). Although we cannot imagine to be the first ones to relate this cross-paradigmatic generalisation to pro drop, we have not been able to find it mentioned explicitly in the literature.

forms, unique to those contexts in the present tense, do not reappear in the past tense. In fact, 1SG and 3SG become syncretic and merely express the past tense with the affix *-e*.

(11)

Frisian	(inf. *pakke* 'to take')	
	Present tense	Past tense
1SG	pak-ø	pak-te
2SG	pakk-est	pak-test
3SG	pak-t	pak-te
1PL	pakk-e	pakt-en
2PL	pakk-e	pak-ten
3PL	pakk-e	pak-ten

The consequence is that Frisian only has pro drop in 2SG contexts, in present and past contexts alike. Bavarian dialects generally do not have a past tense (they use a compound tense) except for the verb 'to be'. As can be established for Swabian (Ute Bohnacker, p.c.), 1SG and 3SG become syncretic in the past, whereas the 2SG affix *-sch* remains intact:

(12)

Swabian	(inf. *sen(t)* 'to be')	
	Present tense	Past tense
1SG	be	war
2SG	bisch	warsch
3SG	isch	war
1PL	sen(t)	waret
2PL	sen(t)	waret
3PL	sen(t)	waret

It is correctly predicted, then, that only 2SG contexts allow pro drop. Also Ölvdalian, which only allows pro drop in 1PL and 2PL contexts, fits this generalisation: in the past tense, the 1PL and 2PL affixes reappear, whereas 3PL contexts become syncretic with the singular (data from Angantýsson 2015):

(13)

Ölvdalian	(inf. *pakke* 'to take')	
	Present tense	Past tense
1SG	spil-är	spil-äð
2SG	spil-är	spil-äð
3SG	spil-är	spil-äð
1PL	spil-um	spil-äð-um
2PL	spil-ið	spil-äð-ið
3PL	spil-å	spil-äð

This cross-paradigmatic generalisation has two advantages over the first, uni-directional generalisation we discussed earlier. First of all, the fact that certain unique affixes

in the present tense do not trigger pro drop is now captured: having a unique affix in the present tense is a necessary but not a sufficient prerequisite. Second, we do not have to refer to infinitival, imperative and participial forms (as Rosenkvist and Bohnacker do) in order to block pro drop in present tense contexts that do not allow pro drop despite being uniquely marked.

Like the previous generalisation, however, it does not appear to work bi-directionally, and counterexamples can be found. Icelandic, for instance, has the same unique affixes for 1PL and 2PL contexts as Ölvdalian, *-(j)um -ið*, and these effortlessly reappear in the past tense too (although with a vowel change to *-uð* in the paradigm of *vera* 'to be'). Nevertheless, Modern Icelandic does not allow pro drop in these contexts (cf. Sigurðsson 1993, 2011). An even more prominent counterexample would be Standard German: although it has the robust *-st* ending in 2SG present and past contexts, pro drop is disallowed. This highlights an important fact about partial pro drop in Germanic varieties: it is predominantly a substandard phenomenon, in contrast to pro drop in for instance Romance languages. It is unclear how to characterise and capture this particular feature of Germanic pro drop exactly, but it is at least conceivable that Modern Icelandic patterns with Standard German, rather than Ölvdalian, in disallowing pro drop. If so, the Icelandic grammar would in principle allow pro drop in plural contexts (and the cross-paradigmatic generalisation therefore works bi-directionally) but extra-grammatical factors would block it. At the moment, it is unclear if this is a viable hypothesis and how evidence can be found to support it, but it may be worthwhile to look into the history of Icelandic further. Sigurðsson (2011: 276) notes that Icelandic has lost pro drop over time without significant changes in verbal morphology. This fact may either constitute an argument against the correlation between pro drop and morphology or highlight the existence of extra-grammatical factors.

Let us now turn to languages that are rich according to the definition in (5) but nevertheless only allow pro drop partially. Two languages that always come up in this context are Standard Finnish and Hebrew. Both languages disallow pro drop in 3rd person contexts, whereas they allow it in 1st and 2nd person contexts (data from Vainnika & Levy 1999:615).

(14) a. *Nousi   junaan
          step-PAST/3SG train-into
          (He/she) boarded the train.
      b. Nousin   junaan
          step-PAST-1SG train-into
          I boarded the train.

(15) a. *Ala   al ha-rakevet.
          stepped-PAST/3SGM on the train
          (He) boarded the train.
      b. Aliti   al ha-rakevet
          step-PAST/1SG on the-train
          I boarded the train.

This is surprising for Standard Finnish because it has six distinct affixes in the present tense. Hebrew only has agreement in the past and future tense (which is probably why pro drop is not an option at all in the present tense) but even there pro drop is restricted and does not

occur in 3rd person contexts, despite the existence of six distinct forms. The question, then, is what blocks 3SG/PL pro drop in these languages.

Here too, a morphological factor has been taken as relevant. Hakulinen (1979) notes for Finnish that 1st and 2nd person affixes are at least diachronically related to the current pronouns of the language. Vainikka & Levy argue that the same can be observed for Hebrew. You have to look through your eyelashes a bit, in the sense that the relationship is synchronically not completely evident for all person/numbers combinations, but there is an observable difference with 3rd person affix, which show no link to 3rd person pronouns whatsoever.

(16)   *Standard Finnish agreement morphology and pronouns*

	1SG	2SG	3SG	1PL	2PL	3PL
agreement	-n	-t	-V	-mme	-tte	-vAt
pronouns	minä	sinä	hän	me	Te	he

(17)   *Hebrew agreement morphology and pronouns*

	1SG	2SG.M	2SG.F	3SG.M	3SG.F	1PL	2PL	3PL
past agr	-ti	-ta	-t	0	-a	-nu	-tem	-u
future agr	e-	te-	te- -i	ye-	te-	ne-	te- -u	ye- -u
pronouns	ani	ata	at	hu	hi	anaxnu	atem	hem

It is possible, therefore, that the explanation for why 3rd person contexts lack pro drop must be built on this morphological observation.

2.2.3 Pro drop with specific subjects

There are languages that do not allow subjects to be dropped in general but nevertheless allow certain types of subjects to remain unexpressed in 3rd person contexts. These types include expletives and impersonal subjects like generic *one*. Finish and Icelandic allow both, but there is quite some variation as to exactly which types are allowed in specific languages (cf. Biberauer (2010), Sigurðsson & Egerland (2009) and Machulkov & Siewierska (2011) for discussion). Examples are given below ((19)b is from Sigurðsson & Egerland (2009), the other ones from Biberauer et al (2010)):

(18)   a.   Ulkona sataa   Finnish
             outside rains
             'It's raining outside.'
        b.   Í gær rigndi   Icelandic
             yesterday rained
             'It rained yesterday.'

(19)   a.   Kesällä herää aikaisin   Finnish
             summer.INE wake.PRS.3SG early
             'In the summer one wakes up early.'
        b.   Í þessari fjölskyldu má bara ekki drekka áfengi   Icelandic
             in this family may.3SG just not drink alcohol
             'In this family, one is simply not allowed to drink alcohol.'

Are these types of pro drop related to morphology in any way? Impressionistically, one can observe that Icelandic and Finnish are quite richly inflected (with the latter even meeting the generalisation in (5)). It may therefore not be a coincidence that Mainland Scandinavian languages for instance do not allow it. Considerably less work has been dedicated to relating these types of pro drop to morphological properties but there is one influential proposal by Jaeggli & Safir (1989). They argue that pro drop is possible if the paradigm for verbal inflection is morphologically uniform. A paradigm is morphologically uniform if every form is either inflectionally derived (and hence different) from the stem, or inflectionally underived. The Italian paradigm in (2) is an example of the former, whereas Chinese is an example of the latter, since it lacks inflectionally derived verbs. The English paradigm, on the other hand, is not uniform, as it contains a derived from and forms identical to the stem. It should be emphasised that Jaeggli & Safir's proposal was originally intended to distinguish between languages without *any* pro drop and languages with at least some, e.g. in 3rd person expletive or impersonal contexts. Hence, morphological uniformity licenses pro drop, according to these authors, but argumental (or 'consistent') pro drop also requires identification, either through rich agreement or the discourse. The proposal never intended to predict that a language like German should have argumental pro drop, although it has sometimes been interpreted in that way.

Jaeggli & Safir's proposal is reminiscent of Huang's proposal on argumental pro drop in the sense that the in-between languages are the ones disallowing pro drop (although expletive drop is not directly related to the notion richness). An interesting consequence of this proposal is that it captures the fact that expletive drop is pervasive in creole languages (see e.g. DeGraff 1996 for Haitian Creole; see also Nicolis 2008), and these often lack of inflectional morphology, which implies they are uniform.

The proposal runs into two empirical problems. First of all, there exist languages, like the Mainland Scandinavian languages Danish, Swedish and Norwegian, that are morphologically uniform (expressing finiteness and/or tense uniformly) but the correlates to (18)/(19) are ungrammatical (cf. Vikner 1995, Holmberg & Platzack 1995). Second, Dutch is an example of a language that is morphologically non-uniform (only the 1SG context coincides with the verbal stem) but allows drop of a *there*-type expletive:

(20)   Op straat wordt gevoetbald
        on street is   soccer-played
        'They play soccer on the street.'

The second problem may be less severe than the first, as there is a debate in the literature as to whether examples like (20) involve an expletive subject at all (cf. Bennis 1986 for a negative answer). The fact that Dutch does not allow pro drop of an *it*-type expletive, as with weather-verbs, or generic *one* may therefore be more relevant, and supports the generalisation under scrutiny.

2.3   Conclusion

We have looked at different types of pro drop: agreement-based pro drop, radical pro drop and partial pro drop, the latter covering a number of quite distinct languages allowing either argumental pro drop in specific number/person contexts or expletive/generic *one* drop.

Roberts and Holmberg (2010:12) conveniently place these types in a hierarchy, based of the 'liberality' of the dropping options:

(21)   expletive null subjects ⊃ partial null subjects ⊃ consistent null subjects ⊃ discourse
        pro drop

This section has provided concrete morphological properties that have been proposed as related to these distinctions. Discourse (or radical) pro drop requires agglutinative nominal morphology visible in pronouns, consistent (or agreement-based) null subjects require rich agreement under some definition, partial null subject languages require a morphological resemblance between subject agreement affixes and pronouns, whereas expletive and/or generic null subjects may require a morphological uniform paradigm.

        The kinds of morphological properties distinguishing the different types of pro drop are quite heterogeneous. This means that from a morphological point of view alone the overall picture we arrive at is far from clear, but there is certainly a scaffolding, or scaffoldings, on which to start theorizing.

3.   Theoretical issues

The literature on pro drop is enormous and the next pages cannot do any justice to it because they are very selective. We will limit ourselves to discussing those proposals that explicitly address the relation between pro drop and morphology and that add important ingredients to this overall discussion. What we will therefore ignore altogether is the line of research that tries to determine whether pro drop is part of a cluster of other properties that languages either have or not. See Roberts & Homberg & Roberts (2010) and D'Alessandro (2015) for recent discussions. We will treat consistent (3.1), radical and partial pro drop in turn, after which we will discuss the status of paradigms in current theorizing.

3.1 Accounting for agreement-based pro drop

We will first consider theoretical proposals on how to characterise consistent, agreement-based pro drop languages. Section 3.1.1 makes the point that some level of formalisation is necessary to account for the pro drop typology, and section 3.1.2 looks at some concrete examples. In 3.1.3 we look at some concrete proposal addressing the nature of the missing subject.

3.1.1 A functional or formal account?
A general question about pro drop is what triggers it. An obvious candidate is a Gricean-type maxim that requires the speaker not to be redundant. If in one sentence or discourse the same information is present twice, then one occurrence can be left out, up to recoverability. Several theoretical issues arise, however, and the seeds for these have already been planted earlier.

        First of all, the fact that the absence of gender marking does not seem to hinder 3rd person pro drop in agreement-based pro drop languages is not straightforwardly understood.

Second, the fact that we can understand pro drop in terms of a pragmatically-oriented principle of communication does not mean that we can settle for a naive functional account. Such an account would state that an argument can remain absent whenever it can be recovered on the basis of its linguistic context. However, that would both overgenerate and undergenerate, as we have seen. It overgenerates by expecting pro drop in languages that have poor agreement but nevertheless have affixes that are able to uniquely identify a missing subject. Despite the unique -s in 3SG person contexts in English no pro drop is allowed in this context. At the same time, such an account would undergenerate in that it would block pro drop in European Portuguese in those environments where the verb carries a syncretic agreement marker, contrary to fact. A solution to this problem, we have noted, is to say that richness (whatever the right formulation turns out to be) is determined by properties of the paradigm as a whole. This entails that the choice between dropping or not dropping arguments must be a formal property of the grammar, since it abstracts over the recoverability of the missing argument in specific person/number contexts. This formal property can for instance be conceived of as a binary parameter with two settings, the formulation of which will be looked at more closely in section 3.2.

This does not mean that functionality has no place in pro drop accounts. First of all, the intuition about what distinguishes Italian from English is essentially functional in nature, so that even a formal account can be said to have a clear functional grounding. Second, a formalisation in terms of parameters also leaves holes. As we have seen in section 2.3.2, there exist partial pro drop languages and these cross-cut the predictions of a parameter-type account. We find that poor languages can sometimes have argumental pro drop in certain person/number contexts (such as Frisian and German dialects). It is not unthinkable that these unexpected exceptions are more amenable to a functional account.

3.1.2 The nature of the licensing condition

There are countless proposals on how to formalise the observation that rich languages have pro drop whereas poor languages do not, but many of them, starting with Rizzi (1982), assume that agreement in an agreement-based pro drop language is 'pronominal' in some form or shape. This does not necessarily entail that they *are* pronouns: after all, they can co-occur with a (nominative) pronoun in the same clause. For this reason, rich agreement is often taken to express uninterpretable (or unvalued) person/number/(gender) features, for which the umbrella term 'phi-features' is used. Alternatively, rich agreement is taken to imply the presence of an uninterpretable D(eterminer)-feature that stand in an agreement relation with for instance the subject carrying the interpretable counterpart (as in Holmberg & Roberts 2010). In its standard conception, the difference between having or not having pronominal status for agreement depends on the agreement properties of the language, which has to be rich under some definition.

Suppose that richness is defined based on the generalisation in (5). The question is then how we could understand it. Tamburelli (2006) argues that a paradigm is rich if it unambiguously instantiates its formal features, and for this to happen it must realize each feature opposition morphologically. There must be forms that reflect the presence of [+speaker] and [-speaker], as well as forms that instantiate the [±addressee] and [±singular] opposition. To see how this works, let us contrast Italian (cf. (2)), European Portuguese (cf. (4)) and Icelandic (cf. (3)). Only the former two have consistent pro drop, and only the last two have a syncretic form. Merely counting the morphological distinctions will therefore not give the correct result. What sets apart Italian and EP from Icelandic, according to

Tamburelli, is that they unambiguously provide evidence for all the feature values. Assuming the features [αspeaker], [αaddressee] and [αsingular] (where α stands for a feature without a value), he provides the following analyses for Italian and EP are provided in (22):

(22)

Italian infinitive: parl-are			European Portuguese Infinitive: cant-ar		
	Form	*features*		*form*	*features*
1SG	parl-o	+sp, αad, +sg	1SG	cant-o	+sp, αad, +sg
2SG	parl-i	-sp, +ad, +sg	2SG	cant-as	-sp, +ad, +sg
3SG	parl-a	-sp, -ad, +sg	3SG	cant-a	-sp, -ad, +sg
1PL	parl-iamo	+sp, αad, -sg	1PL	cant-amos	+sp, αad, -sg
2PL	parl-ate	-sp, +ad, -sg	2PL	cant-am	-sp, αad, -sg
3PL	parl-ano	-sp, -ad, -sg	3PL	cant-am	-sp, αad, -sg

As can be observed, for every feature there is a form in the overall paradigm reflecting the positive and negative value. This is different in German and Icelandic because in addition to syncretic forms they have forms that are identical to the infinitive, and these receive no analysis for person/number features. The analyses are given below:

(23)

German infinitive: spazier-en			Icelandic Infinitive: seg-ja		
	Form	*features*		*form*	*features*
1SG	spazier-e	+sp, αad, +sg	1SG	heyr-i	+sp, αad, +sg
2SG	spazier-st	-sp, +ad, +sg	2SG	heyr-ir	-sp, αad, +sg
3SG	spazier-t	-sp, αad, βsg	3SG	heyr-ir	-sp, αad, +sg
1PL	spazier-en	-	1PL	heyr-jum	+sp, αad, -sg
2PL	spazier-t	-sp, αad, βsg	2PL	heyr-ið	-sp, +ad, -sg
3PL	spazier-en	-	3PL	heyr-a	-

As a consequence, neither German nor Icelandic has a form reflecting the [-addressee] feature so that the pro drop parameter will be negatively set and the languages will disallow consistent pro drop. The analysis succeeds in going beyond merely counting the different affixes and argues in a plausible way that the featural structure underlying these paradigms makes the right cut for those languages with one syncretic form. A potential weakness is that it has to assume for German that 3SG and 2PL -*t* forms are syncretic and not accidentally homophonic (*pace* Müller 2005): otherwise the -*st* versus -*t* contrast in the singular would provide the [-addressee] feature and we would predict consistent pro drop in German. This is not completely obvious because in the past tense these contexts can be distinguished, with 3SG carrying -*te* (*spazier-te*) and 2PL carrying -*tet* (*spazier-te-t*). It has to be assumed, then, that the same -*t* disappears in past tense singular but not in past tense plural contexts.

Most proposals on pro drop assume that the empty subject must be licensed, and rich agreement morphology on the verb is usually mentioned as the most important property taking care of this. There is an alternative school of thought, however, that argues for the hypothesis that in fact agreement on some functional head (I(NFL), AGR or T) must be licensed. Speas (1994) and Holmberg & Roberts (2010) take Huang's generalisation as a basis stating that pro drop is possible in those languages where agreement is either rich or non-existent. The idea is that the relevant functional head must contain a fully specified (or in minimalist terms, valued (see Chomsky 2000, 2001)) set of person and number features. If agreement on the verb already provides this full set (as in Italian) the subject can remain covert. If the language does not encode agreement at all on this functional head, such as in Chinese, there is no agreement to be licensed and therefore no subject has to be present either. This gives rise to radical pro drop. It is only in languages with poor agreement, therefore, that subjects have to be overtly present. In this way, the proposal aims to generalise over Italian-style and Chinese-style pro drop.

This proposal runs into a number of problems, noted by Neeleman & Szendrői (2007). First of all, it inherits the empirical problems raised by the generalization it is based on (see section 2.3.1): There are languages without agreement that still require the overt presence of a subject, such as Mainland Scandinavian languages and Afrikaans, and there are languages (like Wichita and Kokota) with poor agreement and radical pro drop. Second, the differences between clause-level and discourse-level pro drop are unexpected. It remains unclear, for instance, why a language like English does not have consistent object drop, given that the paradigm for object agreement is uniform (i.e., there is no morphological evidence for it).
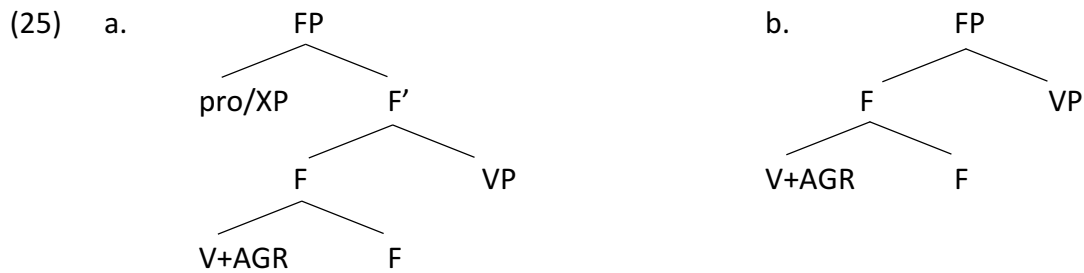
3.1.3 The nature of the empty argument

Under the assumption that in a sentence displaying pro drop the argument has been 'left out', several options arise as to what leaving out means exactly. The following positions have been defended in the literature:

(24)   a.   The empty constituent is a separate lexical entry, known as *pro*.
       b.   There is no empty constituent.
       c.   The empty category is a regular pronoun phonologically unexpressed.

For a scholar interested in morpho-syntax, this debate is relevant because it has repercussions for the morphological inventory of subject markers and their function in the clause. Position (24)a allows the existence of an empty subject pronoun that syntactically takes the same position as an overt one. The difference between Italian and English is then minimal: both have subjects agreeing with the verb but in Italian this subject can be empty. The appeal is in the syntactic uniformity we can uphold between these two languages. Position (24)b holds that *pro* does not exist. Under the assumption that clauses generally need a subject in the functional domain of the clause (a condition often referred to as the Extended Projection Principle (EPP), cf. Chomsky 1981), we could argue that in a pro drop language agreement on the verb – which after all is 'pronominal' – satisfies this requirement (cf. Borer 1986; Alexiadou & Anagnostopoulou 1995, among others). The uniformity achieved under position (24)a is then lost, because what counts as the subject is distinct

between languages. The gain, however, is in not having to postulate an invisible subject.[5] Omitting a lot of details, we can structurally represent the different positions as follows:

(25) a.

```
              FP
            /    \
       pro/XP     F'
                /    \
               F      VP
             /   \
         V+AGR    F
```

b.

```
              FP
            /    \
           F      VP
         /   \
     V+AGR    F
```

Position (24)a argues that the presence of some constituent is required as the specifier of FP to ensure grammaticality, as in (25)a, whereas position (24)b argues that the structure without a specifier is grammatical as is (cf. (25)b). Empirically, arguments go both ways. Barbosa (2009) argues on the basis of a comparison between European and Brazilian Portuguese that the former (a consistent pro drop language) has no obligation to move a constituent to specFP, in line with (25)b. Pinto (1997) and Sheehan (2010), on the other hand, argue that an investigation into wide and narrow focus in a number of Romance pro drop languages leads to the conclusion that there must be an empty constituent in specFP. See the references for further details.

It is less clear if position (24)c has serious implications for a morpho-syntactician. Under this view, the empty subject is just a regular pronoun, the only difference being that it does not receive phonological content at the relevant level (Perlmutter 1971). Especially in a grammatical model in which insertion of morpho-phonological forms follows after the creation of morpho-syntactic representations (Halle & Marantz 1993; Embick & Noyer 2007), this can be naturally stated. For Holmberg (2005, 2010), who offers an analysis along these lines, the impetus of this proposal is conceptual. In current approaches to agreement relations, agreement features are not only uninterpretable but their values have to be provided by a constituent carrying interpretable features (cf. Chomsky 2000, 2001 for details). Hence, a subject provides values (say, 1st person and singular) to the agreement feature on some functional head in the clausal spine. Under the assumption that *pro* is an empty subject, however, the pro drop phenomenon cannot be treated along the same lines: in the traditional conception, *pro* needs to be identified by rich agreement and not the other way round. One can of course assume that the grammar of Italian contains different *pro*s, one for every person/number context, thereby enriching the lexicon with six additional pronouns. This, however, is conceptually awkward. Under the assumption that am empty

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[5] It is often observed that what looks like an overt clause-initial subject in a pro drop language (such as *Gianni* in *Gianni parla* 'Gianni talks') actually behaves like a left-dislocated constituent (cf. Barbosa 1995), so that the structure is not as in (ia) but as in (ib):

(i) a. [FP Gianni parl-a]
         Gianni talk.3SG
         'Gianni talks.'
     b. [FP Gianni [PF *pro* parl-a]]

This can be construed as an argument in favour of position (24)b: If Gianni is not the subject, then agreement on the verb is. However, the empirical facts can also be derived by assuming that using a pro subject is not an option but in fact the rule. In that case, *Gianni* cannot occupy the structural subject position.

subject is a regular, fully specified pronoun but just not pronounced, it can value the uninterpretable agreement features just like in English and no problem arises. Relevant for the present discussion is also that for a pronoun to remain unpronounced it has to be there in the first place. Therefore, position (24)c is at odds with position (24)b.

3.2 Accounting for radical pro drop

Languages with pro drop in the absence of agreement have for some time been taken to reflect a different kind of phenomenon, with consequences for the analysis of the empty arguments. The fact that identification of empty arguments relies on the discourse could be related to the general "discourse-prominent" nature of these languages (cf. Tsao 1977).

Huang (1984) treats empty arguments as variables bound by zero topics that are available in discourse-oriented languages. Although Huang relates the possibility of an empty subject to the absence of agreement, he does not explain why this should hold. In addition, the availability of zero topics follow from a parameter setting that distinguishes discourse-oriented from sentence-oriented languages. This parameter is logically independent from agreement properties, so that the link between radical pro drop and agreement is only indirect.

Saito (2007) treats pro drop as a case of ellipsis. He argues that at the level of Logical Form an argument from the discourse must be copied into the elided position. If this LF copy has all its features checked in the clause it was copied from, its copy cannot partake in Agree relations with syntactic heads that trigger those relations. Under the perhaps somewhat controversial assumption that English generally establishes agreement with all nominal arguments, although this is only morphologically visible with subjects, whereas Japanese doesn't (because it lacks agreement altogether), LF copying will create a problem in English but not in Japanese. In this way Saito derives a correlation between not having agreement and radical pro drop, Huang's generalisation.

We have seen, however, that Huang's generalisation, the basis of Huang's and Saito's approaches is not empirically flawless. This brings us to the alternative morphological generalisation languages that have radical pro drop and allow missing arguments from a clause to be recoverable from the discourse: they have pronouns with agglutinative nominal morphology (Neeleman & Szendrői 2007). The question is then why this morphological correlation would hold.

Neeleman & Szendrői follow Holmberg (2005) in assuming that pro drop is the result of not spelling out a regular pronoun. In addition, they follow Weerman & Evers-Vermeul (2002) in assuming that morpho-phonological forms can target non-terminal nodes, including whole phrases. If these assumptions are combined, the pro drop rule can be formulated as the zero spell-out rule in (26):

(26)   [$_{KP}$ +pronoun -anaphor] $\Leftrightarrow$ 0

Now, in a language where nominal properties such as person, number or case are fusional and spelled out as one overt morpho-phonological form, the spell-out rule responsible also targets the entire syntactic structure. In (27), the rule is provided that leads to the insertion of *he* in English:

(27) $[_{KP}$ +pronoun -anaphor, 3, SG, MASC, NOM] ⇔ /he/

Since (27) is a more specific rule than (26) in that it realises more features of the syntactic structure, (27) will block (26) in compliance with the Elsewhere Principle (Kiparsky 1973). The result is that English does not have radical pro drop, since the relevant rule can never apply.

Why, then, is radical pro drop possible if the language has agglutinative morphology on pronouns? This is because these languages have morpho-phonological forms that spell out subparts of the syntactic structure of a pronoun. Take Japanese, which has a form to spell out a masculine 3rd person pronoun but also a form to spell out nominative, as illustrated in (28):

(28) a. $[_{NP}$ +pronoun, -anaphor, 3, SG, MASC] ⇔ /kare/
      b. $[_K$ nom] ⇔ /ga/

These forms can then be combined to create a nominative-marked masculine pronoun, *kare-ga*. Assuming a structure for pronouns in which KP (the case phrase) dominates NP, we can say that (28)a targets the head of the KP and (28)b targets the NP. Crucially, the rules in (28) do not block application of (26). The reason, Neeleman & Szendrői state, is that (26) has its own specificity. It is more specific than the rules in (28) in that it spells out a larger piece of structure. This is comparable to the situation in English where $[_V$ GO [+PAST]] is spelled out as *went* by a rule that targets the whole structure, thereby blocking the regular past tense rule (*go-ed*), which would target the terminals. The rules in (28), on the other hand, are more specific in that they mention features of the syntactic representation that (26) does not mention. Given this situation, the result is that the spell-out procedure cannot determine what the most specific spell-out of a Japanese pronoun is overall, and therefore both are possible. In short, Japanese allows radical pro drop, because there is no rule that categorically blocks application of (26).

An attractive feature of this analysis, apart from the link with observable morphology, is that it makes the difference between radical and agreement-based pro drop minimal. They do not involve distinct phenomena, as both are the result of zero spell-out. The only difference is that that the zero spell-out rule in Japanese and Chinese is more radical because it is not context-sensitive. In Italian, on the other hand, (26) needs to include reference to rich agreement properties, as in (29).

(29) $[_{KP}$ +pronoun -anaphor, Φ_i] ⇔ 0/___[Φ_i]

Another advantage is that it immediately captures the fact that radical pro drop languages can drop arguments, not just subjects. The fact that empty arguments must be discourse-licensed is not so much an integral property of the analysis but a logical consequence: if zero spell-out is not triggered by a rule mentioning rich agreement in the same clause, as in Italian, then the only way of identifying the content of the null arguments is via the discourse.
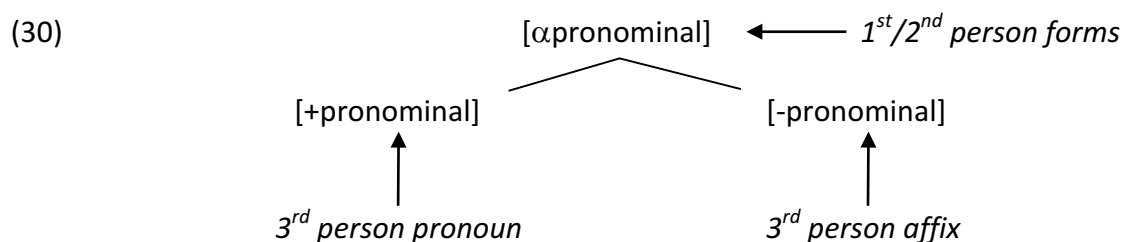
3.3 Accounting for partial pro drop

Section 3.3.1 takes a look at restricted argument drop in Germanic varieties, Standard Finnish and Hebrew. Section 3.3.2 briefly looks at drop of expletives and generic 'one'.

3.3.1 Pro drop in restricted person/number contexts

We have seen two distinguishable language types with restricted argument drop: (i) languages that are not rich according to (5) but nevertheless have pro drop in some contexts, observable in e.g. Germanic varieties, and (ii) languages that are rich according to (5) but nevertheless have only restricted pro drop in 3rd person contexts, like in Standard Finnish and Hebrew.

As for (i), we observed that pro drop seems to be an option if a particular context always comes with a unique affix. This means that pro drop is not a property that is paradigmatically set for the language as a whole but set for specific contexts, distinguishing it from consistent pro drop languages like Italian and Spanish. Not much attention has been devoted to this distinction, and how to characterise it, but see section 3.4 for some ideas.

As for (ii), we noted that Vainikka & Levy (1999) capitalise on the fact that in Standard Finnish and Hebrew agreement morphology in 1st and 2nd person contexts resembles that of 1st and 2nd person pronouns. They argue that these languages have two parameter settings, one leading to pro drop in 1st and 2nd person contexts and one blocking it in 3rd person contexts (see the paper for their structural implementation). Although this derives the basic facts, it remains unclear how the distinct parameter settings should be tied to the observation of morphological resemblance between 1st and 2nd person pronouns and agreement markers, as they themselves admit (Vainikka & Levy L 1999: 645). After all, Italian and Spanish have pro drop in the absence of such resemblances. Koeneman (2006) argues that this resemblance reflects a diachronic stage in which the paradigms for pronouns and agreement affixes in these two languages are intertwined, with 1st and 2nd person affixes being part of both. This is indicated in (30) by α, indicating an unspecified value for the feature [pronominal].

(30)

$[\alpha\text{pronominal}] \longleftarrow$ *1st/2nd person forms*

$[+\text{pronominal}]$ $[-\text{pronominal}]$

$\uparrow$ $\uparrow$

3rd person pronoun   *3rd person affix*

Since 1st and 2nd person forms at this stage are underspecified for this feature, they can either co-occur with a pronominal subject or replace them, leading to a pro drop pattern. The 3rd person affixes, on the other hand, are [-pronominal] and therefore resist pro drop. Since there is merely a resemblance and not an identity relation between 1st and 2nd person pronouns and agreement markers nowadays, 1st and 2nd person pronouns have been added to the list of [+pronominal] items in the meantime but without destroying the overall structure, so that the partial pro drop pattern remains. Alternatively, one could analyse the morphological differences between 1st and 2nd person pronouns and affixes as allomorphic. Either way, the analysis accounts for partial pro drop by making direct use of the morphological resemblance. It needs to assume, however, that forms are mentally stored as

a paradigm, with consequences for the grammar, and it is this assumption that has been challenged, as we will see in section 3.4.

3.3.2 Expletive and generic 'one' drop

Recall that Jaeggli & Safir argue that languages with a morphologically uniform paradigm are predicted to have pro drop (section 2.2.3). This may not always be fully-fledged argumental pro drop (which requires further identification) but languages like German and Icelandic at least allow expletive drop, the former with *there*-type expletives (*es* in German) and the latter with *it*-type of expletives in weather-predicates (*Það* in Icelandic). It remains unclear, however, why morphological uniformity would have the exact consequence it has, namely the dropping of expletives or generic pronouns. Hence, to the extent that the morphological generalisation is successful, a theoretical explanation is pending.

A possibly relevant generalisation is brought in by Holmberg & Roberts (2010). They note that a consistent pro drop language like Italian does not allow generic pro drop but uses an overt pronoun instead. Icelandic (not a consistent pro drop language), however, can use a covert one.

(31)   a.   Si può controllare questo macchinario con una mano sola   Italian
              SI can-3SG control-INF this machine with one hand only
              'One/*he can operate this machine with one hand.'
   b.   Nú má fara að dansa   Icelandic
              now may begin to dance
              'One may begin to dance now.'

This shows that in order to understand null subjects we should not only look at properties of the agreement system but also study licensing within a pronominal paradigm. If in 3rd person contexts specific subjects are always realized, as in German and Icelandic, this might paradigmatically license a null subject for non-specific contexts. Since pro drop languages can systematically drop specific subjects, a non-specific one must be overtly realised. The question then is how and when these different types of licensing can interact such that the facts follow.

One prominent question is how to account for the difference between languages with expletive and/or generic 'one' drop and a language like English, which lacks this property. Impressionistically, Icelandic and German are more richly inflected than English, but this begs the question why this would be relevant. The fact that expletive drop can occur in agreement-less creole languages, such as Haitian Creole, makes this question even more urgent. Given the heterogeneity of the languages allowing either expletive or generic 'one' drop (rich like Standard Finnish, relatively rich like Icelandic, or poor like Haitian Creole), it is far from obvious that morphology has anything to offer on this point.

3.4 The notion of a paradigm

Bobaljik (2003) discusses the status of the notion 'paradigm' in current minimalist theorising and concludes that it should not have any. Under the assumption that morpho-phonological forms are inserted after the syntactic representation has been created (Halle & Marantz 1993; Embick & Noyer 2007), different morpho-syntactic features can lead to different spell-

outs. The forms spelling out these features can be conveniently put together into something we call a paradigm, but this paradigm is epiphenomenal and has no grammatical status. The rules of grammar can therefore not refer to it. This of course makes it more difficult to derive paradigmatic effects: The idea that a subject pronoun can be dropped in a particular context *because* the whole paradigm is rich, simply cannot be stated as such.

In fact, many analyses of pro drop explicitly or implicitly rely on the paradigm. Take Rizzi's original proposal holding that a language like Italian has pronominal agreement, in contrast to English, which has been repeatedly recast into more modern terminology (such as Holmberg & Roberts's (2010) [D]-feature on the head of the Tense Phrase). Either Italian has this property as a consequence of the rich paradigm that it has (and this certainly was the initial intuition), or this property is simply arbitrary. In the first case, reference to the paradigm as a whole is at least implicit. In the second case, reference to morphology is abandoned and the difference between Italian and English is not derived but stipulated. As a consequence, the fact that Italian is rich and English poor would ultimately be a coincidence. Also Tamburelli's proposal discussed in 3.1.2 requires inspection of the feature system of the whole paradigm before it can be established whether pro drop in any person/number context is an option.

A proposal on pro drop that maintains reference to morphology but explicitly tries to circumvent mention of the paradigm is Müller (2005). He argues that if a language shows a systematic syncretism in its morphological paradigm, this is indicative of an operation, known as impoverishment rule (cf. Bonet 1991), that deletes a feature in the morpho-syntactic component. The result is that a less specific form is spelled out. German has at least two systematic syncretisms that are amenable to such an analysis: the syncretism between 1PL and 3PL contexts and the one between 1SG and 3SG contexts in the past, and these justify the postulation of impoverishment rules in the grammar of German. The consequence of such impoverishment, Müller argues, is that it destroys the licensing relation between an empty pronoun, *pro*, and the (impoverished) agreement features on the Tense head. Since a language like Italian does not display any system-wide syncretisms, it must lack system-wide impoverishment rules too. Therefore, *pro* can always enter into an agreement relation with T and get licensed. Hence, Italian has pro drop but German does not.

Although the paradigm indeed plays no role in the analysis, it comes at a cost. A language that, like German, has system-wide impoverishment does not necessarily have impoverishment in all person/number contexts. In German, the 1SG and 3SG contexts become syncretic in the past but not in the present tense, where the contexts remain unaffected by impoverishment. In Icelandic, impoverishment can be applied in singular contexts, leading to 2SG-3SG syncretism in the present, and 1SG-3SG syncretism in the past tense. At the same time, no syncretism can be observed in plural contexts, neither in the present or past tense. In order to block argumental pro drop categorically from German and Icelandic, i.e. also in contexts where no impoverishment can be assumed, and in order to do so without reference to the paradigm, Müller stipulates that the impoverishment rules are not triggered by the features they mention but always apply to the T-head. In Icelandic plural contexts, for instance, the impoverishment rules referring to the [singular] feature apply 'vacuously' in plural contexts as well, and this is enough to block pro drop altogether. The consequence of this is that the proposal is only as strong as the stipulation it rests on, and one may wonder how attractive it is to allow untriggered, vacuous application of rules.

A related approach perhaps worth pursuing is to take partial argumental pro drop languages as a starting point. Remember that in a number of Germanic varieties pro drop

was possible because morphologically a context, e.g. 2SG, is uniquely marked across paradigms. One might therefore pursue what Müller proposes but then for specific person/number contexts: the 2SG context allows pro drop because it is never targeted by impoverishment rules (although, as noted earlier, the fact that Standard German does not allow pro drop in these contexts requires an independent explanation). One could then argue with Müller that non-impoverishment is what generally characterises the Romance languages. Any context that is not affected by impoverishment in principle allows pro drop, and Romance languages simply have more of those. In this way, impoverishment is a crucial component, but no vacuous application is required to derive consistent presence or absence of pro drop.

In remains to be seen how far this alternative would take us. Like Müller's original proposal, it runs into some empirical difficulties. European Portuguese, for instance, has systematic impoverishment in the plural (cf. (4)) yet allows consistent pro drop. In addition, 1st and 3rd person agreement is syncretic in the past, and nevertheless pro drop is possible here (Pekka Posio, p.c.). And as Holmberg (2010:113) notes, Finnish does not have any system-wide impoverishment, and yet pro drop is limited in 3rd person contexts. All in all, it is not entirely clear at the moment how to close the holes in an approach to pro drop that does not allow reference to paradigmatic properties.

4. Discussion

An ideal theory of pro drop is one that derives the phenomenon in a non-arbitrary, non-stipulative way, and explains exactly how different types of pro drop are related. At the moment, such a theory does not exist. We have seen that reference to morphology in order to keep arbitrariness out of the door, is very useful for different types of pro drop and it is hard to shake off the impression that morphological properties are fundamentally involved. Two critical remarks are in order, however.

First of all, many empirical facts have been left undiscussed, such as the interesting differences between European and Brazilian Portuguese (cf. Barbosa 2009, Sheehan 2006), the question of whether colloquial French is a consistent pro drop language or not (cf. Roberts 2010 and Koeneman & Zeijlstra 2014 for recent discussions and references), the status of VSO languages like Irish, etcetera. And there is an almost unavoidable focus on Indo-European languages, for which the link with morphology has been studied the longest (cf. Gilligan 1987 for a broader empirical overview). This means that the empirical picture is incomplete.

Second, reference to morphology is unlikely to provide the whole picture, as it now stands. This is already brought out by the fact that it is hard to formulate perfect generalisations and, to the extent this is possible, the number of languages that have led to certain formulations (take (5) as a concrete example) is quite small. Hopefully, an enlargement of the empirical base will lead to significant progress on this point.

Third, it is important to state again that this paper does not in any way provide an exhaustive overview of the pro drop literature. Given the topic of this volume, as well as space limitations, we have deliberately focused on literature that tries to make sense of correlations with morphology that have been noted in the literature. An extensive comparison with theories that do not refer to morphology in any direct way, or that explicitly argue against this, is therefore needed in order to obtain a more complete picture.

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