

Radical Pro Drop and the Morphology of Pronouns

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We propose a new generalization governing the crosslinguistic distribution of radical pro drop (the type of pro drop found in Chinese). It occurs only in languages whose pronouns are agglutinating for case, number, or some other nominal feature. Other types of languages cannot omit pronouns freely, although they may have agreement-based pro drop. This generalization can for the most part be derived from three assumptions. (a) Spell-out rules for pronouns may target nonterminal categories. (b) Pro drop is zero spell-out (i.e., deletion) of regular pronouns. (c) Competition between spell-out rules is governed by the Elsewhere Principle. A full derivation relies on an acquisitional strategy motivated by the absence of negative evidence. We test our proposal using data from a sample of twenty languages and *The World Atlas of Language Structures* (Haspelmath et al. 2005).

Keywords: pro drop, agreement, pronouns, spell-out rules

1 The Problem

The generalization that pro drop is conditioned by rich agreement allows for a very attractive theory that reduces variation in the syntax to variation in the lexicon. The central idea is that languages allow pro drop to the extent that their verbal agreement paradigm expresses the ϕ -features necessary for local recovery of the content of dropped arguments (see Taraldsen 1978, Rizzi 1982, 1986, and Koenenman 2000, among many others). The generalization is mainly based on European languages: richly inflected languages like Italian, Spanish, and Greek allow subject drop; but English, Dutch, and Swedish, which are poorly inflected, do not.

Earlier versions of this article were presented during departmental colloquia at Utrecht University (2005), Leiden University (2005), the University of Amsterdam (2005), Boğaziçi University (Istanbul, 2006), and the University of Southern California (Los Angeles, 2006). Other presentations were given at the DGfS meeting (University of Siegen, 2007), the Essex-York Morphology Meeting (University of Essex, 2004 and 2007), the EGG Summer School (Wrocław, 2005, and Olomouc, 2006), WCCFL 24 (Simon Fraser University, Vancouver, 2005), GLOW in Asia (Jawaharlal Nehru University, Delhi, 2005), the workshop ‘‘Structure of Parametric Variation’’ (Newcastle, 2005), the conference ‘‘Sounds of Silence: Empty Elements in Syntax and Phonology’’ (Tilburg, 2005), and TABU (Groningen, 2005). We thank audiences and colleagues for valuable comments, questions, and help in writing this article. We especially thank Hagit Borer, Miriam Butt, João Costa, Junji Hamamatsu, Daniel Harbour, Martin Haspelmath, Anders Holmberg, Murat Kural, Julie Ann Legate, Marika Lekakou, Shakuntala Mahanta, Jan Mohammad, Valéria Molnár, Bill Palmer, Maren Pannemann, David Pesetsky, Elizabeth Ritter, Taylor Roberts, Andrew Simpson, Natasha Slioussar, Roberta Tedeschi, Hans van de Koot, Tonjes Veenstra, Jean-Roger Vergnaud, Reiko Vermeulen, Fred Weerman, John Whitman, and two anonymous *LJ* reviewers. The research reported here was partially supported by AHRC Research Grant 119403. The second author would also like to acknowledge financial support from the Dutch Science Foundation (NWO) (VENI grant 048.011.047) for the research carried out during her time at the Utrecht Institute of Linguistics.

Further evidence for the link between agreement and pro drop comes from language-internal variation. Pashto data can be used to illustrate the point. This language displays split ergativity conditioned by tense. In the present, it has a nominative-accusative pattern of case marking, and, as expected, the verb agrees with the nominative subject rather than the accusative object. In the past, Pashto is ergative-absolutive, and the verb agrees with the absolutive object rather than the ergative subject. As the data in (1) show, pro drop is possible exactly when the argument in question agrees with the verb (see Huang 1984:536; agreeing arguments are italicized). There is further language-internal evidence for the relation between agreement and pro drop, for instance in Hebrew (see Vainikka and Levy 1999).¹

- (1) a. (Zə) manna xwr-əm. Pashto
 I.NOM apple eat-1.SG
 ‘[I] eat the apple.’
 b. Zə *(manna) xwr-əm.
 I.NOM apple eat-1.SG
 ‘I eat [the apple].’
 c. *(Maa) manna wə-xwarr-a.
 I.ERG apple PERF-ate-3.F.SG
 ‘[I] ate the apple.’
 d. Maa (manna) wə-xwarr-a.
 I.ERG apple PERF-ate-3.F.SG
 ‘I ate [the apple].’

An agreement-based theory of pro drop faces difficulties with languages like Japanese and Chinese, which lack agreement and nevertheless allow pro drop. In fact, pro drop in these languages seems to be more widespread than in Italian-type languages: any pronominal argument can be omitted. The literature refers to this phenomenon as *radical pro drop*, *rampant pro drop*, or, perhaps most frequently, *discourse pro drop*. It is illustrated in (2) and (3). (The Chinese data are from Huang 1984:533, 563.)

- (2) a. ∅ siken-ni otita. Japanese
 exam-DAT failed
 ‘pro failed the exam.’

¹ Abbreviations used in this article are as follows. 1/2/3: 1st/2nd/3rd person; ACC: accusative; ADD: addressee; ART: article; CL: classifier; DAT: dative; DEM: demonstrative; DU: dual; EMPH: emphatic; ERG: ergative; EXCL: exclusive; F: feminine; GEN: genitive; IMM: immediacy marker; INCL: inclusive; INSTR: instrumental; INVIS: invisible; KIN: kinship marker; LMT: limiter; LOC: locative; M: masculine; N: neuter; NOM: nominative; NT: neutral; O: object agreement; OBL: oblique; PAR: participant; PAST: past tense; PERF: perfect; PL: plural; PM: predicate marker; PRES: present; PROG: progressive; PRT: particle; RL: realis; S: subject agreement; SG: singular; SPC: specific referent suffix; SPEC: specific; TR: transitivity marker; U: unmarked; VIS: visible; VOC: vocative.

- b. Bill-ga \emptyset settokusuru.
 Bill-NOM persuades
 ‘Bill persuades pro.’
- c. [\emptyset mimi-ga] nagai.
 ear-NOM long
 ‘pro’s ears are long.’
- (3) a. \emptyset kanjian ta le. Chinese
 see he LE
 ‘pro saw him.’
- b. Ta kanjian \emptyset le.
 he see LE
 ‘He saw pro.’
- c. Zhangsan, [\emptyset baba] hen youqian.
 Zhangsan father very rich
 ‘Zhangsan, pro’s father is very rich.’

One reaction to these data is to give up on the connection between pro drop and agreement. But such a move would amount to abandoning what insight we have in favor of descriptivism. It is more desirable to develop a theory that maintains the agreement-based account where it seems relevant, but allows pro drop in the absence of agreement under certain well-defined circumstances. There are at least three proposals in the literature that attempt to do so. We discuss these in section 2, arguing that all three have serious shortcomings. We propose a new theory of radical pro drop and its crosslinguistic distribution in sections 3 and 4.

What sets our proposal apart from competing theories is that it focuses on the pronominal paradigm. While many researchers have looked at the relevance of agreement for pro drop, none have considered whether the nature of pronouns has a role to play in allowing omission of arguments in languages like Japanese and Chinese. Our proposal is based on the generalization that a language will allow radical pro drop only if its personal pronouns are agglutinating for case or some other nominal feature.

(4) *Radical-Pro-Drop Generalization*

Radical pro drop requires agglutinating morphology on pronouns.

Thus, the morphological characteristics of the pronominal paradigm determine whether radical pro drop is allowed. In languages that do not have an agglutinating pronominal paradigm, omission of pronouns is possible, but only in the presence of rich verbal agreement. This proposal thus maintains the idea that variation in the lexicon may determine variation in syntax.

We should point out that our proposal does not address the pragmatic conditions under which pro drop can take place in discourse. Rather, we intend to find out what grammatical characteristics give rise to radical pro drop and what typological predictions can be derived from them. A full theory of pro drop requires an additional pragmatic component that governs the use of null

pronouns in languages whose grammar allows them. Ariel's (1990) Accessibility Theory would be a candidate. However, there are many other proposals in the literature that bear on this aspect of radical pro drop, and evaluating them is beyond the scope of this article.

2 Three Earlier Proposals

2.1 *Radical Pro Drop Involves Topic Drop*

A first attempt at explaining why pro drop can take place in the absence of agreement can be based on the phenomenon of topic drop. In many Germanic languages, elements that have moved to sentence-initial position can be deleted (if mentioned in the previous discourse). Some Dutch examples are given in (5).

- (5) a. \emptyset_1 ken ik t_1 niet. Dutch
 know I not
 'I don't know pro.'
- b. \emptyset_1 ken t_1 hem niet.
 know him not
 'pro don't know him.'
- c. \emptyset_1 had ik gedacht dat ik morgen t_1 zou zien.
 had I thought that I tomorrow would see
 'I thought that I would see pro tomorrow.'

In non-sentence-initial position, deletion is ruled out, even if the appropriate discourse conditions are met. Thus, examples like (6a–c) are ungrammatical.

- (6) a. *Ik ken \emptyset niet. Dutch
 I know not
 'I don't know pro.'
- b. *Hem ken \emptyset niet.
 him know not
 'pro don't know him.'
- c. *Ik had gedacht dat ik morgen \emptyset zou zien.
 I had thought that I tomorrow would see
 'I had thought that I would see pro tomorrow.'

Topic drop is clearly different from, and independent of, the type of pro drop found in languages like Italian (the latter does not rely on movement). This provides an opportunity for explaining away radical pro drop in languages like Japanese and Chinese as a case of topic drop. If this can be done successfully, the link between genuine pro drop and rich agreement need not be severed. The traditional analysis of Italian-style pro drop can be maintained as part of a more elaborate theory of argument omission. This brings us very close to the proposal in Huang 1984.

Huang proposes a theory of empty arguments based on two parameters: one allowing zero topics, the other allowing silent pronominal arguments. The former are subject to conditions on

movement. The latter are subject to a fairly standard theory of recoverability: they must be locally bound by either a DP argument or rich agreement. In pro-drop languages with rich agreement, such as Italian, pro can appear in the specifier position of any finite IP, as desired. In pro-drop languages with poor or no agreement, such as Chinese, pro can only appear as the subject of an embedded clause, bound by an argument of the matrix clause. All other null arguments in languages like Chinese must be accounted for by the setting of the second parameter: they must be zero topics.²

Although we agree with the claim that radical pro drop depends on a second parametric factor, there are contrasts between topic drop and radical pro drop that in our view prevent unifying the two. In particular, Germanic topic drop shares crucial properties with movement: just as no constituent can be moved out of a subject or adjunct, so no topic contained in a subject or an adjunct can be deleted. We illustrate this for Dutch in (7).

- (7) a. \emptyset_1 ken ik [alleen dat boek van t_1]. Dutch
 know I only that book of
 ‘I only know that book of pro.’
 b. * \emptyset_1 heeft [alleen die vriend van t_1] een bijdrage geleverd.
 has only that friend of a contribution made
 ‘Only that friend of pro has made a contribution.’
 c. * \emptyset_1 heb ik Jan [alleen tijdens een lezing van t_1] gezien.
 have I Jan only during a lecture of seen
 ‘I have seen Jan only during a lecture of pro.’

As it turns out, there is no such parallel behavior when it comes to radical pro drop. Nakamura (1991) shows that empty arguments in Japanese can appear inside relative clauses (see (8)). In contrast, extraction out of relative clauses is systematically ruled out. Hiraiwa and Ishihara (2002) show that in clefts, for example, focus movement out of a relative clause is impossible (see Saito 1985 and Takezawa 1987 for related discussion of the islandhood of relative clauses for topicalization and *tough*-movement).

- (8) a. Watasi-wa [[moo \emptyset yonda] hito]-ni aimasita yo. Japanese
 I-WA already read person-DAT met PRT
 ‘I already met someone who read pro.’
 b. John-ga mada [[Mary-ga \emptyset okutta] tegami]-o yonde-inai.
 John-NOM yet Mary-NOM sent letter-ACC read-has.not
 ‘John hasn’t yet read the letter that Mary sent pro.’

² The main observation that underpins Huang’s theory is that, in Chinese, a dropped object in an embedded clause resists binding by the matrix subject. Such an interpretation is allowed for overt pronouns, suggesting that a dropped object is not a pronoun. However, as Huang points out, the relevant construal is not always ungrammatical. Huang concludes from this that certain discourse factors may override grammatical principles in Chinese, but not in English. We would like to propose a different interpretation of the restriction under discussion—namely, as a pragmatic principle, thus maintaining the autonomy of syntax.

Contrasts between the distribution of pro drop and movement have been observed before. In fact, Huang notices that radical pro drop does not always have movement properties in Chinese and proposes that in such cases pro drop involves a base-generated empty category bound by a null operator. This might be true, but it amounts to giving up the original analysis, as the base-generated empty category in question cannot empirically be distinguished from a silent pronoun.

2.2 *Poor Agreement Must Be Licensed*

A second theory that reconciles radical pro drop with an agreement-based account of pro drop in languages like Italian has been developed by Speas (1994, 2006). The basic idea is that poor agreement, rather than pro, must be licensed. When I^0 contains ϕ -features that lack a specification, values must be provided through the specifier-head relation. Since pro lacks ϕ -features, it cannot act as a licenser, and hence languages with poor agreement do not allow insertion of this element. Rich agreement is fully specified and consequently does not need a licenser. Therefore, null subjects are allowed in languages like Italian. Finally, if there is no agreement, there is nothing to be licensed, which means that pro can appear in subject position in languages like Japanese. Thus, Speas derives the generalization that null subjects occur in the context of either very rich agreement or no agreement at all (this generalization goes back to Jaeggli and Safir 1989).

Although Speas's proposal is attractive, it faces various problems. To begin with, it is not general enough. As noted above, radical pro drop can apply to any argument, not just the subject. This might follow, given that Japanese lacks object agreement as well as agreement between nouns and possessors. However, the same is true for most European languages, which typically do not permit object drop or possessor drop. Of course, technical solutions are not inconceivable, and have in fact been developed in Speas 1994, 2006. But, to the extent that these solutions are successful, they inevitably weaken Speas's account of subject pro drop, because they undermine the basic claim on which it rests.

The problem repeats itself for subjects in languages like Swedish, Norwegian, and Afrikaans. These languages lack verbal agreement but disallow null subjects. Speas accounts for the lack of pro drop in Swedish by arguing that the language does not entirely lack agreement. It has some agreement in noun phrases, as well as between adjectival predicates and their subjects. This suggestion is not without problems, however. First, a theoretical link between pro drop and nominal or adjectival agreement is lacking, at least for the moment. Second, there are residual empirical problems. Afrikaans lacks agreement altogether and still does not allow pro drop. Moreover, as an anonymous reviewer points out, Malayalam is like Swedish in lacking verbal agreement and having some agreement in NP, but unlike Swedish in allowing radical pro drop (notice that Malayalam pronouns are agglutinating; see Geethakumary 2002).

In fact, the claim that poor agreement blocks pro drop is incorrect as well. As pointed out by O'Grady (1997:87) and Butt (2001), there are languages that allow pro drop in the presence of agreement affixes that are not fully specified for ϕ -features. One example that O'Grady mentions is Wichita (quoting Rood 1976). Another example is Kokota (an Oceanic language described in detail by Palmer (1999)). Here, richness of agreement differs across arguments: object agreement is specified for person and number, subject agreement is merely specified for person, and there

is no agreement with oblique arguments. Nevertheless, as Palmer shows, all arguments can be dropped if the right discourse conditions are met.

Crucial for present purposes is subject drop, which takes place in the presence of poor agreement. The partial discourse in (9) makes clear that the subject dropped in the (b) example is interpreted as third person singular. Note that it is indexed by the affix *-e*.

- (9) a. . . . n-e hage gobilologu, Kokota
 RL-3.S ascend Gobilologu
 ‘. . . Gobilologu went up,’
 b. kai gilai n-e la toke-i bla \emptyset mane n-e-ke seha-n-lau.
 LOC until RL-3.S go arrive-3.SG.O LMT man RL-3.S-PERF climb-that.N-SPC
 ‘until pro reached that man who was climbing.’

The partial discourse in (10) features a null subject in the third person plural, apparently associated with the same underspecified agreement marker *-e*.³

- (10) a. Tetu-ña ira naitu toke nogoi. Kokota
 stand-IMM the.PL devil arrive VOC
 ‘The arriving devils stood up, man!’
 b. g̃-e toḡla-ni $\emptyset \emptyset$ n-e-ke-u.
 NT-3.S chase-3.SG.O RL-3.S-PERF-be.thus
 ‘pro chased pro.’

These data suggest that Speas’s proposal cannot be upheld.

2.3 Radical Pro Drop Is Blocked by Determiners

In a paper mainly concerned with the semantics of null arguments across languages, Tomioka (2003) suggests a new perspective on radical pro drop.⁴ Simplifying considerably, we can summarize the proposal as follows. According to Tomioka, what underlies radical pro drop is that languages (almost) universally allow deletion of NP. In a language that lacks determiners, this operation will give rise to phonologically unrealized arguments (and hence radical pro drop). In a language that has determiners, these will be stranded by NP-deletion. This might not be possible in some languages—for example, because the determiner is a phonological clitic. But irrespective of this, NP-deletion cannot create null arguments in a language with determiners, as overt material will remain after NP-deletion. The following empirical generalization thus emerges from Tomioka’s work:

- (11) All languages that allow radical pro drop allow (robust) bare NP arguments.

³ One way of dealing with Kokota would be to deny that the subject agreement endings are unspecified for number. They would carry only a fully specified person feature. But this would predict that languages with fully specified number, but no person agreement, should also allow subject drop, contrary to fact (see Trosterud 1989 on Hallingdalen Norwegian).

⁴ The main point of Tomioka’s paper concerns the interpretation of null arguments in radical-pro-drop languages. Some relevant discussion of this issue can be found in section 3.2.

Assuming that DP-deletion is conditioned by rich agreement, along the lines of the classical pro-drop parameter, a full typology of null arguments can be drawn up.

- (12) a. Italian-style pro drop ⇒ Rich agreement, obligatory determiners
 b. No pro drop ⇒ Poor/no agreement, obligatory determiners
 c. Radical pro drop ⇒ i. Rich agreement, optional/no determiners, or
 ii. Poor/no agreement, optional/no determiners

Although elegant, Tomioka's proposal must be rejected for various reasons. To start with, it is unclear to us why, of all the material that can adorn NP, only D would block radical pro drop. Various radical-pro-drop languages require certain functional heads to be present in the extended nominal projection. In standard Japanese and Korean, for example, NPs must be accompanied by a case particle (with some minor exceptions). Tomioka predicts that these would be stranded by NP-deletion, as in (13a), but this is not the case, as shown in (13b).

- (13) a. * \emptyset -ga subete-no hon-o yon-da. Japanese
 NOM every-GEN book-ACC read-PAST
 b. \emptyset subete-no hon-o yon-da.
 every-GEN book-ACC read-PAST
 'pro read every book.'

In addition, the generalization in (11) is not without exceptions. There are languages that allow pro drop in the absence of agreement and that require referential NPs to be accompanied by determiners. Oceanic again provides the crucial example. Palmer (2003) describes the syntax of Cheke Holo in considerable detail. He shows that the language allows every argument to be omitted, even if the predicate does not agree with it. For instance, the subject is dropped in (14a), although no corresponding agreement marker appears on the verb. Nevertheless, Cheke Holo has determiners, even on proper names, as (14b) shows. To the best of our knowledge, these obligatorily accompany definite count nouns.

- (14) a. Wasi gu \emptyset pohe are. Cheke Holo
 wash EMPH clothes those
 '[She] washes the clothes.'
 b. Richard *(na) e tusu mei radio *(na) ka iara.
 Richard ART PM hand.OVER come radio ART to me
 'Richard handed the radio to me.'

3 Our Alternative: Pro Drop as a Spell-Out Phenomenon

The discussion in the previous section shows that the crosslinguistic distribution of radical pro drop is still poorly understood. We will now explore a different approach, based on the idea that the possibility of radical pro drop in a given language depends on the nature of its pronominal paradigm. More specifically, as stated in (4), we believe that a language may drop pronouns if it has at least some agglutinating pronominal morphology. In the absence of such morphology,

pro drop is blocked. In Japanese, for example, case morphology is agglutinating: the pronominal stem *kare* in (15a) is accompanied by separate case morphemes (*-ga* and *-o*). Chinese has an agglutinating plural marker *-men*, which attaches to pronominal stems like *ta* ‘he’ in (15b).

- (15) a. *Kare-ga kare-o settokusuru.* Japanese
 he-NOM he-ACC persuades
 ‘He persuades him.’
- b. *Ta-men kanjian ta le.* Chinese
 he-PL see he LE
 ‘They saw him.’

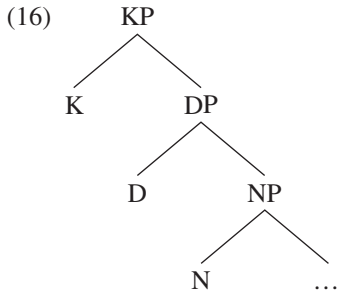
In contrast, languages in which case on pronouns is fusional do not permit radical pro drop, nor do languages whose pronouns fail to express case distinctions and are fusional for number. English is an example of the former type of language. Its pronouns are fusional for case, as *He saw him* shows. Hence, English pronouns cannot be omitted. Jamaican Creole is an example of the latter type, as illustrated by *Dem/Im neva sii dem/im* ‘They/He never saw them/him’. Pronouns in this language do not show case distinctions and express number by suppletion. As in English, omission of pronouns is impossible.

The correlation between the morphology of pronouns and the availability of radical pro drop can be derived from three independently motivated assumptions. First, as originally argued by Perlmutter (1971), null arguments are regular pronouns that fail to be spelled out at PF, rather than instantiations of a special silent lexical item, *pro* (Holmberg (2005) adopts a similar position for Finnish null pronouns). Second, as argued by Weerman and Evers-Vermeul (2002), spell-out rules for pronouns may target nonterminal nodes, as well as terminals. Finally, potential competition between different spell-out rules is regulated by the Elsewhere Principle (see Kiparsky 1973 and subsequent work). We discuss these assumptions in turn in sections 3.1–3.3, after which we sketch our proposal in section 3.4 and sharpen the typological predictions in section 3.5 using an acquisitional strategy motivated by the lack of negative evidence.

3.1 *Pronominal Spell-Out*

Let us start by discussing the nature of spell-out rules for pronouns. For concreteness’ sake, we assume as shown in (16) that the extended nominal projection consists of an NP, dominated by a DP, which is in turn dominated by a KP (or Case Phrase). The hypothesis that there is a DP goes back to Abney 1987 and has been widely adopted. Motivation for KP can be found in Bittner and Hale 1996 and Neeleman and Weerman 1999, among others. It is conceivable that there is some crosslinguistic variation in the make-up of the extended nominal projection, but we take KP and NP to be universal.⁵

⁵ It is not crucial for our purposes that KP is universally available. What is important is that the zero spell-out rule refers to the highest extended nominal projection available in any given language. This is not unimportant, as it has been argued that nominative and absolutive arguments lack a case layer (see, e.g., Nichols 1986, Bittner and Hale 1996, Neeleman and Weerman 1999). As for the universality or otherwise of the D layer in pronouns, see Noguchi 1997, where it is argued that Japanese pronouns like *kare* ‘he/him’ lack this layer.



There is general agreement that in an ordinary referential noun phrase like *the old man*, the phonological units *the*, *old*, and *man* correspond to terminal nodes. In theories that posit *en bloc* lexical insertion of semantic, syntactic, and phonological material, this is the only possibility. Phonological units cannot be associated with nonterminal nodes. This is different in theories based on ‘late spell-out’ (see Sproat 1985, Halle and Marantz 1993, Jackendoff 1997, and many others). In such theories, syntactic terminals do not contain phonological information; rather, syntactic representations are associated with phonological material in a mapping procedure at the PF interface. They therefore allow spell-out not only of terminal nodes, but also of larger chunks of structure.

Of course, the idea that a single phonological unit may represent a nonterminal node has been around for a long time. For example, the contrast between *the student from Amsterdam* and *the one from Rotterdam* and the ill-formed **the student of physics and the one of chemistry* can be explained by assuming that *one* realizes N', rather than N (see Radford 1988). More recent proposals relying on the phonological realization of nonterminal categories have been developed by Weerman and Evers-Vermeul (2002) and by Michal Starke in unpublished work.

Weerman and Evers-Vermeul (2002) argue that pronouns often correspond to chunks of structure larger than D or N. The evidence they provide is partly based on Dutch possessive pronouns. Regular possessive pronouns seem to realize D, as shown in (17). The possessive pronoun *mijn* ‘my’ and the determiner *de* ‘the’ are mutually exclusive, but *mijn* does not block the insertion of other material that can normally appear in the extended nominal projection. Hence, it cannot be said to spell out a projection of D, as that would block realization of the NP *mooie boek* ‘beautiful book’ (because any projection of D contains NP).

- (17) a. *Mijn mooie boek is gestolen.* Dutch
 my beautiful book is stolen
 ‘My beautiful book has been stolen.’
 b. **De mijn mooie boek is gestolen.*
 the my beautiful book is stolen
 c. **Mijn de mooie boek is gestolen.*
 my the beautiful book is stolen

Dutch has a second type of possessive pronoun whose distribution suggests that it spells out NP.

As (18a–b) show, *mijne* must cooccur with a determiner; as (18c) shows, its presence blocks realization of material that can normally be part of NP.⁶

- (18) a. De mijne is gestolen. Dutch
 the mine is stolen
 ‘Mine has been stolen.’
 b. *Mijne is gestolen.
 mine is stolen
 c. *De mijne mooie boek is gestolen.
 the mine beautiful book is stolen

In nonstandard varieties of Dutch, there is an additional possessive pronoun that corresponds to DP. Its presence excludes not only insertion of a determiner, but in fact insertion of all DP-internal material.

- (19) a. Mijnes is gestolen. Dutch
 mine is stolen
 ‘Mine has been stolen.’
 b. *De mijnes is gestolen.
 the mine is stolen
 c. *Mijnes mooie boek is gestolen.
 mine beautiful book is stolen

On the basis of these data, we cannot ascertain whether *mijnes* spells out DP or KP. The fact that it does not have separate forms for nominative and accusative might suggest that it does not realize case, and therefore spells out DP (compare (19a) and (20)). However, since syncretism of nominative and accusative forms is very common, it might also be that *mijnes* spells out KP.

- (20) Ik ben mijnes kwijt. Dutch
 I am mine lost
 ‘I have lost mine.’

Weerman and Evers-Vermeul suggest that personal pronouns like *hem* ‘him’ correspond to KPs. They cannot be combined with any other material normally hosted by DP, as (21a–c) illustrate, and they vary in form depending on their case, as shown by (21d).

- (21) a. Ik heb hem gisteren nog gezien. Dutch
 I have him yesterday still seen
 ‘I saw him only yesterday.’
 b. *Ik heb de hem gisteren nog gezien.
 I have the him yesterday still seen

⁶ Note that spell-out of nonterminal nodes does *not* imply that these nodes have no internal structure. Hence, syntactic evidence for the internal structure of items like *mijne* is fully compatible with the claim that *mijne* realizes NP.

- c. *Ik had hem aardige jongen gisteren nog gezien.
 I have him nice guy yesterday still seen
- d. Hij is vertrokken.
 he is left
 ‘He has left.’

If we accept Weerman and Evers-Vermeul’s proposal, the Dutch paradigm for personal pronouns consists of a set of spell-out rules that distinguish between KPs on the basis of their ϕ -feature composition. For example, *hem* is introduced by the spell-out rule in (22).⁷

$$(22) [\text{KP} + \text{p}, - \text{a}, 3, \text{SG}, \text{M}, \text{ACC}] \Leftrightarrow / \text{hem} / \quad \text{Dutch}$$

Although the idea that pronouns stand for complete nominal phrases is quite intuitive and was part of traditional grammar as well as early generative grammar, it is not uncontroversial. Since Postal 1969, personal pronouns have been analyzed as occupying the D position. The main evidence for this is based on expressions like *us guys*, in which a pronoun seems to take an NP complement. However, various linguists have argued that this conclusion is incorrect and that the relation between *us* and *guys* is more like apposition than complementation. In fact, the presence of a determiner in a comparable expression like *we the people* seems to force such an analysis (see Bhat 2004:50–52 and Weerman and Evers-Vermeul 2002 for relevant discussion). All in all, we think that the distributional evidence in Dutch and English favors an analysis of personal pronouns as spelling out KP rather than D.

3.2 *Pro Drop as Zero Spell-Out of Regular Pronouns*

Given what we have said so far, a natural way of analyzing pro drop is to assume that null arguments are regular pronouns in syntax that fail to be realized at the PF interface. Thus, radical-pro-drop languages would have the spell-out rule in (23).

$$(23) [\text{KP} + \text{p}, - \text{a}] \Leftrightarrow \emptyset$$

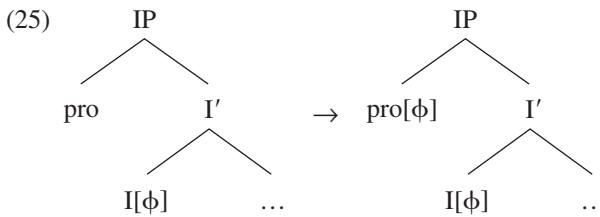
The way the rule in (23) is formulated is meant to capture the fact that pro drop cannot affect nonnominal arguments (such as PPs and CPs), adjuncts, or reflexives. The evidence showing that reflexives cannot be dropped is very simple: *zibun* ‘self’ cannot be omitted in (24) without a loss of the example’s reflexive interpretation. It requires more space to show that nonnominal arguments and adjuncts do not permit pro drop, and we will therefore have to refrain from doing so here.

- (24) Taroo-ga *(zibun-o) semeta. Japanese
 Taro-NOM self-ACC blamed
 ‘Taro blamed himself.’

⁷ We use the features [$+\text{p}(\text{ronominal})$, $-\text{a}(\text{naphoric})$] to indicate that KP is a pronoun. We are not committed to these particular features. What is important for our account is that pronouns can be distinguished from other nominal categories, such as R-expressions and anaphors.

An analysis of pro drop in terms of spell-out ties in with recent work by Holmberg (2005) and I. Roberts (2005). Holmberg argues that omitted pronouns must carry a full set of ϕ -features. This is compatible with an analysis based on a rule like (23), but incompatible with the claim that pro drop results from the insertion of a special silent pronoun, pro. He presents the argument in terms of minimalist checking theory (see Chomsky 2001), but we believe it holds more generally.⁸

If there were a special silent pronoun, it could not have valued ϕ -features, as its interpretation would vary depending on context. At the same time, it seems reasonable to assume that pro would have to receive a ϕ -feature specification in the course of the derivation, since it is interpreted as a referential argument. It is often assumed that in languages like Italian the features of pro are provided by the agreement on the verb. An analysis along these lines implies that ϕ -features are copied to pro (or that pro has an underspecified set of ϕ -features, whose values are copied).



The copying operation in (25) is incompatible with principles that regulate the way structures are built in minimalism. In particular, the Inclusiveness Condition requires that the properties of a terminal node be recoverable from the lexicon and that the properties of a nonterminal node be recoverable from the structure it dominates (see Chomsky 1995, Neeleman and Van de Koot 2002). Copying information from I^0 to pro violates Inclusiveness, as pro acquires features from a node that it does not dominate.

Holmberg (2005) points out that there are two general types of analyses of agreement-related pro drop that adhere to minimalist assumptions. First, one could assume that pro does not exist and that the information in I^0 is interpreted as the subject (see Weerman 1989, Barbosa 1995, Alexiadou and Anagnostopoulou 1998, Ackema 1999, Platzack 2004). The alternative is to assume that omitted pronouns carry a full set of ϕ -features, and one natural implementation of this idea is to adopt an analysis of pro drop as zero spell-out of regular pronouns. Otherwise, one would have to postulate a different covert pronoun for each overt one, thus unnecessarily multiplying the number of lexical entries. Holmberg shows that the first approach must be rejected for Finnish. The empty pronoun blocks expletive insertion, showing that it occupies the specifier of IP (see also Hakulinen 1975, Holmberg and Nikanne 2002). The first approach must also be rejected for languages like Japanese and Chinese, which lack agreement altogether. Thus, adopting it for languages like Italian requires dramatically different accounts of radical and agreement-related pro drop. In the absence of very strong evidence to the contrary, this seems to us an unattractive

⁸ Holmberg's argument is based on the idea that feature checking is valuation of unvalued features. Crucially, the uninterpretable ϕ -features of the verb are unvalued; hence, these would have to be valued by pro, but this element does not have a full set of ϕ -features.

proposal, and we therefore opt for an analysis of both radical and agreement-related pro drop as zero spell-out of regular pronouns.⁹

It has been observed that omitted arguments sometimes behave like regular NPs, rather than pronouns. In Japanese, structures like (26b) are ambiguous. The strict reading is unproblematic, but the sloppy reading seems to require an empty category with more internal structure than a deleted pronoun would have. In particular, it requires that the elided category contain a covert possessor. But pronouns, whether overt or covert, do not have possessors.

- (26) a. Mary-wa zibun-no kuruma-o aratta. Japanese
 Mary-WA self-GEN car-ACC washed
 ‘Mary washed her car.’
 b. John mo \emptyset aratta.
 John also washed
 i. ‘John washed Mary’s car too.’ (strict)
 ii. ‘John washed John’s car too.’ (sloppy)

If examples like (26b) involve pro drop, the availability of the sloppy reading would falsify an account of pro drop as zero spell-out of regular pronouns. However, Hoji (1998) and Whitman and Moriyama (2004) argue convincingly that the sloppy reading of such examples is *not* due to pro drop; rather, it is due to ellipsis of a nominal category.¹⁰ Crucially, null arguments can get a sloppy interpretation only if some kind of parallelism constraint is met. For instance, if the example in (26a) is followed by a nonparallel structure, as in (27), only the strict reading is available. Sensitivity to parallelism is of course typical of ellipsis, not pro drop.

- (27) Atode John-wa \emptyset notta. Japanese
 afterward John-WA rode
 i. ‘Afterward, John rode in Mary’s car.’ (strict)
 ii. *‘Afterward, John rode in John’s car.’ (sloppy)

The fact that a sloppy reading is excluded where ellipsis is not possible suggests that pro drop should be analyzed as zero spell-out of regular pronouns. After all, overt pronouns do not allow sloppy readings either in the relevant contexts.¹¹

⁹ Holmberg’s analysis of agreement-related pro drop is slightly different from ours, in that he analyzes (the relevant subset of) null arguments as pronominal structures smaller than regular pronouns (ϕ Ps rather than DPs). A more dramatic difference concerns pro drop in languages like Japanese and Chinese, which he analyzes as involving an underspecified empty pro-form. This is possible because these languages lack agreement, and therefore the problem illustrated in (25) does not arise. This proposal potentially faces the same empirical problems as that of Speas (1994, 2006), who also links radical pro drop to the absence of agreement (see section 2.2).

¹⁰ Otani and Whitman (1991) suggested that ellipsis of a remnant VP was involved, an analysis that had to be abandoned in the light of evidence in Hoji 1998 and Kim 1999.

¹¹ An account distinguishing ellipsis from pro drop has a further advantage. It explains why reflexives can be omitted in parallel structures, but not elsewhere. The rule in (23) does not permit pro drop of anaphors; but, like other nominal categories, anaphors can undergo ellipsis.

Note that the claim that pro drop is deletion of regular pronouns does not imply that overt and covert pronouns are identical in all respects. There is an obvious phonological difference. Therefore, where a pronoun cannot be destressed, it also cannot be dropped. Focused pronouns thus resist omission, as do pronouns in coordinate structures. What circumstances require phonological realization of a pronominal is a matter of debate, but it is clear that under the present proposal, contrasts between overt and covert pronouns must be attributed to pragmatic considerations.

3.3 The Elsewhere Principle

The third and final assumption that underlies our account of radical pro drop is the Elsewhere Principle. This principle was introduced into generative grammar by Kiparsky (1973), although it has a rich history predating the Chomskyan turn. It can be formulated as follows:

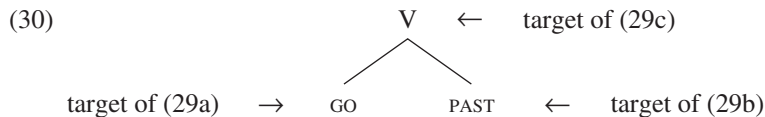
- (28) Let R_1 and R_2 be competing rules that have D_1 and D_2 as their respective domains of application. If D_1 is a proper subset of D_2 , then R_1 blocks the application of R_2 in D_1 .

The notion of ‘rule’ that the Elsewhere Principle relies on includes single operations as well as sets of operations. Suppose, for example, that some structure S is to acquire some property P . Then, any two sets of operations that add P to S will be in competition (all else being equal).

The Elsewhere Principle has two well-known implications with respect to the phonological realization of syntactic structures. The first is that, all else being equal, it favors spell-out of a category C over spell-out of the categories contained in C . This can be demonstrated using the irregular past tense of verbs like *go*. The following relevant spell-out rules are part of the English lexicon:

- (29) a. $GO \Leftrightarrow /go/$ English
 b. $PAST \Leftrightarrow /-ed/$
 c. $GO + PAST \Leftrightarrow /went/$

Given these rules, the structure in (30) can be assigned two different phonological realizations. If we apply the rule in (29c), the resulting form will be */went/*; if we apply the rules in (29a) and (29b), we arrive at the ungrammatical **/go-ed/*.



The Elsewhere Principle rules out the regular past tense of *go*. This is because any verb allows a past tense in *-ed*, but only *go* allows a past tense *went*. Put differently, the domain of application of the rule for the past tense of *go* is properly included in the domain of application of the rule for the regular past tense. It therefore takes priority. This result holds generally: all else being equal, spell-out of a higher-level category will involve a more specific rule than spell-out of the categories contained in it. It will therefore be favored over spell-out of lower-level categories.

A second implication of the Elsewhere Principle is that it gives preference to a phonological realization of a category C that spells out more of C's features over a phonological realization that spells out fewer features. As an example, consider the spell-out rules for person agreement in German.

- (31) a. [_{PERSON} PAR] ⇔ /e/ German
 b. [_{PERSON} PAR, ADD] ⇔ /st/
 c. PERSON ⇔ /t/

Arguably, person distinctions are syntactically encoded through two features: [PAR] (for participant in the speech act) and [ADD] (for addressee). The second person is specified as [PAR, ADD], as it involves an addressee, and by implication, a participant in the speech act. The first person involves a participant, but not an addressee, and is therefore specified as [PAR] only. Finally, the third person involves neither a participant nor an addressee and consequently does not carry any person features (see Kerstens 1993, Harley and Ritter 2002, and Ackema and Neeleman 2004 for further discussion of person features).

Now consider the structures in (32). In the case of a third person subject, only the spell-out rule in (31c) can apply, as (31a) and (31b) are overspecified. Hence, (32c) will be realized as *Er spielt*. In the case of a first person subject, however, not only (31a) can apply, but also (31c), as the latter has a very general structural description. When we are dealing with a second person subject, the situation is even worse: all three spell out-rules in (31) can in principle apply.

- (32) a. Ich spiel-[_{PERSON} PAR]. German
 I play
 b. Du spiel-[_{PERSON} PAR, ADD].
 you play
 c. Er spiel-[_{PERSON} ∅].
 he play

But of course the domain of application of the rule in (31a) properly includes the domain of application of (31b), as the latter mentions an additional feature (namely, [ADD]). For the same reason, the domain of application of (31c) properly includes that of (31a). This means that the Elsewhere Principle blocks (31a) where (31b) can apply, and (31c) where (31a) can apply. The structures in (32a) and (32b) are consequently realized as *Ich spiele* and *Du spielst*, respectively.

We should stress that the two implications of the Elsewhere Principle discussed above hold *all else being equal*. This is particularly important when we consider situations in which a spell-out rule for a category C realizes fewer features than the spell-out rules for the categories contained in C (say, A and B). In situations of this type, the Elsewhere Principle does not favor one realization of [_C A B] over the other. A realization of C as /c/ is more specific in that it targets a higher category, while a realization of C as /a-b/ is more specific in that it spells out more features. The consequence of this stalemate is that neither form will block the other and hence that both realizations of C are allowed. We may therefore sum up the effects of the Elsewhere Principle in the

following three rules of thumb:

- (33) a. All else being equal, a phonological realization of a category C takes priority over a phonological realization of the categories contained in C.
 b. All else being equal, a phonological realization of a category C that spells out more of C's features takes priority over a phonological realization that spells out fewer features.
 c. Optionality results if the phonological realization of a category C spells out fewer of C's features than the phonological realization of the categories contained in C.

3.4 Why Radical Pro Drop Is Sensitive to the Morphology of Pronouns

We now turn to the question at the heart of this article: what determines the crosslinguistic distribution of radical pro drop? As a result of the Elsewhere Principle, the general zero spell-out rule in (23) would be blocked by more specific spell-out rules that realize a KP with particular case and ϕ -features, such as (22). (We repeat these rules here.)

(22) [_{KP} +p, -a, 3, SG, M, ACC] \Leftrightarrow /hem/ Dutch

(23) [_{KP} +p, -a] \Leftrightarrow \emptyset

This means that in languages whose pronominal paradigm consists of spell-out rules for KP, a general pro-drop rule would not have any effect. Its application would be systematically suppressed by the more specific spell-out rules that introduce overt pronouns.

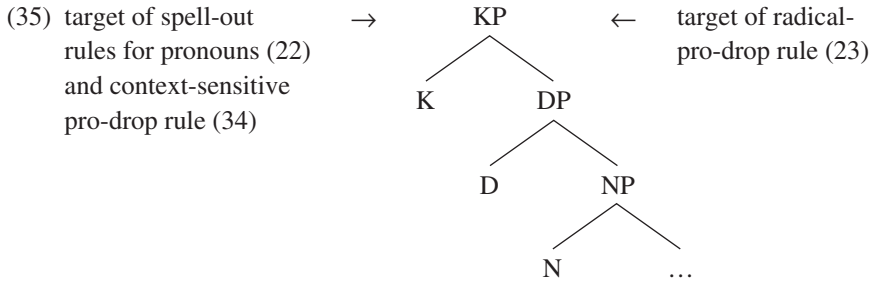
This does not mean that such languages necessarily lack pro drop altogether. A context-sensitive spell-out rule could legitimately give rise to zero arguments. Consider a rule that mentions agreement (indicated by coindexation with an element in its structural description).¹²

(34) [_{KP} +p, -a, ϕ_i] \Leftrightarrow \emptyset / _____ [ϕ_i]

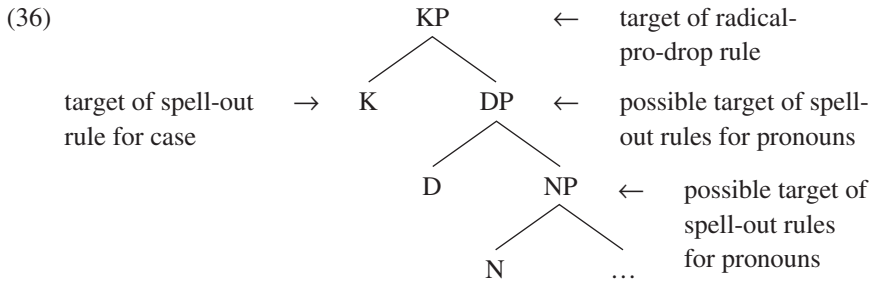
The rule in (34) is not in an elsewhere relation with the rules that make up the (overt) pronominal paradigm. In order to see this, compare it with (22). The structural description of the context-sensitive rule is more specific in one sense: it mentions agreement, while the context-free rule does not. On the other hand, the structural description of a context-free rule like (22) is more specific in that it mentions particular ϕ -features, which (34) does not. Consequently, neither rule blocks the other: languages with fusional pronominal paradigms cannot have radical pro drop, but they can have pro drop in the context of rich agreement.

The reason why radical pro drop is blocked in languages with fusional pronominal paradigms is that the relevant spell-out rules all apply to the same category, KP, as illustrated in (35).

¹² It has been established that the richer agreement is, the greater the likelihood of context-sensitive pro drop (see Ackema et al. 2005 for an overview). On the theory developed here, this correlation is not derived from a syntactic principle; rather, it must be explained either in functional terms, in terms of restrictions on context-sensitive spell-out rules, or both.



So, in order for a general zero spell-out rule like (23) to have an effect, the language in question cannot have other spell-out rules for pronominal KPs. Consider what happens if the rules that express the pronominal paradigm target lower-level categories, such as K and DP or NP, as illustrated in (36).



Japanese is a language with this setup for overt pronouns. Recall that it has independent pronominal stems and case markers, which are inserted by the rules in (37).¹³

- | | | |
|------------------------------------|----------------------------|----------|
| (37) [NP +p, -a, 1, SG] ⇔ /watasi/ | [_K NOM] ⇔ /ga/ | Japanese |
| [NP +p, -a, 2, SG] ⇔ /anata/ | [_K ACC] ⇔ /o/ | |
| [NP +p, -a, 3, SG, M] ⇔ /kare/ | [_K DAT] ⇔ /ni/ | |
| [NP +p, -a, 3, SG, F] ⇔ /kanozyo/ | [_K GEN] ⇔ /no/ | |
| [PL] ⇔ /tati/; /ra/ | | |

Application of these rules generates forms like *kare-ra-ga* ‘he-PL-NOM’ (‘they’). Similarly, the nominative form of ‘I’ is *watasi-ga*, the accusative form is *watasi-o*, and so on. Clearly, the general zero spell-out rule in (23) does not stand in an elsewhere relation to any of the rules in (37), which generate overt pronouns. The structural description of (23) is more specific in one sense—namely, in that it spells out a larger chunk of structure than any of the rules in (37). On the other hand, the structural descriptions of the rules in (37) mention features that the zero spell-out rule is insensitive to, which makes *them* more specific. Hence, the domain of application of

¹³ Several tests indicate that the case particles listed in (37) are K heads rather than postpositions. For instance, they permit quantifier float, as opposed to true postpositions (see Shibatani 1977, Miyagawa 1989).

the zero spell-out rule does not properly include those of the rules for overt pronouns; similarly, none of the domains of application of the rules for overt pronouns properly includes that of the zero spell-out rule. As a consequence, there will be no blocking effects between (23) and (37), and pro drop should be possible for all pronominal arguments. This is indeed a fair characterization of the situation in Japanese, as was demonstrated in (2).

The logic of our proposal dictates that the effects of agglutinating case morphology extend to other types of agglutinating morphemes, as long as these realize categories lower than K in the extended nominal projection. Number morphology is an example. As is well known, it is almost never realized externally to case morphology, an observation that goes back to Greenberg's universal 39, which is given in (38) (see also the Web-based Universals Archive of the University of Konstanz).

- (38) Where morphemes of both number and case are present and both follow or both precede the noun base, the expression of number almost always comes between the noun base and the expression of case. (Greenberg 1963:95)

The distribution of case and number morphology follows if number is a feature belonging to a category lower in the extended nominal projection than case. Therefore, if a language realizes plural pronouns using a separate plural morpheme, the pronominal stem cannot correspond to KP.

The implication of our theory that not only case but also agglutinating number morphology can give rise to radical pro drop is the key to understanding why arguments can be freely omitted in Chinese. In this language, pronouns do not inflect for case (with the possible exception of possessors, which are marked by the particle *de*). However, plural pronouns are derived from their singular counterparts by adding the plural morpheme *men*. This means that Chinese pronominal stems must spell out a category lower than number, and by transitivity lower than K—say, NP. Thus, the spell-out rules for pronouns in Chinese are as in (39). These rules generate forms like *wǒ-men-∅* 'I-PL-CASE' ('we/us') and *wǒ-de* 'I-POSS' ('my/mine').

- | | | |
|----------------------------------|---------------------------|---------|
| (39) [NP + p, - a, 1, SG] ⇔ /wǒ/ | [_K . . .] ⇔ ∅ | Chinese |
| [NP + p, - a, 2, SG] ⇔ /nǐ/ | [POSS] ⇔ /de/ | |
| [NP + p, - a, 3, SG] ⇔ /tā/ | [PL] ⇔ /men/ | |

If analyzed along these lines, the situation in Chinese is, at least for our purposes, indistinct from that in Japanese, which explains why Chinese allows radical pro drop.

To sum up, we have argued in this section that radical pro drop is blocked in languages like English and Dutch, whose pronouns are fusional for case. This is because the spell-out rules for such pronouns are in an elsewhere relationship with the rule in (23). On the other hand, radical pro drop is allowed in languages that have pronouns accompanied by markers expressing features located lower than KP in the extended nominal projection. This is because the occurrence of such markers signifies that the pronominal spell-out rules target categories lower than KP. In Japanese, the relevant morphemes express case, while in Chinese, number morphology is involved. Of course, the same kind of explanation should hold of other radical-pro-drop languages: their pro-

nouns should be accompanied by morphemes expressing case or heads closer to the noun than case, such as number, determiners, and classifiers.

3.5 *Pronouns without Case in Language Acquisition*

So far, we have concentrated on languages like Dutch and English, which express case in pronouns fusionally, and on languages like Japanese and Chinese, which have agglutinating nominal morphology. However, there are also languages whose pronouns are invariant for case and do not display any agglutinating morphology. This is true of most, if not all, creole languages. In Jamaican Creole, for example, subject and object pronouns have the same form, and number is expressed by suppletion (see Bailey 1966:22–23).

Given our assumptions so far, there are two possible analyses of Jamaican Creole. Either the pronominal spell-out rules target KP, or they target a category lower than KP (say, NP), while K is not realized overtly. In other words, XP in (40) could stand either for KP or for NP (in the latter case, there will be an extra spell-out rule: $[_K \dots] \Leftrightarrow \emptyset$).

(40) $[_{XP} + p, -a, 1, SG] \Leftrightarrow /mi/$	$[_{XP} + p, -a, 1, PL] \Leftrightarrow /wi/$	Jamaican Creole
$[_{XP} + p, -a, 2, SG] \Leftrightarrow /yu/$	$[_{XP} + p, -a, 2, PL] \Leftrightarrow /unu/$	
$[_{XP} + p, -a, 3, SG] \Leftrightarrow /im/$	$[_{XP} + p, -a, 3, PL] \Leftrightarrow /dem/$	
$[_{XP} + p, -a, 3, SG, N] \Leftrightarrow /i/$		

Crucially, the two analyses differ in that spell-out rules that target KP block radical pro drop, while spell-out rules that target NP permit it. We will argue that, as a result of a language acquisition strategy, the pronominal spell-out rules of languages like Jamaican Creole systematically target KP. Such languages can therefore not have radical pro drop.

The language acquisition strategy in question is a preference for spell-out rules that target the highest category compatible with their feature specification. This strategy is necessitated by the lack of access to negative evidence in language acquisition. Suppose a child has acquired a pronominal form /xxx/ that realizes a set of features $\{F_1, F_2\}$, but he or she has not figured out yet what category the pronoun realizes (see (41)). Suppose, furthermore, that the lowest category that can host these features is N and that /xxx/ could hence realize N, NP, DP, or KP.

$$(41) [_2 F_1, F_2] \Leftrightarrow /xxx/$$

An insurmountable problem arises if the child hypothesizes that /xxx/ spells out N, while in the adult grammar it stands for a larger category (say, KP). Under such circumstances, adult speakers will never produce data that can persuade the child to abandon his or her initial (incorrect) hypothesis (which allows generation of ungrammatical strings). On the other hand, it is harmless for the child to hypothesize that /xxx/ realizes the highest category KP, even if in the adult grammar it stands for a lower category (say, N). Adult speakers will produce data in which /xxx/ is combined with other KP-internal material, and this input will force the child to reassociate the rule in (41) with a lower-level category. Learnability thus dictates that spell-out rules are hypothesized to target the highest possible category compatible with their feature specification and distributional data (compare Pannemann and Weerman's (2005) proposal about the acquisition of

determiners).¹⁴ The implication for Jamaican Creole is that its pronouns must be associated with KP and that it will therefore not allow radical pro drop (cf. Bailey 1966:63). This is correct, as (42) shows.

- (42) a. *(Mi) a rait. Jamaican Creole
 I am write
 ‘I’m writing.’
 b. Nobadi neva sii *(im).
 nobody never see he
 ‘Nobody ever saw him.’
 c. Dem so fiesty in *(dem) ways.
 they so feisty in they ways
 ‘They were so feisty in their ways.’

Once we take into consideration the effects of the acquisitional strategy described above, we arrive at the generalization stated in (4): free omission of pronominal arguments is found only in languages whose pronouns display agglutinating morphology. In the remainder of this article, we consider to what extent this generalization is correct.

4 The Crosslinguistic Distribution of Radical Pro Drop

4.1 Predictions

Our theory predicts a correlation between the form of pronouns in a given language and the availability of radical pro drop. How strong we expect this correlation to be depends on which aspects of our analysis are accepted. The barest form of the theory consists of the three core assumptions introduced in sections 3.1–3.3. These generate a relatively weak prediction, namely, that fusional case morphology is incompatible with radical pro drop.

The empirical content of the theory is strengthened by the acquisitional strategy discussed in section 3.5, which implies that radical pro drop cannot occur in languages whose pronouns do not express case and that are fusional or invariant with respect to other nominal features. Still stronger predictions depend on the status of the zero spell-out rule in (23). If this rule is part of Universal Grammar, we expect all languages with agglutinating pronominal morphology to have radical pro drop. If it is not, we should not expect more than a statistical correlation in this direction (given the Avoid Pronoun Principle; Chomsky 1981).

In sections 4.2–4.5, we will explore to what extent these predictions are true. We will start by considering a sample of languages in some detail. We will argue that the evidence supports our proposal, but does not show that the zero spell-out rule in (23) is universal. In section 4.5, we will use *The World Atlas of Language Structures* (Haspelmath et al. 2005) to survey a larger

¹⁴ The acquisitional strategy described in this section strengthens our conclusion that pronouns with fusional case morphology, such as those found in languages like English, realize KP. Like invariant pronouns, pronouns with fusional case will be hypothesized by the child to realize the highest node in the extended nominal projection, and in the absence of counterevidence, that hypothesis will survive in the adult grammar.

set of languages. Inevitably, such a wide-ranging survey cannot be detailed, but it is important to carry it out in view of the typological implications of our proposal.

4.2 Languages That Do Not Allow Radical Pro Drop

The primary aim of this section is to test whether the morphology of pronouns determines the availability of radical pro drop. To do so, we will first consider several languages with fusional or invariant pronouns and check whether they disallow radical pro drop. Then we will turn to radical-pro-drop languages and check their pronominal morphology. The section has a secondary aim, which is to illustrate some of the complications that arise in classifying pronominal systems.

We begin by considering some Germanic languages. In all Germanic languages, pronominal paradigms are fusional, and as expected, none of these languages allows omission of arguments. For reasons of space, we will restrict ourselves to Swedish, Dutch, and Afrikaans.

The Swedish pronominal paradigm is given in table 1. It is clearly fusional: no separate pronominal stems or case suffixes can be identified. Even though it is fusional, some patterns can be observed in the Swedish paradigm. For example, third person singular forms share the string *hVn*, while first and second person singular forms display the same *-ig/-in* alternation in the accusative and possessive. This, however, is not sufficient to establish an agglutinating paradigm. It seems pointless to identify *hVn* as a third person singular morpheme, as that would require listing of several otherwise unmotivated case suffixes. It seems equally pointless to analyze *-ig* and *-in* as case endings, simply because they do not generalize across the pronominal paradigm or indeed to any other nominals.

The patterns in the Swedish paradigm are reminiscent of the ‘‘family resemblances’’ discussed by Bybee and Slobin (1982) and Pinker and Prince (1988, 1994, 1996) in connection with English irregular verbs. These authors argue that subregularities among irregular verb forms are real, but should be handled in terms of associative memory rather than by symbol manipulation

Table 1
Swedish pronouns

	NOMINATIVE	ACCUSATIVE	POSSESSIVE
1 SG	jag	mig	min
2 SG	du	dig	din
3 SG M	han	honom	hans
3 SG F	hon	henne	hennes
1 PL	vi	oss	vår
2 PL	ni	er	
3 PL	de	dem	deras

(i.e., grammatical rules). Similarly, family resemblances among fusional pronouns should not be analyzed as part of the grammar and hence do not affect the theory of pro drop.

Note that there is no theory-independent cutoff point between family resemblances and grammatical rules. A rule-based analysis can be devised for any paradigm, as long as one allows oneself an unlimited number of allomorphy rules for both stems and affixes. But if the complexity of the rule system is comparable to (or exceeds) the complexity of the actual paradigm, it seems likely that native speakers simply list unanalyzed forms (for a more specific suggestion regarding the nature of the cutoff point, see the discussion of Russian in section 4.4). For Swedish, this is clearly the case; the same is true of the other paradigms in this section.

As is well known, Swedish does not allow pro drop of pronominal subjects, objects, or possessors. (It is likely that Germanic possessors are D heads, as demonstrated above for Dutch, in which case they cannot be input to the zero spell-out rule in (23) for independent reasons.)

The Dutch strong pronominal paradigm is given in table 2. Like the Swedish paradigm, it is not agglutinating for any nominal feature. However, some forms are invariant, rather than fusional, for case. We believe that an argument can be made for treating such irregular, partially invariant paradigms as fusional. However, even if this is incorrect, the acquisition strategy discussed in section 3.5 still rules out low spell-out in partially invariant but otherwise fusional paradigms.

Dutch also has weak pronouns, which differ in form from their strong counterparts given in table 2. (Indeed, the weak paradigm might seem more relevant, given Cardinaletti and Starke's (1999) claim that null subjects fall into the category of weak pronouns.) The reason we give the strong paradigm for Dutch, as well as for the languages discussed below, is that tonic pronouns are less susceptible to phonological change and therefore more likely to preserve regularity.

Like Swedish, Dutch lacks radical pro drop. As mentioned in section 2.1, arguments can only be omitted if they move to the first position in main clauses (as a result of topic drop).

Table 2
Dutch strong pronouns

	NOMINATIVE	ACCUSATIVE	POSSESSIVE
1 SG	ik	mij	mijn
2 SG	jij	jou	jouw
3 SG M	hij	hem	zijn
3 SG F	zij	haar	
3 SG N	het		zijn
1 PL	wij	ons	
2 PL	jullie		
3 PL	zij	hun	

Table 3

Afrikaans pronouns

	NOMINATIVE	ACCUSATIVE	POSSESSIVE
1 SG	ek	my	
2 SG	jy	jou	
3 SG M	hy	hom	sy
3 SG F	sy	haar	
3 SG N	dit		sy
1 PL	ons		
2 PL	julle		
3 PL	hulle		

While Afrikaans singular pronouns must be classified as fusional, the plural ones have systematically invariant forms; as shown in table 3, they are not inflected for case, number, or gender (to put it differently, case distinctions are neutralized in the context of plural). Afrikaans does not have pro drop of either singular or plural pronouns. The absence of pro drop in the singular is captured by the weakest form of our proposal; the absence of pro drop in the plural supports the acquisitional strategy of section 3.5.

We now turn to languages that have “classical” pro drop. Italian allows context-sensitive pro drop in the subject position of finite clauses. However, as is well known, it does not allow possessors or referential objects to be omitted.¹⁵ The selective nature of Italian pro drop partially follows from the nature of the language’s pronominal paradigm. Nominative and accusative pronouns are either fusional or invariant. Hence, they cannot undergo radical pro drop. Possessives are more complex: they have two sets of ϕ -features. The first—expressed by the possessive stems in table 4—determines their reference; the second, which indicates properties of the possessum, is represented by the possessive endings. Therefore, possessive pronouns have predictable morphological structures.

However, according to the traditional analysis of Italian possessive pronouns, they are adjectival rather than nominal. This claim is supported by the fact that the agreement endings they carry are identical to the adjectival agreement endings (modulo some allomorphy in the masculine plural). Moreover, the distribution of possessive pronouns contrasts with that of other possessors (cf. *la casa di Gianni* ‘the house of Gianni’ with *la mia casa* ‘the my house’), while it resembles the distribution of certain adjectives (cf. *la piccola casa* ‘the small house’). If possessive pronouns

¹⁵ Rizzi (1986) observes that Italian allows nonreferential human objects to be dropped. Although this shows that Italian has a silent arbitrary object pronoun, it does not establish that the language has object pro drop: there is no corresponding overt pronoun.

Table 4
Italian strong pronouns

	NOMINATIVE	ACCUSATIVE	POSSESSIVE
1 SG	io	me	mi-
2 SG	tu	te	tu-
3 SG M	lui		su-
3 SG F	lei		
1 PL	noi		nostr-
2 PL	voi		vostr-
3 PL	loro		

POSSESSIVE ENDINGS	
SG M	-o
SG F	-a
PL M	-i/-ei/-oi
PL F	-e

are adjectival, they cannot be input to the zero spell-out rule in (23), even if they carry agglutinating morphology, because this rule targets a nominal category, KP.¹⁶

Although the two languages are typologically distant, Pashto, like Italian, has agreement-based pro drop (see (1)). That nonagreeing pronouns cannot be dropped in subject or object position is not surprising, given that Pashto personal pronouns are fusional. (The paradigms in table 5 are taken from T. Roberts 2000; see pages 19–21 and 68 for discussion. Clitic forms are included for reasons that will become apparent below.) This leaves possessive pronouns. The possessive relation can be expressed in two ways in Pashto. There is a general strategy involving the preposition *dildee*, which applies to strong pronouns as well as R-expressions. For pronouns, an alternative strategy is available, namely, the use of a second-position clitic. As the clitic portion of table 5 shows, these clitics do not relate to the strong pronouns in any transparent way.

Neither strategy allows omission of the possessor (Taylor Roberts, pers. comm.). The zero spell-out rule in (23) does not target PPs, nor can it apply to the pronominal complement of prepositions (its application there is blocked by the more specific rules that insert overt forms).

- (43) a. *(Di taa) plaar mee dee wé-leg-i. Pashto
of 2.SG.OBL father 1.SG must PERF-send-PRES.3.SG
- b. Di *(taa) plaar mee dee wé-leg-i.
of 2.SG.OBL father 1.SG must PERF-send-PRES.3.SG
‘Your father must send me.’

As expected, possessive clitics cannot be omitted either (Taylor Roberts, pers. comm.).

¹⁶ Kayne (2000:131–162) suggests that the regularity in the Italian (and French) possessive paradigm can be used as an argument for segmentation of personal pronouns. French *moi* would consist of a first person morpheme *m-* and a singular morpheme *-oi*. One problem with this account is that it does not generalize to other pronouns unless a number of allomorphy rules are adopted. Our inclination is to treat these patterns as family resemblances.

Table 5

Pashto pronouns

	DIRECT	OBLIQUE
1 SG	ze	maa
2 SG	te	taa
3 SG VIS M	day	de
3 SG INVIS M	agha	aghe
3 SG VIS F	daa	dee
3 SG INVIS F	agha	aghee
1 PL	mung	
2 PL	táasee	
3 PL VIS	duy	
3 PL INVIS	aghuy	

CLITICS	
1 SG	mee
2 SG	dee
3 SG/PL	yee
1 SG/1 PL	am/mo

- (44) *Plaar mee *(dee) léeg-i.*
 father 1.SG 2.SG send-PRES.3.SG
 ‘Your father is sending me.’

Pashto

Greek is our final example of a classical pro-drop language. It allows omission of subjects of finite clauses, which agree with the verb, but omission of objects or possessors is impossible (cf. Papangeli 2000).

The Greek pronominal paradigm is given in table 6. No case or number affixes can be identified, and in this respect the paradigm can be characterized as fusional. However, a complication arises because there are regularities that go beyond the notion of family resemblance: third person forms share *af-*, while first and second person forms share *e-*. This cannot be coincidental, given that pronominal clitics can by and large be derived from their strong counterparts by omission of *af-* and *e-* (see Drachman 1997 for discussion). We give the clitic forms for comparison on the right-hand side of the table. The prefixes *af-* and *e-* are what Cardinaletti and Starke (1999) call support morphemes, that is, elements that allow deficient pronominal forms to function as strong pronouns. There are various ways of analyzing such elements. The most likely one, in our view, takes them to be inserted at PF by a rule of extended exponence (see Matthews 1972 and subsequent literature). Simplifying things considerably, *e-* would be a second realization of [PERSON PAR] (a feature specification that generalizes over first and second person), while *af-* would be a second realization of [PERSON] (the feature expressing third person). On this analysis, the spell-out rules for both strong pronouns and clitics in fact realize KP and they thus block application of (23).

Table 6
Greek pronouns

	STRONG PRONOUNS			CLITICS	
	NOM	ACC	DAT/GEN	ACC	DAT/GEN
1 SG	ego	emena(ne)		<i>me</i>	mu
2 SG	esi	esena(ne)		<i>se</i>	su
3 SG M	aftos	afton(e)	aftu	<i>ton(e)</i>	<i>tu</i>
3 SG F	afti	aftin(e)	aftis	<i>ti(n)(e)</i>	<i>tis</i>
3 SG N	afto		aftu	<i>to</i>	<i>tu</i>
1 PL	emis	emas		<i>mas</i>	
2 PL	esis	esas		<i>sas</i>	
3 PL M	afti	aftus	afton	<i>tus</i>	tus
3 PL F	aftes			<i>tis/tes</i>	
3 PL N	afta			<i>ta</i>	

The languages discussed so far all have paradigms that encode at least some case distinctions. The stronger version of our theory predicts, however, that languages whose pronouns do not vary for case will lack radical pro drop, unless other nominal features are expressed through separate markers. Initial evidence in this direction was already found in Afrikaans. Creole languages provide more substantial support.

As Holm (2000) points out, these languages do not mark case, even if the superstrate or substrate languages do. Moreover, when creoles distinguish number in pronouns, the expression of plurality is typically fusional. We have already demonstrated this for Jamaican Creole. The same observation can be made for Papiamentu, as shown in table 7, taken from Kouwenberg 2006.¹⁷ Given that invariant and fusional pronominal paradigms block the application of the zero spell-out rule in (23), creole languages should not allow radical pro drop. Indeed, argument omission is impossible in Papiamentu (see Kouwenberg and Muysken 1994 for general discussion of this language).

¹⁷ The situation in Papiamentu is in fact more complex. Kouwenberg (2006) shows that in addition to the strong pronouns given in table 7, Papiamentu has weak and emphatic pronouns as well. The weak forms are truncated versions of the strong forms. The emphatic forms might be derived by a separate marker *a-*. However, the existence of such a marker is not sufficient to license radical pro drop, because it is presumably attached externally to KP. Moreover, in general, emphatic forms cannot be deleted because they must bear stress.

Papiamentu also allows omission of expletives and generic subjects (see Muysken and Law 2001, Veenstra, to appear). But given that genuine arguments cannot be dropped, it cannot reasonably be specified as a radical-pro-drop language.

Table 7

Papiamentu strong pronouns

	DIRECT	POSSESSIVE
1 SG	mí	
2 SG	bó	
3 SG	é	su
1 PL	nós	
2 PL	'bòsó(nán)	
3 PL	nán	

(45) a. Ta kiko *(bo) ta hasi?

PRT what you PROG do

'What are you doing?'

b. Mi a mir' *(e) o.

I PAST see he PRT

'I did see him.'

c. Bo ke bende *(bo) auto Hapones?

you PRT sell you car Japanese

'Do you want to sell your Japanese car?'

Papiamentu

There are a few creole languages for which it has been suggested that pronouns may carry an independent plural marker. Perhaps the best-known example is Tok Pisin, whose paradigm is given in table 8. Various descriptions of this language treat *-pela* as a plural marker attached to the singular pronouns *mi* and *yu* (see, e.g., Foley 1986). If *-pela* were a plural marker, we might expect radical pro drop, at least for first and second person pronouns. But Tok Pisin is a typical creole language in that it does *not* allow arguments to be omitted (data from Mühlhäusler 1985).

Table 8

Tok Pisin pronouns

1 SG	mi
2 SG	yu
3 SG	em
1 PL INCL	yumi
1 PL EXCL	mipela
2 PL	yupela
3 PL	ol

- (46) a. *(Mi) laik go long Mosbi. Tok Pisin
 I want go to Moresby
 ‘I want to go to Moresby.’
- b. Wanpela man i bin skul-im *(mi) long Tok Pisin.
 one man PM PAST teach-TR I to Tok Pisin
 ‘A man was teaching me Tok Pisin.’
- c. Em ya i bagarap-im meri bilong *(mi).
 he EMPH PM assaulted-TR woman of I
 ‘It’s he who assaulted my wife.’

As a matter of fact, *-pela* does not seem to be a plural marker. It is never used as one anywhere else in the language. Rather, it appears on short adjectives and numerals. In this context, it is uncontroversially analyzed as an adjectival marker, among other things because it occurs in expressions like *wanpela man* ‘one man’ (see (46)). At best, then, *-pela* is ambiguous between an adjectival marker and a plural marker that exclusively attaches to *mi* and *yu*. We agree with Mühlhäusler (1985) that an analysis along these lines is rather unattractive, given that positing a rule of pluralization for two lexical items is more complex than simply listing *mipela* and *yupela* as underived forms. Moreover, Moravcsik (1978:354) observes that if a language uses an inflectional ending to indicate number in the first and/or second person pronoun, then it does so in the third person as well. An analysis of *-pela* as a number marker would make Tok Pisin an exception to an otherwise almost exceptionless generalization.

4.3 Languages That Allow Radical Pro Drop

So far, we have examined a number of languages that have overt spell-out rules for KP and that consequently disallow the omission of pronominal arguments, at least on our analysis. In this section, we turn to languages that allow radical pro drop and check whether their pronouns realize categories lower than KP. Recall that this implies that pronouns must be accompanied by separate morphemes spelling out case or other nominal features.

We begin by considering two straightforward cases: Korean and Burmese. It is well known that both languages allow omission of subjects, objects, and possessors (see, e.g., Sohn 1994 for Korean and Okell 1969 for Burmese). As predicted, both languages have agglutinating pronominal paradigms. Korean is like Japanese in that pronouns carry the same case particles that regular nouns do. The pronominal stems and case endings are introduced by the spell-out rules in (47). (There are many more pronominal stems, but since these all inflect regularly for case, we only give some representative examples here.)

- | | | |
|---------------------------------------|--------------------------------------|--------|
| (47) [NP + p, - a, 1, SG] ⇔ /na/, ... | [NP + p, - a, 1, PL] ⇔ /wuli/, ... | Korean |
| [NP + p, - a, 2, SG] ⇔ /ne/, ... | [NP + p, - a, 2, PL] ⇔ /ne-huy/, ... | |
| [NP + p, - a, 3, SG] ⇔ /ku/ | [NP + p, - a, 3, PL] ⇔ /ku tul/ | |
| [K NOM] ⇔ /ka/ | [K ACC] ⇔ /(l)ul/ | |
| [K GEN] ⇔ /uy/ | [K DAT] ⇔ /ey/; /eykey/; ... | |

Application of these rules gives rise to inflected pronouns like *ku-tul-ka* ‘he-PL-NOM’ (‘they’).

The Burmese system is very similar. Pronouns have agglutinating morphology for case and number. Application of the rules in (48) gives rise to forms like *thu-toú-yé* ‘he-PL-GEN’ (‘their’).

(48) [NP + p, - a, 1, SG] ⇔ /nga/	[PL] ⇔ /toú/	Burmese
[NP + p, - a, 2, SG] ⇔ /niñ/	[K NOM] ⇔ /ká/	
[NP + p, - a, 3, SG, M] ⇔ /thu/	[K ACC] ⇔ /kou/	
[NP + p, - a, 3, SG, F] ⇔ /thumá/	[K GEN] ⇔ /yé/	

We now turn to two languages from the Indo-Aryan family: Assamese and Hindi/Urdu. As Butt (2001) shows, languages from this family freely omit arguments (although possessor drop seems restricted, at least in Assamese). The relevant Hindi/Urdu data can be found in Butt and King 1997. We give Assamese examples in (49) (from Shakuntala Mahanta, pers. comm.).

- (49) a. Sobei koisi-le je Ø Bill-ok bhal pa-i. Assamese
 everybody say-3.PAST that Bill-ACC good get-3.PRES
 ‘Everybody said that pro likes Bill.’
- b. Sobei koisi-le je Bill-e Ø bhal pa-i.
 everybody say-3.PAST that Bill-ERG good get-3.PRES
 ‘Everybody said that Bill likes pro.’
- c. Sobei koisi-le je Ø maa-k-e Bill-ok bhal pa-i.
 everybody say-3.PAST that mother-KIN-ERG Bill-ACC good get-3.PRES
 ‘Everybody said that pro’s mother likes Bill.’

The morphology of Assamese and Hindi/Urdu pronouns is more complex than that of their Korean and Burmese counterparts. Assamese has a set of case endings that accompany all nominal expressions, including pronouns. These are introduced by the rules in (50). Case endings are subject to a certain degree of phonologically conditioned allomorphy. The choice of ending in the genitive and accusative is determined by ATR (advanced tongue root) harmony and avoidance of hiatus. The latter also underlies deletion of the ergative ending *-e* when preceded by a stem ending in a vowel.

(50) [K NOM] ⇔ Ø	[K ACC] ⇔ /ok/; /k/; /ak/	Assamese
[K GEN] ⇔ /or/; /r/; /ar/	[K ERG] ⇔ /e/	

As illustrated in table 9, many Assamese pronominal stems have two allomorphs. The direct form is selected by the nominative and ergative affixes, and the oblique form by the accusative and genitive ones. As an example of the pronouns that appear in the language, we give the declension of the second person plural pronoun in table 10. In these forms, stems and case markers can be determined for each element of the paradigm. Therefore, pronominal morphology is agglutinating, as predicted. In general, we may conclude on the basis of Assamese that allomorphy does not preclude the availability of radical pro drop.

Hindi is much like Assamese, except that it has a higher degree of allomorphy, as shown in table 11. Most pronominal stems have three different forms. In addition, there are two variants of the accusative/dative marker and six variants of the genitive marker, as indicated in (51).

Table 11

Hindi pronominal stems

	DIRECT	OBLIQUE	POSSESSIVE
1 SG	mē	mujh	me-
2 SG	tu	tujh	te-
3 SG	yəh/vəh	is/us	
1 PL	həm		həma-
2 PL	tum		tumha-
3 PL	yə/və	in(hō)/un(hō)	

Note that third person forms are demonstratives. The 'near'-form is the /y-/ one and the 'far'-form is the /v-/ one.

selects oblique stems, except in the first and second person singular, where it selects direct stems. It is also the single case that selects the longer stems in the third person plural.

Allomorphy in the case endings is regulated as follows. Genitive case is realized as /ra/; /ri/; /re/ on third person pronouns, while /ka/; /ki/; /ke/ appears with all other nominals (the vowel alternation marks gender and number). The ending /ko/ can be optionally replaced by the ending /e/ in the case of pronouns. Thus, the forms in table 12 emerge. Notwithstanding the complexities of Hindi/Urdu allomorphy rules, we can distinguish separate stems and case endings in table 12. Thus, the language is agglutinating in the required sense.

Our theory does not predict that languages that allow radical pro drop should be agglutinating for case. They may also have separate endings for other nominal features. We have already seen one example of this. In Chinese, radical pro drop is made possible by the existence of number

Table 12

Hindi/Urdu pronouns

	NOMINATIVE/ ABSOLUTIVE	ACCUSATIVE/ DATIVE	ERGATIVE	GENITIVE
1 SG	mē-∅	mujh-ko	mē-ne	me-ra/ri/re
2 SG	tu-∅	tujh-ko	tu-ne	te-ra/ri/re
3 SG	yəh-∅/vəh-∅	is-ko/us-ko	is-ne/us-ne	us-ka/ki/ke
1 PL	həm-∅	həm-ko	həm-ne	həma-ra/ri/re
2 PL	tum-∅	tum-ko	tum-ne	tumha-ra/ri/re
3 PL	yə-∅/və-∅	in-ko/un-ko	inhō-ne/unhō-ne	un-ka/ki/ke

- (55) Ahmet \emptyset *çığ sev-iyor.* Turkish
 Ahmet raw like-PRES.3.SG
 ‘Ahmet likes pro raw.’

As expected, the Turkish pronominal paradigm is agglutinating. It is obvious that pronouns carry case markers, and, although we will not demonstrate this here, it could be argued that number also receives a separate realization. The spell-out rules are given in (56) (the instrumental attaches to genitive forms only).

- (56) $[\text{NP} + \text{p}, -\text{a}, 1, \text{SG}] \Leftrightarrow /ben/$ $[\text{NP} + \text{p}, -\text{a}, 1, \text{PL}] \Leftrightarrow /biz/$ Turkish
 $[\text{NP} + \text{p}, -\text{a}, 2, \text{SG}] \Leftrightarrow /sen/$ $[\text{NP} + \text{p}, -\text{a}, 2, \text{PL}] \Leftrightarrow /siz/$
 $[\text{NP} + \text{p}, -\text{a}, 3, \text{SG}] \Leftrightarrow /o/; /on/$ $[\text{NP} + \text{p}, -\text{a}, 3, \text{PL}] \Leftrightarrow /onlar/$
 $[\text{K NOM}] \Leftrightarrow \emptyset$ $[\text{K ACC}] \Leftrightarrow /i/$
 $[\text{K GEN}] \Leftrightarrow /in/$ $[\text{K DAT}] \Leftrightarrow /a/$
 $[\text{K LOC}] \Leftrightarrow /de/$ $[\text{K ABL}] \Leftrightarrow /den/$
 $[\text{K INSTR}] \Leftrightarrow /le/$

These rules generate pronominal forms such as *biz-im-le* ‘1.PL-GEN-INSTR’ (‘with us’).

4.4 Is the Zero Spell-Out Rule Universal?

The data discussed so far support the proposed correlation between fusional or invariant pronominal morphology and the impossibility of radical pro drop. However, we do not think that the opposite is true: not all languages with an agglutinating pronominal paradigm allow radical pro drop. One language that seems relevant in this respect is Finnish, which is not a radical-pro-drop language. It only allows subject drop in the first and second person (see Vainikka and Levy 1999). The written language is clearly agglutinating for case, and abstracting away from some irregularities, the same is true of the general spoken language and of most dialects (see Sulkala and Karjalainen 1992:278–279). This state of affairs suggests that the zero spell-out rule in (23) is not universal.

There are other languages that seem to require a language-specific interpretation of (23). Case endings in a subset of Russian pronouns, for example, follow the second declension (see Wade 1992:69, 117). Yet the language does not allow free omission of these pronouns.

At this point, we could either accept that (23) is not universal or attempt to find independent factors that are responsible for the observation that some languages have agglutinating pronouns but lack radical pro drop. Whether this line of research will be successful is unclear to us. As far as Finnish is concerned, we have not been able to isolate any independent factor that would prevent application of (23). However, we can offer some speculations regarding Russian. A closer look at the Russian paradigm reveals that more than half of pronouns are irregular, either because they are uncontroversially fusional or because morphological decomposition would depend on some sort of allomorphy.¹⁸ One may wonder whether under these circumstances the language-learning child will succeed in analyzing Russian pronouns as agglutinating.

¹⁸ We ignore the ablative, which is marked by a preposition rather than a case ending.

This question cannot be answered by mere observation; rather, it must be supplied by a theory of how morphological segmentation is achieved in acquisition. There is not much work on this. One relevant proposal is developed in Pinker 1984. Pinker argues that morphological segmentation is driven by shared phonetic material in all members of a set of related forms. Applied to pronouns, his proposal entails a strategy according to which the child chooses a particular valued feature and checks if all forms with this value share phonetic material. If so, this material is taken to be the expression of the relevant feature value. If not, another feature value is considered. To give an example, a child learning Chinese might consider forms that express first person (i.e., [PERSON PAR]). The child will find two forms: *wǒ* and *wǒmen* (see (39)). This trivially allows identification of *wǒ* as the expression of the relevant feature value (the stem). Similarly, a child learning Hindi might consider forms expressing ergative case: *mēne*, *tune*, and so on (see table 12). Identification of *-ne* as the affix that expresses ergative case is again straightforward. For more complex systems, combinations of feature values (e.g., [PERSON PAR] + [NUMBER PL]) may have to be considered.

The problem with the Russian pronominal system is that no feature value, or combination of feature values, defines a nonsingleton set of forms such that all its members share phonetic material. This, we speculate, means that attempts at morphological segmentation will be unsuccessful and hence that an analysis of the Russian pronominal paradigm as agglutinating is blocked. If so, Russian no longer stands in the way of the strongest version of our proposal.¹⁹

4.5 *The Typological Range of the Proposal*

The sample of languages used to test our proposal above is limited. However, given the nature of the claim we are defending, it is possible to use typological databases to enlarge its empirical grounding. Such databases might help us find languages that are potentially problematic. These should then be analyzed in some detail to determine whether they are genuine counterexamples.

One database seems particularly useful. *The World Atlas of Language Structures* (Haspelmath et al. 2005) displays structural properties of languages gathered from a wide range of descriptive sources. It consists of maps with accompanying texts on diverse grammatical features. Each map shows between 120 and 1,110 languages. Crucially for present purposes, the atlas is accompanied by a searchable CD-ROM, allowing the user to combine different maps. The languages that our proposal excludes have fusional or invariant pronouns, but allow radical pro drop. We can find languages that potentially fall into this group by combining two maps. The first identifies languages that allow subject omission in the absence of verb-subject agreement; the second identifies languages with independent subject pronouns whose plural is expressed by unanalyzable person-number stems (at least in the first and second person plural). The combination of these two properties gives us languages that may have radical pro drop (depending on the generality of

¹⁹ See Ackema and Neeleman, to appear, for discussion of how the availability of clitics or weak pronouns may affect the distribution of null pronouns. This may be another factor that inhibits application of the zero spell-out rule in (23).

argument omission) and that may have fusional pronouns (depending on whether the potential fusional nature of number marking extends to case, etc.).

The combination of the two relevant maps yields the following list of languages:

- (57) Epena Pedee, Garo, Guugu Yimidhirr, Kayah Li (Eastern), Khmu', Lezgian, Maybrat, Thai, Yidij, Yoruba

To begin with, we can remove from this list of potential counterexamples those languages that do not have radical pro drop. In Yoruba, for instance, the only context in which a subject can be omitted is when a third person singular pronoun occurs before the negation marker *kò* or the future tense marker *yó* (see Bamgbose 1967:42). Given this constraint on subject omission, it is very unlikely that Yoruba has radical pro drop.

The number of sources on Kayah Li is limited, but the evidence available in the literature does not suggest that it allows free omission of pronouns. For example, Solnit (1997:311–333) gives several transcripts of Kayah Li stories narrated by native speakers, and in these transcripts few, if any, pronouns are omitted. We asked a native speaker of Japanese to translate one text, and we found that she omitted pronouns very frequently. In fact, in his opening remarks Solnit (1997:3) states that “virtually every clause contains at least one pronoun” in Kayah Li.

Our theory predicts that Kayah Li should not have radical pro drop, because its pronouns do not display any agglutinating morphology (see Solnit 1997:183). The fact that this prediction seems to be borne out is noteworthy in view of the fact that Kayah Li is spoken in Burma and Thailand, hence is surrounded by languages that do have radical pro drop.

The information we managed to amass on Khmu' was insufficient to determine whether this language has radical pro drop or not, and we will therefore have to put it to one side. The remaining languages are listed in (58).

- (58) Epena Pedee, Garo, Guugu Yimidhirr, Lezgian, Maybrat, Thai, Yidij

Our proposal allows radical pro drop in languages that have pronouns with agglutinative case morphology, and therefore such languages may be removed from the list as well. We have already shown that Burmese has agglutinative case markers (see (48)). The same is true of Epena Pedee (Harms 1994:58), Garo (Burling 2003), Lezgian (Haspelmath 1993:184), and Yidij (Dixon 1977:168; Martin Haspelmath, pers. comm.).

We are not confident of the correct analysis of Guugu Yimidhirr pronouns. Guugu Yimidhirr is an Australian language, and so, as expected, it has a large set of agglutinating case markers. Dixon and Blake (1979:6) state that the Australian languages “seldom exhibit morphophonemic alternations that obscure the agglutinative character of words; there is little fusion of any kind and little suppletion (as in English *Ilme* or *golwent* for instance).” This would suggest that Guugu Yimidhirr is no different from Epena Pedee or Garo. But there are some complications in the Guugu Yimidhirr pronominal paradigm. An overview of pronominal forms is given in Haviland 1979:65–66. In table 15, we give a simplified version of the paradigm, abstracting away from regional variation and omitting some further cases. As the table shows, all nonsingular pronouns exhibit perfectly regular noncumulative agglutinating morphology for all cases: nominative is the

Table 15

Guugu Yimidhirr pronouns (simplified)

	NOMINATIVE	ACCUSATIVE	DATIVE	PURPOSIVE	ABESSIVE
1 SG	ngayu	nganh-i	ngadh-u	ngadh-un-ngu	ngadh-un-ga
2 SG	nyundu	nhina-in	nhan-u	nhan-un-ngu	nhan-un-ga
3 SG	nyulu	nhinhaan-in	nhang-u	nhang-un-ngu	nhang-un-ga
1 DU INCL	ngali	ngali-in		ngali-in-ngu	ngali-in-ga
1 DU EXCL	ngaliinh	ngalinh-un		ngalinh-un-ngu	ngalinh-un-ga
1 PL	ngana	nganang-an		nganang-an-ngu	nganang-an-ga
2 DU	yubaal	yubal-in		yubal-in-ngu	yubal-in-ga
2 PL	yurra	yurra-an		yurra-an-ngu	yurra-an-ga
3 DU	bula	bulang-an		bulang-an-ngu	bulang-an-ga
3 PL	dhana	dhana-an		dhana-an-ngu	dhana-an-ga

unmarked form; there is an accusative/dative form marked by *-in/-an/-un*; and purposive and abessive cases are derived from the dative by attachment of *-ngu* and *-ga*, respectively.

The singular is more complex. To begin with, accusative and dative forms are distinguished: the former are marked by *-i/-in*; the latter by *-u*. The oblique cases are derived from an allomorph of the dative forms (ending in *-un*, rather than *-u*). Again, from the dative onward, the singular paradigm shows perfectly regular noncumulative agglutinating morphology. The nominative and accusative singular forms are puzzling, though, and in order to extend the analysis of Guugu Yimidhirr pronouns as agglutinating, one must assume that singular stems have three allomorphs: nominative, accusative, and dative ones (the latter affixed by *-i(n)* and *-u*). It seems to us that this would be a reasonable assumption for the child to make, given that the nominal paradigm is fully regular, while the pronominal paradigm is regular in the vast majority of cells. But needless to say, more work would be required to determine whether this idealized description of Guugu Yimidhirr pronouns is correct.

If we are allowed to remove Guugu Yimidhirr from the list in (58) on the basis of the above considerations, two languages remain, Maybrat and Thai. Both are arguably radical-pro-drop languages. Dol (1999:160) states that in Maybrat, subjects and objects may “be omitted if they have been mentioned earlier in the discourse.” Similarly, Campbell (1969:60) notes that Thai has null objects and subjects. Neither language marks case on either nouns or pronouns. Therefore, the initial description of pronouns in both Maybrat and Thai suggests that they are like the pronouns found in Jamaican Creole. If this were true, these languages would constitute counterexamples to the stronger version of our theory, which is based on the acquisitional strategy described in section 3.5.

However, there is other evidence that pronouns in Maybrat and Thai realize categories lower than KP in the extended nominal projection. In both languages, pronouns cooccur with the same set of functional heads as regular nouns. In Thai, the neutral order of material in the extended nominal projection is Noun-Adjective-Numeral-Classifier-Demonstrative (see Den Dikken and Singhapreecha 2004). Den Dikken (2006:232) gives the example in (59a). Campbell (1969) argues at length that Thai pronouns are nearly indistinguishable from regular nouns. In particular, they can be modified by much the same material (with the possible exception of adjectives), as exemplified by (59b) (from Campbell 1969:28). Given that pronouns are not in complementary distribution with other material contained within the extended nominal projection, it must be the case that they spell out categories lower than KP (we speculate NP).

- (59) a. rôm (khan) jàj sǎam khan nán Thai
 umbrella (CL) big three CL DEM
 ‘those three big umbrellas’
 b. khǎw sǎam khon ní
 they three CL DEM
 ‘they, these three’

Essentially the same argument holds for Maybrat. The order of constituents in this language is Noun-Adjective-Classifier-Numeral-Demonstrative (Dol 1999:141). Pronouns seem to have the same distribution as nouns. This is illustrated in (60); the examples are from Dol 1999:146, 145, 142.²⁰

- (60) a. rae m-api m-ana tiet re-t-o Maybrat
 person 3U-big 3U-head four LOC.SPEC-NEAR-U
 ‘these four big men’
 b. amu p-na tuf
 we 1PL-head.PL three
 ‘the three of us’
 c. ana eok ro-n-o
 they two LOC.SPEC-FAR-U
 ‘the two of them there’

Although more detailed analysis would be required to draw firm conclusions from the data discussed in this section, it seems to us that the outcome of our search of the *World Atlas of Language Structures* database is compatible with the generalization that radical pro drop occurs only in languages whose pronouns can be combined with separate morphemes that express nominal features like case and number.

²⁰ Note that the agreement between classifier and pronoun in (60b) precludes an alternative analysis of the Maybrat data as involving apposition. Indeed, Dol (1999) suggests (as Campbell (1969) does for Thai) that they are a case of regular modification.

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