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Mixed agreement, the person feature, and the index/concord distinction

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Abstract In *mixed agreement*, different agreement targets show different values for the same controller. This paper offers an explanation for the existence of mixed agreement that accounts for the following Polite Plural Generalization: universally, any second person 'polite plural' pronouns (e.g. French *vous*), used honorifically for a single addressee, control syntactic (plural) agreement on all person targets, while non-person-agreeing targets such as predicate adjectives vary across languages, between syntactic and semantic number agreement. Following Wechsler and Zlatić (The Many Faces of Agreement, CSLI Publications, 2003), person features exist only as features of referential indices (*Index phi features*), never as grammatical head features of the sort that are involved in adjective-noun concord (*Concord phi features*). Mixed agreement arises if the 'polite plural' or other pronominal controller is underspecified for Concord phi features. But a pronoun has a referential Index, which is necessarily marked with phi features, so any Index agreement targets will appear in the second person plural form. A diachronic explanation is offered for this bifurcation of agreement targets into Index and Concord targets: the former descend from incorporated pronouns while the latter have other sources.

Keywords Agreement · Concord · T/V pronoun · Mixed agreement · Person · Semantic agreement · Index agreement

1 Introduction: mixed agreement

In *mixed agreement* (also called *hybrid agreement*), different agreement targets show different values for the same controller (Comrie 1975; Corbett 1983, 2006; Wechsler

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and Zlatić 2000, 2003; Kathol 1999). For example, the French second person plural pronoun *vous* refers to multiple addressees, and also has an honorific or polite use for a single (or multiple) addressee. When used to refer politely to one addressee, *vous* triggers singular on a predicate adjective but plural on the verb, as in (1a):

(1) a. Vous êtes loyal. French
you.PL be.2.PL loyal.M.SG
'You (singular, formal, male) are loyal.'

b. Vous êtes loyaux.
you.PL be.2.PL loyal.PL
'You (plural) are loyal.'

Polite plural pronouns of this kind are found in many languages of the world (Head 1978). Some of those languages (e.g. French) show mixed agreement with such pronouns, while others (e.g. Serbian/Croatian) have uniform plural agreement on both verbs and adjectives. However, notwithstanding this cross-linguistic variation, in another respect languages appear not to vary much at all regarding agreement with such pronouns. As will be shown in detail below, across languages a polite plural pronoun uniformly determines plural agreement on all targets that show person agreement. For example, in (1) the finite verb *êtes* agrees in person with the subject, and it appears in the plural form, showing syntactic number agreement with its subject. It is only the non-person-agreeing targets that vary across languages, showing semantic number agreement with the subject in some languages and syntactic number agreement with the subject in others. That observed correlation between person-marking and syntactic agreement will be called the *Polite Plural Generalization*.

This paper offers an explanation for the phenomenon of mixed agreement that accounts for the Polite Plural Generalization. The cross-linguistic asymmetry between adjectival and verbal agreement with polite plurals has been described in detail before (Corbett 1983: 56ff., 2000: 193–194, 2006: 230–232; Comrie 1975). But as for explaining that asymmetry, Comrie (1975: 417) concluded simply that "universal grammar says that verbs are more likely to agree syntactically than adjectives…". In this paper the asymmetry is recast in terms of a correlation with the Person feature, and so it is that correlation that is explained. The explanation offered below partly follows Wechsler and Hahm (2011), but also includes a new diachronic component (Sect. 5). Because of the important role of the Person feature in this explanation, the analysis presented below also has implications for the more general question of the distribution of Person among agreement targets (Baker 2008; Baker 2011, this volume).

The paper is organized as follows. Section 2 presents cross-linguistic data on mixed agreement, including evidence for the Polite Plural Generalization. Then a theory of semantic agreement is defended, in which an agreement target defaults to the semantics when the controller is underspecified for the feature it seeks (Sect. 3). With that framework as background, we offer the following account of mixed agreement, from which the Polite Plural Generalization is deduced (Sect. 4). First, as argued by Wechsler and Zlatić (2000, 2003) and further defended in Sect. 5 below, the Person feature exists only as a feature of referential indices, never as a grammatical head feature of the sort that is involved in adjective-noun concord, for example. Following Wechsler and Zlatić (2000, 2003), features of the former type, that is, features of

the referential index, are called *Index phi features*, while the latter type are called a *Concord phi features*. Following Pollard and Sag (1992, 1994), anaphoric agreement results from the identification of the referential index of a pronoun with that of its antecedent nominal phrase. Hence a pronoun has a referential Index that is marked with phi features, e.g. French *vous* 'you.PL' has a referential Index with the features 2nd person plural. In contrast, nothing in principle requires pronouns to be specified for grammatical Concord features, so languages therefore vary as to whether pronouns are specified for Concord features. Thus any agreement targets that are sensitive to the Index phi features of the controller will appear in the 2nd person plural form. But all person agreement targets are sensitive to the Index phi features of the controller so person agreement targets appear in the second person plural form. This explains the Polite Plural Generalization. More generally, mixed agreement (as in French) arises if the pronominal controller is selectively underspecified for Concord phi features, while uniform agreement (as in Serbian/Croatian) arises if the pronominal controller is also specified for Concord phi features.

A diachronic explanation for this bifurcation of agreement targets into those that can include Person (Index targets) and those that must exclude Person (Concord targets), is presented in Sect. 5: the former descend from incorporated pronouns while the latter descend from incorporated noun classifiers.

2 Mixed agreement with polite plurals

2.1 The polite plural generalization

In the French example (1), where the subject is the honorific second person pronoun *vous*, the verb shows syntactic agreement while the predicate adjective shows semantic agreement. Languages exhibiting this split between verbs and predicate adjectives with polite plural controllers will be called *mixed agreement* languages. Contrasting with mixed agreement languages are *uniform agreement* languages, where polite plurals trigger plural agreement on both verbs and predicate adjectives. Serbian/Croatian is a uniform agreement language (Comrie 1975; Corbett 1983; Hahm 2006). The following example can be used with one or more addressees, but the adjective must appear in the plural in agreement with the subject:[1]

(2) Vi ste duhovit-i. Serbian/Croatian
you.PL AUX.2PL funny-M.PL
'You (one formal addressee/multiple addressees) are funny.'

The mixed agreement pattern was documented for Czech, French, Italian, Romanian, Icelandic, and Modern Greek by Comrie (1975: 410). Greville Corbett investigated this issue for all the Slavonic languages, and found this mixed agreement pattern to be favored in Macedonian, Bulgarian, Czech, Slovak, Upper Sorbian, Ukrainian,

[1] Some Serbian/Croatian dialects accept a singular adjective (Corbett 1983: 49; Comrie 1975: 407). Wechsler and Hahm (2011) show that uniform agreement with second person pronouns is restricted to nominative forms of the pronoun (see also Wechsler 2004).

Belorussian, and Russian (long form adjectives) (Corbett 1983: 56ff., 2000: 193–194, 2006: 230–232). On the other hand, other languages studied by Comrie and Corbett showed uniform agreement with polite plurals. Uniform agreement Slavonic languages included Serbian/Croatian, Slovene, and Russian (short form adjectives).[2] We look at Serbian/Croatian in more detail in Sect. 4.3 below.

For now, let us focus on mixed agreement languages. Romanian provides another example. With the Romanian polite second person pronoun *dumneavoastra* as subject, the predicative adjective can be singular or plural, referring to one or more than one formal addressee (Avram 1986). The following examples, taken from the INTERNET, illustrate singular and plural adjectives, respectively (Alexandra Teodorescu, p.c.). (Hahm 2006; Wechsler and Hahm 2011)

(3) a. Când clientul dumneavoastră este mulţumit si Romanian
when client.DEF 2.POLITE be.3SG satisfied.SG and
dumneavoastră sunteţi mulţumit.
2.POLITE.NOM be.2PL satisfied.SG
'When your client is satisfied, you (one formal addressee) too are satisfied.'

b. Noi suntem mulţumiti numai cand dumneavoastră sunteţi mulţumiţi.
we be.1PL satisfied.PL only when 2.POLITE.NOM be.2PL satisfied.PL
'We are satisfied only when you (multiple formal addressees) are satisfied.'

In (3a) the adjective *mulţumit* 'satisfied.SG' appears in singular, indicating one addressee, while in (3b) it appears in plural, indicating more than one addressee. Similarly, Czech has a polite plural (*vy*) that determines the plural form on finite verbs, but semantic agreement on predicate adjectives.

The verbs, which show syntactic number agreement, also agree in Person with the subject, while the adjectives, which show semantic number agreement, do not agree in Person. This pattern is generalized as follows (see Wechsler and Hahm 2011; ex. (68)):

(4) *The Polite Plural Generalization*: A polite plural pronoun agreement controller determines plural number (i.e. syntactic rather than semantic agreement) on any agreement targets marked for person (and number).

In contrast, targets that lack person features can vary depending on the features of the controller.

The Polite Plural Generalization is supported by all of the languages described in the surveys of differential predicate agreement with polite plurals by Comrie (1975)

[2]The patterns of adjective agreement with polite plurals described by Corbett and reviewed here are not always categorical. In a corpus study of Bulgarian polite plural triggers, the predicate adjective appeared in singular 97% of the time ($N = 163$) (Dončeva-Mareva 1978, cited in Corbett 1983: 47–48). Corbett's (1983: 53) meta-study of Russian corpora found 89% of long form adjectives in singular ($N = 37$). Nonetheless I assume a traditional discrete formal grammar, over which probabilities could be placed to model gradient data (Manning 2003: 309).

Table 1 Agreement with polite 2PL pronouns (Comrie 1975; Corbett 1983)

	FINITE VERB	PARTICIPLE	ADJECTIVE	NOUN
PERSON agreement?	yes	no	no	no
Romance:				
French	pl	sg	sg	sg
Romanian	pl	sg/(pl)[a]	sg	sg
Italian dialects[b]	pl	sg	sg	sg
Modern Greek	pl	sg	sg	sg
Icelandic[c]	pl	n.d.	pl/sg	n.d.
West Slavic:				
Czech	pl	(pl)/sg	(pl)/sg	sg
Slovak	pl	pl/(sg)	sg	sg
Lower Sorbian	pl	pl	pl/sg	sg
Upper Sorbian	pl	(pl)/sg	(pl)/sg	sg
Polish dialects[d]	pl	pl/sg	pl/sg	sg
South Slavic:				
Bulgarian	pl	pl (96%)	sg (97%)	sg
Macedonian	pl	pl	(pl)/sg	sg
Serbian/Croatian	pl	pl	pl/(sg) [e]	sg
Slovene	pl	pl/(sg)	(pl)/sg	sg
East Slavic:				
Ukrainian	pl	pl/(sg)	(pl)/sg	sg
Belorussian	pl	pl	sg	sg
Russian	pl	pl	SF: pl (97%)[f]	sg
			LF: sg (89%)	

Notes: Romance, Modern Greek, and Icelandic data are from Comrie (1975); Slavic data are from Corbett (1983: 56ff.). Percentages indicate data from corpus studies reported by Corbett (1983: 56; Table 3.5). As shown in the table, with polite plural pronoun subjects with a singular referent, plural number was found on: 96% of Bulgarian participles, 97% of Bulgarian predicate adjectives, 97% of Russian short form adjectives, and 89% of Russian long form adjectives. "Other parentheses indicate less frequent or less preferred variants." (Corbett 1983: 56). (a) The Romanian participle takes the singular but Comrie (1975: 410) also notes "the possibility of the plural in non-standard Romanian." (b) The 'Italian dialects' are "regional (especially southern) forms of Italian"; Comrie (1975: 409) cites examples from Verga's *I Malavoglia*. (c) Icelandic data on finite verb and adjective agreement are from Comrie (1975: 409). (d) Dialects spoken in southeastern Poland are described by both authors (Comrie 1975: 406–407; Corbett 1983: 45–46). (e) Serbian/Croatian nominative pronouns trigger plural (preferred) or singular, depending on dialect, while non-nominatives uniformly trigger singular. (f) Russian Short Form (SF) and Long Form (LF) adjectives differ, as shown

and Corbett (1983: 56ff.; 2000: 193–194; 2006: 230–232). Table 1 combines those findings.

Among the predicate agreement targets, only the finite verb shows person agreement, as shown in the first row of Table 1. As can be seen by looking at the leftmost column, agreement with the finite verb is uniformly plural across all of these languages. Meanwhile, as shown in the other columns, the agreement determined on participial and adjectival targets varies. The number feature of a predicate nominal

correlates strongly with the notional number of its subject, suggesting that in many languages they do not show grammatical agreement in the usual sense (Comrie 1975: 410; Corbett 2006: 233).[3]

Next we move beyond the European languages to test the strength of this generalization. We find further confirmation in the Niger-Congo language Gbaya (Samarin 1966). According to Samarin's grammar, second (and third) person plural pronouns 'are used for single individuals who are held in respect', including 'parents, in-laws, elderly people in general, etc.' (Samarin 1966: 102). Pronouns have both full analytic forms and affixal forms, such as the second person plural *wi* and the bound allomorphs *-Vi*, *-i*, *-ˊi*. Whether analytic or affixal, it is the plural form that is used for honorific reference to a single addressee. Whether those affixes are strictly incorporated pronouns, or rather serve as agreement markers when an associated nominal argument appears, will not be addressed here (Bresnan and Mchombo 1987; Baker 1996; Mithun 2003, inter alia). Either way they are consistent with the Polite Plural Generalization, taking the plural form regardless of the cardinality of the referent, as predicted for person markers.

Apart from such pronominal affixes, verbs in Gbaya do not show person agreement. However, certain verbs show number (but not person) agreement (Samarin 1966: 114), as in these examples[4]:

(5) a. am ɔ́ gére.
I be.SG alright
'I am alright.'

b. ɛrɛ yá gére.
we be.PL alright
'We are alright.'

Samarin (1966: 102) observes that the polite second person forms, despite taking the form of the plural pronoun, "are not followed by the plural verbs where such exist", citing this example:

(6) wi ɔ́ gére wéndé?
you.PL be.SG alright QU
'Are you (one addressee, honorific) alright?'

Since these Gbaya verbs agree only in number and not person, the selection of the singular form with a polite plural pronoun is consistent with the Polite Plural Generalization, which predicts plural (syntactic) agreement on any person agreement targets, but is silent regarding other targets. Note that person agreement correlates with finite verbs in the European languages listed in Table 1, but not in Gbaya. The statement of the Polite Plural Generalization bypasses the category of verb per se, connecting person agreement directly with syntactic agreement.

[3]Comrie and Corbett observe that predicate nominals are not universally prohibited from showing true agreement, citing certain Hungarian numeral phrases (Comrie 1975: 410) and other "rare examples which show that it is potentially an agreement target" (see Corbett 2006: 233 for references).

[4]This agreement follows an absolutive pattern, that is, the verb agrees with the object if there is one, otherwise agreeing with the subject.

Turning next to Papuan languages, Kobon (Papua New Guinea, Kaironk Valley) has a special use of the second person plural for reference to addressees bearing one of the following familial relations to the speaker: a female blood relative of a male speaker's wife, the wife of a male cross-cousin of a male speaker, the husband of a female cross-cousin of a female speaker, or a female speaker's husband's brother (Davies 1981: 153). In this example, the 2PL pronoun *kale*, used in reference to the speaker's sister(s)-in-law, can have singular or plural reference (Davies 1981: 153; ex. (403b)):

(7) Fub niñin yam kale au-aj-im gau e.
Fub 3POSS.sister group 2PL come-DUR-PAST.2PL there VOC
'Fub's sister(s), you have come.' (Fub is the speaker's wife.)

Verbs in Kobon agree in person with their subjects, as illustrated by this example. Crucially, 'If the subject of the sentence is such a taboo relative of the speaker, the verb must carry plural or dual number suffixation regardless of the actual number of the referent' (Davies 1981: 153). This is illustrated in (7), where the verb bears the second person plural past tense suffix *-im*. Thus Kobon also confirms the Polite Plural Generalization.

Verbs in Usan (Papuan; Papua New Guinea, Madang province) also show person agreement. The Usan free pronouns "are used rather frequently although each verb clearly identifies the person-number of the subject and, in the case of animates, of the object" (Reesink 1987: 52). Here is an example (Reesink 1987: 56; ex. (33)):

(8) ye yonou â qâmb ig-oum.
I my idle say.SS be-1SG.Pr
'I myself am just speaking without purpose.'

(SS = same subject) In Usan, addressees bearing "affinal relations" to the speaker, such as in-laws, must be referred to with the second person plural pronoun *an*" (Reesink 1987: 57). Reesink further notes that Usan predicates agree in number with such a subject, showing plural even "when the plural pronoun that refers to a singular referent is the subject". Like Kobon, Usan abides by the Polite Plural Generalization.

Hindi has several options for pronominal reference to the addressee. The pronoun *tuu*, formally second person singular, is generally limited to intimates and inferiors, while *tum*, formally second person plural, is the default pronoun for social equals (Hindi data from Rajesh Bhatt, p.c.).[5]

(9) a. tuu lambaa hai. (/* lambe ho.)
2SG tall.M.SG be.PRES.SG tall.M.PL be.PRES.2PL
'You (single informal) are tall.'
b. tum lambe ho (/* lambaa hai.)
2PL tall.M.PL be.PRES.2PL tall.M.SG be.PRES.SG
'You (single honorific, or multiple) are tall.'

[5]A third option is not discussed here: the honorific *aap*, historically related to a reflexive and mostly limited to second person referents but occasionally for third person referents, usually triggers third person agreement. We are interested here in the variation in grammatical number, not person.

As predicted, *tum* triggers plural on person agreement targets, even when used for singular reference, as shown in (9b). It shows uniform agreement, triggering plural on adjectives as well.

Sakha (Turkic; spoken in Siberia) agreement with a 'Russian style' polite pronoun provides further support for the Polite Plural Generalization. As predicted, person targets take the plural form (all Sakha examples are from Mark Baker, p.c.):

(10) Ehigi professor buol-a(r)-qyt.
you.PL professor be-AOR-2pS
'You are a professor.' (singular "Russian-style honorific" subject)

Baker (p.c.) notes that in a special raising construction, person agreement on the lower verb becomes optional:

(11) Min ehigi-ni bügün kyaj-yax-xyt/-tara dien erem-mit-im.
I you-ACC today win-FUT-2pS/-(3)pS that hope-PAST-1sS
'I hoped that you would win today.'

With a raised polite pronoun in this construction, the lower verb still requires the plural form:

(12) a. Min ehigi-ni professor buol-al-lar dien ihit-ti-m.
I you.PL-ACC professor be-AOR-PL that hear-PAST-1sS
'I heard that you (formal) are a professor.'

b. ??Min ehigi-ni professor buol-al dien ihit-ti-m
I you.PL-ACC professor be-AOR that hear-PAST-1sS
'I heard that you (formal) are a professor.'

If the Polite Plural Generalization is true, then we expect plural agreement on person targets. Only a singular, person-marked form could falsify that generalization, so this example does not.[6]

2.2 A possible exception

Persian prescriptive grammar abides by the Polite Plural Generalization, but colloquial speech, at least in the Tehran area, sometimes violates it. According to the prescriptive grammar, first of all, both the finite verb and the participle show person agreement, and both take the plural form, regardless of whether the pronoun has singular (polite) or plural reference. The second singular *to* is shown in (13b) for contrast (Hahm 2009).

[6]Coppock and Wechsler (2011) argue that the Sakha plural morpheme *-LAr* in (12) is not part of the person/number inflectional paradigm; in terms of the Index/Concord theory (see Sect. 4.2 below), *-LAr* is not an Index phi feature inflection. Among their evidence: (i) the same morpheme marks plural on nouns; (ii) this morpheme is unmarked for person, appearing for example on predicate nominals with first or second person subjects (Vinokurova 2005: 141; ex. (25a)). The cognate plural morpheme in Turkish can even appear on second person pronouns (Hahm 2010); (iii) it does not descend historically from an incorporated pronoun.

(13) a. Somâ dâr-id mi-r-id.
pron.2PL have.PRES-2PL go-PART-2PL
'You (one formal or more than one addressee) are going.'

b. To dâr-i mi-r-i.
pron.2SG have.PRES-2SG go.PART-2SG
'You (one informal addressee) are going.'

Thus Persian agreement with the polite second person plural pronoun *somâ* prescriptively conforms to the Polite Plural Generalization.

However, according to a study of speakers in the Tehran area in the 1980s, Persian colloquial speech often showed sociolinguistically motivated number mismatches between a second person subject and the verb form (Baumgardner 1982, cited in Ferguson 1991). When used in reference to a single addressee, subject *somâ* sometimes appeared with predicates showing the second person singular *-i* inflection, instead of second person plural *-id*. Ferguson (1991: 190) notes that "some speakers of Persian do not admit to using this kind of mismatch; others recognize its use when attention is called to it". According to Ferguson (1991), who cites Baumgardner (1982), the mixed singular-plural locution has a sociolinguistic value intermediate between the intimate and formal variants, with the singular agreement acting as a softener to the formal pronoun. For example, for one Iranian speaker in the study, "the use of the mixed form combined intimacy (close kin) with respect (older age)". (Ferguson 1991: 190). These facts suggest that for dialects and registers allowing mismatches, *somâ* is losing its syntactic plural feature altogether, while retaining its 'plural cardinality'∼'honorific' polysemy.[7] Then, by the Agreement Marking Principle, the pronoun and the target agreement inflections combine semantically, yielding a mixed sociosemantic value.

2.3 Conclusion regarding the polite plural generalization

Polite second person plural pronouns, even when used in singular reference, trigger plural agreement on person targets in (almost) every language surveyed: Gbaya, Kobon, Usan, Hindi, Sakha, French, Romanian, Italian (dialects), Modern Greek, Icelandic, Czech, Slovak, Lower Sorbian, Upper Sorbian, Polish (dialects), Bulgarian, Macedonian, Serbian/Croatian, Slovene, Ukrainian, Belorussian, and Russian. (The sole exception is colloquial Persian, as discussed above.) Non-person targets are split: some of them, such as the special number-marked Gbaya verbs and the adjectives in the mixed agreement languages discussed above, show semantic number agreement, while others, such as adjectives in Hindi and other uniform agreement languages discussed above, show syntactic number agreement. This language sample is neither exhaustive nor typologically balanced, so more research is needed in order to establish this generalization with greater certainty.[8] But it is certainly a robust generalization that seems to be confirmed to a degree that is unlikely to be due to chance.

[7] There is some evidence of this loss of the syntactic plural feature: Ferguson (1991: 189) notes that "a new form, *somâ-ha* 'you (pl)', appears in informal speech, resolving the singular:plural ambiguity of *somâ*…".

[8] More languages with polite second person plurals are discussed in Head (1978) and Hahm (2010).

Before we can explain mixed agreement and, in particular, why it is subject to the Polite Plural Generalization, we need to specify a framework for understanding semantic and syntactic agreement more generally. This framework must show how the two types relate, and how the grammar negotiates between them. The next section provides such a framework, based on the notion that semantic agreement arises when the controller lacks the phi feature to which the target is sensitive. Once that framework is in place we will turn to explaining mixed agreement with polite plural pronouns in Sect. 4. That account reduces to explaining why such pronouns are necessarily marked for the phi features to which person targets (such as finite verbs) are sensitive, but vary as to whether they are marked for the features to which non-person targets (such as predicate adjectives) are sensitive.

3 Semantic agreement as underspecification of the controller

3.1 The agreement marking principle

In this section we ask the basic question of what semantic agreement is, and how it relates to syntactic agreement. Following Wechsler (2004) and Wechsler and Hahm (2011), so-called semantic agreement will be analyzed, strictly speaking, as the failure of agreement. This failure of agreement arises when the controller lacks the grammatical phi feature in question. In such cases the semantic content of the phi feature of the target form is applied to the controller. For example, if the controller lacks a grammatical gender specification, then a feminine feature on the target results in applying the property 'female' to the denotation of the controller.

Consider English determiner-noun agreement. Semantic minimal pairs such as the plurale tantum noun *clothes* and mass noun *clothing* in (14a,b) show that agreement is driven by the form, not the meaning of the subject.

(14) a. these clothes/*this clothes
b. this clothing/*these clothing

When the controller noun has the relevant syntactic phi feature, then that feature controls agreement. But when it lacks such a feature, then the features on the target forms, such as determiners and verbs, become semantically potent. To take a well-known example, the English noun *sheep* is unmarked for number, so the number feature of the target form becomes semantically potent in (15).

(15) this sheep/these sheep (*this*: 1 sheep/*these*: more than 1 sheep)

Similarly, French gender agreement is determined by the syntactic gender feature of the controller. The noun *sentinelle* 'sentry' triggers feminine agreement regardless of the biological gender of the referent, as in (16a). But a French sex-neutral proper name like *Dupont* or *Professeur Dupont* lacks a gender feature, as does a first or second person pronoun such as *tu* 'you.SG'. So the target gender is semantically interpreted in (16b–e):

(16) a. La sentinelle à la barbe a été prise/*pris en otage.
the.F.SG sentry bearded has been taken.F.SG/taken.M hostage
'The bearded sentry was taken hostage.'

b. (Le Professeur) Dupont est compétent.
the.M.SG professor Dupont is competent.M.SG
'(Professor) Dupont (a *man*) is competent.'

c. (La Professeur) Dupont est compétente.
the.F.SG professor Dupont is competent.F.SG
'(Professor) Dupont (a *woman*) is competent.'

d. Tu es compétent.
you.SG are.2SG competent.M.SG
'You (a *man*) are competent.'

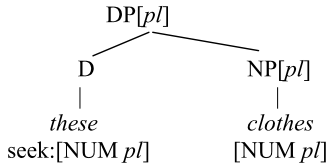
e. Tu es compétente.
you.SG are.2SG competent.F.SG
'You (a *woman*) are competent.'

Following Wechsler and Hahm (2011), semantic agreement can be analyzed as resulting from the controller lacking the phi feature needed to trigger syntactic agreement. This follows from the following *Agreement Marking Principle*. It is given informally first, followed by a slightly more formal statement, where a *feature* is defined as an ordered pair consisting of an *attribute* (F_{att}) such as PERS(on), NUM(ber), or GEND(er), and a *value* (F_{val}) such as singular (*sg*) and plural (*pl*) values for NUM:

(17) *Agreement Marking Principle*
(i) (informal statement) Agreement is driven by a syntactic feature of the controller, if the controller has such a feature. If the controller lacks such a feature, then the target agreement inflection is semantically interpreted as characterizing the controller denotation.
(ii) Suppose an agreement target is marked for a syntactic phi feature $\langle F_{\text{att}}, F_{\text{val}} \rangle$ with semantic content Σ. Then:
a. If $\langle F_{\text{att}}, F_{\text{val}} \rangle$ appears on the controller, then it is accepted. (*syntactic agreement*)
b. If $\langle F_{\text{att}}, G_{\text{val}} \rangle$ appears on the controller, $G_{\text{val}} \neq F_{\text{val}}$, then it is rejected. (*violation of syntactic agreement*)
c. If the controller lacks F_{att} altogether, then assign Σ to the controller denotation. (*semantic agreement*)

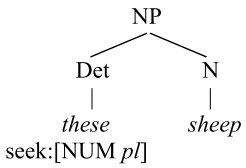
This principle applies to the above examples as follows. In (14)–(15), the English noun *clothes* bears the feature [NUM *pl*], the noun *clothing* bears the feature [NUM *sg*], and the noun *sheep* lacks a NUM feature altogether. The determiner *these* is specified to seek the [NUM *pl*] feature, assigning plural semantics if it fails to find that feature. So *these clothes* is accepted, and in *these sheep* the interpretation is 'semantically plural':

(18)



result: *these* finds the [NUM *pl*] feature, so it is accepted

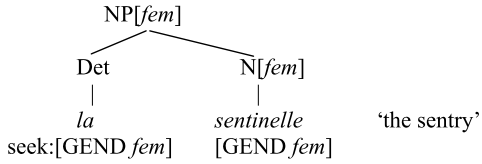
(19)



result: *these* fails to find a NUM feature, so it assigns 'plural' semantics

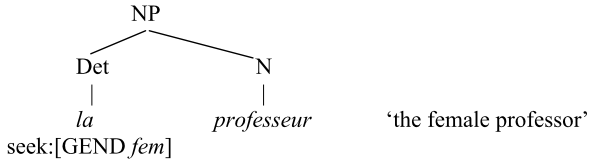
Similarly, in (16a), the French noun *sentinelle* bears the feature [GEND *fem*] but the noun *professeur* lacks a GEND feature altogether. The determiner *la* is specified to seek the [GEND *fem*] feature, assigning 'female' semantics if it fails to find that feature. So example (16a) is accepted (see (20)), and in (16c) the interpretation is 'female' (see (21)):

(20)



result: *la* finds the [GEND fem] feature, so it is accepted

(21)



result: *la* fails to find a GEND feature, so it assigns 'female' semantics

The idea behind this proposal is that a general grammatical principle allows speakers to leverage the absence of a controller phi feature. It is precisely the lack of a grammatical feature on the controller that leads to the semantic interpretation of the target feature. The Agreement Marking Principle is not in itself a descriptive generalization, since the presence versus absence of a given phi feature on the controller NP is not always directly observable, but rather depends upon the grammatical analysis of the NP. Instead, it is a grammatical principle that makes predictions when taken in conjunction with analyses of particular constructions in natural languages.[9]

[9]For example, if coordinate structures are analyzed as exocentric, then the Agreement Marking Principle explains the observation that the resolution of conjuncts of different genders is typically semantic rather than syntactic (Corbett 2006: 259ff.): the coordinate structure lacks a syntactic gender feature so agreement is driven by the meaning instead (Wechsler 2008). If instead such structures are analyzed as headed (Johannessen 1996, 1998), e.g. by the conjunction word, then the prediction depends on whether that head element is marked for phi features. If it is then those features are predicted to project to the maximal projection and trigger syntactic agreement, but if it is not then the Agreement Marking Principle still predicts semantic agreement.

3.2 Explaining the Agreement Marking Principle

If indeed grammars are subject to the Agreement Marking Principle, we should also ask why they are.[10] The function of the Agreement Marking Principle is to allow a certain type of commonsense reasoning to operate within the grammar.

The first clause of the Agreement Marking Principle addresses cases where the grammatical phi feature is present on the controller: 'Agreement is driven by a formal grammatical feature of the controller, if the controller has such a feature.' Consider a language user seeking to explain why a particular target form such as an adjective has a marked agreement inflection for a feature Φ (e.g. feminine gender) with semantic correlate Σ (e.g. the property 'female'). In general there are two possible explanations a priori: because the controller is grammatically specified for Φ; or because the thing denoted by the controller has the semantic property Σ. In the Bayesian tradition this type of commonsense reasoning about situations with multiple possible causes is sometimes called *explaining away* (Pearl 1988: 49ff.; Kjaerulff and Madsen 2007: 25ff.). Pearl (1988: 49) illustrates this concept with the story of a man whose home alarm system sends him an automatic call:

> As he is debating whether or not to rush home, Mr. Holmes remembers reading in the instruction manual of his alarm system that the device is sensitive to earthquakes and can be accidentally ($P = 0.20$) triggered by one. He realizes that if an earthquake has occurred, it surely ($P = 0.40$) would be on the news. So he turns on his radio and waits for either an announcement over the air or a call from his daughter.

Pearl observes that "though burglaries can be safely assumed to be independent of earthquakes, a positive radio announcement [of an earthquake—S.W.] reduces the likelihood of a burglary, since it 'explains away' the alarm sound" (Pearl 1988: 49). Pearl notes that "this interaction among multiple causes is a prevailing pattern of human reasoning".

Applied to agreement, the presence of a syntactic phi feature on the controller "explains away" an agreement feature on the target, thus reducing the likelihood that the semantic content of the target phi feature is meant to be interpreted as applying to the controller denotation. The first clause of the Agreement Marking Principle is a non-probabilistic idealization of this type of reasoning. According to that principle, the presence of a syntactic phi feature indeed 'reduces the probability' of semantic agreement—all the way to zero.

The assumption of a reduction to zero probability may be too strong, however. The literature on agreement is rife with examples of NPs that trigger semantic agreement despite the apparent presence of a head noun that is marked for the relevant phi fea-

[10] This conception of the Agreement Marking Principle in terms of explanation-seeking was suggested to me by Elizabeth Coppock. See Coppock (2009) for an explanation-seeking account of language acquisition. Katrin Erk suggested the relevance of Bayesian inference.

ture. Examples include Scandinavian 'pancake sentences' such as the Swedish (22b), in which the adjective appears in singular despite the morphologically plural subject (Faarlund 1977; Enger 2004; Corbett 2006: Sect. 5.2.2)[11]:

(14) a. [Pannkakor] är gula.
pancake.PL be.PRES yellow.PL
'Pancakes are yellow.'

b. [Pannkakor] är gott.
pancake.PL be.PRES good.NT.SG
roughly: 'Eating pancakes is good.'

As suggested by the gloss, the singular agreement on the adjective can be used when the subject refers to an activity or other situation involving pancakes (Enger 2004). Broadly speaking, from the perspective of this paper there are two approaches to such phenomena: modify the Agreement Marking Principle, as hinted at above; or maintain the Agreement Marking Principle as stated above but posit a structure for the triggering nominal (here, [*pannkakor*]) that lacks a plural number feature.

Consider first the possibility of amending the Agreement Marking Principle. As suggested above, we may decide to replace the first half of the Agreement Marking Principle with a more nuanced version in which the syntactic and semantic features are allowed to compete probabilistically as potential explanations (Pearl 1988: 49ff.; Kjaerulff and Madsen 2007: 25ff.). Under such an account, the syntactic and semantic agreement alternatives would be weighted, subject to various factors.

Alternatively, it may turn out that the Agreement Marking Principle is correct as stated. Under this assumption, the bracketed NP in (22b) lacks a syntactic plural number feature, or else it has a singular number feature—despite the plural suffix (*-or*). Any analysis of that structure that has the effect of preventing the projection of the syntactic number feature up to the phrasal node will account for the semantic agreement. There are several variants of this type of analysis. On one analysis a productive rule of systematic polysemy (Apresjan 1974; Copestake and Briscoe 1995; Nunberg 1995; Pustejovsky 1995) applies to the word *pannkakor* to derive a variant referring to an activity or other situation involving pancakes. This variant, the output of the systematic polysemy rule, either has a singular feature, or else lacks a formal number feature, so that agreement defaults to the semantics in keeping with the Agreement Marking Principle.

Similarly, one could posit a phrasal polysemy rule affecting the NP. This could be implemented for example with a unary branching rule deriving the semantic content of the mother node from that of its one daughter node, but without passing

[11]For similar examples from English see Reid (this volume). Other well-known problems include reference transfer (Nunberg 1995), British collective plurals (Copestake 1995; den Dikken 2001, inter alia), and *N-of-N* type nominals (*A variety of vegetables **are** available*~*A variety of vegetables **is** good for you*). Regarding the last type see Reid (this volume), who observes the relevance of the relative degree of semantic specification, hence 'conceptual prominence', of the first and second noun.

up any phi features: [[*pannkakor*$_{\mathrm{NP}[pl]}$]$_{\mathrm{NP}}$]. This unary branching structure should not be understood as phrase structure in the usual sense, however. This local subtree is opaque, i.e. the daughter node is inaccessible to the external syntax, so perhaps a better notation would show only a single NP node annotated with the effects of the polysemy rule: [*pannkakor*$_{\mathrm{NP}[pl]\rightarrow\mathrm{NP}}$].On a third alternative, these nominals have a branching phrase structure with a silent or abstract head that lacks the relevant phi features. For example, the bracketed constituent in (22b) could be a clause or VP like [EATING *pancakes*], where the formative EATING is silent (Faarlund 1977).

The agreement controllers analyzed in this paper are polite plural pronouns. So we put aside the resolution of this issue of 'pancake' nominals and related problems. For concreteness one may assume any of the grammatical solutions that preserves the Agreement Marking Principle as given. The analysis of polite plural pronouns proposed below is perhaps closest to the productive rule of systematic polysemy sketched above, except that the polysemy is not systematic across an open class but rather limited to the pronoun system (perhaps even limited to a single pronoun in some languages). But this analysis could probably be reformulated in terms of unary or binary branching phrase structure for the pronoun, as sketched above for pancake nominals, if such structures can be motivated. While a precise formal analysis is proposed here, the focus of this paper is on the distribution of phi features across agreement controllers and targets and not on the specific formal representation of phi features.

Now consider the second half of the Agreement Marking Principle (17i): "If the controller lacks such a [formal syntactic] feature, then the target feature is semantically interpreted as characterizing the controller denotation". If the controller lacks the syntactic phi feature Φ then the first possible cause of the target inflection is eliminated, leaving only the second: so-called semantic agreement, i.e. the application of the semantic content of the phi feature to the denotation of the controller. The absence of a syntactic phi feature entirely would reduce the probability of that alternative to zero and therefore raise semantic agreement to a probability of one.

As applied to pronoun triggers such as subject pronouns, the consequence of this principle is simply that a pronoun triggers syntactic agreement on a given agreement target if that pronoun is specified for the feature to which the target is sensitive. If it lacks that feature then the result is so-called semantic agreement, that is, the semantic content of the target phi feature is applied to the denotation of the controller.

3.3 Formalizing the Agreement Marking Principle

The idea behind the Agreement Marking Principle is that the absence of a phi feature on the controller form causes the target feature to be semantically interpreted. Since it is somewhat unusual for the *lack* of a feature to have grammatical effects, it may be helpful to see one way to formalize such a mechanism.

The Agreement Marking Principle can be formalized by specifying target forms disjunctively to either (i) find a formal feature in the controller, or (ii) contribute the semantic content of the agreement feature to the denotation of the controller (Wechsler 2004, 2005, 2008). Feature checking in this special sense is captured with Lexical Functional Grammar constraining equations (notated $=_c$), and semantic content is shown by the projection function σ from f-structure to semantic structure.[12] As a consequence of this disjunction, whenever the controller fails to satisfy the constraining equation, the semantic value of the target is added to the denotation of the controller. The following lexical entries for three French words account for the determiner agreement in (16a, c) above:

(23) Lexical entries for three French words

a. *la*, Det:	$(\uparrow\text{GEND}) =_c \textit{fem} \vee [\textbf{female}(\uparrow_\sigma) \wedge \neg(\uparrow\text{GEND})]$
b. *sentinelle*, N:	$(\uparrow\text{PRED}) =$ 'sentry'
	$(\uparrow\text{GEND}) = \textit{fem}$
c. *professeur*, N:	$(\uparrow\text{PRED}) =$ 'professor'
d. *Dupont*, N:	$(\uparrow\text{PRED}) =$ 'named-Dupont'

In prose, the equation in (23a) says that the determiner *la* must satisfy one of the following conditions: (i) the f-structure of the constituent immediately dominating the determiner (designated by '↑') contains a [GEND *fem*] formal feature that was contributed by some other element in the sentence (e.g. the noun); or (ii) the f-structure lacks such a feature, and this target form contributes 'female' semantics to the semantic structure of the constituent immediately dominating the determiner. The Det and N nodes are f-structure co-heads, so all the equations contribute features to the same f-structure. As shown in (23b, c) the noun *sentinelle* 'sentry' introduces the [GEND *fem*] feature but the noun *professeur* 'professor' does not, hence the feminine determiner *la* contributes the 'female' property in the phrase *la professeur* but not *la sentinelle*.

The other cases of semantic agreement discussed above work the same way. The English noun *sheep* in (15)/(19) lacks a Number feature, so the target forms *this* and *these* fail to find the syntactic number feature and therefore effectively impose their number semantics on the noun. This formalization is provided for concreteness, but could be replaced by a more explanatory account under a theory of markedness such as Optimality Theory (see Wechsler 2005).

Before laying out the analysis of mixed agreement, let us consider to what extent a commitment to a specific framework is necessary for expressing the ideas in this paper. The two ideas presented here are the Agreement Marking Principle and the Wechsler and Zlatić (2000, 2003) theory of Concord/Index agreement (see Sects. 4 and 5 below). The formal system for grammatical description adopted

[12] This notation is simplified and slightly non-standard. The expression $\uparrow_\sigma$ refers to the semantic denotation of (the f-structure corresponding to) the mother node; call that denotation x. Then '$\textit{female}(\uparrow_\sigma)$', for example, indicates that x has the semantic property 'female'. See Dalrymple (2001) for a formulation of LFG compositional semantics.

above is a particular unification-based formalism that includes constraining equations (Kaplan and Bresnan 1982; Kaplan 1995), which was developed for use in the family of theories known as Lexical-Functional Grammar (Bresnan 2001; Dalrymple 2001). So the question is whether these proposals depend upon a commitment to that particular formal framework.

Taking first the Wechsler and Zlatić (2000, 2003) theory of phi features and agreement, the answer is clearly that it does not depend upon a commitment to a specific framework, since Wechsler and Zlatić formalized that theory in a different framework (namely Head-Driven Phrase Structure Grammar). It was later adapted for LFG (King and Dalrymple 2004, inter alia), without any serious issues arising, as far as I know. The question of whether and how that theory can be translated into the Minimalist Program framework was recently addressed in some detail by Danon (2009a, 2009b).[13]

Turning next to the formulation of the Agreement Marking Principle, it places one noteworthy requirement on the formal system: it requires an output filter to check for the presence of a formal feature on the controller. LFG constraining equations fulfill that requirement, as explained above. However, not all formalisms allow output filters. In particular, some versions of Head-Driven Phrase Structure Grammar eschew the use of output filters, while others include them (Lascarides et al. 1995). The implications of the Agreement Marking Principle for Minimalism have not yet been investigated in any published work, as far as I know.

With this theoretical machinery in place, the action now moves to the specification of phi features on pronouns. Section 4 is devoted to motivating the particular specification of phi features on pronouns that gives rise to the mixed agreement patterns observed in Sect. 2 above.

4 An analysis of mixed agreement with polite plurals

4.1 Pronouns versus common nouns as agreement controllers

The framework for syntactic versus semantic agreement outlined in the previous section emphasizes the importance of the phi feature specification (or underspecification) of the controller. That approach finds support when we contrast polite plural pronouns with common noun phrases as controllers. Consider again the French mixed agreement example (1), repeated here, focusing on the predicate adjective:

[13] Specifically, Danon (2009a, 2009b) explores the possibility of adapting Wechsler and Zlatić's (2003) Index/Concord analysis of agreement with Serbian/Croatian Quantified NPs (QNPs) within Minimalism, focusing on related facts of Hebrew QNPs. Some QNPs trigger agreement based on the features of the Quantifier, some trigger agreement based on features of the noun, and some alternate. On Wechsler and Zlatić's (2003) analysis, agreement with QNPs is always with the QNP as a whole. Apparent cases of agreement with the complement NP come about when the Q's and N's indices are unified. In the Minimalist framework, the Q enters the derivation with unvalued Index features, probes for the Index features of its complement NP, and Agree between Q and NP copies those features to Q. Danon (2009a: 6) asks rhetorically, "If Q's features are deleted following this Agree, how can they later be the goal for T's unvalued features?" Following Pesetsky and Torrego (2007), Danon proposes that agreement does not delete features but rather involves feature sharing, so that such features "may still enter further Agree operations to value higher probes". (Danon 2009a: 6).

(24) a. Vous êtes loyal. French
you.PL be.2.**PL** loyal.M.**SG**
'You (singular, formal, male) are loyal.'

b. Vous êtes loyaux.
you.PL be.2.**PL** loyal.**PL**
'You (plural) are loyal.'

Why does the adjective not show plural syntactic agreement with its subject? A first hypothesis, proposed by Kathol (1999), is that French predicate adjectives are grammatically specified for semantic rather than syntactic agreement with their subjects.

But there is a problem with that view, pointed out already by Wechsler (2004) and Wechsler and Hahm (2011). When the controller is a plurale tantum noun such as *ciseaux* 'scissors', then the adjective invariably shows syntactic agreement in number and gender:

(25) Ces ciseaux sont géniaux!/*génial!
these.PL scissors(M.PL) are.PL brilliant.M.PL/*brilliant.M.SG
'These scissors are cool!'

As far as the syntax is concerned, *ciseaux* 'scissors' is an ordinary masculine plural common noun. Such plurale tantum nouns are special only with regard to semantic interpretation. All agreement is masculine plural, although the noun need not be interpreted as semantically plural, and obviously is not male-denoting. Hence the predicate adjective does not, as a rule, show semantic agreement with its subject.

The other mixed agreement languages are similar. Recall that Romanian is a mixed agreement language (ex. (3)), hence a Romanian adjective has semantic agreement with a polite second person plural subject. But the plural form of the adjective is used with a plurale tantum noun like *ochelarii* 'glasses':

(26) Ochelari-i tai sunt draguti.
glasses-DEF.M.PL your.M.PL be.3PL pretty.M.PL
'Your glasses (one/more than one pair) are pretty.'

Similarly, Czech has a polite plural (*vy*) that determines the plural form on finite verbs, but semantic agreement on predicate adjectives, while a plurale tantum like *brýle* 'glasses' takes plural on both verbal and adjectival targets.[14]

Indeed, in all of these mixed agreement languages, polite plural pronouns trigger plural on a verb but semantic agreement on an adjective, while plurale tantum common nouns trigger plural on both. See Table 2.

[14]This plural agreement cannot be explained simply as semantic agreement, where a plurale tantum noun like *scissors* is semantically plural. Among other problems with that view, predicate nominals, which typically show the semantically justified number form (regarding agreement with polite plurals, recall the right-hand column of Table 1 above), can be singular when predicated of a plurale tantum nominal: *These scissors are an important tool*. For examples from other languages see Wechsler and Hahm (2011).

Table 2 Agreement on selected targets for 2nd person polite plural and plurale tantum controllers in mixed agreement languages

target→ / controller↓	finite verb	predicate adjective
polite 2PL pronoun ex. French *vous* 'you.PL'	PL	semantic
hybrid common noun ex. French *ciseaux* 'scissors'	PL	PL

Notes: '*Polite 2PL pronoun*' refers to a grammatically plural pronoun used for polite (formal, honorific) address. '*Hybrid common noun*' refers to a common noun that is grammatically plural but notionally singular

This contrast between pronoun and common noun controllers is significant. Of all the languages documented for mixed agreement with polite plural pronouns, none exhibits mixed agreement with common nouns such as plurale tantum nouns as well (Wechsler and Hahm 2011). Hybrid common nouns (such as plurale tantum nouns) systematically contrast with hybrid pronouns (such as polite second person plural pronouns) in mixed agreement languages. This shows the importance of the morphological, as opposed to semantic, category of the controller, namely whether it is a pronoun or common noun phrase. Next we will see exactly how pronouns and common nouns differ in their phi specifications, and why they do.

4.2 The concord/index distinction

When used to refer politely to one addressee, *vous* triggers singular on a predicate adjective but plural on the verb, as in (1)/(24) above. On the account presented in Sect. 3, semantic agreement results from the underspecification of the controller. For example, first and second person pronouns are unspecified for gender in French (recall (16d, e)) and most other languages. Similarly, French *vous* is underspecified for number, but only selectively underspecified. That is, it has a plural number feature to which only some agreement targets are sensitive. This selective specification of controllers follows as a natural consequence from theories based on a bifurcation of agreement targets into two types (Pollard and Sag 1994; Kathol 1999; Wechsler and Zlatić 2003). Here we adopt Wechsler and Zlatić's (2000, 2003) distinction between Concord targets and Index agreement targets. In Sect. 5 below, I speculate that the explanation for this bifurcation is ultimately diachronic in nature: Index agreement inflections (e.g. finite verbs) derive from incorporated pronouns, while Concord agreement inflections (e.g. adjectives) derive from incorporated noun classifiers. The Concord/Index theory of agreement within synchronic grammar is briefly reviewed next.

Fundamental to the Concord/Index theory is the universal grouping of (target) agreement features into two different feature bundles. The most important difference for the present purposes is that only the Index feature bundle can include the Person feature. So, from among the phi features Person, Number, and Gender, the Concord

phi features comprise at most Number and Gender, while the Index phi features include at most Person, Number and Gender. (In addition, in case-marking languages the Concord features include the non-phi feature Case.) Wechsler and Zlatić (2000, 2003) motivate this bifurcation on synchronic grounds, showing for example that when target values diverge it is always the Concord value—not the Index value—that shows the closer relation to the declension class of the triggering noun (see Sect. 5).

The following example illustrates the two different grammatical processes that can access the phi features of a noun controller.

(27) Those[*pl*] **musicians**$_{i\,[3\,pl]}$ are enjoying themselves$_{i\,[3\,pl]}$.

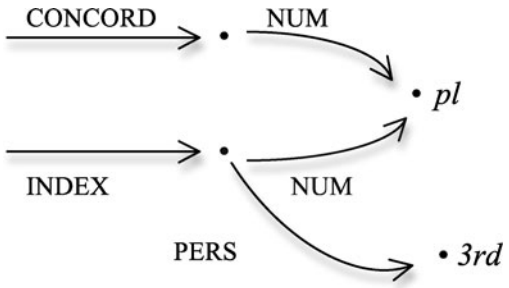
First consider the reflexive pronoun *themselves*. The NP *those musicians* has a 3PL referential Index, as does the reflexive pronoun. In the binding theory of Pollard and Sag (1992, 1994), binding involves literal co-indexation, i.e. structure-sharing of the referential index, between binder and anaphor. Phi features called *Index phi features* directly mark that referential index, so the features of the binder and anaphor cannot clash.

Determiner-noun agreement in (27) is analyzed not as sharing of Index features but rather sharing of syntactic features called Concord features. The exact mechanism of agreement is not crucial here. It often reduces to a side effect of the syntactic combination of the noun with its determiner. In Lexical Functional Grammar, for example, principles of structure-function mapping dictate that a functional category (such as D), its complement (such as NP), and the mother node (DP) all map to the same f-structure (Bresnan 2001: Chap. 6). This means that phi features of the two daughter nodes, D (*those*) and NP (*musicians*), as well as the DP mother node, are all unified, so any phi features lexically marked on the words *those* and *musicians* must be mutually consistent.

Finite verb agreement such as plural *are* in (27) is treated as Index agreement, like the pronoun. The verb *are* does not itself bear a referential Index but rather selects a subject with a plural (or second person) Index. There is synchronic evidence for classifying finite verb agreement with pronoun agreement: finite verbs and pronouns pattern together in special situations where Concord and Index diverge in value (see below for examples). The diachronic explanation for this patterning is that finite verb agreement inflection derives historically from incorporated pronouns (see Sect. 5 below).

These various relations—determiner-noun, pronoun-antecedent, and verb-subject—access the same plural number value on the controller. That number value ultimately originates from the plural *-s* morpheme on the noun *musicians*. The plural morpheme has one plural value that is accessed by agreement targets along two different paths. This is modeled in the unification formalism by allowing two arcs of a directed graph to terminate at the same value. Each arc represents an attribute path to that value. The path labeled CONCORD in (28) is for the inflectional head feature and the path labeled INDEX is for the referential Index. In (29) the same information as (28) is presented in the abbreviated form used in this paper, where phi attribute names (PERS, NUM, GEND) are implicit and the subscript (here, [3^{rd}.*pl*]) represents the referential Index, i.e. the value for the feature INDEX, as in standard HPSG notation.

(28) Phi features of an English plural noun, such as *musicians*:

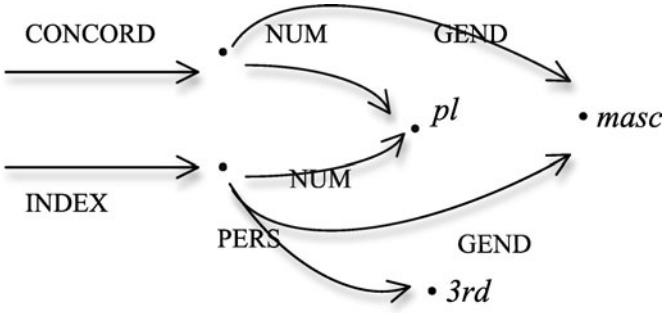


(29) Phi features of an English plural noun, such as *musicians*:
N[CONC pl]$_{[3rd.pl]}$

The French plurale tantum noun *ciseaux* 'scissors' has a similar representation, except with masculine gender arcs added to the graph:

(30) Phi features the French masculine plural *ciseaux* 'scissors'

a. Directed graph notation:



b. abbreviation: [CONC $m.pl$]$_{[3rd.pl.m]}$.

As noted above, with respect to syntax this noun is an ordinary masculine plural common noun. All determiner, verb, and adjective number agreement is plural, as shown in (25) above.

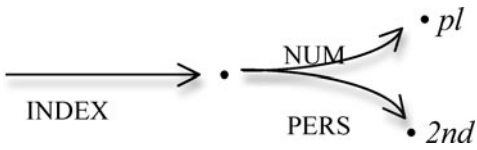
Now consider the phi feature specifications of the French pronouns. Pronouns are special in that they can serve either as targets or controllers of agreement. From their behavior as targets we know that they are specified for Index features. As explained above, Index phi features are features of the referential Index which is involved in pronoun binding. Thus the 2PL features of *vous* are necessarily (at least) Index features. Also, since pronouns bound by *vous* show the 2PL form, we know that its Index features are 2PL. That is, the French polite plural *vous* determines second person plural agreement on a reflexive pronoun, regardless of whether it refers to one or more than one addressee:

(31) a. Et vous$_i$ { vous$_i$ / *te$_i$ } considérez loyal?
and you.PL you.PL/you.SG consider.2PL loyal.M.SG
'And you$_i$ (male, formal) consider yourself$_i$ loyal?'

b. Et vous$_i$ { vous$_i$ / *te$_i$) considérez loyaux?
and you.PL you.PL/you.SG consider.2PL loyal.PL
'And you$_i$ consider yourselves$_i$ loyal?'

This rather unsurprising fact confirms that the referential Index of *vous* has the features [PERS *2nd*] and [NUM *pl*]. Nothing in the theory requires that pronouns have Concord phi features, however. So suppose *vous* has only Index phi features and no Concord phi features:

(32) a. *vous*: (n.b.: no CONCORD path)



b. *vous*: Pron$_{[pl,2nd]}$

Now consider the targets in question, namely finite verbs and adjectives. As noted above, the finite verbs show Index agreement: they always pattern with bound pronouns when those pronouns show grammatical agreement, and they include a Person feature, which is restricted to the referential Index. Adjectives, on the other hand, are morphologically suited for Concord, since they can be used attributively and DP-internal agreement is Concord. So finite verbs show Index agreement while adjectives show Concord agreement. In (24) the controller *vous* lacks Concord features, so the adjective seeking those features defaults to the semantics, in keeping with the Agreement Marking Principle. Similarly, the lack of a Gender feature on the pronoun causes the adjective's gender to be semantically potent, hence the addressee hearing (24a) is male. This accounts for the mixed agreement observed in (24a).

Within the formal system presented above, the lexical entries for the French words *vous* 'you.PL', *êtes* 'are.2PL', and *loyal* 'loyal.M.SG' are as follows.

(33) LFG Lexical entries for the French words in (1a)/(24a)

a. *vous*, Pron: (↑PRED) = 'pro'
(↑INDX PERS) = *2nd*
(↑INDX NUM) = *pl*

b. *êtes*, V: (↑SUBJ INDX PERS) = *2nd*
(↑SUBJ INDX NUM) =c *pl* ∨
[**plural**$(\uparrow_\sigma)$ ∧ ¬(↑ SUBJ INDX NUM)]

c. *loyal*, A: (↑PRED) = 'loyal⟨(↑SUBJ)⟩'
(↑SUBJ CONC NUM) =c *sg* ∨
[¬ **plural** $((\uparrow\text{SUBJ})_\sigma)$ ∧ ¬(↑ SUBJ CONC NUM)]
(↑SUBJ CONC GEND) =c *masc* ∨
[**male**$((\uparrow\text{SUBJ})_\sigma)$ ∧ ¬(↑ SUBJ CONC GEND)]

The parts of these equations that appear in square brackets (such as [**plural**($\uparrow_\sigma$) $\wedge$ **¬**(↑ SUBJ INDX NUM)]) are spelled out above for the sake of completeness, but they actually follow from the Agreement Marking Principle, rather than being stipulated for each lexical item. In any case, as explained above, the particular choice of formal framework is not crucial.

4.3 Uniform agreement as assimilation

For some uniform agreement languages there is evidence that the uniformity results from the assimilation of the adjective to the verb. Recall that Serbian/Croatian is a uniform agreement language. Sentence (2), repeated here, can be used with one or more addressees, but the adjective must appear in the plural in agreement with the subject:

(34) Vi ste duhovit-i. Serbian/Croatian
you.PL AUX.2PL funny-M.PL
'You (one formal addressee / multiple addressees) are funny.'

There is variation. Some Serbian/Croatian dialects accept a singular adjective (Corbett 1983: 49; Comrie 1975: 407). Historically, mixed agreement was previously more common, while uniform agreement is the innovation: 'It is interesting to note that the trend has been away from the semantic form towards syntactic agreement.' (Corbett 1983: 49). Striking evidence for assimilation comes from the fact that this uniform agreement with second person pronouns is restricted to *nominative* forms of the pronoun (Wechsler 2004; Wechsler and Hahm 2011). Non-nominative pronouns determine semantic agreement on an adjective, as shown by this example of an accusative subject of a secondary predicate adjective:

(35) a. Očekivao sam vas veselu.
expect.M.SG AUX.1SG you.PL.ACC happy.ACC.F.SG
'I expected you (formal, one female addressee) to be happy.'

b. Očekivao sam vas veseli.
expect.M.SG AUX.1SG you.PL.ACC happy.ACC.M.PL
'I expected you (more than one; male or mixed gender) to be happy.'

c. Očekivao sam vas vesele.
expect.M.SG AUX.1SG you.PL.ACC happy.ACC.F.PL
'I expected you (multiple female addressees) to be happy.'

For similar data involving dative controllers see Wechsler and Hahm (2011).

This supports the view that the Concord targets assimilated to the Index targets appearing within the same clause, namely finite verbs and auxiliaries. Finite verbs and auxiliaries agree only with nominatives, so it is only with nominatives that such an assimilation is expected. Variation results from incomplete assimilation.

Thus nominative Serbian/Croatian *vi* has Concord phi features, while non-nominative forms of Serbian/Croatian *vi* lack phi Concord features and have only case features:

(36) Serbian/Croatian second person plural pronouns
  a. nominative *Vi:*
     'standard' dialect: Pron[CONC *nom.pl*]$_{[2nd.m.pl]}$
     colloquial/dialectal: Pron[CONC *nom*]$_{[2nd.m.pl]}$
  b. accusative *vas:* Pron[CONC *acc*]$_{[2nd,m,pl]}$

However, this explanation does not necessarily apply to all uniform agreement languages.

4.4 Summary of the analysis

Let us recapitulate the explanation for mixed agreement with polite plural pronouns. When a controller form is unspecified for a phi feature that a target form is sensitive to, the result is semantic agreement (the Agreement Marking Principle; Sect. 3 above). Technically the controller has at most one value (e.g. *pl*) for each phi attribute type (e.g. NUM); but it can specify up to two different paths to that value, the INDEX path leading to the referential Index and/or the CONCORD path leading to inflectional head features. Thus a target can be sensitive to the phi feature of a controller in either of two ways. It can be sensitive either to the phi feature marked on the referential Index of the controller (Index agreement), or to an inflectional head feature of the controller (Concord agreement).

Pronouns are specified for Index phi features, as shown by anaphoric agreement between a pronoun and its binder (Pollard and Sag 1994). Agreement with the referential Index can involve the feature of Person (in addition to Number and Gender). Index agreement is found both on pronouns and on certain predicates such as finite verbs. We speculate below that those agreement inflections derive historically from incorporated pronouns, which are distinguished by Person (Sect. 5 below).

Agreement inflection on other agreement targets such as adjectives excludes Person, including at most Number, and Gender phi features (and Case, in a case-marking language). We speculate below that those agreement inflections derive historically from non-pronominal sources such as incorporated noun classifiers, which are not distinguished by Person (Sect. 5 below). This second type is called Concord.

Since pronouns have Index phi features, a pronoun serving as controller triggers agreement on all Index targets. Hence French *vous* triggers plural on any Index targets such as finite verbs. But nothing in the theory requires a pronoun to have Concord phi feature, hence nothing requires *vous* to have a plural feature to which adjectives are sensitive. Thus polite plural pronouns vary in their Concord specifications, being marked for plural Concord in some languages but not others. French second person *vous* lacks a Concord number feature, leading to the semantic interpretation of the plural number value on the target adjective form. Since the Index, but not the Concord, can include the Person feature, this correctly predicts the Polite Plural Generalization.

It is important to understand that this analysis is not merely a description of the Polite Plural Generalization, but rather an explanation for it. A hypothetical reverse language, with semantic number agreement on person targets and syntactic number agreement on person-free targets, is theoretically impossible. A pronoun must have Index phi features, and a Person target must be an Index target. Those features of the controller therefore determine syntactic agreement on such targets.

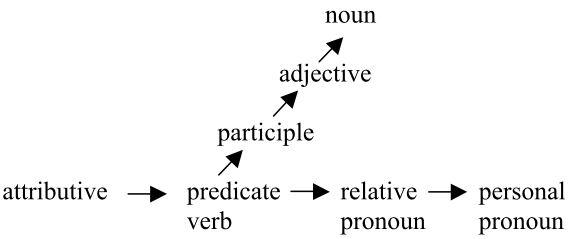
5 Mixed agreement in natural language: why?

Why do languages have mixed agreement at all? Why don't all targets show the same agreement with a given controller? The analysis in this paper focuses on polite plural controllers. But let's first step back to consider how the present claims fit in with the broader patterns of syntactic and semantic agreement. Those patterns have been largely explained in terms of distance between controller and target. I will suggest that the locality-based explanation should be complemented by the present approach in terms of a bifurcation between target types. Then I will speculate on the diachronic origin for that bifurcation.

5.1 Locality, bifurcation, and the Agreement Hierarchies

On the basis of extensive crosslinguistic data, Corbett (1979, 1983, 1991, 2000, 2006) has established universal implicational hierarchies regarding the relative likelihood of syntactic or semantic agreement on targets of different types. Attributive modifiers are the most likely to show syntactic agreement, pronouns are the most likely to show semantic agreement, and predicates lie in between (the Agreement Hierarchy). Among the predicates, verbs are most likely to show syntactic agreement, then participles, adjectives and predicate nominals (the Predicate Hierarchy) (Comrie 1975; Corbett 2006). Corbett (2006: 233) combined the two hierarchies as follows, where "the claim for the monotonic increase in semantic agreement then applies to each link of the combined hierarchies".

(37) The Agreement and Predicate Hierarchies (Corbett 2006: 233)



←syntactic agreement semantic agreement→

> For any controller that permits alternative agreements, as we move rightwards along the Agreement Hierarchy, the likelihood of agreement with greater semantic justification will increase monotonically (that is, with no intervening decrease) (Corbett 2006: 207).

Corbett explained the hierarchies as resulting from relative syntactic distance between controller and target. The key is that pronouns can be arbitrarily far from their antecedents and may be used deictically (hence show semantic agreement) or anaphorically (hence syntactic agreement is possible), with the deictic strategy more likely with greater distance. Thus "the further the target is distanced from the controller, the more likely semantic agreement becomes" (Corbett 1991: 243). As syntactic agreement is lost and replaced by semantic agreement, the semantic option can also move

into the predicate system, while syntactic agreement is retained in attributive positions (for an illustration from Bantu, see Corbett 1991: 254).

Corbett rejects attempts to explain the hierarchy by splitting agreement into two types: "whichever way we attempt to split agreement into two phenomena, we do not thereby solve the problem of the distribution of agreement options" (Corbett 2006: 229). He notes that the cutoff between syntactic and semantic agreement varies across languages, and moreover "we often find syntactic and semantic agreement as alternatives for a given agreement target" (Corbett 2006: 229).

The Index/Concord split advocated in this paper is not meant to replace Corbett's syntactic distance explanation, but rather to complement it.[15] Notice that the Index/Concord split is actually orthogonal to the Agreement Hierarchies. It does not have the effect of cutting the Hierarchies at any particular place. Rather it effects a split between Person-inclusive and Person-exclusive targets, and its consequences depend upon the features of the controller.

Consider adjectives versus finite verbs. In many languages, adjectives lack person agreement regardless of whether they are used attributively or predicatively, hence they are Concord targets in both positions. But attributives and predicate adjectives lie on opposite sides of verbal predicates on the hierarchy in (37). This is one situation where syntactic distance alone does not suffice to explain the facts. For example, recall that Serbian/Croatian non-nominative polite plural pronouns determine semantic agreement on predicate adjectives ((35) above). Interestingly, the same is true for attributive adjectives. It is generally hard to modify pronouns with attributive adjectives, but pronouns allow modification by certain affective adjectives, as in English *Lucky you!* and *Poor me!* The attributive adjective's phi features are semantically interpreted (Wechsler 2004):

(38) a. [Vas jadnu] niko ne postuje.
you.ACC.PL poor.ACC.F.SG nobody NEG respect
'Nobody respects) poor you.' (one female addressee)

b. [Vas jadnog] niko ne postuje.
you.ACC.PL poor.ACC.M.SG nobody NEG respect
'Nobody respects poor you.' (one male addresee)

c. [Vas jadne] niko ne postuje.
you.ACC.PL poor.ACC.PL nobody NEG respect
'Nobody respects poor you.' (multiple addressees)

Attributives lie at the far left edge of the hierarchy: they are the most likely of all to have syntactic agreement (see (37)); normally this is expected because they are closer to the controller than any other targets. But it only follows if the controller is marked for the features to which the target is sensitive. Being unmarked for Concord features, the Serbian/Croatian non-nominative pronouns cannot trigger syntactic agreement on an adjective, regardless of how close it gets.

[15] The relation between the Concord/Index theory and the agreement hierarchies advocated here differs somewhat from the view expounded in Wechsler and Zlatić (2003: Chap. 5).

If the distinction between Index and Concord targets cannot simply be derived from syntactic distance, then we must look elsewhere for its ultimate explanation. In the following sections some speculations are offered.

5.2 Two historical sources of agreement inflections

Fundamental to the Concord/Index theory is the universal grouping of target agreement features into two different feature bundles. Index phi features can (and usually do) include the Person feature, while Concord phi features exclude Person. Within the generative tradition the notion that agreement splits into two types is a recurrent but controversial theme. Bresnan and Mchombo (1987) introduce a split between anaphoric and grammatical agreement, the difference hinging on whether the target inflection has semantic content (hence is an incorporated pronoun) or not (hence is an agreement affix) (see also Bresnan 2001: Chap. 8). The Wechsler and Zlatić (2000, 2003) two-feature theory assumed here has roots in the work of Pollard and Sag (1994) and Kathol (1999). As noted above, Corbett (2006: 229ff.) rejects the splitting of agreement as a solution to the Agreement Hierarchy.

But the idea of an agreement bifurcation is older within the diachronic literature on agreement (Greenberg 1978). There are thought to be two different lexical sources for agreement inflections: (i) incorporated pronouns, and (ii) incorporated noun classifiers. Noun classifiers, in turn, derive from so-called 'generic' common nouns, i.e. semantically superordinate common nouns meaning 'animal', 'man', 'woman', and so on. I hypothesize that these two sources give rise to Index and Concord target inflections, respectively.

Many grammatical agreement systems evolve historically from the incorporation of pronominal arguments into the predicates selecting those arguments, such as verbs and nouns (Bopp 1842; Givón 1976; Wald 1979, inter alia). When a nominal topic serving as antecedent to the subject or object incorporated pronoun is reanalyzed as the true subject or object of the predicate, the pronominal affix effectively becomes an agreement marker. This explains why the features of grammatical agreement match those of pronominal anaphora, as observed by Bresnan and Mchombo (1987: 752):

> . . .discourse-anaphoric relations, and even deixis, universally show agreement in the referentially classificatory categories of person, number, and gender class; these are also the categories of grammatical agreement between a verb and its arguments, reflecting the historical derivation of many agreement systems from pronominal systems.

Grammatical agreement of this type is Index agreement. As explained above, Index phi features characterize the referential Index, which is mapped to a discourse referent in the interpretation of the sentence (Pollard and Sag 1994). Structural anaphoric binding involves identifying (structure-sharing) the referential indices of the pronoun and its binder, so personal pronoun-antecedent agreement is normally Index agreement.[16] (Pollard and Sag 1994). The historical development of grammatical agree-

[16]Under certain conditions pronouns need not agree with their antecedents in phi features. Instead they refer directly to discourse referents and therefore have semantically based phi features. But when they do agree grammatically, it is Index rather than Concord agreement (see Wechsler and Zlatić 2003: Chap. 9).

ment affix from incorporated pronouns has been analyzed as loss of semantic reference by the affix (Bresnan 2001: 146–147).[17] Hence agreement that is historically derived from pronoun incorporation is Index agreement (Wechsler and Zlatić 2003: 15–16).

Turning now to adjective agreement, the agreement inflections on modifiers of nouns are thought to derive historically, not from pronouns, but from noun classifiers (Greenberg 1978; Corbett 2006: 268–269; Grinevald and Seifart 2004; Seifart 2009; Reid 1997; Corbett 1991). The classifier morphemes in turn derive historically from lexical common nouns denoting so-called 'generic' (i.e. superordinate) categories like animal, woman, man, etc.

For example Reid (1997) posits the following probable stages in the historical development of Ngan'gityemerri (southern Daly; southwest of Darwin, Australia), a language where most of these stages continue to cooccur in the current synchronic grammar. Stage 1 is characterized by "generic-specific pairing of nouns as a common NP construction type" (Reid 1997: 215), such as the generic *gagu* 'animal' and the specific *wamanggal* 'wallaby' in this example:

(39) gagu wamanggal kerre ngeben-da
animal wallaby big 1SGS:AUX-shoot
'I shot a big wallaby.' (Reid 1997: 216; ex. (162))

At Stage 2, the specific noun is omitted when reference to it is established in discourse, leaving the generic noun and modifier, to form NPs like *gagu kerre*, literally 'animal big' but functioning roughly like 'big one'. Then, where the specific noun is also included, both noun and modifier attract the generic term (Stage 3):

(40) gagu wamanggal gagu kerre ngeben-da
animal wallaby animal big 1SGS:AUX-shoot
'I shot a big wallaby.' (Reid 1997: 216; ex. (164))

Reid (1997: 216) reasons that "once gender markers come to be repeated within the noun phrase, they come under strong pressure to contract to monosyllables and cliticise". Hence at Stage 4 "we find gender markers reduced to proclitics, and agreement marking by proclitics on modifiers":

(41) wa=ngurmumba wa=ngayi darany-fipal-nyine
male=youth male=mine 3SGS:AUX-return-FOC
'My initiand son has just returned.' (Reid 1997: 216; ex. (165))

Next an asymmetry between the prefixes on the common noun and the prefixes on the modifiers may develop: "proclitics to nouns become obligatory, develop increased dependency on their host, and become prefixes"; as a consequence, "morphophonological processes. . .now operate between prefix-noun, but not between proclitic=modifier" (Reid 1997: 216). In this example, the noun prefix has undergone vowel harmony but the modifier clitic has not:

[17] In LFG this is modeled as loss of the PRED feature, which encodes lexicosemantic content. See Bresnan (2001: Chap. 8).

(42) é-melpe a=yéyi
ANIM-stingray ANIM=other
'another stingray' (Reid 1997: 217; ex. (168))

This stage (Stage 5) represents canonical NP-internal gender concord: the gender class of a noun determines the gender marker on its modifier.

This process may further progress to 'prefix absorption' into the common noun, as evidenced by "gender prefixed nominal roots being interpreted as stems for further gender marking" (Reid 1997: 217). For example, *wa-mumu* 'policeman' is formed from the Male gender marker *wa-* and stem *mumu* 'taboo'. But the newer word for 'policewoman' is not the expected *wur* = *mumu*, but rather *wur* = *wamumu*, showing that the prefix *wa-* has been absorbed into *wamumu*, which is now analyzed as a stem.[18]

Agreement derived from sources other than pronoun incorporation is our Concord. Prima facie evidence comes from the observation that the correlation between a noun's form and its phi features is stronger for Concord phi features than Index phi features (Wechsler and Zlatić 2000, 2003; see especially Wechsler and Zlatić 2003: Chap. 2). This would follow from the presence of the classifier affix on both the noun and its modifiers, as discussed above. If the phonology of that affix remains the same across different hosts (Stage 4, ex. (39) above) then the result is 'alliterative agreement', where the controller and target bear the same affix (Corbett 2006: 87–88). Corbett (2006: 88) cites this example from Russian: *Maš-a čita-l-a* (Masha(F)-SG read-PST-F.SG 'Masha was reading'), where "the same marker *-a* is found on controller and target". If the noun affix undergoes morphophonological processes so that its form differs from the corresponding morphemes on the modifiers, as in (42) above, then the result is 'partly alliterative' agreement (Corbett 2006: 88).

5.3 A consequence: person is part of index but not concord

For the present purposes the most important consequence of the different provenance of Concord and Index agreement concerns the Person feature: Index often includes it but Concord never does. Much as Bresnan and Mchombo (1987: 752) observed that Person, Number, and Gender are inherited by agreement morphemes from their pronominal sources, we expect agreement derived from generic common nouns (via classifiers) to range over the features of common nouns, namely Number and Gender. (In addition, the non-phi feature Case is a feature of nominals in some languages, and therefore also becomes a Concord feature.) So for agreement inflection that historically derives from generic nouns, the phi features maximally comprise the features Gender and Number.

Conspicuously absent from the list of Concord features is Person. Pronouns are distinguished from one another by the Person feature, but common nouns are not, so pronoun-derived agreement includes Person while common noun-derived agreement does not. The lack of Person on common nouns follows from the common view

[18] Luraghi (2011) argues that small gender systems, such as the one found in Indo-European, arise from the differentiation of object case according to animacy.

that first and second person are privative features, and the so-called third person is really the lack of person altogether (Benveniste 1966, inter alia). But even without assuming that analysis of third person, Person is not expected to be a feature of noun classifiers, since they classify common nouns into lexicosemantic classes. Since Person is not a feature of noun classifier systems, agreement inflection derived from classifiers does not include the person feature. This explains why cross-linguistically NP-internal agreement so rarely includes the person feature (Lehmann 1982; Kathol 1999; Wechsler and Zlatić 2003: 15).

Summarizing, we have sketched a diachronic account of an important difference between Concord and Index agreement: Person is a feature of the Index but not Concord. That difference plays a role in our analysis of mixed agreement, a role that leads to our explanation for the Polite Plural Generalization. It identifies the Person feature as a sign of pronoun-derived agreement, hence agreement which involves features of the referential Index.

6 Conclusion

This paper illustrates two ideas by applying them to the problem of mixed agreement with second person honorific pronouns. The first idea offers a way to negotiate between syntactic and semantic agreement. So-called semantic agreement arises from the lack of a syntactic feature on the controller. The Agreement Marking Principle reflects the intuition that inflectional marking on a target form must be justified, and if the controller lacks the feature in question then the justification must come from the semantics instead.

The second idea is that controller forms can be underspecified in way that is selective about targets, resisting access by some targets while allowing access by others. With regard to this selectivity, the targets bifurcate into the same two types defended in earlier work, where they were dubbed Concord and Index targets. A diachronic account of the two different classes of target inflection was sketched above.

Pronouns are special in that they can serve as either targets or controllers. As agreement targets, pronouns are necessarily marked for Index phi features, so as controllers they are too. This immediately predicts that Index targets should show plural agreement with polite plural pronouns. All Person targets are Index targets, hence all Person targets should be plural with such controllers. This explains the strongest generalization emerging from the Comrie/Corbett agreement hierarchies, and supported with further typological evidence above: that Person agreement targets are uniformly, cross-linguistically plural with polite plural controllers, while targets lacking person vary in their number agreement.

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