On the (un)interpretability of phi-agreement[*]

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1   Introduction

1.1   Overview

Phi-features in agreement have commonly been viewed as uninterpreted, and this hypothesis has played an important role in syntactic theorising. Yet some cases of phi-agreement have also been given partly or wholly interpretive accounts, and it has even been proposed that phi-agreement reduces to interpretation generally, so there are no formal phi-dependencies at all. At the same time, few phi-agreement phenomena have been approached from this perspective. This study looks at the potential and challenges of interpretive proposals when set against this larger picture – where extension of extant ideas seems straightforward and where it does not, how difficult cases might be approached and at what cost, and what evidence there is for interpreting phi-agreement in the first place.

In minimalist explorations of syntax, the uninterpretability of phi-agreement has been central. One line of thought goes as follows (Chomsky 2000, 2001): plural agreement in (1a) is on T(ense) in syntax but is not interpretable on T; so it reflects an uninterpretable property of T that must be eliminated to meet Full Interpretation; a syntactic dependency is established to do so and results in phi-agreement; the need to eliminate uninterpretable properties of lexical items, perhaps phi-features specifically, underlies all syntactic dependency formation, including movement without apparent interpretive effect (1b).

(1a)   There <u>remain</u> **trees**. ~ **Trees** <u>remain</u>.
        $[_{TP}$ __ $[T_{\varphi=}$ [remain trees$_{\varphi=3PL}]]$
(1b)   There seem to be tabs kept on Kate ≈ Tabs seem to be kept on Kate.

Elements of this proposal have been challenged within minimalism, for instance that phi-agreement is in syntax (e.g. Bobaljik 2008), or that uninterpretable phi-features need a syntactic dependency (e.g. Bošković 2009, Preminger 2014). Here the challenge of interest is to the very uninterpretability of phi-agreement. A typical semantic analysis of (1a) interprets the inflectional plurality of *remain* in the same way as that of *trees*, so agreement is interpretable, and may even

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reduce to interpretation; then it is no longer "agreement" with anything. This and other interpretive approaches extend to a range of cases, even odd ones like phi-agreement under *wh-*movement, less so to others like long-distance agreement (sec. 2).

Among the more unusual phi-agreement phenomena studied in syntax, it often turns out to be unclear for now whether they are problematic for the interpretive approach, even when descriptively they seem so at first, like adverb-object agreement. Others clearly are difficult, including phi-agreement of arguments with coarguments or partial agreement with coordinations. Many need work that suggests trade-offs between syntactic and semantic approaches and possible mixtures, considered at greater length for patterns of phi-agreement in "quantitative" and "qualitative" constructions (sec. 3).

The interpretive enterprise must also address conditions on agreement that refer to phi-features, like intervention effects. A reduction to interpretation has mostly not been attempted, and is discussed for a couple of cases like person hierarchy interactions (sec. 4).

There is a different sort of challenge to interpreting phi-agreement, but it goes to phi-features themselves: grammatical phi-features on like the feminine gender of French *sentinelle* 'sentry'. Their apparent uninterpretability has played an important role in syntactic theorising, as much elsewhere as in minimalism, where they have been viewed as evidence that uninterpretable phi-features might simply be ignored. Yet there are interpretive approaches to them, and they lead to interesting commitments, like the D-type analysis of pronouns. Still, by and large the challenges of grammatical phi-features remain to be faced, and they are set out here, from differences among nouns to phi-features associated not with nouns but with "constructions" (sec. 5).

Finally, work on phi-agreement as a phenomenon has often pointed to cases like (2) as "semantic" agreement, and many are met along the road. They are gathered at the end to pose the inverse question, what evidence there is that agreement ever contributes to interpretation (sec. 6).

(2)   If the **majority** of the **jury** <u>are</u> landscape architects, you will be acquitted.

1.2   Interpretability, structure, and phi-agreement

The matter of the *interpretation of phi-agreement* may be separated into *interpretability* and *reducibility*. Interpretability turns on whether agreement phi-features are legitimate objects at the interpretive interface of syntax (Chomsky 1995, 2000). To the extent that they are, it may be asked whether they are *reducible* to interpretation, as envisaged by Dowty and Jacobson (1988: 96): "By a *pure semantic account* of agreement, we mean one in which no mechanisms of the linguistic theory *at all* are involved in linking an agreement controller to the agreeing form". That is a lofty goal, like reducing the distribution of *a* to semantics: not just that *a* lets NPs combine with VPs, but also that it marks predicate NPs, or that it is not compatible with *furniture*, or with *pants*. In opposition to *semantic* or *interpretive* is here used the term *formal*, for accounts that appeal to some linguistic aspect *form* irreducible to its semantics, such as locality in syntax or adjacency in phonology.[1]

To study these questions, (un)interpretability needs a definition, and that needs fixing an interpretive interface, a function from syntactic objects to meanings. Here it is essentially the

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[1] Dowty and Jacobson's formulation allows for an interpretive reduction to appeal to aspects of form that are not linguistic but domain-general, like the Maxim of Manner (see sec. 5). To be compared to their aim is the functionalist analysis of agreement of Reid (2011), where grammar makes available both of *the boys play(s)* and both may be deployed according to pragmatic (usage-functional) "focus".

function ‖·‖ from LFs to model-theoretic objects characterised in Heim and Kratzer (1998) (see the Appendix). It is familiar and used in much work on the interpretation of phi-features, and readily relatable to other model-theoretic interpretations. Interpretability is then the "bare output condition" of being in the domain of ‖·‖ (relative to its parameters) – one way of spelling out what it is to be "meaningful". Phi-features are in the domain of ‖·‖ if they are ever interpretable, so their uninterpretability in agreement is relative to a larger syntactic object like *[[PL] [past]]*.[2]

Next, the locution "on" *tree* or "on" T needs to be clarified. Work on the interpretation of phi-features often views them as lexical items inserted at terminal nodes in syntactic trees (e.g. Heim and Kratzer 1998: 9.1.2, Heim 2008, Sudo 2012). Thus *the tree* might receive analyses like (1a) and agreement like (1b) or (1c). (1a) and (1b) but not (1c) are in the domain of usual meanings for [PL], *tree*, *remain*, *[past]*, so [PL] is uninterpretable in (1c).

(1)   (a) [the [[PL] tree]]   (b) [[PL] remain]   (c) [[PL] [past]]

On the other hand, syntactic work usually views phi-features as subatomic properties of syntactic atoms, at least when a modular separation between syntactic atoms and their properties is made (Chomsky 2000: 100-1). In that case, [PL] is not the domain of ‖·‖ in the first place, only lexical items that bear [PL] like *tree* are. Then to ask about the interpretability of phi-agreement, we need to define the syntax of subatomic features and a compositional interpretation for it (cf. Pustejovsky et al. 2013). It is not often done explicitly, but when done, the proposals can for our purposes be mapped into syntactic trees with phi-features as terminals and interpreted by ‖·‖ (Schlenker 2003: app. II, Kratzer 2009: sec. 5 in sec. 1.3 below, Harbour 2014: sec. 2-4).[3]

The interpretation function in Heim and Kratzer (1998) is defined on LFs of standard binary-branching trees. Among other views of phrase-structure, structure-sharing rather than copying approaches to movement are common (e.g. Kracht 2001, Gärtner 2002, Collins and Stabler 2016; Carnie 2010: 10.3), and structure-sharing has also been proposed for phi-agreement (Haug and Nikitina 2016), including when phi-features are subatomic (Frampton and Gutmann 1999, Pesetsky and Torrego 2007, Kratzer 2009). The difference between copying and structure-sharing does not matter here, because $\|\gamma\|^{c,g}$ is a function of what is immediately reflexively dominated by γ. A term K that is the structure-shared daughter of α and of β, or K's occurrences leads to the same interpretation as replacing these daughters by copies of K (further sec. 2.1).

Finally, a position must be taken on the domain of study, phi-agreement, and ways of talking about it (see esp. Corbett 2006, Barlow 1988, Moravscik 1978). Phi-featural dependencies involve covariation in form between two elements regimented according to phi-features, here person, number, and gender. They are often analysed as asymmetric relationships between a controller where phi-features originate and a target that agrees for them, through a formal mechanism such as syntactic copying. If agreement reduces to interpretation in Dowty and Jacobson's sense, there is no such asymmetry or relationaship: [PL] contributes what it does to

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[2] The interpretive interface is sometimes another formal system that captures certain intuitions about meaning like entailment and coreference, and may itself be given a model-theoretic interpretation (DRT, Kamp and Reyle 2011, conceptual structure, Jackendoff 2002). Different from interpretability are interpretive conditions on syntax, such as licensing structure by effect on interpretation (Fox 2000, Reinhart 2006), or restriction of syntactic primitives to ones interpretable somewhere (Epstein, Kitahara and Seely 2010 on "convergent gibberish", Brody 1997 on "radical interpretability", cf. Adger and Svenonius 2011: 2.2.3). One such condition is discussed in sec. 2.1.

[3] On a mixed position, uninterpretable phi-features would be subatomic and interpretable ones atomic; a positions actually found is rather one where subatomic phi-features of roots are uninterpretable and those of functional elements are interpreted, in some cases transmitted from roots (e.g. Heycock and Zamparelli 2005, Kramer 2014b).

tree and *remain* independently. If agreement is merely interpretable, there is a role for formal licensing by a controller (Kratzer 2008, see sec. 2.2). Inversely, approaches that rely on a formal component do not need to suppose an asymmetric controller - target relationship (e.g. Pollard and Sag 1994: ch. 2; cf. Corbett 2006: 4.1). In this study, the interpretation of phi-agreement is approached as a challenge to the view that it is uninterpretable, so it is convenient to frame the discussion in the controller-target perspective. A range of target-controller pairings in different domains is introduced from this perspective, all on the premise that the target has its phi-features in syntax. The Excursus looks at phi-agreement outside syntax.[4]

1.3 <u>Meanings of phi-features</u>

The interpretation of agreement mostly makes for an interesting subject only if the meanings of phi-features and their hosts are constrained. Among meanings for phi-features outside agreement, two sorts are common. On one, phi-features are of type *<e,e>*, or *individual operators*, and in particular, *individual "filters"* like (1): they take an *e*-type meaning and return it if it meets certain conditions (e.g. Heim and Kratzer 1998, Schenker 2003, Sauerland 2003b, 2008, Heim 2008). This approach is useful if pronouns are individual variables. Phi-features are then interpretable as sisters to *e*-type DPs: pronouns, definites on their referential analysis, and *e*-type traces of QR (Sauerland 2003b).[5]

(1)   Phi-features as individual filters
        $\|[\text{SG}]\|^{c,g} = \lambda x : x$ is an atom . x
        $\|[\text{PL}]\|^{c,g} = \lambda x : x$ is a plurality . x
        $\|[\text{FEM}]\|^{c,g} = \lambda x : x$ is female in c . x
        $\|[1^{\text{st}}]\|^{c,g} = \lambda x :$ the speaker of c $\leq$ x . x

On the other common view, phi-features combine with property-denoting NPs. It can be extended to pronouns if they are definites with a silent NP (Schlenker 2004; see sec. 5). Phi-features may then be viewed either as properties that combine with the NP by Predicate Modification (PM), or as functions from properties to properties that take the NP as argument through Functional Application (FA).[6] All such meanings will be called *property operators*. Both views are common for gender, and give [FEM] and *female* similar meanings (gender as property, Kratzer 2009, Percus 2011; function from property, Percus 2011, Merchant 2014, Sudo and

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[4] This controler-target framing does not exclude phi-features without an apparent controler, as it would simply posit nonovert controllers (sec. 6). Inversely, all positions are compatible with some phi-morphology really being realisation of controllers and so not agreement (Stump 1984). Excluded from discussion are phi-features on bound-variable pronouns, except insofar as they touch on other matters like grammatical phi-features: if they are interpretive (Sudo 2014), they do not affect syntactic analyses of agreement, though they do have troubling repercusions for locality if they need to be syntactic (Heim 2008) or at PF (Kratzer 1998).

[5] The meanings reflect particular if common choices among various assumptions (for alternatives, see e.g. Sauerland 2003b for number with a world-relative numerosity and Arregui 2007 for person with world-bound individuals). Link's (1983) approach to numerosity is assumed, where where the domain of individuals includes atoms and pluralities, partially ordered by $\leq$ "part of", and other aspects are introduced as needed. There is debate whether gender is relativised to context or index of evaluation (here briefly in sec. 5.4); the former is illustrated for individual operators, which would otherwise need a situation variable, and the latter for predicate operators.

[6] *Property* is used here for properties of individuals, *<est>*. The notion of an (individual's) property, and so of property operators, may be generalised to various functions to propositional-type that have an individual argument, for instance the type *<<est><est>>* of nonintersective adjectives (sec. 2.2).

Spathas 2015; number, Harbour 2011, 2014). Below are sample meanings for property operators that restrict the domains of NP meanings, and so can be called *property filters*.[7]

(2)　　Phi-features as property filters (by FA, *or* PM, illustrated once)
　　　　$\|[SG]\|^{c,g} = \lambda p_{est}.\lambda x.\lambda s : x$ is an atom . $p(x)(s)$ *or* $\lambda x.\lambda s : x$ is an atom . 1
　　　　$\|[PL]\|^{c,g} = \lambda p_{est}.\lambda x.\lambda s : x$ is a plurality . $p(x)(s)$
　　　　$\|[FEM]\|^{c,g} = \lambda p_{est}.\lambda x.\lambda s : x$ is female in s . $p(x)(s)$
　　　　$\|[1^{st}]\|^{c,g} = \lambda p_{est}.\lambda x.\lambda s :$ the speaker of c $\leq x$. $p(x)(s)$

Functions are not limited to filtering. A particularly common property operator meaning is [PL] as a function that cumulates properties of atoms to yield properties of (atoms and) pluralities (the * of Link 1983 and its polyadic versions, e.g. Chierchia 1998b, Beck 2000, Heycock and Zamparelli 2005, Kratzer 2008). Here is one version:

(4)　　$\|[PL]\|^{c,g} = \lambda p_{est}.\lambda x.\lambda s$ (: x is a plurality) . for all y such that y is an atom and $y \leq x$, $p(y)(s)$

A number of other meanings have proposed. To illustrate, Kratzer (2009) gives $1^{st}/2^{nd}$ person and index features *directly referential* meanings, where they denote individuals.[8]

(5)　　$\|[1^{st}]\|^{c,g} =$ the speaker of c

All these proposals are often combined with underspecification of 3rd person, masculine, and one of singular or plural, whose absence may give rise to implicatures through preferences for "stronger" meanings or uses, in particular the principle Maximise Presupposition MP (Heim 1991; for phi-features, see esp. Schlenker 2003, 2012, Heim 2008, Percus 2006, 2011, Sudo and Spathas 2015). It may be briefly illustrated through (6).

(6)　　(a) $[[_{DP} [SG] 2] [_{VP} left]]$　　　　(b) $[[_{DP} 2] [_{VP} left]]$
　　　　$\|(a)\|^{g}$ is defined only if *g(2)* is an atom; if defined, $\|(a)\|^{g} = 1$ iff *g(2)* left.
　　　　$\|(b)\|^{g}$ is defined for all *g*'s; $\|(b)\|^{g} = 1$ iff *g(2)* left.

An utterance with the LF (a) is felicitous iff all pragmatically available assignments map *g(2)* to an atom, and then it is equivalent to an utterance of (b). In that case, MP prefers (a), because $\|(a)\|^{g}$ is defined on a smaller set of assignments than $\|(b)\|^{g}$, or if eveluted locally, because (a) is identical to (b) save that there is a constituent, the DP, defined on a smaller domain. Through this preference, an utterance of (b) gives rise to the implicature that (a) infelicitous, and thus, that it is not the case that every contextually available assignment maps *g(2)* to an atom.

Work on phi-features does not limit itself to the foregoing meanings, nor will the following discussion. But property and individual operators are the simplest ways of interpreting typical

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[7] In DPs, determiner meanings neutralise the distinction between domain-condition and output; *the NP*, for instance, is defined only if there is a unique individual on which ‖NP‖ is defined and true. But casting the contribution of phi-features as part of the domain condition can even then matter for local application of Maximise Presuppositions, and more generally on predicate NPs and APs (Sudo and Spathas 2015, see below).

[8] These features are subatomic but open to a syntactic reification according to type-driven interpretation: e.g. $\{[1^{st}],$ $[2^{nd}], [sum], [group]\}$ as $[[group] [[1^{st}] [[sum] [2^{nd}]]]]$.

agreement, because it occurs on individual- and/or property-denoting expressions, and conclusions about particular meanings of this sort can be revealing more generally.

2   Basic agreement interpretation

This section establishes as it were the baseline for interpreting phi-agreement. First, the notion of a special interpretation for phi-features is briefly introduced, to contrast it with ordinary interpretations and set out its explanatory limits. Then ordinary interpretations of phi-features are discussed for agreement configurations that lend themselves to an interpretive analysis, such as agreement under movement. By contrast, other agreement configurations can be difficult, including long-distance agreement, though possibilities that turn on the nature of expletives are explored. Finally the notion of "pronominal" agreement is discussed.

2.1   <u>Vacuous interpretation</u>

The uninterpretability of agreement phi-features is chiefly an issue if we keep to independently motivated meanings. Otherwise, agreement can simply be interpreted vacuously. There are two sorts of ways to do so, one that simply skips agreement and one that interprets it trivially, and both have actually been proposed for grammatical phi-features (sec. 5.3).[9]

In what might be called *skipping*, the interpretation function is so defined that certain occurrences of phi-features are in its domain but ignored:

(1)   For all c, g, $\|[_\gamma \; \varphi \; \alpha]\|^{c,g} = \|\alpha\|^{c,g}$, where $\varphi \in \{[PL], \dots\}$ and $\alpha \in \{[past], \dots\}$

Skipping is different from syntactically deleting agreement phi-features from the input to $\|\cdot\|$. Under the syntactic, *[[PL] [past]]* is not in the domain of $\|\cdot\|$, while under skipping it is, though both interpret it as *[past]*. The conceptual considerations that enter into choosing on or the other may be illustrated through Johnson's (2012) version of Full Interpretation, FI_{LF}.

> FI_{LF}: Every term in a phrase marker must semantically combine with at least one of its sisters. (Johnson 2012: 542; cf. p. 545 for the PF counterpart)

If FI_{LF} is a formal principle that specifies LF inputs to $\|\cdot\|$, it allows deletion of occurrences of a term provided another occurrence is sister to an undeleted occurrence of some other term. In a structure-sharing or chain implementation of movement, FI_{LF} allow a step of movement to go totally uninterpreted, like totally reconstructed A-movement (Johnson 2012: 552). In analogous implementations of subatomic feature dependencies, it would allow phi-agreement to go uninterpreted (as in Pesetsky and Torrego 2007: 273-4). Instead of a formal principle, FI_{LF} could be made part of the definition of $\|\cdot\|$, like (1). But the cost is the usual formulation of compositionality: $\|\alpha\|$ could no longer refer only to material immediately dominated by α, but also to whether a daughter of α is nonvacuously interpreted as sister to a nondaughter of α.

There is a different way to implement vacuous interpretation; call it *trivialisation*. Trivialisation supplies lexical items with meanings that take agreement as argument and then

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[9] Vacuous interpretation raises questions about principles that restrict vacuity, *#my female sister*, Gricean or semantic (e.g. Schlenker 2005, Abrusán 2014: 6.2); but so does the feminine gender of French *ma sœur* 'my sister'.

ignore it. Suppose *[past]* has the meaning in (a) and [PL] (a'); then (b) lets *[past]* take [PL] as argument but ignore it, while (c') does so through a functor *AGR* (ignore α for the moment).

(2) (a) $\|[past]\|^{c,g} = \lambda p_{st}.\lambda s \ . \ time(s) < time(c) \ and \ p(s)$[10]
 (a') $\|[PL]\|^{c,g} = \lambda x : x \ is \ a \ plurality \ . \ x$

 (b) $\|[past]\|^{c,g} = \lambda f_{ee}.\lambda p_{st}.\lambda s : \alpha \ . \ time(s) < time(c) \ and \ p(s)$
  (Syntax: [$_{T'}$ [[PL] [past]] vP])

 (c) $\|AGR\| = \lambda f_{ee}.\lambda q_{<<st>,<st>>}. : \alpha \ . \ q$
  (Syntax: [$_{T'}$ [[past] [AGR [PL]]] vP])

Trivialisation is not really vacuous, since *[past]* in (b) must combine with an *<e,e>* function. If phi-features were the only functions of this type in the lexicon, and could not be constructed in the syntax as sister to *[past]*, then by (b) *[past]* needs a phi-feature as sister. Content can be added through conditions like α in (b, c). If α is as in (3), the trivialised phi-feature must have the meaning of [SG] or [PL], up to equivalence within the model parameter of $\|\cdot\|$. In a domain with one woman and no other females or atoms, (3) cannot differentiate [SG] from [FEM].

(3) $\alpha \Leftrightarrow \forall x[f(x) \ is \ defined \ iff \ x \ is \ a \ plurality \ and \ if \ f(x) \ is \ defined \ f(x)=x]$ or $\forall x[f(x) \ is$ defined iff x is an atom and if f(x) is defined f(x)=x]

Vacuous interpretations might seem uninteresting, but they can be thought of as a highly restricted UG means to cope with variation like the presence of agreement. Faced with *[past]* that occurs next to [PL], UG might permit postulating a meaning for *[past]* that trivialises [PL]. The vacuous interpretations above do not reduce agreement to interpretation and need further stipulations to do so. These matters are discussed further in sec. 5 for grammatical phi-features. In the meanwhile, vacuous interpretations are not called on, save for want of alternatives.

2.2   Baseline for interpretable agreement

There are certain cases where agreement may be interpreted using the same meanings for phi-features as they have on controllers, and possibly reduces to interpretation. These are the baseline cases for the interpretive approach. They are discussed here for verb agreement in the clause and modifier agreement in nominals.

Under the property operator analysis of phi-features, an agreement phi-feature is interpretable whenever it is sister to a property, not just *tree* but also *remain*.[11] Accordingly, the inflectional plurality of verbs has been analysed in the same way as that of nouns, specifically as [PL] cumulating a property of atoms, *tree, remain*, to a property of atoms and pluralities, *trees, remain* (Schwarzschild 1993, Winter 2002).[12] So [PL] in (1) is interpreted uniformly, and (1) is true iff the maximum plurality of trees is among the pluralities of things that remain.

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[10] The meaning of [past] does not matter (q.v. Grønn and von Stechow 2016).

[11] When there is no danger of confusion, shorthands are used like "sister to a property" for "sister to property-denoting predicate" or "[PL] cumulating a property" for "the denotation of [PL] cumulating a property".

[12] Schwarzschild (1993) and Winter (2002) are explicit about fully correlating morphological plurality with cumulation; other work posits partial correlations, e.g. Link 1983 [2002: 130-4] on * and distributivity (cf. Dowty

(1)   [the [[PL] tree] [[PL] remain]

This approach to [PL] works so long as the agreeing predicate, here *remain*, takes the controller of agreement, *the trees*, as argument (or inversely, if *the trees* is a generalised quantifier). Let us call this *argumental* agreement:

Agreement on a target β with a DP controller α is *argumental* iff β denotes a property and combines with α by Functional Application (where "on" is as in sec. 1.2, sc. "sister to").

Generally, interpreting [PL] as property cumulation is unhelpful if [PL] agreement is interpreted where it surfaces. We do not want to cumulate meanings of *have, seem* in *The trees have remained, The trees seem to be likely to remain*, since that is either impossible or wrong.[13] But that is not the intended mechanics. Rather, the inflectional plurality of the verb reflects cumulation of the VP and of predicates formed by movement of its arguments (e.g. Schwarzschild 1993: 207). So in (2), [PL] as cumulator is sister to the derived predicate α created by movement of *the tree*, though it surface on *seem*.[14]

(2)   [$_{DP}$ the [$_{NP}$ [PL] tree]] [[PL] [$_{\alpha}$ λ_i [$_{T'}$ T [$_{VP}$ seem [$_{TP}$ to [$_{VP}$ remain t_i $_{VP}$] $_{TP}$] $_{VP}$] $_{T'}$] $_{\alpha}$] $_{\beta}$]

Of course, phi-agreement is then uninterpretable where it surfaces – on *seem+[present]*, for instance. But that is not necessarily relevant to the enterprise of interpreting agreement phi-features in syntax. If syntax yields structures like (2), [PL] can end up on *seem* through syntactic head-movement and/or PF merger under adjacency (Embick and Noyer 2001). These are independent mechanisms known not to feed interpretation, for understood reasons in the case of PF merger. LFs are then syntactic objects like (2), and there phi-agreement is interpretable.
So far then, plural agreement is interpretable so long as it surfaces in such a way that it can be analysed as argumental agreement in syntax. Reducing it to interpretation is another matter. In (2), [PL] cumulates α, while [PL] next to *remain* would cumulate *remain*, with different meanings (Schwarzschild 1996: 62, cf. Schwarzschild 1993: 207, Kratzer 2008: sec. 5).[15] Both

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and Jacobson 1988: 98, Schwarzschild 1993: 206n1). Liberty is taken throughout to describe proposals with flat set-plurals using Link's individual-plurals (Winter and Scha 2014). Note that Schwarzschild does not explicitly analyse cumulation of NPs, and Winter's cumulator is not the overt [PL] but an operator required by it (Winter 2001: 5.4).

[13] At best, cumulated *seem* would denote a sum of propositions or propositional individuals, but *seem* does not in fact pluralise with a conjunction of infinitives *seem* and barely with *that* clauses (McCloskey 1991).

[14] If movement is a single-step mapping of [$_{XP}$ …α…] to [α [λ_i [$_{XP}$ …t_i…]]] (Heim and Kratzer 1998), the phi-features in (2) must be Merged countercyclically. Cyclic Merge is available for them if λ-abstraction is due to Agree and independent of re-Merge of the moved element (Adger and Ramchand 2005, Kratzer 2009). Related but slightly different mechanics pose the question in still other ways (e.g. Büring 2004).

[15] This is easiest seen in (i) with the same types as (2) (adapting Schwarschild 1996: 62, attributed to A. Kratzer). Cumulating α means: there is a good chance that John wins and there is a good chance that Mary wins (≈ high *each* in (ii)). This is a weaker claim than cumulating β: there is a good chance that John wins and that Mary wins (≈ low *each* in (ii)). The entailments reverse with *unlikely*. If lexical predicates are always cumulated (see below), the two readings might be obtained by interaction of cumulating the derived predicate and total reconstruction.

(i)   [John and Mary] [[PL] [$_{\alpha}$ are likely to [[PL] [$_{\beta}$ win this marathon]]]]
(ii)   John and Mary are (each) likely to (each) win this marathon.

meanings are available and both need plural agreement morphology on *seem*. Moreover, if number agreement were simply absent, (2) should be false, yet it is ungrammatical. These are the challenges of a fully interpretive theory of agreement.

The intricacies of the undertaking are brought out by Kratzer's (2008) detailed study of [PL] as cumulator. Briefly, Kratzer argues that verbs are cumulated lexically, but certain readings need the cumulation of predicates derived by movement. This only occurs through movement of *formally* plural DPs, which includes DPs with NP cumulated by DP-internal [PL], but also DPs with no interpreted [PL] like coordinations. All formally plural DPs are analysed with a [PL] feature on top of the DP that is not interpretable there, but "migrates" out of the DP upon movement to become the [PL] that cumulates the derived predicate:

(3) $[_\alpha \ldots [_{DP} \textbf{PL} [D [[PL] NP]]] \ldots] \rightarrow [_{DP} \textbf{P̶L̶} [D [[PL] NP]]] [\textbf{PL} [\lambda_i [_\alpha \ldots t_i \ldots]$

The resulting clausal occurrence [PL] is reflected as plural agreement. It is interpreted where it is, but it is not reduced to interpretation. It is present even when not needed (when lexical cumulativity would suffice) and absent even when it could be interpreted (with formally singular DPs like *the committee* which lack the upper [PL]). Moreover, there remains an uninterpretable occurrence of [PL], the one on top of the DP, though another occurrence of it, after "migration", is interpreted (cf. FI$_{LF}$ in sec. 2.1). It may be possible to develop a more completely interpretive theory of plural agreement, but it remains to be done.[16]

So far we have looked only at [PL] as cumulator. Other phi-features as property operators are also interpretable in argumental agreement, though they have not been given meanings analogous to cumulation.[17] Gender and person, and number as well, may be analysed as property filters, say [PL] restricting a number-neutral meaning for *remain* to a property of pluralities. As filters, they are never needed, but they can be forced to be present by Maximise Presuppositions MP. Sudo and Spathas (2015) is a detailed development of this approach to gender agreement (including how far MP remains an interpretive rather than a formal principle).

These ways of interpreting argumental phi-agreement extend to a variety of movement constructions. An unusual example is phi-agreement with *wh*-phrases in (4) (Kimball and Aissen 1971, Kayne 2000: ch. 10, 11, den Dikken 2001, Baker 2008: 3.3).[18] It admits of an analysis where [PL] attaches to the predicates formed by criterial and successive-cyclic *wh*-movement. There is much to say about how [PL] surfaces on the finite verb and how it interacts with subject agreement, but that is also so for a syntactic account through uninterpretable agreement.

(4a)   What people [[PL] [λ_i [**do** Muttonhead address his words to t_i]]]

(4b)   Where are the boys [who$_i$ [[PL] [λ_i Tom **think**(s) [t_i'' [[PL] [λ_j Dick **believe**(s) [t_i' [[PL] λ_k Hary **expect**(s) t_k to be late]]]]]]]]]?

(Kimball and Aissen 1971: 245-6)

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[16] In particular, the limitation of cumulation to sisters of moved formally plural DPs draws heavily on the analysis of *committee* and *furniture* type nouns as properties of pluralities (contrast e.g. Barker 1992, Schwarzschild 1996 on the former), and the existence of purely formal [PL] on top of DPs depends on analysing *John and Mary* without a cumulated NP (unlike if they were analysed with an NP, cf. Elbourne 2008).

[17] E.g. [FEM] as a map of the set of male poets to female poets.

[18] Contrary to most work, Wagers, Lau and Phillips (2009) and Phillips (2010) analyse the phenomenon as agreement attraction, see the Excursus. The crosslinguistic picture needs to be taken into account: phi-agreement with criterial A'-movement is common (e.g. Lipták 1998 on Hungarian, Oyharçabal 2005 on Basque), and has been reported at successive-cyclic steps as well (Bruening 2001: 4.3.2 on Passamaquoddy).

DP-internal agreement as in (5) is our other illustration of agreement that lends itself well to an interpretive account (see esp. Percus 2011, Merchant 2014, Sudo and Spathas 2015 on gender). The subject DP in (5a) can be analysed as in (5b), where [PL] as cumulates or filters the attributive adjective just as it does the noun, and just as it does the predicate adjective in the small clause. Again, MP can force [PL] if it is not needed, say if adjectives are lexically cumulated. Only the determiner needs saying something special, perhaps that it is trivalent and interprets [PL] as presupposition about the domain of its NP argument, or perhaps that its [PL] is the realisation of a [PL] sister to the whole NP in addition to [PL] in its subconstituents.[19]

(5a)   Les/Certains chevaux loyaux sont amicaux.
        the.PL/some.{PL} horse.PL loyal.PL be.3PL friendly.PL

(5b)   … be [$_{SC}$ [$_{DP}$ [the/some [PL]] [$_{NP}$ [[horse [PL]] [loyal [PL]]]] [$_{AP}$ friendly [PL]]]

In other cases, there is more to say. For instance, nonintersective adjectives, *certain cheveaux supposés* 'some.PL horse.PL alleged.{PL}', need adaptation either of their type $<<est>,<est>>$, or of the meaning of phi-features (cf. also sec. 3.1).

Both the above paradigm examples of interpreted phi-agreement rely the property operator analysis of phi-features. The individual operator analysis needs to approach them differently. It is not clear what to do about DP-internal agreement. Agreement with a moved controller might can exploit traces of successive-cyclic movement, if they are sufficiently dense. In (6), [SG] as an individual filter can be interpreted on the intermediate trace in Spec,v (Sauerland 2003a,b), and forced to be there by MP. Agreement might then reflect realisation of [SG] on *seem* (see Legate 1999, Ackema and Neeleman 2003, Matushansky 2006 on possible mechanisms).

(7)   [the tree] [λ_i [T [t$_i$ [λ_j [v seems to remain t$_j$]]]]]
        [T [[[SG] t$_i$] *realised as* T+[SG]]

2.3   Long-distance agreement

Long-distance agreement like (1) is a good illustration of challenges faced by the program of interpreting agreement, because it is a genuinely difficult case and because it has informed much syntactic theorising.

(1)   There <u>are</u> expected to be likely to remain **many trees**.
        There <u>look</u> like there <u>remain</u> **many trees**.

It is has been argued at length that in English (1) and analogues in other languages, no content of the controller is interpreted anywhere near the target, in particular in the matrix clause (see a.o. Lasnik and Saito 1992, den Dikken 1995, Lasnik 1999, Polinsky and Potsdam 2001, Potsdam and Runner 2003, Rezac 2010, 2011, Potsdam and Polinsky 2012). Among evidence is failure of the controller or its agreement to scope over or bind matrix material:

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[19] In glosses, distinctions made only orthographically are in braces {…}.

(2)   There seem to {their$_{*distributive}$ spouse, *themselves, *each other, a$_{*\neg>\exists}$/*any journalist (*each)} to have been no women candidates given good job offers.
There is (not) expected (not) to be a woman candidate given a job offer. (*$\exists>\neg$)
There are expected to be exactly two buildings damaged by the storm. (*2>seem)
There had (*all) hung over the fireplace (all) the portraits by Picasso.

    The formal properties of long-distance agreement can also differ from local agreement; in English *there*-constructions, details of agreement with complex DPs like coordinations differ (Morgan 1985, Sobin 1997; see van Koppen 2007 elsewhere) and in varieties plural controllers have singular agreement (Henry and Cottell 2007: 3.5, Schütze 1997: 4.1.6). Let us proceed therefore on the hypothesis that the controller in long-distance agreement really is in syntax at a distance from the target, as in (3):[20]

(3)   there [seem [not [many trees]$_i$ [λ$_i$ to remain t_i]]]

    It is not clear how to interpret [PL] anywhere near the target *seem+[present]* in (3) without special devices like vacuous interpretation.[21] One strategy that keeps to independent meanings for phi-features and other well-understood elements would look to the the frequent but poorly understood companion of long-distance agreement, the expletive.

(4)   [$_{TP}$ [there [**PL**]] [λ$_{<i,<est>>}$ [$\underline{T}$ seem to remain [$_{DP}$ many [$_{NP}$ [PL tree] t$_{<i,<est>>}$]]]]

    Suppose that the expletive originates within the associate, as in (4) (q.v. Kayne 2016: sec. 5, Deal 2009: 304n31, with literature), or is predicated of the associate (Moro 1997). Suppose further that *there* denotes a property *M*, and so as such, it has interpretable phi-features like modifier and predicate adjectives (sec. 2.2). If *there* moves, it is predicate movement, and so must reconstruct (Heycock 1995). To keep the account entirely interpretive, let us suppose that predicates reconstruct because they must leave a property-type trace (cf. Cresti 1995). Then the displaced expletive is interpreted in its surface position, but only to substitute into its base position, where it is interpreted as a modifier. Agreement can then be viewed as realisation of the expletive's phi-features on T – a version of the long-standing idea that the expletive agrees with the associate and through it T does, but worked out interpretively. Nonagreement in English varieties might be modelled by varying the meaning *M* and so its compatibility with [PL].

    Needless to say, this is a toy example, for now. It connects with proposals about *there*, but ones that have been challenged, and needs to be embedded in a theory of expletive constructions that would provide for successive-cyclic movement to account for agreement of participles along the way and code restrictions based on v (Deal 2009). There is no reason to suppose that it is extensible to other long-distance agreement, even locative inversion insofar as the expletive is

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[20] The controller has also been argued to be distant from the target at LF in total reconstruction (Sauerland and Elbourne 2002). In total reconstruction there is no formal corroboration, so it might be approached through semantic reconstruction, discussed below (but see Fox 2000). If so, agreement might be made interpretable by extending the meanings of phi-features to be interpretable, but the meanings of phi-features need to be extended to higher-order properties, e.g. functions from (assignments to) generalised quantifiers to truth-values. If total reconstruction, and for that matter long-distance agreement, is approached rather through a PF mechanism (Sauerland and Elbourne 2002, Bobaljik and Wurmbrand 2012), agreement remains uninterpreted where it is, though through a a mechanism independent of agreement itself.

[21] Implementable for instance by a special meaning for *there* in Spec,T which neutralises agreement in Fin°.

meant to account for indefiniteness of the associate (Rezac 2010), and more gravely to dative-subject constructions in Icelandic (Sigurðsson and Holmberg 2008), complementiser agreement in Germanic (van Koppen 2007), or cross-clausal agreement in Tsez (Polinsky and Potsdam 2001) (for long-distance agreement in the DP, see sec. 3.3).

2.4   Pronominal agreement

Phi-agreement has been spoken of as (pro)nominal various ways. Only one will be addressed here: that certain agreement – say that of the finite verb – is always interpretively a pronoun, that is, an *e*-type variable or a definite with silent NP. This position was early rejected because full DPs usually cannot be doubled by pronouns within the minimal clause, even in systems where agreement alone is pronominal (Rizzi 1982: 131, with ramified explorations, e.g. Stump 1984, Baker 1996). However, later work established the existence of such pronominal doubling of full DPs, allowing a construal of agreement as doubling (e.g. Preminger 2009, Nevins 2011, Kramer 2014a). Here the idea is applied to local and long-distance agreement in English in order to bring out the commitments that characterise it.

The usual analysis of clitic doubling nowadays base-generates the pronoun and doublee in a "big DP" and moves out one or both (Belletti 1999, Cecchetto 1999, van Craenenbroeck and van Koppen 2006). (1) extends it to English agreement.

(1)   Agreement realises the phi-features of doubling pronoun *pro*:

(1a)   local agreement (with A-movement)
         [no candidates] [λ_i [*pro*$_i$ [λ_k [seem (to their spouse) [to remain [$_{\text{big-DP}}$ t$_k$ [R t$_i$]]]]]]]

(1b)   long-distance agreement (with QR)
         there [*pro*$_m$ [λ_k [seem (#to their spouse) [[no candidates] [λ_i [to remain [$_{\text{big-DP}}$ t$_k$ [R t$_i$]]]]]]]]
         (QR)

The big-DP hypothesis needs some way to relate the pronoun and doublee interpretively, in (1) through a relator *R*. Generally, the interpretive contribution of the pronoun and *R* is useful in accounting for the distinctive interpretive effects of clitic-doubling (e.g. Gutierrez-Rexach 1999) and something to look to when agreement has an interpretive effects (sec. 6).[22] But to make agreement pronominal generally, as in English (or Basque), what we want of *R* is to relate *pro* and doublee in such a way that *pro* gets the right phi-features interpretively yet is otherwise interpretively inert. These two aims are difficult to meet together.

Consider two candidates for *R* in (2). One, an identifying *R* relates doublee and *pro* by identifying their traces, the other, a trivialising *R*, interprets *pro* vacuously but ensures that it has the same phi-features as the trace of the doublee. They are promising for agreement. In general, the phi-features of bound pronouns match those of agreement, as in *No trees remain in their place*. Let us suppose that there is a fully interpretive theory of the phi-features of bound pronouns (Sudo 2014). Then these phi-features will also be present on traces, since these are bound pronouns. So in (1), t_k will have the phi-features we want for agreement, *R* ensures that t_i has them too, and therefore so does *pro*, and *pro* is realised as agreement.[23]

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[22] An illustration is Suñer (1988: 3.1) for effects on WCO by otherwise apparently inert dative clitic doubling.
[23] The logic extends to copies as Trace Converted definites (Fox 2002).

(2a) $\|R_{ident}\| = \lambda x.\lambda y : y=x . x$ (identifying)
(2b) $\|R_{triv}\| = \lambda x.\lambda y : \alpha . x$ (trivialising)
        $\alpha \Leftrightarrow$ [x is a plurality $\leftrightarrow$ y is a plurality] and [x is an atom $\leftrightarrow$ y is an atom]

However, *R* only gets the right meaning so long as a quantificational doublee binds *pro*, namely if *pro* is pro_i in the scope of λ_i as in (1a). This is precisely not the case in long-distance agreement (1b). In (1b), the interpretation is entirely wrong with the identifying *R*, and more subtly even with with the trivialising *R*. For one, pro_m as a free variable needs a salient referent for *g(m)* if the utterance is to be felicitous (Cooper 1979, Heim 1982: 109, Heim and Kratzer 1998: 240); but perhaps that can be set aside (Tomioka 2003, Matthewson 2008). More gravely, *pro* should bind, for instance a pronoun in the experiencer, incorrectly and with a wrong meaning even if it were possible (in (1), *Some_i are such that it seems to their_i spouse that no candidates remain*). This observation contributed to early rejection of pronominal agreement, unless *pro* is somehow prevented from binding independently (Chomsky 1981: 211-2, 1995: 4.4.5).

A way out is to force *pro* reconstruct below the doublee. This cannot be done semantically if *pro* is or contains a variable, and so if it is a pronoun as defined at the outset.[24] However, if *pro* denoted a property or a quantifier, forcing semantic reconstruction through a higher-order trace would have the desired effect. For a property-denoting *pro*, this move is instantiated by the agreeing expletive analysis of long-distance agreement in sec. 2.3. Likewise for *pro* on a meaning like 'some individual(s)', either version of *R* would get the right meaning so long as *pro* must reconstruct into the scope of the doublee. This gets away from the original notion of pronominal agreement, but beyond not theoretical analyses of pro-nominals cross-linguistically (see Déchaine and Wiltschko 2002 on pro-NP and pro-ΦP and sec. 5.5 below).

3   Challenging targets and controllers

So far, we have seen how the interpretive approach to agreement fares with particularly well-studied cases. They give a baseline of its potential and difficulties, and suggest ways of approaching them. This section brings in more exotic agreements, sometimes susceptible to the interpretive approach, often difficult. First are discussed challenging targets like adverbs and even coarguments, then partial agreement and resolution in coordinations, and finally, at greater length, clausal and DP-internal agreement for a variety of complex chiefly "quantitative" DPs.

3.1   Unusual targets

Phi-agreement on T can be seen as interpretive if not interpreted on T itself. Tsakhur examples in (1, 2) illustrate less usual targets of phi-agreement. In (1), the absolutive object of the clause controls agreement on the adverb and on the dative pronoun.[25]

(1)   buwa-mu **b-ez diƚa\<b>u** x^{w}alli a\<b>u
       mother(II)-ERG **III-1SG.DAT early\<III>** bread(III)[ABS] made\<III>
       Mother made bread for me early. (Tsakhur, Corbett 2006: 44, 67)

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[24] Unless the interpretive system is modified by reification of assignments (Sternefeld 1997, 2000).
[25] The interpretation of class features is not relevant to the point being made here, and it is convenient to pretend that [II] is [FEM] qua restriction to females and [III] is [NEUT] qua restriction to nonhumans.

In (2), 'beautiful(ly)' also agrees with the absolutive object, but its modifier 'very' agrees with the ergative subject, not otherwise an agreement controller (Corbett 2006: 44). Agreement seems to contribute to interpretation: "The example is not fully clear, but the effect of agreement in gender II […] is to emphasize that the quality of the lessons was due to the teacher, Anna Vasil'evna, and did not come about by chance" (Corbett 2006: 45).[26]

(2)   anna wasilewna-nī̄ wo-r-na inⱼā̄ maIʔallim, **gē̄-r uftan-da** dars hel-e-na
        Anna Vasil'evna-ESM be-II-ATTRIB.II here teacher(II) **very-II beautiful-ADV.IV**
        class(IV)[ABS] IV.give-IPFV-ATTRIB.II
        Anna Vasil'evna was a teacher here, and she gave classes very beautifully.

                                                              (Tsakhur, Corbett 2006: 44)

There are no proposals for interpreting object agreement on temporal adverbs, degree modifiers, or dative pronouns. Here are three ways one might go about it.

The first extends argumental agreement under movement, giving (3) the analysis in (1). It needs for the controller to move through positions such that phi-features on the derived predicate surface on the target, by some mechanism like PF merger (ditto if intermediate traces are used instead). This type of analysis may be compared to a syntactic analysis with uninterpretable probes in the clause and some mechanism to transfer their phi-features to the dative pronoun (cf. Polinsky, Radkevich and Chumakina 2015).

(3)   [bread(III) [[**III**] [λ_j [$_{AdvP}$ early … [t$_j$ [[**III**] [λ_i [$_{ApplP}$ me [Appl …

The second approach is suggested by the interpretive effect of agreement on 'very' for (2). The agreement is analysed as agreement with a silent pronoun (or realisation of a pronoun) anteceded by the controller and interpreted in some suitable way:[27]

(4)   she(II)$_i$ gave clases [[very *pro*(**II**)$_i$] beautifully]

Of course, if *pro* in (4) commuted with DPs like *Anna*, agreement in (2) would have been described as pronominal. In order to extend the pronominal analysis to phenomena described as agreement, we need for there to be arguments that can only be pronouns bound by a designated antecedent. That is the description of inherent reflexives. Canonical examples are of the sort *behave oneself/*Anna*. More similar to (1, 2) are structures like (4), where the object of the preposition must be a pronoun bound by the subject. If the pronoun in (4b) were realised by phi-agreement morphology on *with*, it would look like the adverb *along* agreeing with the subject, though found only with certain verbs. Similarly (5) might look like an agreeing *entirely*.[28]

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[26] But Kalinina (2002: ex. 23) translates the second clause as a nonrestrictive relative, 'the one who gave…', and attributes agreement to the relative operator; could the pragmatics of nonrestrictive relatives alone be responsible for the meaning effect?

[27] Possibly relevant interpretations include clausal ethical datives (Fried 2011), similar nominal possessors (Nikoaeva 2003), reified perspective takers (Bylilina, McCready and Sudo 2014), and others (Greek type *poté mou* 'never me.GEN = never ever', Holton et al. 2012: 455).

[28] Inherent reflexives of the *behave oneself* type have been supposed to "have no denotations", because "they do not correspond to logical arguments" (Collins and Postal 2010: 3.3). But the *on*-PP might contribute like it does in *How much money was there found on Kate you arrested her?*, and likewise for other local anaphora like the possessor of

(4a)   I made sure that Kate and John are carrying food on {**them**, *her, *us, *me}.
(4b)   I made sure that Kate and John would bring food with {**them**, *her, *us, *me}.
(4c)   #No food was {carried on, brought with} Kate. (only locative *on*, accompaniment *with*)

(5)   We are all of {**us**, them$_{\subset we}$, *the medievalists$_{\subset we}$} a bit crazy.

The third and final approach is to dismiss the problem. In Tsakhur (2), 'beautifully' is analysable as a secondary predicate of 'classes' (Corbett 2006: 44), and 'early' might be approached this way too (cf. Schultze-Berndt and Himmelman 2004: 4.6). In (6), adposition agreement with the subject rather than its argument is likewise straightforward if the PP is a property of the subject. But the agreement on 'for me' in (1) is difficult to analyse in this manner, so this approach creates asymmetries where none exist descriptively.

(6)   **We(I/II)** be.I/II centre(IV).in inside.<u>I/II</u>.PL 'We were in the centre' (Corbett 2006: 2.2.5)

Certainly, much apparently difficult agreement needs consideration along these lines. One staple of adverbial agreement is in French (7) (cf. Corbett 2006: 2.2.4). By traditional description, *tout(e)* is an adverbial modifier of *nu(e)* and of *grande*, and *grande* is an adverbial modifier of the verb, and both show agreement.

(7)   Un(e) poète quasiment **tout(e)** nu(e) a ouvert la porte **toute grande**.
        a.M/F poet(M/F) almost all.M/F naked.M/F opened the.F door(F) all.F big.F
        An almost entirely naked poet opened the door full wide. (French)

But *grande* in (7) is obviously a candidate for a secondary predicate use of the adjective *grand* 'big', though within French this use of adjectives is severally lexically restricted by both adjective and predicate (Grevisse 2008: §963; cf. Legendre 1997). *Tout* in (7) is distinct in its agreement morphology from adnominal, pronominal, and floating quantifier *tout* 'all' (Grevisse 2008: §994b vs. §637-640, §766). We do not know a priori that it poses a problem: it might denote a property like *whole* or a function from properties to properties like *alleged*, and then it falls under whatever solution is adopted for their agreement (sec. 2.2).[29]

It is unknown how far any of these strategies will prove helpful with exotic agreement targets. A hard case for all strategies is described in Troike (1981) for the extinct language Coahuilteco, where determiners (and complementisers) agree with in person with the subject:

(8)   **xawu· pil'in**   xa-ta·m   tače·-**t**   mami·k·k·a·y am   e·?
        man   other-∅   2-breast   DEM-3CON 3S:2O-touch PAST Q
        Has another man touched your breasts? (Troike 1981: 666, bold added)

Difficult targets of agreement are also found within the DP. Tundra Nenets has DP-internal possessor agreement illustrated in (9a) (cf. Corbett 2006: 141). In (9a) the noun and adjective might each be given the same syntax and interpretation, where 2SG reflects the silent pronominal argument of the possessor relation, 'that which is your good object and your boat'. But Nikolaeva (2005, 2014: 3.2) gives formal evidence against such a simple view, and it does not extend to possessors like (9b) that reflect arguments of the noun only.

(9a) (pidər°) t'uku səwa-r° ŋəno-r°
      your this good-2SG boat-2SG = this good boat of yours (Nikolaeva 2014: 155)

(9b) səwa-r° n'u-r°
      good-2SG child-2SG = your good child (Nikolaeva 2014: 155)

(9c) [your [λ_k [[2nd] [SG] [good t_k [[2nd] [SG] [λ_i [child t_i]]]]]]]]

    In this case, successive-cyclic movement (9c) of the relational argument of 'child' to specifier of the DP might allow an argumental analysis of the agreement.

3.2 <u>Partial agreement and resolution in coordinate structures</u>

Coordinate DPs can control partial or resolved agreement. *Partial agreement* refers to agreement with one member of the coordination at the expense of others. In (1), 'love' agrees only with 'she'. The example is difficult for an interpretive theory of agreement: it seems that a property of gender-neutral pluralities, 'love each other', takes as argument a mixed-gender plurality 'she and her brother', so it should not be restricted by SG.F to a property of female atoms.

(1) <u>tuḥibbu</u> **hiya** wa axuu-haa baᶜḍahu-maa
      love-3.SG.F she and brother-her each-other
      She and her brother love each other. (Standard Arabic, Harbert and Bahloul 2001: 59)

    (2) is similar. Again there is a property of pluralities, this time with plural agreement, but gender agreement is with the closest-conjunct, so that the property should be restricted to pluralities of neuters in (2a) and pluralities of females in (2b).[30]

(2a) Krava in **njeja teleta** so <u>trčila</u> drug ob drugega.
      cow(F) and her calves(N) be.3.PL collided.N.PL other into other
      A cow and her calves collided with each other.

(2b) Včeraj so <u>trčile</u> druga ob drugo **krave** in tele(ta).
      yesterday are collided.F.PL other into another cows(F) and calf(es)[N]
      Yesterday cows and a calf / calves bumped into each other.
                  (Slovenian, Marušič, Nevins and Saksida 2007: 220-221, translations adapted)

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[30] The following examples use grammatical gender, discussed in sec. 5. Assume here for simplicity that calves are so conceived that they are neither male nor female, while cows that they are female, while for the feminine gender of 'government', the proposals in sec. 5 are assumed.

Even more challenging are examples like (3), where there are different targets with different agreement, one or both partial. In (3a) participle agreement fits a property of gender-neutral pluralities, 'separated'. However, auxiliary agreement suggests that there is a higher property of atoms denoting individuals described by feminine nouns, and that 'government' is its argument though it does not move out of the coordination (see van Koppen 2007, Haegeman and van Koppen 2012 for syntactic accounts). (3b) is worse; we should like a low predicate of pluralities of calves and a high predicate of pluralities of cows.

(3a) … třeba tam *byla **vláda a naboženství*** formálně <u>odděleny</u>
      … maybe there be.3SG.F government(F) and religion(N) formally separated.PL.DFLT
      … maybe government and religion were formally separated there

<div align="right">(Czech, G, cf. Corbett 1983: 214n19)</div>

(3b) Včeraj so *bile **krave** in teleta* <u>prodana</u>.
      yesterday be.3PL been.PL.F cows(F) and calves(N) sold.PL.N
      Yesterday cows and calves were sold.

<div align="right">(Slovenian, Marušić, Nevins and Badecker 2015: 51n5)</div>

It is not clear how to approach these conflicts between the denotations of apparent predicates and controllers and agreement phi-features, though the predicate transfers discussed in the next section might be explored.

There are also conditions on partial agreement that look interpretive. In Slovenian (Marušić and Nevins 2010, Marušić, Nevins and Badecker 2015) or Serbo-Croatian (Bošković 2009), partial agreement for gender like (3b) is only possible of the controller is plural, (4a) but not (4b), though in (4) the other conjunct, the quantity DP, is unspecified for gender (cf. sec. 3.3).

(4a) Pet stanovanj in **vse hiše** so se <u>prodale</u> poceni
      5 flats and all houses are sold.F.PL cheaply

<div align="right">(Slovenian, Marušič and Nevins 2010: ex. 25)</div>

(4b) 5 fantov in **1 deklica** so peli / je pelo / *je <u>pela</u> lepe pesmi
      5 boys and 1 girl are sing.M.PL / is sing.SG.N / *is sing.SG.F nice songs
      Five boys and five girls sang nice songs.

<div align="right">(Slovenian, Marušič and Nevins 2010: note 3)</div>

This restriction to plural controllers curious in light of systems like Czech where partial agreement is also available for number. But these systems in turn often disallow singular partial agreement with predicates of pluralities, unlike (1) (Škrabalová 2004: 7.3.3, 7.4; generally, Aoun, Benmamoun and Sportiche 1999, Bošković 2009: sec. 5).[31] It is tempting to see here an effect of the interpretive plurality of the controller (in Slovenian) or predicate (in Czech).

Partial agreement also seems subject to conditions that are singularly challenging to an interpretive theory of agreement, like linear proximity and syntactic (abstract) Case (Benmamoun, Bhatia and Polinsky 2010, Bhatt and Walkow 2013).

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[31] Apparent counterexamples (e.g. Munn 1999, Bhatt and Walkow 2013: 6.3.2) seem to rely on predicates that admit groups in their singular denotation, like *meet*, unlike those that admit only puralities, *meet each other*, though of course everything then turns on the theory of this distinction (cf. sec. 3.3). In Czech, *rozdělit* 'separate' in (3a) is a *meet*-type predicate, but the configuration (3a) has not been studied for predicates of pluralities.

Instead of partial agreement, coordinations can control total agreement through *resolution* that takes into account the phi-features of all conjuncts (Corbett 2006: ch. 8, Wechsler 2015). Usually, resolution yields the same phi-features as an anaphoric pronoun would have, and does not create special problems for interpreting agreement. *I, you and she* agrees as 1PL and is picked up by a 1PL pronoun, because it denotes a plurality inclusive of the speaker.

However, beside such "semantic" resolution there is "syntactic" resolution, particularly well studied for Slavic (Corbett 1983: ch. 10, Wechsler and Zlatić 2003: ch. 8). Typical is (6), and there are even more form-sensitive resolutions that depend on properties like declension class. Often, anaphoric pronouns also follow syntactic resolution rules. This support the D-type theory of pronoun in sec. 5, where an anaphor picking up several DPs is a coordination of their NPs (Elbourne 2005, 2008), but it does not help with an interpretive theory of resolution.

(6)   PL.N *or* PL.N+PL.N → PL.N agreement
        SG.N + SG/PL.N → PL.F/M.INAN agreement[32]

3.3   Quantity and quality controllers

This section takes a longer look at complex controllers that may be dubbed Q-DPs for "quantity" and "quality". A particular focus of study have been Q-DPs of the form (D) Q PP/DP, like *the majority of the jurors*. Crosslinguistically, clausal agreement can occur with Q or PP/DP, or be "semantic", or fail and use default. These options have been approached formally through different phi-specifications, arrangements, and agreement mechanisms of elements in the QP (Wechsler and Zlatić 2003, Doetjes and Rooryck 2003, Danon 2013). For an interpretive approach of phi-agreement, each of these outcomes can be problematic but also productive.

Our starting point are Q-DPs in Czech (Veselovská 2001, Franks 1995). One type consist of a cardinality element like 'five' and an overt or understood genitive plural count restrictor. Finite verb agreement is 3SG.N, while predicate adjectives and anaphoric pronouns agree with the genitive.[33]

(1)   (Těch) pět/několik/mnoho mužů {se sešlo, stálo vedle sebe, se od sebe lyšilo, si bylo rovných}. Promluvil jsem k nim/*němu.
        (those.GEN) five/several/many men.GEN {SE_CL met.SG.N, stood.SG.N beside SE, SE_CL differed.SG.N from SE, SE was.SG.N equal.GEN.PL} spoke I.am to them/*it
        (Those) five/several/many men {met, stood beside each other, differed from each other, was similar} I addressed them/*it. (Czech)

As (1) shows, the 3SG.N finite agreement is compatible with properties of pluralities. This is not an issue for the interpretability if it is default, as has been argued for cognate systems (e.g. Marušić and Nevins 2010, Pesetsky 2014). But to reduce agreement to interpretation, something must be said to bare plural agreement on the finite verb.

Interpretability itself is problematic in the similar second type (2). Here the topmost noun is F.SG, e.g. *většina* 'majority', *polovina* 'half', *řada* 'row', with an overt or understood genitive

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[32] This rule, of long standing in studies of Slavic resolution (Corbett 1983: ch. 10), is mostly confirmed in recent studies (Marušić, Nevins and Badecker 2008, 2015, Bošković 2009, van Koppen and Rooryck 2008).
[33] Only a discourse anaphor is shown, but the same is true for a bound variable: *Pět mužů_i doufalo že jim_i/*mu_i pomůžeš* 'Five men hoped.3.SG.N that you help them/*it'.

plural count partitive. The Q-DP controls (3)SG.F agreement on the finite verb, but also on predicate adjectives, while anaphora still track only the phi-features of the genitive.

(2)   (Malá) většina / (Tato) polovina (těch) mužů {se sešla, stála vedle sebe, se od sebe lyšila, si byla rovná}. Promluvil jsem k nim/*ní.
        (small.SG.F) majority(F) / (this.F) half(F) (those.GEN) men.GEN {SE$_{CL}$ met.SG.F, stood.SG.F beside SE, SE$_{CL}$ differed.SG.F from SE, SE was.SG.F equal.SG.F} spoken I.am to them/*her.
        (A small) majority / (This) half of (those) men {met, stood beside each other, differed from each other, was similar} I addressed them/it. (Czech)

The feminine singular agreement should restrict the denotation of the agreeing predicate to a property of female atoms (or atoms described by a feminine noun). That is in fact ordinarily so in Czech, including in the last Q-DP type considered here. These are ordinary group nouns like *skupina* 'group', with optional genitives specifying their members. They only allow singular agreement, but this time it has the same semantic effect as in English, and only lets them combine with properties of atoms, including of group atoms like 'meet', 'be constituted of', but not properties of pluralities like 'meet each other', 'be similar'.

(3)   Skupina mužů {se sešla, *stála vedle sebe, …}. Promluvil jsem k nim/ní.
        group(F) men.GEN {SE met.SG.F, *stood.SG.F beside SE, …}. spoken I am. to them/her.
        A group of men {met, *stood beside each other, …}. I addressed them/it. (Czech)

So the puzzle of agreement with the *většina* 'majority' type of Q-DPs is both interpretability and reducibility of agreement. It is not to be solved by analysis of the DP, since the conflict is between number and gender on the clausal predicate and the predicate's denotation.[34]

This mismatch between agreement and interpretation can be contrasted with very similar cases where interpretively expected agreement appears, even though it is unexpected syntactically. Cognates of the cardinality construction elsewhere in Slavic allow plural agreement and may require it with properties of pluralities (Franks 1994, Pereltsvaig 2006; for counterparts in Hebrew, see Danon 2013: 5.2). English shows a similar pattern in (4) (cf. Huddlestone and Pullum 2002: 5.18.2).

(4)   A minority of the jurors do/(?)does not agree with the verdict.
        A minority of the jurors {are/*is neighbours, are/?*is unknown to each other}.

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[34] Person agreement can give rise to similar issues. In (i), 1PL agreement should need a speaker-inclusive plurality as argument, and 3PL a plurality, whilst *chacun de nous, each of us* seems to quantify over atoms, by the phi-features and restrictions of *chacun, each* like *each person(*s), *police*. On the other hand, accounts of the "dependent" 1PL *notre/our* may require that the matrix VP combine with a speaker-inclusive pluralities, and then 3SG and 3PL agreement are difficult. In English, counterparts of (i) give rise to the same issue with *think(s)* (Rullmann 2010). See Rullmann (2004, 2010) and Sudo (2014) for strictly semantic analyses, Collins and Postal (2010) for a strictly formal one, Heim (2008), Kratzer (2009) for combinations.

(i)   Chacun de nous croit/croient/croyons que notre nez est le plus long.
        Each of us believe.3SG/3PL/1PL that our nose is the longest (French, cf. Grevisse 2008: §934)

A minority of the jury (?)do/does not agree with the verdict.
A minority of the jury {are/*is neighbours, are/?*is unknown to each other}.
The jury {%are/*is neighbours, %are/?*is unknown to each other}.

Q-DPs headed by *minority* (*majority*, etc.) with a plural restrictor like *the jurors* prefer plural agreement, while with a group-noun restrictor like *the jury* either is allowed. In both cases, plural agreement is required if the Q-DP combines with a property of pluralities. So here agreement nicely tracks the meaning of the predicate. But now the singular agreement within the Q-DP is problematic, as it is in fact in Czech (1) and (2), since by it the Q-DPs should denote or range over atoms. Moreover, plural agreement in (4) with *the majority of jurors* is allowed even for speakers who do not use it with group nouns like *jury*, so something must be said about that.[35]

To resolve this, we need to look at group nouns (here adopting the theory of Barker 1992; cf. Schwarzschild 1996: ch. 9, Pearson 2011). When nouns like *jury* are singular, DPs based on them may control singular agreement, and are then incompatible with properties of pluralities (5a). Barker (1992) analyses group nouns as properties of group atoms, so the definite in (5a) denotes a group atom, and can properly combine with a property of group atoms but not with one of pluralities. DPs based on group nouns may also, with variation, control plural agreement, and then are compatible with properties of pluralities, (5b). Barker proposes that in (5b) the whole definite, denoting a group and so singular, is mapped to the plurality of its members, and as such combines with properties of pluralities but not of group atoms. Under this view, all agreement in (5) matches interpretation.

(5a)   This jury is {constituted of landscape architects, *all old}.
(5b)   This/*These jury are {*constituted of landscape architects, all old}.

In Barker's shifter from groups to pluralities, we have a device that allows DPs based on *majority* as a group noun to control plural agreement, independently of whether its partitive PP has a plurality or group-denoting definite. The shifter can be reified syntactically as the silent counterpart of *the members of* or *they of* above the group noun DP (cf. den Dikken 2001, Kayne 2010: 133n5).[36] Variation in its availability in a dialect is just variation in its lexical presence.

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[35] French makes the point even better, because group nouns (at least without plural partitives) strictly require singular agreement, and it brings gender into the picture (cf. Grevisse 2008: §431). (i) only has the reading where the troop is different from another, while (ii) requires plural number agreement, and masculine gender agreement unless it is common ground that it is a troupe of women.

(i)   La troupe est/*sont différent*(e)(*s) (*les un(e)s des autres).
      The.SG.F troupe(F) is/*are different.F/*M.{*PL} (*from.each.other.M/F.{PL})
(ii) La majorité/plupart de la troupe sont différent(e)s les un(e)s des autres.
      The.SG.F majority(F)/most of the.SG.F troupe(F) are different.M/F.{PL} from.each.other.M/F.{PL} (French)

[36] Barker's shifter for definites can be extended to generalised quantifiers (shifting a generalised quantifier as a property of properties p of groups to a property of properties p' of pluralities such to each p' corresponds a p of which the unshifted quantifier is true). But reification as definite *they/the members of DP* works right as well, with inverse linking (May and Bale 2005, Büring 2004) for cases like *No team support each other like we do = The members of no team ...*, including for variation in bound pronouns, *A northern team are carrying its/their mascott* (Elbourne 1999) = *The members of a northern team ...*. Gender supports syntactic reification, and the particular form it should have: for (i), we are best off with a silent *they of* on the D-type analysis of *they* as *the stools* (sec. 5). The definiteness of *they/the members of* prevents shifting for expletive associates (cf. Sauerland and Elbourne 2002).

Variation on particular nouns, so that even speakers who do not shift *jury* can shift *majority*, can avail itself of tools like c/s-selection or realisability needed anyway: we need, for instance, *the* of singular kinds to be silent just with one noun, *Man* (Quirk et al. 1985: §5.54). So for *majority*, there is an account of agreement that is to a significant extent interpretive, and only looks to syntax to code the distribution of the shifter. This too could be done interpretively by a semantic coding of c-selection in the manner discussed for grammatical phi-features (sec. 5.3).

But now we almost have a tool that helps with Czech *většina* 'majority', with its anomalous feminine singular clausal agreement. Suppose that *většina* denotes a property of group atoms. Then we can use silent *they of pro*, but *within* the agreeing predicate as μ in (6), to "transfer" the meaning of the predicate from what a property of atoms to one of pluralities. *The majority is equal* is effectively shifted to *The majority is ~~such that its members are~~ equal*. The working of μ is analogous to that of the distributive operator or floating quantifiers, and even the specific analysis corresponds to *all* as *all of i* (Fitzpatrick 2006). A stipulation is needed in both cases that *i* be locally bound, say by selecting it as a minimal pronoun (Kratzer 2009).

(6)   [the majority of DP] [[SG.F] [λ_k [$_T'$ be [t_k [[SG.F] [λ_i [$_{SC}$ t_i [[$_\mu$ **they of i**] [equal]]]]]]]]]]

The numerosity shifter μ in (6) is a syntactic reification of a predicate transfer, in the sense of Nunberg (1995). It is by no means a full account. One outstanding problem is anaphora, bound and discourse, which track the phi-features of the genitive partitive of *většina* and not of *většina*. The shifter μ can be made to bind anaphora, but it is not clear why the subject *většina*-DP cannot. Other candidates for predicate transfer do allow their subject but not their shifters to bind anaphora, as in (7), where the shifter is essentially existential quantification over cars owned by the subject (Nunberg 1995, on anaphora sec. 8 there).[37]

(7)   Ringo$_{car}$ is parked in his/*its usual spot.
        cf. Ringo is such that his car is parked in his/its usual spot.

Moreover, the availability of μ depends on the noun, distinguishing *většina* 'majority' from *skupina* 'group'. So the shifter must be within the predicate sister of the Q-DP, because the predicate has singular agreement, but only for idiosyncratic choices of head of the Q-DP. Perhaps it originates as part of the the Q-DP, so *they of i* in (6) might in fact be *they of t$_i$* and separate *t$_i$* is absent (cf. Sportiche 1988 on floating quantifiers).

Nothing prevents a shift directly of the NP, from a property of group atoms to one of pluralities. It has been proposed for metonymies like (8), mapping the NP for a property of french fry pluralities to a property of atoms who ordered them, with corresponding DP agreement (Nunberg 1995, Pollard and Sag 1994: 2.4).[38]

(i)   La majorité des tabourets sont différents.
      the.SG.F majority(F) of.the stools.PL.M are different.PL.M (French)

[37] Just how to model a predicate shifter's ability to bind anaphora depends on the theory of pronouns. If they are or contain bound variables, then the shifter in (6) must move to create a λ-abstract, and not in (7). If they are D-type pronouns, the shifter must supply a silent NP to license them.
[38] By the same token, plural determiner and verb agreement in German (French, Czech) counterparts of (7) need multiple shifts to be interpreted (HPSG admits uninterpretability, Pollard and Sag 1994: 85n20, Kathol 1999: 246). In fact English agreement is more complicated as well and transfer may be of the DP, not NP (Ward 2004: 3.1).

(8)   That/*Those french fries is/*are getting impatient. (Nunberg 1995: 115)

In the domain of Q-DPs, shifting of the NP may be instantiated in Basque with *erdi* 'half', *gehien* 'most' (Goenaga 2012). Consider *erdi* in (9). At first sight, it appears to track the number of the genitive or ablative partitive, and so with count partitives in (9a) it is plural even if it means 'half' rather than 'halves', (9a). A syntactic analysis could analyse plurality on the meaning 'half' as agreement of its D with plural in the partitive (Goenaga 2012: 128, generally Danon 2013). But the number of the partitive does not in fact determine the number of *erdi*, and meaning seems to (cf. Goenaga 2012: 125-7). One type of evidence is in (9b), where *erdi* is compounded with the mass noun 'programming', yet is plural on the meaning 'programmes'. So a better analysis might be semantic, with a silent shifter meaning 'members of' combining with the group denoting *erdi*-headed NP, and limited to a few head Ns like *erdi*.

(9a)   Program-en erdi-ak erdaraz dira.
         programme-the.PL.GEN half-the.PL.ABS in.Spanish be.3PL.ABS
         Half of the programmes are in Spanish *or* Halves of the programmes are in Spanish.

(9b)   Programazio erdi-ak erdaraz dira.
         programming half-the.PL.ABS in.Spanish be.3PL.ABS
         Half of the programmes are in Spanish. (Goenaga 2012: 126)

English determiner agreement in (10a) of *these* with the plural *of*-PP across singular *kind* is superficially similar to the Basque phenomenon. It too might be analysed semantically, as shifting of the *kind*-headed NP from a property of kind atoms to a property of pluralities of instances of a kind, or syntactically, as long-distance agreement between D and PP across underspecified N (as in Danon 2013, save that D as well as clausal agreement agrees).

(10a)   <u>These</u> kind(s)/sort(s)/type(s) of **parties** <u>are</u> dangerous. (cf. Quirk et al. 1985: §10.43)
(10b)   <u>These</u> kind of **secret agents** rarely even <u>know</u> each other's spouse.
(10c)   What color shoes should I wear with <u>these</u> color **dresses**?
(10d)   %<u>tous</u> ces espèces de **animaux**
         all.PL.M this.PL kind(F).{PL} of animal(M).PL (cf. Grevisse 2008: 432b2°, 348b1°)

There are too many outstanding questions about this construction to do more here than note them. In (10b), *these kind of NP.PL* does combine a predicate that denotes a property of pluralities of instances, so that is what the subject seems to denote or range over. But the meaning of the subject seems to be not *these instances of the secret agent kind* but *instances of this secret agent kind*, and it also seems to be available for *these kinds of secret agents* and even *this kind of secret agents* with plural agreement. Long-distance agreement also occurs in (10c), but *size, colour* here participate in what seems quite a different structure. So the meaning of these head nouns and their constructions need more study (Wilkinson 1995, Partee 2008: sec. 4; on *size, color* generally, cf. Huddlestone and Pullum 2002: 5.4, Kayne 2005: ch. 8, 10). In French gender enters into the fray, (10d) (see Doetjes and Rooryck 2003 for a syntactic approach).

As in previous sections, some apparent mismatches between agreement and interpretation may not be such. A staple of form-meaning mismatches is *more than one* with its singular agreement and quantification over pluralities (Morgan 1985: 74, Huddlestone and Pullum 2002:

5.18.2n72, Grevisse 2008: §440c). But the singular agreement matches the singular of bound pronouns and incompatibility with predicates of pluralities (cf. Winter 2002). So there is perhaps no mismatch, only a more complex structure that has *one woman VP* as its realised part, as in ellipsis analyses of comparatives.

(11)   More than one woman is/*are unknown to {her/*their neighbours, *each other}.

4   Conditions on agreement

Agreement is subject to conditions that are usually understood formally, like c-command or spec-head configurations. Much of this bears only in a limited way on an interpretive theory of agreement. Consider participle agreement for number and gender in French. Déprez (1997) argues that the agreement reflects movement of the controller through Spec,Agr_O, for reasons both formal (casual) and interpretive (specificity). All an interpretive theory of agreement needs to show is (i) that phi-agreement on the participle is interpretable when the controller moves though Spec,Agr_O, (ii) that it must be present then, (iii) that it must be absent otherwise. This reduces to argumental agreement under movement, (1), under the hypothesis that the participle realises precisely the phi-features sister to the predicate formed by movement to Spec,Agr_O.

(1) DP_i … $[_{AgrOP} t_i [[\varphi] [\lambda_k Agr_O PRT … t_k …]]]$ *such that* PRT necessarily spells out φ

Conditions on agreement are the subject of an interpretive account of it when they refer to phi-features. Often enough the reference is eliminable, as in the formulation of conditions on A-movement through phi-relativised locality (Chomsky 2000: 122-131), stable in many other ways (e.g. Chomsky 1995: 4.5.5). But reference to particular phi-features cannot be reformulated in this manner, and is then part of the account of agreement; for instance, different configurational condition for $1^{st}/2^{nd}$ than for 3rd person agreement (Baker 2008).

To illustrate a reductionist story, consider a situation where agreement for gender occurs with 3rd but not $1^{st}/2^{nd}$ person DPs (Cortés 1993: 5.2, Kayne 2000: 9.10 on Romance varieties). It is independently common for $1^{st}/2^{nd}$ person pronouns to lack gender distinctions. Kratzer (2009: 222-3) proposes to derive it from interpretation: $[1^{st}/2^{nd}]$ denote an individual, [MASC/FEM] denote a property, so together they would give a propositional and not an NP meaning. This only helps with agreement if supplemented by the postulate that the target's gender features come to be shared by the pronoun (cf. Kratzer 2009: 195-6). Then precisely when this is so, a $1^{st}/2^{nd}$ person pronoun with gender agreement is uninterpretable structure. The idea is hard to maintain for many reasons, not least because $1^{st}/2^{nd}$ person limits gender agreement only rarely and only under specific conditions, typically for agreement of participles with object clitics and not otherwise. But it suggests how an agreement condition might reduce to interpretation.[39]

Particularly challenging for an interpretive approach to phi-agreement are conditions where the controller interacts with another element in virtue of their phi-features, or *dependent agreement*. Types that have been uncovered include:

Competition (omnivory, promiscuity): Agreement is with whichever of two potential controllers is higher on a scale, including person 1 > 2 > 3, 2 > 1 > 3, or 1/2 > 3 (e.g. Béjar 2003, Bianchi

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[39] Harbour (2011) illustrates the reduction to an interpretive basis of a system of classes and its intricate interaction with number agreement, but not without a formal, uninterpretable component.

2006), number PL > SG (e.g. Nevins 2011, D'Alessandro and Roberts 2010), perhaps gender (cf. D'Alessandro 2016), sometimes with indication of which of the two actually controls agreement (direct-inverse marking). Person, number and gender/class can combine to form complex scales (e.g. Zuñiga 2006, Trommer 2006), even arbitrary lists (e.g. Bobaljik and Branigan 2006).

Blocking and *facilitation*: Agreement depends on the phi-features of a DP that is not itself a potential controller. In Icelandic, nominative person and number agreement are blocked by the intervention of an undisplaced dative, but plural number agreement can be facilitated if the dative is plural (Holmberg and Hróarsdóttir 2003, Sigurðsson and Holmberg 2008).

Anaphoric strengthening: agreement becomes possible or obligatory if the controller antecedes an anaphor (Burzio 1986: 81n48; cf. Graf 2007).

This is a descriptive regimentation. Some dependent agreement is outside syntax (Bobaljik and Branigan 2006, Arregi and Nevins 2011, Rezac 2011 on competition and blocking). That which is syntactic of each group is not of a piece; in maximisation, for instance, competition for person and number may or may not reflect the same mechanics (Nevins 2011, Béjar 2011). Some dependent agreement may be trivial, for instance blocking by a clausal boundary that really reflects agreement with the interpretable phi-features of a "quasiexpletive" doubling the clause.[40]

Dependent agreement is yet to be approached interpretively. Consider a canonical person maximisation system:

(i) The target H agrees in person for the highest of 1 > 2 > 3 on the external argument EA or potentially noncoargument object O, whose person features are necessarily distinct.
(ii) If the controller is O, there is also an inverse morpheme INV on H.
(iii) The controller moves to Spec,H.[41]

The person feature of agreement is itself interpretable in configurations like (2), in the manner argumental agreement under movement: [1st] restricts α to individuals including the speaker. But nothing so far explains why agreement is with that of EA, O which has a higher person value, why that DP moves, or what INV is. Tools to do this have so far been formal, like locality (e.g. Bianchi 2006, Béjar and Rezac 2009).

(2) $[O_{[1st]} [[INV] [[1^{st}] [_\alpha \lambda_i EA_{[2nd]} \text{ v } [\dots t_i \dots]]]]]$

(3) $\|INV\| = \lambda p_{est}.\lambda x.\lambda s : [x \neq Agent(s)]$ and $[[speaker(c) \leq x]$ or $[participant(c) \leq x$ and $participant(c) \not\trianglelefteq Agent(s)]]$. $p(x)(s)$

If INV is given the meaning in (3), it is interpretable in (2), it is only found in the right structures like (2), and it is enforcable in them by local MP just like [1st] is. This still does not

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[40] It is common to look to the clausal boundary or an associated quasiexpletive as an intervener that values a probe to 3SG (e.g. den Dikken 2001: 33, Rezac 2006: 298), but without considering whether phi-features are interpretable on such objects (q.v. cf. Moulton 2009).

[41] The presentation is simplified in not taking into account 3.EA+3.O combinations, which also involve distinct person marking on EA and O, proximate 3 and obviative 3', with inverse marking for 3'.EA+3.O combinations, giving the person scale 1 > 2 > 3 > 3'. Extension to this case only needs a semantics for proximate/obviative.

rule out undesirable configurations, where the lower of EA, O on the person hierarchy controls agreement, and INV is not present. To do so, we could suppose that INV or an analogous direct morpheme DIR must be present, perhaps as the sole values of a functional head, and try to write a meaning for DIR. But to rule out $EA_{[2nd]} \rightarrow O_{[1st]}$, we need to talk about O's phi-features, and O is not semantically isolable in the verbal event like EA is as Agent (O can be the object of ECM). This problem can be sidestepped if both EA and O move to Spec,H, a prediction that is in principle testable (Rezac 2011: ch. 3).[42]

5 Grammatical phi-features

5.1 <u>Introduction</u>

This long section turns to a rather different problem for the interpretability of agreement: *grammatical phi-features* like the feminine gender of French f. *chaise* 'chair', which do not seem to be interpretable at all, unlike *referential phi-features* on *shirt(s)*, *poète* m. 'poet', f. 'female poet'. One conclusion that has been drawn is that grammatical phi-features do not contribute to model-theoretic interpretation (Tasmowski and Verluyten 1982, 1985, Pollard and Sag 1994). In the minimalist program, they have been taken as evidence for syntactic features that are uninterpretable yet do not cause a crash at LF (e.g. Rezac 2004: 1.6, Bošković 2009, Carstens 2008, 2011, Kramer 2014b; but cf. Pesetsky and Torrego 2007: 286n31). Elsewhere, they have given rise to equally far-reaching conclusions about agreement mechanisms, because they are tracked both by agreement in local syntax and by anaphoric pronouns without any structural limitations (e.g. Pollard and Sag 1994, Corbett 2006).

However, there are proposals to interpret grammatical phi-features, and these too have important consequences. On one type of proposal, grammatical phi-features depend for their interpretation on a local relationship to their host like the root √*pant*, √*chaise*; that leads to particular theories of pronouns and agreement. On the other type of proposal, they rely on metalinguistic reference, and that tool can make short work of other difficulties with interpreting agreement. This subsection introduces the basic phenomena, and the remaining sections go through theories, consequences, and twists like grammatical phi-features selected by adpositions.

Interpretive approaches to grammatical phi-features have chiefly looked at gender and number (on class, see Crisma, Marten and Sybesma 2011; on person, Collins and Postal 2010, Rezac 2011: 6.4). French will illustrate gender.[43] Nouns describing referentially gendered entities often have referential gender, f. *femme* 'woman', m. *homme* 'man', or f./m. *poète* 'female/male poet', but not always, f. *personne* 'person', *sentinelle* 'sentry', beside m. *individu* 'individual', *témoin* 'witness' (Schafroth 2003, Grevisse 2008: §464ff.). With other nouns, there need be no rhyme or reason to gender assignment, e.g. f. *chaise* 'chair' beside m. *tabouret* 'stool', m. *siège* 'seat'. Two observations set boundaries on any theory associating grammatical gender with other meanings. One differentiation of apparent synonyms by gender, f. *bicyclette*, m. *vélo* 'bicycle';

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[42] The meaning in (3) supposes that the situation argument is rather a neo-Davidsonian event argument, from which the EA is recoverable as Agent, and that at the point where INV is, the event of the lower VP has not yet been closed off (see Kratzer 2007 on situations vs. events). Agreement, inverse voice marking, and controller movement in person hierarchy systems has sometimes been attributed to v (e.g. Béjar and Rezac 2009). This suggests reformulating INV as v_{INV}, allowing direct reference to the EA, but that needs further changes, easier if the λ-abstractor and phi-agreement are also all on v (as in Kratzer 2009).

[43] French data here have been discussed with many over the years, especially at SWIGG 12 and TTSV 13, and above all with M. Jouitteau, whose judgments are reflected in all the examples here.

m./f. *après-midi* 'afternoon'; f. *femme* = m. *être femme* 'woman-being' (Grinder and Postal 1971: 282, Tasmowski and Verluyten 1985: 360, Percus 2011: 180-1). The other switchof gender with number, m.sg *délice*, f.pl. *délices* 'delight(s); delicacy(ies)' (cf. Corbett 2000: ch. 3), underscoring the different gender for synonymous roots and demonstrating sensitivity to more than just root.

English can for the most part illustrate grammatical number through idiomatic plurals, including pluralia tantum that have no singulars: *scissors, pants*; *genitals*; *scales* (British = US *scale*); *minutes*; *remains*; *savings*; *surroundings*; *shallows*; *manners*; *damages*; *letters* 'literature'; *condolences*; *odds*; *oats*; *Alps;* idiom chunk *keep **tabs** on, be **friends** with*; phrasal *odds and ends*, and French *belles lettres* 'beautiful.PL letter.PL = literature' (Huddlestone and Pullum 2002: 5.3.2.1-2, cf. Corbett 2000: 5.8 generally).[44] Grammatical plural lacks the interpretation expected of referential [PL], both as standard sum-plurality, but also it seems as abundance plurality (q.v. Harbour 2009, 2014, Gillon 2015):[45]

(1)   {These pants ≠ The legs of this pair of pants} are similar.
         {#The minutes ≠ The entries of the minutes} are each in a different hand.
         {These scales ↛The parts of these scales} are square.

         How {?*much manners is, *many manners are, good behavior is} enough?

(2)   The skies parted and waters/oats fell to the earth.
         → lots of water, ↛lots of oats

Failure to pass such tests does not entail the absence regular [PL] features; *pants* might be a sum of pant-legs turned group atom, say by covert ~~pair of~~ *pant-legs*. In that case the interpretive problem is reducibility – what differentiates *pants* from *sleeve(s)*, *wages* from *pay*, *oats* from *oat-flake(s)* and *oatmeal*.[46] This sort of analysis is rather awkward for gender.

Grammatical and referential phi-features are sometimes given different syntax, the former attributed to roots and the latter to functional architecture (e.g. Kramer 2014b, Landau 2016; but not e.g. Borer 2005: 1.4). This difference is not supported – though neither is it belied – by independent asymmetries. Grammatical gender and number are routinely linked to roots as *host* (*chaise*), but the host can also be root with number (*délices*), and much larger (*odds and ends, belles lettres, be friends with*). This is unsurprising given the known range of idiomatisation

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[44] Other languages have pluralia tantum of types found rarely in English or not at all, and they may bring out the open-ended range of possible meanings, e.g. Czech *hodiny* 'clock, lit. hours', and with no singular form of the stem *ústa* 'mouth', *dveře* 'door', *housle* 'violin', *saně* 'sled', *křtiny* 'baptism'; French *orgues* 'organ' f.pl. with no f.sg. beside m.sg/pl *orgue, orgues* 'organ', though for some m.sg. vs. f.pl like *délice(s)*; Hebrew *be'alim* 'owner' (Landau 2016). Examples show lexicalisation of gender alone and gender and number together, but not number alone, i.e. a counterpart of *be'alim* that could be masculine and feminine like m./f. *poète* 'poet'. Given how few human-reference pluralia tantum are known, this is weak evidence of the theoretically common lower placement of gender than number. More telling is another asymmetry. English seems to lack singularia tantum that are both arbitrary like *scales* and not parts of larger idioms, and many other languages seem to as well once independently defective nouns are excluded (though cf. Corbett 2000: 5.8). Why couldn't *oats* or *brains* develop so as to allow singular agreement (this is found) without switching to a mass noun (not found: singular *oats* allows *how much oats*). It may support certain assumptions, such as absence of [SG] and so its unlexicalisability, in contrast then to [MASC].

[45] Some distributivity tests may rely on the availability of a singular counterpart to the plural (Chierchia 1998a: 3.1 on counting furniture), but not all: *These (*three) cattle are related to each other*.

[46] Or alternatively, if pluralia tantum morphology reflects a syntactic absence (Bale, Gagnon and Khanjian 2011), the absence of combinations like *oat* and [SG].

(Fellbaum 2015). Grammatical and referential phi-features also behave the same for local agreement and for pronominal anaphora, discussed below.

Agreement with grammatical phi-features in cases like (3) raises the same interpretability and reducibility questions as have been discussed so far.

(3)   Le/*la **vainqueur** du concours Miss Anthropologie a été très participat-if/*ive.
       The.M/*F winner(M) of.the context Miss Anthropology has been very participative.M/*F

       These fireproof **pants** pay for themselves, don't they?
       *This fireproof **pants** pays for itself, doesn't it?

But for grammatical phi-features interpretation on their hosts as well raises questions that can be formulated as interpretability and reducibility. The *interpretability* puzzle is whether there is a meaning of, say, [FEM] and [PL], which restricts f.pl. *poètes* to pluralities of females, but not f.pl. *bicyclettes* 'bikes', *sentinelle* 'sentry', *délices* 'delights'. *Reducibility* turns on whether semantics can put the or a [FEM] feature on *bicyclette* 'bicycle' but not *vélo* 'bike', on the plural but not singular of *délice*, like it puts [FEM] on *poète* only under the meaning 'female poet'.

The puzzles of grammatical phi-features on hosts and in agreement come together in *pronominal matching* (Tasmowski and Verluyten 1982, 1985). Consider the following examples for number (all the same goes for gender):

(4)   Deictic: pointing at socks/pants without any prior mention of *pants/scissors*:
       Can you hand them/?*it to me? – But they$_{socks/*pant-legs}$ are each of a different colour!

       Anaphoric:
       You shouldn't wear these horrible socks/pants. You know their/*its size doesn't fit you. –
       I know, but they$_{socks/*pant-legs}$ are each of a different colour, and I like that.
                                                                (cf. Tasmowski and Verluyten 1985: 341, 351)
On the usual account of the *socks*-examples, [PL] contributes interpretive sum-plurality independently to *socks* and to *them*. In the *pants* examples, [PL] does not make *pants* a sum-plural, and neither does it make *them* so, provided one of two conditions is met:

(i) *them* is *anaphoric* to a DP whose NP *pants* is *overt*; or
(ii) *them corresponds* to a definite whose NP *pants* is *evoked*, in the sense that the definite that would most naturally replace *them* is *the pants* (cf. *Could you hand the pants to me?* but *Could you hand that/??the piece of clothing to me?*).

These conditions are irreducible to meaning, since – concludes most of the literature with Tasmowski and Verluyter (1982, 1985) – it is an language-specific fact about the form of *pants* and not about its meaning that it is plural. The point is striking with contextual synonyms (here it is convenient to add examples with gender, adapting Dowty and Jacobson 1988: 99):

(5a)   On leaving the area, you must take off your **clothing** and put **it**/***them** in the bin set up
       for this purpose. The **clothes** may have been contaminated and **they**/***it** will be
       incinerated.

Le **vélo** est dans le jardin. **Il/*Elle** est cassé. Jan met la **bicyclette** à l'envers, doucement, car **elle/*il** a des freins-à-main.

The bike(M) is in the garden. He/*She is broken. Jan puts the bicycle(F) upside down, carefully, because she/*he has hand brakes. (French)

It is even possible to disambiguate anaphors to synonyms through grammatical phi-features:

(6)   Take off your **clothing**$_i$ and put on these **clothes**$_k$. **It**$_i$ / **They**$_k$ will be washed later.

J'ai laissé ma **bicyclette**$_k$ ici. A côté il y avait aussi un **vélo**$_i$/**vehicule**$_i$. Je suis revenu après une demi-heure, mais **il**$_{i/*k}$ / **elle**$_{*i/k}$ n'était plus là.

I left my **bicycle**(F)$_k$ here. Alongside there was also a **bike**(M)$_i$/**vehicle**(M)$_i$. I came back after half an hour, but **he**$_{i/*k}$ / **she**$_{*i/k}$ was not there anymore. (French)

Pronominal matching seems to have exceptions like the switch to referential gender in (7). However, this is really pronominal matching to the NP *homme* 'man' evoked by *sentinelle* (Tasmowski and Verluyten 1985, Cornish 1986). Some NPs but not others are easily available to "redescribe" a given antecedent in a given context, as in (8). (7) pronominalises the redescription, in the sense that its pronoun corresponds in phi-features to one of these NPs as the evoked NP. (9) shows the same phenomenon without grammatical phi-features.

(7)   Toute/La sentinelle mâle a dit qu'il/elle n'a rien entendu.
       Every.F/The.F sentry(F) said that he/she has not heard anything.

(French, cf. Tasmowski and Verluyten 1985: 353)

(8)   An actress's CV say a lot about the {woman, artist, person, #female, #human}.

(9)   That **dog** is so stupid, every time I see **it** I want to kick **it**. **He's** damned good hunter though.
       The **Senate** just voted **itself** another raise. Most of **them** were already overpaid to begin with.

(Pollard and Sag 1994: 72-3)

Pronominal matching seems to call for a formal way to relate a pronoun to an overt antecedent NP without any configurational restrictions, or to an "evoked" one. The formal and interpretive conclusions drawn from this have been significant. That is the topic of what follows.

5.2   Nonlocalism

Interpretive approaches to grammatical phi-features are conveniently divided into two types: *localist*, where their interpretation depends on a local syntactic relationship to the host noun, and *nonlocalist*, where it does not. The latter is the metalinguistic approach of Dowty and Jacobson. It is best set out in the context of its nonsemantic but related alternatives.

Tasmowski and Verluyten (1982, 1985) took it as evident that grammatical number and gender are not part of the interpretation of their host, pointing particularly to synonyms, and concluded that phi-matching in both pronouns and agreement involves a formal mechanism. The

number and gender of a pronoun, in particular, are always "linguistically controlled" by an NP, either overt, or pragmatically recovered from a contextually "salient object".[47]

Pollard and Sag (1994: 2.3-4) specify such a mechanism through language-specific "pragmatic constraints" constraints. In a language with grammatical phi-features like German, [FEM] restricts reference to females, or else to individuals such that there is a noun in the lexicon of the language "that effectively classifies that entity at a level of granularity appropriate to the context". These constraints are not part of the model-theoretic interpretation of syntactic structures (p. 79n13) but rather conditions on use ("presupposition", p. 76). So a pronoun or agreement referring to the girl Hilda can be either [FEM] or [NEUT], because there is the neuter noun *Mädchen* 'girl' in the lexicon of German. Syntactic constraints limit this gender switch in certain syntactically local domains by forcing structure-sharing between antecedent and local anaphor, quantifier and bound variable, agreement controller and target. But there is no nonlocal syntax, so outside these domains, only the pragmatic constraints on [FEM] apply.

On this sort of approach, grammatical phi-features are not interpreted in our sense. It may be useful to draw a parallel with the usual pragmatic explanation of the blocking of *the day before today* by *yesterday*. The blocking is due to conditions on use that refer both to meaning – they compare utterances that are both true and equally informative and relevant – and to form, namely the idiosyncratic availability of a briefer way to express *the day before today* in English. However, whereas Gricean pragmatic constraints are consequences of cooperative behavior, Pollard and Sag's constraints on [FEM] are specifically linguistic, formal in the sense used here.

Pollard and Sag (1994: 79n13) contrast this pragmatic approach to grammatical phi-features with the semantic one of Dowty and Jacobson (1988). Nevertheless, Dowty and Jacobson's semantic account works rather similarly through availing itself of *metalinguistic* reference. Linguistic expressions are individuals in a model of the world like any other, and linguistic properties are properties that hold of them in the model. The meanings of words like *verbatim, aforementioned, proparoxytone* refer to linguistic objects, and other meanings may do so, like 'not' and 'rather' in (1). This is metalinguistic reference.

(1)   **Sa Majesté** n'est pas <u>content</u>, plutôt, **Sa Majesté** est <u>contente</u>.
        His Majesty(F) is not happy.M, rather, his Majesty(F) is happy.F (French)

Dowty and Jacobson (1988: 98-9) give a metalinguistic account of pronominal matching in grammatical phi-features:

> [For *La chaise est belle/*beau* 'the.F chair is beautiful.F/*M:] What we would say is that the adjective *beau* denotes a function which is defined only for those objects with the property that the most salient common noun that would be chosen to refer to them in the present context of utterance has the masculine gender feature. In this way, we can retain the notion that gender features are syntactic, but agreement can still be treated as semantic. (Dowty and Jacobson 1988: 98)

> [For *Elle est belle* 'she is beautiful.F' when pointing to a chair:] As it seems absurd to hypothesize that such pronouns have "unpronounced" linguistic antecedents, lurking

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about somewhere in the discourse context, we see no way to account for this kind of matching, particularly the purely deictic use, without acknowledging that a property of an object is what noun could appropriately refer to it -- that facts about language are part of the real world properties of objects. (Dowty and Jacobson 1988: 99)

The key element is "the most salient common noun that would be chosen to refer to them in the present context of utterance". No nonce tools enter into this formulation as it stands: reliance to what "would be chosen" (cf. reference to intentions in specific indefinites, Fodor and Sag 1982), to contextual "salience" of objects in the model (cf. deictic pronouns, Cooper 1979, Heim 1982: 109, Heim and Kratzer 1998: 240), and to objects with metalinguistic reference like common noun individuals (cf. quotation, Maier 2014, negation Horn 1989, Potts 2007, comparison, cf. Morzycki 2009, and deictics, Corblin and Laborde 2001).

The proposal does need spelling out. Factors that affect which "noun … would be chosen" must not include Condition C and degradation due to repetition, otherwise *it* would beat *them* in (3) like *pay* beats *wages*.

(3)   This week's wages will be garnished too. In fact I doubt I'll see half of my {??wages/pay, them/*it}.

        La voiture s'est arrêtée au milieu de la route et puis {le véhicule, ??la voiture, elle/*il} a explosé.
        Suddenly the.F car stopped in the middle of the road and then {the.M vehicle, ??the.F car, she/*it} exploded. (French)

But some aspects of the context matter. Suppose an archaeological dig reveals a pair of checkered linen pants at a palaeolithic site. Then deictic *they* far and away beats *it* in *My god, they've been ironed!*, like *the pants* beats *the object*, but *it* is better in *My god, it's still intact!* This effect of predicates on pronoun choice is diminishes if the pronoun is anaphoric, *I picked up the pants and noticed that {they were, ??it was} still intact*.

There seems to be no reason why these complexities could not be handled by a precise formulation of "the most salient common noun that would be chosen." But they bring out the powers that inhere such a tool. If failure to respect the gender of a salient noun that would be contextually chosen to described an individual gives rise to ungrammaticality, why not failure of the current word to have the gender feature of the closest noun it c-commands without an intervening island boundary – implementing long-distance agreement. Dowty and Jacobson effectively note this in discussing "local" agreement, which they exclude from a semantic treatment because of its formal complexity: it "probably *could* be accommodated in the kind of semantic approach we have advocate here" – but "it is not clear that it would be insightful to do so." (Dowty and Jacobson 1988: 101; cf. Pollard and Sag 1994: 79n13, Dowty n.d.).

Dowty and Jacobson actually use metasemantic reference in a very limited way, and appeal to pragmatics to address another aspect of pronominal matching. Pragmatics presumably is responsible for which common nouns are salient and why. More explicitly, pragmatics is their solution to the problem of synonyms in (4) (or rather its Dutch version):

(4)   Le **vélo** est dans le jardin. **Il**/*Elle est cassé. Jan met la **bicyclette** à l'envers, doucement, car **elle**/*il a des freins-à-main.

The bike(M) is in the garden. He/*She is broken. Jan puts the bicycle(F) upside down, carefully, because she/*he has hand brakes. (French)

Dowty and Jacobson attribute the need of a pronoun to match the most recent antecedent to pragmatics, appealing to implicatures generated by choosing a less anaphoric expression than available (p. 99-101: see since e.g. Ariel 1990, Gundel, Hedberg and Zacharski, 1993, Levinson 2000, Huang 2000, Schlenker 2005). In essence, using a feminine pronoun as anaphor to a grammatically masculine antecedent is not cooperative of the speaker, like repeating *John* or irrelevantly redescribing him in (5), and an implicature of disjoint reference arises unless other factors step in (they suggest that decayed memory of the antecedent contributes to switching to referential gender; contrast partial agreement in sec. 3.2).

(5)   John$_i$ ate all the hot-dogs, but {he$_i$, ??John$_i$, ??the artist$_i$, the hitherto unbeaten hot-dog eating champion$_i$} finally got sick afterwards. (elaborated from Dowty and Jacobson 1988: 100)

So semantic metalinguistic reference chiefly does the job of pronominal matching to "evoked" nouns, while the lion's chare of matching to overt antecedents is pragmatic. It relies on constraints that differentiate various anaphoric expressions by form and not meaning alone, but the constraints, in Gricean pragmatics, are constraints on behavior, not on linguistic behavior. This pragmatic proposal does not depend on Dowty and Jacobson's semantics for grammatical phi-features, and is applicable to other approaches, discussed next.

5.3   Localism

On localist approaches to interpreting grammatical phi-features, the key is a local relationship between grammatical phi-features and their host, in which the contribution of the phi-features is neutralised. The problem of grammatical phi-features then looks very much like the problem of idioms (q.v. Fellbaum 2015). On the idiomatic reading of *pull strings, keep tabs on*, the elements or their combination have a special interpretation in virtue of their relatively local collocation. The same could be said of [PL] and *minute, pant* in *minutes* 'records', *pants*. If this is the right parallel to pursue, then pronominal matching must not be a special interpretation of [PL] on *them* because there is *minutes, pants* in another sentence; it would be like *strings* having an idiomatic meaning because there is *pull* in another sentence. Rather, *them* must contain *minute-, pant-*, an important conclusion about the nature of pronouns.

It is therefore useful to begin with the three approaches to the compositional interpretation of idioms presented in Westerståhl (2002):

(A) Lexicalise the idiom as an atom for $\|\cdot\|$: *[$_\gamma$ [$_\alpha$ kick [$_\beta$ the bucket]]*] gets its meaning by the lexical function L(γ) and not from its daughter nodes. Discontinuous idioms are a problem, and idiom chunks separated by movement need total reconstruction.[48]

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[48] If γ is to be syntactically compositional, as is common of idioms, the Terminal Nodes rule can be reformulated without reference to terminality, TN' "if a node $\xi \in$ the domain of L, $\|\xi\| = L(\xi)$"; but if $\|\cdot\|$ is to remain a function, γ must be distinct from the mother δ of literal *kick the bucket*, so γ is in the domain of TN' but not FA and inversely.

(B) Special meanings for idiom chunks, e.g. *pull^i* (say close to the meaning of *use*) and *strings^i* (*connections*). Discontinuous idioms and movement are fine, but cooccurrence restrictions need saying something, e.g. no verb save *pull^i* is defined on first argument that is *strings^i*.

(C) Special interpretive rules, and so special syntactic objects if $\|\cdot\|$ is a function. Here is a sketch: suppose *pull* and *strings* can combine both by Merge to give VP and an idiomatic Merge^i to give VP^i, with VP in the domain of FA and VP^i in the domain of FA^i, where FA^i is like FA save for certain objects like VP^i with daughters *pull, strings* on which it gives idiomatic meanings. Discontinuous idioms, movement, cooccurence restrictions can be made to work, but synonyms of idiom subconstituents like *pull* should be substitutable.

Localist approaches to grammatical phi-features can be discussed in light of these options. There seem to be just two, Percus (2011) and Merchant (2014) on gender. Both give it a *vacuous* interpretation in the sense of sec. 2.1. One way to do so is through a special interpretive rule "skipping" gender as part of the definition of $\|\cdot\|$:

(1)   for all c, g, $\|[_\alpha \text{ [FEM] N}]\|^{c,g} = \|N\|^{c,g}$ iff N $\in$ {chaise…}

<div align="right">(cf. Percus 2011: ex. 19a, adapted)</div>

This would correspond to idiom strategy (C) if developed.[49] In contrast, idiom strategy (A) would treat α in (1) as a terminal node in the definition of $\|\cdot\|$, $L(\alpha) = \lambda x \lambda s$. x is a chair.

Alternatively, vacuous interpretation can interpret but "trivialise" gender by ignoring it with certain nouns, as in (2) or (3) (consider them first without *(and α)*). It can be seen as a version of idiom strategy (B), with ordinary and idiomatic meanings conflated in a single conditional meaning. In (2), for instance, [FEM] could be split up into [FEM] defined only if its individual argument has referential gender, and [FEM'] defined only if it does not – two syncretic features in complementary distribution, referential and grammatical [FEM].

(2) $\|\text{[FEM]}\| = \lambda p_{est}.\lambda x_e.\lambda s$: if x has referential gender in s (and α), then x is female in s . p(x)(s)

(3) $\|\text{[FEM]}\| = \lambda p_{est}.\lambda x_e.\lambda s$: if [for all x', s', p(x)(s) $\to$ x' has referential gender in s'] (and α), then x is female in s . p(x)(s)

<div align="right">(cf. Percus 2011: ex. 17', 28, n. 14, 23, Merchant 2014: n11; adapted)</div>

In these meanings, α is meant to list nouns like f. *personne* 'person' that do entail having a referential gender, as in (4) (cf. Percus 2011: note 14). This amounts to coding c-selection semantically, with an important limitation: unless α is metalinguistic, it cannot distinguish synonyms. If [FEM] combines with roots (for instance), there should be no root synonymous with the root of *personne*, but which [FEM] restricts to females (a much weaker condition than requiring that there be no synonym of *personne* or of its root).

(4)   α $\Leftrightarrow$ it is not the case that for all x",s" [[p(x")(s") $\leftrightarrow$ x" is a person in s"] or [p(x")(x") $\leftrightarrow$ x" is a sentry in s"] or …]

These tools make grammatical gender interpretable. Can they help with reduction of gender to semantics, so that *chaise, personne* but not *tabouret, humain* combine with [FEM]? In order to force referential-gender [FEM] to combine with *poète* 'poet' when it describes female poets, the principle of Maximise Presuppositions MP has been invoked (Percus 2011, Sudo and Spathas 2015). MP (applied locally) prefers *[NP [FEM] poète]* to *[NP poète]* when both make for felicitous and equivalent utterances, because the meaning of the former is defined on a smaller domain than that of the latter, namely <x,s> such that x is female in s. The meaning of *[NP [FEM] chaise]* under (2+4) and *[NP [FEM] personne]* under both (2+4) and (3+4) end up always defined, and so should not be preferred to *[NP chaise]*, *[NP personne]*. It seems possible to formulate the meaning of [FEM] so that MP works here as well.[50]

A different way to combine nouns with phi-features is to reverse the functor-argument relationship, as in (5) – always, or just for desired cases such as grammatical phi-features.

(5) $\|\text{bicyclette}\| = \lambda f_{<<est>,<est>>}.\lambda x.\lambda s$: for all x', s', p_{est} [[p(x')(s') is defined $\rightarrow$ f(p)(x')(s') is defined] $\leftrightarrow$ x' is female in s'] . x is chair in s
        $\|[\text{FEM}]\| = \lambda p_{est}.\lambda x.\lambda s$: x is female in s . p(x)(s)

Meanings like (5) "project" functional architecture from roots, here [FEM] from *bicyclettes*, while meanings like (2, 3) select roots. By (5), *bicyclette* must combine with something that is extensionally equivalent to the meaning of referential-gender [FEM], and ignores it. It might seem that meanings like (5) have an easier time of dealing with synonyms, but that is a mirage. If *vélo* and *bicyclette* are distinguishable by only the latter taking [FEM] as in (5), then they are functions with different domains, and this can be used in the statement of α like (4).

These proposals for grammatical gender can be extended to grammatical number. All of these interpretations for grammatical phi-features are arbitrary stipulations, matching the intuition that it is an arbitrary property of French *chaise* or *personne* that they are feminine, or British *scales* that it is plural, much as it is arbitrary that one's *strings* but not *wires* can be pulled.

Grammatical number also suggests a different localist strategy, where all elements have independently motivated interpretations but their cooccurrence is stipulated. This has been suggested above for *pants* as *[G [[PL]] pant]*, with *pant* 'pant-leg', [PL] the regular sum plural phi-feature, and *G* a mapping from pluralities to group atoms like a silent *pair of*. Arbitrary stipulation is needed to implement cooccurrence restrictions, perhaps in semantics as for [FEM] above: that *pant* must combine with [PL] and *G*, and *G* can combine with *[[PL] pant]* but not *[[PL] sleeve]*.[51] If these cooccurrence restrictions are rather a matter of form, say a constraint on

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[50] Consider (2/3+4) with *personne*. Projection of the presupposition is by the definition of FA, whereby FA of *[NP [FEM] N]* is only defined if $\|N\|$ is in the domain of $\|[\text{FEM}]\|$. This is so iff (i) is true, a tautology thanks to the necessarily false underlined material contributed by α, so there is no domain restriction. With *chaise*, whose meaning is not part of α, the definedness condition by (3) is (ii), again a tautology if chairs do not have referential gender; but by (2), it is rather (iii), so *[NP [FEM] chaise]* is presuppositionally stronger than *[NP chaise]*.

(i)   {x, s: if for all x',s', … <u>and it is not the case that for all x",s", x" is a person in s" ↔ x" is a person in s" or …</u>, then x is female in s}
(ii)   {x, s: if for all x',s', x' is a chair in s' → x' has referential gender in s', then x is female in s]
(iii)   {x, s: if x has referential gender in s, then x is female in s}

[51] There are further complexities that a real analysis should attend: *pant* occurs without *-s* in compounds but means 'pants', and *pants* unlike *pair of pants* resists DP environments that select for number, *We sold {?every, ?seven, (?)many, no} pants* (cf. Quirk et al. 1985: 5.76).

silent *pair of*, then that remains as an uninterpretable aspect of grammatical phi-features. Extension of this approach to grammatical gender is less intuitive, as noted earlier.

5.4   Anaphoric pronouns in localism

Localist approaches need to put the host into pronouns in order to interpret their grammatical phi-features. This is characteristic of the *D-type* analysis of pronouns as definites with a silent NP in Elbourne (2001, 2005, 2013).[52] What makes a pronoun is a variant of the definite determiner, *the$_{pron}$*, which (i) requires that its NP complement be silent, like stranded determiners such as *none* beside *no*, and (ii) realises phi-features, just as stranded determiners do in languages where determiners agree, such as *aucun* 'none' in French. Stranded determiners need an overt or evoked NP as licensor (Elbourne 2005: 2.1.3, 2.7.2). The matching by stranded determiners of the grammatical phi-features of these licensors has been viewed as evidence that the stranded determiner combines with an NP, not just with a property (Elbourne 2013: 200-1). To illustrate with an example motivating the D-type analysis in Elbourne (2005), paycheck pronouns in (1), it is not enough for there to be a salient relation mapping recipients to pay/wages (Cooper 1979, Heim and Kratzer 1998). The relation must be reified in the pronoun with the same Ns *pay, wage* as the antecedent's N, in order to account for grammatical number:

(1)   Gwen$_i$ gave her {pay, wages} to her mistress, but every other woman$_k$ gave {it ~~her pay~~, them ~~her wages~~} to her$_k$ wife.

The D-type analysis of pronouns lets grammatical phi-features be interpreted on pronouns just as they are with overt NPs, and dissolves the problem of interpretability. Reducibility remains. It is the problem of ensuring that the silent NP of stranded determiners match overt or evoked NP in grammatical phi-features. It should be a constraint on matching in lexical Ns, since silent NPs do not need to match their licensors in phi-features, (2). By matching of lexical Ns, a pronoun *them* based on *pant-* should require [PL] just as *pant-* does in full *pants*.

(2)   I have a marble, and Kate has several ~~marbles~~.

The semantics of definites in Elbourne (2005, 2013) places stringent limits on what silent NPs are felicitous. Briefly put, in (3), *une bicyclette* allows for the satisfaction of the existence-and-presuppositions for *la* as *la bicyclette* 'the.F bicycle'; but not for *le* as the hyponym *le$_{pron}$ VTT* 'the.M mountain-bike(M)', since the bicycle needn't be a VTT; nor for *le* as the hyperonym *le$_{pron}$ véhicule* 'the.M vehicle(M)', since there needn't be a unique vehicle. However, Elbourne's semantics should allow for synonyms, *il* as *le vélo* 'the.M bike(M) or *le véhicule terrestre à deux roues…* 'the.M terrestrial vehicle(M) with two wheels…'.

(3)   Si j'avais **une bicyclette**$_i$, je **la**$_i$/***le**$_i$ vendrais.
       If I had a.F bicycle(F), I would sell her/*him.

So something more than the semantics of *the$_{pron}$* is needed to constrain its silent NP. Elbourne (2001, 2005) adopts a formal identity condition, like the syntactic identity condition much

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[52] This definite theory of pronouns is advanced in Postal (1966) and pertinent discussion of grammatical phi-features in ellipsis is already found in Grinder and Postal (1971). What follows draws on Rezac and Jouitteau (2016).

debated for VP ellipsis (see Craenenbroeck and Merchant 2013, Aelbrecht 2015, Merchant forthc.; on Elbourne's proposal, cf. Schlenker 2010). That entails a nonlocal syntax that can span sentences. But even a formal identity condition is not enough where there are multiple synonymous antecedents, as in (3). Here nothing would prevent il_k from being formally licensed as *le vélo/véhicule* while denoting k (in Elbourne's terms, by being evaluated in the salient situation that is part of the *I-left* situation and not the *be-beside* situation). The formal licensor of a silent NP does not require any semantic relationship it, as in (2).

(4)   J'ai laissé ma **bicyclette**$_k$ ici. A côté il y avait aussi un **vélo**$_i$. Je suis revenu après une demi-heure, mais **il**$_{i/*k}$ / **elle**$_{*i/k}$ n'était plus là.
      I left my **bicycle**(F)$_k$ here. Alongside there was also a **bike**(M)$_i$. I came back after half an hour, but **he**$_{i/*k}$ / **she**$_{*i/k}$ was not there anymore.

Perhaps (3) can be taken care of pragmatically along the lines proposed by Dowty and Jacobson. It remains to be seen how much more needs saying beyond a constraint that the property argument of determiners must be a linguistically reified salient property, that is, if we need a formal identity condition and one that goes beyond local syntax. Much evidence for formal identity like (4a) can be reduced to Elbourne's (2013) semantics of situations, which in this case does not put wives into situations verifying the restrictor. But there remain cases like (4b) where formal identity might give a better account (cf. Sharvit 2008: 5.2).

(4a)   Every {??married man, man with a wife} is sitting next to her.
(4b)   I dreamt that my uncle was a female/??female, and that she taught calculus.

5.5   Localist agreement and a disaster of hybrid facts

If grammatical phi-features in agreement are to be interpretable in localist approaches, they need a host.[53] One simple way to supply the host is view agreement as the realisation of the phi-features of a movement occurrence (copy, trace) on a clausal head (sec. 2.2). Thus *My pants are on fire* might proceed by moving *my pants* through Spec,v before landing in Spec,T, and [PL] on this occurrence is realised on *are* while the rest is deleted. This approach is unhelpful when there are no occurrences, as in long-distance agreement or adjective agreement. The same goes for agreement as a D-type pronoun (sec. 2.4).

We might also view agreement as an NP with its phi-features, the ΦP of Déchaine and Wiltschko (2002). It gives structures like (1) in the case of movement: an NP$_{Agr}$ attaches to the derived predicate formed by movement, its [PL] phi-feature is realised on *are*, and rest is deleted under identity with the NP of the controller. Interpretation is by Predicate Modification of NP$_{Agr}$ and the movement-derived predicate. The semantic contribution of NP$_{Agr}$ is innocuous (for conservative determiners): the controller denotes or quantifies over individuals that satisfy its NP, and NP$_{Agr}$ restricts P to those individuals: *No pants are blue* gets the interpretation of *No pants are pants that are blue*.

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[53] In many approaches, phi-matching between antecedent and local anaphor is syntactic and may reflects the same mechanism as agreement (e.g. Pollard and Sag 1994, Kratzer 2009, Reuland 2011, Drummond, Kush and Hornstein 2011, Rooryck and vanden Wyngaerd 2011). Wechsler and Zlatić (2003: ch. 9) use grammatical phi-features to support this position, but only for a subset of local-anaphoric relationships.

(1)   [the [NP [PL] pant]] [[NPAgr [**PL**] ~~pant~~] [λ_i [T' <u>are</u> [VP t_i blue VP] T']]]

We may also define a functor Agr to combine NP_Agr and a predicate, (2). This may be useful if it is desirable to restrict the distribution of NP_Agr by s-/c-selection. Both alternatives are sorts of predicate transfers (Nunberg 1995, cf. sec. 3.3). This pro-NP agreement recalls nominal incorporation, and so agreement types that have been analysed as incorporated nominals (Mithun 1984, Baker 1988: ch. 3). It seems extensible to adjective agreement and to the expletive approach to long-distance agreement (sec. 2.3).

(2)   [the [NP [PL] pant]] [[NPAgr [**PL**] ~~pant~~] [λ_i [T' <u>are</u> [VP t_i blue VP] T']]]
        $\|Agr\| = \lambda p_{est}.\lambda q_{est}.\lambda x.\lambda s \ . \ p(x)(s) \ and \ q(x)(s)$
        Syntax of Agr: allows and requires a silent NP as first argument.

Even if agreement is such that it allows grammatical phi-features to be interpreted, reducibility does not follow. Consider *le vainquer* 'the.M winner(M)' as subject. If it is common ground that it denotes a woman, it can antecede anaphoric *elle* 'she', yet still cannot control feminine agreement, though there should be no denotational incompatibility if feminine agreement turns a property into a property of female individuals. At this point, a more fuller description of agreement facts is needed, taking gender in French as example.

DP-internal adjective and determiner agreement is essentially fixed to grammatical phi-features (rare counterexamples probably involve predicates in reduced relatives). DP-external predicate participle and adjective agreement can sometimes switch to referential gender if it is common ground that the controller denotes or ranges over individuals of a given referential gender. However, the conditions on the switch remain formal. Typical contrasts are:[54]

(3)   [Context: referential gender is known to be opposite to grammatical gender.]

(3a)   La victime de l'affaire a été très participat-ive/*-if.
        The.F victim(F) of he affair has been very participative.F/*M.

(3b)   Le vainqueur du concours Miss Anthropologie a été très participat-if/*ive.
        The.M winner(M) of.the context Miss Anthropology has been very participative.M/*F

(3c)   Ce mannequin est charmant(e).
        This.M fashion_model is charming.M/F. (cf. Grevisse 2008: §438b)

(3d)   La sale bête a encore été violent(*e) avec elle.
        The.F dirty.F beast(F) has again been violent.M/*F with her.

Some nouns, (3a, b), resist switching to referential gender, f. *vedette* 'star', f. *sentinelle* 'sentry', m. *vainqueur* 'winner', m. *témoin* 'witness' (a bit less strong).[55] Some prefer or require

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[54] For types of nouns and their agreement, see Grevisse (2008: §485ff., §438), Schafroth (2003), Ihsane and Sleeman (2003), but also isolated discussions, e.g. Larrivée (1994) on *laideron*, Morin (1978) on *sentinelle*. Reports of agreement and pronominal patterns often seem contradictory, but most examples do not form minimal pairs with adequately described contexts.

[55] Even such nouns use their referential gender in coordination resolution, *la victime et sa famille/douleur* 'the

switching. One such class, (3c), is m. nouns usable for either referential gender though with a marked derivational f. counterpart. Another, (3d) is pejorative nouns of either gender without a derivational counterpart of the other gender. Titles like *Sa Majesté* 'his/her majesty(F)' also allow switching. Change to referential gender is abetted by distance (raising, secondary predication), robustness of agreement (participles easier than adjectives), lexical factors (cultural associations of *gentil* 'nice'), and textual environment (antecedence of pronouns of a given gender). Sometimes any choice of agreement is resisted (cf. Morin 1978: 362).

To deal with such heterogeneity, syntactic analyses have posited multiple phi-sets on controllers, different mechanisms of agreement for different targets, and only a very partial relationship to interpretation (e.g. Wechsler and Zlatić 2000, 2003, D'Alessandro 2007, Collins and Postal 2010, Rezac 2011, Danon 2013, Landau 2016). On an interpretive approach to agreement, all yet remains to be done. Possibly to be looked into are complex NPs that independently give rise to mismatches between DP-internal and DP-external agreement:

"Joint" coordinations
Ma [seconde victime et dernier mari] était plus courageux.
My.F [second.F victim(F) and last.M husband(M)] was more courageous.M.

"Close apposition" and "appositive compounds" (cf. Grevisse 2008: §432)
Le capitaine Susan Ivanova sera surpris(e).
The.M captain(M) Susan Ivanova will.be surprised.M/F.

"Quality DPs " (Doetjes and Rooryck 2003, Den Dikken 2006: ch. 5)
Ton phénomène de fille est distraite.
Your.M phenomenon(M) of girl(F) is distracted.F.

Close apposition is a natural tool to explain vacillating gender with *le capitaine* 'the captain' on the referential use of definites, since theories of referential definites have partly drawn on it (Elbourne 2005: 3.3.3, Scwharz 2009: 6.2, ultimately based on Fox 2002, see esp. his p 67n6). But we are currently at a loss to explain why it is available for *le capitaine* and not *le vainquer*. Quality DPs may lie behind referential gender agreement of *la sale bête* 'the dirty beast' as *la sale bête ~~de ton mari~~* 'the dirty beast of your husband', and even explain why it is available for *bête* but not *sentinelle* given *your beast/??sentry of a husband*. Only syntactic analyses are available for why quality DPs agree as they do, but a semantic approach has been sketched in sec. 3.3 through argument and predicate shifters for similar mismatches in quantity DPs.

Beyond French, grammatical phi-features show further dimensions of complexity. Switches to referential gender and number can occur at particular points within the DP (Wechsler and Zlatić 2003, Corbett 1991, 2006, Hahm 2011, Landau 2016). Pronouns with grammatical phi-features need to be considered (Taylor 2009, Collins and Postal 2010, Hahm 2011, Rezac 2011) and may lead to insights into conditions on switches like the strong-weak distinctions (D'Alessandro and Pescarini 2015). Some nouns have two grammatical phi-sets for different targets, neither reducible to referential phi-features (Wechsler and Zlatić 2000, 2003, cf. Alsina and Arsenijević 2012ab vs. Wechsler and Zlatić 2012). And some nouns follow ridiculously

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sentry(F) and hir family(F)/pain(F)' resolved to MPL (Wechsler 2015) or to whatever the gender of a pronominal anaphor anteceded by such a noun (Graf 2007). Wechsler attributes this to semantic resolution, and then it is independent of the question of agreement.

complex conditions (Rezac 2011). French *gens* in (5) controls masculine agreement, save on preceding adjectives and determiners, but only if the first of these is not syncretic for gender, save if… (Grevisse 2008: §490, a norm reflected in the judgments of some; cf. the Excursus).

(5)   <u>Toutes</u> ces très <u>vieilles</u> **gens** <u>pleins</u> d'espoir sont <u>fous</u>.
        All.F.{PL} this.PL very old.F.{PL} people full.M.{PL} of hope are insane.M.{PL}

5.6   Constructional phi-features

There is one more aspect of grammatical phi-features for the interpretive enterprise to attend to: the nature of the host. Grammatical phi-features are typically hosted on noun predicates, *scissors, scales, manners,* including nouns zero-derived from adjectives, *shallows*, and nouns in larger idioms, *odds and ends, be at odds with*, some with agreeing elements, *belles lettres*. It is not clear that there are counterparts with verbal and adjectival hosts, say a grammatically plural verb *fall'* that is a predicate of atoms. However, perhaps that is one way to approach *friends* in the larger idiom *be friends with*, with an adjectival syntax, cf. *be associated/*colleague(s) with*. If there were no verbs and adjectives with grammatical phi-features, it would suggest that phi-features on a noun and a verb are different in some way, like interpretability.[56]

But a far odder host is found in Finnish, the comitative case (Hakulinen et al. 2004: §1261-4, §686, Ikola 1999, Sirola-Belliard 2011).[57] Finnish cases attach to singular and plural DPs. In the DP, adjectives and determiners agree for plural. Plural mostly makes the same interpretive contribution as in English. The result for a typical case is (1a). The comitative case (1b) is unique in only combining with plural DPs, ascertainable as such by analytic plural morphemes, plural-conditioned allomorphy (*ni-*), and plural agreement.[58]

(1a)   ni-i-lla valko-i-lla hattu-i-lla(-an)
        PL\this-PL-ADESS white-PL-ADESS hat-PL-ADESS(-3)
        on those white hats (of his/hers)

(1b)   ni-i-ne valko-i-ne hattu-i-ne-en
        PL\this-PL-COM white-PL-COM hat-PL-COM-3
        with those/that white hat(s) of his/hers

Yet this obligatory formal plurality need not be interpreted in the way of sum-plurals or any other obvious way, though it can be.

(2a)   Veimme Lauran äite-i-ne-en.
        We.saw Laura mother-PL-COM-3 = with her mother *or* #mothers

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[56] There are differences between nouns and adjectives/verbs that may be relevant; see Baker (2003). But it is a premise of the interpretive approach to agreement in the form explored here – using denotations posited for nouns – that [PL] (say) cumulates noun and verb *fall* even if only the noun provides Gupta's (1980) criteria for individuals.

[57] The instrumental also seems to have an uninterpretable plural: *yks-i-n käs-i-n* 'one-PL-INST hand-PL-with = with one hand'. But whereas the references cited argue that the comitative is (now) productive, this is less clear for such instrumental combinations.

[58] Historically, the plural in the comitative has been seen as a possessive adjective affix and distinct from the source of the plural elehere (Lehtinen 2007: 77). Synchronically, it is unclear how far even a morphomic syncretism is plausible, given the identical concord patterns of the comitative plural with other plurals.

(2b)   Matti tuli juhlaan Liiso-i-ne-en / Liisa-vaimo-i-ne-en.
       Matt came to.party Lisa-PL-COM-3 / Lisa-wife-PL-COM-3
       Matt came to the party with his Lisa / with his wife Lisa. (Sirola-Belliard 2011: 147)[59]

(2c)   kirkko yks-i-ne valtav-i-ne kupole-i-ne-en
       church one-PL-COM mighty-PL-COM dome-PL-COM-3
       the church with its one mighty dome

This interpretive inertness may be contrasted with the possessive suffix. The comitative is also unique among Finnish cases in requiring a possessive suffix on its DP argument. But it is interpreted regularly, as possession by a pronoun. In (2b), *Liisoineen* means 'with his Lisa' and not 'with Lisa' (Siirola-Belliard 2011: 147; cf. Quirk et al. 1985: §563c). Accordingly the comitative cannot attach to pronouns, just as there is no *with his her*.

At first sight, the comitative plural is a perfect example of a construction in the construction grammar sense. In search for a compositional interpretation for the comitative's plurality, three solutions come to mind. One, the interpretive suffix takes [PL] as its argument and interprets it vacuously. This would require the structure *[N [[PL] COM]]*, unlike what is suggested by morphosyntax. In part, that is a familiar sort of bracketing paradox of the *unhappier* sort. But it is more difficult, because we need to explain plural morphology on determiners and adjectives in DP-internal agreement, perhaps by giving them each an elided comitative.

On the second solution, [PL] is interpreted as usual, and the comitative case neutralises its contribution. (3) combines the instrumental with a plural individual and applies 'with' to any part of the plurality.

(3) $\|COM\| = \lambda y.\lambda x.\lambda s$: y is a plurality . there is z such that $x \leq y$ and x is with z in s

But with (3), (2a) above should have presuppose that Laura has several mothers, like *We saw Laura with her mothers* or at least *with mothers of hers*, as it seems to in Finnish when comitative is replaced by another case or adposition, including *kanssa* 'with'. The comitative however only has the presupposition that Matt has a mother. Perhaps a place to look for a solution might be uses of plurals in Finnish that are rare in English, like the "exaggerative" plural (Corbett 2000: 7.3, Hakulinen et al. 2004: §1732).

The third solution is starts from the supposed number-neutrality of morphologically plural expressions (e.g. Sauerland 2003, Sauerland, Andersen, and Yatsushiro 2005, Zweig 2009, Bale, Gagnon and Khanjian 2011 vs. Farkas and de Swart 2010, Grimm 2013, Mathieu 2014). But then the comitative suffix needs to be unique in not combining with singular DPs, so that the number-neutrality of plural DPs can come out. That then is the challenge for an interpretive account of grammatical phi-features – typically, when a something is incompatible with singular DPs, it is a property of pluralities.

5.7   Honorific plural

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[59] The example has been modified only by replaicing *Sirkku* with *Liisa*, as familiarity with the name makes a point about the genitive below easier to make (but *Matti tuli tuolta Liisoineen* is in fact a textual example).

The interpretive challenge of grammatical phi-features is sometimes discussed together with that of "special" uses of morphosyntactic phi-features (q.v. Corbett 2000: ch. 7). These may be illustrated by the polite plural in Slavic. In (1), the 2PL pronoun *vy* controls 2PL agreement on the finite verb but SG.F agreement elsewhere, and the combination reflects a polite relationship to a single addressee. There is nothing like it for non-speech-act participants, (2).

(1)   **Vy** jste tenkrát <u>byla</u> <u>sama</u> <u>mladá</u>, babičko.
        ye be.2PL back_then been.SG.F self.SG.F young.SG.F, grandma(F)
        You were young yourself back then, grandma.

(2)   <u>Naše</u> **babička** tenkrát <u>byla</u> <u>sama</u> <u>mladá</u>.
        our.SG grandmother(F).SG back_then been.SG.F self.SG.F young.SG.F
        Our grandmother was then young herself.

                                                    (Czech; only agreements possible)

Polite plurals like (1) have been viewed as difficult because they are not sum-plurals and because of number conflicts (Barlow 1988: ch. 3). So Pollard and Sag (1994: 2.6) analyse the French version of (1) by lexicalising the pronoun with uninterpreted [PL] but interpreted politeness, and the participles and adjectives with no number feature but a content restriction to atoms or pluralities according to descriptively singular or plural form. Controller and target contribute distinct information, some of it is uninterpretable, some of it nonce.

But the challenges of the honorific plural do not necessarily lead to uninterpreted content. Some special uses of phi-features may turn out to be ordinary (Sauerland 2003b, Sauerland, Andersen, and Yatsushiro 2005, Bale, Gagnon and Khanjian 2011 on a variety of descriptively distinct plural uses), while others may reflect syncretism (Harbour 2009, 2014, Gillon 2015 on sum and abundance plurals). For polite plurals, syncretism seems particularly suitable, because their morphosyntax often does not collapse with sum plurals. In Czech (1), honorific 2PL controls 2PL only on the finite verb, while sum-plural 2PL would do so on all targets. Across closely related varieties, polite 2PL differ from ordinary 2PL in which of the three agreement targets in (1) tracks plurality, and whether this affects gender agreement on the target (cf. Corbett 1983: ch. 3). Independently, Slavic varieties differ in whether honorific plurality is restricted to certain pronouns, or is available for all DPs like (2); in the latter case, the noun remains singular but plurality appears on one or more targets according to variety, while sum-plurality appears on controller and all targets (e.g. Šípková 1993, Skulina 1971, Dvonč et al. 1966). Even in the form of polite pronouns themselves, syncretism with the sum-plural can break down (Simon 2003 on German 3PL, Rezac 2013 on Czech). All this suggests that the polite plural are simply syncretic with the sum plural.[60]

6   Prospects

To a considerable extent – a surprising extent from the perspective of common assumptions in syntactic work – there are good prospects for the interpretability of phi-features in agreement, and even their reducibility to interpretation. This is clearest for baseline argument-predicate and

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[60] This sort of difference between polite and sum plurals also suggests that there is more to say about the polite plural than number-neutrality and blocking of the singular, as in Sauerland, Anderssen and Yatsushiro (2005). Revealing on this point might prove systems that contrast polite 3SG, 3PL, 2PL (Betsch 2000).

modification structures, but initially forbidding cases like long-distance agreement or adverb agreement are not unmanageable.

This optimism is also a first-approximation optimism. Even for the baseline cases, a full reduction of agreement to interpretation remains to be worked out, and presently includes formal components or special assumptions. Solutions suggested here to challenging cases sometimes make use of independent tools, like argument and predicate shifters for quantity DPs, but often are ad-hoc, like the agreeing expletive analysis of long-distance agreement. When it comes to the hornet's nest of grammatical phi-features, any optimism about an interpretive theory is very much programmatic. But the interpretive project has mostly not taken up the challenge of the agreement phenomena discussed here, and one of the aims of the study is to bring out their potential to contribute to the question.

By way of ending, let us turn the question on its head: what evidence is there for an interpretive and against a formal theory of agreement, whether generally, or within a specific type of agreement (like the index and concord types, Wechsler and Zlatić 2000). It would be evidence for an interpretive theory, for instance, that a given clausal predicate is cumulated if and only if it has plural agreement. At present, this sort of evidence is slender (sec 2.2). (1-3) are staples of "semantic" agreement in the literature, where agreement has been supposed to correlate with interpretation. They include agreement that has no apparent controller like (1), or adds information to that apparent on the controller, (2), or contradicts information on the controller and fits interpretation better, (3).

(1)   Chez Legrand vendent leur maison.
        At Legrand sell.3PL their house
        The Legrands are selling their house. (French, Grevisse 2008: §438c3°)

(2)   Tu es grande.
        thou be.2SG tall.{SG}.F (French)

(3a)   This team support(*s) each other.
        That french fries is getting impatient. (Nunberg 1995: 115)
        Eggs is my favourite breakfast. (Morgan 1985: 73)
        Pickels and ice-cream is/are delicious. (Morgan 1985: 72)

(3b)   Ce mannequin est charmante.
        This.M fashion_model(M) is charming.F (French, Grevisse 2008: 438b2°)

(3c)   Ninguna estamos libre(s).
        none.SG.F be.1PL free.SG/PL
        We are none of us free. (Spanish)

(3d)   Moj brat tam tóža žýl'i.
        my.SG.M brother(M) there also lived.M.PL
        My brother and his family also lived there. (Russian, Corbett 2000: 192)

However, this evidence is ambivalent. It is consonant with an interpretive contribution for agreement that in (3a) *this team* needs plural agreement to combine with a predicate of

pluralities, but not that it is itself singular. So the interpretive approach needs to say something about the mismatch between subject number and interpretation, and the syntactic approach about the mismatch between subject and verb number. In general, the types of evidence illustrated in (1-3) do not militate against a purely formal and for an interpretive approach to phi-agreement.

Indeed, studies of agreement across its descriptive range have not concluded that agreement is interpretive in the sense used here (Barlow 1988, 1999, Pollard and Sag 1994: ch. 2, Corbett 2006). Rather, (1-3) have been viewed as evidence that some instances of agreement have no source on a controller, and so make an autonomous contribution, though not necessarily a semantic one. But even then, the argument is not that the classical picture is unworkable, but that it would need overly abstract content – ~~they of this~~ team or *that french fries* ~~orderer~~ in (3a) or *my brother* ~~and associates~~ in (3d) or *we are none* ~~of us~~ *free* in (3c). Yet abstractness is surely needed. The putative interpretive contribution of phi-features in (1-3) typically extends to contexts without phi-agreement, like (4), as Chomsky (2000: 146n70) points out for similar examples – an important caveat to keep in mind in the study of agreement.

(4)   We expect the team to support each other.

The agreement phenomena surveyed here are of course challenging for syntactic accounts as well. But syntax is – in most theories – the mechanism of autonomous formal dependencies in structurally local domains. Mismatches between form and interpretation are not in themselves troubling, and mismatches in form can often look to devices that are motivated independently and no worse off than purely interpretive ones (sec. 3.3). Still, reduction to independent mechanisms remains difficult for some of the same cases as in interpretive approaches, notably partial agreement and resolution (sec. 3.2). And grammatical phi-features are a riddle in many of the same ways. Little is explained by distinguishing grammatical and referential phi-features as uninterpreted and interpreted, root and functional, morphological and syntactic, for the puzzles of selection, local agreement, and nonlocal anaphoric matching, and some costs like the abandonment of the usual version of Full Interpretation are high (sec. 5).

7   Excursus: Extrasyntactic agreement

Interpretability is not an issue whenever phi-agreement – the covariation of one element with the phi-features of another – is invisible to interpretation. It then lacks an interpretive effect in the same way as does in most theories allomorphic syncretism: interpretation does not see the absence of number in *sheep, series, dice*, and or of tense on *put*, *cast*. Three extrasyntactic sources of phi-agreement have been proposed: morphology, viruses, and processing.

Much work has attributed certain cases of phi-agreement to morphology and developed theories of morphology to suit (e.g. Bonet 1991, 1995, Noyer 1992, Halle and Marantz 1993, 1994, Arregi and Nevins 2010). An example is the *opaque cliticisation* in (1). Under Bonet's analysis, morphology transfers gender and number of the 3PL.F.DAT clitic (*les*) are transferred to 3SG.M.ACC clitic (*lo*), resulting in a clitic sequence that appears to be *se* 3PL.F.ACC (*se las*). Since the transfer occurs outside of the syntactic computation from lexicon to interpretation, there is no need to worry about interpreting [FEM] [PL] on the theme argument of *sell*.

(1)   Si ellas$_i$ me quieren comprar el caballo$_j$ yo se$_i$ las$_j$ vendere.
        If they(F) me wish buy the horse(M) I SE 3PL.F.ACC will.sell

If they want to buy my horse, I will sell it (*lo* > *las*) to them (*les* > *se*)

(American Spanish, Bonet 1995: 636)

Similarly, to take a phenomenon discussed earlier, some apparent partial agreement without interpretive effects has been analysed as morphological feature-transfer (e.g. Ackema and Neeleman 2003) or as having a morphological component (Benmamou, Bhatia and Polinsky 2010, Bhatt and Walkow 2013). Phi-agreement has sometimes been shifted to a postsyntactic PF component entirely (Kratzer 1998, Bobaljik 2008), calling for PF dependencies with syntax-like locality properties and predicting absence of syntactic effects (Rezac 2011). Conversely, some opaque cliticisation has been given syntactic analyses (Pescarini 2014).

To morphology have also been generally attributed *arbitrary gaps*, such as the existence of only singular forms in the present indicative of *frire* 'fry', *moudre* 'grind' for many French speakers (cf. Baermann, Brown and Corbett 2010). So an interpretive theory of agreement does not face the awkward explanandum of how an atom can fry a fish but a plurality cannot.

Also outside of syntax in its realisation are *agreement viruses*. Morgan (1972, 1985) draws attention to (2) and a variety of other cases where it seems that phi-agreement is sensitive to PF factors like proximity and syncretism. Sobin (1997) attributes many such effects, including (2), to PF rules called viruses. If this is right, there is no need to face in (2) the problem put by Barlow (1988: 4.2.8) as "Finally, let us note the obvious fact that for semantic accounts, agreement patterns that are sensitive to word order are quite troublesome" (but see Marušić, Nevins and Badecker 2015 for evidence that some equally troublesome partial conjunct agreement is in syntax). The agreement of *gens* in sec. 5.5 is a perfect candidate for a virus.

(2)   There was/*were a man and two women in the room.
        There were/*was two women and a man in the room.

(Morgan 1985: 74)

Finally, agreement phenomena like *agreement attraction* in (3) have been attributed to the processing of syntactic structures (Wagers, Lau and Phillips 2009, Phillips 2011, Franck 2011; see den Dikken 2001, Reid 2011 for dissent, and discussion of *wh*-agreement in sec. 2.2)

(3)   The key to the cabinets are on the table.

All these proposals make predictions about the distinctive properties of agreement outside syntax and its (usually absence of) interaction with syntax and interpretation. In most cases the matter remains under debate.

8   Appendix

TY2 extension of Heim and Kratzer (1998), with variables <i,e> over individuals in D_e and <i,s> over situations in D_s and corresponding abstractors λ_i, σ_i (von Fintel and Heim 2010, Schwarz 2012: 3.1.1, 3.2, Elbourne 2013: ch. 2).
Contexts are situations (Zimmermann 2011, Schlenker 2011), assignments are pragmatically restricted relative to a context (Cooper 1979, Heim 1982: 109, Heim and Kratzer 1998: 240, Schlenker 2003: 51).

Presupposition (partialisation) projection is by definedness conditions on compositional rules and partialisation of lexical functions.

Definition of the interpretation function $\|\cdot\|^{M,L,c,g}$ relative to a model M, lexicon L, context situation c, assignment g (parameters often omitted, M, L always):

Variables: If $\langle i,\tau\rangle$ is a lexical terminal, $\|\langle i,\tau\rangle\|^g = g(\langle i,\tau\rangle)$ for any type τ

Lexicon: If α is a lexical item, $\|\alpha\| = L(\alpha)$.

Functional Application (FA): If α is a branching node and $\{\beta, \gamma\}$ the set of its daughers, then for any context c and any assignment g, α is in the domain of $\|\cdot\|^{c,g}$ if both β and γ are and $\|\beta\|^{c,g}$ is a function whose domain contains $\|\gamma\|^{c,g}$. In that case, $\|\alpha\|^{c,g} = \|\beta\|^{c,g}(\|\gamma\|^{c,g})$.

Predicate Modification (PM): If α is a branching node and $\{\beta, \gamma\}$ the set of its daughters, then for any context c and any assignment g, α is in the domain of $\|\cdot\|^{c,g}$ if both β and γ are and $\|\beta\|^{c,g}$ and $\|\gamma\|^{c,g}$ are of type $\langle e,\langle s,t\rangle\rangle$. In that case, $\|\alpha\|^{c,g} = \lambda x.\lambda s : x \in D_e$ and $s \in D_s$ and $\langle x, s\rangle$ is in the domain of $\|\beta\|^{c,g}$ and $\|\gamma\|^{c,g}$. $\|\beta\|^{c,g}(x)(s) = \|\gamma\|^{c,g}(x)(s) = 1$.

Predicate Abstraction for individuals (PA): For all indices $\langle i,e\rangle$ and assignments g, $\|\lambda_i\,\alpha\|^g = \lambda x : x \in D_e$ and α is in the domain of $\|\cdot\|^{g[\langle i,e\rangle\to x]}$. $\|\alpha\|^{g[\langle i,e\rangle\to x]}$.

Predicate Abstraction for situations (PA): For all indices $\langle i,s\rangle$ and assignments g, $\|\varsigma_i\,\alpha\|^g = \lambda s : s \in D_s$ and α is in the domain of $\|\cdot\|^{g[\langle i,s\rangle\to s]}$ and s is in the domain of $\|\alpha\|^{g[\langle i,s\rangle\to s]}$. $\|\alpha\|^{g[\langle i,s\rangle\to s]}(s)$.

Notational conventions: Object language: type of variables is usually omitted. Metalanguage: x *(x', x''…), y, z* are variables in D_e, *s (s', s'')* in D_s, and for λa_b read $\lambda a : a \in D_b$.

Interpretability is spoken of as being in the domain of $\|\cdot\|$ under the (immaterial) assumption that assignments are total and contexts make defined all context-sensitive metalanguage terms.

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