

# Aspects of the Constructional Nature of Agreement

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## Abstract

This contribution is intended to show that agreement is a schematic construction (Culicover & Jackendoff 2005: 192; Steels 2011: 27; Hoffmann 2013: 310), of the core kind (like Goldberg's argument structure constructions), and that this construction shares with the rest of the *constructicon* the very same cognitive principles that structure it: categorization, metaphorical extension, metonymy, Gestalt formation and prototypicality effects, usage-based self-structuring, and portions of idiosyncrasy which nevertheless show signs of resting on independently identifiable general cognitive principles. Like all constructions, agreement has a symbolic nature, with a form side (formal co-variance) and a meaning side ('Unify'). Besides those general dimensions, two particular facts about the grammar of agreement need to be accounted for: the first is the Agreement Hierarchy (Corbett 1979; 2006); the second is the fact that, given vast cross-linguistic differences in the size of the morphological component, which agreement capitalizes on, we should be able to see how languages exhibit different 'ecologies', that is, different reflexes of the size (and the frequency) of their agreement systems in the rest of the grammar. Although this work has no serious typological pretensions, agreement operations will be illustrated using English and Spanish, as these two languages show two rather extreme positions in their morphological repertoire. This approach thus assumes that agreement (like transitivity or caused-motion) may be seen as a cross-linguistically valid construction with particular instantiations, and that these instantiations depend to a very large extent on the size of the morphology in a way that will be made precise. Finally, experimental evidence will be used to argue that agreement is very strongly usage-based.

## 1. Introduction

Over the past two decades different forms of construction grammar (CxG) have come to the fore. These approaches have pursued different paths, leading to different priorities and degrees of formalization (see, for instance, Trousdale & Hoffmann 2013 for a review). However, most of them stay

united in the belief of a core set of primitive assumptions. Among these are: that a grammar that is able to generate large chunks of idiosyncratic constructions should have less trouble generating rule-governed behavior; that constructions (henceforth also *cxns*) are representational objects; that *cxns* are symbols; and that, to reiterate a frequent theme, when it comes to grammar at large "it's constructions all the way down", structured in inheritance networks (Goldberg 2006: 18). The range of *cxns* analysed by grammarians sharing these beliefs has greatly expanded since Adele Goldberg published her work on argument structure *cxns* in the 90s. Thus, apart from these, CxG has offered insightful accounts of a large set of idiosyncratic *cxns*, including idioms and all kinds of *prefabs* (Culicover 1999), as well as of variously productive *cxns* like the *V-away* *cxn* (Jackendoff 1997), the *What's X doing Y* *cxn* (Kay & Fillmore 1999), the Resultative *cxn* (Goldberg & Jackendoff 2004) and many others. An outstanding lacuna in this large set of studies is agreement, which figures prominently in all forms of generative grammar (Guasti & Rizzi 2001; Boeckx 2009, among many others).

To my knowledge CxG not only does not have a proper theory of agreement but it has not generally devoted 'space' to agreement all along its development as a model (as is evident from even a cursory look at the *Oxford Construction Grammar Handbook*; Trousdale & Hoffmann 2013; Hoffmann 310-2). Whatever is often written about it within its confines is a relatively frequent invocation of the way agreement was conceptualized in the eighties and nineties of the last century under the auspices of - especially - HPSG (Pollard & Sag 1994: chapter 2; see section 5). This contribution is intended to partly fill that gap by offering an account of the

constructional properties of agreement that may help build a theory of it. This account fits best inside the particular form of CxG known as Cognitive Construction Grammar (e.g. Goldberg 2006) but is compatible with other constructionist approaches.

A likely reason for the lacuna just mentioned is the fact that a large portion of CxG arose in the context of Cognitive Grammar. In Cognitive Grammar it is axiomatic that every form be coupled with a meaning and agreement pairings have traditionally been regarded as offering the slimmest evidence for that (Jespersen 1922: 352 ff.; Corbett 2006: 274):

While the facts of gender (and, more generally, of inflection classes) and of agreement patterns can be represented within a Cognitive Grammar framework (...), the very existence of inflection classes is somewhat puzzling, since they contribute little to the symbolization of conceptual structure. English, for example, which lacks noun gender, is thereby not one with less efficient as a symbolic system than languages that do have gender systems. On the contrary, **elaborate inflection class systems might seem to be dysfunctional**, in that they place a heavy burden on a speaker's memory. But while inflection classes certainly present the second language learner with severe problems, they are a fact of many languages, and **speakers of these languages show no signs of wanting to give them up. It would even seem that speakers take delight in the formal complexity of their language.** For my part, therefore, I am inclined to see the complexities of inflection classes, and the sometimes elaborate systems of agreement patterns with which they are associated, as manifestations of **humans' delight in what I called (...) form-focused activities.** To the extent that they lack a symbolic-conceptual content, agreement patterns are an example of *'pure phonology'*. (Taylor 2002: 332 f; emphasis added)

In fact, Langacker (1991: 289 ff.) has denied that gender and agreement systems are unequivocal instances of the autonomy of form (Broccias 2013: 151), and has consequently argued for their symbolic nature:

Indeed, the apparent arbitrariness of gender assignment over most of the lexicon in European languages is generally the first embarrassing fact to be thrown in the face of anybody with the audacity to suggest that grammar might be semantically based. (Langacker 1991: 304)

Agreement markings are perhaps the archetypal example of sentence "trappings" employed for purely grammatical purposes, and are supposedly inconsistent with any claim that grammar might have a semantic basis. (Langacker 1991: 307)

(...) I have no quarrel with the traditional notion that agreement serves the function of signalling grammatical relationships; it might indicate, for example, that B modifies A, or that A is an argument of B. I would only reiterate in this regard that serving a specifiable grammatical function is perfectly consistent with being meaningful. (Langacker 1991: 308).

Langacker's idea that agreement signals grammatical relations – and that those *mean* something – seems right, but given that agreement is present in three out of four of the world's languages (Mallison & Blake 1981), and that it is a major topic in all formal approaches to grammar, it makes sense to say something more about such a central notion.

Here I intend to show that agreement *is* a schematic construction (Culicover & Jackendoff 2005: 192; Steels 2011: 27; Hoffmann 2013: 232), of the core kind (like Goldberg's argument structure constructions), and that this construction shares with the rest of the *constructicon* the very same cognitive principles that structure it: categorization, metaphorical extension, metonymy, Gestalt formation and prototypicality effects, usage-based self-structuring, and portions of idiosyncrasy which nevertheless show signs of resting on independently identifiable general cognitive principles. Like all constructions, agreement has a symbolic nature, with a form side (formal co-variance) and a meaning side ('Unify'). Besides those general dimensions, two particular facts about the grammar of agreement need to be accounted for: the first is the Agreement Hierarchy (Corbett 1979; 2006); the second is the fact that, given vast



cross-linguistic differences in the size of the morphological component, which agreement capitalizes on, we should be able to see how languages exhibit different ‘ecologies’, that is, different reflexes of the size (and the frequency) of their agreement systems in the rest of the grammar. Although this work has no serious typological pretensions (Corbett 2006), I will illustrate agreement operations using English and Spanish, as these two languages show two rather extreme positions in their morphological repertoire. This approach thus assumes that agreement (like transitivity or caused-motion) may be seen as a cross-linguistically valid construction with particular instantiations, and that these instantiations depend to a very large extent on the size of the morphology in a way that will be made precise.

Throughout this work experimental evidence for the various cognitive dimensions that affect agreement will be more central to the discussion than is normally the case in the linguistics literature. The reason is simply that, fortunately, there is now a large body of experimental work done on the processing and the production of agreement ties in the two languages just mentioned, so there is no need to drop the word ‘psycholinguistic’ – as is often done – without really going into the psycholinguistic data in at least some detail. I regard psycholinguistic data as ‘usage-based’ evidence.<sup>1</sup>

The structure of this work is as follows. First, in section 2 the basic facts of agreement in English and in Spanish will be presented. Section 3 will show the constructional properties of agreement. Section 4 will dwell on the idea that agreement is a dynamic phenomenon, not a static one. Section 5 will pit the properties of agreement raised during sections 3 and 4 against well known theories. It will be argued there that one size-fits-all approaches to it are ill-suited. Likewise, it will also be argued that standard unification views inherited from HPSG are not enough either. Section 6 offers a summary and some conclusions.

## 2. The basic facts of agreement in English and Spanish

Assuming a simple definition of agreement as “some systematic covariance between a semantic or formal property of one element and a formal property of another” (Steele 1978: 620), among the basic facts of agreement in English are the following:

- a. Agreement is of the poor kind (Bobaljik 2002: 16–17), being formally coded for only the number feature inside NPs containing demonstratives *this/that* vs *these/those*, for the third person singular indicative of most verbs in most dialects (with the verb *be* showing a little more internal differentiation: *is, are, was, were*), and for the features of gender and number in pronouns (*he, she, it, they*). Pronouns also code gender-sensitive case (*he/him*; etc.)
- b. It spans the four identifiable domains: inside the NP (*this car/ these cars*), NP-VP (*this car is nice/ these cars are nice*), the clause (*these cars take care of themselves*), and the discourse (*these cars take care of themselves. However, they are really boring*).
- c. It exhibits a remarkable degree of idiosyncrasy. The following (not an exhaustive list; see Morgan 1972; Pollard & Sag 1994; Kathol 1999) are all idiosyncratic sub-constructions of *un-agreement* in English:
  - (1) The hash browns at table four **is** getting angry.
  - (2) The committee **have** postponed any decision.
  - (3) Twenty dollars for a T-shirt **is** a rip-off.
  - (4) The bad thing about that **is** the kids.
  - (5) To err and to forgive **is** human. (compare: *to err and to succeed are two related things*)
  - (6) We seem to be a little displeased with **ourself** today, Mr Jones.
  - (7) A villainous gang of ruffians **were** creating havoc at that time.
  - (8) That **three days** we spent in Santiago **was** sensational.

Notice that in all these *un-agreement* constructions involving mismatches of form and meaning semantics is in control: thus, for instance, the hash browns in (1) (Pollard & Sag 1994) is 'one' client in a restaurant, and twenty dollars in (3) is 'one' ridiculous amount of money; likewise *that three days in Santiago* (8) is 'one' period of time in our lives. There is strong evidence via questionnaires that such semantic control/interference (agreement *ad sensum*) is much greater in English than in Spanish and German (for instance, (7) above would be statistically more likely to be resolved in the singular (*was*) than in the plural in Spanish and German; Berg 1998; Riveiro-Outeiral & Acuña-Fariña 2012).

d. Most instances of un-agreement follow the *Agreement Hierarchy* (Corbett 1979; 2006), according to which as we move from left to right in it there is an increasing likelihood of semantic control (agreement *ad sensum*). Thus, one has more trouble saying \**/? these committee* than *this committee are satisfied with themselves*.<sup>2</sup>

The Agreement Hierarchy (Corbett 1979, 2006)

Attributive > predicate > relative pronoun > personal pronoun

e. In the production of agreement, English is notorious for two things: 1. the high level of malfunction; and 2. the semantic basis of such malfunction. Thus, on the one hand, as *attraction* studies in psycholinguistics have shown, in carefully controlled completion experiments involving preambles such as *the label on the bottles*, English language-users make as many as 13% of agreement mistakes on average (e.g. \**the label on the bottles are cute*; Eberhard, Cutting & Bock 2005; see also Lorimor, Bock, Zalkind, Sheymean & Beard 2008 and Bock, Carreiras & Meseguer 2012; Acuña-Fariña 2012). On the other hand, they make statistically many more mistakes when such preambles code distributive referents than when they do not. Thus, despite the singular head noun, in *the label on the bottles* we conjure up one label on each bottle (underlying distributivity or numerosity) whereas in *the road to the*

*mountains* (also with a singular head noun) that reading is much less likely and as a result mistakes are also statistically less frequent.<sup>3</sup>

By comparison:

- a. Spanish is a language of the rich agreement type. It displays the characteristically Romance 'alliterative' gender-plus-number agreement schema  $-a(s) \dots -a(s) \dots -a(s) / -a(s) \dots -a(s) \dots -a(s)$  on all kinds of determiners, adjectives and nouns inside NPs, giving rise to well known redundancies (e.g. *todas estas viejas sillas altas y blancas*, with 12 gender + number cues; compare English 'all these old, high, white chairs', using only one morphological cue). Additionally, it marks number and person punctiliously on the verb (four conjugations, three moods, six grammatical persons per each). Thus, for instance, *comieras* ('to eat') is second person singular past subjunctive and *comerían* is third person plural conditional.
- b. It spans the four identifiable domains, too – but much more fully than English.
- c. It is much more regular, allowing fewer un-agreement constructions. Thus, for instance, unlike English, collectives must establish formal agreement inside and outside their containing phrase (\**la policía* (sg) *no vienen* (pl) / 'the police are not coming'). Also, unlike English, as already suggested, so-called *number transparent* nouns (*bunch, number, group, host*, etc.; Huddeslton & Pullum 2002: 500 ff.) show more left- than right-orientation, thereby presenting greater resistance to the grammaticalisation of the first noun as a quantifier (*un importante número* (sg) *de personas esperaba* (sg) *a la puerta* vs 'an important **number** (sg) of people were (pl) waiting at the door'; Verveckken & Cornillie 2012; Riveiro-Outeiral & Acuña-Fariña 2012). Finally, a string like (8) above is not only impossible in Spanish but even – I presume – hard to understand by Spanish speakers who speak English as a second language.<sup>4</sup>
- d. In production studies of attraction, Spanish is statistically less prone to miscalculation (Bock et al. 2012; Acuña-



Fariña 2012) and less prone to semantic interference of the kind illustrated by the distributivity data (Foote & Bock 2012; Bock et al. 2012; Acuña-Fariña 2012; see below).

### 3. The constructional nature of agreement

In this section a constructional account of agreement is tentatively considered using the conceptual tools of CxG. I realize that a better case for such an account would necessitate a serious cross-linguistic investigation and a better grasp of certain historical facts concerning inflection classes. It is well known that historical reconstruction of syntax is very often impossible and we really seem not to know much about the way gendered systems first arose and were (later?) recruited for the task of clause construction (Janse, Joseph & De Vogelaer 2011; Luragi 2011). The account presented here is therefore meant to **suggest** lines of attack to the problem posed by agreement if one is really serious about ultimately having a solid theory of it in CxG. Some of it must necessarily rest on – hopefully well-founded and reasonable – assumptions.

#### 3.1 *Categorization and inflection classes in prototypical agreement systems: the nominal nature of agreement*

Agreement is useful to unify constituents and thus help decoders identify phrasal packages (Steels 2011; Beuls & Höfer 2011; Luragi 2011). This is a major function in grammar which agreement shares with word order. It is well known that the world's languages position themselves differently on a scale that goes from word order fixity *cum* lack of agreement to word order freedom *cum* agreement (Siewierska 1998; Hawkins 2004: 160; Acuña-Fariña 2009: 417 ff.).<sup>5</sup> English or Danish and Warlpiri or Latin may serve to identify these two opposite extremes respectively but most other languages partake of the two main clause-building strategies in different proportions. With its profound alliterative structure, that Spanish is agreement-oriented (AO) is surely intuitively obvious, especially to native speakers of English who learn it as a second language. As regards English being word-order-oriented (WOO), consider

its strict adjunct placement (\**Tom loves very much potatoes*) or the area of misrelated participles (\**While watching the parade, my wallet was stolen* (meaning 'while I was watching'), where the subject of the *-ing* clause must be positionally recovered by looking at the subject of the matrix clause). In the area of information structure, English very often cannot respect the principle of *end-focus* either, because, when the subject is focal information, it cannot easily be placed last, as in the following example: A. *Who gave you that ring? It was Paul, wasn't it?* B. \**No, me it gave Xabi* (*No, XABI did*; compare *Spanish: No, me lo dio Xabi*, instead of *Xabi me lo dio*; Lambrecht 1994; see further below). These rigidities are also very well known by speakers of Romance languages who try to learn English as a second language.

The qualification 'oriented' used above is inevitable, however, since English has some agreement and Spanish some word order fixity, and makes it difficult to view agreement as some sort of fixed UG mechanism that behaves in the same way in all languages of the world, with perhaps only two positions in a parametric binary scale. Notice, interestingly, that these two major devices are of the obviously general cognitive kind, a simple fact that is usually ignored. Word order is just sequential order, a principle that may be exemplified by, say, a predator's behavior when reaching for prey A instead of prey B if the former is closer than the latter (other things being equal); and agreement rests on co-classification, the same operation that may allow us to, e.g., use a red or a yellow label to distinguish different items in a wardrobe. Putting together the fact that Spanish is AO and that agreement feeds on co-classification, we reach the idea of inflection classes. In Spanish almost all nouns are of either masculine or feminine gender, regardless of their meaning. All satellites of every noun must replicate the morphological features of the noun (gender and number). That is to say, in a prototypical AO type of language, agreement comes from inflection classes and these are prototypically nominal. Hence the traditional (and well-founded) idea that agreement is essentially a nominal (Lehman 1982) or a referential (Croft 2001: 12)

phenomenon. This is another way of saying that nouns are the archetypical *controllers*. Now, the notion of *controller* does not sit well with many cognitive accounts, which – inspired by ideas in Head-driven Phrase Structure Grammar (HPSG) or Lexical Functional Grammar (LFG) – tend to rely on the concept of *unification* instead (Kay 1985; Barlow 1992; Pollard & Sag 1994). The existence of a controller entails a directional view of agreement whereby features originate somewhere (say, a noun) and then migrate to somewhere else (say, an agreeing adjective or a verb). In unification, features do not start anywhere: rather, the two or more constituents that participate in an agreement relationship may specify only partial information about the same linguistic object. Such information is subsequently merged if compatible (Shieber 1986; Pollard & Sag 1994; Copestake 2002).<sup>6</sup> On this view, agreement is viewed as a static set of identity conditions: features do not ‘move’; they are simply ‘shared’ and agreement thus becomes a sort of ‘long component’ or ‘discontinuous morpheme’ (Ferguson & Barlow 1988: 13).

A serious discussion of copying vs unification is beyond the scope of the present contribution. In part, this is due to the fact that there is probably no reason to contemplate these two views as absolutely antagonistic: it is perfectly possible that languages may have more of one or the other depending on the robustness of their morphological systems. In particular, it makes sense to believe that agreement is always initially directional but that once it becomes redundant and alliterative, its nominal origin is backgrounded and the agreement schema  $[-Xo/-X'o/-X''o]$  foregrounded. Since any part of the schema (especially in the absence of a missing controller) projects the whole schema, this is unification in practice (see section 5). There is one strong argument against treating unification as the only or the major cognitive strategy supporting agreement, namely: if it were so we would see agreement inside adjective phrases, adverbial phrases and prepositional phrases just as much as inside NPs (where directionality is more obvious). Likewise, we would see agreement between adjective phrases or prepositional phrases and verb phrases

reasonably frequently. Neither of the two options is *prototypically* the case. Spanish and English are very different but neither has anything like agreement inside a prepositional phrase or between an adjective phrase and a transitive verb phrase. And, interestingly, whatever little agreement is left in English is of the noun-as-controller kind. In short, no notion of ‘lexical underspecification’ (the idea that, for some reason not yet understood, some categories (like prepositions or adverbs) lack features (like gender and number) that other categories do code or code much more frequently cross-linguistically) can explain why nouns dominate the agreement landscape so overwhelmingly.<sup>7</sup> Finally, even in work strongly advocating a lexicalist and/or constraint-based view of agreement and the view that “elements that participate in an agreement relation specify partial information about a single linguistic object” (Pollard & Sag 1994: 60), one can find numerous occasions where an indirect appeal to directionality as a sort of hidden default seems inevitable:

NPs share the agreement of their heads because, (...), the Semantics Principle requires them to share their semantic content, to which the agreement features belong. But (in English at least) **the agreement of a verb or of a verb phrase is entirely a matter of the index of the SUBCAT element corresponding to the subject**, and this element is shared in its entirety by the VP and its lexical head (by virtue of the Subcategorization Principle). Pollard & Dag 1994: 84; emphasis added.

In short, there seems to be no principled reason to ignore the obvious dominance of the nominal/verbal complex in agreement systems. This is particularly evident in theoretical frameworks that naturally accommodate gradience and prototypicality effects (so for instance agreement in the absence of a controller need only be seen as less prototypical; see section 5).<sup>8</sup>



### 3.2 From categorisation to metaphorical extensions

(information 'in the wrong place'):

on agreement schemas

So in prototypical AO types of language the existence of inflection classes comes first, and these are expressible principally via gender distinctions. Corbett (1991: 8–32) defines two basic kinds of gender systems in the world's languages: one semantic, the other formal. But he makes it clear that **even** the formal kind has a semantic core (see also Dahl 1999: 101; Spencer 2002: 282; and Johnson 2014: 21). This applies to women, fire, and dangerous things (Lakoff 1987), and a myriad of such cross-linguistic semantically 'exotic' gendered categorizations. Johnson (2014: 22) observes that "(t)he basic semantic relationship between the gender of a noun and its meaning for most Indo-European languages is biological sex: higher-order beings that are biologically male behave differently with respect to their agreement patterns from higher-order beings that are female". If we take that "basic semantic relationship" to be the core of the system, whatever extension from the semantic categorization core a language may exhibit is likely to piggyback on, or radiate from, the pre-existing form that is used to code that core. This means that if the language in question has an experientially salient feminine/masculine distinction coded as *-o/-a*, it will utilize that formal distinction to also categorize less and less grounded nouns using various chaining operations. These will end up uniting the grounded to the more arbitrary (say, fire = dangerous thing) and the fully arbitrary (say, women = dangerous things) extensions (Fodor 1959; Spencer 2002: 282). We have now reached another dimension of prototypicality: the prototypical controller is a gendered noun designating a sex distinction, with the form used to code that distinction co-varying with it. That is, prototypical agreement means form and meaning in synchrony.

Notice that a first metaphorical mapping takes place when a category (say, *fire*) is seen via another category (say, *women*). This is not analogous to claiming that metaphorical extension accounts for the whole system of agreement directly. I am making the much more modest

claim that categorization **is** a metaphorical mapping **when** it is semantically motivated (women, fire, dangerous things ...). How does one end up with a system of agreement that 'sees' the feminine feature of *house* in Spanish ('*casa*')? The answer to that may be another metaphorical mapping, one that applies a fem/masc distinction not to other nouns but to determiners, quantifiers, participles and adjectives (Booij 1996). In semantically motivated phrases (all agreement systems initially; Corbett 1991: 8–32; Dahl 1999: 101; Spencer 2002: 282), all heads are grounded nominal categories but the dependents of those heads need not be – at least not for the semantic dimensions that the head may code, such as numerosity or sex. This means that for phrase construction purposes the features that matter are the head features of the noun, and these are superimposed on constituents that are semantically unrelatable to them (hence the rather well known adage that agreement is marking in the wrong place (Corbett 2006: 1) and the generative notion of *uninterpretable feature*; Chomsky 2000). In effect, a plural feature on an adjective means: 'use this feature to unify me with the head that bears it'. Likewise, a determiner is obviously neither feminine nor masculine on its own semantically so one such feature on it is to be interpreted in the same fashion ('unify me with a head'). The crucial step must then be when a template is formed out of a myriad of such grounded gendered nominals (say, man, or woman, boy, or girl, for which a (sex) distinction is semantically motivated) unified with DETs, QUANTs and APs. Once the schema is available and strongly routinized, if the language in question has opted for an AO phrase-construction schema (as opposed to a WOO schema), then out of consistency it will use that template also for the less grounded extensions (say, fire, women, etc.). Finally, once the agreement template is clearly the preferred mode of clause construction, it will be used by default and so it will blindly be applied to whatever arbitrary categorization the language may keep developing (*house* as 'feminine'). I regard the operation that puts a formal cue on an adjective or a determiner as a schematic metaphorical mapping in the sense that the sole purpose of that operation

is to understand that cue via the search for a similar cue in a place where the cue is grounded (the noun). That is, just as we understand that the true meaning of *up* in *I feel up* is to be recovered by a cognitive operation that unites spatial verticality with the idea of 'feeling great', so are we to understand that the true meaning of a feminine determiner like *la* ('the') in Spanish comes via unification with a similarly-marked noun (say, *casa* (house), but not *barco* (ship)).<sup>9</sup>

An interesting indication of the semantic and categorization-driven core of the synchronic system comes from gender categorization studies showing that language-users do indeed fleetingly illuminate masculine or feminine conceptualizations of objects denoted by nouns that are thus marked (like *chair* or *pen* in Spanish, *masc* and *fem* respectively; Boroditsky & Schmidt 2000). For instance, Vigliocco et al. (2005) studied whether Italian and German speakers differ in the way they form semantic representations concerning subtle aspects of reality based on the particulars of their respective languages like the gender system. German has three genders (masculine, feminine and neuter) but Italian only two (masculine and feminine). They used a similarity judgement task in which speakers were presented with triplets of words (translation equivalents in the two languages and in English, which acted as a baseline, so Italian and English vs German and English), and their task was to judge which two of the three were most similar in meaning. What they found was that gender effects (i.e. grouping by gender similarity) was visible only when the language allows for an easy mapping between gender of nouns and sex of human referents (Italian) but not when the mapping is less transparent (German). It seems that Italian language-users fine-tuned their lexical representations by opportunistically drawing on the specific regularities of their language and that German speakers framed their semantic representations differently because they could not count on such regularities (Acuña-Fariña 2016). Similarly, in a series of three experiments, Cubelli et al. (2011) asked English, Italian and Spanish participants to judge whether two objects, whose names did or did not

share the same grammatical gender, belonged to the same semantic category by pressing a key. Italian and Spanish participants responded faster to pairs of stimuli sharing the same gender, whereas no difference was observed for English participants. In their second experiment, the pictures were chosen in such a way that the grammatical gender of the names was opposite in Italian and Spanish. Therefore, the same pair of stimuli gave rise to different patterns depending on the gender congruency of the names in the two languages. As in Vigliocco et al.'s study, the authors concluded that meaning/gender interaction resides at the level of the lexical representation that specifies syntactic information: nouns that share the same grammatical gender activate each other, thus facilitating their processing and speeding up responses, both to semantically related pairs and to semantically unrelated ones. In sum, in AO languages grounded and arbitrary gender form a networked structure of lexical associations that starts in the grounded conceptualizations and spreads to the non-grounded ones synchronically. The gender cue provides access to the network. As noted, even though diachronic evidence cannot be conclusive, it does suggest similar connectedness and motivation.

### 3.3 *The usage-based nature of schemas: on entrenchement*

Another property of prototypical agreement is its consistency: it applies across the board, and not just in those cases where it is maximally (functionally) motivated. This may prompt another extension from the prototype (involving form + meaning harmony) which does not even demand a controller, that is, a feature originator, namely: phrase-internal agreement in case, involving government by the same phrase-external head and utilizing the same formal instantiation of the schema. There is in all likelihood a processing motivation for this consistency: in a system which may have to implement 5 to 10 compatible morphological cues per second (*tod-os es-os chic-os alt-os* / 'all those tall boys' has eight gender (masc) and number (pl) cues and is pronounced in about a second), it



is easier to apply the schema  $[-X'o/-X'o/-X''o]$  by default than to switch it on and off all the time. Keeping the schema on re-enforces it, entrenching it even more, turning it into something akin to a neural *avalanche* (MacWhinney 2001; see also Bybee & Scheibman 1999), a *Gestalt*-type object. In usage, speakers of Spanish often make mistakes when they extend a gender or a number cue to a constituent which does not house such cues (such as an adverb) if this is pronounced right after another constituent (such as a NP) which has many of those cues expressed in quick succession, that is after an *avalanche*. The psycholinguistic literature provides interesting pointers to the degree of entrenchment and blind automaticity of such feature-handling operations. That is a large literature by now, so I will mention a few cases only.

The first is an E.R.P. study by Barber and Carreiras (2005) in Spanish in which they presented subjects with gender, number and gender + number agreement violations in both noun + adjective sequences (*sopa* (sg-fem) *fría* (sg-fem) / 'cold soup') and determiner + noun sequences (*la* (sg-fem) *sopa* (sg-fem) / 'the soup'). They obtained an N400 effect for the three kinds of violations in the noun + adjective condition (suggestive of difficulties with lexical-semantic integration) and an additional Left Anterior Negativity (classic LAN; see below) in all the determiner + noun conditions. Notice that they contrasted arbitrary gender with semantically-motivated number (and with a double number + gender violation) but that had no effect: participants just registered a break in the expected alliterative sequence ( $[-X'o/-X'o/-X''a]$ ) for *all* cases. And in the case of referential expressions (determiner + noun), they did so via the electrophysiological measure most prominently associated with morphosyntactic processing: LAN (Friederici 2002).<sup>10</sup> In another set of E.R.P. studies, Barber et al. (2004) directly compared gender agreement violations involving both arbitrary and biologically-based gender (*abuelo* (masc) *delgada* (fem) 'thin grandfather' vs *libro* (masc) *delgada* (fem) 'thin book'), but again failed to find any difference between the two. Finally, in a recent review of some thirty E.R.P. studies of agreement, Molinaro

et al. (2011) concluded that the typical LAN signature that is cross-linguistically consistently associated with a break in inflectionally-marked agreement operations reveals a system of 'active expectations' that rests on the rapid identification of a functional morpheme sequence (a kind of agreement *ad formam* in performance; Corbett 2006: 155):

(...) the identification of the morphologically expressed feature may well trigger an **active expectation** for a following constituent showing the same value. For instance, a determiner triggers an expectation for a noun, while a noun triggers an expectation for a verb.

(...) a feature expressed by the functional morphology of a trigger would initiate a search for a target constituent with a matching feature. **If the features are expressed formally, as functional morphemes attached to lexical stems, the cognitive system could rely just on those cues** to satisfy the agreement expectation, and establish the syntactic relation (**without accessing non-functional information**). When the value expressed on the expected constituent does not match, a LAN is triggered. (Molinaro et al. 2011: 925; emphasis added)

To put things in perspective, morphosyntactically-oriented LAN is triggered in English in the face of violations like *\*the shirt was on ironed* (N400 tends to appear in a topographically different way in the face of selectional restriction violations like *the thunderstorm was ironed well*; Friederici 2002). What this suggests is that the mind is exquisitely sensitive to the detection of the phrase-building agreement schema ( $-X'o/-X'o/-X''o$ ), since LAN starts acting at around 300 ms after anomaly detection, and that it assumes it as a default without needing to access the other side of the symbolic package: the meaning. This is not only because for most nouns the meaning is useless (*qua* arbitrariness: there is nothing feminine in a table but *mesa* is indeed feminine in Spanish) but also because even when there is a meaning substrate to tap, accessing it (say, the notion of numerosity) 5 to 10 times per second during the processing of a short nominal string is surely not functional in actual usage.

### 3.4 *The role of usage-based morphology in containing agreement ad sensum (semantic interfacing)*

There is an interesting point lurking here. If one believes in the idea of usage-based grammars and in the idea that morphemes are symbols (ie. form/meaning pairings), then one is led to believe as well that a redundant morphological cue like a number cue should imply increased access to the meaning side of the cue: numerosity (Vigliocco et al. 1995). On that logic, and back to production studies of proximity concord, a comparison of distributive preambles like *the label on the bottles* and non-distributive ones like *the road to the mountains* should cast more distributivity effects in Spanish than in English. The reason is that English marks number using only one cue on the noun (and, very often, none on the verb) whereas Spanish marks it on all noun satellites (including first-situated, priming-inducing determiners) and all six persons of the verb. The facts are precisely the very opposite of that: English shows statistically greater distributivity (i.e. semantic) effects than redundant, alliterative Spanish (i.e. they make more mistakes of the kind *\*the label on the bottles are green*, where every bottle has a label and is thus underlyingly plural). A meta-analysis of the cross-linguistic data available from attraction studies is revealing. That was done by Lorimor, Bock, Zalkind, Sheymean & Beard (2008). They found a cline of semantic interfacing that neatly correlated with morphological strength: the language with the greatest porosity was English, followed by Dutch, German, the Romance languages (Spanish, Italian, French) and Russian, with the richest morphology and greatest resistance to semantic interfacing (fewer mistakes in distributive NPs). The facts of Slovak (three genders and case) align in the same way, as this language has shown both less tendency to miscalculate (less attraction) and to be affected by underlying semantic variables than English, thereby displaying biases like similarly-morphologized Russian (Badecker & Kuminiak 2007). Remember that from the grammar standpoint, the fact that English is prone to semantically-driven mismatching is also well known (Morgan 1972; Pollard & Sag 1994;

Kathol 1999; Berg 1998; Riveiro-Outeiral & Acuña-Fariña 2012).

In a startling demonstration of the role of a rich morphology in blocking semantic interfacing, Foote and Bock (2012) compared two varieties of the same language, Mexican and Dominican, with English as a baseline. Mexican has intact morphology, but Dominican is going the French way, so it is losing (in fact has already lost) a lot of it, not unlike southern Spain (Toribio 2000). Distributivity turned out to be statistically lower for Mexican than for Dominican, which aligned with English. Acuña-Fariña (2018) compared two varieties of Portuguese (European and Brazilian) and two varieties of Spanish inside Spain and found exactly the same: namely, that the varieties with a poorer morphology showed greater distributivity effects than those whose morphology was intact. In sum, contrary to the belief that the repeated presence of a morph (*-o / -a*) provides repeated access to its meaning, the experimental evidence shows that it does the very opposite of that: it automatizes its recognition as a Gestalt percept and uses that mode of perception to unify phrasal packages in an initial, shallow, non-strategic stage. The biases of English (more miscalculation/mistakes and more permeability to semantic interfacing) are different as a reflection of its sparse morphology.<sup>11</sup> This is all to do with frequency of operations (which is massive in the case of AO languages) and with how that frequency bolsters entrenchment, all notions that a usage-based CxG approach to grammar is ideally suited to deal with. The clines attested also speak against one-type-fits-all or binary switch mechanisms.<sup>12</sup> I will capture this idea in the form of an Agreement Morphological Hierarchy (AMH):

#### **The Agreement Morphological Hierarchy**

Other things being equal, semantic interfacing in agreement operations (agreement *ad sensum*) correlates inversely with morphological strength: the more of the latter, the less of the former.

A final demonstration of the power of extremely entrenched agreement schemas in rich-inflection languages is provided



by a comprehension study by Cacciari, Corradini, Padovani & Carreiras (2011) on Italian epicene nouns. An epicene noun is a noun with one morphosyntactic gender which can be coindexed with either a male or a female referent. For instance, *celebrità* ('celebrity') is feminine in Italian but can be used to refer to a male or a female character. Taking advantage of the existence of such nouns, Cacciari et al. invented little stories in which epicenes were to be coindexed with pronouns. They created a gender-match condition (*celebrità-lei/'she*), a gender-mismatch condition (*celebrità-lui/'he*) and a control condition involving nouns with no morphological mark at all. This was a reading experiment. Latencies indicated that, despite strong pragmatic manipulation in the contexts prior to the coindexation, Italian language-users preferentially bound the epicene noun to a pronoun of the same gender (there were shorter reaction times, RTs, in those cases). This formal bias revealingly occurred at the rightmost edge of the Agreement Hierarchy: with pronouns and long distances, where semantic interfacing is expected to be strongest (as in *My son works for IBM(sg). They(pl) pay him a lot*; Acuña-Fariña 2009a). Although comparisons are difficult due to differences in the design of experiments and in objectives, another reading (eye-tracking) study by Van Gompell and Liversedge (2003) in English provides an interesting contrast. The authors manipulated both the gender and the number of antecedent noun phrases in the establishment of backward anaphora, as shown in (9):

- (9) a. gender match  
When **he** was at the party, **the boy** cruelly teased the girl during the party games.
- b. gender mismatch  
When **he** was at the party, **the girl** cruelly teased the boy during the party games.
- c. control  
When **I** was at the party, **the boy** cruelly teased the girl during the party games.

RTs were higher (slower reading) at the word *cruelly* in (9b), indicating that sentences were easier to read when the

cataphoric pronoun and the first NP in the main clause were gender-matched than when they were not. There was thus a solid tendency to assign the cataphoric pronoun proactively to the first NP, rather than to the second one, as a kind of a geometrical bias (remember that English is WOO: word-order-oriented). This *feature mismatch effect* indicates that the processor does not check the (absolutely transparent) gender of the first NP before establishing a coreferential relationship between that NP and the pronoun. This results in a processing penalty when the geometrically-chosen subject NP is not semantically and/or morphosyntactically congruent with the pronoun. In sum, in the Cacciari et al. Italian study, morphology acted as a confound (as its effects could not be suppressed, even in the face of potent pragmatic biasing); in the Van Gompell and Liversedge one on English, though useful (because it would undo any ambiguity), it was simply ignored in the first pass of processing, as co-indexation was done based on the expectancy of a determinate position for the matrix subject phrase. So in this latter case it was word order that acted as a confound.<sup>13</sup>

### 3.5 *Suppression and partial agreement: the role of metonymy*

Finally, for present purposes, another property of prototypical AO systems is the existence of partial agreement and suppression phenomena. This is actually the other side of the consistency coin. If, out of sheer conformity to an extremely highly frequent schema, a grammar codes agreement cues in excess of its actual utility, there will typically be cases where, if advantageous, some of the agreement marks will be dropped.<sup>14</sup> This is what happens in Spanish NPs whose head nouns are contextually salient/old information: those nouns are very often just silenced. For instance, in (10):

- (10) Sé que te encantan [esos pañuelos rojos]  
('I know you love [those red handkerchiefs],  
pero a mí me vuelven loca [los azules]  
but I am crazy about [the blue **ones**]?),

the absolutely transparent cue on the determiner (masc+pl), repeated on the adjective, makes it clear that only *pañuelos* ('handkerchiefs') may be referred to by the noun-less NP (*los azules*, literally 'the blue'). This deletion strategy rests on two cognitive operations: first, the identification of a feature originator (the discourse salient noun); and second, on metonymy: a part (*los azules*) stands for the whole (*los pañuelos azules*). The exuberant morphology of Spanish makes this deletion strategy available across the board. A comparison with English is revealing: since English determiners and adjectives usually bear no morphological cues, head noun deletion is usually impossible (which is of course why *one/ones* and similar strategies like *the former/the latter* must be used when the noun codes old information) and, when it is possible (as in *the white* or *the poor*), it is so heavily constrained that we are actually facing a very specific sub-construction: the Adjectivally-Headed NP Construction. Such deletions seem to be common in the world's languages. According to Bhat (1991: 35), in Kannada NPs mark case ordinarily but can drop it if they appear juxtaposed to their transitive verbs. According to Moravcsik (1995:471), a case-copying implicational universal works this way: if agreement through case copying applies to NP constituents that are adjacent, then it necessarily applies to those that are non-adjacent as well but not the other way around. That is, we find no languages with agreement + adjacency that have no agreement in the long distances; we may find languages with agreement in the long distances without agreement + adjacency (that is, in the short distances), since agreement is actually much less necessary in the face of linear contiguity, as English proves. As Hawkins (1994:369) points out, agreement features are sufficient to construct a higher node even in the absence of the head node. In German NPs, when the determiner is absent, adjectives take on the strong inflection to signal case and thus 'construct NP'. Grammars typically vary in what they delete, but they must all delete pieces of semantics (like old or presupposed information) because form cannot spell-out all of it. Agreement is thus extremely functional in

that it provides grammars with a wide menu of deletion of core elements (Acuña-Fariña 2009a: 419).

#### 4. The agreement construction as a dynamic instantiation, not a fixed form

In the preceding section we have identified a number of properties of agreement that fall out of a cognitively-based constructional approach to grammar. In the first place, agreement's basic working mechanism is formal co-variance (the form of the symbol), this being a general cognitive device that rests on the principle of co-classification. Language wise, co-classification rests in its turn on the existence of inflection classes and these are variously semantically-motivated instances of categorization. This brings in nouns. Agreement proceeds from a prototypical noun controller with synchronous form + meaning features and, in typically AO types of languages, is metaphorically extended to the noun satellites and to all other nouns. Another metaphorical extension may bring agreement in case, with no discernable phrase-internal source. In such cases, the agreement schema ( $-X\alpha/-X'o/-X''o$ ) does something similar to the *Caused Motion Construction* imposing its schematic meaning on the verb *sneeze* (*she sneezed the napkin off the table*; Goldberg 1995): it coerces a kind of merging operation (the meaning of the symbol: 'Unify' similarly-marked X-s, regardless of their meaning). That coercion is made possible by the flexibility of gender classes, as opposed to number classes. Once the mechanism that binds together *delgado* / 'thin' and *chico* / 'boy' becomes available and routinized, when *Delgado* (masc/sg) becomes linked to/unified with *concepto* (masc/sg) / 'concept' via feature sharing the metaphorical composite meaning may sound strange but is nevertheless *generated*. That is why agreement flourishes in gendered languages and is almost extinct in English. Interestingly, however, experiments reveal that once recruited as agreement markers, both semantically-grounded number and semantically-arbitrary gender behave in the same way: as initially semantically-blind schema instantiators or 'unificators' (Acuña-Fariña 2009; Acuña-Fariña et al.



2014). In strongly alliterative languages, such as Spanish, the agreement schema is a powerful priming-inducing Gestalt, the usage-based nature of which resting on the size of the morphological component and on the frequency with which morphology is instantiated.

The evidence that morphology directly regulates agreement operations in performance is very strong. We have already mentioned attraction studies, which neatly show how it inversely correlates with rates of malfunction and of semantic interfacing (the AMH: the more morphology the less of both). We may add now the series of studies showing that morphological transparency/cue validity significantly reduces performance errors (Lewis & Vasishth 2005; Lewis et al. 2006). For instance, in Italian, clear, typical plurals in *-i* elicit fewer errors than plurals which do not differ from the singular (similar to *sheep* in English; Vigliocco, Butterworth & Semenza 1995). In the same language, Vigliocco & Zilli (1999) showed that predicative adjectives coding gender in the transparent fashion (*-o/-a* for masculine and feminine respectively) cause less attraction than adjectives (in *-e*) whose gender is not transparent. In German, Hartsuiker et al. (2003) found that a plural local noun phrase was able to attract number agreement from a feminine head noun if the local noun phrase was accusative (as in *Die Stellungnahme gegen die Demonstrationen* 'the position against the demonstrations'), but not if it was dative (as in *Die Stellungnahme zu den Demonstrationen* 'the position on the demonstrations'). This is because the determiner in the plural, accusative local noun phrase *die Demonstrationen* is case-ambiguous (as *die* is used for both nominative and accusative plural NPs), so it may partly "resonate" as a subject cue to the agreement system (Badecker & Kuminiak 2007).<sup>15</sup> In Dutch, Meyer & Bock (1999) found more errors in antecedent-pronoun gender agreement in those cases where the antecedent had the morpho-phonologically ambiguous indefinite determiner (*een*) than when it had a transparent definite determiner (*de/het*). The usage-based nature of many linguistic phenomena is usually attested via corpus studies. I see no reason to regard the blunt homogeneity of the

mentioned psycholinguistic production studies as any less usage-based. They target the same cue reliability effects and therefore illuminate the same theoretical significance.

Finally, another classic constructional property that we have identified is the habitual finding of sizable pockets of idiosyncrasy in the middle of a core of largely regular behavior. Agreement in English is notorious for that, which connects us to a recent theoretical trend according to which semantic agreement (*ad sensum*, as in collectives) shows up when formal agreement fails (Baker 2008: 24; Wechsler 2011; Wechsler & Hahn 2011). This may actually be a subtly biased interpretation, as it establishes that 'normal agreement' is formal. In fact, 'normal (prototypical) agreement' is formally *and* semantically coherent, so the right principle seems to be: semantic agreement enters the scene (or is all that is left) when [formal + semantic] agreement fails. However one wishes to look at it, agreement in English – but not in Spanish – is indeed continually penetrated by semantics, mostly in accordance with the Agreement Hierarchy (Corbett 1979; 2006). This makes sense: the hierarchy speaks to the role of distance between controllers and targets and, lacking morphology, it is only natural that the longer the distance, the lesser the role of word order fixity/predictability in guaranteeing default connections among constituents. In those cases, semantics – one of the two sides of the symbolic package – is conveniently brought to the rescue (this is the *Index* pathway – as opposed to the *Concord* pathway – in accounts like those proposed by Wechsler 2011; see also Pollard & Sag 1994: ch 2; and Berg 1998). It is a reassuring thing that, as we have seen, the production literature in psycholinguistics reveals exactly the same trend (Acuña-Fariña 2012).<sup>16</sup>

In sum, agreement rests on most of the cognitive principles that structure the construction: categorization and co-classification (yielding inflection classes), metaphorical extension (yielding semi-arbitrary gender, arbitrary gender, marking on satellites, and case), metonymy (yielding suppression phenomena), Gestalt formation and

prototypicality (yielding first-pass, form-based effects via priming: agreement *ad formam*), usage-based self-structuring (sensitive to morphological clines), and portions of idiosyncrasy that tend to be semantically interpreted (sanctioned by the grammar as agreement *ad sensum*). Its symbolic structure contains a feature co-occurrence side (form) and a unification side (meaning).<sup>17</sup> Two key features of it, namely the dynamics of the AH and the regulating role of morphology (the AMH), work in unison to produce predictable biases both at the grammatical and at the processing level. Particularly, the AH rightly predicts that semantic control increases with distance between controllers and targets. The AMH rightly predicts that semantic control diminishes with greater morphological strength.

##### 5. How the present account overcomes problems with other accounts

It is instructive to consider how a classic formal approach to grammar can cope with the range of descriptive facts reviewed in the preceding sections. When it comes to agreement, the first thing one encounters is a network of graded constraints and interacting prototypicalities. First is the issue of controllers and it turns out that nouns are the prototypical controllers but not the only controllers. Then, languages differ in the features that their nouns code (semantically grounded, like number or person, or ungrounded, like arbitrary gender or case, or unique, language-specific, partial instantiations of all of these). That is to say, nouns themselves differ widely cross-linguistically. Then there is the question of domains, which directly connects to the AH: the prototype of harmonious semantic + formal agreement works best in the short distances (inside noun phrases) and is progressively relaxed (leaving often just semantics to do all the job) as controllers and targets are more separated in the three other recognized domains (S-V, clause, discourse). Finally, there is the rather blunt impact of morphological strength: morphology blocks semantic interfacing, but morphology is essentially a graded phenomenon in that it occurs in unique doses in the world's languages. Maybe some parameterization could be

accommodated inside the typically strict architectural designs, but even if this were feasible, it would probably be of the (favorite) binary kind.<sup>18</sup> This seems clearly not enough.

In addition to the variability of grammatical constraints on controllers, features, domains and morphology, the processing constraints follow suit. We have already mentioned the meta-study of Lorimor et al. (2008) showing a cline of semantic interfacing in attraction that correlates with morphological strength almost seamlessly. It is not difficult to find more evidence of the same kind. For instance, in an attraction study of Italian, Spanish and French, Franck, Vigliocco, Antón-Méndez, Collina & Frauenfelder (2008) manipulated the cue reliability of both the noun and the article in complex NP preambles, as this differs cross-linguistically. For instance, Italian nouns are highly reliable in that the *o/a* distinction that codes masculine vs. feminine can be observed in around 80% of the nouns, but determiners are less reliable because when the noun starts with a vowel, the article is contracted (e.g. *l'armadio* 'the wardrobe-MASC' ; *l'aria* 'the air-FEM'). In Spanish, the *o/a* contrast is reliable only in some 68% of the nouns but, in stark contrast with Italian, determiners are extremely dependable. Franck et al. found out that subjects tended to trust the noun preferentially in the three languages, but that preference interacted with the reliability of the cue: they paid attention to the nouns alone in Italian, both to the nouns and the articles in Spanish, and they were particularly sensitive to the articles in French (since nouns have lost much of their morphology in this language). The same opportunism is evident in production in the studies reviewed in section 3 above: clear vs ambiguous number and gender marking in Italian (Vigliocco et al. 1995; Vigliocco & Zilli 1999), ambiguous vs non-ambiguous pronouns in Dutch (Meyer & Bock 1999), ambiguous vs non-ambiguous case-marked noun phrases in German (Hartsuiker et al. 2003)). It is also visible in work by Van Heugten & Shi (2009), Van Heugten and Johnson (2011), and Arias-Trejo et al. (2013) on early use of determiners in French, Dutch and Spanish respectively.



It seems difficult to accommodate this kind of dynamic, graded performance in just one tree. Additionally, even if a notion like c-command between controllers and targets could be salvaged by tweaking underlying derivations (Franck et al. 2006, 2010) and thus account for the fact that direct object phrases and object clitics have been shown to elicit attraction errors in French (*\*Il les promènent* (\*He-sg them-pl walk-pl); meaning: 'he walks them around'; Franck et al. 2006; note that such phrases are outside the subject NP, where features are supposed to start 'moving'), agreement attraction has nevertheless also been reported for pronouns, for which c-command is an extraneous concept (tag pronouns such as *the actor in the soap operas rehearsed, didn't he/\*they*; Bock, Nicol & Cutting 1999). Importantly, attraction occurs in so-called *downward percolation* as well (as in *\*the books that the government want are sold out*; see Staub 2010; also Wagers et al. 2009), for which 'fixed' c-command does not work either. Ultimately, one can bar pronouns from our account of agreement, bar extremely frequent *ad sensum* forms of agreement, neglect NP-internal agreement and the obvious connections of this with S-V agreement (same controllers, same features), neglect the fact that c-command sensitive reflexive pronouns attract the same (and involve the same features) as c-command insensitive personal pronouns (Bock et al. 1999), neglect object clitics and downward percolation, and even neglect the whole issue of massively cross-linguistically gradient morphology and its impact on semantic interfacing. If we proceed in that way we may end up with a tightly-delineated object, a *core*, but we would need reasons to justify that move –and, more importantly, we would still need to solve *the perennial problem*: we would still need to say something about the large slice of grammar and processing left out of the core.

A view in principle more in line with the constructional properties of agreement identified here is Pollard & Sag's (1994: ch. 2) HPSG unification-based approach, largely assumed in the constructional literature as 'the' account of agreement. The first key notion of this account is the idea that two elements that participate in an agreement relation

independently specify partial information about the same linguistic object: "Agreement is simply the systematic variation in form that arises from the fact that information coming from two sources about a single object must be compatible" (p. 60). The structures that are required to be token-identical are not functional structures (unlike in minimalism), but rather referential *indices*. So for instance:

"the index indicated by the subscript 'i' in *My neighbor<sub>i</sub> thinks she<sub>i</sub> is a genius* is a third-person singular feminine index. We can think of these indices as abstract objects that function in discourse to keep track of the entities that are being talked about (...). Thus agreement features serve the practical purpose of helping conversants to keep referential indices distinct from each other by encoding contextually relevant properties of the entities or sets that they are anchored to. Just which properties of referents are encoded by agreement features is subject to cross-linguistic variation, but common choices include person (...) and number (...). Other agreement features are often lumped together as 'gender' ... (pp. 67–68).

In this system the index is a formal object with semantic grounding (actual reference): the referent of a linguistic expression is thus 'the anchor of its index' (p. 68). Agreement rules become a static set of identity conditions and the appearance of directionality is the result of lexical *underspecification*: not all categories project indices (pp. 97–98). The representation in (11) captures how features are compatible (and therefore 'unifiable') or not:

$$(11) \quad \left[ \begin{array}{l} \textit{the salmon} \\ \text{PER } 3^{\text{rd}} \end{array} \right] \left[ \begin{array}{l} \textit{swims} \\ \text{SUBJ} \left[ \begin{array}{l} \text{PER } 3^{\text{rd}} \\ \text{NUM } \textit{sing} \end{array} \right] \end{array} \right] \left[ \begin{array}{l} \textit{you} \\ \text{PER } 2^{\text{nd}} \end{array} \right]$$

That in (12) shows a representation of the third person singular agreement rule in a more recent descendant of the feature-matrix approach, that of Sag, Wasaw & Bender (2003: 107):

(12)

$$\left[ \text{SYNC} \left[ \text{CAT} \left[ \begin{array}{l} \text{AGR 3sing} \\ \text{XARG Y : [ AGR3sing]} \end{array} \right] \right] \right]$$

As (12) shows, the verb's CAT(egory) feature includes information on its AGR(eement) features (person and number in English). The value of the verb's AGR feature must be identical to the AGR features of the verb's XARG (its 'distinguished' argument, *aka* the subject). It follows from this that agreement is basically a matter of lexical content and feature-structure: some categories have AGR features and others do not, and categories which do have such features merely share their expression, so there is no need for a full, constant re-indexation of features, or even for the obligatory presence of a feature controller. All that needs to be in place is a dynamic recount of the referential anchor ('what we are talking about') and of the abstract index used to indirectly refer to it (if a CAT has an AGR feature this must be harmonized with the AGR feature of another CAT). This solves the problem of massive redundancy of the directional accounts and even accounts for agreement in the absence of controllers. In sum, agreement is static, feature-based, constraint-based, and lexical. Models differ in how AGR features are actually conceptualized. For instance, Sag, Wasaw & Bender (2003) argue that they cannot be HEAD features (allowing their content to percolate from words to phrases: feature inheritance) because in small clauses and absolutive constructions there is no agreement. This causes them to explicitly push agreement out of the grammar and place it squarely inside lexical specifications. Models also differ as to whether agreement seen this way is an abstract and independent schematic construction or only a part of a larger construction, even though this debate in itself is rarely visible (see Hoffmann 2013: 232 ff.).

Although the complex interplay between the abstract notion of *index* and the substantive notion of *anchor* does allow Pollard & Sag's theory and its unification-based descendants to adapt more freely to the notorious variability of agreement systems, feature matrices and enriched, *à la*

*carte* lexical specifications cannot account for a number of the constructional properties identified here.<sup>19</sup> Firstly, as already noted, the very notion of unification is indeed too general to provide a fine-grained account of agreement (see fn 8 above). Secondly, positing lexical underspecification merely labels a phenomenon without explaining it: as already noted, it fails to let us see why agreement is so vastly present in NPs and VPs, but not so in PPs and APs, or among PPs and VPs, etc. (in the account developed here, that is because NPs have inherent features via categorization and NPs and VPs 'construct' clauses, so that agreement capitalizes on lexical features to do a syntactic - relational - job; Hawkins 2004:161 and 166-167 and references therein; see also Lugaris 2011). Thirdly, the unification theory cannot account either for why gender is so often 'lumped together' (Pollard & Sag 1998: 68) with the more substantive features of number and person, let alone for why in AO systems the mind does not compute arbitrary gender-agreement violations differently from non-arbitrary number agreement violations. Fourthly, unification *per se* does not naturally relate to the notion of *agreement domains*, and in particular to the *Agreement Hierarchy* (Corbett 1979, 2006), which -based on it- is one of the most solid generalizations governing agreements systems cross-linguistically. Likewise, it cannot account for the AMH posited here, and this has an extremely robust psycholinguistic grounding: languages with strong morphological components stave off *ad sensum* agreement more than languages with poorer components, to a degree that seems to correlate with the size of the morphology very precisely. This holds both for the grammar and the production of agreement ties, revealingly.

Another interesting phenomenon that static feature matrices cannot explain is why in so many languages agreement extends to determiners, quantifiers and adjectives, nor why in languages with case these constituents replicate morphological information as well. Without something like the notion of a *preferred, prototypical 'merging' pattern* (word order, agreement), these facts can only be described but not adequately motivated. It makes



sense to acknowledge the fact that agreement may be 'partial', but if it *can* be partial, why is it not partial more often in Spanish, Italian, German or Russian? In its turn, lexically-specified feature structures cannot explain why in languages which, like English, gradually lose their morphology and become more WOO, it is gender instead of number that is lost more fully. A widespread idea about gender is that it is a lexical dimension, but if that were indeed the case, why did it – instead of number – disappear in English once this language opted for greater syntactic (word order) fixity (Acuña-Fariña 2009)? Under the account developed here, that is because gender – especially arbitrary gender – is actually syntactically-oriented: maximally useful to unify constituents in a relational way, unconstrained by the meaning of the units that it unifies (by contrast, number cannot be stretched so freely because numerosity is not so easily arbitrarily construed). Finally, unification is not incompatible with the massive opportunism that regulates agreement production via extremely well-attested cue reliability effects (nor with many of the properties just mentioned), but it again fails to motivate those effects.

In contrast with the aforementioned limitations, a constructional account such as the one advocated here manages to connect the dots in the network of agreement relations in a fluid way,<sup>20</sup> a way that we can actually **motivate**. Not only does the network contain most of the cognitive principles that structure grammars as ecological niches, but it captures in a predictable way the most defining feature of agreement, namely: that it “is not only syntactic, not only semantic, and not only pragmatic, but all of these things at once” (Eberhard et al. 2005: 531). The general cognitive principles in play are independently-motivated categorization and co-classification, metaphorical extension, metonymy, Gestalt formation and prototypicality of schemas, usage-based self-structuring and cue-based processing biases (Lewis & Vasishth 2005; Lewis et al. 2006). To these we must add portions of idiosyncrasy that tend to be semantically interpreted (sanctioned by the grammar as agreement *ad sensum*), together with the combined working

of the AH and the regulating role of the AMH. All these properties make ‘the same linguistic object’ a less mysterious *object* by casting it as a more constructional one.

## 6. Summary and conclusions

Agreement has always posed a puzzle to grammarians for a number of reasons. First is the fact that it is not a universal of language but is still mysteriously prevalent cross-linguistically. Then is the related fact that it becomes instantiated in cross-linguistically very different proportions. Frequent mismatches (un-agreement) where meaning ties do all the work have typically plagued discussions of it and made a unifying account difficult. The latest solution to the problem of agreement seems to be to contemplate it as an interface problem (Corbett 2006: 3; Eberhard, Cutting & Bock 2005). In a way, the view held here gives substance to the interface theory, as this, on its own, seems too vague. Particularly, the view presented here makes it possible to accommodate graded performance and the different biases that two relatively different languages such as English and Spanish exhibit both at the grammatical level and at the processing level. Many languages have both agreement and word order constraints and we do not know what makes a language in particular opt for more or less of either of these two general clause-building mechanisms. We do know that once a language becomes oriented towards either type, a number of grammatical and processing biases follow suit.

In agreement-oriented types of languages, one can typically identify large sets of inflection classes, which are different forms of categorization. These always have a semantic core. Metaphorical extensions apply to these cores and produce different degrees of schematicity. Such schematicity results in the creation of agreement schemas, whose strength has an obvious usage-based explanation. The psycholinguistic literature makes it clear that in agreement-oriented type of languages those schemas are powerful Gestalts: the mind not only recognizes them in the same way as other morphosyntactic forms of entrenchment but is even predisposed to predicting them once minimal priming occurs. Rich morphological systems provide ample

opportunities for priming. In less agreement-oriented types of languages agreement schemas are less potent, but since the same substance of thought (the same semantic relations) must be coded efficiently, the coding job is taken on or shared opportunistically by other biases, such as determinate tree geometries. It is crucial to understand that languages have unique proportions of morphology, so they will have unique proportions of agreement-oriented biases and word-order-oriented biases. Such uniqueness is evident both at the grammatical and the processing levels.

The perennial problem of contemplating agreement as either an encapsulated cycle or a conceptual mechanism is thus too crude. We need to visualize a much more fluid and dynamic system where, depending on the raw size of the morphological component and on the structural distance between controllers and targets, the *agreement construction* will become correspondingly more encapsulated or, alternatively, more permeable to conceptual pressures. An interesting issue – not tackled here – is what kinds of relative complexity measures are involved in these choices.

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## Notes

<sup>1</sup> For a defence of the value of experimental evidence in linguistics, see for instance Sag, Boas & Kay (2012: 14) in their Sign-Based Construction Grammar (SBCG): "SBCG embodies a strong commitment to psycholinguistic plausibility, in fact adhering to a stronger version of Chomsky's (1965) competence hypothesis than is customary in the field. This means that the mechanisms of grammar are motivated not by descriptive economy, lack of redundancy, or mathematical abstractions of questionable direct relevance to linguistic science (...). Rather, linguistic proposals are motivated and evaluated in terms of how well they comport with models of language use (e.g. production and comprehension), language learning, and language change".

<sup>2</sup> It seems that British English is more permissible with some NP-internal plurals. Even in American English, *these faculty*, *these clergy* and *these staff* are acceptable to many speakers. On differences between both dialects in this area, see Bock et al. (2006). Notice also that the AH is not exceptionless only because of these collective nouns: in *that three days was great* there is un-agreement inside the NP too. The motivation for it is still the same: notionally, what is meant is 'that period of three days'.

<sup>3</sup> *Attraction* refers to what traditional grammar usually understands by 'proximity concord', where a modifying local noun usurps the agreement relationship from a head noun. In psycholinguistic studies of production this constitutes a solid and fruitful research agenda which theoretical linguists are seemingly happily oblivious to. This agenda started in the early 90s with research spearheaded by Kathryn Bock (Bock & Miller 1991, Bock & Cutting 1992, Bock & Eberhard 1993, etc.). In typical studies of this kind, subjects are simply asked to complete preambles like *the signs on the doors* any way they like. Such preambles are conveniently manipulated to reflect either form biases, meaning biases or both. For instance, that

attraction is sensitive to inflectional miscalculation is evident from the fact that collectives like *army* (as in *the appearance of the army ...*) do not attract but inflectionally-marked nouns like *soldiers* (as in *the appearance of the soldiers ...*) do. Or that summation plurals like *scissors* also attract but to a lesser degree than those plurals which are the product of a productive morphological contrast, like *cat/cats*. Research on attraction has been done on all major European languages (see Acuña-Fariña 2012 for a review).

<sup>4</sup> One interesting un-agreement construction in Spanish involves first and second person plural person mismatches, as in *las escritoras*(fem/pl/3rd pers) *sois*(pl/2nd pers) *muy poco afortunadas* / 'the women-writers you-are very little lucky/ 'you women-writers are very little lucky'. On the processing of such mismatches, see Mancini, Molinaro, Rizzi & Carreiras (2011).

<sup>5</sup> I ignore the issue of classifiers here (see Corbett 1991: 136ff.).

<sup>6</sup> Note Langacker (1991: 307): "since it would be counter to both the letter and the spirit of cognitive grammar to describe this situation [alliterative agreement] by a rule that 'copies' x from A onto B, or in terms of features 'percolating' up, down, across, around or through", x and x' are both analysed as "meaningful symbolic units".

<sup>7</sup> Corbett (2006: 125): "the three indisputable agreement features are gender, number and person", which happen to be inherent features of nouns, as Johnson (2014: 19) points out.

<sup>8</sup> The generic status of unification in several forms of Construction Grammar is in any case evident from the fact that, as Fried & Östman (2004: 71) point out, it applies to at least five different processes: agreement (feature match between structural sisters), government (match in relational properties between head and dependents), semantic linking (match between frame and valence elements), semantic integration (unification between mother and daughter), and



valence expansion (incorporation of adjuncts between structural mother and daughter). It is unlikely that the major part of the (notoriously complex) nature of agreement can be captured so generically.

- <sup>9</sup> We need to be clear that we cannot have solid evidence for the transitions suggested here. As Janse, Joseph & Devogelaer (2011) observe on the evolution of gender systems and the reasons why these “may evolve in such a way that core semantic distinctions are confined to playing a minor role” (p. 244): “we make reasonable assumptions, especially that distinctions are meaningful at least at their first appearance, and further assume that well-understood processes of change, such as analogy, semantic bleaching, metaphorical extension (perhaps itself a kind of analogy), and reanalysis, can interact in such a way as to bring about changes in systems that originally had a clear semantic basis. But oftentimes, the “clear semantic basis” is just a hypothesis and not a fact, in the technical sense, not something we know for sure but rather something that we believe is a reasonable starting point (or pathway of change, or the like)” (p. 239). Luragi (2011: 435–6) makes the same point. The idea that sex-encoding nouns acted as attractors, and created the genders in a purely formal (non-semantic) way is an old one, though (Brugmann 1899).
- <sup>10</sup> They did register differences between gender and number in the second part of the P600 component, that is, during reanalysis, showing that it is harder to recover from a gender agreement violation than from a number agreement violation. This is most likely due to the fact that the former type involves going all the way back to the lexical retrieval stage, as arbitrary gender is indissolubly linked to the stem in Spanish nouns.
- <sup>11</sup> One way of theoretically recognizing the fact that a repeated cue does not grant repeated access to content would be to say that words –not morphemes– are the basic form-meaning-units. This idea has been defended in Booj (2010) in the context of a *Construction Morphology* and it may have the added merit of accounting for the apparent breach of the iconicity principle posed by marking information ‘in the wrong place’ (e.g. gender on an adjective or a verb).
- <sup>12</sup> In a way, the automatization of first-pass agreement cues that is done by ignoring the literally excessive meaning side of the symbolic package is not unlike the failure of extremely frequent symbols to conform to regular patterns (Bybee & Scheibman 1999).
- <sup>13</sup> Notice that the dispreferred option is still legal in (9). This behaviour of English parallels a similar geometrical bias whose regularity is indeed very strong in grammar (see section 3 above). In English *misrelated participles* tend to be unacceptable: *¿/\*walking towards the city, the view of the sunset was spectacular*. This is because English language-users expect the missing, subordinate non-finite clause subject to be co-indexed with the subject of the matrix clause. Nothing like this happens in Spanish (as Spanish is not WOO; though see Betancort, Carreiras & Acuña-Fariña 2006 and Mesguer, Acuña-Fariña & Carreiras 2009 on interactions of word order and the recovery of elliptical information in this language).
- <sup>14</sup> “As the meaning of a gram continues to generalize, grow in frequency and become obligatory, its occurrence in certain contexts may become redundant (...) For instance, in English, if a narrative is framed in the past tense, then all the verbs in a sequence must bear the past tense marker, even though its appearance on all but the first verb is redundant” (Bybee & Dahl 1989: 65).
- <sup>15</sup> The psycholinguistic model known as the *Working Memory Retrieval Model* (Lewis & Vasishth 2005; Badecker & Kuminiak 2007) relies on the joint work of working memory and similarity-based interference to account for agreement (Lewis, Vasishth & Van Dyke 2006).
- <sup>16</sup> One should be wary of confusing the blunt evidence showing semantic control with the idea that, in view of it, it is probably best to view agreement as semantically regulated only (Dowty & Jacobson 1989). There is abundant evidence as well that the grammar of agreement is very sensitive to form constraints like locality, for instance. To the classic arguments against a pan-semantic approach in Pollard & Sag (1994: 71 ff.), many more can be added. For instance, in phenomena like *Close Conjoint Coordination*, due to locality one is more likely to say *this man and woman* than *\*these man and woman* (King and Dalrymple 2004: 70). In *Long Distance Agreement* (LDA), a finite verb in a matrix clause shows agreement morphology that co-varies with the feature values of an NP in an embedded clause (e.g. Basque or Icelandic). This occurs at a distance but under strict locality conditions in that it is often only the highest NP in the subordinate clause that can act as a controller (Boeckx 2009). In English, agreement is formally implemented if it involves subjects placed at the left of their

predicates and that rule can only be relaxed when subjects appear in a non default position, such as at the right of the verb: *Many athletes are at gate already* vs *there's many athletes at the gate already* (something observable also in Arabic and in certain Italian dialects; see Guasti & Rizzi 2001). Psycholinguistically, proximity concord mistakes also exhibit well known form biases. For instance, regular (e.g. *cat/cats*) and irregular plurals (*mouse/mice*) have the same error-attracting power, and that attraction is stronger for nouns that are contrastively related to their singular forms (*cat/cats*, but not *suds* or *scissors*; Eberhard et al. 2005). This indicates that inflectional miscalculation *per se* is involved. We also know that attraction effects are sensitive to the cue reliability of the morphs involved, as pointed out above. The most solid form effect in all completion experiments done in the last three decades is the so-called *markedness effect*: errors are vastly much more frequent in complex noun phrases containing a singular head noun followed by a plural modifying one than in any other combination (Haskell et al. 2010). A priori, markedness has little to do with semantic control, so models which aim at accounting for semantically-guided mismatches by advocating the view that agreement is only about conceptualizations misrepresent the facts. Finally, the effects caused by a stronger or a weaker morphology in preventing or allowing semantics to intervene directly (resulting in notorious cross-linguistic variability in agreement patterns) is not accounted for either under an all-semantics type of account.

<sup>17</sup> Remember Langacker's (1991: 308) point in this regard (see section 1): "I have no quarrel with the traditional notion that agreement serves the function of signalling grammatical relationships; it might indicate, for example, that B modifies A, or that A is an argument of B. I would only reiterate in this regard that serving a specifiable grammatical function is perfectly consistent with being meaningful".

<sup>18</sup> See Acuña-Fariña (2012: 28 ff.) for tentative suggestions on how to articulate such an idea.

<sup>19</sup> In this paragraph and the next I deal with problems with Pollard & Sag's theory which are not often recognised in the literature. See Kathol (1999) on agreement and government and Wechsler (2011) and Johnson (2014: 170 ff.) on hybrid agreement.

<sup>20</sup> I use the term 'fluid' informally here, not necessarily in the sense of Dynamical Systems Theory (Van Orden, Holden & Turvey 2005; Rączaszek-Leonardi 2014), although this theory is fully compatible with the views expounded here.

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