DP-Internal Semantic Agreement: A Configurational Analysis

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Abstract

"Hybrid" nouns are known for being able to trigger either syntactic or semantic agreement, the latter typically occurring outside the noun's projection. We document and discuss a rare example of a Hebrew noun that triggers either syntactic or semantic agreement within the DP. To explain this and other unusual patterns of nominal agreement, we propose a configurational adaptation of the CONCORD-INDEX distinction, originated in Wechsler and Zlatić 2003. Morphologically-rooted (=CONCORD) features are hosted on the noun stem while semantically-rooted (=INDEX) features are hosted on Num, a higher functional head. Depending on where attributive adjectives attach, they may display either type of agreement. The observed and unobserved patterns of agreement follow from general principles of selection and syntactic locality.

Introduction

In a series of extensive typological studies, Corbett (1979, 1983, 1987, 1991, 2006) has established an inescapable grammatical result: Not only does agreement sometimes appear to be sensitive to syntactic features and some other times to semantic features, but occasionally it appears to be sensitive to both types of features *simultaneously*, within the same utterance. The implication is that controllers of agreement - typically, nominal phrases - must carry two sets of ϕ-features, which often coincide but need not to. The result and its implication have been corroborated and explored in much research (see Smith 2012, to appear, Danon 2013 for recent examples) and the present study takes them as its starting point.

Once the co-existence of two sets of ϕ-features in DPs is acknowledged, immediate questions arise: Where are they located (on the same head or not)? How are they correlated? What types of mismatch are allowed and what types are not? Which ϕ-set governs agreement on which agreement targets? What are the universal constraints on mixed agreement patterns and what does the space of parametric variation look like? These are the questions we explore below. Our window into these questions will be a remarkable pattern of agreement found with a specific noun in Hebrew: Attributive adjectives may show either syntactic or semantic agreement with this noun. Although exceptional, we will see that this behavior falls together with other classes of agreement "exceptions" in other languages. Much in the spirit of Wechsler and Zlatić's (2003) insightful study of agreement, we will argue that exceptions are no less and often more revealing as to the underlying grammatical system than regular patterns are. In an attempt to make sense of

the entire data set, we will extend Wechsler and Zlatić's dual model of CONCORD-INDEX agreement and implement it within a configurational model of DP structure. This will allow us to capture a number of agreement patterns that have so far eluded explicit explanation.

The structure of this paper is as follows. Section 2 provides empirical and theoretical background by introducing the terms "syntactic" and "semantic" agreement, CONCORD and INDEX features, and by exemplifying their application to several test cases of determiner and adjectival agreement within DP. Section 3 presents a novel test case from Hebrew, which displays a typologically rare pattern of agreement. Section 4 analyzes this pattern as a case of DP-internal INDEX agreement, using the formal apparatus of HPSG. At the same time, we highlight a theoretical puzzle it raises for the HPSG analysis of Wechsler and Zlatić (2003).

Section 5 is the theoretical core of the paper. It develops a general model for DP-internal agreement where a key role is played by an intermediate projection between NP and DP, the NumP projection. Using the structural options opened up by this model, we explain the various canonical and non-canonical patterns displayed in the Hebrew case as well as in other documented cases, both for [number] and for [gender] agreement. Section 6 examines the theoretical implications of the analysis: first, we compare three other cases of 3/4 agreement patterns that received similar treatments in recent work, and second, we highlight the implications of the present analysis for grammatical architecture and typology. Section 7 concludes the paper.

2. Background

In this section we introduce the basic terms "semantic agreement" and "INDEX agreement" and describe how they are used in the literature (section 2.1). Focusing on the latter term, we will then review a number of situations where INDEX agreement, normally external to DP, shows up inside of it (section 2.2).

2.1 Semantic agreement and INDEX agreement

The terms "semantic agreement" and "INDEX agreement" largely overlap and the distinction between them will not play a role in this paper. In the analysis to follow I adopt the term "INDEX agreement" because it is couched within a fully explicit theory of feature sharing, and this explicitness will prove conducive to understanding the fine-level properties of the Hebrew paradigm. However, to set the stage, let me clarify how these terms are defined and employed by their originators.

Corbett (2006:155-157) states that "semantic agreement" is consistent with the meaning of the controller whereas "syntactic agreement" is consistent with its form. For example, in certain varieties of English collective nouns can trigger plural agreement on predicates.

(1) a. **This** committee **has** decided on the issue.
b. **This/*these** committee **have** decided on the issue.

In (1a), the auxiliary displays syntactic (singular) agreement, consistent with singular form of the subject nominal *committee*. In (1b), it displays semantic (plural) agreement, consistent with the aggregate meaning of *committee*. Crucially, the English demonstrative *this* always shows syntactic agreement (we return to these data in section 6.1).

As Corbett emphasizes, the terms "syntactic agreement" and "semantic agreement" only make sense when there is a potential choice; In *Mary has decided on the issue*, there is no telling whether agreement is syntactic or semantic. Semantic agreement typically arises in mismatch situations, on so called "hybrid nouns". Still looking at the [number] feature, it is the singular value that may count as semantic in the context of honorific plural pronouns, when the referent is singular. Grammatically feminine nouns may refer to males, in which case masculine agreement would count as semantic; and so on.

A major typological generalization, due to Corbett, is the Agreement Hierarchy (AH) (Corbett 1979, 1983, 1987, 1991, 2006).

(2) *The Agreement Hierarchy*
attributive > predicate > relative pronoun > personal pronoun

For any controller that permits alternative agreements, as we move rightwards along the AH, the likelihood of agreement with greater semantic justification will increase monotonically (that is, with no intervening decrease).

The AH is a statistical claim about relative frequencies of agreeing forms in a corpus, not a claim about particular utterances. Yet to the extent that agreement mismatches are revealed in particular utterances, they will very often track the same hierarchy. Thus, the demonstrative determiner in (1b) occurs in an "attributive" position, whereas the auxiliary occurs in a "predicate" position. Indeed, the former cannot but the latter can display semantic agreement. Words for children, especially for girls, often show a parallel pattern. For example, the German noun *Mächen* 'girl' triggers neuter agreement on modifiers and predicates but can antecede either neuter or feminine personal pronouns, the latter instantiating "semantic agreement". This asymmetry too follows the AH.

It is, in fact, not clear that coreference relations, especially cross-sentential ones, should count as "agreement" in the same sense as subject-predicate agreement does - even when the two relations happen to be sensitive to semantics. To draw this finer distinction, Wechsler and Zlatić (2003) introduce the term "pragmatic agreement", which is simply the requirement that coreferential elements bear compatible referential features. Pragmatic agreement applies at the level of discourse and is solely concerned with grammatical features that have real-world denotation.

Semantics can impact the grammatical system more directly, according to W&Z, through the INDEX system. The INDEX features of a nominal include person, number and gender specifications, which are the *grammaticalized* content of the semantic denotation of the noun. Thus, there is a close match between INDEX features and semantic features, but they are distinct. Similarly, there is a close match between the semantically motivated INDEX features and the morphologically motivated features, labelled CONCORD in W&Z's system, which reflect the declension class and derivational morphology of the noun. Here again, INDEX and CONCORD may part ways in non-canonical cases, giving rise to interesting agreement mismatches.

The full space of mismatch possibilities is witnessed in the following example. The Serbian/Croatian noun *deca* 'children' is the plural of *dete* 'child'. Like a number of irregular nouns, it belongs to a declension class that triggers feminine singular CONCORD. Consistent with its meaning, it triggers neuter plural INDEX agreement. Still, when the referent of *deca* includes some boys, pragmatic agreement may display masculine plural features (Wechsler and Zlatić 2003:6).

(3) a. Postmatrali smo ovu dobru decu$_i$.
watched.1PL AUX this.**F.SG** good.**F.SG** children.ACC

b. Ona$_i$ su se lepo igrala.
they.NT.PL AUX.3PL REFL nicely played.**NT.PL**

c. Oni$_i$ su se lepo igrali.
they.**M.PL** AUX.3PLREFL nicely played.M.PL
'We watched these good children$_i$. They$_i$ played well.'

The boldfaced inflections in the glosses of (3a), (3b) and (3c) stand for CONCORD, INDEX and pragmatic agreement, respectively. As can be seen, the different types of agreement rule over different syntactic domains. The canonical domain of CONCORD agreement is within the DP (determiners and attributive adjectives); that of INDEX agreement is within the clause (predicate and locally bound pronouns); and that of pragmatic agreement is intersentential (pronominal coreference). Thus, that much of the effects of Corbett's AH can be derived by letting semantically motivated agreement (INDEX) to operate over greater distances than morphologically motivated agreement (CONCORD) (see Wechsler and Zlatić 2003:Ch. 5 for discussion).

Agreement mismatches of the sort illustrated in (3) call for more complex grammatical representations; in particular, they motivate the *simultaneous* occurrence of CONCORD and INDEX features on the same nominal. Adopting the HPSG notation (and putting aside for the moment the "pragmatic" features), the lexical entry for a noun like *deca* would include the following information.

(4) Partial lexical entry for *deca* ‘children’

$$\begin{bmatrix} \text{CONCORD} & \begin{bmatrix} \text{NUM} & \textit{sing} \\ \text{GEN} & \textit{fem} \end{bmatrix} \\ \text{INDEX} & i \begin{bmatrix} \text{NUM} & \textit{pl} \\ \text{GEN} & \textit{neut} \end{bmatrix} \end{bmatrix}$$

Furthermore, the system allows for *partially* specified entries, where either CONCORD or INDEX features are missing; default matching constraints may operate to fill them in, giving rise an array of "exceptions" which nonetheless fall into regular patterns, as W&Z document. If CONCORD is unspecified, semantics may allow (via the INDEX features) “alternating” agreements, reflecting distinct referential properties. The Hebrew data discussed below display a variant of this option, however, they present a non-trivial challenge to the otherwise well-motivated model of W&Z. Before turning to these data, let us examine how this model copes with the general phenomenon of INDEX agreement applying non-canonically inside DP.

2.2 Documented precedents of DP-internal INDEX agreement

The literature on DP-internal agreement discusses a handful of cases where this agreement can be shown to be sensitive to the INDEX rather than the CONCORD features of the head noun. As noted, this scarcity is consistent with Corbett's Agreement Hierarchy, which designates the "attributive" position as the least likely of all agreement targets to display semantic agreement. Similarly, within the theory of Wechsler & Zlatić (2003), the canonical domain of CONCORD agreement is attributive modification.

The exceptions are, in fact, not evenly distributed over all DP-internal elements: They mostly consist of INDEX agreement on determiners and quantifiers. Furthermore, they often involve conjunctions, where number resolution is semantic in nature and determines the compositional INDEX number of the conjoined NP. I will review a number of representative examples before focusing on the type most similar to the Hebrew test case.

Consider first number agreement in conjunctions. King and Dalrymple (2004) (henceforth, KD) present a typological analysis of agreement in determiner systems which is based on the CONCORD-INDEX distinction. A fundamental assumption in this model concerns an asymmetry between the resolution of the two types of features in conjoined structures. A conjunction of two NPs is semantically dependent, in a lawlike manner, on the semantic values of the conjuncts. For example, a conjunction of two NPs each denoting a distinct

individual denotes a plurality (e.g., *the cat and dog*) but a conjunction of two NPs denoting descriptions of the same individual still denotes a singular individual (e.g., *my friend and colleague*). This correlation is tracked by the INDEX features of the conjuncts and those of the conjunction.

In contrast, CONCORD features do not accumulate or interact in this way; in KD's terminology, they are *distributive*. So a conjunction of NPs has no "compositional" CONCORD features; it only has the separate CONCORD features of each conjunct. This implies that agreement with a conjunction in CONCORD must be agreement with the CONCORD value of each conjunct, but agreement with a conjunction in INDEX is agreement with the overall (compositional) INDEX values of the conjunction.

Crosslinguistically, determiners could be unselective (e.g., English *the*), sensitive to the CONCORD features or sensitive to the INDEX features of the NP they combine with. An example of a CONCORD-sensitive determiner is English *this*, which is specified [CONCORD *sg*]. *this* is only compatible with morphologically singular nouns (5a-b), as well as conjunctions of singulars (5c), but no other combination (5d-f).

(5) English *this*: [CONCORD|NUMBER *sg*]

a. this cat
b. * this scissors/cats
c. [this [cat and dog]]
d. * [this [cats and dogs]]
e. * [this [cat and dogs]]
f. * [this [cats and dog]]

DK show that INDEX-sensitivity is also found in determiner systems. Brazilian Portuguese singular determiner *o* 'the' cannot combine with conjunctions unless they pick a single individual (6); the same is true of German *der* 'the'. This is captured by imposing the specification [INDEX *sg*] in the lexical entry of the determiner.[1]

(6) Brazilian Portuguese *o* 'the': [INDEX|NUMBER *sg*]

a. * o cachorro e gato
the dog.M.SG and cat.M.SG
('the dog and cat')

[1] Both determiners are also specified [CONCORD|NUMBER *sg*] but this is redundantly satisfied in the cases under consideration. Further gender restrictions apply which are not relevant to the present point.

b. o presidente e director da Air France
the president.M.SG and director M.SG of Air France
'the president and director of Air France'

Just the opposite pattern is found with INDEX-sensitive *plural* determiners. Russian *èti* 'these' takes plural NPs (7a). Crucially, it is compatible with a conjunction of singular nouns that denotes a plurality (7b) (compare the ungrammatical English **these man and woman*), but not with an individual-denoting conjunction (7c).

(7) Russian *èti* 'these': [INDEX | NUMBER *pl*]

a. èti mužčiny/*mužčina
these men/man
'these men/*man'

b. èti mužčina i ženščina
these man and woman
'this man and woman'

c. * èti drug i kalega (A. Shahnovich, p.c.)
these friend and collegue
('this friend and collegue')

Hebrew plural demonstratives are the same.[2]

(8) Hebrew *ha-hem* 'those': [INDEX | NUMBER *pl*].

a. ha-yeled ve-ha-yalda ha-hem
the-boy and-the-girl the-they
'that boy and girl'

b. * ha-xaver ve-ha-kolega ha-hem
the-friend and-the-collegue the-they
'that friend and colleague'

DK state that CONCORD-sensitivity is typologically more common than INDEX-sensitivity, but no comparative data are cited in support of this claim. In section 5.1 we will develop a theoretical analysis that generates both options as possible realizations of DP-internal agreement.

Staying at the functional edge of DPs, there is a class of phenomena grouped under the title "person agreement on quantifiers". For DP-internal agreement, which is normally restricted to gender/number/case features, this is quite unusual. Indeed, in Wechsler & Zlatić's (2003)

[2] (7c) and (8b) are possible, of course, on the plural reading (the friend and the colleague are distinct).

system, [person] is necessarily an INDEX feature, so that the phenomenon at hand is another instance of DP-internal INDEX agreement. Person agreement on DP-internal quantifiers is a feature of certain Bantu languages, including Zulu and Swahili (Baker 2008:184-186), Kinyarwanda and Lubukusu (Jerro and Wechsler, to appear), but also occurs in Cuzco Quechua and Turkish. An example from Kinyarwanda is given below.

(9) (Mwe) **mw**-ese mw-agi-ye ku i-duka.
2PL 2PL-all 2PL-PST.go-PERF to CL5-store
'All of you went to the store.'

In Serbian/Croatian, certain animate nouns show mixed gender agreement in the plural. Although feminine by form, they may trigger semantic masculine agreement on predicates and pronouns. To a lesser extent, Corbett (2006:216) reports, they can do so also on quantifiers.

(10) mnog-i Sarajlij-e
many-**M**.PL Sarajevan.**F**-PL.NOM
'many Sarajevans'

Semantic agreement can also show up on determiners that appear with these nouns. Interestingly, it cooccurs (for some speakers) with syntactic agreement on the attributive adjective (Corbett 2006:234; we return to mixed agreement in section 5.4).

(11) ov-i privatn-e zanatlij-e
this.**M**.PL.NOM private.**F**.PL.NOM artisan.**F**.PL.NOM
'these private artisans'

So far we have seen crosslinguistic evidence for DP-internal INDEX agreement on determiners and quantifiers. Both Corbett and Wechsler & Zlatić group these items together with adjectival modifiers under the label "attributive", but this move is theoretically dubious. Attributive adjectives occupy a distinct structural position within the DP and compose with the head noun through different semantic mechanisms. In the domain of agreement they are also different, showing a greater adherence to syntactic agreement. We now turn to the documented exceptions to this tendency.

A first, systematic exception involves, once again, conjunctions. It is not uncommon to find plural agreement on attributive adjectives that modify a conjunction of singulars. The following Hebrew example illustrates this; note that plural agreement is impossible on the singular reading of (12b) (the friend is the colleague), confirming that the plural marking on the adjective tracks the INDEX number value of the conjunction.

(12) a. ha-yeled ve-ha-yalda ha-nediv-im
the-boy and-the-girl the-generous-PL
'the generous [boy and girl]'

b. * ha-xaver ve-ha-kolega ha-nediv-im
the-friend and-the-collegue the-generous-PL
'the generous friend and colleague'

Outside conjunctions, there are a few documented case studies. Corbett (1991:231-2, 2006:158) discusses profession names in Russian, like *vrač* 'doctor', which are masculine by form but may designate either males or females.

(13) Ivanov-a xoroš-ij / xoroš-aja vrač.
Ivanov-F.SG.NOM good-M.SG.NOM / good-F.SG.NOM doctor.SG.NOM
'Ivanova is a good doctor'

In a substantial questionnaire carried out during the 1960s, a majority of speakers applied syntactic masculine agreement to the attributive adjective, but a minority of 16.9% opted for semantic feminine agreement. It is not clear from Corbett's discussion how pervasive this option is across the entire range of profession names; according to Pesetsky (2014), the phenomenon is quite systematic. In W&Z's's terms, *vrač* can be analyzed as a sexed noun bearing [CONCORD *masc*]; its INDEX gender is inherited from the value of the SEX semantic restriction, which could be female or male. We return to these nouns in sections 5.4 and 6.1.

More pervasive in occurrence, but still limited to a few exceptional nouns, is semantic agreement on human-denoting nouns in some Bantu languages (Corbett 1991:239-259). Normally such nouns belong to gender 1/2 , which is restricted to animates, but sometimes they occur in other gender classes, giving rise to a split between (what Corbett calls) syntactic and semantic agreement, or CONCORD and INDEX agreement in W&Z's terms. For example, the Chichewa noun *ngwazi* 'hero' has the morphology of gender 9/10. It can either exhibit CONCORD (9/10) or INDEX (1/2) agreement, as in (14). Interestingly, it can also show mixed agreement, to which we return in section 5.4.

(14) ngwazi y-athu y-oyamba / ngwazi w-athu w-oyamba
hero 9-our 9-first / hero 1-our 1-first
'our first hero'

Corbett describes a gradual shift within the Bantu family, where such nouns are involved in ever greater relations of semantic agreement until they are practically re-classified in the gender system (effectively aligning CONCORD gender with INDEX gender).

The next section presents a novel case study of DP-internal INDEX agreement in Hebrew, found with a specific noun stem. The relevant feature is [number] and the target is any attributive adjective that modifies this specific noun. Like most of the interesting cases examined above, it is an exception, but one whose behavior is especially revealing as to the complexity of the underlying agreement mechanisms.

3. The noun *be'alim* 'owner(s)' in Hebrew

The data of interest come from the Hebrew noun *be'alim* 'owner(s)' (see fn. 6 for historical background and additional examples). In section 3.1 I describe the unusual pattern of agreement of this noun: an asymmetric CONCORD-INDEX mismatch in the [number] value. In section 3.2 I demonstrate that attributive modification on this noun is sensitive to (hence can disambiguate) its referential features.

3.1 The agreement pattern of *be'alim*

The Hebrew noun *ba'al* is ambiguous between 'husband' and 'owner'.[3] In practice, however, syntactic resources are employed to resolve the ambiguity. As is well known, Hebrew (like all Semitic languages) realizes genitive constructions in two forms: the construct state (CS) and the free state (FS). The two constructions differ along several dimensions (for a full description, see Doron and Meir 2013), but for present purposes the important difference is the occurrence of the genitive case marker *šel* in the FS vs. its absence from the CS. As can be seen below, the choice of construction determines the meaning of *ba'al*.

(15) Singular *ba'al*

a. ha-ba'al šel ha-šxena / *ba'al ha-šxena
the-husband of the-neighbor.F (FS) / *husband the-neighbor.F (CS)
'The neighbor's husband'

b. ba'al ha-dira / *ha-ba'al šel ha-dira
owner the-apartment / the owner of the-apartment
'The owner of the apartment'

The alignment of the 'husband'-sense with the FS and the 'owner'-sense with the CS is peculiar but is not our main concern here. In modern Hebrew the CS construction is not fully productive and gaps of this sort are not entirely uncommon. More interesting is the situation with the plural form *be'alim*. This form retains the same ambiguity, but crucially does not distinguish the CS from the FS; each construction allows both meanings. Focusing on the 'owner'-sense in the FS, an interesting observation emerges: Although

[3] This unhappy ambiguity is a constant source of disgruntlement, so much that the word is often avoided in feminist circles.

morphologically marked as M.PL (by the suffix *-im*), *be'alim* is fully compatible either with a singular or with a plural referent.[4] Similarly, the morphological masculine gender of *be'alim* does not prevent it from referring to female referents.

(16) Morphologically plural *be'alim*

a. hem/hen hayu ha-be'al-im šel ha-dira.
they.M/F were.3PL the-owner-M.PL of the-apartment
'They were the owners of the apartment'

b. hu/hi haya/hayta ha-be'al-im šel ha-dira
he/she was.3.SG.M/F the-owner-M.PL of the-apartment
'He/She was the owner of the apartment'

In these examples, *be'alim* heads a predicate nominal. These nominals do not enter agreement relations with their subjects like verbal and adjectival predicates do (Baker 2008). Hence *be'alim* does not obviously participate in the INDEX agreement displayed by the subject and the auxiliary. The question is how the form-meaning mismatch attested in (16b) is translated to the CONCORD-INDEX system we have discussed above. To answer this question we need to look at examples where *be'alim* heads a subject nominal and triggers agreement *both* inside and outside its maximal projection.

Consider first the following pair (in the following examples the subject is uniformly masculine; gender glossing is suppressed).

(17) a. ha-be'al-im ha-kodem maxar et ha-makom lifney šana.
the-owner-**PL** the-previous.**SG** sold.**3SG** ACC the-place before year
'The previous owner sold the place a year ago'

b. ha-be'al-im ha-kodm-im maxru et ha-makom lifney šana.
the-owner-**PL** the-previous-**PL** sold.**3PL** ACC the-place before year
'The previous owners sold the place a year ago'

In (17a), *be'alim* triggers (mismatching) singular agreement on an NP-internal attributive adjective and singular agreement on the verb. In (17b), it triggers (matching) plural agreement on the attributive adjective and plural agreement on the verb. Importantly, there is a semantic difference between the two examples: (17a) refers to a single owner and (17b) to plurality of owners, as the translations indicate. This situation may give the illusion that it is the [number] specification on the verb, rather than any feature of the subject nominal, that determines the interpretation of the sentence. That this cannot be true is shown by the

[4] One might speculate that the emergence of the 'owner'-sense in (16b) is a response to the general dispreference for the CS (as in (15b)) among speakers of modern Hebrew.

following pair, in which the attributive adjective and the verb bear conflicting [number] values. Strikingly, a mismatch is tolerated only in one direction.

(18) a. (?) ha-be'al-im ha-kodm-im maxar et ha-makom lifney šana.
the-owner-**PL** the-previous-**PL** sold.**3SG** ACC the-place before year
'The previous owner sold the place a year ago'

b. * ha-be'al-im ha-kodem maxru et ha-makom lifney šana.
the-owner-**PL** the-previous.**SG** sold.**3PL** ACC the-place before year
('The previous owner(s) sold the place a year ago')

(18a) and parallel examples are slightly off for some speakers but are incomparably better than (18b) and its counterparts. This sharp asymmetry was also confirmed by a web search, which yielded many examples of the first type but no example of the second type. (19a) and (20a) were found on the web.

(19) a. ha-be'al-im ha-xadašim hexlit al picul.
the-owner-**PL** the-new-**PL** decided.**3SG** on demerger
'The new owner decided on demerger'

b. * ha-be'al-im ha-xadaš hexlitu al picul.
the-owner-**PL** the-new.**SG** decided.**3PL** on demerger
('The new owner(s) decided on demerger')

(20) a. ha-be'al-im ha-kamcan-im šelanu lo zorek ecem la-kvuca.
the-owner-**PL** the-stingy.**PL** our not throw.**SG**.PRS bone to.the-team
'Our stingy owner doesn't throw a bone to the team'

b. * ha-be'al-im ha-kamcan šelanu lo zorkim ecem la-kvuca.
the-owner-**PL** the-stingy.**SG** our not throw.**PL**.PRS bone to.the-team
('Our stingy owner(s) do(es)n't throw a bone to the team')

Note that while (18a)/(19a)/(20a), like (17a), refer to a single owner, (18b)/(19b)/(20b) are ungrammatical on any interpretation (singular inflection on the verb would make them all grammatical). If verbal inflection alone were responsible for the interpretation of the subject then it would be expected to generate the plural reading in (18b)/(20b)/(20b) regardless of inflection on the NP-internal modifier.[5]

The agreement pattern we observe can be summarized as follows.

[5] The agreement pattern is insensitive to the semantic class of the adjectives (intersective, non-intersective and intensional), as (17)-(20) make clear. See also (60) below.

(21) Agreement pattern with *be'alim*

a. [$_{DP}$ *be'alim* Adj$_{[SG]}$] … V$_{[SG]}$ …
b. [$_{DP}$ *be'alim* Adj$_{[PL]}$] … V$_{[PL]}$ …
c. [$_{DP}$ *be'alim* Adj$_{[PL]}$] … V$_{[SG]}$ …
d. * [$_{DP}$ *be'alim* Adj$_{[SG]}$] … V$_{[PL]}$ …

We now return to the interpretive correlates of these agreement options.

3.2 Number agreement on the attributive adjective tracks semantics

Before laying out the proposal, let me establish the following descriptive claim about the semantic value of modified NPs headed by *be'elim*.

(22) [$_{NP}$ *be'alim* Adj$_{[PL]}$] denotes either a single or a plural entity;
[$_{NP}$ *be'alim* Adj$_{[SG]}$] denotes a single entity.

The pair in (16) has already demonstrated that *be'alim*, although morphologically plural, is semantically number-neutral. The claim in (22) is that this neutrality can be resolved one way or another by NP-internal agreement in [number]. The interpretive contrast between (17a) and (17b) was a first indication to this effect. But one can factor out interactions with verbal agreement in order to demonstrate the full force of the claim in (22). This can be done in two ways.

First, we observe that even when verbal agreement is kept constant (as singular), the semantic difference stands out. This is brought out with collective predicates.

(23) a. ha-be'al-im ha-kodm-im šel ha-binyan hitkansu ba-lobi.
the-owner-PL the-previous-PL of the-building gathered.PL in.the-lobby
'The previous owners of the building gathered in the lobby'

b. # ha-be'al-im ha-kodem šel ha-binyan hitkanes ba-lobi.
the-owner-PL the-previous-SG of the-building gathered.SG in.the-lobby
'The previous owners of the building gathered in the lobby'

c. ha-ka'hal hitkanes ba-lobi.
the-crowd gathered.SG in.the-lobby
'The crowd gathered in the lobby'

(23a), with a plural attributive adjective modifying *be'alim*, is compatible with a collective predicate because its subject denotes a plurality. (23b), on the other hand, with a singular attributive adjective modifying *be'alim*, is semantically deviant because its subject denotes an individual. That verbal agreement is not at issue is shown in (23c), where a singular subject, denoting a group, is fully compatible with this verb, triggering the same singular agreement.

Second, coreferential pronouns pick on the same semantic distinction. Note that present tense predications in Hebrew contain no auxiliary, so the examples below once again target the features of the subject alone.

(24) a. hine [ha-be'alim ha-xadaš-im]$_i$. hu$_i$/hem$_i$ kvar al kocim.
here the-owner.PL the-new-PL. He/They already on thorns
'Here is/are the new owner(s). He's/They're already on edge'

b. hine [ha-be'alim ha-xadaš]$_i$. hu$_i$/*hem$_i$ kvar al kocim.
here the-owner.PL the-new-SG. He/They already on thorns
'Here is the new owner. He's/*They're already on edge'

Consistent with the claim in (22), the referent introduced by *be'alim* when modified by a plural attributive adjective is either singular or plural, but when modified by a singular attributive adjective, it must introduce a singular referent.[6]

4. The proposal

The analytic proposal I will make is very simple. It will be able to explain *both* the agreement pattern in (21) and its semantic consequences in (22). It will, however, raise a theoretical puzzle for the theory of agreement propounded in Wechsler & Zlatić 2003,

[6] The phenomenon of morphologically plural nouns with singular reference is recognized in traditional Hebrew grammars as *pluralis excellentiae*, which is akin to *pluralis majestatis* (royal *we*), the idea being that the plural suffix can function as an intensifier. The paradigm example is the noun *elohim* 'god(s)' in Biblical Hebrew (other examples are *adonim* 'Lord(s)', *trafim* 'household god(s)' and *behemoth* 'giant beast(s)', the last one taking the feminine plural suffix *–oth*). Consider *elohim*. Although morphologically plural, it could refer to either a single god (normally, Jehovah) or a plurality of gods (normally, idols); the singular form, *eloha*, was also in use. (i) is an example of plural reference (notice the plural pronoun that takes *elohim* as antecedent), parallel to (17b); (ii) is an example of singular reference, cooccurring with a singular attributive adjective, parallel to (17a); and (iii) is an example of singular reference, cooccurring with a plural attributive adjective, parallel to (18a)/(19a).

(i) ki zanu axarey elohim axerim va-yištaxavu la'em.
for went.astray.3PL after god.**PL** other.**PL** and.worshipped.3PL to.them
'For they went astray after other gods, and worshipped them.'
(*Judges* 2, 17)

(ii) mi yuxal la'amod lifney yehova ha-elohim ha-kadoš ha-ze?
who able.FUT to.stand before Jehovah the-god.**PL** the-holy.**SG** the-this.**SG**
'Who is able to stand before the LORD, this holy God?'
(*Samuel 1*, 6, 20)

(iii) va-yehova elohim emet hu elohim xayim u-melex olam.
and-Jehovah god.PL truth he god.**PL** living.**PL** and.king.SG world
'But the LORD God is the true God, He is the living God, and the everlasting King.'
(*Jeremiah* 10, 10)

whose basic descriptive devices I adopt here. Section 4.1 presents the formal lexical entry for *be'alim* and how it feeds agreement operations to yield the observed facts. Section 4.2 points out the conflict between this proposal and a key theoretical tenet of W&Z's model.

4.1 The lexical entry of *be'alim*

In HPSG, the CONTENT feature assembles the semantic information encoded in lexical signs. CONTENT splits to INDEX with its ϕ-features, as discussed in section 2.1, and RESTR(ICTIONS), which lists semantic predicates that apply to the referent of the INDEX. Relevant to our concerns are two subfeatures of RESTR: SEX and COUNT. The former is only specified for animate nouns and designates their biological sex; the latter is only specified for count nouns and distinguishes aggregate from non-aggregate entities. Thus, these two features provide the semantic grounding of the GENDER and NUMBER values of the INDEX feature.[7]

The peculiar behavior of *be'alim*, as seen above, falls neatly into place if we make the following three assumptions: (i) its CONCORD features are invariantly specified M.PL, owing to the plural marker *-im*; (ii) its INDEX features are semantically transparent (i.e., directly inherited from RESTR)[8]; (iii) crucially, NP-internal INDEX agreement is allowed.

Formally, the lexical sign for *be'alim* contains the following information. Note that INDEX sharing between the values of INDEX and those of RESTR reflects assumption (ii).

(25) Information in the lexical sign for *be'alim*

$$\begin{bmatrix} \text{CONCORD} & \begin{bmatrix} \text{NUM} & pl \\ \text{GEN} & masc \end{bmatrix} \\ \text{CONTENT} & \begin{bmatrix} \text{INDEX} & i \begin{bmatrix} \text{NUM} & \boxed{1} \\ \text{GEN} & \boxed{2} \end{bmatrix} \\ \text{RESTR} & \begin{bmatrix} \text{COUNT} & \boxed{1} \\ \text{SEX} & \boxed{2} \end{bmatrix} \end{bmatrix} \end{bmatrix}$$

[7] It is a moot question whether encyclopedic information of the kind stored in SEX and COUNT is directly encoded in linguistic representations. I follow the HPSG practice in assuming it is, but nothing crucial hinges on this assumption. Even if the relevant information is grammar-external, it is still somehow mapped to the linguistic INDEX features, and the mapping is systematic.

[8] Although we focus on [number], recall that [gender] is also unspecified; see (16a-b).

This kind of lexical entry, with partially specified ϕ-features, is not extraordinary; typical examples of agreement mismatches involve very similar representations. What *is* seemingly exceptional is the way in which the INDEX features are resolved and their visibility to NP-internal agreement. We return to consider the theoretical implications of this proposal in the next section.

For now, observe that the lexical entry (25) affords a principled explanation for the agreement pattern in (21), repeated below.

(26) Agreement pattern with *be'alim*

a. [DP *be'alim* Adj[SG]] … V[SG] …
b. [DP *be'alim* Adj[PL]] … V[PL] …
c. [DP *be'alim* Adj[PL]] … V[SG] …
d. * [DP *be'alim* Adj[SG]] … V[PL] …

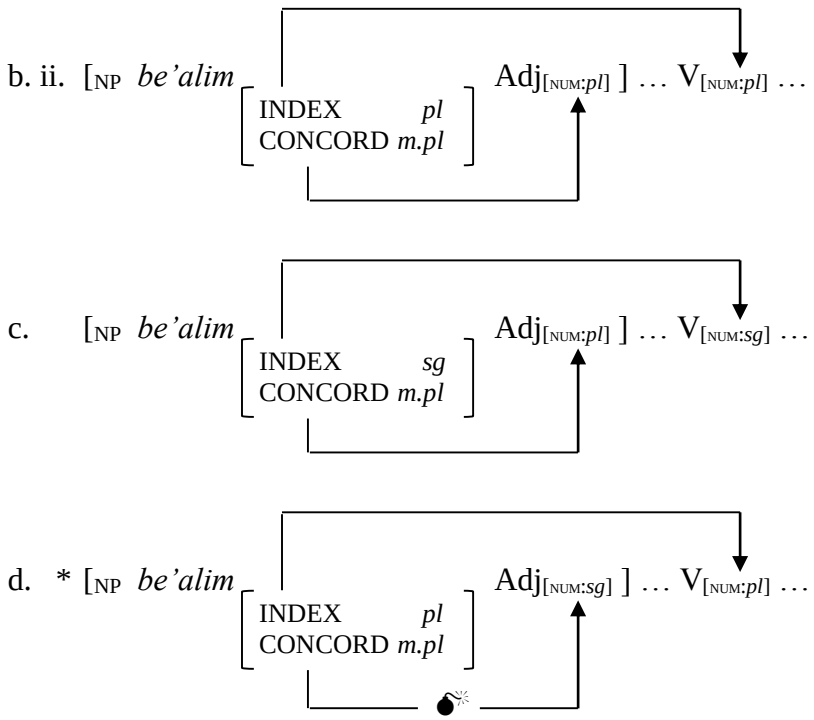
The four scenarios in (26) map to the agreement configurations in (27).[9] Verbal agreement, to recall, is necessarily keyed to the INDEX features. Thus, the verb agrees with the INDEX number value of *be'alim*, which is either SG or PL (being initially unspecified). The attributive adjective agrees either with the CONCORD value (PL) or with the INDEX value (SG or PL) of *be'alim*. Thus, a PL value on the adjective could originate either from INDEX or CONCORD agreement, (27b-i) or (27b-ii), respectively.

(27) Agreement configurations with *be'alim*

a. [NP *be'alim* [INDEX *sg*, CONCORD *m.pl*] Adj[NUM:*sg*]] … V[NUM:*sg*] …

b. i. [NP *be'alim* [INDEX *pl*, CONCORD *m.pl*] Adj[NUM:*pl*]] … V[NUM:*pl*] …

[9] The diagrams in (27) envision agreement as an asymmetric directional relation, in line with a derivational view of syntax (e.g., minimalism). A symmetric representation, however, is equally possible, as in declarative grammars (e.g., HPSG).



A mismatch is generated, as in (27c), if the verb picks the [INDEX|NUMBER *sg*] and the adjective picks the [CONCORD|NUMBER *pl*] feature of *be'alim*. The opposite mismatch in (27d), however, cannot be generated. If the verb is marked plural, then *be'alim* must be specified [INDEX|NUMBER *pl*]. But then the adjective must be marked plural too, for *be'alim* is intrinsically specified [CONCORD *m.pl*]. "Reversed linking" – Adj agrees with [INDEX|NUMBER *sg*], V agrees with [CONCORD *m.pl*] - is also ruled out, since verbs never enter CONCORD agreement.

We also derive the asymmetric interaction of number agreement on the attributive adjective with the referential properties of *be'alim*, stated in (22) and repeated below.

(28) [NP *be'alim* Adj[PL]] denotes either a single or a plural entity;
[NP *be'alim* Adj[SG]] denotes a single entity.

By assumption, [INDEX|NUMBER *sg*] is inherited from [COUNT *sg*], the semantic restriction on individual-denoting nominals, and [INDEX|NUMBER *pl*] is inherited from [COUNT *pl*], the semantic restriction on plurality-denoting nominals. Thus, plural marking on the adjective may arise from CONCORD agreement, leaving the INDEX number value undecided ((27b-ii) vs. (27c)); singular marking on the adjective, by contrast, may only arise from INDEX agreement (27a), fixing the reference of *be'alim* to an individual.

The peculiar behavior of the noun *be'alim*, then, is fully explained within the dual CONCORD-INDEX agreement system, utilizing and therefore supporting its general assumptions (i.e., the semantic grounding of INDEX features and their manifestation in

verbal agreement). The one additional assumption, which seems firmly justified by the Hebrew evidence, is that attributive adjectives can display INDEX agreement. This is a novel and crosslinguistically very rare instance of what Corbett (2006) termed "semantic agreement", scratching the edge of the Agreement Hierarchy. Before we address the source of this curious possibility, let us highlight a puzzle it raises for current understanding of NP-internal agreement.

4.2 A theoretical puzzle

We may first note that *no* puzzle is raised for Corbett's Agreement Hierarchy. Recall that the hierarchy regulates statistical frequencies over linguistic corpora and not agreement choices within particular sentences. Even so, the asymmetric pattern in (27) is streamlined with the overall directionality of the Agreement Hierarchy. While it is possible for agreement on the attributive position to be *as semantically motivated as* that on the predicate, it cannot be *more* semantically motivated (the "reverse linking" alluded to above). The proposal, however, does raise a substantial issue for Wechsler & Zlatić 2003.

The lexical entry in (25) tacitly assumes that semantic information wins over morphological information when they pull the INDEX feature in opposite directions. The noun *be'alim* is morphologically marked as plural but is semantically number-neutral. Depending on its referential content in a given utterance, agreement will display either singular or plural marking.

This kind of INDEX resolution is not what we find elsewhere. In fact, according to W&Z, the general rule is for morphology to win over semantics. Let us briefly review their evidence.

W&Z's examples are drawn from gender agreement with animate nouns. When these nouns are morphologically marked with a gender value that conflicts with the biological sex of their referent, it is the former, morphological gender that is targeted for agreement. For example, the Serbian/Croatian noun *devojka* 'girl' has a diminutive form, *devojče*, which belongs to a declension class with neuter gender. Not surprisingly, it triggers [CONCORD *neut*] agreement on determiners, but more interestingly, it also triggers [INDEX *neut*] agreement on verbs, overriding the biologically-based specification [SEX *fem*] (Wechsler & Zlatić 2003, p. 65).

(29) Ovo malo devojče je ušlo.
this.NT.SG little.NT.SG girl.NT.SG AUX.3SG entered.NT.SG
'This little girl came in.'

In this case the noun is intrinsically specified for SEX. The same pattern is found with nouns that are not. The French noun *sentinelle* 'sentry' usually refers to males but does not have to. Being morphologically feminine, it triggers [CONCORD *fem*] agreement but also [INDEX

fem] agreement (on verbs). This is just the mirror image (in the domain of gender) of the Hebrew noun *be'alim*, where morphological specification yields to contextually determined semantic information, a contrast that calls for explanation.

According to W&Z, morphology wins over semantics in the resolution of INDEX features for principled, architectural reasons. The default matching constraints are ordered in such a way that CONCORD-INDEX matching takes priority over INDEX-semantics matching, being more specific. The only chance for semantic information to fix the value of (initially unvalued) INDEX features is when CONCORD features are absent, making the CONCORD-INDEX matching constraint inapplicable. This typically happens in conjunctions, but it can also happen with lexical nouns that are morphologically gender-neutral. W&Z cite the Serbian/Croatian noun *sudija* 'judge' and the French noun *journaliste* 'journalist' as examples. These nouns carry no morphological gender information; as a result, their CONCORD gender value is matched by default with their INDEX gender value, which in turn is matched by default with their (biological) SEX gender value. Thus, both trigger uniform feminine or masculine agreement, in accordance with their reference. Once again, Hebrew *be'alim* is different in allowing semantics to determine agreement even in the presence of a valued CONCORD (number) feature.

There is, in fact, reason to believe that the ranking of CONCORD-INDEX matching above INDEX-semantics matching is too strong even outside Hebrew. Recall the Chichewa example (14a), repeated below. The noun *ngwazi* 'hero' shows the morphology of gender 9/10, but can trigger either CONCORD (9/10) or INDEX (1/2) agreement (gender 1/2 is the unmarked class of animates).

(30) ngwazi y-athu y-oyamba / ngwazi w-athu w-oyamba
hero 9-our 9-first / hero 1-our 1-first
'our first hero'

Thus, Chichewa makes the opposite choice of Serbian/Croatian in the realm of gender, suggesting that how the tension between CONCORD and semantics is resolved is open to parametric variation. Intuitively, gender resolution on Bantu hybrid nouns and number resolution on Hebrew hybrid nouns should fall under parallel analyses. The next section spells out this intuition.

Finally, it is worth noting that *radical* underspecification will not do, since it fails to produce the desired asymmetry between (26c)-(26d). Compare the English noun *data* in this respect, which is unspecified for number in standard English.[10] Crucially, both CONCORD and INDEX are unspecified, so both alternate between singular and plural;

[10] I thank Stephen Wechsler for this example.

however, due to the overarching default constraint that matches CONCORD and INDEX values, matching is imposed.

(31) a. This data is interesting.
b. These data are interesting.
c. * These data is interesting.
d. * This data are interesting.

English determiners agree in CONCORD, verbs agree in INDEX. Neither CONCORD nor INDEX are inherently specified for [number] on *data*, but once a value is fixed for one, it must be shared by the other, as per the default constraint. Precisely this constraint is overridden in the lexical entry (25). This explains the striking contrast between (18a)/(19a) (pattern (26c)) and (31c).

5. A NumP-based solution

We now face three puzzles. First, how can semantic matching override morphological matching in fixing the INDEX values of *be'alim*, contrary to what is found with gender agreement in Serbian/Croatian and French? Second, how is this property of Hebrew related to the other exceptionality of *be'alim*, namely, its ability to trigger INDEX (rather than CONCORD) agreement on attributive adjectives? A solution that will tie together these two exceptional properties is of course desirable. Lastly, we would also like to understand what makes Chichewa different from Serbian/Croatian and French in allowing semantics, and not just CONCORD, to fix INDEX gender agreement.

The conspicuous difference between Serbian/Croatian *deca* 'children', in (4), and Hebrew *be'alim*, in (25), is the fact that the former is lexically specified for its INDEX values (namely, [NT.PL]) but the latter is not. The challenge, therefore, is to make the option of DP-internal INDEX agreement causally linked to the nonspecification of the INDEX values. In what follows I will first outline a general theoretical framework for nominal agreement and then address this particular challenge, as well as the three puzzles above.

The analysis I propose is couched within configurational theories of DP structure in derivational syntax, but it crucially incorporates the descriptive ontology of CONCORD and INDEX features from HPSG. The basic intuition is quite simple. CONCORD and INDEX features are simultaneously represented in the extended projection of the noun, but they are normally hosted on different heads. The various patterns we observe – both in canonical and in non-canonical agreement – follow from the interaction of the distributional

combinatorics of CONCORD and INDEX features and locality restrictions on the operation Agree, the generator of feature sharing in this model.[11]

5.1 A configurational model of CONCORD and INDEX features in DP

Let us start with canonical, well-behaved agreement, restricting attention to the feature [number] at the moment. A plausible hypothesis as to the configurational mapping of CONCORD and INDEX features is the following.

(32) *Location of CONCORD and INDEX [number] within DP*
CONCORD number is specified on N; INDEX number is specified on Num.

The NumP projection, situated between NP and DP, has been motivated in a series of studies by Ritter (1991, 1992, 1995) and further corroborated by other researchers (see, among others, Bernstein 1991, 2001, Delfitto and Schroter 1991, Valois 1991, 2006, Koopman 1999, Heycock and Zamparelli 2005, Julien 2005, Munn and Schmitt 2005 and Pearce 2012), the evidence coming from word order effects, the licensing of genitive possessors and the existence of periphrastic plural marking (Dryer 1989). The basic idea is that nouns are normally not intrinsically specified for [number], which therefore counts as an inflectional (rather than a derivational) feature; as such, it is hosted on a functional projection of its own, much like verbal inflectional features are hosted on T, Asp etc.[12] Ritter has further shown that pronouns could realize either Num or D, specifically arguing for Hebrew that its 3rd person pronouns are Num heads.

This reasoning is harmonious with W&Z's original conception of INDEX features as the grammatical encoding of semantic concepts. The affinity in fact runs deeper, as W&Z analyze the morphological exponents of INDEX agreement on finite verbs as a diachronic derivative of pronoun incorporation, an idea that was put to full synchronic implementation in Ritter 1995.

On the other hand, the natural locus of CONCORD features is the nominal stem. These features register the morphological properties of the root and/or its derivational affixes, and so cannot be specified elsewhere. We may take the association of CONCORD features and the nominal stem to be an inviolable UG principle.

[11] I assume that agreement is implemented as feature sharing. For argumentation and formal models within a minimalist framework, see Frampton and Gutmann 2006, Pesetsky and Torrego 2007, Rooryck and Wyngaerd 2011 and Danon 2011.

[12] By implication, it is possible that NumP is missing in *pluralia tantum* nouns and [number] is lexically specified on N. Note that cardinal numerals do not occupy NumP but a distinct, higher projection, that we may label CardP. CardP must be higher than NumP because semantically cardinals are functions over plural individuals (Heycock and Zamparelli 2005). Some terminological confusion is caused by the fact that studies of Greenberg's Universal 20 routinely refer to the projection of cardinals as NumP (e.g., Cinque 2005, Steddy and Vieri 2011, Abels and Neeleman 2012). I keep to the original sense of NumP (that is, Ritter's sense). See also the discussion of Finnish and Lebanese Arabic data in section 5.4. _ENREF_1

Where do attributive adjectives attach in this extended projection? To the extent that the question has been raised, the common answer is - between NP and NumP (Ritter 1992, Valois 1991, 2006, Heycock and Zamparelli 2005, Cinque 2010:63). I will take this to be the norm (see the position of Adj_1 in (34)), capitalizing on its implications for the accessibility of CONCORD (N-hosted) and INDEX (Num-hosted) features to the ϕ-probe on the adjective. We will nevertheless propose that "high" attachment of adjectives - or rather, low projection of NumP - is also possible under restricted circumstances, giving rise to intricate patterns of adjectival agreement (see the next section).

Although not the focus here, person and gender features should also find their place within a complete theory of agreement in the nominal domain. There is good evidence that these features too are lodged on different heads. Languages differ in their coding of nominal gender, some treating it as a derivational affix and others as an inflectional one. Ritter (1993) proposed that gender is located on N in the former and on Num in the latter (below we will utilize this flexibility even within a single language). Note that Ritter did not distinguish CONCORD from INDEX gender features, but her discussion makes it clear that the relevant features govern verbal agreement, hence, they are INDEX features. Once again, we assume that CONCORD gender (like CONCORD number) is a morphological property, universally registered on N. As to [person], I follow Ritter 1995, Carstens 2000, Baker 2008 and Danon 2011 in assuming it is located on D (the category of personal pronouns). Note that [person] is unambiguously an INDEX feature.

This divergent distribution of ϕ-features within the DP, with potential crosslinguistic variation, raises a serious question for theories of the *external* agreement of the DP. How can ϕ-complete clausal agreement be established with a given DP if the various features are not found on the same head within it? Are there multiple Agree operations, each targeting a different nominal head? This option raises vexed questions of "defective intervention". Fortunately, the problem was addressed head-on in Danon 2011 and given an elegant solution (see Shlonsky 2012 for a similar proposal). Danon proposes, in line with phase-based conceptions of agreement, that the only nominal head that is accessible to agreement from the outside is the highest one, D. It follows that for D to mediate external agreement on all ϕ-features, it must somehow register them via prior DP-internal agreement relations, understood here as feature sharing. Thus, D carries its own, inherent (and interpretable) [person] value, as well as unvalued slots for [gender] and [number], the latter two being valued by their correspondents on Num and N.[13]

[13] A formally similar proposal, motivated by entirely different facts, has been put forward in Danon 2013. Danon discusses an agreement alternation involving QPs, attested in many languages, where agreement targets that are clausemate to the QP agree either with the Q head or with its NP (often partitive) complement.

This picture will be adopted here with one crucial extension: We will indicate for each feature (i) whether it is typed (i.e., INDEX or CONCORD), and (ii) if so, which type it is. By assumption, inherently valued features (on N, Num or D) are typed, according to the criteria discussed above. In fact, all the features on D should be typed, whether inherently valued or not; this will allow us to capture the selective sensitivity of various determiners to INDEX or CONCORD features (as shown in section 2.2). The emerging criterion, then, is that all nominal heads along the projection line of DP carry typed ϕ-features. What remains is modifiers outside the projection line, such as attributive adjectives; these carry unary, untyped and unvalued ϕ-slots.[14]

Putting together these assumptions, we obtain the following distribution of features (I ignore case features throughout; parentheses indicate that the location of the feature alternates across languages or lexical items).

---

i. xelek me-ha-tošav-im hitnaged/hitnagdu la-toxnit. *Hebrew*
part.M.SG of-the-resident-M.PL opposed.3.M.SG/3.PL to.the-plan.
'Part of the residents opposed the plan.'

ii. Each of us think(s) that we can win the nomination. (Rullman 2010)

Danon analyzed what looks like (non-local) agreement between T (or v) and the NP complement of Q in (i) as standard local agreement with Q. The latter is endowed, on top of its inherent CONCORD number feature (singular in (i)), with an unvalued INDEX number feature, which is valued by the INDEX number feature of the head noun (plural in (i)). On the present analysis, this dependency would be broken into a two-step agreement chain: D-Num and Q-D. Note that (ii), on the bound variable reading of *we*, introduces an additional puzzle: The verb may show [3Sg] agreement while the bound pronoun shows [1Pl] agreement (possibly via feature transmission; see Postal and Collins 2012:169-174 for a syntactic account, contrasting with Rullman's semantic account).

[14] There may be a deeper reason why adjectives cannot bear typed INDEX features. If we assume that typing implies exhaustivity, a category with INDEX features should specify gender, number and person. But adjectives universally lack the person feature, possibly for principled reasons (Baker 2008, 2011), hence would not be typed with INDEX features. Valuation, of course, does not require exhaustivity, hence adjectives as agreement targets can be (and often are) less specified than their controllers.

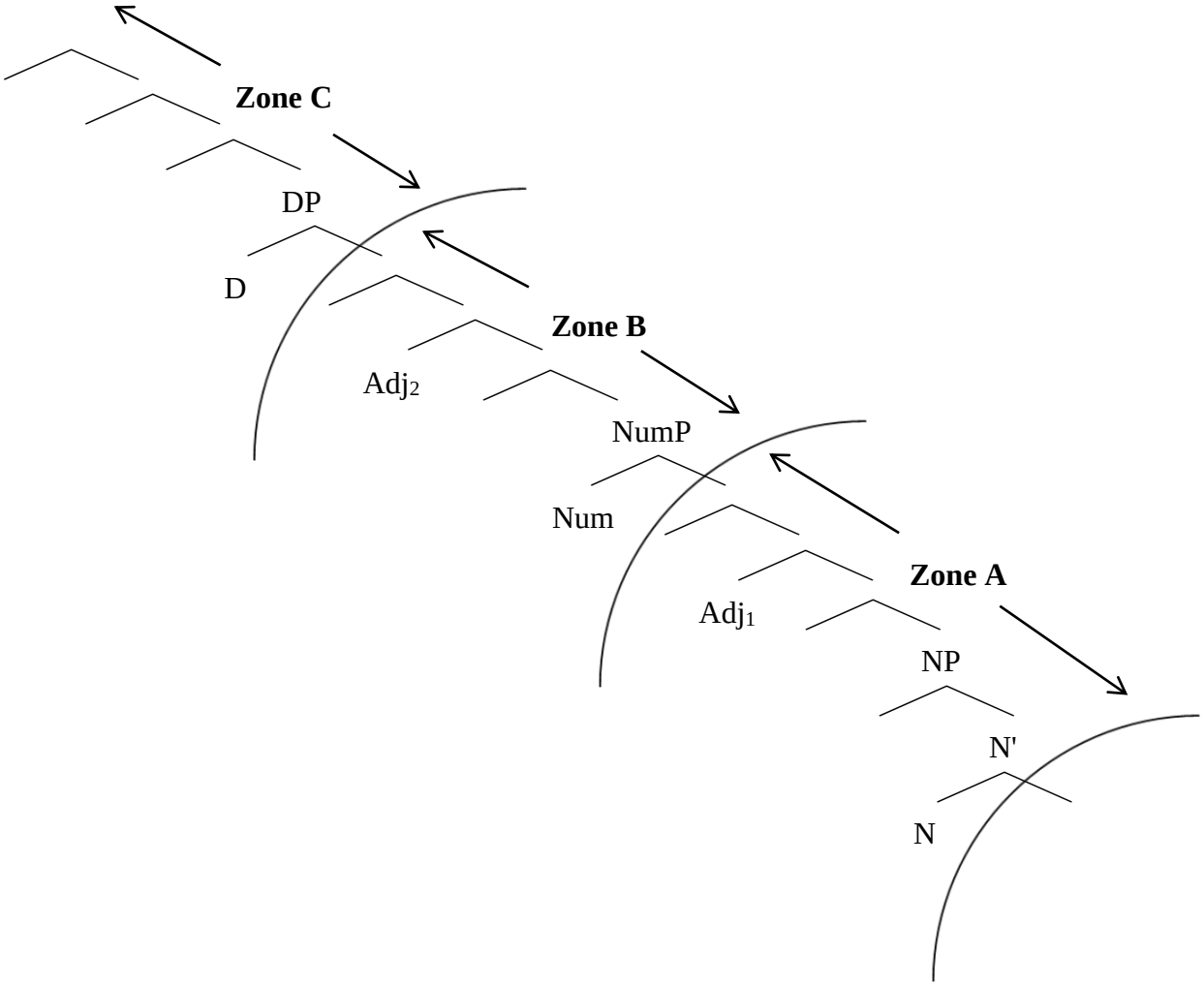
(33) *The distribution of ϕ-features within DP*

N	**Adj**
[CONCORD	GENDER *val*] [CONCORD	NUMBER *val*] ([INDEX	GENDER *val*])	[GENDER ___] [NUMBER ___]
Num	**D**
[INDEX	NUMBER *val*] ([INDEX | GENDER *val*])	[INDEX	PERSON *val*] [INDEX	NUMBER ___] [INDEX	GENDER ___] [CONCORD	NUMBER ___] [CONCORD	GENDER ___]

Consider now the schematic structure of DP, incorporating the results of the previous studies mentioned above.[15] Combined with the feature distribution in (33), this structure delineates three agreement zones.

[15] The structure in (34) is neutral on the phrase-structural status of attributive adjectives – adjuncts or specifiers. For similar proposals that break up the nominal space into two agreement zones, see Ouwayda 2013, 2014 (on [number]) and Pesetsky 2014 (on [gender]). I discuss their data and analyes in sections 5.4 and 6.1.

(34) *Agreement zones inside and outside DP*



The normal attachment site for attributive adjectives falls within Zone A (= Adj_1) in (34). Assuming a strictly bottom-up, feature-driven derivation, once the adjective is merged it probes for a ϕ-source to value its features. At this stage, *before Num is merged*, the only such source is the head noun. Given that N carries only CONCORD features, we straightforwardly derive the strong universal tendency of attributive adjectives to manifest syntactic agreement (Corbett 2006) or, in Wechsler and Zlatić's (2003) terms, CONCORD agreement.

After Num has been merged and before D has, adjectives could potentially be merged in Zone B. This is a marked option which indeed gives rise to alternating agreement patterns; we presently return to it.

Zone C is introduced, and bounded from below, by D. This is where DP-external agreement takes place. On the phase-based view adopted here, D is the exclusive "contact point"

between external probes (like v and T) and any nominal ϕ-feature. As discussed above (and extensively documented in Wechsler and Zlatić 2003), this type of agreement targets INDEX features, perhaps universally so. The question is why.

Two possible answers suggest themselves: A locality-based answer and a type-based one. A locality-based solution would split D into two distinct projections: A low $D_{CONCORD}$ and a high D_{INDEX}. Only the latter would count as the phase-head, making the INDEX features of D, but not its CONCORD features, accessible to the outside. However, it is not clear that the specific hierarchical relation between the two D projections can be justified by anything other than stipulation.

A type-based solution would link the INDEX nature of DP-external agreement to the nature of the probes themselves – T and v. On this view, these inflectional heads are specified for INDEX features only, and thus can only target the INDEX features of D. CONCORD agreement between T/v and DP would simply not arise as the former lack CONCORD features. This solution is independently supported by the fact that verbal inflection (reflecting subject or object agreement) encodes [person] distinctions, an exclusively INDEX feature. It also meshes well with Wechsler and Zlatić's contention that verbal agreement is historically derived from pronoun incorporation and for that reason it is keyed to INDEX features.[16]

This analysis covers the canonical patterns of DP-external and DP-internal agreement and derives them in principled manner. Before we turn to non-canonical patterns, a question arises concerning the various determiner systems surveyed in section 2.2. Recall that following King and Dalrymple 2004, we characterized the differences among them in terms of the agreement properties of the D heads – whether they are sensitive to INDEX features, CONCORD features, or both; thus, for example, English *this* is specified [CONCORD|NUMBER *sg*] while Brazilian Portuguese *o* is specified [INDEX|NUMBER *sg*] (see (5)-(6)). The present analysis suggests a revision in this characterization. The category D is universally specified *both* for CONCORD and for INDEX features, as per (33), and agrees DP-internally through both routes in parallel. Vocabulary insertion of specific determiners is governed by the familiar Subset Principle. The observed crosslinguistic variation, then, should be captured not in terms of selective *agreement* choices of different determiners but rather in terms of their featural makeup. To illustrate, consider the following example.

(35) a. [$_{DP}$ This [$_{NP}$ cat and dog]] are good friends.

[16] An interesting question concerns agreement on predicative adjectives and participles, categories unspecified for [person]. If these elements agree directly with the subject nominal, they are expected to be able to target CONCORD features. If, however, they first form an agreement relation with the auxiliary verb, they will be forced to enter INDEX agreement. Variation is expected and indeed may be real (see Wechsler and Zlatić 2003:53-56 and "The Predicate Hierarchy" in Corbett 2006:230-233).

b. Partial feature structure of D after agreement:

$$\begin{bmatrix} \text{CONCORD}\,|\,\text{NUMBER} & sg \\ \text{INDEX}\,|\,\text{NUMBER} & pl \end{bmatrix}$$

An NP-conjunction has a CONCORD|NUMBER value if the values of its daughters match (see the discussion in section 2.2). In this example, both conjuncts are singular and hence the conjunction is too. Upon agreement (or feature sharing), the D node comes to have this value. In contrast, the INDEX|NUMBER value of an NP-conjunction is compositional, hence plural for *[cat and dog]*. Upon agreement, D comes to have this value too. The demonstrative D node, then, is a "hybrid" head, not unlike Serbian/Croatian *deca* 'children', albeit less arcane. Vocabulary insertion applies, selecting *this*, which is specified [CONCORD|NUMBER *sg*], as the maximally specific item available for insertion in this context. The hybrid nature of *this* in sentence (35a) is revealed by the coexistence of its singular morphology and the plural agreement it triggers on the verb.[17] On the opposite side we find Russian *èti* 'these', which is specified [INDEX|NUMBER *pl*]. Presumably it too carries a [CONCORD|NUMBER] feature, which is valued by its complement NP, although in this case it is less clear whether this feature can be independently detected.

5.2 Zone B: Agreement with Num

Having seen how the model of feature distribution in (33)-(34) handles the canonical patterns of DP-internal and DP-external agreement, we can finally return to the outstanding Hebrew noun *be'alim*, the empirical focus of this study, and consider how its peculiar behavior fits within the general model. As often happens with "exceptions" that stretch the limits of formal models, this one will turn out to teach us a great deal about architecture of the model.

In section 4.2 we presented and motivated an analysis of the agreement pattern of *be'alim* (see (26)) that crucially allows attributive adjectives to enter INDEX number agreement with this noun; see (27a) and (27b-i). This kind of agreement is not available for adjectives merged in their canonical site, Zone A in (34), for principled reasons: The locus of the valued INDEX number feature in the DP is the Num head, which is not part of the structure when the adjective is merged. For this reason, attributive adjectives must share their features with the head noun, which is only specified for CONCORD number.

[17] This analysis is parallel to the hybrid analysis of another class of D-heads - relative pronouns - developed by Wechsler and Zlatić (2003:56-59). The Serbian/Croatian relative pronoun *koja* 'who (NOM)', for example, spells out inherent CONCORD features but simultaneously mediates INDEX agreement between the head noun and the predicate in the relative clause.

By the same logic, however, if an adjective were able to attach in Zone B, *above* the Num head, nothing would prevent it from agreeing with Num on INDEX number.[18] In fact, the implication is stronger: Given locality, the adjective would *not* be able to access the features of N, Num acting as an intervener. Hence, an adjective in Zone B (Adj_2 in (34)) can only manifest INDEX agreement. I argue that this, in a nutshell, is the source of INDEX agreement of attributive adjectives with *be'alim*. The exceptionality of *be'alim* consists in its occurrence *either* with Zone A adjectives, producing canonical CONCORD agreement, as in (27b-ii)/(27c), *or* with Zone B adjectives, producing non-canonical INDEX agreement, as in (27a)/(27b-i).[19]

Note that throughout we focus on initial Merge positions and abstract away from DP-internal movements. It is reasonable to assume, for example, that Hebrew nominals involve internal "roll-up" movements, triggered by the need to value the [D] features on attributive adjectives. This yields the observed N-initial order, which is the "mirror image" of English (Shlonsky 2004, 2006, 2012, Cinque 2005, 2010). These movements, however, do not offer new opportunities for agreement with respect to the patterns of present concern. Within Zone A, adjectives may only agree with N (in CONCORD), whether or not it has been rolled-up below them. Within Zone B, adjectives may attach immediately above NumP and establish INDEX agreement with Num prior to any further roll-up movements.[20]

What allows *be'alim* to exhibit the latter option, unlike standard nouns? Recall that even hybrid nouns like Serbian/Croatian *deca* 'children' only make their CONCORD features available to attributive agreement, as in (3a), repated below.

(36) Postmatrali smo ovu dobru decu$_i$.
watched.1PL AUX this.**F.SG** good.**F.SG** children.ACC
'We watched these good children.'

The reason must be somehow related to the lexical entry of *be'alim*, (25). Its distinctive character lies in the total independence of the INDEX number from the CONCORD number.

[18] Attributive adjectives cannot attach above D, presumably for reasons of semantic type (Adj takes NP-meanings as arguments), hence Zone C is off limits for them.

[19] The complexity added to standard feature systems by the CONCORD-INDEX distinction raises technical questions for the notion of feature matching (Danon 2013). In what sense are the typed features [CONCORD|NUMBER] and [INDEX|NUMBER] and the untyped feature [number] (on adjectives) "the same thing"? Some equivalence is needed to guarantee, for example, that a single morpheme may spell out either one of the first two and that both may agree with the third. One possibility is to make [number] (and by extension, [gender] and [person]) the superfeature and CONCORD and INDEX its subfeatures. Another possibility (suggested by Danon) is to allow complex values, e.g., [CONCORD [NUMBER SG]].

[20] It is conceivable that the entire Zone A would be rolled-up and sandwiched between NumP and adjectives in Zone B. Whether or not the resulting configuration would bleed INDEX agreement on the latter is unclear, since the deeply embedded N would not c-command Num and so might not count as closer to the probing adjectives. This derivation can be excluded in principle if Num is a "freezing head" in the sense of Shlonsky (2004), similarly to cardinal numerals in Hebrew. In Shlonsky (2012) this property reduces to the absence of the movement-trigger, an unvalued [D] feature, from Num.

This property sets it apart from standard nouns, in which the default CONCORD-INDEX matching constraint applies, as well as from exceptional nouns of the *deca*-type, where the INDEX number is fixed. The latter two dependencies can be stated as kinds of *selection*.

(37) *Selection and location of NumP*

a. [INDEX *val*] is selected iff *val* is uniquely determined.

b. NumP is rigidly located iff [INDEX *val*] is selected.

Standard nouns (e.g., *dog*/*dogs*) manifest consistent matching between their INDEX and number features. Once CONCORD number is set as singular (upon choosing *dog*), INDEX number is similarly set, and the same is true for plural. In this sense, the INDEX number feature is uniquely determined by the choice of the noun (and its CONCORD features), hence it is selected. Selection can also work in the opposite manner, imposing *non*-identity between CONCORD and INDEX, as in *deca* 'children'. Here too, once the noun is chosen, there is no freedom in the value of the INDEX feature. By contrast, a noun like Hebrew *be'alim* comes with no pre-set INDEX number value; its INDEX number is unselected.

The claim in (37b) is that this difference in selection is the key to the rigidity or freedom in where the NumP projection is permitted to appear within the DP. Under selection, the Num head, which *bears* the selected feature [INDEX|NUMBER], can only appear in its designated position; by assumption, this position is above the canonical position of attributive adjectives in Zone A. In the absence of selection, NumP is free to project anywhere between NP and DP. In particular, it may project immediately above NP, effectively eliminating Zone A. If NumP projects immediately above NP, the only available space for attributive adjectives is in Zone B, above NumP. The result is INDEX agreement, as observed with *be'alim*. Alternatively, NumP (being unselected) can project higher up, above the adjectives, which will then manifest canonical CONCORD agreement. In this way we capture the causal relation between the indeterminacy of the INDEX number value on *be'alim* and the indeterminacy of the location of NumP, which is the source of the alternation between CONCORD and INDEX agreement of attributive adjectives with this noun.

(38) *The structural basis of the two agreement patterns of* be'alim

a. $[_{DP}\ D \ldots [_{NumP}\ Num_{[INDEX]} \ldots [\ Adj \ldots [_{NP}\ N_{[CONCORD]}\ ]]]]$

CONCORD agreement ←

b. $[_{DP}\ D \ldots [\ Adj \ldots [_{NumP}\ Num_{[INDEX]}\ [_{NP}\ N_{[CONCORD]}\ ]]]]$

→ **INDEX agreement**

It is important to note that the agreement alternation is ultimately rooted in the freedom of projection granted to NumP and *not* to attributive adjectives. These always project in the

space between NP and DP according to their universal hierarchy. What floats around - under the restricted conditions of (37) - is only the position of Num, normally an unpronounced head, creating the illusion that it is the adjectives that shift between “low” and “high” positions. This point should be kept in mind even when one resorts to informal talk about adjectives that “may” attach in Zone A or Zone B.

5.3 Gender agreement

The hypothesis in (37), connecting the inherent featural makeup of a noun to its configurational projection, provides us with the appropriate machinery to express not only number but also gender agreement. A number of different realizations of gender features on nouns were mentioned above, and they are summarized in (39).

(39) *Crosslinguistic patterns of gender realization*

a. Standard gendered inanimate nouns. Concord gender is inherent and index gender matches it (e.g., French *chaise* 'chair(F)').

b. Standard animate nouns. Concord gender and index gender are both inherent and they match (e.g., Italian *ragazza* 'girl(F)').

c. Nonstandard animate nouns. Concord gender is inherent and index gender matches it and not the SEX value (e.g., Serbian/Croatian *devojka* 'girl(N)').

d. Standard sex-neutral gendered animate nouns. Concord gender is inherent and index gender matches it and not the SEX value (e.g., French *sentinelle* 'sentry(F)').

e. Sex-neutral non-gendered animate nouns. Index gender is locked to the SEX value and concord gender matches it (e.g., Serbian/Croatian *sudija* 'judge', French *journaliste* 'journalist').

f. Non-standard sex-neutral gendered animate nouns. Concord gender is inherent and index gender is free (e.g., Chichewa *ngwazi* 'hero', Russian *vrač* ‘doctor’ for a minority of speakers).

g. Lexical hybrids. Concord gender and index gender are both inherent and they do not match (e.g., Serbian/Croatian *deca* 'children').

It was Ritter (1993) who proposed that languages differ in where they situate the gender feature within the extended DP projection. Specifically for the languages she analyzed, Ritter argued that gender in Hebrew is a feature of the nominal stem while gender in Romance is a "free-rider" on the Num head. Once again, Ritter used predicate agreement as a probe, which means that the said variation is restricted to INDEX gender; CONCORD gender features, like all CONCORD features, are universally located on N. This feature

distribution is already represented in table (33), although we are not committed to the claim that the choice between the hosts N and Num is a language parameter; it may vary language-internally as well. Recently, Kramer (2014) argued that in Amharic, even interpretable (namely, INDEX) gender is located below Num, specifically on the categorizing *n* head that combines with the root.

To handle the default matching patterns, I propose the following redundancy principle.

(40) *Location of INDEX gender* (default)
[INDEX|GENDER] is shared with [CONCORD|GENDER] iff both are specified on N.

Recall that unlike [INDEX|NUMBER], which is invariantly located on Num, [INDEX|GENDER] wanders between N and Num. (40) is an hypothesis as to how this choice is regulated. Intuitively, CONCORD-INDEX sharing is a rigidly lexical property that can only be imposed on a single head. Importantly, it cannot be accomplished by agreement, since concord and index features are type-distinct. They only come to be shared by default matching constraints, as elaborated in Wechsler and Zlatić 2003. Differently from Wechsler and Zlatić, however, I assume that deviations from the default are not only lexically specified but must also be syntactically sanctioned, by a different configuration. This will give us some insight into the exceptional agreement patterns.[21]

Consider first the matching patterns (39a-e). In all of these cases, [CONCORD|GENDER] and [INDEX|GENDER] are shared, hence located on N. The result is that attributive adjectives will indiscriminately agree with the same shared gender value. Pattern (39e) gives rise to either masculine or feminine agreement, depending on the SEX value of the referent. Importantly, this is *not* semantic agreement, since there is no opposition to syntactic agreement: All agreement targets match. To illustrate, consider the noun *čita* 'chita' in Hebrew, a loanword that is superficially feminine in form (owing to the final *-a*).

(41) a. ha- čita ha-ra'ev xipes/*xipsa teref.
the-chita the-hungry.**M** looked.for.**M**/***F** prey
'The hungry male chita was looking for prey'

b. ha- čita ha-re'eva xipsa/*xipes teref.
the-chita the-hungry.**F** looked.for.**F**/***M** prey
'The hungry female chita was looking for prey'

Although feminine by form, the [CONCORD|GENDER] value of *čita* is determined by the semantics, as evidenced in the masculine agreement on the attributive modifier in (41a). Thus, the noun displays what Wechsler & Zlatić call "Morphology-Concord mismatch".

[21] See Steriopolo and Wiltschko 2010 for a related proposal that distributes gender features over three distinct heads in the nominal projection.

Crucially, semantic agreement on the verb that conflicts with syntactic agreement on a modifier is impossible, as shown in (41b).

The interesting cases are (39f-g), which involve a CONCORD-INDEX mismatch. (39f) is the gender analogue to (38). Recall the dual behavior of the Chichewa noun *ngwazi* 'hero', whose morphological (=CONCORD) gender class is 9/10 but which may nonetheless trigger "semantic" (=INDEX) 1/2 agreement, the gender class of animates.

(42) ngwazi y-athu y-oyamba / ngwazi w-athu w-oyamba
hero 9-our 9-first / hero 1-our 1-first
'our first hero'

Let us assume, following Carstens 2008, that Bantu noun class prefixes are gender-specific number markers (an analysis motivated by the distinct forms these prefixes take in the singular and the plural). Then they are simply Num heads under which [INDEX|NUMBER] and [INDEX|GENDER] are jointly spelled out. The peculiar property of *ngwazi*-type nouns is that their [INDEX|GENDER] is independent of their [CONCORD|GENDER]. If [INDEX|GENDER] tracks the notional class of animates, it will be distinct from the [CONCORD|GENDER] value, hence located on Num.[22] Given that it is unselected, (37) permits NumP to be projected anywhere, and in particular immediately above NP, as in (38b). This gives rise to index (= 1) agreement on the attributive adjectives. Alternatively, NumP could be projected above the adjectives, which will then agree with [CONCORD|GENDER] on N, giving rise to 9-agreement. Notice that this analysis makes Hebrew *be'alim* and Chichewa *ngwazi* entirely parallel despite their superficial unrelatedness.

The final type of exception is (39g), the case of truly lexical hybrids. The example of Serbian/Croatian *deca* was already discussed above in comparison to *be'alim*. The relevant point was that its index features are rigidly selected (as [N.PL]). For this reason, NumP cannot "wander" within the DP and must project above the attributive adjectives; this produces uniform DP-internal concord agreement, both in number and in gender.

We thus see that the configurational rendering of the CONCORD-INDEX distinction can successfully represent a rather intricate array of possibilities for DP-internal agreement, both in number and in gender, using the very same theoretical concepts for both domains. Notice that the system does not and indeed is not intended to predict *which* lexical items will fall under *which* pattern; this much is left for lexical idiosyncrasies, in any theory of agreement. What is nevertheless intriguing is the finding that "irregular" patterns are

[22] Is [INDEX|GENDER] always hosted on Num, even when it matches [CONCORD|GENDER]? This contradicts (40) but may conform with Bantu-specific morphosyntax. These typological issues merit detailed investigation and must be left open for now.

explicable in terms of the same theoretical principles that explain the regular patterns, so that even in this seemingly peripheral outskirts of the grammar, chaos has no real hold.

At the same time, the system is not merely descriptive; built-in constraints rule out certain patterns in principle. Some predicted "negative" universals are listed below.

(43) *Agreement patterns predicted not to exist*

a. CONCORD agreement with verbs.
[Reason: Verbal agreement is derived from pronoun incorporation and pronouns bear exclusively INDEX features].

b. An INDEX feature (number or gender) is inherent and its CONCORD counterpart is free.
[Reason: CONCORD features are either inherent or not. If not, they are inherited from the INDEX features, and if those are inherent, the former cannot be free].

c. [INDEX | NUMBER] and [CONCORD | NUMBER] are distinct and inherent, attributive adjectives may show INDEX number agreement.
[Reason: Since [INDEX | NUMBER] is inherent, it is selected, so by (37) NumP must be projected rigidly, above the adjectives, which consequently may only show CONCORD number agreement].

d. Number and gender are hybrid, attributive adjectives show INDEX agreement for one and CONCORD agreement for the other.
[Reason: The INDEX features would be located on Num, the CONCORD features on N. INDEX agreement on the adjective implies attachment in Zone B, which precludes – by locality – any CONCORD agreement].

e. Stacking in which the lower attributive adjective shows INDEX agreement and the higher one shows CONCORD agreement.
[Reason: See the next section]

The next section turns to stacking configurations, which provide interesting support for the structural model in (34).[23]

[23] The model in (34) is clearly close in spirit to a very traditional dichotomy in grammatical analysis - between NP-internal and NP-external agreement (the former even labelled differently as "concord"). It is, however, refined in the present analysis by the tripartite, rather than binary division of the clausal space. Corbett (2006:228) explicitly argues against such divisions. The argument is based on the tendency of relative pronouns to show greater "semantic" agreement than attributive adjectives, which are like them NP-internal, and even greater than predicates, which are NP-external (the so-called "Agreement Hierarchy"). The force of this argument, however, rests on the vagueness of the category "NP", which, for us, is really an extended projection. Note that relative clauses are adjoined to the maximal projection of the "traditional" NP, which is

5.4 Further evidence: Mixed adjectival agreement

The present analysis covers much the same empirical ground as Wechsler and Zlatić 2003. One significant advantage it has over that work is the principled account for the behavior of Hebrew *be'alim* and Chichewa *ngwazi*, both of which illustrate that CONCORD agreement may sometimes yield to INDEX agreement even within DP, in contradiction to Wechsler and Zlatić's theory. Nevertheless, one might suppose that the problem is not so grave and that some local amendment in that theory will be sufficient. In this section I discuss more complex cases, in which two attributive adjectives manifest *different* types of agreement. Interestingly, the pattern is systematically asymmetric, precisely in the way our configurational analysis predicts it to be. No comparable prediction is derivable from Wechsler and Zlatić's theory.

The claim that the two agreement patterns of hybrid nouns arise from two different attachment sites for attributive adjectives (Zone A or Zone B) naturally leads to the question: Can Zone A and Zone B *simultaneously* host different adjectives? If they can, we expect agreement mismatches internally to the DP.

(44) *Mixed adjectival agreement*

$$[_{DP}\ D\ [\ Adj_{[INDEX]}\ [_{NumP}\ Num_{[INDEX]}\ [\ Adj_{[CONCORD]}\ [_{NP}\ N_{[CONCORD]}\ ]]]]]$$

The predicted mismatch is crucially asymmetric. The higher attributive adjective will display INDEX agreement, the lower one CONCORD agreement. The opposite linking is impossible because (i) the CONCORD agreement controller (=N) is lower than the INDEX agreement controller (=Num), (ii) Agree applies as soon as it can, and (iii) Agree respects locality. Given that the INDEX-CONCORD distinction closely tracks the form-meaning distinction, we derive a particularly strong form of Corbett's "Distance Principle" (see Corbett 1983:71, 1991:239, 2006:235): If parallel (and in particular, stacked) targets show different agreements, then the further target will show semantic agreement. We now present five test cases in support of this theoretical result.

The first case is an extension of the Chichewa data in (42). Recall that the CONCORD gender class of *ngwazi* 'hero' is 9 and its INDEX gender class is 1. As shown above, stacked attributive adjectives may manifest either uniform CONCORD agreement or uniform INDEX agreement. However, Corbett (1991:239) also notes (crediting S. Mchombo) that an option

surely high enough to contain NumP (and any projection up to DP). Thus, relative pronouns are predicted to manifest INDEX (= semantically grounded) agreement in the general case - *unlike* attributive adjectives. Furthermore, unlike nonverbal predicates which are unspecified for [person], relative pronouns are specified for this feature (even if invisibly), owing to their pronominal origin. Thus, in principle the former can but the latter cannot avail themselves of CONCORD agreement. These consideration then make Corbett's Agreement Hierarchy fully consistent with a rigid, domain-sensitive theory of agreement.

of mixed agreement exists: The inner adjective may show 9-agreement and the outer one 1-agreement. The reverse is impossible.

(45) a. ngwazi y-athu w-oyamba
hero **9**-our **1**-first

b. * ngwazi w-athu y-oyamba
hero **1**-our **9**-first
'our first hero'

I will assume that as in many other N-initial languages, the left-to-right order of adjectives in Chichewa nominals reflects low-to-high hierarchical projection. This means that the outer adjective is higher than the inner one (subsequent movements inside the DP – head or phrasal movements – produce the observed word order). The contrast in (45), then, can be readily derived from structure (44): The inner adjective attaches below Num, the outer one above it; as a result, the former agrees in CONCORD with N, the latter agrees in INDEX with Num.

The second case involves our key example, the Hebrew noun *be'alim* 'owner(s)'. Mixed agreement with this noun is indeed rare. The example in (46a), however, appeared in the Wikipedia entry of *L'Origine du monde*, Gustav Courbet's famous painting.

(46) a. ha-be'alim ha-pratiyim ha-axaron šel ha-tmuna haya
the-owner the-private.**PL** the-last.**SG** of the-painting was.3SG
ha-psixo'analitika'i Jacques Lacan.
the-psychoanalyst Jacques Lacan

b. * ha-be'alim ha-prati ha-axron-im šel ha-tmuna haya/hayu
the-owner the-private.**SG** the-last-**PL** of the-painting was.3.SG/P
ha-psixo'analitika'i Jacques Lacan.
the-psychoanalyst Jacques Lacan
'The last private owner of the painting was the psychoanalyst Jacques Lacan'

The subject nominal refers to a single individual; therefore, the singular morphology of the outer adjective in (46a) is INDEX agreement in Zone B, which cooccurs with CONCORD plural agreement on the inner adjective in Zone A. The reverse is impossible (46b): Plural CONCORD agreement cannot traverse singular INDEX agreement because the latter applies outside the domain of the former. Note that (46b) is excluded solely because of the mixed agreement inside the subject nominal, regardless of whether the finite verb is singular or plural.

The third case comes from number agreement in Finnish. Brattico (2010, 2011) discusses the effect of numerals on case concord and agreement inside DPs in Finnish (and to some

extent, in Slavic languages). The basic observation is that the numeral splits up the DP into two domains: Above it, elements show "semantic" agreement in number and the structural case assigned from the outside (NOM or ACC); below it, elements show singular agreement and partitive case. Since an attributive adjective may attach in either domain, it may show either pattern.

(47) a. ne kaksi pilaantunut-ta leipä-ä.
those.PL two.SG rotten-**SG**.PRT bread-SG

b. ne pilaantune-et kaksi leipä-ä.
those.PL rotten-**PL**.ACC two.SG bread-SG
'Those two rotten breads.'

That the domain above the numeral registers semantic number is further corroborated in the following examples; note that both the determiner and the adjective reflect the numerosity of the NP.

(48) a. ne pitkästyttävä-t kolme minutti-a
those.PL boring.**PL** three.SG minute.SG.PRT
'those boring three minutes'

b. se pitkästyttävä puoli minutti-a
that.SG boring.**SG** half.SG minute.SG.PRT
'that boring half a minute'

The two options in (47a) and (47b) can be combined. Crucially, the higher adjective must bear the plural marking and the lower one must be singular; the opposite marking is impossible (P. Brattico, p.c.).

(49) a. Minä odotin [$_{DP}$ ne pitkästyttävä-t kolme loputon-ta minutti-a].
I waited those.ACC boring-**PL**.ACC three endless.**SG**.PRT minute.SG.PRT

b. * Minä odotin [$_{DP}$ ne pitkästyttävä-n kolme loputtom-ia minutti-a].
I waited those.PL.ACC boring-**SG**.ACC three endless.**PL**.PRT minute.SG.PRT
'I waited those boring endless three minutes.'

In the present terms, this asymmetric pattern directly confirms the two-zone analysis of the DP structure in (34). The low adjective position, in Zone A, agrees with the head noun, hence it shows CONCORD (morphological, non-semantic) agreement. The high adjective position, in Zone B, agrees with Num, hence it shows INDEX (semantic) agreement. One point of concern is the identity of Num. For Brattico, this head is the merge position of numerals, whereas for us it is the merge position of the [INDEX|NUMBER] feature. This terminological conflation can be resolved by designating the projection of cardinal numerals CardP and assigning the plural operator to NumP (or PlP, as in Heycock &

Zamparelli 2005). Natural considerations of semantic composition dictate that the former project above the latter. Hence the high adjectives in (47b), (48) and (49a) project both above CardP and above NumP. In that position, they may only access INDEX features.[24]

The fourth case involves number agreement in the context of numerals greater than 10 ('transdecimal') inside DPs in Lebanese Arabic (Ouwayda 2013, 2014). The head noun following such numerals is singular, and DP-external agreement is either singular or plural, but never mixed (see the next section). Attributive adjectives, however, may exhibit mixed agreement in one direction only: The adjective closer to the noun bears singular and the further one bears plural (Ouwayda 2014:121).

(50) a. tleetin telmiiz mnazzam kesliim-iin
thirty student.**SG** organized.**SG** lazy.**PL**

b. * tleetin telmiiz mnazzam-iin kesliim
thirty student.**SG** organized.**PL** lazy.**SG**
'Thirty lazy organized students'

The two-zone analysis fits here as well. The singular adjective is merged in Zone A and agrees in CONCORD number with the head noun, while the plural adjective is merged in Zone B and agrees in INDEX number with NumP. Ouwayda, in fact, proposes a similar analysis, in which the number projection, which she labels #P, hosts the transdecimal numeral as well, so that the high adjective merges even above the numeral, similarly to the Finnish example (49a). Presumably, the surface word order results from a roll-up DP-internal movement, as in Hebrew. Note that the CONCORD-INDEX distinction is well-suited for the Lebanese Arabic facts. The head noun is morphologically singular, motivating [CONCORD|NUMBER *sg*], and as Ouwayda shows, the # head is a semantic pluralizer, motivating [INDEX|NUMBER *pl*].

As noted above (fn. 12), numerals occurring below adjectives do not occupy the canonical CardP (or QP) projection. Ouwayda shows convincingly that numerals may enter the nominal projection in two guises: either as modifiers or as existential quantifiers. The first type merges in #P (our Zone B) and the second one in QP (Zone C) (see Ouwayda 2014:192); she further argues that the numerals uniformly denote numbers and their different semantic contributions in the two positions arise from the functions that combine with them. What is important for our purposes is that attributive adjectives may only

[24] The singular morphology of the numeral itself is not the outcome of agreement but an inherent, interpretable number feature; when plural, it produces a "layered" plurality:

i. ne kolme auto-a / ne kolme-t auto-t
those three.SG car.SG.PART / those three.PL.NOM/ACC car.PL.NOM/ACC
'those three cars' / 'those aggregates of three cars'

register such semantic aspects in the higher Zone B and not in the lower Zone A, which is the domain of CONCORD agreement.

The fifth and final case involves gender agreement with the hybrid Russian nouns of declension class I, like *vrač* 'doctor', which, as shown above in (13), allow INDEX agreement on attributive adjectives for a minority of speakers. Summarizing the results of a number of Slavic scholars, Pesetsky (2014:38) points out that mixed agreement displays a clear a symmetry: The inner adjective must be masculine (= CONCORD gender) and the outer one feminine (= INDEX agreement) (when the NP refers to a female doctor). Although marginal, this pattern is sharply distinguished from the reverse one, which is ungrammatical.

(51) a. ? U menja očen' interesn-aja nov-yj vrač.
by me very interesting-**F**.NOM.SG new.**M**.NOM.SG doctor.NOM.SG
b. * U menja očen' interesn-yj nov-aja vrač.
by me very interesting-**M**.NOM.SG new.**F**.NOM.SG doctor.NOM.SG
'I have a very interesting new (female) doctor.'

Recall that *vrač* is masculine by form; feminine agreement with this noun is semantically grounded, implying a female doctor. Predictably, it is the higher (further) attributive adjective that accesses the INDEX gender feature (F) and the lower (closer) one that accesses the CONCORD gender feature (M). This is made possible by interjecting Num between the attachment sites of the two adjectives. Once again, the adjective above Num will be blocked from accessing the CONCORD features of the head noun. The *absolute* nature of this asymmetry bears some theoretical significance, to which we return in section 6.2.[25]

Let me summarize the main point of this section. Five test cases, from genetically unrelated languages, involving different types of features, converge on the same pattern: When stacked attributive adjectives show mixed agreement, the lower one shows CONCORD agreement and the higher one shows INDEX agreement. This non-random distribution follows directly from the configurational model proposed above, which embodies the claim that INDEX features are represented higher in the nominal spine than CONCORD features.

We now turn to consider some broader theoretical implications of this model. In particular, we will discuss related paradigms of mixed DP-internal and DP-external agreement, the accounts they were offered, and the challenges that the present analysis pose to them.

[25] Note that if the analysis of determiners in section 5.1 is correct, cases of mixed D-Adj agreement (e.g., (11)) do *not* fall together with the present Adj-Adj cases (contra Corbett). This is because determiners, on the present view, always agree both in CONCORD and INDEX (their features are typed, unlike those of adjectives; see (33)), and merely *spell out* one of these feature sets. In principle, a CONCORD-specified D may attach outside a Zone B adjective, giving rise to (what looks like) a violation of Corbett's Distance Principle. Nothing of the sort should be possible for Adj-Adj stacking. Whether this nuanced contrast is actually realized in any language is an intriguing, open question.

6. Theoretical implications

The interaction of DP-internal and DP-external agreement with the Hebrew noun *be'alim* gives rise to a 3/4 pattern. Such agreement patterns have been described in other languages and given alternative accounts. It is therefore instructive to compare these accounts to the present one, both empirically and theoretically, in order to identify points of contact and departure. Three such paradigms and accounts are discussed in section 6.1: DPs with transdecimal numerals in Lebanese Arabic, gender-hybrid nouns in Russian and collective nouns in British English. The first two involve DP-internal and DP-external agreement targets, the last one involves two DP-external agreement targets. After discussing these cases, I turn to consider the implications of the present study for existing typological and grammatical models of syntactic and semantic agreement (section 6.2).

6.1 Comparison with other 3/4 agreement patterns

The noun *be'alim* in Hebrew triggers singular or plural agreement on attributive adjectives and verbs. We have seen in (21) that when both agreement targets are present, only three out of the four possible combinations are grammatical.

(52) 3/4 agreement pattern with *be'alim* (Hebrew)

a. [$_{DP}$ *be'alim* Adj$_{[SG]}$] … V$_{[SG]}$ …
b. [$_{DP}$ *be'alim* Adj$_{[PL]}$] … V$_{[PL]}$ …
c. [$_{DP}$ *be'alim* Adj$_{[PL]}$] … V$_{[SG]}$ …
d. * [$_{DP}$ *be'alim* Adj$_{[SG]}$] … V$_{[PL]}$ …

By comparing (52) to 3/4 agreement patterns in other languages, we may sharpen our understanding of what parts of the proposed model should be held invariant and what parts might reflect language-particular choices.

Consider first DPs with transdecimal numerals in Lebanese Arabic. As shown in (50) above, these DPs allow mixed attributive agreement. Note that this agreement already follows a 3/4 pattern (uniform singular, uniform plural, (50a) and (50b)). But the more relevant interaction emerges with verbal agreement.

(53) a. tleetin walad mnazzam daras/darasu.
thirty child organized.**SG** studied.**SG/PL**

b. tleetin walad mnazzam-iin darasu/*daras.
thirty child organized.**PL** studied.**PL/*SG**
'Thirty organized children studied.'

Or schematically:

(54) 3/4 agreement pattern with TD-numerals (Lebanese Arabic)

a. $[_{DP}\ Num_{TD}\ N\ Adj_{[SG]}\ ]\ \ldots\ V_{[SG]}\ \ldots$
b. $[_{DP}\ Num_{TD}\ N\ Adj_{[PL]}\ ]\ \ldots\ V_{[PL]}\ \ldots$
c. $[_{DP}\ Num_{TD}\ N\ Adj_{[SG]}\ ]\ \ldots\ V_{[PL]}\ \ldots$
d. * $[_{DP}\ Num_{TD}\ N\ Adj_{[PL]}\ ]\ \ldots\ V_{[SG]}\ \ldots$

The generalization is that "any plural agreement within the noun phrase (adjectives) forces plural agreement outside it (verbs). The opposite is not true" (Ouwayda 2013). Agreement correlates with interpretation, though differently from Hebrew, as we will shortly see. Ouwayda points out that singular agreement forces a distributive reading while plural agreement is neutral between collective and distributive interpretations. For example, (53a) entails that each child was organized but (53b) is compatible with a situation in which the children were organized as a group (but not as individuals). Note that the semantic effect holds equally for attributive adjectives and verbs.

Ouwayda uses these observations to argue against the presence of a silent distributor inside or outside the DP. Instead, she assumes that the distributive reading is the default one and that the collective reading requires the formation of a plural individual from the noun. This is achieved by merging N first with Div, a classifier-type head that creates a count meaning from a mass denotation (see Borer 2005), and embedding the result under a pluralizing head, #, which turns a set of individuals into a plural individual: $[_{\#P}\ Num_{TD}\ \#\ [_{DivP}\ Div\ N]]$. Note that on this "modifier" sense of the TD-numeral, it is projected in [Spec,#P] and provides the cardinality of the plural individual. By assumption, # is endowed with plural morphology and so determines plural agreement on any higher adjective or DP-external target (verbs and pronouns).

Importantly, #P need not be projected. When it is absent, the numeral will function as an existential quantifier: $[_{QP}\ Num\ [_{DivP}\ Div\ N]]$. With numerals smaller than 10, or without a numeral, syntactic plurality may still emerge, this time realizing the Div head.

There are obvious parallels between Ouwayda's analysis and the present one. In both, semantic plurality is introduced via functional structure above N and not by N itself. Both partition the nominal domain into distinct agreement zones, and both are designed to capture the "monotonicity" property – the fact that DP-external agreement may not ignore DP-internal agreement. However, there are substantial differences as well, conceptually and empirically.

First, and perhaps most trivially, the asymmetric patterns in Hebrew and Lebanese Arabic are reversed. In (52c-d) DP-internal *singular* agreement is selective (requiring matching DP-external agreement) whereas in (54c-d) it is DP-internal *plural* agreement that is selective. This is so because the Hebrew *be'alim* is initially specified [PL], and so any singular agreement must be introduced by the functional envelope and propagate outside

the DP; while the Lebanese Arabic nouns that occur with TD-numerals are initially specified [SG] and so it is plural agreement that is contributed by the functional envelope and determines agreement outside the DP.[26]

This trivial difference, however, points to a deeper one. Whereas #P is an optional projection in the Lebanese Arabic DP (and in other languages, according to Ouwayda), NumP is not and cannot be optional. When # is not merged, the collective reading is excluded, but number marking remains unharmed, since the Div head may still carry the [PL] feature. However, failure to project NumP would leave the NP without any INDEX number value – presumably an illicit object, both internally and externally (the INDEX number features of D and V would remain unvalued).

Furthermore, #P requires the presence of a numeral (because # is a function one of whose arguments is the denotation of a numeral), but NumP does not require any numeral in the DP.

Fourth, in associating # with the plural value only and not with the singular, Ouwayda follows the traditional idea that number is a privative feature (with [SG] being unmarked). This, however, cannot work for Hebrew, where precisely the appearance of *singular* agreement revealed the presence of a functional head specified [SG], which is distinct from N; for *be'alim*, the "unmarked" value (so to speak) is [PL] rather than [SG]. Thus both semantic singularity and semantic plurality are read off Num and neither one can be left unmarked. In fact, if one were to place the (interpreted) [SG] number value on N in Hebrew, one would fail to predict the strict ordering in mixed agreement scenarios – the fact that the singular adjective must be further from N than the plural one (see (46)).

A fifth difference concerns the interaction of #P/NumP with definiteness. Since the existential interpretation of the numeral is incompatible with a definite reading, TD-numerals in definite DPs always merge as modifiers, namely, as specifiers of #. Consequently, they force plural agreement (unlike indefinite DPs, which govern singular or plural agreement); see Ouwayda 2014:165. No such interaction is attested in Hebrew; the agreement possibilities with *be'alim* are oblivious to definiteness.[27]

(55) a. yeš be’al-im xadaš(-im) la-binyan.
there.is owner-PL new(-PL) to.the-building
'There is/are (a) new owner(s) to the building.'

[26] Why nouns following TD-numerals are not marked plural in Lebanese Arabic is a puzzle Ouwayda (2014:112) leaves unanswered.

[27] Adding a numeral to the subject in (55a-b), makes no difference. Note that Hebrew lacks the TD/non-TD divide that Arabic has and treats all numerals greater than one the same way.

b. ha-be'al-im xadaš(-im) kvar kan.
the-owner-PL new(-PL) already here
'The new owner(s) is/are already here.'

More generally, the possibility of agreement mismatches with Lebanese Arabic TD numerals arises as productive, predictable feature of this construction. There is nothing irregular about it, unlike the situation with *be'alim*, which together with a handful of other nouns, is an oddity in Hebrew grammar. Admittedly, both phenomena ultimately reduce to some lexical peculiarity. In Lebanese Arabic, it is the inability of plural nouns to occur with TD-numerals; in the hybrid nouns of Hebrew (and other languages), it is the dissociation of CONCORD and INDEX features on a given lexical item that grants freedom in the position of the NumP projection. While the position of #P is fixed although its occurrence is optional in Lebanese Arabic, the position of NumP is variable although its occurrence is obligatory in Hebrew hybrid nouns.

Finally, the operation of agreement in Ouwayda's analysis only partially overlaps with the present assumptions. NumP and #P produce parallel locality effects *downwards*: any adjective below them must agree with N and not with Num/#. Things are different upwards, however. For us, DP-external agreement is necessarily mediated by the highest functional head in the DP, namely D, for principled reasons laid out in section 5.1. In contrast, Ouwayda (2014:131) assumes direct probing between the DP-internal #P and DP-external targets, potentially violating phase-locality. More problematically, in definite DPs with TD-numerals plural agreement is mandatory (as noted above). This requires a countercyclic derivation, in which adjectives merged below #P avoid agreeing with N and "wait" until D is merged and transmits to them the [PL] feature it got from # (p. 222).

In view of these considerations, it is unlikely that NumP and #P can be collapsed. Although overlapping in function, substantial differences remain between the two projections as well as between the analyses in which they are embedded. Whether a higher-level integration is feasible remains to be seen.

Let us turn now to a second instance of a 3/4 agreement pattern that received a similar analysis – the Russian gender hybrid nouns. As we saw in (51), profession nouns of the *vrač*-type ('doctor') give rise to mixed agreement, where [M] tracks the formal gender and [F] the natural, or semantic gender. Again, just like in Hebrew and Lebanese Arabic, the interaction of attributive and verbal agreement with these nouns is asymmetric: When the attributive adjective that modifies a subject nominal headed by *vrač* is masculine, the verb may either be masculine or feminine; but when the attributive adjective is feminine, the verb must be feminine as well (Pesetsky 2014:36).

(56) a. Nov-yj vrač prišël/prišl-a.
new-SG.**M** doctor.SG arrived.SG.**M/F**

b. Nov-aja vrač prišl-a/*****prišël.
new-SG.**F** doctor.SG arrived.SG.**F/*M**
'The new doctor arrived.'

Or schematically:

(57) 3/4 agreement pattern with gender hybrid nouns (Russian)

a. [$_{DP}$ $Adj_{[M]}$ *vrač*] … $V_{[M]}$ …
b. [$_{DP}$ $Adj_{[F]}$ *vrač*] … $V_{[F]}$ …
c. [$_{DP}$ $Adj_{[M]}$ *vrač*] … $V_{[F]}$ …
d. * [$_{DP}$ $Adj_{[F]}$ *vrač*] … $V_{[M]}$ …

Applying a configurational logic to this pattern, Pesetsky proposes that *vrač*-type nouns enter the syntax masculine and may be "feminized" during the derivation by merger of a functional gender head between NP and DP, which he labels Ж ('že'). This head is optional; if merged, all adnominal modifiers projected above it, as well as DP-external targets, will bear feminine agreement. Anything below it (i.e., between Ж and N) will agree with N, i.e., be masculine. If Ж is not merged, agreement will be masculine throughout.

The present analysis of Hebrew number hybridity, then, is remarkably similar to Pesetsky's analysis of Russian gender hybridity; the role of Num in the former is isomorphic to the role of Ж in the latter. There are, however, a number of differences between the two analyses, to which I now turn.

First, Pesetsky does not distinguish semantic features from INDEX features; for him, Ж simply denotes **female**, whereas for us, [INDEX *pl*] on Num indeed often denotes **plural**, but exceptions are tolerated (e.g., polite plurals, which trigger plural agreement but nonetheless denote individuals; see Wechsler 2011).

Second, to deal with unfeminized hybrid nouns, Pesetsky assumes that Ж is not projected, whereas for us Num is consistently projected. The question for Russian, then, is how the denotation **male** arises in the absence of Ж, since, presumably, the masculine feature on *vrač* is not be intrinsically linked to this denotation, being compatible with female referents. It will not do to state that **male** is the default interpretation of unfeminized nouns; presumably, nouns with inherent female sex denotation (e.g., *nun, cow, nurse*) are also unfeminized in the syntax.

On the analysis defended here, however, both male and female interpretations arise from a valued [INDEX|GENDER] feature on Num; a masculine value will simply match the [CONCORD|GENDER] value of *vrač* but in no way will be *redundant* with it, as the two features interface with different grammatical modules. This uniform treatment, as far as I

can tell, is not available to Pesetsky's analysis, which specifically conceives Ж as a "feminizing" head, rather than a neutral gender head.

Third, for reasons having to do with the agreement properties of paucals, Pesetsky assumes that D in Russian does not register gender features at all. This implies that external probes – like finite T – must be able to penetrate DP and directly agree with Ж or even N. As discussed in section 5.1, this raises nontrivial issues of locality and opacity, which are avoided on the present view, in which all DP-external agreement is mediated by D.

Finally, Pesetsky observes that Ж may not be merged too low: Low adjectives (nonintersective, idiomatic or argumental) must be merged below it, hence never manifest feminine agreement with hybrid nouns.

(58) Priiskov-yj/*-aja sčetovod ser'ëzno zabolel-a.
mine.**M**/***F**.NOM.SG accountant.NOM.SG seriously take.ill-PST.F.SG
'The (female) mine accountant took seriously ill.'

Parallel facts obtain in Lebanese Arabic. Ouwayda (2014:122) observes that plural marking on the adjective under a TD-numeral, normally in free alternation with singular marking (cf. (53)), is unavailable with idiosyncratic (compound-like) modification. She too attributes the effect to low-merger of the adjective – at least lower than the merge position of the #-head, which could have licensed plural agreement.

(59) tleetin mhandes madani(*-iin) / arbʔiin tabiib šarʔi(*-iin)
thirty engineer civil(*-PL) / forty doctor legal(*-PL)
'thirty civil engineers' / forty forensic medical examiners'

Thus, both in Russian and in Lebanese Arabic, there is a lower threshold on the merge position of a ϕ-projection which is semantically active.

Is any parallel effect observed in Hebrew? Within our terms of reference, the question is whether there are any adjectives that, when modifying the noun *be'alim*, must show plural agreement. This would indicate that Num (the only potential source of [SG]) is never accessible to such adjectives; confined to Zone A, they would only enter CONCORD agreement with N.

As far as I can tell, there are no such adjectives in Hebrew. We have already seen in (17a) that nonintersective adjectives, like *kodem* 'previous', can licitly modify *be'alim* in the singular. Similarly, nonpredicative modifiers occur either in the singular or the plural (the former, of course, forces a singular reference).[28]

[28] There are no idiom-forming adjectives that occur with *be'alim*. *elohim* 'god', another noun in this class (see fn. 6), does occur with an adjective in an idiom, and indeed, only plural agreement (reflecting CONCORD number) is compatible with the idiomatic reading.

(60) a. ani makir et ha-be'alim ha-ikari(-yim) šel ha-esek.
I know ACC the-owner the-main.M.SG(-M.PL) of the-business
'I know the business' main owner(s).'

b. mi ha-be'alim ha-xuki(-yim) šel ha-nexes ha-ze?
who the-owner the-legal.M.SG(-M.PL) of the-property the-this
'Who is/are the legal owner(s) of this property?'

What is the source of this crosslinguistic difference? What grammatical parameter sets a lower threshold on the merge position of nominal INDEX features in some languages but not in others? Given that #, Ж and Num are distinct in content, although evidently related, it is not obvious that they should all be subject to the same positional constraints. Much more comparative data on the agreement properties of hybrid nouns is needed before we can offer a genuine explanation of this variation. At this stage, I leave it as a topic for future research.

Our third and final 3/4 agreement pattern occurs with collective nouns in British English (and to a lesser extent in other varieties of English), which have long been known to display mixed agreement (see Corbett 2006:206-213). It has also been observed that "semantic" agreement with these nouns is more restricted than syntactic agreement. Summarizing the findings of previous studies, Smith (2012, to appear) presents four environments where plural agreement with a collective NP is disallowed.

(61) a. *Demonstratives*
this committee / *these committee

b. *Expletive constructions*
There is/*are a committee deciding on the budget for next year.

c. *Scope reconstruction*
A northern team is likely to be in the final. ∃>*likely* / *likely*>∃
A northern team are likely to be in the final. ∃>*likely* / **likely*>∃

d. *Inverted predicate*
The best committee is theirs. *committee* = subject / predicate
The best committee are theirs. *committee* = subject / *predicate

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(i) elohim adir-im / *adir!
god mighty-PL/ *mighty.SG
'Dear god! / Oh my god!'

It is difficult to draw general conclusions from this single example.

The emerging generalization ("LF-visibility" in Smith's terms) is that plural agreement requires the controller (collective NP) to asymmetrically c-command the target *at LF*.[29]

Smith derives this generalization as follows. First, the "hybridity" of collective NPs amounts to double specification of number: An uninterpretable singular value and an interpretable plural value: {*u*Num:*sg*, *i*Num:*pl*}. For all speakers, *u*Num is active post-syntactically, at PF, and *i*Num is active semantically, at LF. For speakers of British English, however, the latter is also active syntactically, thereby controlling agreement. Second, Smith proposes that syntactic agreement is unidirectional, operating upwards only, while PF agreement is direction-neutral and may operate upwards or downwards. Now since agreement with *i*Num must be syntactic and cannot be morphological (at PF), it must apply upwards; that is, the controller must asymmetrically c-command the target. Since agreement with *u*Num may either be syntactic or morphological, it may operate upwards (in the syntax, or at PF) or downwards (at PF). Thus the "LF-visibility" of plural agreement with collective NPs is explained.

The 3/4 pattern shows up when verbal agreement and anaphor agreement are crossed. A plural verb requires a plural anaphor but a singular verb does not require a singular anaphor.

(62) a. The government has offered itself up for criticism.
b. The government have offered themselves up for criticism.
c. The government has offered ?themselves/each other up for criticism.
d. * The government have offered itself up for criticism.

Or schematically:

(63) 3/4 agreement pattern with collective NPs (British English)

a. $NP_{collective}$ … $V_{[SG]}$ … reflexive/$pronoun_{[SG]}$
b. $NP_{collective}$ … $V_{[PL]}$ … reflexive/$pronoun_{[PL]}$
c. $NP_{collective}$ … $V_{[SG]}$ … reflexive/$pronoun_{[PL]}$
d. * $NP_{collective}$ … $V_{[PL]}$ … reflexive/$pronoun_{[SG]}$

The contrast between (63c-d) cannot be due to LF visibility alone and must be rooted in grammatical constraints on possible mismatches between agreement targets. Smith proposes "Valuation Economy", which stipulates that within a grammatical component,

[29] In (61a), the collective NP only symmetrically c-commands D; in (61b), the associate does not raise covertly (Den Dikken 1995); in (61d), the inverted predicate must reconstruct at LF (Heycock 1995). Note that the assumption that agreement is checked at LF is at odds with the bare minimalist view of LF as an interface level that only contains semantically contentful information.

agreement targets of the same controller must target the same feature. Furthermore, he assumes that anaphors must agree syntactically because their features are interpreted. The auxiliary, however, is free to agree in syntax or PF.

In (63a), then, the anaphor agrees in the syntax with the collective NP, targeting [*u*Num:*sg*]. If the auxiliary also agrees in the syntax, Valuation Economy requires that it agree with this feature too; if it agrees at PF, again it can only agree with this feature, [*i*Num:*pl*] being absent from PF. In (63b), [*i*Num:*pl*] is targeted both by the auxiliary and the anaphor, which therefore must both agree in the syntax. The mismatch in (63c) results from the anaphor agreeing with [*i*Num:*pl*] in the syntax and the auxiliary agreeing with [*u*Num:*sg*] at PF; the mismatch is exempted from Valuation Economy, which only applies to agreement operations occurring in the same component. Finally, the reverse mismatch in (63d) cannot be generated. The anaphor agrees with [*u*Num:*sg*] in the syntax. If the auxiliary agrees in the syntax, by Valuation Economy it must also target this feature, producing a match. If it agrees at PF, again it must target the only feature that is available at PF, [*u*Num:*sg*], producing a match.

The pattern of agreement with collective NPs in British English is formally similar to the pattern of *be'alim* in Hebrew. In both cases, hybrid nouns license mixed agreement, and in both cases a 3/4 pattern emerges. There are, however, some differences that are worth mentioning.

First, while I assumed (following Wechsler & Zlatić 2003) that the counter-valued features are distinct in type (CONCORD vs. INDEX), Smith explicitly denies that and instead suggests that they are "two halves" of the same feature: one its morphological half, the other its semantic half. The implication is that [*i*Num:*pl*] expresses both the notion of number and the notion of mereology (since [*u*Num:*sg*] does not contribute to interpretation). This raises the question how *committee* and *committees* are semantically distinguished, if their only interpretable feature is [*i*Num:*pl*]. It is actually not obvious how the hybridity of collective NPs should be represented in the CONCORD-INDEX system. While CONCORD number is evidently [SG], INDEX should be free to vary between [SG] and [PL], each value associated with a different semantic feature – number (of aggregates) or mereology. The contrast between (63c-d), therefore, falls outside the bare assumptions of the present CONCORD-INDEX system, and the similarity between the Hebrew and the British English 3/4 patterns is rather superficial.

Second, Smith takes it for granted that ϕ-features on anaphors are interpreted (and therefore must be valued in the syntax), but this assumption has been contested on principled grounds (Heim 2008, Kratzer 2009). If anaphors agree at PF, however, the explanation for the 3/4 pattern in (63) is lost, as there would be no distinction in how or where the singular and the

plural values of [number] on the collective NP control agreement. To recall, the 3/4 pattern in Hebrew did not derive from a difference in how agreement operates or where it does, but rather from a type distinction: Adjectives carry untyped ϕ-features whereas verbal inflection is typed as INDEX. This distinction itself was rooted in the [person] asymmetry between the two categories.

To sum up this section: 3/4 agreement patterns are not uncommon across languages, and typically arise when agreement is controlled by a hybrid noun. Hybridity itself may have various sources: A lexical exception (Serbian/Croatian *deca*, Hebrew *be'alim*, Chichewa *ngwazi*, Russian *vrač*), semantic complexity (collective nouns in British English), or functional structure inside DP (numerals in Finnish and Lebanese Arabic). Overall, the asymmetric agreement patterns respect the Agreement Hierarchy of Corbett (1979) (although they are underdetermined by it, as we discuss in the next section). The idea that hybrid nouns project a nominal structure that splits into two agreement zones has been fruitfully pursued in two recent works, Ouwayda 2014 and Pesetsky 2014, and put to use in explaining the 3/4 patterns. The current study joins and expands on this trend by developing a configurational mapping of the CONCORD-INDEX featural distinction, raising new challenges to the existing proposals.

6.2 Grammatical architecture and typology

The Hebrew data discussed in this study and the analysis we offered for them contribute to a view of nominal structure and nominal agreement that has been developed independently by various authors. In particular, the following general assumptions proved useful and explanatory (see Ritter 1991, 1992, 1993, 1995, Wechsler & Zlatić 2003, King & Dalrymple 2004, Danon 2011, 2013, Brattico 2010, 2011).

(64) a. Agreement features are distributed along the nominal spine.
b. The agreement system is dual, consisting of CONCORD and INDEX features.
c. Both types of features are simultaneously present inside DPs.

The novelty in the present study consists in the synthesis of these assumptions, namely, in the claim that there is a principled correlation between the *type* of feature (CONCORD or INDEX) and its syntactic *location*. These correlations explain both canonical agreement patterns and particular classes of irregular (or mixed) agreement. At this stage it is worth considering precisely how well-motivated the theoretical innovations in this study are by comparing them to the existing accounts.

Our main indication that something is missing in the non-configurational CONCORD-INDEX theory of Wechsler & Zlatić is the existence of nouns with an inherently specified CONCORD feature (couched in their morphology) which nevertheless display INDEX

agreement DP-internally. Such were Hebrew *be'alim* 'owner(s)', Chichewa *ngwazi* 'hero' and Russian *vrač*. As discussed in section 4.2, these nouns raise a serious challenge to W&Z's theory, which absolutely prohibits semantics to override CONCORD in fixing the INDEX values. The solution we offered was *configurational*. Both the unmarked situation (CONCORD attributive agreement) and the marked situation (INDEX attributive agreement) follow from general locality properties of the feature-sharing operation, namely Agree. The difference lies in where within the nominal spine the INDEX features project - a choice which can be linked to certain plausible principles of the lexicon-syntax interface (see (37) and (40) above). As W&Z's theory harbors no comparable structural asymmetry between the locations of CONCORD and INDEX features, it is not clear that it is can come to terms with these challenging data without thereby compromising some of its essential tenets.[30]

Second, the present configurational analysis is *asymmetric*. INDEX features project higher up than CONCORD features inside the DP, for principled reasons related to how they are anchored. This asymmetry was most strikingly brought out in the mixed agreement patterns discussed in section 5.4, a rare but surprisingly consistent phenomenon. Thus, non-configurational alternatives not only must cope with the existence of mixed agreement inside DP but also with the asymmetric nature of the mix - the occurrence of INDEX agreement on higher attributive adjectives and CONCORD agreement on lower ones, but not vice versa.

Third, the present analysis is not just configurational and asymmetric but also *derivational*. The logic of blocking INDEX agreement in Zone A and CONCORD agreement in Zone B was crucial in deriving the observed patterns. Notice that this logic rests on the idea that at some point in the derivation Num is absent, making INDEX agreement impossible, and at a later point (following its merge) it is present, making it inevitable.[31] In contrast, declarative frameworks like HPSG assume that all the morphemes with all their grammatical features are present at the outset, hence they cannot avail themselves of similar explanations. Whether a natural alternative exists within such frameworks is a question I leave open.

Finally, although consistent with Corbett's Agreement Hierarchy, our analysis makes somewhat stronger crosslinguistic predictions. Corbett's constraints are corpus-level generalizations: "The constraints we have been discussing, in particular The Agreement Hierarchy, are violable at the 'sentence level'. The Agreement Hierarchy does not

[30] Obviously, W&Z's theory draws a number of grammatical distinctions between CONCORD and INDEX features that are fruitfully exploited elsewhere (e.g., the fact that the former is a HEAD feature and the latter is not, the fact that the latter attaches to an index and the former does not, etc.). The point is that none of these indisputable distinctions is of any help in making sense of the data at hand.

[31] A non-derivational (but still crucially configurational) alternative way of deriving these results might restrict the Agree operation to downward probing. Thus, even in the presence of a higher Num head that bears the INDEX features, an attributive adjective in Zone A would only be able to Agree with the lower head, N, in CONCORD features. This solution, however, runs afoul a growing body of research that shows upward probing to be a viable, in fact common option for agreement (Rezac 2003, Baker 2008, Zeijlstra 2012, Harley 2013).

necessarily rule out specific sentences…" (Corbett 2006:229). The same is true of The Distance Principle, which merely predicts that remote semantic agreement (65a) will be more frequent than proximate semantic agreement (65b).

(65) *Mixed adjectival agreement*

a. [$Adj_{[Agr\text{-}Sem]}$ [$Adj_{[Agr\text{-}Syn]}$ [N]]]
b. * [$Adj_{[Agr\text{-}Syn]}$ [$Adj_{[Agr\text{-}Sem]}$ [N]]]

In contrast, the present analysis predicts pattern (65b) to have zero frequency. In our terms, it can only arise as CONCORD agreement between an adjective in Zone B and N, across the intervener Num. Such locality violations are categorically excluded. In a similar vein, the asymmetry between DP-internal and DP-external agreement (see (52c) vs. (52d)) reflects a principled result of our analysis (and for that matter, W&Z's as well).

(66) *Mixed agreement inside and outside DP*

a. [$Adj_{[Agr\text{-}Syn]}$ [N]] … $V_{[Agr\text{-}Sem]}$
b. * [$Adj_{[Agr\text{-}Sem]}$ [N]] … $V_{[Agr\text{-}Syn]}$

Pattern (66b) requires CONCORD agreement on the finite verb, contrary to the robust finding that such verbs systematically display INDEX agreement. Corbett's Agreement Hierarchy, however, merely requires a significant gap in probability in favor of (66a).

To the extent that counterexamples do not turn up (see also the negative universals in (43)), the stronger analysis is corroborated.

Conclusion

This paper had two aims. First, on the empirical level, to present novel data from Hebrew that demonstrate a remarkable case of "semantic agreement" on attributive adjectives inside DP. Such a pattern has rarely been documented before and thus its very existence is a nontrivial challenge for theories of nominal agreement of all stripes. Second, on the theoretical level, to develop an syntactic model of DP-internal agreement by offering a configurational adaptation of the CONCORD-INDEX distinction (due to work in HPSG).

The central idea of the analysis is that CONCORD features, being morphologically anchored, are hosted on N, while INDEX features, being semantically anchored, are hosted on a higher functional head, here identified as Num. This configurational distinction holds of [number] features quite generally, and, to a lesser extent, also of [gender] features. Thus, the position of Num splits up the nominal space into a lower zone of CONCORD agreement and a higher zone of INDEX agreement - an asymmetry that finds striking support in a variety of constructions across unrelated languages. Determiners, in turn, "neutralize" this

asymmetry because they carry both types of features and may spell out (depending on their lexical specification) either one of them.

The new analysis builds on the earlier insights of Corbett and Wechsler & Zlatić concerning hybrid nouns and mixed agreement. However, it improves over them in being able to introduce more fine-grained and structured predictions into this empirical domain, which may look superficially quite erratic but turns out to obey rigid constraints even in its more irregular corners. New questions arise about possible and impossible complex agreement patterns, about number-gender interactions and possibly about implications for adjective hierarchy inside DPs. These will have to await future research.

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