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The head of the nominal is N, not D: N-to-D Movement, Hybrid Agreement, and conventionalized expressions

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The DP Hypothesis has recently come under intense criticism (Bruening 2009, Bruening et al. 2018). In the face of this criticism, several responses have been offered. This paper addresses three such responses and shows that they are without force. First, N-to-D movement is not necessary in Shona, as Carstens (2017) claims. Second, patterns of hybrid agreement in Bosnian-Croatian-Serbian do not require the DP Hypothesis, as Salzmann (2018) claims. Third, patterns of conventionalized expressions show that there is a close syntactic relation, possibly selection, between a selecting head and N, contra Salzmann (2018). The patterns of conventionalized expressions are incompatible with the DP Hypothesis and require that the head of the nominal is N, not any functional head. Functional heads inside nominals have to be dependents of the head N, not vice versa.
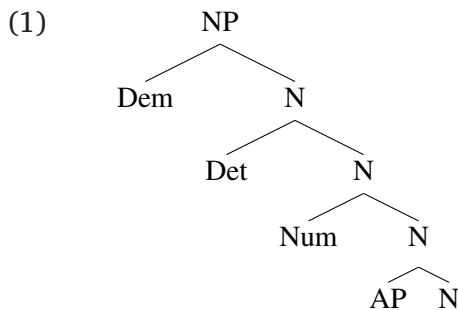
1 Introduction

The DP Hypothesis, which says that the head of the nominal is not N but a functional category D (or a sequence of functional categories), has come under recent scrutiny and criticism. Bruening (2009), Bruening et al. (2018) argue that asymmetries between nominals and other categories show that the head of the nominal must be N, not D. Briefly, patterns of selection and form determination indicate that in the clausal domain, each functional head is the head of its constituent and takes the next functional projection as its complement. Verbs that select clauses select for the functional elements, not the lexical ones. Nominals behave very differently, however, such that the head of the nominal has to be N, and not D or a sequence of functional projections. For one thing, verbs that select nominals *never* select for the functional elements. Bruening (2009), Bruening et al. (2018) further show that every analysis that has been stated within the DP Hypothesis can easily be stated within an NP structure as well. The one exception to this is N-to-D movement, something that is impossible if D is not a head taking NP as its complement. In support of the NP structure, most recent research has actually concluded that N-to-D movement does not exist (Alexiadou 2001, Dimitrova-Vulchanova 2003, Shlonsky 2004, Cinque 2005, 2010, Hankamer & Mikkelsen 2005, Willis 2006, Georgi & Müller 2010, Lipták & Saab 2014).

In the face of this criticism, several responses have been offered. First, Carstens (2017) argues that N-to-D movement is needed for Shona. Second, Salzmann (2018) argues that patterns of agreement with "hybrid" nouns in Bosnian-Croatian-Serbian (BCS) require a DP analysis. Third, Salzmann (2018) also contends that the asymmetries in selection

detailed in Bruening (2009), Bruening et al. (2018) are not telling because there is no evidence for a direct relation between a selecting V and a head N, either. In this paper I address these three responses. I show first that Shona does not require N-to-D movement; second, that patterns of agreement in BCS do not require a DP analysis; and third, that conventionalized expressions like idioms reveal that there is indeed a close relationship between V and a selected N, perhaps the *l-selection* relation of Pesetsky (1995). Crucially, there is no such relation between V and D or any other functional category in nominals. Conventionalized expressions therefore show that the head of the nominal must be N and could not be D.

Before proceeding, I should clarify the sort of analysis that I will be defending. Arguing that the head of the nominal is N and not some functional head or sequence of functional heads does not deny the existence of functional heads. It only requires that they be dependents of the N projection and not the other way around. Thus the structure of a nominal must be something like the following, for a language that allows a demonstrative and a determiner to co-occur:

(1)

```
              NP
           /      \
        Dem         N
                  /    \
               Det       N
                       /    \
                    Num       N
                            /   \
                          AP     N
```

(It is not important whether intermediate projections are labeled NP, N', N, or something else. All that is important is that they are a projection of the head N, and not the functional heads.)
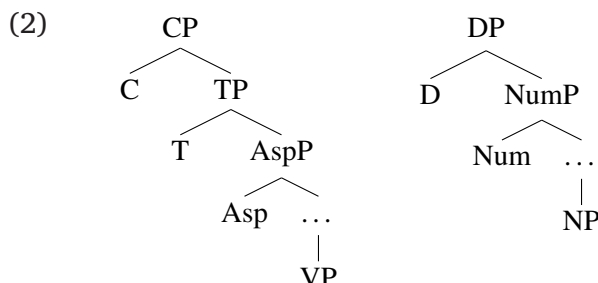
In this type of analysis, functional elements like Dem(onstrative), Det(erminer), Num(eral) are comparable to adjuncts like A(djective) P(hrase)s in being a dependent of the head N rather than taking NP as their complement. This is not to say that these functional elements are adjuncts. It is an open question how these elements are selected and projected, and what determines their order when they are. I will have more to say about this question in section 3. It will be important that, when a selecting predicate like a verb combines with a nominal, it combines directly with NP, the maximal projection of the head N. V and NP combine directly as sisters, without any of the functional heads disrupting this direct combination, any more than adjuncts disrupt direct combination of sisters. This contrasts with the DP Hypothesis, where a verb combines with a DP, not an NP, and V and NP are hierarchically separated by potentially multiple projections (at least DP, perhaps also NumP and others).[1]

I begin in section (2) by summarizing some of the arguments against the DP Hypothesis from Bruening (2009), Bruening et al. (2018). I then address Shona N-to-D movement in section 3, hybrid noun agreement in section 4, and conventionalized expressions in section 5.

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[1] It is also an important question where features like [definite] and [plural] come from. Are they absent from the head N, and added to the NP by the functional elements? Or are they present on the head N, and the functional elements are added as required by the language to mark their presence? Given the common assumption that the features of a maximal projection and the features of its head must be identical (see section 4), I will adopt the latter position.

2 Background: Arguments against the DP Hypothesis

One of the primary motivations for the DP Hypothesis has always been a claimed parallel with the structure of the clause, where a functional head C heads the clause and takes another functional head T (or similar) as its complement, and so on down to the lexical predicate:

(2)

```
        CP                          DP
      /    \                      /    \
     C      TP                   D      NumP
          /    \                       /    \
         T      AspP               Num      …
              /    \                          |
            Asp     …                        NP
                     |
                    VP
```

In the DP Hypothesis, nominals are parallel in having a sequence of functional projections dominating the lexical NP, in the same way that the clause terminates in a lexical VP.

The arguments in Bruening (2009), Bruening et al. (2018) basically refute this claimed parallelism. In most ways, clauses and nominals are not parallel at all. All of the evidence indicates that a sequence of functional projections is correct for clauses, but it is not for nominals. I will summarize one of these arguments here, the selection argument, since it comes up again in section (5).

We know that selection is strictly local. This means that when an element like a verb selects a clause, it must be selecting CP. It could not be selecting for the VP buried deep within the CP. This is exactly what we find. Verbs that select for clauses select for things like declaratives versus interrogatives, or finite versus non-finite. No verb selects for particular VPs. Within the CP, we see C selecting for the next functional head, for instance finite C selects for finite T while non-finite C selects for non-finite T. And so on.

The DP Hypothesis then would predict that verbs that select for nominal phrases would care about what D is. Just as a verb can select for a finite or a non-finite C, a verb should be able to select for a definite or an indefinite D, for instance. The fact is that this never happens. We never see selection for D, or for any of the functional elements in the nominal phrase. Verbs that select for nominals generally permit any sort of nominal: definite, indefinite, bare, with or without numerals and classifiers, quantificational, referential, non-referential, etc.

In the clausal domain, we also see selection for different sizes of clauses. Some verbs select full CPs, others select something like non-finite TP (e.g., raising verbs), others select smaller constituents like VPs (or AspPs or VoicePs). If the DP Hypothesis were correct, we should see something similar with selection for nominals. Some verbs might require a full DP, others something intermediate (NumP, for instance), and others a bare NP. Again, this type of selection never happens. If a verb selects for a nominal phrase, any type of nominal phrase is generally allowed.[2]

The DP Hypothesis then predicts that the empirical facts should be very different from what they actually are. It is therefore incorrect. Verbs can select CP, TP, VP; they can select PP or AP or some kind of nominal. If they select CP, they can require a particular type of C. If they select PP they can require a particular P or a semantic class of P (e.g., location). If the DP Hypothesis were correct, verbs should also be able to select DPs versus NumPs versus NPs; if they select DP they should be able to specify certain types of Ds.

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[2] Researchers sometimes claim that "pseudo-incorporated" nominals are smaller in size than other nominals. However, no verb selects such a nominal. All verbs allow either a full NP or this reduced one.

Neither of these selectional patterns exists. In contrast, if N is the head of the nominal, then the empirical facts are exactly as we expect. A verb can select NP, but it cannot dictate anything about the dependents of N, like D, Num, Classifier, etc. This is correct. A verb should be able to select a particular N, and this might be what conventionalized expressions are (see section 5). A verb might also be able to select certain semantic classes of Ns the way a verb like *put* can select certain Ps (locations). We do see this: some verbs require animate or sentient nouns, some require semantic plurals (which is different from a syntactic Num), and so on.

Bruening (2009), Bruening et al. (2018) lay out these arguments, and others, in detail. They also refute arguments that have been given in favor of the DP Hypothesis, as does Salzmann (2018). I refer the reader to those works for the particulars. I turn now to three responses that have been offered in the recent literature in support of the DP Hypothesis.

3 Shona N-to-D

I begin with the argument for N-to-D movement. N-to-D movement is only compatible with the DP Hypothesis, since head movement is commonly thought to be able to move a head only to the head that takes it as its complement. If N-to-D movement exists, only the DP Hypothesis could be correct. N-to-D movement could not take place if the head of the nominal is N. Bruening et al. (2018) point out that much recent research has argued that, in fact, N-to-D movement does not exist (see the references above). They take this to indicate that the DP Hypothesis is not correct, since it predicts that N-to-D movement should exist, contrary to fact.
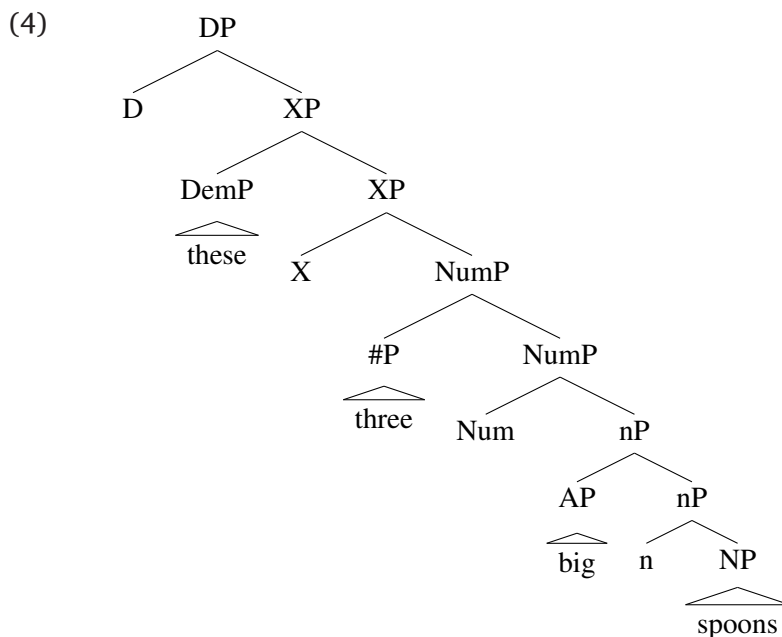
Carstens (2017), in contrast, argues that N-to-D movement is necessary in the analysis of Shona (Bantu). In Shona nominals, only Dem(onstrative) can precede the N, after N order is free (but Dem must be peripheral):

(3)   *Acceptable word orders within Shona NPs* (Carstens 2017: (24))
     a.   zvipunu zvikuru zvitatu izvo
           spoons   big   3   these

     b.   izvo   zvipunu zvikuru zvitatu
           these   spoons   big   3

     c.   zvipunu izvo   zvikuru zvitatu
           spoons   these   big   3

     d.   zvipunu zvitatu zvikuru izvo
           spoons   3   big   these

     e.   izvo   zvipunu zvitatu zvikuru
           these   spoons   3   big

     f.   zvipunu izvo   zvitatu zvikuru
           spoons   these   3   big

Carstens only discusses demonstratives (Dem), adjectives (A), and numerals (Num). Dem can be the leftmost or rightmost of these three elements; if leftmost it can occur before or after the head noun. A and Num have to occur to the right of the head noun but their relative order is free.

Carstens' analysis is shown below. There is a universal order of DP, XP, NumP, nP, and NP. The actual elements DemP, #P, and AP are adjoined to these projections, as follows:

(4)

```
                          DP
                    ┌─────┴─────┐
                    D           XP
                          ┌─────┴─────┐
                        DemP          XP
                         △       ┌────┴────┐
                       these     X        NumP
                               ┌───────────┴───────┐
                              #P                  NumP
                              △            ┌───────┴───────┐
                            three         Num             nP
                                                    ┌──────┴──────┐
                                                   AP            nP
                                                   △        ┌─────┴─────┐
                                                  big       n         NP
                                                                      △
                                                                    spoons
```

DemP, #P, and AP can also be adjoined on the right rather than the left. Additionally, DemP can appear in Spec-DP instead of adjoined to XP. N moves to D obligatorily. These options combined with obligatory N-to-D movement derive all and only the licit orders, as the reader can verify.

It is important to point out that all Carstens has shown is that N-to-D movement is a *possible* analysis of Shona word order. Carstens has not shown that N-to-D movement is *necessary*. To show that, one would have to show that no analysis that does without N-to-D movement could possibly succeed. This is probably impossible. More importantly, all that is necessary to refute Carstens' contention is to show that an analysis without N-to-D movement *can* succeed. This is easy to do, as in principle an infinite number of analyses could be proposed that would have the right result. Of course, the question then becomes, which analysis is a better approach to the word order facts?

Because I am concerned with this question, I will not simply propose an analysis as an exercise, but will spell out what I think is the right approach to the order of functional heads in the nominal, across languages. The order of the elements Dem, Num, and A has actually been a topic of much recent theoretical and typological work. Cinque (2005) and Abels & Neeleman (2012), for instance, propose formal approaches to the typological patterns that exist. It would be desirable to locate an analysis of Shona within such a typological approach. However, more recent research has shown that the typological facts are not as Cinque (2005) and Abels & Neeleman (2012) characterized them (Dryer 2018). Some orders that they thought were unattested are actually attested.

I take the data in Dryer (2018) to show that there are no principles of syntax that dictate the order of Dem, Num, A. As far as the syntax is concerned, these elements can be base-generated in any order (hierarchical or linear) within the NP. Particular languages may choose to only allow certain orders, for instance English generally only allows Dem Num A N. There are non-syntactic factors, for instance semantic factors and functional factors, that dictate that some hierarchical and linear orders will be more common than others. Dryer (2018) discusses some of these. For instance, Dem generally prefers to be peripheral, perhaps because it takes a generalized quantifier type or an individual as its sister, while adjectives tend to occur closest to the noun because they are predicates that need to combine with the N while it is still a predicate, before it has been converted into

an individual or a generalized quantifier. However, these are just tendencies, not grammatical principles.

I therefore propose that all of the Shona orders in (3) are simply base-generated, as shown below.

(5)   a.   (= 3a)   b.   (= 3b)   c.   (= 3c)

d.   (= 3d)   e.   (= 3e)   f.   (= 3f)
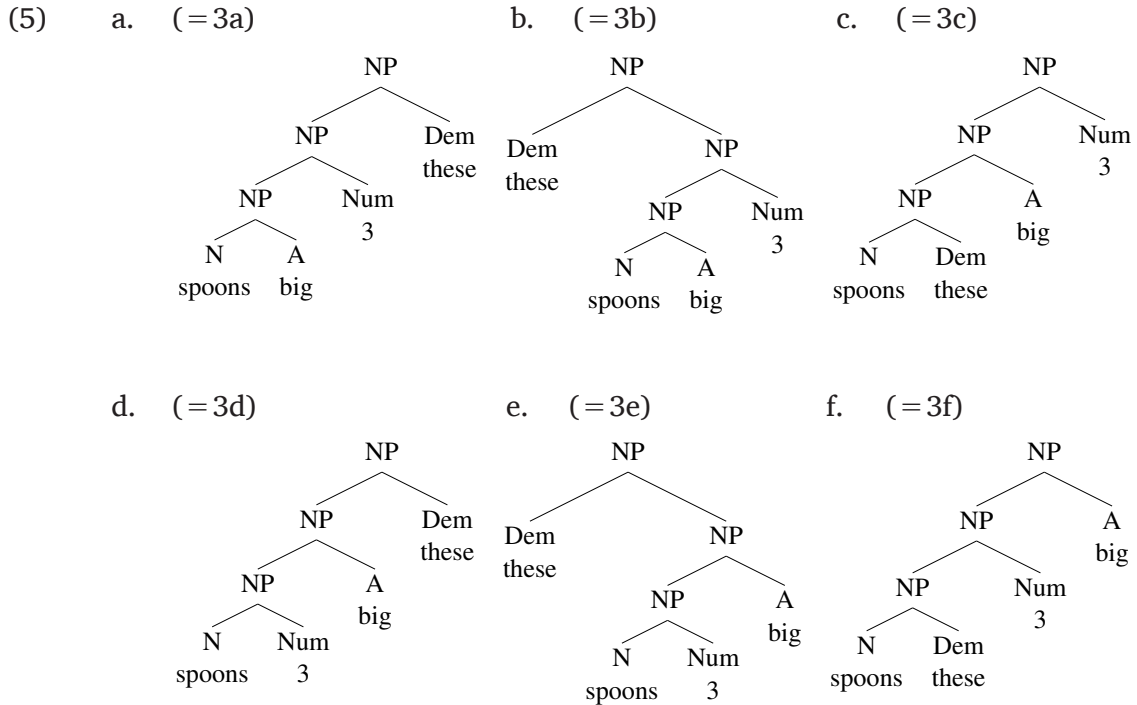
Merger of the three elements Dem, Num, A within the NP is free, except that Shona imposes two language-particular constraints: (1) Only Dem can precede the N, all other elements must follow it. (2) Two elements of the same grammatical class cannot be separated by an element of a distinct class. Regarding (2), it appears that Num and A are formally identical. They both begin with a morpheme that matches the noun class of the head noun. Dem is formally different (and we obviously need to distinguish it because it is the only element that can precede the N). I therefore suppose that Num and A are formally the same type of element in Shona. Given constraint (2), they cannot be separated by Dem. They are free to come in any order relative to each other, however.

Base-generation that is free but subject to just these two constraints derives exactly the orders in (3) and not those that are not attested. All orders with something other than Dem before the head N are ruled out. Only Dem can precede N. When it does, Num and A can merge in any order. This derives (3b) and (3e). When all three elements are after N, they can come in any order except that Dem cannot separate Num and A. This derives (3a), (3c–d), (3f). It rules out the unattested orders where Dem comes in between A and Num.

Since this analysis captures the empirical facts, it is clearly possible to build an analysis where N is the head of the nominal, not D, and there is no N-to-D movement. The question will always be, what is the simplest, best-motivated analysis? Let me compare the proposed alternative to the analysis proposed by Carstens.

Carstens' analysis has at least five relevant stipulations: (1) There is a universal hierarchy of functional heads to which dependents of N adjoin; (2) the elements DemP, #P, AP adjoin to particular functional heads in this hierarchy; (3) Dem can go in two locations; (4) dependents of N can adjoin on the right or the left; (5) N moves to D obligatorily in Shona. The universal hierarchy proposed by Carstens also has much more structure

than the analysis proposed here, including null heads that seem to do nothing other than to provide locations for the actual elements to adjoin. However, the analysis is couched within a framework of assumptions that posits such structure as a cross-linguistic universal, so one might view that as motivating it (but note that XP has no content and just seems to be a placeholder; the same might be true of nP).

In contrast, the analysis proposed here has only three stipulations: (1) There is no universal hierarchy, dependents of N can merge with N in any linear or hierarchical order, in principle. (2) Only Dem can precede the N in Shona. (3) Two elements of the same grammatical class cannot be separated by an element of a distinct class in Shona.

It therefore appears that the analysis proposed here is simpler than Carstens'. It has fewer stipulations. It also has less complicated structures, and it does not need any rule of movement at all. I also take its first stipulation to be motivated by the data in Dryer (2018). This first stipulation is also comparable to the first stipulation in Carstens' analysis as being an approach to the cross-linguistic facts. The other two stipulations in my analysis are not as well motivated as the first, but they fare no worse than Carstens' stipulations, which also lack motivation. (Why are there two positions for Dem? Why does N move to D? How is XP motivated?)

One could criticize the analysis proposed here on the grounds that there is something that it fails to capture, but it is not clear what that would be. The only concern discussed by Carstens is word order. There are no facts other than word order that require an explanation. Note that if there were, that might motivate some other approach, for instance a movement approach. But that would not necessarily have to be head movement, instead some phrase could be moving within the NP. In the absence of such facts, however, all we can do is account for the word order, and base generation does that much more simply than any movement account could.

I conclude that N-to-D movement is not necessary in Shona, as Carstens claims. It is quite simple to build an analysis without N-to-D movement and without the DP Hypothesis that is situated within an approach to the typology of nominal word order.

Before moving on, Carstens also claims that N-to-D movement is necessary to account for a putative cross-linguistic generalization that she advances. The claimed generalization is that only languages with N-initial NPs have clause-level agreement in gender (like Bantu and Semitic languages). Her explanation for this putative generalization is that gender is a property of the N, not the D; the only way to make gender visible outside of DP is for the N to raise to D and amalgamate with it. Therefore we need N-to-D to account for the cross-linguistic generalization. However, it can easily be shown that there is no such generalization. BCS, next, clearly has clause-level agreement in gender (see 6–7), but Ns follow adjectives in BCS, meaning they have not raised to D. Other languages also falsify the generalization: Tsez subjects and verbs agree in noun class (like Bantu), but all modifiers precede N (Comrie et al. 1998).

To summarize this section, there is no convincing case for N-to-D movement. It is not necessary for Shona, and there is no cross-linguistic generalization regarding gender that it is needed to explain. The vast majority of recent evidence indicates that N-to-D movement does not exist (see references above). This is consistent with the head of the nominal being N, not D.

4 BCS hybrid noun agreement

In BCS, certain nouns can have distinct formal gender and semantic gender. Agreement can target either. However, there is a constraint: Once agreement targets semantic gender, it cannot switch back to formal gender for agreement relations that are structurally higher. For instance, the noun *vladik-*, 'bishop', is formally feminine but typically refers

to male individuals. If an adjective in the NP agrees in formal gender (F), then the predicate can agree in either formal (F) or semantic (M) gender (6a). However, if the adjective agrees in semantic gender (M), then the predicate must also (6b; the "%" indicates that not all speakers permit agreement mismatches):

(6)   Puskar (2017: 6, (6))
        a. Star-e   vladik-e   su   se   posvadal-e/i.
            old-F.Pl bishop-Pl are Refl argue.Prt-F.Pl/M.Pl
            'Old bishops had an argument.'

        b. %Star-I   vladik-e   su   se   posvadal-i/*e.
            old-M.Pl bishop-Pl are Refl argue.Prt-M.Pl/F.Pl
            'Old bishops had an argument.'

This constraint has been documented and discussed in great detail in the literature, for many different languages; see, among many others, Corbett (1979, 1991, 2006), Wechsler & Zlatić (2003), Pesetsky (2013), Landau (2016).

Salzmann (2018) argues that this constraint follows from the DP Hypothesis and therefore constitutes an argument in its favor. Analyzing the example in (7), Salzmann argues that the demonstrative is D; as a head that projects it can block agreement relations with other heads that it c-commands and are dominated by its maximal projection (the N). In the NP Hypothesis, this could not be stated. Agreement from outside NP would always have to target the maximal projection NP, and, on the assumption that a head and its maximal projection always have the same features, there would be no way to permit NP-internal and NP-external agreement to diverge, much less account for the constraint that holds when they do.

(7)   Ovi   star-e   vladike   su   me   juče   posetil-i/*e.
        these.M.Pl old-F.Pl bishop.Pl are me yesterday visited-M.Pl/*F.Pl
        'These old bishops visited me yesterday.'

The analysis that Salzmann proposes is slightly more complicated. It includes the hypothesis that agreement for semantic gender is agreement in more features than agreement for formal gender (because semantic agreement includes the feature [Animate] or [Human]). Agreement for more features can look past things with fewer features, but not vice versa. So in (6a), a predicate seeking semantic features can look past an A with only formal features to the head N which has both, but in (6b) and (7), a predicate seeking formal features cannot look past an A or a D that has semantic features (only the head N has both).

One thing to note about this analysis is that it requires A to be a head that takes NP as its complement, just like D, to account for the blocking effect of A in (6). NP has to be a dependent of A and not the other way around in order for A to block agreement with N. This is an analysis that has largely been discredited (see Hankamer & Mikkelsen 2005: 95–96 and references there).

A bigger problem for Salzmann's argument is that it is possible to account for the hybrid agreement pattern without the DP Hypothesis. In fact several successful analyses of hybrid agreement have already been proposed, by Matushansky (2013), Pesetsky (2013), Landau (2016). These theories all have in common the idea that a feature that is not present on the head N can be introduced into the structure in a higher position; once it is introduced, everything structurally higher has to agree with that feature and cannot instead agree with the feature on N. I will not adopt this kind of account, since translating it into the
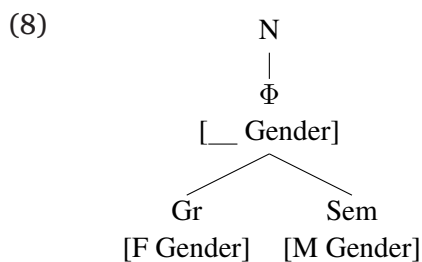
NP Hypothesis requires giving up the view that the features of a phrase are the same as the features of the head of that phrase. It also fails to capture the intuition that both the grammatical features and the semantic features are part of the lexical content of the head noun. As stated, in this type of analysis the semantic features are not present on N and are introduced higher in the structure. But it seems to be precisely a property of the particular noun that it has distinct semantic and grammatical features. Because of these two disadvantages, I will instead propose a different analysis.

The analysis that I will spell out attempts to capture the intuition that the gender features of hybrid nouns—both the grammatical and semantic gender features—are part of the head noun. They are lexical properties of that noun. It also attempts to capture the generalization that once something agrees with the semantic features of the head noun, the grammatical features become unavailable for agreement. At the same time, we want phrase structures to be endocentric, so that the features of the phrase NP and the features of its head N do not differ.
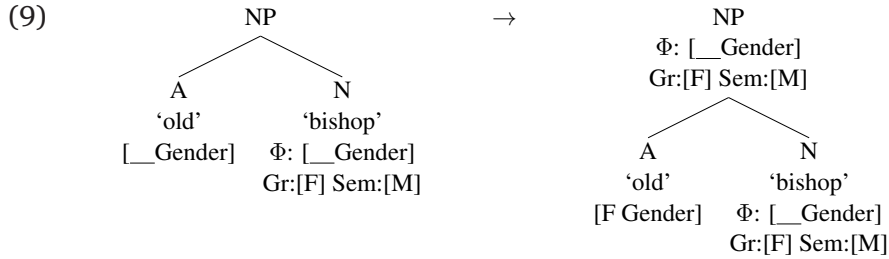
I will adopt the view that nouns may have two sets of features, index features and concord features (Pollard & Sag 1994, Kathol 1999, Wechsler & Zlatić 2000, 2003, Alsina & Arsenijević 2012, Landau 2016). However, I will rename these features *semantic* features and *grammatical* features, respectively, because they do not pattern in the way that the terms concord and index imply (grammatical features may figure in agreement outside of concord, for instance with a predicate as in 6a above, and semantic features may figure in nominal concord, as in 7). I will also reject the standard analysis of these two sets of features where they are unstructured. Instead I propose a structured feature analysis.

The structured feature analysis says that nouns have a set of phi-features, Φ. The phi-features at this level are initially unvalued. However, Φ dominates two sets of valued features, Gr (ammatical) and Sem (antic) features, as follows (illustrating only for Gender, since that is what is at issue in BCS):

(8)
```
               N
               |
               Φ
          [__ Gender]
           /        \
         Gr          Sem
      [F Gender]   [M Gender]
```
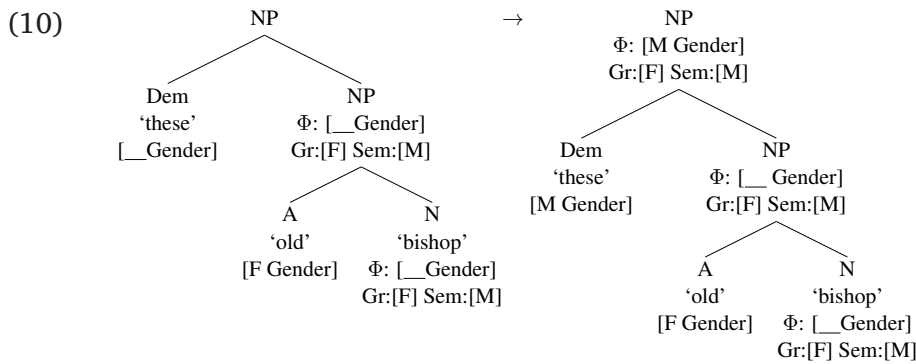
Since the topmost node Φ is not specified, any agreeing element can look past it and target either Gr or Sem. However, there is a principle that says that as soon as something agrees with Sem, the features of Sem are copied onto the Φ node. Thereafter nothing can look past Φ and has to agree in the features copied there from Sem. This captures the cross-linguistic generalization that once something agrees with semantic features, the grammatical features become inaccessible.

I assume that all agreement, including nominal concord, involves an agreement probe with unvalued features that searches its sister for valued features. When it finds valued features of the type it is looking for, it copies the values. In a concord language like BCS, adjectives and demonstratives have unvalued gender features. Illustrating with (7), both the A and the Dem initially have unvalued gender features which they value by copying the value from their sister. Beginning with A, it merges with N as its sister and copies a value from it for Gender:

(9)

```
                   NP                    →                    NP
                                                          Φ: [__Gender]
                                                        Gr:[F] Sem:[M]
          A              N                                   
        'old'          'bishop'                      A              N
     [__Gender]     Φ: [__Gender]                  'old'          'bishop'
                    Gr:[F] Sem:[M]              [F Gender]     Φ: [__Gender]
                                                               Gr:[F] Sem:[M]
```

In this case the A chose to copy the features from Gr, rather than Sem. This does not trigger the rule that would copy Sem values to Φ, so Φ remains unvalued at the node dominating N and A, as illustrated.

Dem then merges with the above NP. Dem also has unvalued gender features, so it agrees with its sister. Its sister also has unvalued Φ features, so Dem may look past the Φ node and may choose to agree either with Gr or Sem:

(10)

```
                  NP                     →                   NP
                                                         Φ: [M Gender]
                                                        Gr:[F] Sem:[M]
       Dem             NP                                    
      'these'      Φ: [__Gender]                Dem              NP
    [__Gender]    Gr:[F] Sem:[M]               'these'       Φ: [__ Gender]
                                             [M Gender]     Gr:[F] Sem:[M]
                  A         N                                   
                'old'     'bishop'                      A              N
            [F Gender]  Φ: [__Gender]                 'old'         'bishop'
                        Gr:[F] Sem:[M]            [F Gender]    Φ: [__Gender]
                                                               Gr:[F] Sem:[M]
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In this case Dem agreed with Sem, so the features of Sem are copied onto the Φ node in the mother, as shown. Any agreeing element higher, such as the participle 'visited' in (7), now cannot look past the Φ node and can only agree with the feature M. The same would have been true for the Dem if the A had instead agreed with the Sem feature. If it had, then the sister of Dem would have been specified M at Φ, and Dem could only have agreed with that. Thus this analysis captures the generalization that as soon as something agrees with semantic features, no agreement after that may target grammatical features.

This analysis obeys endocentricity in that the mother has no features that its daughter did not have, nor did the mother lose any information. The mother is not strictly identical to its head daughter, but the only difference is that a previously unspecified feature has become specified. That specification was already present, just in one location in the structured feature representation rather than two. However, unlike the analyses of Landau (2016), Matushansky (2013), Pesetsky (2013), no features are added during the derivation, and both the grammatical features and the semantic features are part of the lexical specification of the head noun. (One could also propose that when the unvalued Φ node becomes valued, it also becomes valued in all the daughter nodes, since they are all identical. This would strictly obey endocentricity. Since agreement with Gr at A in the above representations took place before this valuation, it would be allowed.)

This analysis also fares at least as well as that of Salzmann's based on the DP Hypothesis. It stipulates a structured representation for features, but so does Salzmann's analysis (semantic features are more complex in his analysis). It stipulates a rule for what happens when agreement targets the semantic features, but so does Salzmann's (agreement can look past a subset of features but not a superset).[3] It may also fare better when applied

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[3] One fact that this analysis does not account for is the difference between singular and plural. In BCS, hybrid nouns only show the possibility of either formal or semantic agreement in the plural. In the singular, they

to other languages. For instance, in English and Hebrew, semantic agreement is in number rather than gender (see Landau 2016). It is not clear that plural agreement with a noun like *committee* must also involve another feature like [animate], which is what is necessary for Salzmann's analysis to work. It happens that all of the relevant nouns in English and Hebrew do refer to animates, but this is not true of the Finnish data cited by Landau (2016: 1005–1006). If it is not true that semantic features always involve more features than grammatical features, then Salzmann's analysis will not succeed as a general approach to hybrid agreement. The analysis proposed here will.

Importantly, it *is* possible to capture the pattern of hybrid agreement without the DP Hypothesis, while maintaining the assumption that the features of a phrase and the features of its head match. Hybrid agreement therefore does not constitute an argument for the DP Hypothesis and against the hypothesis that the head of the nominal is the head N.

5 Conventionalized expressions

Bruening (2009) showed that verbs select functional heads like C when they select clauses, but they never select functional heads like D when they select nominals. Bruening et al. (2018) extended this observation to other functional heads in nominals like numerals and classifiers. Both papers conclude from this that the DP Hypothesis could not be correct, since it makes incorrect predictions for selection of nominals (see section 2 above). In response, Salzmann (2018) argues that this discrepancy in selection is irrelevant, as there is no evidence that verbs ever select for formal properties of nouns, either.

I will address this response by pointing out the relevance of conventionalized expressions like the idioms in (11a) and the collocations in (11b) (idioms and collocations differ essentially in whether they are interpreted literally or not).

(11) a. kick the bucket, bite the big one (both meaning 'die')
      b. keep a promise, pay attention

First, conventionalized expressions have been shown to require a close hierarchical (not linear!) relationship between the syntactic items that comprise them, like constituency, dependency (O'Grady 1998), or selection (Bruening 2010). Bruening (2010), Bruening et al. (2018) suggest that the relevant relation might be the *l-selection* of Pesetsky (1995), which is selection for particular lexical items. Bruening (2019) surveys the syntactic relations that can hold between the items in such expressions and shows that they are all combinations of extremely local relations. For instance, there are predicate-argument relations like the following ("X" indicates an open slot, see below):

(12) V Plus an Argument of V
      a. V NP: answer the door, back the wrong horse
      b. V NP P X: break the news to X, beat the bushes for X
      c. V X NP: give X permission, do X a favor, cut X some slack
      d. V NP NP: give it a rest, give the devil his due
      e. V NP PP: Y bring a tear to X's eye, build castles in the air
      f. V X PP: bring X to justice, feed X to the lions
      g. V (NP/X) Infinitive: lead X to believe Y, let sleeping dogs lie
      h. V (NP) CP: tell me it isn't/ain't so, X teach X's grandmother to suck eggs

always agree as [M]. The simplest thing to say is that these nouns are both formally and semantically [M] in the singular. This is consistent with other facts in the language, where the formal gender of a noun can vary from the singular to the plural (Wechsler & Zlatić 2000).

(13)   P or Adj Plus an Argument
        a.   P NP: against the law, behind the eight ball
        b.   Adj NP/PP: worth a fortune, loaded for bear

There are also local modification relations like the following:

(14)   Modification
        a.   Adjective-Noun: active ingredient, cold feet
        b.   N PP: call of duty, elephant in the room
        c.   Possessor N: beginner's luck, Davy Jones's locker
        d.   N Relative Clause: the least X can do, a bitter pill to swallow

For the complete list of syntactic relations, see Bruening (2019).

Importantly, conventionalized expressions are always *hierarchically continuous,* meaning that when there are two elements, one is a dependent of another. For instance, a verb and its object may comprise such an expression (12a). So may an adjective and the noun it modifies (14a). Expressions that are longer than two elements consist of a sequence of local relations. There are open slots, but they do not introduce hierarchical discontinuities (they do introduce linear discontinuities). Attested open slots are either left branches, like possessors, subjects, and objects, or they are the lowest complement:

(15)   Left Branch—Possessor:
        a.   X's old man
        b.   break X's heart

(16)   Left Branch—Subject:
        a.   as best X can
        b.   the last thing X want
        c.   the least X can do
        d.   X looks like X has seen a ghost

(17)   Left Branch—Object:
        a.   call X names, give X the benefit of the doubt
        b.   bring X to justice, drag X over the coals, set X on fire
        c.   give X to understand Y
        d.   tell X where to get off

(18)   Lowest Complement:
        a.   well aware of/that X
        b.   barely able to X
        c.   God's gift to X
        d.   have a bone to pick with X
        e.   have no idea that X
        f.   have a hard time X-ing
        g.   X cut X's teeth Y-ing
        h.   has had enough of X, had better X, might as well X

These open slots do not introduce hierarchical discontinuities. In the possessor case, the local relation is between two items, like an A and an N that it modifies, or a V and its NP object; the possessor being open does not disrupt either local relation. In the subject

case, for instance *the last thing X want*, the local relation between the N *thing* and the relative clause that modifies it is not disrupted. Within the relative clause, there is presumably a null C that combines with a TP which combines with a VP. The subject being open does not disrupt any of these local combinations. The same holds for a medial object: *names* combines with *call* as its argument in (17a), for instance. The lowest complement also does not introduce a discontinuity, obviously, as it is the last element in a chain of local relations. (Material is also open at the *top* of many if not most of these expressions.)

Importantly, discontinuities are not attested where some head in the middle of a hierarchical sequence of heads is an open slot. Since functional elements are what is relevant to the DP Hypothesis, I will show this for some functional elements. First, what is attested and indeed common is a fixed verb selecting a fixed preposition which then selects an open N as lowest complement (most of these have a fixed NP argument of V in addition to a fixed P):

(19)   Common: [Fixed.V [Fixed.P [Open.N]]]
        a.   light a fire under X
        b.   carry a torch for X
        c.   cast a pall on X
        d.   keep in touch with X
        e.   run the risk of X

(20)   Does not exist: [Fixed.V [Open.P [Fixed.N]]]

What does not exist is a sequence of a fixed verb with an open slot for a preposition and then a fixed NP. This is because the verb does not enter into a local relation with the NP directly, it only enters into a local relation with the PP.

Looking beyond PPs but still in the clausal domain, what we commonly find is a sequence of fixed functional heads (possibly also including fixed lexical heads) with an open lexical element as the lowest complement. For instance, all of the following expressions include functional elements like negation, aspect, and modals, but have an open slot for something with a lexical head as the lowest complement:[4]

(21)   a.   Negation: NEG breathe a word about X_{NP}, NEG bet on X_{NP}
        b.   Aspect: has had enough of X_{NP}, had better X_{VP}
        c.   Modal: might want to X_{VP}, would do well to X_{VP}, would rather X_{VP}, can't afford $X_{NP/CP[-fin]}$, can't help X_{VP}-ing, can't stand $X_{NP/VP}$, might as well X_{VP}

The lowest lexical XP can be open, while the functional stuff above it is fixed. What we do not find is expressions with fixed lexical material at the bottom, fixed material at the top (lexical or functional), but with open functional material in the middle:

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[4] It is not clear how to treat negation. It is probably not correct to view it as a functional head with a fixed position in a sequence of functional heads. Negation can be spelled out in a variety of ways, including with sentential negation or with a negative quantifier instead: *don't leave any stone unturned, leave no stone unturned*. A conventionalized expression that requires negation can also be separated from negation by a clause boundary: *I don't think he'll breathe a word about that*. If negation is a fixed functional head, it is an abstract one, not the actual negative morpheme. A likely alternative is to view conventionalized expressions that require negation as not themselves including negation, but being NPIs that have to occur in the scope of negation or another downward-entailing element. Some of them are indeed licensed without negation, in if-clauses for instance: *If you breathe a word about this,….*

(22)   Does not exist: [Fixed.Lexical/Functional [Open.Functional [Fixed.Lexical]]]

To make this point more clearly, let me point out some conventionalized expressions that include a verb plus an embedded clause. Here are some such expressions:

(23)   a.   know what the score is
        b.   NEG X know where X's head is (at)
        c.   know which side X's bread is buttered on
        d.   know which way the wind blows

(24)   a.   X teach X's grandmother to suck eggs
        b.   wait for the other shoe to drop

(25)   a.   tell X where to get off

In all of these cases, the functional elements in the embedded clause are fixed. In particular, C is completely fixed: as a finite interrogative in (23), as a non-finite declarative in (24), and as a non-finite interrogative in (25).
    None of these examples have an open lowest complement, but when we look at expressions that are entire clauses (but not selected by a V), what we find is that the functional material is fixed while the lowest complement (NP, CP, or VP as in 21 above) is open:

(26)   Questions
        a.   What's up with X_{NP}?
        b.   Whatever happened to X_{NP}
        c.   Where would we be without X_{NP}?
        d.   Who would have thought X_{CP}?
        e.   What/something is eating X_{NP}

(27)   Embedded or Main Declarative CP
        a.   the fact remains X_{CP}
        b.   to say nothing of X_{NP}

In all of these cases, the functional material is a fixed part of the expression and does not vary (the only variation that seems possible is using past instead of present tense).
    Putting these together, what we see is that the following pattern is common:

(28)   [(Fixed.Lexical) [Fixed.Functional [Open.Lexical]]]
        a.   [Fixed.Verb [Fixed.P [Open.N]]]
        b.   [(Fixed.Verb) [Fixed.C … [Open.N/C/V]]]

The pattern that does not exist is the following:

(29)   *[Fixed.Lexical [Open.Functional [Fixed.Lexical]]]
        a.   *[Fixed.Verb [Open.P [Fixed.N]]]
        b.   *[Fixed.Verb [Open.C … [Fixed.N/C/V]]]

Now consider nominals. If the DP Hypothesis is correct, a verb taking a nominal as its complement is exactly like a verb taking a CP as its complement. V should select D and some sequence of functional heads eventually leading down to a lexical N, exactly the way a V selects C and some sequence of functional heads leading down to a VP (or lower).

Given what we have just seen, what we should expect to find, then, is a great many expressions consisting of a fixed V, a fixed D, and an open N. We should never find a fixed V and a fixed N but open D. However, Bruening et al. (2018) show that the facts are just the opposite. In the vast majority of verb-nominal expressions, only the V and the N are fixed, while the D can vary. This is true even when the D has a canonical form. In such cases it can actually freely occur in a different form. The following examples illustrate some verb-object expressions that canonically occur with the definite determiner; in these attested examples, the determiner takes some other form instead:

(30) a. jump the gun: "before you all jump another gun"
      b. bark up the wrong tree: "Have you ever barked up a wrong tree?"; "you're barking up another wrong tree"
      c. bring home the bacon: "I still need to bring home some bacon occasionally."
      d. sell X down the river: "you just sold yourself down another river"
      e. pull the wool over X's eyes: "Tol' ye to go home to the ole man, an' pull some more wool over his eyes!"
      f. toe the line: "Pravda began to toe a line approved by Stalin and Kamenev"

As Bruening et al. (2018) discuss, the effect of varying the determiner is typically to make the event unique or not. Consider the two expressions *bite the bullet* ('decide to do something difficult or unpleasant') and *dodge a bullet* ('manage to avoid a difficult situation'), which in their canonical forms have the same N but distinct determiners. In *bite the bullet*, there is assumed to be a unique, identifiable unpleasant situation, whereas in *dodge a bullet* there are assumed to be potentially many. These assumptions can be changed by using different determiners: "we'll have to bite one of these bullets," "we had to bite yet another bullet"; in the other direction, "we dodged that bullet," "if we can dodge this bullet," "I dodged the real bullet" (amply attested on-line). What this indicates is that the choice of determiner is open, not selected; what determiner it is is determined by the typical rules for English determiner use (uniqueness), not by selection.

  As Bruening et al. (2018) show, then, the pattern with verb-object expressions is the following (indicating linear order now):

(31) a. Common: Fixed.V—Open.D—Fixed.N
      b. *Does not exist: Fixed.V—Fixed.D—Open.N

They show that this is true in classifier languages, too, substituting (demonstrative-) numeral-classifier sequences for D.

  This makes nominals exactly the opposite of what we expect from clauses and PPs. There we saw that open functional material in the middle of a sequence of fixed items was unattested, while open lexical material below fixed functional material was common. Analyzed according to the DP Hypothesis, nominals are outliers and the exact opposite of everything else. The DP Hypothesis requires nominals to exhibit an otherwise unattested discontinuity. In particular, verb-object expressions have to be a sequence $V — D — N$ but where only V and N are part of the expression while D is open. We do not see this elsewhere; in particular, conventionalized expressions have to be hierarchically continuous. Open slots are left branches, either arguments or modifiers, they never disrupt local relations between heads. On the DP Hypothesis, they would have to.

  In contrast, if the head of the nominal is N, then nominals are behaving exactly like every other category: a verb selects an NP headed by N, while left branches within the NP (the determiners, numerals and classifiers) can be open. Verb-object expressions are

hierarchically continuous on this view, with no discontinuity, exactly as we see everywhere else.

Let me make one final observation. This is that when a VP or CP is an open position as the lowest complement, its form is strictly determined by the selecting element. Below are some examples, with the required form indicated:

(32)   VP
        a.   can't help $X_{\text{VP-ing}}$
        b.   X cut X's teeth $Y_{\text{VP-ing}}$
        c.   had better $X_{\text{VP-bare}}$
        d.   might want to $X_{\text{VP-bare}}$

(33)   CP
        a.   can't afford $X_{\text{NP/CP[-fin,decl]}}$ (e.g., can't afford [to see movies])
        b.   Who would have thought $X_{\text{CP[fin,decl]}}$?
        c.   the fact remains $X_{\text{CP[fin,decl]}}$

If the DP Hypothesis were correct, we would then expect that when a nominal is the open lowest complement, the form of D would also be strictly determined. It is not. For instance, the expression *What's up with X?* can have any sort of NP: *What's up with toothpaste/that guy/the government/a prenup?*

If instead N is the head, then we expect that a particular form of N would be selected. N heads do not really have different forms to select, though, and so the attested state of affairs is what we expect if N is the head.[5] This is what is behind Salzmann's (2018) observation: Ns are not comparable to Cs and Vs in having different forms that can be selected. Ds do, so if the DP Hypothesis were correct, we should see them being selected. The fact that we do not indicates that N, which lacks different forms, is actually the head and is what is selected by selecting heads.

To summarize this section, one of the main conceptual motivations for the DP Hypothesis was a claimed parallel between nominals and clauses. With regard to conventionalized expressions, the two are not parallel at all. (They are not parallel in most ways that are important to the DP Hypothesis, as Bruening 2009 and Bruening et al. 2018 show.) Importantly for Salzmann's (2018) argument, V and N do enter into a close syntactic dependency. This becomes clear looking at conventionalized expressions, where all such expressions consist of continuous sequences of close syntactic relations. It is possible but not crucial that the close syntactic relation involved might be *l-selection*, or selection for a particular lexical item. Whatever we call this close syntactic relation, conventionalized expressions show us that V and C enter into one, as do V and P, so V does in fact enter into such relations with functional material. However, when we look at nominals, it is clear that the close syntactic relation is between V and N, not between V and D. This is incompatible with the DP Hypothesis. The only possible conclusion is that the nominal complement of V is headed by the N itself.[6]

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[5] Note that one could say that different case forms are the different forms of N that are selected, comparable to bare versus *-ing* with VPs and finite versus non-finite with CPs. If that is correct, then we do see strict selection for different forms of N.

[6] A reviewer points to the type of analysis in Sportiche (2005), where Vs combine with NPs but then NPs move to a position where they combine with D to become a DP. Bruening et al. (2018: section 2.3) show that this kind of analysis is also untenable.

6 Conclusion

In this paper, I have shown that three recent defenses of the DP Hypothesis fail. There is no argument for N-to-D movement, and in fact most evidence indicates that it does not exist. Hybrid noun agreement in BCS (and other languages) does not require the DP Hypothesis. I have proposed an analysis that accounts for the cross-linguistic pattern while maintaining the assumption that a phrase and its head share all features. Finally, conventionalized expressions show that verbs do in fact enter into close syntactic relationships with Ns, but they never do with Ds. The first two points simply defeat arguments in favor of the need for the DP Hypothesis, but the third goes farther and indicates that the DP Hypothesis is not just unnecessary, but untenable. The head of the nominal really has to be N, not D.

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Competing Interests

The author has no competing interests to declare.

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