Binding and Agreement in Distributed Coordinations

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It is well-known that extraction out of conjuncts is banned (the Coordinate Structure Constraint-CSC) unless the moving element moves out of each conjunct (across-the-board-movement-ATB).

(1) a. *Who$_i$ did he see [enemies of t$_i$] and Bill?   b. Who$_i$ did he see [friends of t$_i$] and [enemies of t$_i$]?

There is an exception, discussed by Postal (1998), Zhang (2010), Bošković (2022), among others, and illustrated by (2). I will refer to such cases as distributed coordination constructions (DCCs).

(2) Which book$_i$ and which magazine$_j$ did [John buy t$_i$] and [Bill read t$_j$] respectively?

(2) violates the CSC but does not involve ATB: it is not the case that the extracted element moves from each conjunct. (2) seems to involve two separate extractions, of different elements, from the conjuncts.

The goal of this paper is to examine binding and agreement patterns in DCCs. It will be shown that DCCs have important consequences for both binding and agreement. What matters for the former is that DCCs provide a rare case where different elements occupy SpecvP and SpecTP, which will be shown to have consequences for subject-oriented anaphors, anti-subject oriented pronouns, and anaphor binding more generally, including the notion of logophoricity. This double subjecthood of DCCs will also be shown to provide a new type of argument for the VP internal subject hypothesis.

Regarding agreement, it will be shown that DCCs provide evidence that the following (not previously observed) scenario is possible: X probes Y, it moves up and probes Z from a higher position, with the features of Z, not Y, realized on X. DCC will also be shown to have consequneces for determining the locus of agreement. The behavior of Japanese object honorification in DCCs and with ATB will also be discussed, and shown to have consequences for the proper analysis of ATB.

1. Basic derivation

As noted above, (2) seems to involve extraction of different elements out of the conjuncts. Postal (1998), Zhang (2010), and Bošković (2022) provide a number of arguments that the wh-phrases indeed undergo separate extractions in (2). One argument is provided by binding into the conjuncts in (3): *which man* binds an anaphor in the first and *which woman* in the second conjunct. Similarly, in (4) one wh-phrase licenses a parasitic gap in the first conjunct and the other wh-phrase in the second conjunct.

(3) [Which man]$_i$ and [which woman]$_j$ did respectively the doctor talk to t$_i$ about himself$_i$, and the
     lawyer talk to t$_j$ about herself$_j$;   (Postal 1998:161)
(4) [Which secretary]$_1$ and [which programmer]$_2$ did Jerome respectively fire t$_1$ after finding t$_1$ drunk
     and hire t$_2$ after finding t$_2$ sober?   (Postal 1998: 136)

This is confirmed by cases like (5). where the extracted elements contain an anaphor. The anaphor can be bound within the first conjunct or the second conjunct.

(5) Which book about himself$_i$ and which picture of herself$_j$ did John$_i$ buy and Mary$_j$ sell respectively?
                                                                              (Bošković 2022)

All this indicates that DCCs involve separate extractions of the conjuncts. The wh-phrases in (2)-(5) are then not coordinated in their base positions, which is also indicated by the interpretation of these constructions. This in turn means that the DCC coordination is formed derivationally—the wh-phrases in (2) get coordinated during the derivation, a conclusion reached in Bošković (2022), Zhang (2010). The former examines the precise mechanism and timing of this derivational coordination formation, which is illustrated by the derivation of (6) from Bošković (2022), given in (7)-(9). ((6) is interesting in that it shows a discrepancy between agreement and interpretation; what is interpreted in the θ-position of the first conjunct is *John* and in the θ-position of the second conjunct *Mary* (the interpretation of the conjuncts is "John was hunting lions" and "Mary was freightened by snakes"). Still, the agreement in (6) is plural—the agreement within the conjuncts is with *John and Mary*.)

As shown in (7)-(9), the lower conjuncts are built separately (7a-b), with ConjP1 formed through sideward merger (7c), and introduced into the structure within each conjunct, where it undergoes agree with the Tense of each conjunct (8). It finally undergoes ATB movement (given split IP, (9)).

(6) John and Mary were hunting lions and were frightened by snakes respectively. (Dougherty 1970)
(7) a. [$_{vP}$ John hunting lions]   b. [$_{VP}$ freightened Mary by snakes]
    c. [$_{ConjP1}$ John and Mary] (ConjP1 formed through sideward merger)
(8) [$_{TP}$ were-T [$_{XP}$[$_{ConjP1}$ John and Mary] X [$_{vP}$ ~~John~~ hunting lions] & [$_{TP}$ were-T [$_{XP}$[$_{ConjP1}$ John and Mary]
        |_____| **Agree** |_____| **Agree**
    X [$_{VP}$ freightened ~~Mary~~ by snakes]
(9) [$_{ConjP1}$ John and Mary] [$_{ConjP}$ [$_{TP}$ [$_{XP}$ [$_{ConjP1}$ ~~John and Mary~~] [$_{vP}$ ~~John~~ hunting lions] & [$_{TP}$ were-T [$_{XP}$
    [$_{ConjP1}$ ~~John and Mary~~] [$_{VP}$ frightened ~~Mary~~ by snakes]   (Bošković (2022)

The underlying assumption here is that it is not possible to move different elements out of a single coordination. Sideward merger makes it possible to get around that restriction (sideward merger was in fact originally employed by Nunes 2004 to get around islandhood/locality effects) and derivational coordination formation is what provides the needed sideward merger mechanism. DCCs then do not involve regular movement of different elements out of a single coordination (despite appearances; the DCC coordination must itself be moving given islandhood effects, see Bošković 2022).

It should be noted that DCCs like (6) provide evidence for the VP internal subject hypothesis given that the element that bears the external theta role is clearly different from the one that is located in SpecIP and undergoes subject agreement. More direct evidence that DCCs provide evidence for the VP internal subject hypothesis will be given in the following section based on binding.

2. Binding

Having discussed the basic derivation of DCCs, I turn to a more detailed discussion of binding. First, that DCC conjuncts start the derivation separately, DCC coordination being formed during the derivation and inserted into the structure above the position where the relevant elements are generated, is confirmed by anaphor binding cases where the DCC or elements within the DC serve as binders, i.e. DCC counterparts of *they$_i$ seem to each other$_i$ to be t$_i$ the best candidates in the convention.*

In (10), the DCC coordination *Bill and Sue* binds the reciprocal (it also undergoes agreement).

(10) [Bill and Sue]$_i$ seem to each other$_i$ to be the best candidate in the election and the best nominee for the convention respectively.

In (11), on the other hand, the conjuncts bind separately: *Bill* binds *himself* and *Sue* binds *herself*.

(11) [Bill$_j$ and Sue$_k$]$_i$ hired himself$_j$ and nominated herself$_k$ respectively.

(11) shows DCC conjuncts start separately. (12) shows they <u>must</u> start separately: they induce a block-ing effect separately (the closest subject for the anaphor is t$_i$ in the first and t$_j$ in the second conjunct).

(12) *[Bill$_i$ and Sue$_j$]$_k$ seem to be t$_i$ the best candidate in each other's$_k$ campaigns and t$_j$ the best nominee in each other's$_k$ parties respectively.

What the above data show is that when the anaphor is low in the structure, below the position where the relevant elements are base-generated, the relevant elements function as binders <u>separately</u> (see (11)). When the anaphor is high in the structure, where only the DCC coordination is higher than the anaphor, the relevant elements bind <u>jointly</u> (see (10)).

It is worth noting that Gawron and Kehler (2004) note interesting ditributive cases similar to (13), which cannot be analyzed the way Bošković (2022) treats DCCs like (6). Importantly, anaphor binding of the kind discussed regarding (11) is degraded in (14) (see also Bošković in prep), which indicates that (13) and (6) should not be analyzed in the same way (see section 3 for additional evidence).

(13) I finally met Lyn and Mary yesterday. These two sisters married Bob and dated Bill respectively.
(14) I finally met Lyn and Bill yesterday. *These two students hired herself and nominated himself respectively.

At any rate, what is important for us is that the above facts indicate that in (15), *the dogs* and *the roosters* start the derivation separately, which means different elements occupy SpecvP and SpecTP.

(15) [The dogs$_i$ and the roosters$_j$]$_k$ were [$_{vP}$ t$_i$ barking] and [$_{vP}$ t$_j$ crowing] all night.

Due to this mismatch in subjecthood, DCCs have important consequences for the unsettled issue of how subject-oriented anaphors (SOA) should be analyzed. Approaches to SOAs differ regarding whether the element in SpecvP or the element in SpecTP functions as the binder of an SOA when both are present. This has largely been considered a theoretical issue since it has been difficult to find a clear case that can tease these two options apart. DCCs in fact provide it.

Serbo-Croatian (16) contains a clear SOA *svom* (e.g. Despić 2011), which in principle can be bound by singular or plural antecendents. In (16), it is bound, in fact obligatorily, by the individual conjuncts.

(16) [Pas$_i$ i kokoška$_j$]$_k$ su lajali u [svom$_{i/*k}$ dvorištu] i kokodakali u [svom$_{j/*k}$ kavezu].
     dog and chicken$_{sg}$ are barked in its$_{anaphor}$ yard   and crowed   in its$_{anaphor}$ cage
     'A dog and a chicken barked in its yard and crowed in its cage.'   (Serbo-Croatian, SC)

What's important here is that what is located in SpecvP are the individual conjuncts but what is located in SpecTP and agrees with T is the whole coordination ((17); the derivationally formed coordination is merged into the structure below SpecTP, see Bošković 2022, which does not affect the point here).

(17)[$_{TP}$[Pas$_i$ i   kokoška$_j$]$_k$ su [$_{XP}$ t$_k$[$_{vP}$ t$_i$ lajali u svom$_{i/*k}$ dvorištu] i [$_{vP}$ t$_i$ kokodakali u svom$_{j/*k}$ kavezu]]
        dog and chicken   are   barked in its$_{anaph}$ yard   and   crowed   in its$_{anaph}$ cage

This is a rare mismatch, which can help tease apart different approaches to SOAs. What functions as the binder of *svom* in (16)/(17) is the element in SpecvP, not the element in SpecTP or the element that undergoes Agree with T. This is confirmed by (18) (recall the anaphor can in principle have a sg or pl antecedent. The judgment is given for the DCC reading; the *k* indexing is fine on the ATB reading).

(18) ?[Marija$_i$ i   Ana$_j$]$_k$ smetaju svome$_{i/*k}$ bratu   i   dosadjuju svojoj$_{j/*k}$ sestri.
      Marija   and Ana   bother her$_{anaph}$ brother and bore   her$_{anaph}$ sister

(16)/(18) provide evidence for approaches where the binder of subject-oriented anaphors is (or can be) the element located in SpecvP and against approaches where the element in SpecTP and/or the element that undergoes Agree with T must be the binder. There are many approaches along the latter lines (e.g. Pica 1987, Safir 2004, Reuland 2011, Antonenko 2012), (16)/(18) provide evidence against all of them.

Additional data in (19)-(20) confirm the above conclusion. (19) involves a slightly higher level of coordination (it is similar to (6)). (20) involves interaction with right node raising (RNR). Its partial derivation is given in (21). (It involves derivational coordination formation for both the subject and the object, with the latter ConjP inserted in the RNR position in (20), after the step in (21d) (see Bošković 2022 for RNR constructions with distributed readings involving derivational coordination formation).)

(19) ?Pas$_i$ i   kokoška$_j$ jesu lajali   u [svom$_i$ dvorištu] i   jesu kokodakali u [svom$_j$ kavezu].
      dog and chicken are   barked in its$_{anaph}$ yard   and are crowed   in its$_{anaph}$ cage
(20) ?Pas$_i$ i   kokoška$_j$ su lajali   i   kokodakali u [svom$_i$ dvorištu] i   u [svom$_j$ kavezu].
      dog and chicken are barked and crowed   in its$_{anaph}$ yard   and in its$_{anaph}$ cage
(21) a. [$_{vP}$ dog barked in its yard]   b. [$_{vP}$ chicken crowed in its cage]
     c. [$_{ConjP}$ dog and chicken]   d. [$_{ConjP}$ in its yard and in its cage]

Now, one of the tests for quirky subjects in languages like Icelandic is SOA binding: subjecthood here is defined in terms of location in SpecTP, given that the characteristic of Icelandic quirky subject constructions is the lack of an external θ-role (see e.g. Holmberg & Platzack 1995; there is no external argument in (22)), i.e. the lack of vP.

(22) Henni   þykir bróðir   sinn leiðinlegur.
     her(D) thinks brother(N) self   boring   (Zaenen et al 1985)

What the SC and Icelandic facts mean, taken together, is that SpecvP closes the binding domain for subject-oriented anaphors <u>when present</u>: This is the case in (17) but not (22).
    DCCs also have consequences for the phenomenon of anti-subject oriented pronouns, which is also found in SC (see (23)). In particular, DCCs provide evidence that what is relevant here is SpecvP: such pronouns are not allowed to be bound by the element in SpecvP (see (24); this is an issue for e.g. Hestvik 1992). Whether or not they can be bound by the element in SpecTP depends on (25). It is marginally possible but the interfering factor here is the possibility of an indexing option along the lines of *njihovom$_{i+j}$*, in light of (26), which does not violate Condition B (see Reinhart & Reuland 1993).

(23) Jovan$_i$ je pričao Marku$_j$ o   njemu$_{j/*i}$.
     Jovan is talked Marko.dat about him
     'Jovan talked to Marko about him.'
(24) [Jovan$_i$ i Marija$_k$]$_k$ su [$_{vP}$ t$_i$ pričali Marku$_j$ o   njemu$_{j/*i}$ i [$_{vP}$ t$_k$ zvocali   Ani$_l$ o   njoj$_{l/*k}$]
     Jovan and Marija are   talked Marko.dat about him   and   complained Ana.dat about her
(25) ?[Psi$_i$ i   kokoške$_j$]$_k$ su [$_{vP}$ t$_i$ lajali u njihovom$_k$ dvorištu] i [$_{vP}$ t$_j$ kokodakali u njihovom$_k$ kavezu]]
     dogs and chicken$_{pl}$ are   barked in their   yard   and   crowed   in their   cage
(26) Ova kuća je nekad pripadala Jovanu$_i$ i   Mariji$_j$ ali je Jovan$_i$ prodao njihovu$_{i+j}$ kuću.
     that house is once belonged Jovan$_{dat}$ and Marija$_{dat}$ but is Jovan sold   their   house

    DCC have consequences for binding beyond subject-orientation. Consider again (27).

(27) *[Bill$_i$ and Sue$_j$]$_k$ seem t$_k$ to be t$_i$ the best candidate in each other's$_k$ campaigns and t$_j$ the best
      nominee in each other's$_k$ parties respectively.

    A simple Agree with (or a relation through) T would not work here either to license the anaphor: the only T-Agree relation is with *John and Mary*, which is apparently not enough to license the anaphor. Furthermore, the intervening subject, which is preventing binding, cannot be defined in terms of SpecTP (the intervening subjects in (27) are t$_i$ in the first conjunct and t$_j$ in the second conjunct; note also that under Chomsky's approach to phases there is only one phase here).
    Another consequence is that a logophor account of (10) (*Bill and Sue$_i$ seem to each other$_i$ to be the best candidate in the election and the best nominee for the convention respectively*) is problematic since it could not block (27). Saliency and the point of view are often appealed to in defining an antecedent for a logophor. It is difficult to see how the relevant requirement could be satisfied in (10) but not (27) (logophoricity is supposed to void the intervening binder effect for less salient binders).
    It should also be emphasized that, as briefly noted above, the DCCs discussed here provide strong evidence for the VP internal subject hypothesis. The element that bears the external theta role and the element that is located in SpecIP and undergoes subject agreement are clearly different in DCCs. Moreover, we have seen that sometimes the former and sometimes the latter functions as a (potential) binder. The relevant facts cannot be accounted for unless the VP internal subject hypothesis, which makes it possible for the relevant constructions to have two subjects (for binding), is adopted.

I will finish the discussion of binding with the surprising contrast between (28)-(29) and (30)-(31).

(28) John and Mary love his pet goldfish and him respectively; coreference possible
(29) Mary and John love him and his pet goldfish respectively; coreference possible (Goodall 1987)
(30) John and Mary hired his cousin and fired him respectively; coreference impossible
(31) Mary and John hired him and fired his cousin respectively; coreference impossible

The contrast is acutally not surprising under the current analysis of DCCs, where (32)-(33) are essentially the underlying structures of (30)-(31): they in fact pattern with (30)-(31) in the relevant respect.

(32) John hired his cousin and Mary fired him; coreference impossible
(33) Mary hired him and John fired his cousin; coreference impossible

Furthermore, RNR examples below pattern with (28)-(29), which suggests RNR may be involved in the derivation of (28)-(29) (for RNR treatments of examples similar to (28)-(29), see Bošković 2022).

(34) John loves, and Mary hates, his pet goldfish and him respectively; coreference possible
(35) Mary hates, and John loves, him and his pet goldfish respectively; coreference possible

3. Agreement

I now turn to agreement. (36)-(37) illustrate the pattern of agreement in DCCs under A-movement.

(36) A dog and a rooster were barking and crowing all night.
(37) *A dog and a rooster was barking and crowing all night.

With A'-movement DCCs, English examples in the literature generally use *do*-support, in a way that avoids addressing agreement (cf. (2)-(5)). However, a surprising pattern was revealed by a 10 speaker survey for constructions that do involve agreement: only one speaker rejected (38), involving plural agreement, with 2 speakers even preferring plural to singular (the possibility of plural agreement was also confirmed with similar constructions from German in (40), with the context specified below).

(38) (?)Which wine and which cake have [$_{TP}$ Peter drunk] and [$_{TP}$ Mary eaten] respectively?
(39) Which wine and which cake has [$_{TP}$ Peter drunk] and [$_{TP}$ Mary eaten] respectively?
(40) Peter and Mary got food poisoning at a party. Peter had a glas of wine and Mary a piece of cake.
    a. Welchen Wein und welchen Kuchen hat   Peter getrunken und Maria gegessen?
      which   wine and which   cake   has(SG) Peter drunk   and Mary eaten
    b. Welchen Wein und welchen Kuchen haben   Peter getrunken und Maria gegessen?
      which   wine and which   cake   have(PL) Peter drank   and Mary eaten

Importantly, distributed extraction is needed for plural; speakers who disallow it with regular ATB accept it with distributed attraction, which indicates that this is not simply a processing agreement-attraction effect (the non-distributed, regular ATB reading holds for (42)).

(41) Which wine and which cake were Peter drinking and Mary eating respectively?
(42) ?*Which wine and which cake were Peter selling and Mary buying?

Inversion is also needed for plural agreement: it is impossible in indirect questions.

(43) *I asked which wine and which cake Peter have drunk and Mary have eaten respectively.
(44) I asked which wine and which cake Peter has drunk and Mary has eaten respectively.

So, for plural agreement the auxiliary must agree for it from C, in the presence of a DCC coordination in SpecCP. This can be taken as indicating that plural agreement arises through Spec-head agreement with the DCC ConjP in SpecCP: the auxiliary would then have to be located in C for plural agreement.

Crucially, two subjects are needed: plural is not possible with DCC VP coordination.

(45) Which nurse and which hostess has Sue sold$_i$ [$_{VP}$ cocaine t$_i$ to] and [$_{VP}$ heroin t$_i$ to] respectively
(46) ?*Which nurse and which hostess have Sue sold$_i$ [$_{VP}$ cocaine t$_i$ to] and [$_{VP}$ heroin t$_i$ to] respectively

The Spec-Head agreement with C analysis cannot differentiate (38) and (46).
    Consider also conjunct agreement. SC allows both first and last conjunct agreement. The latter requires a Spec-head relation (the moving element in (47b) moves through SpecPartP, see Bošković 2009).

(47) a. Juče   su uništena   [sva sela   i   sve   varošice].
        yesterday are destroyed.pl.**neut** all   villages.**neut** and all   towns.fem
        'All villages and all towns were destroyed yesterday.'
     b. [Sva sela   i   sve varošice]$_i$ su (juče)   t$_i$ uništene t$_i$.
        all villages.neut and all towns.**fem** are yesterday destroyed.pl.**fem**   (Bošković 2009)

SC allows extraction of adjectives (48). It also allows it in DCCs, as in (49) (see Bošković 2020).

(48) Crvene$_i$ ona [t$_i$ suknje] prodaje.
     red   she   skirts   is-selling
(49) [Crvene$_i$ i   bijele$_j$] ona [[t$_i$ suknje] i   [t$_j$ kapute]] prodaje.
      red   and white she   skirts   and   coats   is-selling
     'She is selling red skirts and white coats.'

The pattern of conjunct agreement with DCCs is given in (50)-(51).

(50) *Crvene$_i$ i   bijela$_j$ su prodana   [t$_i$ suknje]   i   [t$_j$ dugmad].
      red.fem and white.**neut** are sold.pl.**neut** skirts.fem and   buttons.neut
      'Red skirts and white buttons.'
(51) ?Crvene$_i$ i   bijela$_j$ su prodane   [t$_i$ suknje]   i   [t$_j$ dugmad].
      red.fem and white.neut are sold.pl.**fem**   skirts.**fem** and   buttons.neut

If the unexected plural in (38) arises through Spec-head agreement with the DCC coordination, it is surprising that last conjunct agreement, which involves a Spec-Head relation, doesn't happen here, as (50) shows (assuming the DCC coordination passes through SpecPartP, like the coordination in (47b)).
    I conclude therefore that the Spec-Head agreement analysis cannot account for the surprising plural agreement pattern in DCCs. Instead, I propose that the coordinated IPs are the source of plural in examples like (38), with the inverted/raised auxiliary probing the IP coordination.
    What is relevant here is McCloskey's (1991) observation that CPs can trigger agreement. He observes that when coordinated clauses are compatible, i.e., denote a single complex state of affairs, they do not trigger plural agreement. When coordinated clauses are contradictory, i.e., denote a plurality of distinct states of affairs or situation-types, they trigger plural subject agreement.

(52) That the position will be funded and that Mary will be hired now seems/??seem likely.
(53) That he'll resign and that he'll stay in office seem at this point equally possible. (McCloskey 1991)

    The suggestion is then that the plural agreement in DCCs like (38) is triggered by the coordinated clauses; the distribution induced by *respectively* satisfies the plurality of distinct states requirement, which is what distinguishes it from regular ATB.
    Note that *respectively* alone cannot be responsible for the plural pattern; if that were the case lack of inversion and VP-coordination should not matter since *respectively* is present in (43) and (46) too.
    At any rate, if the analysis proposed above is on the right track, we have evidence here that not only CPs, but also TPs, can trigger agreement (VPs, on the other hand, cannot, cf. (45)-(46)). Under this analysis, it is also obvious why inversion is required (cf. (38) vs (43)): without it, the auxiliary does not c-command the coordinated clauses hence cannot probe them under Agree.
    Note also that distributive cases like (13) do not trigger plural agreement (54), which confirms that they should not be analyzed in the same way as DCCs, as concluded above based on binding.

(54) I finally met the two sisters, Sue and Lyn, yesterday. Which sister is/*are Jon engaged to and Bill dating respectively?

Let us now look more closely at the derivations of (38)-(39), repeated below.

(38) (?)Which wine and which cake have [$_{ConjP}$ [$_{TP}$ Peter drunk] and [$_{TP}$ Mary eaten]] respectively?
(39) Which wine and which cake has [$_{ConjP}$ [$_{TP}$ Peter drunk] and [$_{TP}$ Mary eaten]] respectively?

First, T probes the subject DP within each conjunct prior to inversion, which results in singular agreement (39).

(55) T [$_{vP}$ Peter drunk] and T [$_{vP}$ Mary eaten]
     |_____| **Agree** |_____| **Agree**

Regarding (38), I suggest that there is also a reprobing derivation,[1] with the auxiliary (or C+T) probing the subject ConjP, i.e. clausal coordination, after inversion (note this ConjP is the complement of C).

(56) C+T [$_{ConjP}$ [$_{TP}$ Peter drunk] and [$_{TP}$ Mary eaten]
          |_____| **Agree**

This then overwrites the initial Agree, with the agreement realized with marked plural. Note, however, that we may not necessarily be dealing here with Agree overwriting with marked plural if singular is a lack of number (see e.g. Ackema and Neeleman 2019): there is nothing to override then.[2,3]
    What about (57)?

(57) *Have Mary eaten a cake and Peter drunk wine respectively?

There are two possibilities. One is that the semantic condition on coordinated clauses being plural is not satisfied (extraction of different elements from the conjuncts being needed for that, which is what we get with DCC extraction in (38)). Another possibility is to appeal to Franck, Lassi, Frauenfelder and Rizzi's (2006) double checking system, where in some cases Agree as well as Spec-Head agreement is needed for morphological realization of plural. In (38), the former would be satisfied as shown in (56), and the latter would be satisfied through Spec-Head agreement with the DCC, which does not occur in (57) (note that Spec-Head agreement alone would still not be enough for plural, as discussed above).[4]
    Finally, the following contrasts also straightforwardly follow under the current analysis. What is important here is that the inverted auxiliary in these examples is inside of the coordination, which means that it cannot probe the coordinated clauses since it does not c-command clausal coordination.[5]

(58) ?Which wine and which cake [has [$_{TP}$ Peter drunk] and will [$_{TP}$ Mary eat]] respectively?
(59) *Which wine and which cake [have [$_{TP}$ Peter drunk]] and [will [$_{TP}$ Mary eat]] respectively?
(60)?Welchen Wein und welchen Kuchen hat   Peter getrunken und hat   Maria gegessen?
     which   wine and which   cake   has(SG) Peter drunk   and has.(SG) Mary eaten

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[1]This kind of reprobing may be possible only before transfer (if unvalF would receive value and delete at transfer).
[2]It's worth noting that in conflicting cases like (i), (ib), where the marked plural is morphologically realized, is better than (ia), where singular is morphologically realized, which can be captured if singular is the lack of number.
(i) a. *Is Mary eating a cake and they drinking wine?   b. ??Are they eating a cake and Mary drinking wine?
[3]As for speaker variation, for those who allow both (38) and (39) both the derivation where T probes only prior to inversion, resulting in singular agreement, and the reprobing derivation, with probing after inversion, are allowed (alternatively, clausal coordination optionally has phi features even in this context, singular resulting from the no-phi-feature option). For speakers who disallow plural (recall it was only one out of ten, two even preferred plural), the latter (the reprobing derivation) is not allowed (or clausal coordination does not have phi-features for them).
[4]Z. Shen (p.c.) suggests an intriguing alternative where, instead of reprobing with ConjP as the goal as in (58), when two Ts, each with a [Sg] feature due to the Agree relations in (57), ATB-move to C, the two [Sg] features combine to make a [Pl] feature (for somewhat similar multivaluation, see Shen 2018). It seems tricky to make this sensitive to DCC since PL is impossible with regular ATB (42) or to block it in (59), where there is only inversion.
[5]As for the tests for movement of conjuncts in (3)-(6), for most speakers the paradigm is the same with pl and sg.

(61) *Welchen Wein und welchen Kuchen haben   Peter getrunken und haben   Maria gegessen?
        which   wine and which   cake   have(PL) Peter drunk   and have.(PL) Mary eaten

3.1. Japanese honorification

I will now briefly address a difference with regular ATB regarding reconstruction. Reconstruction for binding is possible into the second conjunct with DCCs (62) but not with regular ATB (63).

(62) a. ?[Which painting] and [which book about herself$_i$] did John buy and Mary$_i$ sell respectively?
    b. ?[Which book about herself$_i$] and [which painting] did Mary$_i$ buy and John sell respectively?
(63) Which book about himself$_{i/*j}$ did John$_i$ buy and Peter$_j$ sell?

This difference is rarely discussed outside English and binding. Consider then Japanese honorification, which has been treated in terms of Agree (e.g. Niinuma 2003). Japanese allows DCCs (64). (65) gives honorification with DCCs (*oyobisita* is a honorific form of *call*; 'insult' cannot be honorified given its meaning). What is important is that reconstruction for honorification is possible into both conjuncts.

(64) Niku-to   sake-o   sorezore   Taro-ga   tabe-te Hanako-ga   nonda.
        meat-and sake-acc respectively Taro-nom eat-and Hanako-nom drank
        'Meat and sake, Taro ate and Hanako drank respectively.'
(65) **DCC**: Context for a/b: Taro pays respect to a professor but not to a student.
    a. ?Kyoujyu-to gakusei-o   sorezore   Taro-ga   **o**yobisi-te Hanako-ga   batoosita.
        professor-and student-acc respectively Taro-nom   call-and   Hanako-nom insulted
    'A professor and student, Taro called and Hanako insulted respectively.'
    b. *Gakusei-to kyoujyu-o   sorezore   Taro-ga   **o**yobisi-te Hanako-ga   batoosita.
        student-and professor-acc respectively Taro-nom   call-and   Hanako-nom insulted
    Context for c/d: Hanako pays respect to a professor but not to a student.
    c. *Kyoujyu-to gakusei-o   sorezore   Taro-ga   batoosi-te Hanako-ga   **o**yobisita.
        professor-and student-acc respectively Taro-nom insult-and Hanako-nom called
    d.?Gakusei-to kyoujyu-o   sorezore   Taro-ga   batoosi-te Hanako-ga   **o**yobisita.
        student-and professor-acc respectively Taro-nom   insult-and Hanako-nom called

Importantly, regular ATB behaves in the same way, allowing reconstruction into both conjuncts.

(66) **ATB**: a/b examples acceptable only if Taro pays respect to a student as well as to a professor.
    a. Kyoujyu-to gakusei-o   Taro-ga   **o**yobisi-te Hanako-ga   batoosita.
        professor-and student-acc Taro-nom call-and   Hanako-nom insulted
    'A professor and student, Taro called and Hanako insulted.'
    b. Gakusei-to kyoujyu-o   Taro-ga   **o**yobisi-te Hanako-ga batoosita.
        student-and professor-acc Taro-nom call-and   Hanako-nom insulted
    c/d examples acceptable only if Hanako pays respect to a student as well as to a professor.
    c. Kyoujyu-to gakusei-o   Taro-ga   batoosi-te Hanako-ga   **o**yobisita.
        professor-and student-acc Taro-nom insult-and Hanako-nom called
    d. Gakusei-to kyoujyu-o   Taro-ga   batoosi-te Hanako-ga   **o**yobisita.
        student-and professor-acc Taro-nom insult-and Hanako-nom called

Reconstruction for honorification into the second conjunct is thus possible with both DCC and ATB, while it is not possible with ATB for binding in English. These data may have consequences for Agree approaches to binding (given that honorification involves Agree) and treatments of ATB. In particular, they may provide evidence for the null Op account of ATB (e.g. Munn 1993), where what moves in the second conjunct is an Op without internal structure: internal structure is needed for anaphor licensing in (63), but it is not needed for honorification in (66c-d), since Op itself can undergo Agree.

3.2. The locus of agreement

Consider now the issue of the locus of agreement. It is standardly assumed that although agreement surfaces on the verb, its source is somewhere else. It is not a priori clear what the source of agreement

is, the verb itself (i.e. the verb has it to start with, which is essentially how Lasnik 1995 treats V-raising languages), or it is somewhere higher up (like on T, which superficially appears to complicate things). DCC semantics/agreement mismatches provide evidence for the latter, including V-raising languages. Given the VP internal subject hypothesis, if the source of agreement is the verb itself, not a higher head like T, we would expect the verb to show singular agreement in English (67a) (cf. (67c)) and SC (67b), where V raises out of vP (Bošković 2001, Stjepanović 1999). Notice also that in SC, the agreement is not separable from the verb—there is no free form of the verbs in (67b) without agreement.

(67) a. In this neighborhood, a dog and a rooster bark and crow all night.
    b. Pas i   pjevac non-stop laju   i   kukuriču.
      dog and rooster non-stop bark.pl and crow.pl
    c. [$_{vP}$ a dog barks]……. [$_{vP}$ a rooster crows] (expected if the verb itself agrees)

What is important here is that the subject of the verbal projection and the subject of the clause are different—the coordination is the subject of the latter but not the former. That the agreement here is with the coordination then provides evidence that the source/locus of subject agreement is not its host, the verb (even in a V-raising language where agreement is not separable from the verb).

The same point can be made with subject agreement that surfaces on the participle. Both the auxiliary and the participle show plural agreement in (68), so even when it comes to the agreement on the participle, the verb is not the source/locus of the agreement.

(68) Pas   i   pjevac   su cijelu noć lajali   i   kukurikali.
     dog   and rooster   are all   night barked.pl and crowed.pl   (SC)

4. Conclusion

DCCs present a rare mismatch where different elements occupy SpecvP and SpecTP, which I have shown has consequences for the treatment of subject-oriented anaphors, anti-subject oriented pronouns and anaphor binding more generally, including agreement approaches to it and logophoricity.

The agreement patterns in DCCs provide evidence that TPs can trigger agreement and that the following scenario, which, as far as I know, has not been previously observed, is possible: X probes Y, then X moves up and probes Z from a higher position, with the features of Z realized on X.[6]

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[6]Another candidate for this pattern may be double participle constructions in SC. Consider (i).
(i) a. ??Juče   su bile   sve varošice i   sva sela   uništena.
       yesterday are been.**fem** all   towns.**fem** and all villages.**neut** destroyed.**neut**
        'All towns and all villages had been destroyed yesterday.'
   b. ??Juče   su bila   sva sela   i   sve varošice uništene.
       yesterday are been.**neut** all villages.**neut** and all towns.**fem** destroyed.f**em**
(ii) ??Oni su   bili Markovog prijatelja otpustili.
     they are been Marko's   friend   fired
     'They fired Marko's friend.'
(i) is degraded independently of participle agreement (cf. (ii)). In fully acceptable examples nothing can intervene between the participles. To capture this, Bošković (1997) suggests they form a complex head. The first participle can apparently marginally excorporate from this complex head. (i) can then be analyzed as follows. Assume the first participle heads what I referred to above as PartP. The second participle adjoins to it (leftward or rightward, see Bošković 1997). As noted, when probing is not accompanied with movement we get first conjunct agreement (iv) and when it is accompanied with movement we get last conjunct agreement, as in (iii), where the coordination moves to the Spec of the relevant head on the way up (one can think of the first-last conjunct agreement difference as Agree vs Agree+Spec-head, a difference discussed above). In (i), the coordination stays in that Spec, but *bile* moves from the head position of that phrase to a higher head position and probes again, which yields first conjunct agreement. The first probing relation then results in last-conjunct agreement. But the aux-participle probes again, resulting in first conjunct agreement. This may then also be a case where a head probes before and after movement, with different results, with the result of the second probing operation, after movement, morphologically realized.
(iii) Sve varošice i   sva sela   su bila   uništena.
    all towns.fem and all villages.**neut** are been.**neut** destroyed.**neut**
(iv) Juče   su bile uništene   sve varošice i   sva sela
    yesterday are been.**fem** destroyed.**fem** all   towns.**fem** and all villages.neut

The double subjecthood of DCCs also provides a new type of argument for the VP internal subject hypothesis as well as that locus of subject agreement is not the verb (although it surfaces on the verb).

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    'All towns and all villages had been destroyed yesterday.'

Another relevant case may be Dutch C-agreement (v), if (vi) is analyzed as involving movement of T to C (which would then always be taking place, see Zwart 1997). The first probing, reflected in the morphology on the verb, would then involve Agree with the coordination (when the subject is located in SpecvP), and the second probing, reflected on the complementizer, would involve Agree with the first conjunct when the subject is in SpecTP (this would be similar to the case discussed in the text in that T would undergo Agree both before and after movement).

(v) Ich denk de-s   doow   Marie   ontmoet-s.
    I   think that-**2SG** you.**SG** Marie meet-2**SG**
   'I think that you will meet Marie.'

(vi) Ich dink de-s   [toow   en   Marie] kump.
    I   think that-2**SG** you.**SG** and Marie   come.**PL**
   'I think that you and Marie will come.'   (Limburgian Dutch, Haegeman and van Koppen 2012)