On Extending the Application-domain of the CSC

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1. Introduction

Ross (1967) stated the well-known restriction that nothing may move out of a coordinate structure unless movement is Across-the-Board (ATB) (see also Williams (1978)). This restriction is generally referred to as the Coordinate Structure Constraint (CSC). (1a) is grammatical, because which car has moved from all coordinates, whereas (1b) is bad, because movement is from the first coordinate (C1) only.

(1) a. Which car t1 did John like t1 but Mary hate t1?
    b. *Which car t1 did John like t1 but Mary hate the salesman?

More recent theories of the CSC (e.g. Goodall (1987), Moltmann (1992), Munn (1993), Fox (2000), among others) are constructed in such a way that the CSC applies once for the entire derivation. Simply put, the CSC looks at a complete sentence and and checks for all the coordinates whether movement has occurred. For a given coordinate, each coordination embedded in it will introduce a branching of this coordinate, where the number of branches corresponds to the number of sub-coordinates. The CSC then requires that, in cases of movement out of the coordinate structure, each (sub)-coordinate contains a trace (or variable, in some theories) bound by the moved element. All of these theories account for the data in (1). However, they are not well suited to deal with apparent exceptions to the CSC.

The present paper uses such an exception from German, termed Subjektlücke in finiten Sätzen (= subject lacking in finite sentences, SLF henceforth) by Höhle (1983, 1990), to shed more light on the workings of the CSC. In particular, interactions of what look like violations of the CSC and proper ATB-movement, show that the theory of the CSC sketched above must be refined. The CSC must, in a certain sense, be conceived of as more local condition. It should be kept in mind that the CSC is active in German, except for the restricted environments to be discussed. (2) is an example of SLF. The object die Katze is moved from C1. We refer to this movement as Asymmetric Extraction (AE), because no movement occurs from the second coordinate (C2). (2) thus shows that no ATB-movement is required in SLF. (3) confirms that this is really movement out of the coordination, as the object can undergo long-distance movement once the coordination is embedded:2:

(2) Die Katze t1 [hat er t1 gestreichelt] und [wird jetzt den Hund füttern].
  'The cat, he stroked and will now feed the dog.'

(3) Den Hund t1 hat Karl geglaubt [habe Hans t1 gefüttert] und [habe eingekauft].
  'The dog, Karl believed that Hans fed and did the shopping.'

In both examples, C2 lacks an independent subject. Moreover the subject of C1 is too low to be related via ATB-movement to both coordinates, as C2 has a finite verb in C. I.e. coordination is higher than TP.

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2Note that the finite verbs in the embedded clause bear subjunctive morphology, which is only possible in embedded clauses. In the following all embedded clauses will show this type of morphology.

This property is intrinsically linked to the availability of AE. As (4) shows, AE is unavailable whenever C2 has an independent subject. In this case, ATB is the only option (5):

(4) *Den Hund1 sagt Karl [habe Hans t1 gefüttert] und [wollte Franz ihn bürsten].
   the dog says Karl has Hans fed and wanted Franz him brush

(5) Den Hund1 sagt Karl [habe Hans t1 gefüttert] und [wollte Franz t1 bürsten].
   the dog says Karl has Hans fed and wanted Franz brush
   'The dog, says Karl that Hans fed and that Franz wanted to brush.'

While making AE available, the absence of an independent subject in the C2 at the same time renders ATB-movement impossible (6), thus yielding a minimal contrast with (5).

(6) *Den Hund1 sagt Karl [habe Hans t1 gefüttert] und [wolle t1 bürsten].
   the dog says Karl has Hans fed and want brush
   'The dog, says Karl that Hans fed and wanted to brush it.'

The properties of SLF are summed up in (7).

(7) **SLF-AE generalization**
   If C2 lacks a subject, the coordination demands AE and prohibits ATB.

We will not give an account of (7) here, but cf. Mayr & Schmitt (2008). Importantly, we assume for the discussion below that the CSC applies as ever in cases of SLF, but that the particular syntactic configuration renders ATB-movement impossible and requires AE. 3 Also, we assume that the CSC is a restriction on movement. For the present paper, the properties of ATB-movement and AE-movement are taken to be as follows:

(8) a. **ATB-movement**
   If movement from coordination C with the status \(-SLF\), then from each coordinate.

b. **AE-movement**
   If movement from coordination C with the status \(+SLF\), then from the first coordinate.

As noted, we will show that cases of SLF+AE represent a testing case for general properties of the CSC, when combined with ATB-movement in more complex constructions. 4 In section 2 we show that constructions such as SLF present us with a genuine puzzle regarding the CSC, namely the question of whether it is a global condition (i.e. applying once for the complete derivation) or a local condition (i.e. applying for chunks of the derivation). We show that neither is viable. In section 3 we argue that the requirements imposed by the CSC on an embedded coordination extend to the matrix coordination, if movement from the embedded coordination targets a position above the matrix coordination. Section 4 concludes the paper.

2. A puzzle

In this section, we introduce two sets of more complex SLF data that give conflicting evidence regarding what serves as input for CSC-evaluation. In particular, they raise the question as to whether the CSC is checked globally, as stated in (9), or locally as in (10).

(9) **Global CSC**
   Let C be a coordinate structure with coordinates C1,..,Cn. Then, if a moves out of C, CSC(C) evaluates C1,..,Cn. Let B be a coordinate structure with coordinates B1..Bn such that Ci embeds B. Let i = j, then CSC(C) evaluates C1,..,Cj + B1,..,Cj + Bn,..,Cn. I.e. the CSC evaluates the entire structure below the coordination that introduces it.

3Examples (13) and (15) show that SLF are coordinate structures and that therefore the CSC must apply (contra Büring & Hartmann (1998) and Reich (2007)).

4We do not mark intermediate grammaticality judgments, i.e. only *grammatical* and * are marked. The differences in acceptability are sharp enough, even in the complex examples to come.
Let $C$ be a coordinate structure with coordinates $C_1,\ldots,C_n$. Then if $a$ moves out of $C$, CSC($C$) evaluates $C_1,\ldots,C_n$. Let $B$ be a coordinate structure with coordinates $B_1,\ldots,B_n$ such that $C_i$ embeds $B$. Let $i = j$, then CSC($C$) evaluates $C_1,\ldots,C_j - B,\ldots,C_n$. i.e. the CSC evaluates only the the coordination that introduces it and no coordination embedded in it.

Given standard ATB-data, the global CSC seems to be more plausible. Otherwise, ATB-movement targeting one or more levels of embedding as in (11) would always be ruled out. In (11), ATB-movement occurs from the embedded coordination together with the first matrix coordinate (Note that no SLF-coordination is involved, yet):

(11) Den the Hund\textsubscript{1} hat er $t_1$ gesucht\textsubscript{1} und [C\textsubscript{2} hast Du gesagt [Kai, habe Hans $t_1$ gesehen] und [C\textsubscript{2} werde Peter $t_1$ finden]]

"The dog, he looked for and you said that Hans saw it and that Peter will find it."

Global CSC would require the CSC introduced by the highest coordination out of which movement has occurred to check the entire derivation. Hence (11) is predicted to be grammatical: Extraction targets both $C_1$ and $C_2$. $C_2$ is split up by the lower coordination into sub-coordinates $C_{2a}$ and $C_{2b}$. Movement targets the embedded coordination as well as the matrix, therefore movement must be from $C_1$ and $C_{2a}$ and $C_{2b}$, as is the case in (11).

Local CSC, on the other hand, states that each coordination is checked separately, with the CSC introduced by a particular coordination being blind for embedded coordinations. Thus, (11) is falsely predicted to be ungrammatical. The lower CSC evaluates the embedded coordination, which fulfills its requirements since movement is from both coordinates. The higher CSC, however, evaluates only the higher coordination and excludes the embedded structure. At this point, the sentence should become ungrammatical: If movement is considered w.r.t. the higher coordination only, movement is from the first coordinate, only. The problem is that the local CSC cannot make reference to branching of coordinates into sub-coordinates as the global CSC does.

(9) therefore seems to be the more adequate characterization of the CSC. Yet, the first set of data that we present below shows that it cannot capture all instances of CSC application. In particular, we give examples that show that if the CSC requires AE rather than ATB, it will only do so for the coordination that introduces it, but not for coordinations embedded under $C_2$ showing the subject gap. This makes (10) the more plausible option. However, (10) does not only face problems regarding examples like (11) but also w.r.t. a second set of data that show that the CSC must take into consideration the complete structure with all its coordinates.

2.1. Local CSC application?

As shown above, the only type of extraction found in SLF is AE from $C_1$. No material can be extracted from $C_2$, i.e. the one containing the subject gap. Now consider a case where this $C_2$ embeds another coordination, which itself is not an SLF-coordination. (12) shows a case where nothing moves from $C_2$ or from the embedded coordination. AE from $C_1$ of the matrix takes place:

(12) Den Hund\textsubscript{1} hat er $t_1$ gesucht und hat gehofft [Kai könne kommen] und [er werde helfen]
the dog has he sought and has hoped Kai can come and he will help
"The dog, he looked for it and hoped that Kai could come and he would help."

If the CSC applies globally, the highest CSC evaluates the entire derivation. Therefore, no ATB-extraction should be possible in (12), as extraction must be AE. The global CSC can account for (12).

(12) is also compatible with the local CSC: The embedded coordination locally satisfies the CSC, as nothing moves. The matrix CSC again locally satisfies the CSC, because SLF blocks ATB in $C_2$ and requires AE.

Now, consider (13). The basic set-up is the same as in (12), the only difference being that in this case ATB-movement from the embedded coordination occurs. Note that this coordination is embedded under
a coordinate with a subject gap. In particular, the object der Hund ATB-moves from the sub-coordinates, and from matrix C1:

(13) Den Hund hat er t₁ gesucht und hat gehofft [ [habe sie t₁ gesehen] und [würde sie t₁ finden]]

the dog has he the cat sought and has hoped have she seen and would she find

'The dog, he looked for and hoped that she saw it and she would find it.'

Global CSC cannot explain this example straightforwardly. Since in this theory the highest CSC checks the entire derivation and the theory of SLF demands AE, it is unexplainable why ATB-movement can take place from the embedded coordination. It is, however, possible to amend the theory in such a way as to account for (13). If the theory of SLF said that only the local CP in which the subject gap is located, requires AE, but no coordination embedded under it, (13) would be explained. In this case, the highest CSC applies at the root and demands that movement be from each coordinate. Since SLF only blocks movement from its immediate environment, ATB from the embedded coordination must occur. We refer to this theory as the relativized global CSC.

Note that the relativized global CSC cannot account for (12), because it demands movement from each coordinate in (12). Recall that only the local environment of the subject gap is excluded from ATB. Thus, the global CSC can account for (12), but not for (13), and the relativized global CSC can account for (13), but not for (12).

If we chose the local CSC, the CSC would be satisfied in the embedded coordination independently of the matrix CSC. At the embedded level the CSC forces ATB. At the matrix level the CSC checks only its immediate coordination: AE is forced, since C2 exhibits SLF. Here, however, a complication must be noted. The local CSC does not require that ATB from the embedded CP should force AE of the same element from matrix C1, as the two CSC applications are independent from each other. This is, however, what is empirically the case. As (14) shows, ungrammaticality results, if (13) is changed in such a way that material does not move ATB together with the material from the embedded CP:

(14) *Den Hund hat er die Katze gesucht und hat gehofft [ [habe sie t₁ gesehen] und [würde sie t₁ finden]]

We therefore face a situation, where neither the global CSC nor its relativized version, nor the local CSC can account for all the data. In the following subsection we introduce a further piece of data that contradicts the present one.

2.2. Global CSC application?

In (15) an SLF-coordination serves as the embedded CP. Ungrammaticality results, if an element from embedded C1 ATB-moves together with an element from matrix C1:

(15) *Den Hund [ hat er t₁ gesucht ] und [ hat Fritz gesagt [ [ habe sie t₁ gesehen ] und [ warden helfen ]]]

the dog has he the cat sought and has Fritz said has she seen and will help

Consider (15) in light of (9) and (10). The global CSC is insensitive to embedded SLF-occurrences and demands ATB from all (sub)-coordinates. Hence, (15) is predicted to be ungrammatical.\(^5\)

The relativized global account can block ATB locally. It incorrectly predicts (15) to be grammatical, because, although the matrix CSC demands ATB from each coordinate, SLF overrules this and blocks ATB locally for the embedded coordination.

The local CSC, on the other hand, predicts (15) to be ungrammatical. The embedded CSC demands AE, because it is +SLF. The ATB-requirement of the matrix is not met, because only the local part of C2, from which no movement took place, is taken into account. Thereby, (15) is explained. However, the local CSC does not predict (16), which is a slight modification of (15) in that the matrix coordination is also +SLF. The embedded CSC demands AE, because of the SLF environment. The matrix CSC also

\(^5\)It is important to see that in this theory SLF can in effect only block ATB if it is located in the local environment of the root, where the global CSC applies.
says that AE should apply. Given that the theory is radically local, extraction from matrix C1 should count as AE. I.e. (16) should be grammatical, contrary to fact:

(16) *Den Hund1 [hat er t1 gesucht] und [hat gesagt [[habe Hans t1 gesehen] und [werde helfen]]]
the dog has he sought and has said has Hans seen and will help

The global CSC can account for (16), as the SLF-nature of the matrix coordination requires AE from matrix C1. Nothing can be moved from the embedded coordination. I.e. the global CSC can explain both (15) and (16). The relativized global CSC, on the other hand, incorrectly predicts both (15) and (16) as grammatical. Recall that SLF always locally blocks AE, but has no consequence for any coordinations below it. ATB of two AE-moved elements as in (16) should therefore be grammatical. Since the relativized global account can only account for (13), we will dismiss it.

2.3. The general puzzle

We have shown that both the global CSC (9) as well as the local CSC (10) are untenable in light of the conflicting data. (17) summarizes the core observations of the preceding sections.

(17) a. (12)-(14) show that ATB-movement from an embedded coordination can target a position outside the matrix, irrespective of whether the matrix coordination requires AE or ATB. Even though (12) shows that the matrix requirement is AE, ATB-movement from the embedded coordination can take place, as shown in (13). (14) shows that C1 of the matrix must partake in ATB-movement from the embedded coordination. Thus, ATB-movement from the embedded coordination to a position outside of the matrix coordination must feed movement from the matrix coordination, irrespective of its requirements.

b. (15)-(16) show that AE from an embedded coordination can never be to a position outside the matrix coordination, irrespective of the conditions of the matrix. In (15) the matrix requires ATB, whereas in (16) the matrix requires AE. In both cases, AE from the embedded coordination together with movement from matrix C1 is impossible. Thus, AE from an embedded coordination to a position outside of the matrix cannot feed movement from the matrix coordination, irrespective of its requirement.

(18) and (19) picture the two conflicting situations, i.e. (17a) and (17b) respectively:

(18)

(19) *
3. A revision of the CSC in terms of application-domain

We will now give our modification of the CSC. The central point that we have established so far is that the matrix part of C2 does not play a role in CSC-evaluation, if it embeds a further coordination, from which ATB-movement takes place. The last point is important: Only if ATB-movement takes place from the embedded coordination, the matrix part of C2, which exhibits a subject gap, cannot block movement. But if this condition is satisfied, matrix C1 functions as if it were the sister of the sub-coordinates.

3.1. Extending the application-domain of the CSC

Given that (12) showed that no extraction from the embedded part, nor from the matrix part of C2 is necessary, we conclude that ATB in (13) cannot be demanded by the matrix coordination.

To allow for ATB-movement from the embedded coordination, the CSC must be active in the embedded coordination independently from the matrix, even if movement out of the embedded coordination is also movement out of the matrix. This is precisely the part that favored the local CSC over the global one. At the same time, however, we must make sure that if there is movement of a particular element from the lower coordination out of the matrix, the same element must also move out of matrix C1 (see (14) above). This last point is what makes it seem as if matrix C1 and sub-coordinates formed one coordination. Hence, we must make sure that the CSC-requirements of the embedded coordination extend to the matrix CSC, crosses the matrix coordination. For us, the central question is how matrix and embedded requirements on the one hand, and AE and ATB requirements on the other, interact. I.e. if, for instance, the embedded part of a clause has an ATB-requirement, whereas the matrix part has an AE-requirement, what is the requirement for movement that crosses both the embedded and the matrix part? We suggest that embedded requirements established earlier in the derivation determine the matrix requirements, if movement crosses the matrix coordination.

(C20) **CSC Extension**

If movement crosses coordination B at stage i the CSC-requirements of B are established. If this movement further crosses C at stage i + 1, the requirements of B extend to C.

In (12) the embedded CSC does not have any requirement, as no movement has taken place from it. Therefore the embedded CSC does not extend to the matrix. The matrix requirement itself is AE, given that the matrix is +SLF. Thus (12) is explained.

In (13) the embedded coordination has the ATB-requirement. Since movement it crosses the matrix coordination, the ATB-requirement extends to the matrix coordination. Therefore movement from matrix C1 must happen, too. (14) works the same way: Because the embedded ATB-requirement is extended to the matrix coordination, movement from matrix C1 would have been required.

So what happens if both the embedded and the matrix coordination could be thought to independently have the ATB-requirement? Is the embedded requirement nevertheless extended to the matrix? On the basis of (11), we claim that the embedded CSC always extends to the matrix. If it did not, the matrix ATB-requirement could be satisfied independently from the matrix requirement. I.e. (21) should be grammatical, where ATB-movement from the embedded coordination crossing the matrix coordination and further ATB-movement from the matrix coordination alone should be grammatical. Note that the ungrammatical matrix movement is ATB-scrambling. The embedded movement is long-topicalization as in the other examples. (11) and (21) together therefore show that the embedded CSC always extends, having the result that long ATB-movement must target the same element in the matrix as in the embedded coordination. This property extends to all other examples, where ATB is embedded and crosses a matrix coordination.

(21) *Den Hund1 hat dem Fritz2 [C1 eine Frau t2 vertraut] und [C2 ein Mann t2 gesagt [C2a habe Hans t1 gesehen] und [C2b werde Peter t1 finden]]

In the case of (15) and (16) the situation is as follows. The embedded clause is in both cases +SLF. Hence, the embedded requirement is AE in both cases. Since movement crosses the matrix coordination,
the embedded CSC must extend. That means that the matrix requirement is AE now. Note that this AE is identical to the lower AE in that it must target the same element, i.e. the element from the first subcoordinate. What changes, however, is the application domain of the embedded CSC. AE is now required at the matrix coordination. Hence, if movement occurs, it must be from matrix C1 only. But the element that must AE-move, already moved AE from the embedded coordination, which is contained in C2 of the matrix. These requirements are contradictory. If no movement from matrix C1 happens, matrix AE is again not satisfied.

(20) explains all the data introduced so far. We have shown that embedded CSC-requirements extend their domain of application.

3.2. Predictions

The theory proposed makes two predictions. First, AE from coordinations embedded in C2 of matrix coordinations can never cross the matrix coordination. Split-topic constructions support this claim. The data in (22) (Schwarz, 1998) show AE from DPs, in split-topic constructions. Part of the object of C1 in (22) is the moved Katzen 'cats', although no element is moved from C2. As with AE in SLF, long-distance movement of the AE-moved element is possible (23). Here AE is independent from SLF:

(22) Katzen1 [hat Bernd drei t1 gefüttert] und [zwei Hunde] cats has Bernd three fed and two dogs 'Hans fed three cats and two dogs'

(23) Katzen1 hat der Hans gesagt [habe der Peter drei t1 gekauft und zwei Hunde]. cats has the Hans said have the Peter three bought and two dogs 'As for cats, Hans said that Peter bought three and two dogs.'

AE in split-topic constructions supports prediction one. Once we embed this structure in C2 of a matrix coordination, AE from the lower clause crossing the matrix coordination becomes impossible, as is shown in (24):6

(24) *Katzen1 [wird er drei t1 adoptieren] und [sagt Du hättest zwei t1 gekauft und vier Hunde]]. cats will he three adopt and said you have two bought and four dogs

The second prediction is as follows. If the matrix coordination is +SLF, AE should be possible from a coordination embedded under matrix C1. (25), however, shows that this is not the case:

(25) *Den Hund1 [hat er gesagt [habe Fritz t1 gesucht] und [werde die Feuerwehr anrufen]] und the dog has he said has Fritz sought and will the fire fighters call and [hat sich verabschiedet] has refl said-good-bye

Although this prediction is not straightforwardly borne out, it must be added that branching C1s seem to be more restricted in the acceptability than branching C2s. Note, however, that the prediction is partially supported, as split-topics are in fact acceptable in such constructions:

(26) Katzen1 hat er gesagt [habe er nur drei t1 gekauft aber vier Hunde] und fütterte den Esel. cats has he said has he only three bought but four dogs and fed the donkey 'As for cats, he said that he bought only three, but bought four dogs, and fed the donkey.'

4. Conclusion

The present paper analyzed unnoticed interactions between ATB- and AE-movement. These were argued to show an hitherto unknown property of the CSC. In particular it was argued that embedded CSC-requirements always extend their domain of application to the matrix coordination, if movement from the embedded coordination crosses the matrix coordination.

6We do not want to take any stance on other AE-data found in the literature, because we have not investigated them in any depth (e.g. Lakoff (1986), Postal (1998), Culicover & Jackendoff (1997)).
References


