Inversion Structures: some puzzles of reconstruction

K. A. JAYASEELAN, *The English & Foreign Languages University (Hyderabad)*

ABSTRACT

Inversion structures present a singular problem: arguments and sentential operators of the inverted phrase seem to c-command "out of" the phrase into the sentence remnant. This phenomenon is often referred to as "connectedness". This paper points out that the class of inversion structures that exhibit connectedness is larger than just "inverse" copular sentences and pseudoclefts; it includes experiencer predicates with "extraposed" clausal theme arguments and also SOV language sentences with post-verbal elements. It then examines some of the solutions proposed for connectedness, in particular a solution in terms of an ι-reduction rule proposed by Heycock & Kroch (1999). It notes a hitherto-unnoticed problem with the last mentioned solution, namely that the rule works only when the variable of the pseudocleft is at the lower end of the clefted phrase. The paper then suggests that the interpretive mechanism of LF is in fact extremely simple: it appends (by adjunction) the sentence remnant at the bottom of the inverted phrase. This solution yields the correct results for all the inversion data.

1 Introduction: the problem

The problem that this paper looks at was first noted by Higgins (1973) with respect to pseudoclefts; but he pointed out that the problem shows up also in cases of predicate inversion in copular sentences, a sentence-type that he described as "specificational sentences." The latter type is illustrated in (1b):

(1) a. John is my best friend. (canonical order)
b. My best friend is John. (inverted order)

The (1b)-type of sentence was called by Moro (1990, 1997) "inverse." The pseudocleft is also in a sense an "inverse" sentence, because it is a copular sentence wherein the surface subject contains a predication (as part of a free relative) and the missing argument of the predication shows up in the post-copular position, cf. (2) (Williams 1990):

(2) a. Who loves Mary is John.
b. Who John loves is Mary.

Also, both pseudoclefts and "inverse" sentences have the presupposition that the post-copular argument is the unique object that the inverted predicate denotes; as Williams (1990:488) puts it: "The subject of the pseudocleft is assumed to be the unique object that the predicate, or clefted clause, is true of."

The problem that we spoke of is the following: arguments and sentential operators of the inverted phrase seem to c-command "out of" the phrase into the sentence remnant. Higgins (1973) termed this phenomenon "syntactic connectedness", so it is often referred to as "connectedness effects." We illustrate this with antecedence of anaphors, pronominal coreference, and NPI licensing.

1.1 Antecedence of anaphors

Consider the sentences in (3):

(3) a. What John$_i$ would like is a picture of himself$_i$.
b. What they$_i$ promised was to love each other$_i$.

The anaphor binding goes through exactly as in the simple sentence paraphrases of these sentences: 'John$_i$ would like a picture of himself$_i$'; 'They$_i$ promised to love each other$_i$.'

1.2 Pronominal coreference

In a paper that pre-dated Binding Theory, Ruwet (1975) pointed out that the canonical and inverted orders differed in the possibilities of pronominal coreference; one of Ruwet's examples is (4):

(4) a. Ses$_i$ yeux verts sont les seuls avantages de Christine$_i$. (canonical order)
her eyes green are the only good.features of Christine
'Her$_i$ green eyes are the only good features of Christine$_i$.'

b. * Ses$_i$ seuls avantages sont les yeux verts de Christine$_i$. (inverted order)
her only good.features are the eyes green of Christine
* 'Her$_i$ only good features are the green eyes of Christine$_i$.'

In Jayaseelan (1992), some further examples such as (5)-(7) were discussed:

(5) a. Her$_i$ husband is Mary$_i$'s biggest liability. (canonical order)
b. * Her$_i$ biggest liability is Mary$_i$'s husband. (inverted order)

(6) a. His$_i$ wife is dear to John$_i$. (canonical order)
b. * Dear to him$_i$ is John$_i$'s wife. (inverted order)

(7) a. His$_i$ brother is John$_i$'s teacher. (canonical order)
b. * His$_i$ teacher is John$_i$'s brother. (inverted order)

1.3 NPI licensing

Negation in the inverted phrase licenses an NPI in the sentence remnant – which is not possible in the case of a non-inverted phrase; cf. (8a) and (8b):

(8) a. What he didn't buy was any novels. (pseudocleft)
b. * What he didn't buy pleased anybody. (non-pseudocleft)

2 Inversion in non-copular sentences

Besides pseudoclefts and "inverse" copular sentences, there is a range of other data that need to be brought into the discussion of connectedness effects.

2.1 Experiencer predicate with a clausal Theme argument

There is a class of unaccusative predicates that take an Experiencer argument and a Theme argument, where the Theme argument functions as the subject of the sentence (in English); e.g. *The noise bothers him*. But when the Theme argument is realized as a clause, as in (9a), an alternative structure is possible, as shown in (9b):

(9) a. That he comes home drunk annoys his wife.
b. It annoys his wife that he comes home drunk.

The traditional account of a sentence like (9b) in early Transformational Grammar was that the clausal argument undergoes "extraposition" by right adjunction to the root clause and the 'vacated' subject position is filled by a pleonastic *it*. An alternative account in terms of current theory could be the following: the subject argument stays low in the clause, perhaps staying in its base position in Spec,vP or possibly moving minimally into a Topic Phrase immediately above vP (cf. the Focus Phrase above vP (Jayaseelan 2001)); while the other elements in the vP undergo their normal movements: the complement of the verb is stacked above vP, and the verb moves to pick up its inflection (Jayaseelan 2010). Finally, the agreement requirements of the head of IP are met by the insertion of pleonastic *it*.
But whatever may turn out to be the right description of the structure of sentences like (9b), we need to note a fact that is of interest to us here: these sentences exhibit connectedness effects. Consider pronominal coreference in (10):

(10) a. That he$_i$ is unpopular doesn't bother John$_i$.
b. * It doesn't bother him$_i$ that John$_i$ is unpopular.

In (10a), where the clausal Theme argument is in the subject position, *he* can corefer with *John* as expected, since there in no c-command relation between the two elements; but in (10b), where the predicate has undergone inversion over the clausal Theme argument, there appears to be a Condition C violation.

Consider also (11):

(11) a. * That he didn't break the rules occurred to anybody.
b. It didn't occur to us that he was breaking any rules.

In (11a), the negation inside the clausal subject does not license the NPI in the predicate of the sentence; but in (11b), where the predicate has moved to the left of the clausal argument, the negation in the predicate licenses the NPI inside the clausal argument, showing that there is a c-command relation here.

There is one verb in the class of verbs that we are looking at here, namely *seem*, which takes only a clausal Theme argument (cf. **This seems to Mary*) and "extraposition" of this argument is obligatory (cf. **That John is nice seems to Mary*; *It seems to Mary that John is nice*). It is now well-known and universally admitted in the case of *seem*, that elements of the predicate c-command into the "extraposed" clause, cf. (12):

(12) a. * It seemed to her$_i$ that John is in love with Mary$_i$. (pronominal coreference)
b. It didn't seem to Mary that John had understood anything. (NPI licensing)

2.2 Post-verbal elements in SOV languages

Another type of data that we might look at is post-verbal elements in SOV languages; see Mahajan 1997, Bhatt and Dayal 2007, Manetta 2012, for some earlier attempts to account for these elements. It can be argued – taking a different tack from these earlier proposals – that these elements arise by inversion of the remnant clause over leftward topics.[1] If this is the case, then we should expect the 'surprising' c-command relations that we noticed in the case of other inversions. Consider (13) (Malayalam data):

(13) a. * [ñaan *t* awan$_i$-e kaaNiccu-koDuttu] John$_i$-inte kuTTikaL-kkə
I he-ACC showed-gave John-GEN children-DAT
* 'I showed him$_i$ to John$_i$'s children.'

b. [ñaan John$_i$-inte kuTTikaL-kkə awan$_i$-e kaaNiccu-koDuttu]
I John-GEN children-DAT he-ACC showed-gave
'I showed him$_i$ to John$_i$'s children.'

c. John$_i$-inte kuTTikaL-kkə [ñaan *t* awan$_i$-e kaaNiccu-koDuttu]
John-GEN children-DAT I he-ACC showed-gave
'I showed him$_i$ to John$_i$'s children.'

(13a) seems to be a Condition C violation, which disappears if we "reconstruct" the post-verbal phrase in its canonical position, cf. (13b), or topicalize it to the left, cf. (13c).[2]

The connectedness effect can be demonstrated also with anaphor binding, cf. (14). (*awar-awar* 'they-they' is a distributive anaphor in Malayalam, see Jayaseelan 1997.)

(14) a. [ñaan *t* kuTTikaL$_i$-e kaaNiccu-koDuttu] awar-awar$_i$-uDe ammamaar-kkə
I children-ACC showed-gave they-they-GEN mothers-DAT
'I showed the children to their respective mothers.'

[1] The inversion seems to be motivated, or at least facilitated, by focus in the remnant clause. It has been remarked (see Jayaseelan 2001:51, among others) that structures with post-verbal elements in SOV languages are happiest when there is a stressed element in the remnant clause.

[2] Bhatt & Dayal (2007:294) observe that leftward scrambling is not reconstructed, but rightward scrambling is. If the assumption is that a rightward-scrambled phrase is reconstructed in its canonical position, this cannot be correct, as (13b) shows: when the rightward topic is "restored" to its base position, the pronominal coreference is fine, leaving us with no explanation of the ungrammaticality of (13a).

b. ?* [ñaan awar-awar$_i$-uDe ammamaar-kkə kuTTikaL$_i$-e kaaNiccu-koDuttu]
I they-they-GEN mothers-DAT children-ACC showed-gave
(intended) 'I showed the children to their respective mothers.'

c. ?* awar-awar$_i$-uDe ammamaar-kkə [ñaan ***t*** kuTTikaL$_i$-e kaaNiccu-koDuttu]
they-they-GEN mothers-DAT I children-ACC showed-gave
(intended) 'I showed the children to their respective mothers.'

In (14a), *kuTTikaL-e* is able to distribute over *awar-awar-uDe ammamaar-kkə*, arguing that the former c-commands the latter; but this cannot happen when the rightward scrambled phrase is "restored" to its canonical position, cf. (14b), or when it is scrambled to the left, cf. (14c).

3 Solutions

An adequate solution to the problem of connectedness should encompass the full range of inversion structures, which (as we just saw) is a class that is larger than just pseudoclefts and inverse copular sentences.

Historically however, the discussions focused on pseudoclefts owing to the fact that the phenomenon was first noted by Higgins (1973) in the course of his very insightful study of pseudoclefts. Higgins himself did not attempt a solution to the problem. But there have been several, and a variety of, attempts since, some of them even trying to recast Binding Theory: a noteworthy example is Williams (1994) which seeks to restate the binding principles in terms of thematic roles. Taking a slightly different tack again, Gueron (2007) looks for a solution outside Binding Theory itself, in considerations of Focus and information structure. Heycock and Kroch (1999) were perhaps the first to say that connectedness should be stated on an LF-representation that is much more abstract than is currently thought of.

The main thrust of the later solutions (in fact) seems to be "reconstruction" at the LF-interface.

3.1 "Reconstruction" at the LF-interface

When one looks at just pseudoclefts, the solution (prima facie) appears to be straightforward: reconstruct the simple sentence paraphrase. Thus consider (8a) (repeated below):

(8) a. What he didn't buy was any novels. (pseudocleft)

If we put back the 'missing part' of the inverted phrase – represented by the variable in the free relative 'what he didn't buy *x*' – from the sentence remnant, we get 'He didn't buy any novels.' This can be done by any formal device akin to λ-conversion. Let us look at the ι-reduction rule proposed by Heycock & Kroch (1999) as a representative of this class of solutions. This rule takes as its input a representation of the free relative as a clause with a variable in the *wh*-trace position that is bound by an iota-operator, which then 'applies' to the focus phrase of the construction, namely the phrase in the sentence remnant. In the words of Heycock & Kroch (1999:388), ι-reduction "eliminates the ι operator and substitutes the focus of the pseudocleft for the ι-bound variable".

This rule will work as shown in (15):

(15) a. ι(x) [he didn't buy x] = any novels
b. he didn't buy any novels

3.2 A problem for the ι-reduction rule

Unfortunately, the pseudocleft problem will not yield to a solution like the ι-reduction rule, which is after all an execution of the simple sentence paraphrase.[3] This rule has a peculiar infirmity which has strangely gone unnoticed. (This is an infirmity that will in fact point the way to our very different solution.) The ι-reduction rule works only when the 'missing part' of the inverted phrase (the variable of the free relative) is at the lower end of the inverted

[3] In fact, Williams (1994) had already pointed out that reconstruction of the simple sentence paraphrase will not work for pseudoclefts, basing his conclusion on the evidence of quantifier interpretation. (We will not go into the details of his arguments.)

phrase, which is the case in (8a). But consider the opposite case, e.g. (16), where the variable is at the upper end of the clefted phrase:

(16) Who didn't read the Student's Guide was any student!

(One can imagine this sentence being uttered in a context like the following: the department has prepared a Student's Guide for the use of new students; but through a goof-up, it wasn't made available to the students. So, in the event, while the faculty had read the Student's Guide, who didn't get to read the Student's Guide was any student!) The ι-reduction rule will work as shown in (17) :

(17) a. ι(x) [x didn't read the Student's Guide] = any student
b. any student didn't read the Student's Guide

This yields *'Any student didn't read the Student's Guide' – which is ungrammatical because the negation does not c-command the NPI.

We get similar results with respect to pronominal coreference, cf. (18):

(18) a. * Who she$_i$ killed was Mary$_i$'s husband.
b. * Who killed her$_i$ was Mary$_i$'s husband.

The ι-reduction rule works with (18a); we get *'She$_i$ killed Mary$_i$'s husband.' But (18b) yields 'Mary$_i$'s husband killed her$_i$' – which does *not* violate Condition C; so, we are left with no explanation of the ungrammaticality of this sentence. In this case too, what makes the difference is whether or not the variable is at the lower end of the free relative.

We can make the same point with anaphor binding. Consider (19):

(19) a. Who John loves is himself.
b. Who loves John is himself.

The ι-reduction rule works with (19a): 'John loves himself'; but (19b) comes out as * 'Himself loves John', which is a bad case of anaphor binding.

Now consider inverse copular sentences which are not pseudoclefts, illustrated in (4)-(7). It is often unclear how to represent the inverted predicate as an open sentence with a variable that the iota-operator can bind. But in the case of (6b) (repeated below), it seems fairly clear that it should be represented as in (20a), because the 'missing part' of the inverted adjectival phrase is the subject argument:

(6) b. * Dear to him$_i$ is John$_i$'s wife.

(20) a. ι(x) [x (be) dear to him] = John's wife
b. John's wife (be) dear to him

But the sentence 'John$_i$'s wife is dear to him$_i$' is a fine sentence; there is nothing wrong with the pronominal coreference. So we have no explanation of the ungrammaticality of (6b).

The sentence (7b) (repeated below) is particularly interesting:

(7) b. * His$_i$ teacher is John$_i$'s brother.

It is unclear how to represent the inverted predicate as an open sentence. Suppose we represent it as shown in (21a) and then apply the ι-reduction rule to it; we get (21b):

(21) a. ι(x) [x teach him] = John's brother
b. John's brother teach him

But 'John$_i$'s brother teaches him$_i$' is a fine sentence and we have no explanation of the ungrammaticality of (7b). But now, suppose we represent the inverted predicate as a *passive* sentence, so that the variable is at the lower end of the open sentence, cf. (22):

(22) a. ι(x) [he (be) taught by x] = John's brother
b. he (be) taught by John's brother

The sentence * 'He$_i$ is taught by John$_i$'s brother' is (correctly) a violation of Condition C, and we explain (7b).

In every case, if the sentence remnant is interpreted at the lower end – or *below* – the inverted phrase, we get the correct result; but not otherwise. This suggests that the hierarchical relation between the inverted phrase and the sentence remnant is never undone by the interpretation: the inverted phrase always remains *above* the sentence remnant. Therefore, operations like λ-conversion or ι-reduction, which do not take into account hierarchical relations, are the wrong tools for the "reconstruction" of inversion structures.

4 A proposal

I now wish to suggest that the sentence remnant is interpreted in *the c-command domain of the lowest head of the inverted phrase*; and that this is brought about by adjoining the relevant phrase of the sentence remnant to the projection of the lowest head. Let us explore how we can implement this idea in terms of our phrase structure rules.

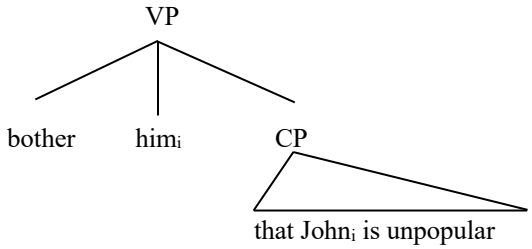
Consider the pseudocleft sentence (23), which shows a connectedness effect:

(23) * What bothers him$_i$ is that John$_i$ is unpopular.

In the VP 'bother him,' the complement position of the verb is already filled. So how can we accommodate another phrase in this VP?

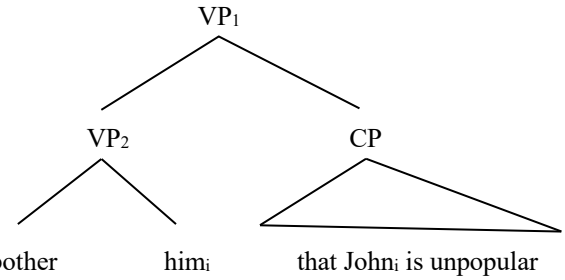
A very bold move would be to consider ternary branching, as shown in (24):

(24)



An alternative, which may be more acceptable, would be right-adjunction to the VP as shown in (25) – with the proviso that a segment of a category does not count for determining c-command. (This is an assumption made in Kayne 1994.[4])

(25)



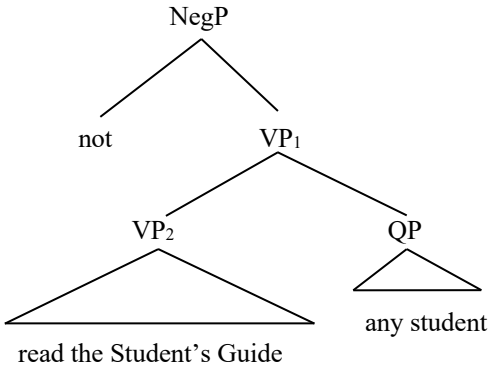
In (25), VP$_2$ does not prevent *him* from c-commanding *John*, and so there is (correctly) a Condition C violation.

Consider also (16) (repeated below), which is a pseudocleft sentence that exhibits a puzzling case of NPI licensing. This will be interpreted as shown in (26):

(16) Who didn't read the Student's Guide was any student!

[4] Since the right adjunction here is taking place at the LF interface, the resulting structure does not have to be linearized. Therefore, considerations of antisymmetry will not apply.

(26)



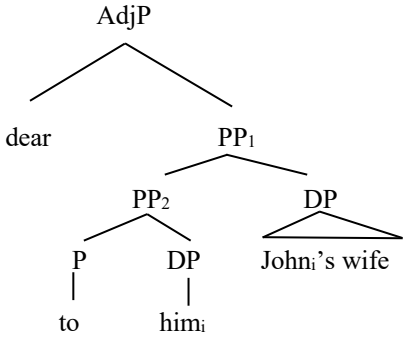
Here, the NPI *any student* is c-commanded by the negative element *not*, correctly licensing it. (We get the same result if we adjoin *any student* to the verb's complement *the Student's Guide*.)

As far as I can see, this solution applies to all the types of inversion structures that we have examined. Consider (6b) (repeated below):

(6) b. * Dear to him$_i$ is John$_i$'s wife.

The projection of the lowest head in the inverted phrase is the PP *to him*; and after adjunction of the relevant phrase of the sentence remnant to this, we get (27):

(27)



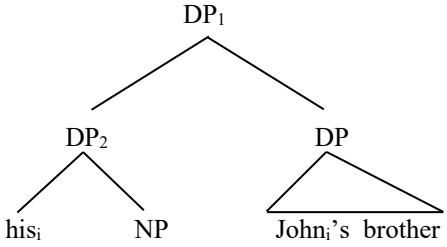
Here, PP$_2$ does not prevent *him$_i$* from c-commanding *John$_i$*, correctly inducing a Condition C violation.

Consider also (7b) (repeated below):

(7) b. * His$_i$ teacher is John$_i$'s brother.

The interpreted structure at LF will be as shown in (28):

(28)



In this structure, *his$_i$* c-commands *John$_i$*, inducing a Condition C violation. (Alternatively, if *John$_i$'s brother* is adjoined to the NP complement of *his$_i$*, we get the same result.)

5 Conclusion

Let us note that our solution is maximally simple and can be applied almost mechanically. Also, it can be generalized to all the inversion data. It contrasts in this respect with a solution like ι-reduction. It is unclear how we can apply ι-reduction to a sentence like (7b): there is no formal way in which we can get from 'his teacher' to 'he is taught by ***x***'.

Let us conclude by asking the 'Why?' question: Why would the interpretive mechanism of the LF component want to append (the relevant phrase of) the sentence remnant to the bottom of the inverted phrase? It is reasonable to suppose that it is the predicate of a clause that seeks to bring together its arguments to yield a propositional meaning. In an inversion structure, the predicate must "pull up" its missing argument from the sentence remnant; there can be no downward movement of the predicate to the argument. There are three cases to consider here.

In the case of simple predicate inversion in a copular sentence, i.e. an "inverse" copular sentence, there is no trace of the missing argument in the inverted phrase if we adopt any of the proposals regarding its derivation in the literature: e.g., Moro (1991, 1997) derives the "inverse" sentence by promoting the predicate of a small clause – in preference to the subject of the small clause – to the Spec,IP position. So, in the absence of a trace, the predicate must find the missing argument in the sentence remnant. And apparently, it is less effort to append the missing argument to the bottom of the inverted phrase than to move it to its canonical position within that phrase; the fact that it is now in a non-canonical position does not seem to matter, cf. the position of the agent argument inside an adjunct PP in the passive sentence *Mary was killed by her husband*.

In the case of a pseudocleft, which is the second case to consider, the missing argument cannot be placed in its canonical position with respect to the predicate because that position is occupied by a *wh*-trace, cf. the free relative of (8a): *What he didn't buy* $\boldsymbol{t}_{what}$. (Perhaps a device like ι-reduction is too powerful a mechanism for natural language to employ: recall our commitment to the weakest theory that is consistent with explanatory adequacy.) So again, the computation of LF chooses the least effort option. The same considerations should apply in the case of post-verbal elements in SOV languages: the rightward-scrambled phrase cannot be "restored" to its canonical position in the remnant clause because that position is occupied by a trace (although in this case, the trace is that of the displaced phrase itself).

Now consider the third case, namely the "extraposition" structure illustrated in the (b) sentences of (9)-(12). If our alternative account of this structure is correct, the "extraposed" clause is already in the c-command domain of the elements of the inverted predicate, and therefore no further movement needs to be postulated to bring about a c-command configuration here.

Acknowledgements

I wish to thank Diti Bhadra for inviting me to participate in the special session of FASAL 11 dedicated to the memory of Rahul Balusu, where this paper was presented. I also wish to thank the audience of this session, especially Rajesh Bhatt and Ashwini Deo, for helpful comments.

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