Part 2 - Scientific abstract

This research extends the Williams/Goodall three-dimensional alignment approaches to coordinate structures and applies it to a variety of elliptical structures including Right node raising, sluicing, VP ellipsis, parasitic gaps, antecedent contained deletion, fragment questions and their properties. Elliptical phenomena will be examined in several languages in addition to English (Danish, Hebrew, Russian and Arabic).

I propose to work out a formal system for parallel alignment which accounts for a variety of coordination types as well as adjunction structures which exhibit similar properties. On a par with most research on ellipsis phenomena, this research will concentrate on the parallelism requirements on these structures (including information structure parallelism), the interpretation of the omitted material and in particular the interaction of these structures with islandhood. Once these topics have been investigated, the architectural consequences will be examined. The unorthodox three-dimensional (3D) phrase structures will receive a formal account based not only on Williams 1981 and Goodall 1987, but also extending the 3D analysis of adjunction found in Lebeaux 1988, Åfarli 1997, Chomsky 2001 and Erteschik-Shir 2005a,b. It seems natural, once an additional dimension of phrase structure is allowed, to extend it to other structures which like adjuncts are linearized post spell-out. As with 3D adjunction of adjuncts, a central architectural question concerns how these structures linearized? I propose an answer along the lines outlined for adverb linearization in Erteschik-Shir 2005a namely that linearization occurs at PF and that it is sensitive to PF properties such as edges and prosody. Linearization of parallel structures occurs at factorization lines and these are derived through constraints on parallel merge. These constraints in turn include the much-discussed Information Structure constraints on elliptical constructions with their concomitant prosodic manifestations.

The idea of 3D structures and parallel factorization does not embed easily in minimalist architecture and forces extensions of the theory that may seem excessive when other more traditional options are available to explain the form and interpretation of coordinations of various kinds. The main argument for this approach is its ability to account for the interaction of elliptical structures of various kinds with islandhood. This is an important result which warrants the required architectural changes. The value of the proposal therefore lies not only its descriptive and explanatory capacities but more significantly in its architectural impact.
Part 3 - Detailed description of the research program

1. Scientific Background

In the 1970s and 80s a number of articles appeared on the Right Node raising (RNR) construction which provided a puzzle to the then current theory of syntax. The construction is illustrated in (1).

(1) John hates __, but Peter likes __, that picture of Mary.

There are a number of problems with the construction. First is the occurrence of two gaps left by the movement of one constituent (in italics), the second is that movement seemingly occurs to the right. Other less obvious problems were noted at that time as well (e.g., Abbot 1976, Grosu, 1976, McCawley 1982, Levine 1985): On the one hand the RNR constituent behaves as though it is still in the position of the gaps, on the other there is evidence that it could not have originated there. One kind of evidence for both these properties comes from the behavior of islands in RNR constructions:

(2) a Mary knows a man who buys, and Bill knows a man who sells, pictures of Fred.
   b *Who does Mary know __ a man who buys, and Bill knows a man who sells, pictures of __?
   c Who does Mary buy and Bill sell

(2)a shows that a constituent can RNR out of a relative clause island. This indicates that the constituent behaves as though it did not originate in the gap position, since then its movement should be sensitive to island constraints. (2)b shows that although RNR constituents generally allow extraction (as shown in (2)c), extraction is blocked if the RNR constituent originates within an island, i.e., here the constituent behaves as though it is still in situ. In Erteschik (1987), I proposed an account in terms of Across-the-Board (ATB) processing which avoids some of the pitfalls of other accounts at the time. The account is based on the ideas of Williams (1981) and Goodall (1987) but both these authors excluded RNR constructions from their accounts. Across-the-board alignment is shown in (3):

(3) Mary knows a man who buys | a picture of Fred
    Bill knows a man who sells | a picture of Fred
The alignment line drawn preceding the constituent *a picture of Susan* is licensed because the two conjuncts have this constituent in common. This common factoring in turn allows the second occurrence of the conjunct to be silent and which in turn requires linearization in this position deriving the linear order in (2) but blocking (4).

(4) *Mary knows a man who buys a picture of Fred and Bill knows a man who sells.*

The explanation for the data in (2) follows easily. The RNR constituent behaves as though it is still in situ because it in fact has not moved as shown in (3) and in the same structure this constituent is embedded in an island, hence the island facts are predicted.

The work on elliptical phenomena and its interaction with island constraints has expanded in leaps and bounds since the 1980s. A variety of approaches are currently available: Among the syntactic accounts are deletion (syntactic and PF) and a variety of movement approaches including sideward movement as well as parallel merge. These accounts are complemented by interpretive accounts some of which concentrate on the information structure requirements of the various elliptical phenomena. In the forefront of the discussion of elliptical phenomena for all researchers are the parallelism requirements on ellipsis, the interpretation of the omitted material and the interaction of ellipsis with islandhood.

Only few researchers have continued exploring the parallel formatting approaches first examined by Williams and Goodall. These include (Citko, 2005, Moltmann, 1992, Muadz, 1991, Phillips, 2003). Citko extends minimalism to include, in addition to external and internal merge, what she calls parallel merge. This is illustrated in (5), the parallel structure underlying (6).

(5) \[ \text{read} \xrightarrow{\text{what}} \text{recommended} \]

(6) What did John recommend and Mary read?

In Citko’s framework a single wh-phrase can merge with elements inside both conjuncts. Linearization of this structure is achieved by movement of the wh-phrase within the complete structure. Citko’s proposal has much in common with the sideward movement account of ATB movement first proposed by (Nunes, 1995) and later developed by (Nunes, 2001), (Winkler, 2006) and (Fernandez-Salgueiro, 2008) among others. In Citko’s approach the single wh-phrase in the ATB question is derived by parallel merge, under Nunes’ account the wh-phrase first merges into the
first conjunct and is then moved sideward into the second conjunct. The two approaches differ in certain ways, but have in common that they are executed within a minimalist framework. Both necessitate certain extensions of minimalism, but they attempt to keep these to a minimum.

The extension of the Williams/Goodall three-dimensional alignment approaches which I applied to RNR is not easily embeddable within minimalism, yet in view of its explanatory power with respect to island constraints, it should not be rejected for purely theoretical reasons. Instead I propose to explore how it can be extended to account for other elliptical structures and their properties.

2. Research Objectives and expected significance

The purpose of the proposed research is to work out a formal system for parallel alignment which accounts for a variety of coordination types as well as adjunction structures which exhibit similar properties. On a par with most research on ellipsis phenomena, this research will concentrate on the parallelism requirements on these structures (including information structure parallelism), the interpretation of the omitted material and in particular the interaction of these structures with islandhood. Once these topics have been investigated, the architectural consequences will be examined. The unorthodox three-dimensional (3D) phrase structures will receive a formal account based not only on Williams 1981 and Goodall 1987, but also extending the 3D analysis of adjunction found in (Äfarli, 1997, Äfarli, to appear, Lebeaux, 1988), (Chomsky, 2001) and Erteschik-Shir 2005a,b. It seems natural, once an additional dimension of phrase structure is allowed, to extend it to other structures which like adjuncts are linearized post spell-out. As with 3D adjunction of adjuncts, a central architectural question concerns how these structures linearized? I propose an answer along the lines outlined for adverb linearization in Erteschik-Shir 2005a namely that linearization occurs at PF and that it is sensitive to PF properties such as edges and prosody. Here another matter arises: linearization of parallel structures occurs at factorization lines and these are derived through constraints on parallel merge. These constraints include the much-discussed Information Structure constraints on elliptical constructions with their concomitant prosodic manifestations (e.g., Merchant 2001, Winkler 2005, 2006a and the references therein). An illustration follows:
In view of the fact that the factor lines separate pairs each of which can be considered to be a natural contrastive pair (in an appropriate context), all these factors are licensed (see for example Merchant and Winkler, op. cit. on this parallelism requirement) and renders the interpretation that John and Peter, hate and like, and Mary and Susan are contrasted, respectively. Linearization occurs at factor lines and results in the following linear sequence:

(8) John and Peter hate and like Mary and Susan (respectively).  

Factorization is optional, even when licensed. (9) is therefore also possible.

(9) John hates Mary and Peter likes Susan.

In this case linearization will result in the simple coordination of the two sentences shown in (10).

(10) John hates Mary and Peter likes Susan.

If a factor in a parallel structure consists of two identical elements the second copy need not be pronounced (as we saw already with respect to the derivation of the RNR construction in (3). If the two verbs are identical we can derive a gapped structure:

(11) John likes Mary and Peter likes Susan.

Linearization then results in the sequence in (12).

(12) John likes Mary and Peter Susan.

Some factorization options may result in non-optimal sequences. Factorization is constrained by Information Structure parallelism. How exactly this works and whether other elements play a role is one of the research questions to be explored here.

Another question which has been much discussed in the literature is what counts as ‘identity’ for co-factoring and deletion. It has been noted by Cito 2005 that ATB wh-movement in Polish is possible only when the case of the wh-phrase matches both

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1 The merger of conjunctions and elements such as respectively, too etc. will be ignored here, but will be investigated in the proposed research.
gaps. Syneretic wh-forms are, however, an exception as shown in (13) from Citko (p. 487).

(13) Kogo Jan nienawidzi e a Maria lubi e?
    who.ACC/GEN Jan hates e.GEN and Maria likes e.ACC
    ‘Whom does Jan hate and Maria like?’

Citko, following Franks 1995 among others, assumes that syneretic forms are appear in the lexicon underspecified for case rendering them compatible with more than one case feature. Another option available in the framework I propose is to allow phonological identity to count for co-factorization. This would put factorization of parallel structures in PF where phonological features are visible. Since we have already seen that factorization depends on Information Structure, and since it would be less than optimal to have factorization occur in more than one part of the grammar, this provides an argument that Information Structure is part and parcel of PF. This is not a surprising result in view of the fact that information structure is prosodically and linearly marked across languages (see also Erteschik-Shir 2005a,b for further arguments for this point).

Another research question concerns the restrictions on linearization. One property which is immediately apparent is the prosodic grouping of the elements within factor lines. In the case of RNR there is a clear prosodic break before the RNR constituent, in the case of gapping there is a clear break at the end of the first conjunct and between the remaining constituents of the second conjunct. My hypothesis that the constraints on linearization are mainly phonological is therefore a natural one. I therefore hypothesize that linearization is a purely PF process. Here I expand the initial research in Erteschik-Shir 2005a,b where I claim that PF linearization targets edges and is sensitive to prosodic constraints. The answers to these two research questions should render an analysis of the matching of particular linearization options and their interpretations. The following summarizes the main hypotheses of the proposal:

• ATB phenomena are viewed as 3-dimensional: structures are processed in parallel and then factorized and linearized at PF.
• Parallel processing requires parallel information structures.
• Processing involves the identification of identical elements across conjuncts and ‘factorization’.
• Identical lexical elements may be linearized once.
The idea of 3D structures and parallel factorization does not embed easily in minimalist architecture and forces extensions of the theory that may seem excessive when other more traditional options are available to explain the form and interpretation of coordinations of various kinds. The main argument for this approach is its ability to account for the interaction of elliptical structures of various kinds with islandhood. This is an important result which warrants the required architectural changes. The value of the proposal therefore lies not only its descriptive and explanatory capacities but more significantly in its architectural impact.

3. Detailed description of the proposed research

My initial research on the topic of the proposed research has concentrated on how the proposed 3D system accounts for island constraints. Here I outline my preliminary results. I first show in detail why RNR does not constitute an island violation. I then demonstrate how Sluicing is predicted to ‘repair’ islands whereas VP ellipsis is not. I then propose an account of parasitic gaps.

As outlined above, RNR constructions are a puzzle to movement approaches because the RNR constituent can be embedded within an island. If this constituent has been ‘raised’ from within an island, under a movement approach, the result should be ungrammatical counter to fact as shown in (14).

\begin{equation}
\begin{array}{c}
\text{Mary knows a man who buys} \, \text{pictures of John} \\
\text{and} \quad \text{Bill knows a man who sells} \, \text{pictures of John}
\end{array}
\end{equation}

This follows easily under the current non-movement account. RNR is the result of parallel formatting, deletion of ‘pictures of John’ in the second conjunct due to identity with the co-factored element in the first conjunct and linearization at factor lines resulting in

\begin{equation}
\text{Mary knows a man who buys and Bill knows a man who sells pictures of John.}
\end{equation}

Since the RNR constituent ‘pictures of John’ has not moved it is still contained within the island and so no violation of an island constraint has occurred.

Extraction out of an RNR constituent embedded in an island is predicted to render island effects since here extraction out of an island does occur. This prediction is again true to fact. (16) shows that extraction out of an RNR constituent embedded within an island cannot occur.
Here the trace occurs within an island: The last factor, pictures of t, is simultaneously in both relative clauses, hence extraction is blocked.

It is well known that Sluicing repairs island constraint. 0 from Merchant 2001 illustrates that this is the case.

(17) They want to hire someone who speaks a Balkan language but I don’t remember which (Balkan language they want to hire someone who speaks t)

Many have attempted explanations of the fact that sluicing seemingly can extract a wh-phrase from within an island. Some have argued that this is so because the deletion sight is deleted and hence invisible, but this view runs afoul of the opposite fact in VP ellipsis as demonstrated below. This property of sluicing follows automatically within the account proposed here.

(18) They want to hire someone who speaks a Balkan language (but I don’t remember)

Here deletion of the co-factored identical sequences occurs leaving behind only the wh-word in the second conjunct. Linearization renders (17) and so the structure is derived without movement of the wh-phrase and no island effect appears. One of the challenges for competing approaches which generate the wh-element in its derived position is getting the correct case marking on this element. This again follows automatically in the current approach since case is derived in-situ.

One of the main achievements of the movement and deletion approach advocated in Merchant 2001, is its account of the correlation between languages which allow preposition stranding under sluicing and those that allow preposition stranding under regular wh-movement. It is not obvious how an approach that does not involve wh-movement can make this prediction. This is therefore a challenge in the current approach. Merchant makes two points that are of relevance here (pp. 100-2). First he admits that there is a lot of variation within languages concerning preposition stranding in sluicing. Second he suggests that the answer to the question as to why it is that preposition stranding occurs in some languages and not in others
may lie in the variation among languages in the way they mark grammatical relations. Languages which allow preposition stranding are analytic in the means they use to mark grammatical relations, languages which do not are fusional in this respect. Importantly Merchant sees variation as a scale, explaining variation with respect to the sluicing data within languages as well as differences in the behavior of different prepositions. Within the current proposed framework the correlation does not follow automatically. The following Danish and Hebrew examples from Merchant (pp. 93, 99) illustrate sluicing with a preposition stranding language and with a non-preposition stranding language, respectively:

(19) Peter har snakket med en eller anden, men jeg ved ikke (med) hvem.
    Peter has talked with one or another but I don’t know with who

(20) Adam diber ’im mišehu, aval ani lo yode’a ?(‘im) mi.²
    Adam spoke with someone but I don’t know with who

In (19) parallel formatting allows both the version with and without the preposition. However, the same analysis is available for (20). An explanation for the reduced acceptability of sluicing without the preposition in this case and its unacceptability in other non-preposition-stranding languages is therefore needed. I propose to explore the idea in Erteschik-Shir 2005a (with respect to object shift) that variation among the Scandinavian languages is due to a difference in their prosodic properties. With respect to preposition stranding, the explanation for both the correlation itself and for its variability within and among languages lies in the prosodic properties of the languages in question. In preposition stranding languages the stranded preposition is prosodically incorporated in the preceding elements, whereas non-preposition stranding languages do not favor such prosodic incorporation. In the Danish example above, the sequence ved+ikke+med+hvem is pronounced as one prosodic unit. In the Hebrew example such prosodic incorporation is less natural – there the preposition prosodically combines with the wh-element instead. This is also the reason for why preposition stranding is not licensed. The fact that most Hebrew speakers do not rule out examples such as (20) is that the incorporation of the preposition in the preceding material does not block its combining with the wh-phrase. If this line of reasoning can be applied to a variety of different languages then it would offer not only an

² Hebrew is among the languages where variation is found. Closely related languages also differ: According to Merchant, German, which does not allow preposition stranding requires the preposition in sluicing, Dutch, however, varies with respect to both preposition stranding and the presence of the preposition in cases of sluicing.
explanation for Merchant’s correlation, but also a better understanding of the phenomenon of preposition stranding itself.

Although Merchant’s account of sluicing is impressive in coverage, it predicts the acceptability of (21), in which an active and a passive are combined, as Merchant himself notes.

(21) *Somone shot Ben, but I don’t know by whom Ben was shot

This follows easily under the current proposal since no parallel alignment is possible in this case. The approach to sluicing proposed here shows promise not only in accounting for island repair, but also in its explanation of other properties of sluicing.

The fact that sluicing and VP ellipsis differ with respect to island repair has been much discussed, but no simple solution is offered in the linguistic literature on the topic. The reason VP ellipsis does not repair islands, follows very simply here since there is no way to derive cases of VP ellipsis without movement:

(22) is from Lasnik 2005 and Hornstein et al., 2007. (23) is the 3D structure.

(22) *They want to hire someone who speaks a Balkan language but they don’t remember which Balkan language they do.

(23) They | want to hire someone who speaks a Balkan language

but I don’t remember

They | want to hire someone who speaks which Balkan language

do

In VP ellipsis the co-factored, ‘deleted’ element is replaced with an appropriate proform. The resulting structure then undergoes wh-movement and inversion. There is therefore no way to derive VP ellipsis structures such as (22) with parallel formatting, but without wh-movement as there was with sluicing structures.

ATB formatting also offers an elegant account of parasitic gaps. (24)a and b illustrate parasitic gaps which follow and precede the regular gap. The examples are given with their respective parallel formatting.

(24) a Which article did John file without reading t

b Which boy did Mary’s talking to bother t

Parallel formatting allows the parasitic gap to be factored with and therefore identified with the regular gap in spite of the fact that it is contained in an island. If such parallel
formatting were not available one of the gaps would be left uninterpretable unless further mechanisms (such as null operators) are introduced. When the parasitic gap precedes the regular gap as in (24)b, the first gap is identified with the second. This requires the processing of the second factor first and then going back to the first explaining why (24)b is somewhat harder to process than (24)a. Note that parasitic gap structures are only minimally parallel, 3D merger and parallel formatting afford a simple analysis of the phenomena. Parallel formatting and processing will thus be examined with the following points and questions in mind:

- Extended to structures that are only minimally parallel. One common factorization of ‘identical’ elements seems to suffice.
- What counts as ‘identical’ elements has been left vague and includes gaps (or copies), phonologically identical sequences and syntactically identical constituents.

The proposed research will extend the analysis in terms of parallel formatting to antecedent contained deletions as well as fragment answers. The analysis will also be applied to a variety of languages with the help of the assistants in the project. I expect to commence with an examination of Hebrew and Russian and then to continue to Arabic if possible. Informants in these languages are readily available.

Once the data has been collected and analyzed and the theory of parallel formatting refined, the more theoretical questions will be explored. Given its exploratory nature, the proposal opens up perspectives, creates new problems, and is particularly challenging in its architectural repercussions. Here lies its main significance. At this stage it is likely that the following venues of research will lead to worthwhile results:

- PF-computation is doing all the work allowing for a ‘cleaner’ syntax.
- Raises questions concerning structural properties of the interface.
- Suggests that Information Structure is part of the phonological computation.
Bibliography

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