On Left and Right Dislocation: A Dynamic Perspective

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Abstract

The paper provides an integrated typology of left and right dislocation phenomena by modelling the process of interpretation as incremental growth of logical form along a left-right dimension, extending. concepts of underspecification plus update from semantics to syntax. Data include hanging topic left dislocation, clitic left dislocation, left dislocation, pronoun doubling, expletives, extraposition, and right node raising, each being explained in terms of general principles of tree growth. In the light of the successful characterization of the similarities and asymmetries between left and right periphery phenomena, the paper concludes that grammar formalisms should model the dynamics of language processing.

Over the twenty-five years from 1965, the Chomskian concept of movement gave rise to a focus on leftward forms of movement that was very largely at the expense of right-periphery phenomena. During this period, right periphery effects were sidelined as "stylistic rules", hence outside the remit of syntax proper. However, in the light of the claim of Kayne 1994 that all linearity effects in natural language are epiphenomenal, reflected in right-branching structures, with no rightward adjunction or movement, and in consequence a (stipulated[1]) universal SVO account of phrase structure, attention has now turned to right-periphery phenomena, to consider how they can be absorbed into an integrated account retaining Kayne's original insight. The problems that this has led to, with multiple (and recursive) topic and Focus projections, both above and below IP (Rizzi 1997, Cecchetto 1998, Mahajan 1996, Ordonez 1997), threaten Kayne's claim, for it is far from obvious what such a framework precludes given the multiple movements posited to sustain it (see Kural 1997, Büring and Hartmann 1997, for criticisms and alternatives). In particular, there is the worry that the claimed asymmetry which was the major motivation for Kayne's original insights has all but disappeared. So there remains the challenge to characterize right-dislocation processes and their relation to left dislocation in terms which bring out both the similarities and dissimilarities between them in a principled way.

In this paper we explore an alternative methodology – that of Dynamic Syntax (DS: Kempson et al 2001). We wish to show that taking the dynamics of language processing seriously and modelling the left-right process of HOW a logical form is built up enables us to capture both the similarities and dissimilarities in left and right dislocation phenomena cross-linguistically.

[1]Kayne's theory of Antisymmetry in fact allows two potential universal orders, SVO and OVS.

Inevitably, given space considerations, the accounts of individual structures will be no more than illustrative, but we hope that the snapshots provided will show the DS potential for syntactic generalizations in a principled way. In particular we shall see that the intrinsic asymmetry between introducing partial information at the opening and closing stages of the parsing task in any clausal sequence determines the much greater cross-linguistic variation in left-dislocation effects than in right-dislocation effects.

There are a number of observations which we shall seek to reflect in our analysis. The first is that parsing, hence NL processing, is highly context-dependent. Every partial string uttered is interpreted relative to the context of what has just been processed. This context-relative process involves change of context not just sentence by sentence, but word by word. Secondly, parsing, like other cognitive activities, involves the manipulation of partial information: in parsing the specific task is the manipulation of partial logical forms as interpretation is incrementally built up. Thirdly, humans can build structures in tandem, using one possibly partial structure as the context for a second, copying information from one structure to another in the process of building up logical forms for each. Anaphora and ellipsis display this directly:

(1) John, who was sick, wished he wasn't.

In processing the word *who* following *John*, the hearer is directed to use the information provided by the first word to initiate a second structure also to be about 'John', this second structure being an assertion that John was sick. Once this second structure is completed, the primary structure can in its turn be completed, and this uses not only the pronoun 'he' identified as the term projected by the word *John* (given the structure as context in which it is understood), but also the auxiliary *wasn't* which licenses the construal of the elliptical string as 'John was not sick' – again on the basis of the context, this time provided by having processed the whole relative clause. The result is a conjoined assertion that 'John was sick and John wished that John was not sick'. It is simple observations of this type which we seek to reflect in a formal model of utterance interpretation, on the basis of which a typology of left and right periphery 'dislocation' structures will emerge. The two concepts we exploit will be the concept of introducing unfixed subparts into a partial logical structure, and the concept of introducing paired partial structures in tandem.

1 The Flow of Language Understanding.

According to Dynamic Syntax (Kempson et al 2001), the process of natural language understanding is a monotonic tree growth process defined over the left-right sequence of words, with the goal of establishing some propositional formula as interpretation. Taking information from words, pragmatic processes and general rules, the theory derives partial tree structures that represent the content of a string as interpreted in context up to the current point in the parse. Intrinsic to this process are concepts of structural underspecification whose resolution is driven by requirements which determine the process of tree growth, having to be satisfied for a parse to be successful.

1.1 Requirements and Tree Growth.

More specifically, the logical form corresponding to the interpretation of a string as established in some context is represented as a tree; and the parsing process is the attempt to extablish some appropriate tree on the basis of the words provided. All nodes are introduced with requirements to be fulfilled, including the initial node which is the basic, universal requirement to build a representation of the propositional content expressed by a string in context. This is formalized

as a requirement to build a tree rooted in type t, with the first step being the introduction of this node decorated with: '$?Ty(t)$', where '?' indicates the requirement to construct an annotation of the sort that follows it.[2]

To satisfy such requirements, a parse relies on information from various sources. Suppose we are modelling the steps involved in parsing *John disliked Mary*. In the first place, there are general processes of construction which give templates for building trees that may be universally available or specific to a language. A pair of such construction rules determine that a tree rooted in $?Ty(Y)$ may be expanded to one with argument daughter $?Ty(X)$ and functor daughter $?Ty(X \rightarrow Y)$.[3] By these rules, the initial requirement $?Ty(t)$ may be expanded to give the partial tree in Figure 1 in which the diamond shows the 'pointer' indicating the node in the tree that is required to be built next, here the 'subject' node.

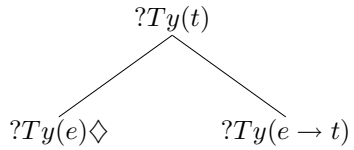

Figure 1: An initial expansion

Information about tree building may also come from actions encoded in lexical entries which are accessed as words are parsed. An entry like that for the word *John* in (1) contains conditional information initiated by a trigger (the condition that provides the context under which subsequent development takes place), a set of actions (here involving the annotation of a node with type and formula information) and a failure statement (commonly an instruction to abort the parsing sequence) if the conditional action fails. The lexical specification also determines, through the annotation $[\downarrow]\bot$ (the so-called "bottom" restriction) that the node in question is a terminal node in a tree, a general property of contentive lexical items.[4]

John

IF	?Ty(e)	trigger
THEN	put(Ty(e), Fo(John), $[\downarrow]\bot$)	content (actions)
ELSE	ABORT	failure

The information derived from parsing *John* in *John disliked the student* thus provides an annotation for the subject node that satisfies the requirement on that node for an expression of

[2]'Ty' is a label indicating type and 't' is the type of a proposition. We assume also a small list of types, eg e the type of entity, $e \rightarrow t$ the type of a predicate, and so on.

[3]One rule, Introduction, introduces requirements on the rootnode for a pair of two daughters of requisite type, the second, Prediction, licenses the construction of those nodes, see Kempson et al. (2001:80-83).

[4]The constraint takes the form "at all nodes below, the falsum holds". See the use of the modal logic LOFT as the basic vocabulary as introduced below.

type e and the pointer moves on to the functor node, as in Figure 2.

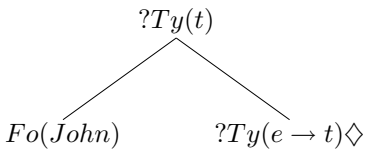

Figure 2: Parsing *John*

Actions may make reference to nodes in the tree other than the trigger node, however, either building or annotating them using instructions such as 'make', 'go', 'put', etc (with obvious interpretations). To formulate both lexical and computational actions in these terms, we adopt The Logic of Finite Trees (LOFT) (Blackburn and Meyer-Viol 1994). LOFT is the centrepin of the DS framework, a modal logic for describing finite trees. Using the following concepts,

$\langle . \rangle$	Existential modality
$[.]$	universal modality
$\uparrow$	'Mother of' relation
$\downarrow$	'Daughter of' relation
L	'LINK' relation (relating nodes in distinct trees)
0	Argument relation
1	Functor relation
$*$	Reflexive, transitive closure of $\{0, 1\}$ relations

principles of LOFT make available the operators:

$$\langle\downarrow\rangle, \langle\downarrow_0\rangle, \langle\downarrow_1\rangle, \langle\uparrow\rangle, \langle\downarrow_*\rangle, \langle\uparrow_*\rangle, \langle L\rangle, \langle L^{-1}\rangle, \langle D\rangle, \langle U\rangle$$

Each operator is interpreted by a discrete relation between nodes in a tree – the modality $\langle\downarrow\rangle$ is evaluated over the daughter relation: e.g. $\langle\downarrow\rangle Ty(e \rightarrow t)$ 'holds' on a node n if there is a daughter where $Ty(e \rightarrow t)$ holds; $\langle\uparrow\rangle$ over the mother relation. More specifically, LOFT has $\langle\downarrow_0\rangle$ and $\langle\downarrow_1\rangle$ interpreted over argument daughter and functor daughter relations respectively; $\langle\downarrow_*\rangle$ is interpreted over the dominance relation (the reflexive transitive closure of the daughter relation); $\langle\uparrow_*\rangle$ over the inverse of dominance; $\langle L\rangle$ over a relation of LINK between trees (see section 1.2 of this chapter), $\langle L^{-1}\rangle$ over its inverse; and finally $\langle D\rangle$, the weakest relation, (along with its inverse $\langle U\rangle$) is interpreted as picking out any relation between nodes (the reflexive transitive closure of the union of daughter and LINK relations). A special sort of modality is expressed by the composite operator $\langle\uparrow_*^1\rangle$ (and its inverse $\langle\downarrow_*^1\rangle$) which is interpreted over the dominance relations occurring on a path of functor daughter relations with no argument functor daughter intervening. We shall see in section 4 that this can be used to express constraints on locality.

The decorations that may hold at a node include specification of a value for the formula predicate Fo, a type specification expressed as an argument of the predicate Ty, and a tree-node position represented as an argument of the predicate Tn. Thus if $\langle D\rangle Fo(Run)$ holds at a node n, there is some node m that can be reached from n following daughter and link

relations arbitrarily far, and $Fo(Run)$ holds at m. Included within possible specifications are META-VARIABLES, which are place-holders for some fixed value to be provided from the current context or from some context provided through the parsing process.

The specific and novel advantage of LOFT emerges from the use of the LOFT operators in combination with a generalization of the concept of requirement $?X$ to any decoration X. This combination makes it possible to describe partial trees which have requirements on a treenode which are modal in form, which entails that an annotation appears on some OTHER node: a lexically defined restriction may be imposed upon one node that must involve a decoration of some distinct node possibly arbitrarily far in order to be satisfied. The requirements that may be imposed are thus by no means restricted to requirements such as $?Ty(e)$, or simple modal requirements, such as $?\langle\downarrow_1\rangle Ty(e \rightarrow t)$. To the contrary, any formula may be used to express a requirement. For example, while $\langle\downarrow_*\rangle Fo(\alpha)$ decorating a node n as an annotation implies that n dominates a node where $Fo(\alpha)$ holds, $?\langle\downarrow_*\rangle Fo(\alpha)$ decorating node n implies that $Fo(\alpha)$ is REQUIRED to hold at a node dominated by n (literally, there is a requirement on successful completion of node n that there be a node dominated by n annotated by *Fo(α)*). By this means, requirements may constrain subsequent development of the tree from a node at some arbitrary remove. This provides an additional mechanism for pairing noncontiguous expressions according as one expression imposes some requirement on a node which is secured by a decoration on some discrete node by the other. This gives a much greater flexibility than is standard.

An example of the way LOFT operators are used can be seen in the lexical entry for *disliked*:

disliked	
IF	$\{?Ty(e \rightarrow t)\}$
THEN	$\mathtt{go}(\langle\uparrow_1\rangle), \mathtt{put}(Tns(PAST)), \mathtt{go}(\langle\downarrow_1\rangle),$
	$\mathtt{make}(\langle\downarrow_1\rangle); \mathtt{go}(\langle\downarrow_1\rangle);$
	$\mathtt{put}(Fo(\lambda x \lambda y.Dislike(x)(y)), Ty(e \rightarrow (e \rightarrow t)), [\downarrow]\bot);$
	$\mathtt{go}(\langle\uparrow_1\rangle); \mathtt{put}(?\langle\downarrow_0\rangle(Ty(e)))$
ELSE	ABORT

The pointer is manipulated by the lexical actions to annotate different nodes. Firstly, it moves to the first $Ty(t)$ node which it annotates with past tense information, then returns to the predicate node. The functor daughter is then built, and annotated with a type and a formula (the two place predicate representing the relation which the verb is taken to denote). The verb then imposes a requirement on the predicate-requiring node for a daughter of type e.

Further conditional actions associated with the determiner and common noun in the object noun phrase eventually yields the tree in Figure 3.[5]

The parsing task is not yet complete, however, as the tree still contains unsatisfied require-

[5]Quantification is expressed through variable-binding term operators of type e, such as ϵ, τ etc. In such terms, the quantificational force of the expression is represented as part of the term itself (once the construction process is complete). Each term represents the appropriate witness of the constructed formula. We will not be discussing this matter further, but for more details see Kempson et al. 2001 chapter 7.

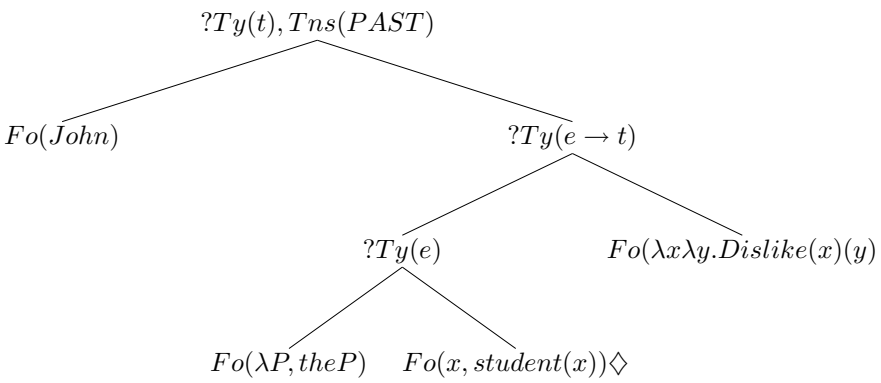

Figure 3: Parsing *John disliked the student*

ments. Completion of the tree involves functional application of functors over arguments, driven by modus ponens over types, to yield expressions which satisfy the type requirements associated with intermediate nodes. Figure 4 shows the completed tree with no outstanding requirements:[6]

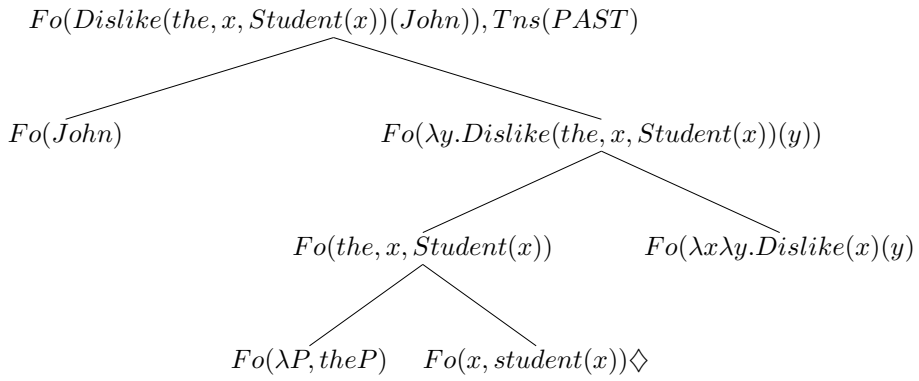

Figure 4: Completing the tree

1.2 Formula Underspecification.

Interacting with tree growth is the processing of anaphoric expressions, which is notoriously context-dependent. This phenomenon of content underspecification, which we here take in a representationalist spirit (cf. Kempson et al 1999, Kempson et al 2001:ch.1 for arguments), involves lexical projection of a metavariable to be replaced by some selected term during the construction process. Such replacement is achieved by a substitution process that is pragmatic,

[6] In subsequent displays, we ignore tense.

and system-external, and restricted only in so far as locality considerations distinguishing individual anaphoric expressions preclude certain formulae as putative values of the projected metavariable (i.e. analogues of the Binding Principles, Chomsky 1981, etc.):

(2) Q: Who upset Mary?
Ans: John upset her.

In processing the pronoun in (2), the object node is first decorated with a metavariable **U**, with an associated requirement, $?\exists x Fo(x)$, to find a contentful value for the formula label. Construed in the context provided, Substitution will determine that the formula **U** is replaced by $Mary$:

he	**IF**	$\{?Ty(e)\}$
	THEN	$put(Fo(\mathbf{U}), Ty(e), ?\exists x Fo(x), ?\langle\uparrow_0\rangle Ty(t), [\downarrow]\bot)$
	ELSE	**ABORT**

Note the expression of nominative case as a requirement on position within the tree, and also the bottom restriction, $[\downarrow]\bot$, constraining the decoration to be to a node which is terminal in the tree.[7] Like all other rules, Substitution is part of the construction process and so is restricted to occurring when the pointer is at the node in question, a matter we return to below.

1.3 Unfixed Nodes.

We have seen underspecification as encoded by requirements to construct nodes of certain types and to identify the formula content of a node. The third sort of underspecification considered here is underspecification of a tree relation, associated with a requirement to identify where in a tree a node should be fixed. This is shown by the requirement $?\exists x Tn(x)$, where Tn is the treenode label which provides the address of some node in terms of the functor-argument daughter relations that intervene between the node and the topnode of the tree. Such positional underspecification is used to account for long distance dependencies which are analyzed in terms of initially unfixed nodes whose position in the emergent tree structure is fixed at some later stage in the parsing process. A construction rule of *Adjunction introduces unfixed nodes, defining a transition from an incomplete tree of $Ty(t)$ with only a single node, to a tree that contains, in addition, a node characterized as dominated by a tree node a with requirements to identify the address of the unfixed node and to construct a type e decoration.

**Adjunction*

$$\frac{\{\{Tn(a), \ldots, ?Ty(t), \Diamond\}\}}{\{\{Tn(a), \ldots, ?Ty(t)\}, \quad \{\langle\uparrow_*\rangle Tn(a), \ldots, ?Ty(e), \Diamond\}\}}$$

Analyzing the string *Mary, John disliked* in these terms is illustrated in Figure 5 with an initially projected unfixed node and the pointer at the object position:

[7] This is a restriction which not all pronouns share, a matter we shall take up later.

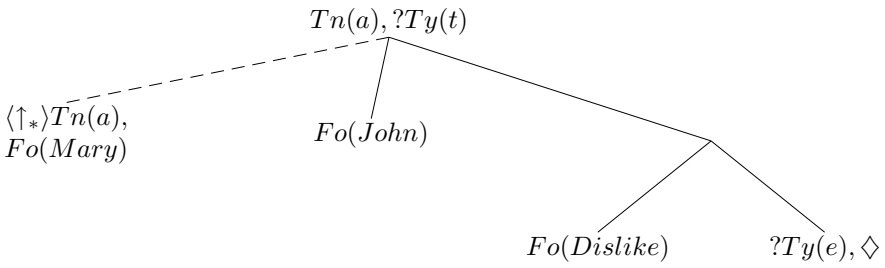

Figure 5: Parsing *Mary, John dislikes*

In figure 5, at the point in the parse at which all words in the string have been processed, there remains outstanding an unfixed node and a requirement to construct a node of type e. In this environment, a process of Merge may take place which unifies the unfixed treenode with the current node which satisfies both requirements. Ultimately, completion of the tree yields a *Ty(t)* Formula value, *Dislike(Mary)(John)* decorating the topnode, with all requirements fulfilled. More generally, a string is wellformed if and only if there is at least one sequence of transitions between partial trees determined by lexical actions and computational rules that gives rise to a tree rooted in $Ty(t)$ with a complete propositional formula and no outstanding requirements.

Notice how this modelling of natural language structure through dynamic concepts of growth replaces the static configurational approach, so that concepts such as c-command defined over a fixed structure are in general replaced by the dynamic concept of order of processing and tree development.[8] And with both anaphora resolution and long-distance dependency defined in terms of tree growth, we have the basis for articulating feeding relationships between the two processes, as we shall shortly see.

1.4 LINK Structures.

The framework also licenses the construction of pairs of trees, reflecting the construal of relative clauses as propositional constructs interpreted with respect to a term in some other propositional structure. Such trees are said to be connected by a LINK relation from the node taken as the 'head' of the construction onto the rootnode of a new "LINKed" tree the topnode of which is of propositional type (i.e. with requirement $?Ty(t)$), but with an additional requirement to secure a copy of the formula α annotating the head node. For this purpose we define an additional LINK operator $\langle L\rangle$, and its inverse $\langle L^{-1}\rangle$, and a rule of LINK Adjunction which carries out exactly these steps:

Link Adjunction

$$\frac{\{..\overbrace{\{X, Fo(\alpha), Ty(e), \Diamond\}}^{\text{head}}\}}{\{..\underbrace{\{X, Fo(\alpha), Ty(e)\}}_{\text{head}}, \underbrace{\{\langle L^{-1}\rangle X, ?Ty(t), ?\langle\downarrow_*\rangle Fo(\alpha)\}}_{\text{linked node}}\}}$$

[8] It is not that no structural concepts remain: to the contrary, development is defined over partial trees. It is just that, with the added dimension of tree growth following a left-right sequence of words, not all explanations need to be in the form of hierarchical relationships between fixed elements in a structure.

The paradigm constructions that involve the use of this transition are relative clauses, and topic constructions. In DS both quantified and nonquantified noun phrases are analyzed as being of type e; and the LINK transition involves imposing a requirement on the LINKed tree for a copy of the formula of type e decorating the node from which the transition is defined. The internal structure of noun phrases (corresponding to DP) contains a determiner node (of type $cn \rightarrow e$)), a type cn node (corresponding to NP), a node annotated with a variable of type e to be bound by the determiner, and the nominal item of type $e \rightarrow cn$.[9] So all determiner-noun configurations are taken to project not one node of type e but two: the one determining the topnode of the structure of the term and the other the node which specifies the variable to be bound by the determiner and restricted by the common noun.[10] After a step of LINK Adjunction, *Adjunction may provide an unfixed node within the new propositional LINKed structure, and, accordingly, the pointer being at the unfixed node, the relativiser provides a metavariable which is substituted by the formula value of the head of the relative clause, thus satisfying the requirement to find such a formula value induced by LINK Adjunction. In this way, we reflect the Jespersen (1927) account of *wh* complementizers in English as 'relative pronouns'. This account is a direct reflection of the initial informal observation that relative clause construal involves a subroutine of initiating a new structure and imposing on it a requirement for a copy of what is analyzed as the head. See Figure 6 for a characterization of a construal of *a man who* at the point at which the relative pronoun has been processed.

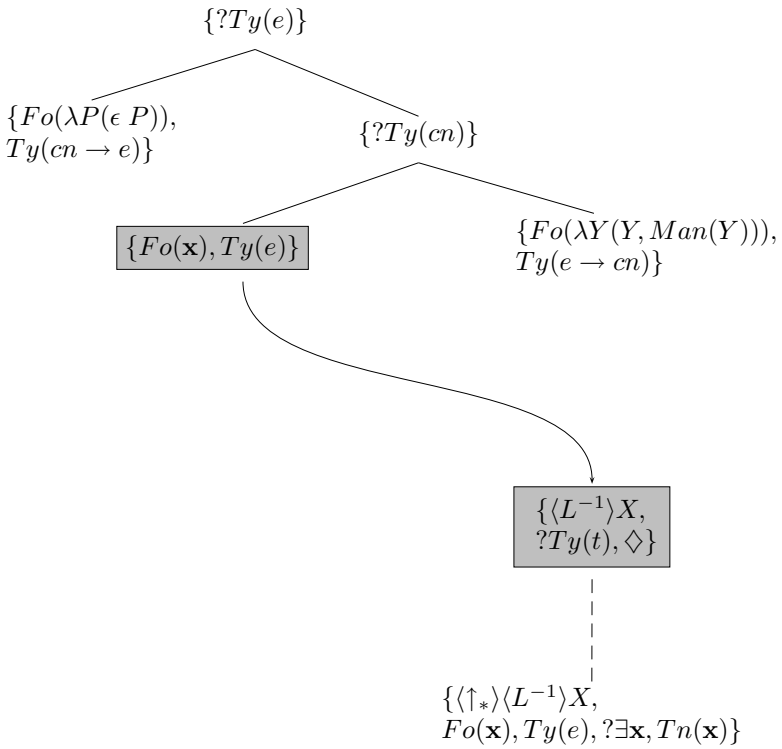

Figure 6: Having parsed *A man who*

[9]Nouns project from the lexicon both these two latter nodes.

[10]Restrictive and nonrestrictive relative clause construals differ as to which node of type e provides the formula that is imposed as a requirement on successful completion of the LINKed structure being introduced, this being sufficient to determine their different forms of construal, as part of the restrictor and nuclear scope of the quantifying phrase respectively. See Kempson and Meyer-Viol in preparation.

The subsequent construction of an interpretation for the relative clause follows the general pattern of left-dislocation structures illustrated in the previous subsection: i.e. the unfixed node merges with some node with an appropriate type requirement in the LINKed tree (here the object of *like*). Once this step of Merge has taken place and a logical formula duly derived for the topnode of the LINKed tree, a rule for evaluating the pair of a common noun node and a formula of type t yields a conjunction of open formulae, as in:

(3) a man who Sue likes: $Fo(\epsilon, x, (Man(x) \wedge Like(Sue, x))$

Notice that according to this characterization of a LINK transition, what is required in a LINKed tree is a second copy of the formula decorating the head. However nothing in that rule determines how such a copy should be provided: this is a property of the WH complementizer.[11] So in principle such a copy might be provided by a regular anaphoric device.[12] Indeed some languages make essential use of pronouns – eg Egyptian Arabic, where a pronoun is essential in all non-subject positions in a relative:

(4) Il mudarris illi Magdi darab-u. [Egyptian Arabic]
'the teacher who Magdi hit him'
the teacher who Magdi hit

(5) *Il mudarris illi Magdi darab.
the teacher who Magdi hit
'the teacher who Magdi hit'

To reflect this distribution, we propose an analysis of the complementizer, *illi*, as inducing the introduction of the linked tree with an associated requirement for a copy, but, unlike English, not itself providing that copy. There is no requirement imposed by the complementizer as to where that copy must occur and it can be provided across yet a further LINK relation, as in:

(6) Il-kita:b da, 'inta tkallimt ma9a l-walad 'illi katab 9aley-h.
the-book this, you talked with the-boy who wrote on-it
'You talked with the boy who wrote on this book'

(7) As for Mary, I talked to the boy who had scribbled on her book.

Figure 7 shows the analysis of (4), prior to the instantiation of the metavariable on the object node (note the lack of island-sensitivity expressed in the requirement $?\langle D\rangle Fo(x)$).

Despite this relatively weak characterization of structure imposed by the complementizer, no specific form of pronoun dedicated to such long-distance dependency structures needs to

[11] To characterize null complementizer effects in eg English, we posit the equivalent of a null complementizer, a free ride process in the lexicon licensing the copy of a formula of type e onto an unfixed node in a newly introduced LINKed structure.

[12] Arguably, this is the basis for:
(i) The man from Leeds – he I detest – is going to be there.
(ii) The man from Leeds – unfortunately I can't stand him – is also going to be there.

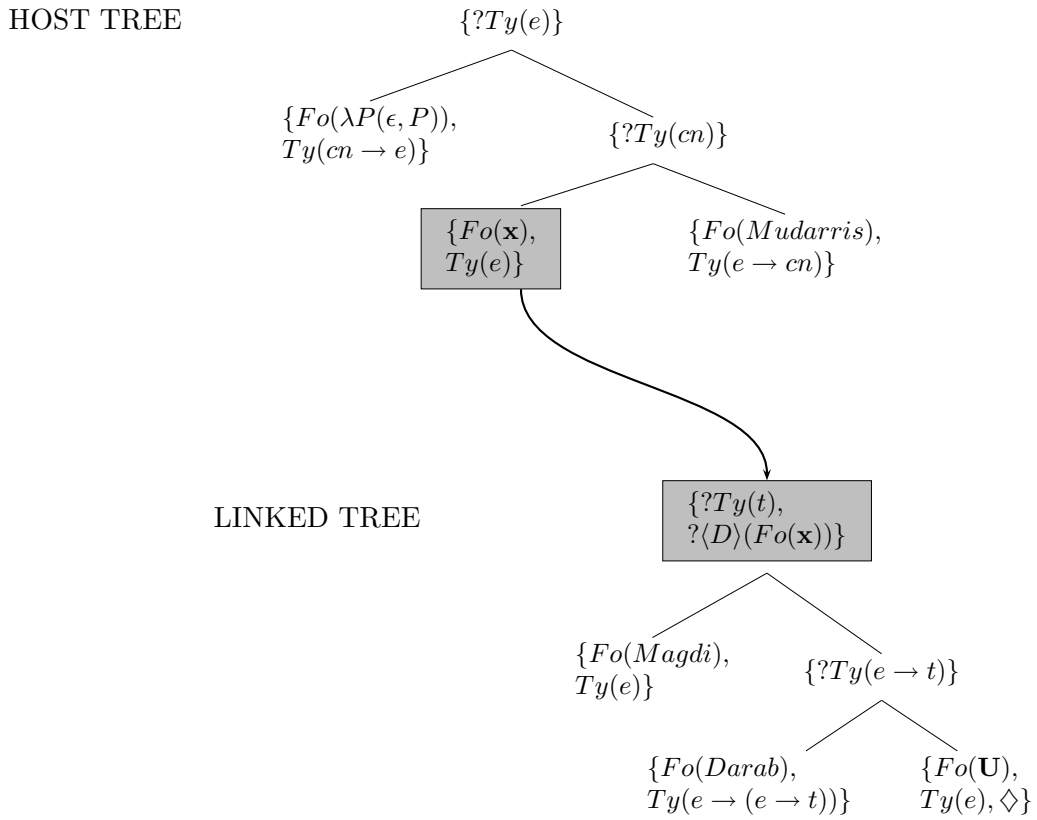

Figure 7: Parsing *Il mudarris illi Magdi darab-u*

be invoked: the mere assumption that the pragmatic process of Substitution interacts with computational actions provides the desired result. The structure lacks any unfixed node; and the modal requirement on the top node of the linked tree remains to be fulfilled. Because by definition *illi* does not provide the copy required by the LINKed structure, there is only one way of meeting the requirement which it imposes, and that is to use the regular copy process of the language, i.e. selecting as interpretation for some pronoun the value of the formula provided at the head node. The process of selecting that choice of substituend remains entirely unrestricted, but any other choice of substituend other than the formula value of the head will ensure that the requirement induced by this form of LINK adjunction will never be satisfied and so never give rise to a completed propositional tree.

A bonus specific to this form of analysis is that nothing special needs to be said to accommodate the so-called epithet cases, observed in all languages, in which full anaphoric noun phrases take the place of the gap or resumptive pronoun:[13]

(8) That friend of mine, who the idiot forgot his lighter, is late again.

(9) That friend of mine, who I left the poor guy at home looking after the dogs, can't be here.

This is in contrast to analyses which reduce the phenomenon of resumptive pronouns to some reflex of the regular long-distance dependency form of analysis. All that is required on this analysis is that a metavariable lexically provided by an anaphoric device can be updated by a process of Merge, so that even in those languages such as English, where the relative pronoun

[13]We are grateful to Ivan Sag for reminding us of this fact.

provides the copy of the head formula at an unfixed node, the metavariable projected by the pronoun or definite NP can be replaced by the formula decorating the head.[14] But such a move is an immediate consequence of the general concept of tree growth.

Notice what this dynamic perspective on relative clause construal has provided. The mode of analysis is top down and left to right. The transition from some head onto a new structure introduced as LINKed, imposes on that structure the requirement for a copy, a requirement which drives the subsequent construction process for the relative clause. Either the complementizer is an itemized anaphoric device; or it is not and regular anaphoric devices must be brought into play. In short, the mode of analysis of relative clause construal is not a bottom-up abstraction process but a top-down anaphoric process, moreover one that involves essential interaction between structural processes and the pragmatic process of anaphora resolution.

1.5 Topic structures as a pair of linked structures.

The concept of building linked structures has so far been restricted to inducing a new tree from some node WITHIN a given partial structure. However, nothing in the rule of Link Adjunction requires this: it can equally apply from the TOP node of a tree of type e to induce some second structure to be of type t, duly imposing a requirement on that second structure that it contain an occurrence of the formula annotating the topnode of the first. This provides a basis for modelling so-called topic structures, in which a left-peripheral NP, characteristically indicated to be separated from the following string by intonation, is associated with the presence in the following string of a coreferring pronoun:

(10) That friend of yours, I found him wandering around the supermarket.

Notice what such an analysis of topic structures would lead us to expect. Since there is no analogue to a relative pronoun in topic structures, their analysis as projecting linked trees would require the construal of the pronoun as identical to the interpretation assigned to the left-peripheral NP. This is because, given the modal requirement on the top node of the LINKed structure and the lack of any morphological expression analogous to an English relative pronoun, some pronoun MUST be interpreted as identical to the Fo value projected by that NP in order to yield a wellformed result. We thus have a first taste of how to set about characterizing left-dislocation structures.

Recalling now the characterization of long-distance dependency deriving from the concept of an unfixed node within a single tree, we can see that the DS framework has two established procedures for interpreting left-dislocation sequences: (i) as a pair of linked structures, (ii) as a single tree containing an initially unfixed node.

2 Left-Dislocation.

The problem faced in analyzing left-dislocation data is that there is more variation than orthodox assumptions about long-distance dependency effects would lead one to expect. There are, familiarly, languages with the left-dislocated expression paired with 'a gap' and displaying island restrictions:

(11) Mary, John thinks Tom had upset.

[14] This account presumes on an analysis of definite NPs as providing a metavariable exactly as pronouns relative to a presumed inference ("presupposition") that the predicate content of the nominal holds. This requires the assumption that a definite NP is an anaphoric expression. See Ranta 1994, Kempson et al 1999, Kamp and Van Eijck 1997, Kempson et al 2001, Fernando 2001.

(12) *Mary, I dislike the man that married.

There are also languages/structures that display pairing of the left-dislocated expression with a pronoun with no subjacency effects:

(13) Il-kita:b da, 'inta tkallimt ma9a l-walad 'illi katab 9aley-h. [Egyptian Arabic]
the book this, you talked with the boy who wrote on it
'You talked with the boy who wrote on this book'

(14) As for Mary, I talked to the boy who had scribbled on her book.

However this is by no means all the types of variation allowed. There are left-peripheral constituents paired with a pronoun which display properties of movement, such as strong island effects (as first explored for Italian with the positing of Clitic Left Dislocation (CLLD) by Cinque 1990):

(15) Ton Petro ton nostalgo poli. [Greek]
The Peter$_{ACC}$, Cl$_{ACC}$ miss-1sg much
'I miss Peter a lot'

(16) *Tin Maria, xtes gnorisa ton andra pu tin patreftike.
The$_{ACC}$ Maria yesterday met$_{1st.ps.sing.}$ the man that her$_{ACC}$ married
Mary, yesterday I met the man that her married'

Conversely, there are left-dislocation structures which lack subjacency restrictions without reliance on a lexical pronoun, as in Japanese:

(17) Ano hon-wa$_i$, Hanako-ga e_j t_i katta hit-o$_j$ sagasite-iru rasii. [Japanese]
That book$_{TOPIC}$ Hanako$_{NOM}$ bought person$_{ACC}$ is looking for seem
'It seems Hanako is looking for the person who bought that book'

There is also interaction with case effects. Given that the left-dislocated constituent may or may not be marked with the case that indicates its relative position in the structure, it is the case-marked variant that displays subjacency restrictions. If on the other hand, it is marked with nominative case (or is morphologically unmarked), there are no such restrictions (compare Greek (16) with (18)):

(18) I Maria xtes gnorisa ton andra pu tin patreftike. [Greek]
The Maria$_{NOM}$, yesterday I met the man who her married
'As for Maria, yesterday I met the man who married her.'

Of these it is the non-case-marked form (or nominative) which is associated with a sharp intonational break and occurs only in root clauses; it is the matching case-marked form which can occur in subordinate clauses and without any such phonological clues.

This basic pattern is very widespread across languages. For example, Aissen 1992 has argued that the Mayan languages differ according to whether they have an external topic which is an independent structure, separated by an intonational break, or have no such break but are able to occur in subordinate clauses. Then, yet further, there are mixed effects in which left-dislocated constituents may be paired with a pronoun which is itself dislocated:

(19) As for Shalom, he I think should be given the position.

(20) Shalom, ?ani xošev še ?alav ?amarta še sara katva šir. [Hebrew]
Shalom I think that about-him said-you that sara wrote poem
'Shalom, I think that you said that Sara wrote a poem about'

2.1 The DS Account of Left-Dislocation: Linked Trees and Structurally Unfixed Nodes.

This heterogeneity might appear to demand a number of different analyses with structure-specific stipulations; and the number of intervening functional projections has blossomed in an attempt to provide a distinctive analysis of the bases of the various patterns (see Anagnastopoulou et al 1996 for a representative range of analyses). The obvious challenge for DS is whether the distinction between linked structures and an unfixed node within a single structure could possibly provide sufficient richness to express the variation that the data present. Of itself, of course not. However there are other grounds for variation in establishing the relation between the initial sequence and its construal within the resulting structure. First, there is the feeding relation between anaphora resolution and long-distance dependency, in DS expressed in compatible tree-growth terms as we have seen. Secondly, there are different forms of locality restriction on the domain within which a fixed interpretation must be found.

2.2 Clitic Doubling as *Adjunction : Clitic Left Dislocation.

With the concept of linked structures and unfixed nodes in mind, we take as our point of departure two primary alternative forms of analysis for left dislocation sequences. Consider the forms of interpretation that could be projected from the English string:

(21) That party last week, I hated it.

On the one hand, the projection of a pair of LINKed structures clearly provides a possible basis for analysis, with the pronoun *it* substituted with the formula projected from *that party last week* (whatever the internal complexity of the structure from which that formula is built up). As an alternative, however, an interpretation could be assigned to this string by taking the left peripheral constituent *that party last week* as annotating some topnode of a structure WITHIN some propositional structure, in which it is initially analyzed as unfixed. The disadvantage of this alternative is that it risks there being no possible logical form as outcome, at least on the assumption that the lexical specification of *it* is analogous to the earlier characterization of *he* as having a "bottom" restriction determining that the variable assigned as Fo value annotate a terminal node in a tree. The issue turns on the applicability of *Merge* unifying an unfixed node and a fixed node decorated with a metavariable as an interim partial Fo value.

In principle an unfixed node can merge with any node in a tree, as we've already seen, just as long as the process gives rise to a consistent outcome. Hence, the formula value of an unfixed node will be compatible with that decorating the node with which it is to be merged only if one of these is a metavariable. With *that party last week* annotating an unfixed node, and the object node in the main structure standing in a fixed relation to the root, nothing in that specification in principle therefore precludes the merging of the unfixed node with the object node to yield a wellformed output. However, should the pronoun *it* bear a "bottom" restriction, such unification will not be able to take place because the topnode of the tree analyzing *that party last week* is a nonterminal node, i.e. dominates other nodes. This bottom restriction was taken to be a lexical property of the pronoun *he*. Supposing however that a pronoun for whatever reason should fail to have any such restriction, the immediate consequence would be that the node decorated by the full term could merge with the node decorated by the pronoun. (21), on such an analysis, could be analyzed either as a pair of linked structures or as a single structure in which the left-peripheral constituent is unfixed, merging with the node decorated by the pronoun during the construction process.[15]

[15]Notice that on this analysis Substitution is not the only process available for assigning a value to the metavariable lexically projected by a pronoun. The definitive property of pronouns is that they fail to project a determinate

In English, the regular pronouns invariably display this bottom restriction: all such sequences have to be construed as topic structures.[16] So this processing ambiguity doesn't arise. However, this putative duality of analysis matches exactly the tension in many languages as to whether clitic doubled sequences require analysis in more than one way according as their first constituent is clearly demarcated from the remainder by stress. As noted earlier, a lack of stress separating off the left dislocated expression often correlates with case marking, matching of this case by the associated clitic, and island sensitivity, while the presence of stress clearly demarcating the first constituent from the remainder correlates with a failure of the appearance of a default case on the left peripheral expression, a failure of case-matching, and lack of island sensitivity (Spanish, Greek, Malayalam, and many more).

(16) *Tin Maria xtes gnorisa ton andra pu tin pantreftike. [Greek]
Maria$_{ACC}$, yesterday I met the man who her married
' Maria, yesterday I met the man who married her.'

(18) I Maria xtes gnorisa ton andra pu tin pantreftike
Maria$_{NOM}$ yesterday I met the man who her married
'As for Maria, yesterday I met the man who married her.'

In Malayalam, as in many other languages, this is reflected in the fact that if the left-peripheral constituent is analyzed as a topic, case is not marked on that expression (or its case can be taken to be nominative, this being morphologically unmarked) and a pronoun is obligatory, e.g. (23), the analysis of such a construction being that of an initial LINKed structure. On the other hand, if the left-peripheral constituent bears the case indicating its position in the resulting tree, the (case-marked) pronoun is optional, e.g. (22) with the analysis being that of a left unfixed node.

(22) Suewine Johninu (avale) ishtammanu. [Malayalam]
Sue$_{Acc}$ John$_{Dat}$ her$_{Acc}$ likes
'She, John likes her.'

(23) Sue Johninu avale ishtammanu.
Sue, John$_{Dat}$ her$_{Acc}$ likes

value: they all project a metavariable and a requirement for provision of a fixed value. The value assigned depends on the particular context in which they occur and may be the result of Substitution, Merge or other processes as licensed. Of interest in this connection are reconstruction effects in which a pronoun contained within a left-dislocation structure is interpreted relative to some subsequent term (a process which if it involved Substitution would involve movement back into the LINKed structure once the subject pronoun is processed):
(i) Which teacher that he trusts will each boy talk to?
This particular form of pronoun construal is, we suggest, not the regular process of Substitution but a byproduct of having an unfixed node in a partial tree. The decorations on the unfixed node are evaluated against each new node as the tree is constructed, node by node, each node being considered as a putative candidate for merging the unfixed node. Because this causes two nodes to be considered together, this makes available the formula decorating the fixed node as a value for some outstanding metavariable contained as a subterm in the formula decorating the unfixed node. Reflecting this, we define a rule that substitutes the *Fo* value of some fixed node for a metavariable contained within the formula decorating the unfixed node. In the case of (i), this will allow the metavariable in the formula decoration of *which teacher that he trusts*, i.e. $Fo(WH, teacher(x) \wedge Trust(\mathbf{U}, x))$ to be replaced by a formula identical but for the replacement of (U) by the formula value of the subject node, *each boy*, i.e. $Fo(WH, teacher(x) \wedge Trust((\tau, y, Boy(y)), x))$ The rule takes the form:
**Reconstruction*:

$$\frac{\{\{\langle\uparrow_*\rangle Tn(X), ..Fo(\alpha[\mathbf{U}])..\}, ...\{(MOD)Tn(X), Fo(\beta), Ty(e), \Diamond\}\}}{\{\{\langle\uparrow_*\rangle Tn(X), ..Fo(\alpha[\beta])..\}, ...\{(MOD)Tn(X), Fo(\beta), Ty(e), \Diamond\}\}}\ .$$

where $MOD \in \{\langle\uparrow_0\rangle, \langle\uparrow_1\rangle\}^*$

[16] The only exception is expletive *it*, paired with propositional formulae (see section 3.1.2 for discussion of expletives).

'Sue, John likes.'

Notice how such case-matching examples will necessitate an analysis of Malayalam pronouns as having lost their bottom restriction, since the NP marked nominative may be arbitrarily complex. In other languages, the distinction may be expressed through discrete forms of such "topic" structures:

(24) Cît despre Ion, n-am întîlnit fata care l-a văzut ultima
As to John, not-I have met the girl which him she has seen the last
dată. [Romanian]
time.
'As for John, I have not met the girl that she saw him last time.'

(25) *Pe Ion n-am întîlnit fata care l-a văzut anul trecut.
pe John not-I have- met the girl which him-saw year last.
'*The John, I have not met the girl who saw him last year.'

This gives us a second parameter of variation according to which clitic doubling structures for left-dislocation effects can be analyzed – whether the individual pronoun in the individual language retains its full lexical status as an item imposing a bottom restriction, or has the freer distribution of occurring also in structures in which it must merge with some unfixed node.[17] Since this is a lexical matter, we might expect variation between individual pronouns, eg the dative in Spanish, which notably can be used to duplicate ALL forms of NP, quantified and referential, in contrast to eg the object clitic which can only double referential noun phrases construed as independently fixed in the context, and so, arguably, in such cases analyzable as a pair of linked structures.

This possibility allows forms that are intermediate between the conventionally labelled Hanging Topic constructions and the so-called Topicalization cases (Move α), for it characterizes strings where the morphological form matches the Hanging Topic structures but the analysis is closer to that of Topicalization. This matches the distinctive internal topic posited by Aissen 1992 for Tz'utujil, distinguishing it from the external topic she suggests for Tz'otzil and Jakaltek, an analysis which, predating Kayne 1994, provides theory-neutral evidence for a category intermediate between a clause-external topic and a topicalized constituent.

In having a distinction between pronominal elements some of which have, and some of which do not have, a bottom restriction, notice how we now have a basis for reflecting the lack of distinctiveness in pro-drop structures as to whether some NP is quasi-independent of the structure projected by the verb, or not. Suppose we uncontentiously assume that subject pro-drop phenomena are modelled as actions by the verb which from a trigger of *?Ty(t)* make a subject node annotated with a metavariable and then make the node(s) for the predicate item (if the verb is transitive inducing not merely a predicate node but a node also for the two-place predicate and its corresponding object node).[18] Then, in so far as the bottom restriction is a reflection of lexical information (associated in particular with contentive words), we would not expect a node of type e annotated by some verb to share the same status as a metavariable decoration provided by a lexical pronoun, and we might reflect this by assuming that any 'pro-drop' decoration would have no such bottom restriction. These assumptions enable us to reflect directly the duality and potential ambiguity in subject-verb sequences in pro-drop languages:

[17] English relative clauses, in which resumptive use of pronouns is an available, albeit marked option, do not provide evidence of any such loss of restriction as in these LINKed structures, it is is ONLY the formula value that is copied over into the LINKed structure, and not any ancillary structure.

[18] If the language is fully pro-drop, we assume the verb projects a full propositional template of structure with all argument nodes decorated with metavariables (see Kempson et al 2001).

either they can be analyzed as a pair of linked structures with the head NP expression imposing a requirement on the LINKed structure for a copy which the metavariable projected from the verb's specification can provide; or they can be analyzed with the subject NP taken to annotate an unfixed node which merges with the subject node projected by the verb. The framework, that is, directly reflects the uncertain status of NP V sequences in subject-pro-drop languages as to whether the subject NP is or is not part of the clause.

2.3 Clitic Doubling and LINKed structures.

Finally we take up the potential for variation in combining the concept of requirement with a range of modal operators. In the characterization of relative clauses, we indicated that languages might vary as to which form the requirement imposed by the LINK transition might take, being either of the form $\langle D \rangle$ or $\langle \downarrow_* \rangle$, with English being defined to have the latter, Arabic the former.[19] This gives us a basis for analyzing the so-called Hanging Topic Structures, as we've already seen (see Agnastopoulou et al eds. 1996). However, the assumption that linked structures can be projected with a requirement for a copy to be provided within a SINGLE structure provides us with an alternative means of characterizing Clitic Left Dislocation (CLLD) data, since according to the proposed analysis these could be analyzed not merely as an unfixed node subject to Merge (if the pronouns are not restricted) but also as pairs of linked structures with the LINKed structure having the more stringent restriction that the copy be provided within an individual structure. Again this gives us a case intermediate between dislocated topics and what have been analyzed as movement strategies for the data analyzed in terms of a pair of LINKed structures albeit displaying a locality restriction redolent of long-distance dependency. In fact it will provide the basis for two analyses of CLLD structures. From a parsing perspective, this is not a tension as between analyses to be decided upon, as we expect alternative strategies to be available in parsing a string.[20]

2.4 Generating Radically unfixed nodes – Verb-final languages.

Given the application of a range of modal operators to express syntactic non-contiguity effects in relative clauses and topic structures, we might also now expect that the license to introduce unfixed nodes should allow a more liberal variant, with nodes introduced relative to some topnode without any constraint as to where they are resolved in the resulting structure. This potential appears to be what is needed for verb-final languages such as Japanese. The general perspective of partial specification and update is well suited to these languages, in which all noun phrases are introduced in sequence and resolved only in the presence of the cluster of verbs that appear finally:

(26) Hiroto-ga ringo-o tabeta-to itta.
Hiroto$_{NOM}$ apple$_{ACC}$ ate$_{COMP}$ said
'Hiroto said he ate an apple'

[19] Arguably there are structures with yet more stringent requirements. In this connection, we note that the obligatory subject control in participial relatives could be analyzed as a requirement in the LINKed structure for a copy of the head $Fo(\alpha)$ of the form $?\langle\downarrow_0\rangle Fo(\alpha)$, though we leave analyses of these on one side:
(i) The man dying was English.

[20] While this may seem an embarrassment of riches, it provides exactly the alternative strategies needed to explain the diachronic shift from Latin through Old Italian to modern Italian (Nigel Vincent personal communication).

(27) Dono-kyoujyu-mo, [futari-no sikenkan-ga kaku touan-o saiten-sita]-to
every professor, two examiners$_{NOM}$ each script$_{ACC}$ marking-did$_{COMP}$
houkoku-sita.
reported
'Every professor reported that two examiners marked each script'

However such underspecification includes uncertainty as to whether or not the described terms are part of the main structure or a LINKed structure. For though the relative position of the terms might be specified through the case specification, the decision as to whether they are assigned an interpretation within the root structure or a nested structure or even a LINKed structure is simply not available until some noun following a verb is available, as witness:

(28) Hiroto-wa muita ringo-o tabeta.
Hiroto$_{TOP}$ peeled apple$_{ACC}$ ate
'As for Hiroto, he ate an apple he peeled.'
'As for Hiroto, he ate an apple Tom peeled.'

With Japanese being fully pro-drop, (28) is ambiguous at least between the two indicated interpretations (assuming some contextually provided occurrence of the term *Tom*), with the left-peripheral expression interpretable either as part of the structure projected as a relative, or not. It appears then that we need the weakest form of adjunction to reflect the apparently unstructured way in which terms in such languages are initially introduced into the structure.

2.5 Left Dislocation – The Overall View.

This now gives us the array of possibilities listed in Figure 8 which provides a typology of construction types rather than a typology of languages. We have variation as to whether some left-peripheral item annotates an unfixed node within a single structure, or is taken to annotate a distinct structure within a pair of linked trees. We have variation as to whether such introduced information has to be resolved within a local tree or is merely a global "anywhere" constraint. Finally, we have variation according to whether a pronoun annotates a node within a structure with a bottom restriction, thereby imposing an analysis on the left-peripheral item as annotating an independent structure within a linked pair, or whether, lacking such a restriction, both forms of analysis remain available.

The first distinction is a distinction of structure types within which partial specifications of structure are introduced. The second distinction concerns variation in the limit WITHIN which some underspecification has to be resolved. The third distinction concerns the forms of update which provide the basis for resolving such structural underspecification. These are all alternative specifications of either computational or lexical actions, and each posited source of variation is independently motivated.

The primary subdivision provides a subclassification as to whether the structure is a single structure or a pair of linked structures. Within the first of these, we have the distinction between whether the tree specification given by the individually introduced expressions is merely that

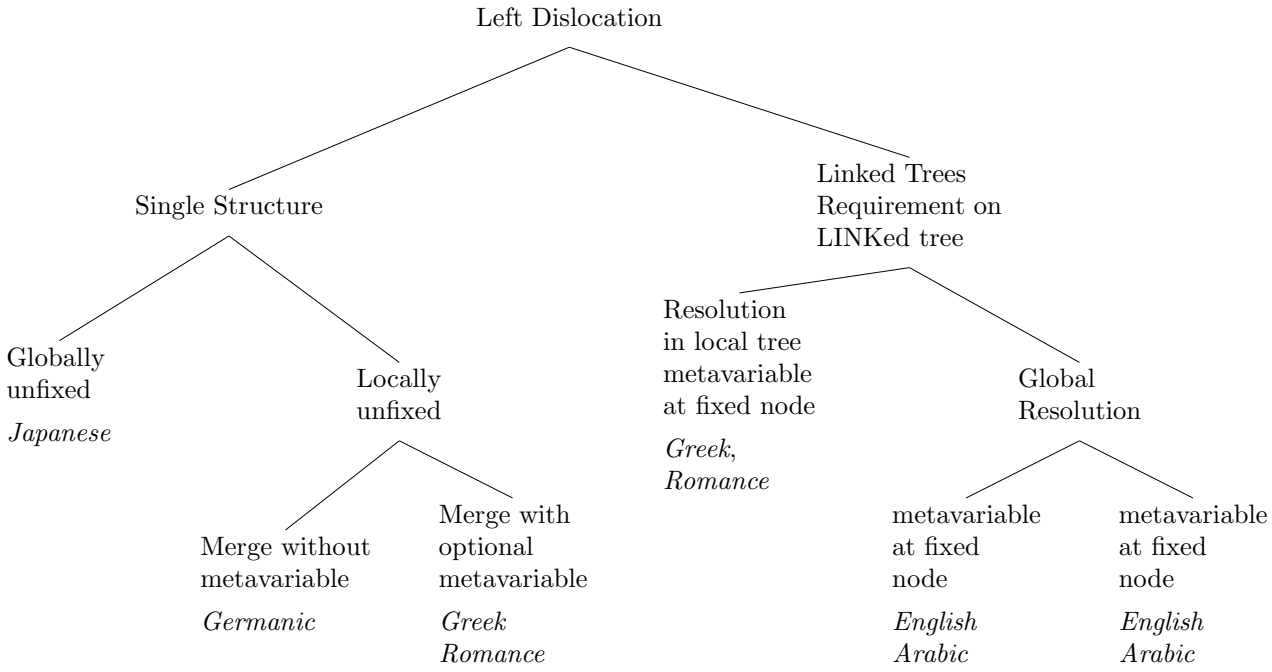

Figure 8: A Typology for Left Dislocation

they are building blocks to be incorporated into the tree somehow (as in verb-final languages), or whether the introduced expression is taken to annotate an unfixed node within a locally introduced tree - the classical long-distance dependency cases. Within these, languages divide between those in which some left-peripheral expression projecting a type e node is resolved without need of any in situ morphological pronoun, as in the Germanic languages, the classical *Move* α forms, and those languages in which with the pronoun has by assumption lost its bottom restriction and the resolution of the unfixed node can be achieved by merging with a node decorated by a pronoun. This latter gives us the first analysis of CLLD.

Then within the set of left-dislocation effects analyzed as pairs of linked structures, we have the same division between resolution presumed to be local within a single tree and resolution being structurally unrestricted. On the assumption that the requirement imposed upon some LINKed structure is restricted to being satisfied within a single tree, we expect the pronoun realising that second copy to occur at a fixed position providing a second analysis of clitic left dislocation phenomena – as a pair of linked structures.

Upon the analysis in which the requirement for a copy of the paired structure on the LINKed structure is presumed to be unrestricted, we have available an analysis of Hanging Topic Left Dislocation structures, which reportedly impose no restriction on where in the structure introduced subsequently to the projection of the topic constituent the required copy should occur:

(29) As for John, I can't stand the woman he is marrying.

This then allows the possibility that the point of resolution providing the copy required for a pair of linked structures is a decoration (provided by a pronoun) on an unfixed node. The position of this node is then to be determined locally within the tree in which its decoration was introduced. This is the basis of the Hebrew pronoun fronting ((19)-(20)), displayed also in English:

(30) As for John, he I heard is sick.

So the three basic subdivisions allow for cross-classifications that make available a rich array of language-particular variation.[21]

It is worth noting at this juncture the general pattern of analysis. In place of the orthodox reduction of linearity considerations to hierarchical relations and c-command as in Kayne and elsewhere, we provide accounts that project structure reflecting the order of processing of words, while allowing relatively weak specification of tree position of the introduced terms so that strict linearity of actions no longer corresponds to a fixed position in some syntactic tree that c-commands all terms that follow. There is accordingly no need to invoke multiple functional projections and movement to achieve the necessary flexibility of interpretation relative to sequence of words, nor any projection of structure specific to an individual construction. There is also no stipulation of ranking of constraints as in Optimality theory (see Bresnan 1999): the variations licensed emerge simply from the interaction of independently licensed forms of tree growth.

3 Right Dislocation.

When we turn to right periphery phenomena, the first observation is that there is considerably less cross-linguistic variation. The range of structure types that is found is:

(i) Afterthoughts
All languages display structures in which something is added once a sentence is completed as an addition or modification:

(31) Sue and I have carefully checked all the French scripts. But not the German. At least, not yet.

(32) I was relieved to see that everyone was having a good time. Except Harry.

(ii) Pronoun Doubling
All languages also display pronoun doubling, a backgrounding construction:

(33) It's an impossible topic, right dislocation.

(34) He's not an easy man, Marg's husband.

These are available in all languages, restricted only in that the final expression must be construed as referential, and must pick out an individual referred to within the primary structure.

(iii) Subject Inversion
Pro-drop languages invariably license the occurrence of NP expressions that can be implicitly projected by the verb in a position following the complete verb phrase. So in the Romance languages, the subject may occur following a complete VP:

(35) Ha telefonato Beatrice. [Italian]
has telephoned Beatrice
'Beatrice has telephoned.'

[21] In this classification of so-called "left-dislocation" structures, we are presuming that the term satisfying the restriction on linked trees sharing a common term is satisfied at the topnode of the initially projected structure. If we drop this restriction, we have a basis for extending the account to Across-the-board extraction (*John, Mary likes and Sue dislikes*) and correlative structures(*Whoever John likes, Mary dislikes*), both a combination of paired linked structures, the first of which contains an initially unfixed node. See footnote 15.

(36) E' arrivato uno studente.
Is arrived one student.
'A student has arrived.'

In Turkish and Japanese, both subject and object can occur after the verb (in root clauses):

(37) Saiten-sita. futari-no sikenkan-ga kaku-touan-o. [Japanese]
marked-did two examiners$_{NOM}$ each script$_{ACC}$
'Two examiners marked each script'

(38) Gövrevlendir-mi s bir asistan-i her hoca. [Turkish]
give duties an assistant$_{ACC}$ every teacher
'Every teacher gave an assistant duties'

And in Greek, there is also free postposing of all arguments:

(39) Kaθe fititis vlepi enan kaθiγiti. [Greek]
every student see$_{3.sg}$ a professor$_{ACC}$
' Every student sees a professor'

(40) Vlepi kaθe fititis enan kaθiγiti.
see every student one professor
' Every student sees a professor'

(iv) VP-internal ordering. Quite generally, there is relative freedom of ordering in post-verbal positions in SVO languages, which gives rise to a shuffling of constituents which is labelled 'Heavy NP Shift':

(41) I gave to Mary my grandmother's ivory fan.

(v) Right Node Raising. When right-periphery placement strategies are combined with coordinate constructions, the effect is so-called Right-Node Raising. These are strings in which one structure may be "temporarily set on one side" in a parsing sequence while a second is introduced, both then being completed by a single right-most expression:

(42) John introduced and I then talked at length to, that new professor from Taiwan.

This phenomenon is universally available, though in rather different forms from language to language (data from Hartmann 1998):

(43) Maria hat Hans, und Klaus hat Peter ein grosses Stück Kuchen
Maria has Hans and Klaus has Peter a big piece of cake
gekauft. [German]
bought
Maria has bought Hans a big piece of cake and Klaus has bought Peter a big piece of cake.

(44) Hiroto-ga ringo-o, Tami-ga nashi-o tabeta. [Japanese]
Hiroto$_{SUB}$ Apple$_{ACC}$ Tami$_{SUBJ}$ pears$_{ACC}$ ate.
'Hiroto ate apples and Tami ate pears.'

(vi) Finally, we should note the phenomena which displace the subject, in which an expression may be prevented from occurring in a canonical eg subject position early in the string, and be accordingly required to occur in some position following the predicate. These are the lexical expletive constructions, whose effect is to ensure that some constituent occurs at the right periphery of a clause:

(45) It is likely that I am wrong

(46) There emerged a tired young man.

Of this list, we leave on one side real after-thought phenomena. These are sequences in which a single constituent may be projected as a fragmentary sentence, to be taken as some revision or afterthought of what precedes:

(47) We left all the students at the bar. Though not Tami.

There is reason to analyze these as ellipsis phenomena (see Reinhart 1991, Lappin 1995, Kempson 1995 Kempson et al 1999). Within DS terms, these fragments can be characterized as projecting an unfixed node to be merged with some partial tree abstracted from the structure built up in processing the previous conjunct.[22] For (47), this would mean projecting an unfixed node decorated by $Fo(Tami)$, which then gives rise to a process of abstraction over the previous tree to yield a partial tree which can merge with this unfixed node. The overall interpretation is a pair of conjuncts 'We left all the students at the bar', 'We didn't leave Tamiat the bar'.

So putting these afterthought phenomena aside, the task is to provide an account of right-dislocation in terms of LINK and *Adjunction that nevertheless brings out the asymmetry between right and left dislocation effects.

3.1 Pronoun Doubling.

The simplest type of right periphery construction is the analogue of Hanging Topic constructions on the left periphery. In left-dislocation structures, we postulated the construction of a LINK relation between a node of type e and a node requiring type t. A candidate right periphery structure for which the converse LINK transition from some completed node of type t onto one requiring type e is well-suited is the Pronoun Doubling construction:

(48) She talks too fast, Ruth Kempson.

(49) He's an idiot, that man at the cashdesk

In these structures, an anaphoric expression is identified as co-referential with the formula annotating the right-peripheral structure which is optional:

(50) He's an idiot.

Nevertheless the final expression must be construed as co-referential with some anaphoric expression within the preceding string for the structure to be well-formed:

(51) *He's an idiot, my mother.

Such structures are naturally interpreted in DS as involving a LINK transition from the rootnode of the propositional tree to some following structure requiring type e, with that term required to be identical to some subterm of the just constructed propositional structure. This accounts directly for both optionality (50) and co-referentiality (51). The restriction of these right dislocated expressions to referring expressions (cf. *$Sue\ met\ him,\ a\ man$) follows from the fact that the pronoun in the propositional structure is not cataphoric but required to be identified from some larger context in order to complete the propositional tree without outstanding

[22] The Japanese postverbal phenomena reported in Sells 1998 Japanese are arguably of this sort, for their most notable characteristic, as he himself points out, is that they all meet the condition that the string to which they are postposed must be able to stand as an independent sentence. They are all observed only in informal conversation.

requirements. This assigned value is then carried across as a requirement on the development of the LINKed structure which can only be satisfied by some referential term which itself uniquely identifies that value in context (i.e. a proper name or a definite noun phrase). This ensures that, however that referring expression is subsequently constructed, it must also be assigned the same term as value, a necessary prerequisite for the LINK-imposed requirement, hence well-formedness of the string, to be fulfilled. A first bonus for this analysis is the naturalness with which it reflects the fact that a right dislocation structure with this type of construal, like the analogous left dislocation structure, is a root structure phenomenon, unavailable within the confines of an individual tree – the phenomenon being essentially construed as a transition from one tree structure to the next.

Though, in pronoun doubling, we have the mirror-image of the Hanging Topic Left Dislocation effect at the left periphery, there is nevertheless an asymmetry between right and left periphery effects, which we can view as a consequence of the dynamics of the left-right processing. A linked structure projected at the outset (as a topic) cannot rely for its interpretation on any information projected by the following clausal sequence. However the projection of a pronoun within that clausal string can, indeed must, take the preceding linked structure as its context (see section 2.1):

(52) Giovanni, l'apprezzavamo. [Italian]
Giovanni him, we appreciate
'Giovanni, we appreciate him.'

With a right-peripheral NP construed as an independent linked structure, the tables are turned. In this case, as we've just seen, the pronoun in the clausal sequence must be interpreted relative to the context in which it is processed to establish a logical form; and the right-peripheral NP then must be interpreted as referring to the same individual in order to assure that there is a shared term in the two structures. Hence the invariably reported reminder effect in such pronoun doubling structures (see Heyting 1994, Kural 1997). The backgrounding topic effect is essential, in this framework emerging as an immediate consequence of the analysis.

3.2 Subject postposing and Final*Adjunction.

Turning to the regular postposing of constituents in pro-drop languages, we now explore the applicability of a variant of *Adjunction at the right periphery also. It might seem that such a process could not be motivated, since the later stages of processing a sentence string do not provide the same underspecification so manifestly provided at the left periphery. However there are strong grounds for positing such a rule. First, notice what the effect of such a rule would be. It would introduce an unfixed node in the face of some completed propositional structure; but if it is to lead to a wellformed outcome, it must induce an operation of Merge with the already constructed tree to yield a single logical form. This can only take place if there is some outstanding metavariable which has not been assigned a value, for Merge would then provide that metavariable with a value while providing the unfixed node with its treenode address.

Such an analysis would well suit (36), a type of structure displayed in all pro-drop languages, the metavariable on the subject node being provided by the lexical actions of the predicate and merged with the unfixed node decorated by the post-predicate noun phrase:

(36) E' arrivato uno studente.
Is arrived one student.
'A student has arrived.'

We define such a rule as follows:

*Final*Adjunction*

$$\frac{\{\{Tn(a), \ldots Ty(t), \Diamond\}\}}{\{\{Tn(a), \ldots, Ty(t)\}, \quad \{\langle\uparrow_*\rangle Tn(a), \ldots, ?Ty(X), ?\langle\uparrow_0\rangle\langle\uparrow_*^1\rangle Tn(a), \Diamond\}\}}$$

In addition to the free type specification in this rule and the locality restriction (displayed by all extraposition constructions), note the condition for its application that a complete tree be derived with no outstanding type requirement. This ensures that it will only apply after some propositional structure has been compiled, reflected in its characteristic right edge position in a clausal string. Given that Final*Adjunction feeds application of Merge to yield an updated propositional structure, there is no reason why application of Final*Adjunction should not be recursive, giving rise to indefinite sequences of NPs following the verb in both canonically VSO languages and supposedly rigidly verb-final languages such as Turkish and Japanese: [23]

(53) Görevlendýr-mýth bir hoca her asistan-ý.
give duties$_{EV}$ a teacher every assistant$_{ACC}$
A teacher gave every assistant duties.

(54) Górev ver-mi- her hoca bir asistan-a.
duty give$_{EV}$ every teacher an assistant$_{DAT}$
Every teacher gave an assistant duties.

(37) Saiten-sita futari-no sikenkan-ga kaku touan-o. [Japanese]
marking-did two$_{GEN}$ examiner$_{NOM}$ each script$_{ACC}$
'Two examiners marked each script'

What determines choice of ordering of such NPs may then be a range of factors, relative scope choice, phonological weight, and so on.[24] It should not go unnoticed, however, that in arguing that an unfixed node can be introduced in the closing stages of constructing a logical form, with subsequent merging that replaces some outstanding metavariable, there is at least one hidden assumption. The application of Merge that unifies this pair of tree nodes is not a process applying at the node in question, but one that applies at the topnode as a general tree-update process. It thus takes an essentially complete structure and combines it with an unfixed node, in so doing providing a value for the metavariable annotating some node and a fixed tree node position for the hitherto unfixed node, replacing all occurrences of that metavariable. In advocating Final*Adjunction, we shall therefore need to have independent evidence to motivate the extension of the Merge process that is its corollary.[25]

In fact, there is substantial independent evidence that this form of *Adjunction is required as an additional strategy, discrete from the process of *Adjunction that operates in early strategies of interpreting a clausal string. The arguments concern: (i) expletives; (ii) post-verbal quantified NP scrambling; (iii) Romance subject postposing; (iv) scrambling and quantifier-pronoun binding.

[23] We are grateful for Asli Göksel for examples and helpful discussion.

[24] It is unclear whether Final*Adjunction is applicable in Japanese. Though quantified noun phrases can occur following the verb in conversation, they are highly marked, as though afterthought constructions that modify the first structure, which is complete in itself. We leave these within this characterization, noting their parallelism with data from other languages, while leaving open the possibility that the phenomenon in Japanese is rather an instance of fragment ellipsis.

[25] It should be noted that Final*Adjunction is not required as a process independent of *Adjunction for free word order languages for which *Adjunction has in any case to be generalised to allow for more than one application, as long as the process of Merge is generalised to apply in this more general way, merging trees rather than nodes. See Gregoromichelaki 2001.

First, there are the expletive constructions, in which lexicalised elements have the effect of a pro-drop decoration by a verb – they fill a node with a metavariable that has no bottom restriction:

(55) It is likely that I am confused.

(56) There emerged a tired woman.

In effect, they project placeholders for subsequent provision of a value. In the nonpro-drop languages such as the Germanic languages, such lexicalised elements are essential in this position, for, without them, the parsing sequence breaks down and cannot proceed:[26]

(57) *I know smokes that woman.

(57) is completely illformed because, though *know* is a propositional attitude predicate and accordingly licenses the introduction of a subgoal $?Ty(t)$, and though general computational rules license the introduction of a subject node which then awaits input to update it, the positioning of the pointer at that subject node then means that the parsing process can only continue if a word is accessed whose trigger for action is $?Ty(e)$. However, with the next word being a verb for which the trigger for action is $?Ty(e \rightarrow t)$, the sequence of actions aborts. What the sequence of parse moves has NOT provided is any means of licensing a move of the pointer from the subject node to some predicate-requiring node. The function of an expletive use of a pronoun, accordingly, is to keep the parsing process alive, by first providing a metavariable as an interim value to some type e requirement associated with the subject node, albeit without provision of a fixed formula value, and then moving the pointer to the predicate node, so that Substitution is inapplicable. The locality restriction, which corresponds to the Right Roof Constraint (Ross 1967), precludes resolution of some unfixed node within a further nested structure:[27]

(58) *That it is certain is unfortunate that I am wrong.

A value for the metavariable projected by the expletive is and must be provided only once some propositional structure has been completed: the trigger of a completed $Ty(t)$ node is thus essential:

(59) *It that I'm wrong is likely.

Despite the fact that Final*Adjunction and subsequent Merge only lead to a successful outcome if the propositional formula which decorates the node input to Final*Adjunction contains a metavariable, no special provision needs to be made to reflect this. This is a consequence of the fact that the merging of the trees derived respectively from the preceding clausal sequence and the right-peripheral expression will only be successful if the propositional structure in question contains a metavariable, for which the Merge process provides both its value and the value for the treenode just introduced as unfixed. In all other cases, no application of Merge will be possible. While this analysis of an expletive as projecting a metavariable with no bottom restriction requires justification in detail over the full class of expletives,[28] it has the advantage of reducing apparently specifically itemized expressions to a more general form of anaphoric device.

The second piece of evidence for Final*Adjunction comes from the construal of quantifiers in inversion structures in which an NP occurs after the verb in verb-final languages. In these,

[26]This analysis may also be extended to existential expletives, the expletive *there* projecting a metavariable in subject position that merges with the post-verbal NP (introduced by Final*Adjunction: see Cann 2001).

[27]Recall that a node α is locally dominated by a discrete node β if from α, $\langle\uparrow_0\rangle\langle\uparrow^1_*\rangle\beta$ holds, i.e. β is connected to α by a series of functor nodes and one argument node.

[28]See Cann 2001 for an analysis of expletive *there* in similar terms.

quantified NPs may occur freely. An indefinite in such a position may be interpreted as taking narrow scope with respect to some quantifier in a canonical position preceding the verb (see (37)-(40) for Japanese, Turkish and Greek data):

(60) Ellavarum vangikkum moonnu sadhanangal. [Malayalam]
everyone buy_{FUT} three things
'Everyone will buy three things' (both interpretations)

(61) Sab kharidege tiin ciize. [Hindi]
everyone buy_{FUT} three things
'Everyone will buy three things' (distributive interpretation)

This availability of narrow scope interpretations for the indefinite is puzzling if, on the standard metaphor of movement, the right-peripheral NP is presumed to have been raised out from its canonical position before the verb to some right adjoined position, from which it c-commands the expressions internal to the VP. As Mahajan 1997 notes, the situation is worse if more than one NP follows the verb, as then multiple adjunction on the VP node would lead one to expect the second NP to have scope over the first in virtue of c-commanding it, a result contrary to the availability of a narrow scope reading for the second NP:

(62) Raam dikhaayegaa sab-ko tiin kitaabe.
Ram show_{FUT} everyone-ko three books
'Ram will show everyone three books.'

Within a DS perspective, the availability of a narrow-scope interpretation for an indefinite NP following the verb is also unexpected on an analysis of that NP as projecting a linked structure, since there is reason to assume that quantifier construal is relative to the individual propositional structure into which the quantifying term is introduced (see Kempson, Meyer-Viol and Otsuka in preparation).[29] At best, upon such an analysis, the indefinite would have to be interpreted as independent of any quantification in the structure projected from the previous clausal sequence.[30] But on an analysis of such postposed NPs as unfixed within a single structure the interpretation is expected. If the left-peripheral expression annotates a node constructed WITHIN the single structure under construction, albeit unfixed, the term projected by the quantifying expression can interact with other quantifying terms relative to whatever constraints, eg linearity, determine scope choice within the language in question.[31] This analysis notably solves the problem for adjunction analyses of right-peripheral constituents as to how high/low their adjunction should be in the resulting tree (see Belletti 1999, Mahajan 1997, Cecchetto 1999).[32]

[29] In Kempson et al 2001, scope statements for quantified expressions are projected incrementally with subsequent scope construal rules defined over a completed propositional formula. These scope construal rules take the incomplete term projected by the quantifying NP and any copies of it that may have been constructed during the interpretation process, and replace them with a variable bound within the scope of the quantifying operator projected by the determiner.

[30] Given its conjunctive form, an indefinite can participate in binding effects across pairs of linked trees, which a universal quantifier cannot. But such a projection would impose an E-type form of construal contrary to the distributive interpretation.

[31] Languages vary in how strictly scope choice is determined by linear order. In English, inversion of scope with respect to subject position appears to be relatively free:
(i) A nurse interviewed every patient
In Chinese to the contrary, no such scope inversion appears to be allowed, with an indefinite in subject position invariably having to be construed as independent of any term that follows. See Kempson and Meyer-Viol 2001 for arguments that interpretation of indefinites parallels anaphora in involving a relatively free scope choice made relative to the other terms constructed in the interpretation process.

[32] It is also considerably simpler than any Kayne-style analysis involving multiple topicalization as in Ordonez 1998.

Comparable phenomena are reported for Italian subject postposing. Pinto 1997 reports that postposing of indefinite subject NPs at least strongly encourages an interpretation of the indefinite as being interpreted relative to the tense of the verb that precedes it, indefinite NPs occurring before the verb being interpreted as taking wide scope with respect to that predication. In particular in a sequence of (63)-(64), the indefinite in the second sentence is interpreted not relative to the past event of studying, but relative to the previous assertion of a set of famous linguists:

(63) In questo paese ci sono molti linguisti famosi. [Italian]
in this country there are many famous linguists
'In this country, there are many famous linguists.'

(64) Un linguista ha studiato in questa università.
a linguist studied in this university
'One of those linguists studied in this university.'

Pinto reports that reversing the order of constituents in these two sentences would be unnatural, at best.

The fourth piece of evidence for Final*Adjunction comes from quantifier-pronoun binding facts. Analogous quantifier-pronoun binding data with rightward-scrambling of NPs in Hindi are reported by Mahajan 1997: a quantifying expression can be construed as binding a pronoun in some subsequent expression even when both follow the verb, again contrary to the adjunction analysis. In the reverse order, it cannot:

(65) Raam-ne dikhaaii har ek kittab$_i$ uske maalik-ko$_i$. [Hindi]
Ram$_{ERG}$ show$_{PERF-fem}$ every book$_{fem}$ its owner$_{DAT}$
'Ram showed every book$_i$ to its$_i$ owner.'

(66) *Raam-ne dikhaaii uske maalik-ko$_i$ har ek kittab$_i$.
Ram$_{ERG}$ show$_{PERF-fem}$ its owner$_{DAT}$ every book$_{fem}$
*'Ram showed its$_i$ owner every book$_i$.'

Such data are straightforwardly available on an analysis in which such paired NPs are both introduced as unfixed. The pronoun can be interpreted as identified with the quantifying term if that has already been introduced. If however the pronoun precedes the quantifying expression, Substitution will take place fixing the value of the projected metavariable before the quantifying expression is processed. This means of interpreting the pronoun will indeed be essential, since the node which it decorates (as a sub-term) has to be merged with the main structure before the node to be decorated with the quantifying term is introduced into the tree, and unless the pronoun allows an expletive construal from this position (a possibility precluded in Hindi), no such cataphoric binding of the pronoun by the quantifying term will be possible.

3.3 Porteno Spanish Resolved.

Evidence confirming this account of postverbal NPs in terms of both a linked structure analysis and Final*Adjunction comes from Spanish clitic doubling; for this notorious syntactic puzzle falls into place relative to this account.[33]

In Porteno Spanish, when a strong pronoun is used instead of a full form of NP, apparently it is not just one pronoun that is needed, but two:

[33]Since this apparent idiosyncracy of one Spanish dialect is also displayed in other language families (eg Bantu), a general explanation in terms of a number of processes would obviously be preferable (see Suñer 1988, Belletti 1999, Montrul 1995).

(67) Le hablaron a ella.
to her spoke$_{3pl.}$ to her
'They spoke to her'.

(68) *Hablaron a ella.
Spok$_{3pl.}$ to her
'They spoke to her'

This doubling is optional in the case of full NPs in the postverbal position:

(69) (Les) ofrecieron queso y leche a familias de pocos medios.
to them offer$_{3pl}$ cheese and milk to families of small means
'They offered cheese and milk to low-income families.'

(70) La llamaron a ella.
her call$_{3pl.}$ her
' They called her'

(71) *Llamaron a ella.
call$_{3pl}$ her
'They called her'

(72) (La) oian a Paca.
Her listen$_{3pl}$ to Paca
'They listened to Paca.'

The pecularity of this phenomenon is that the strong form of the pronoun appears in some sense not to be strong enough to occur in a regular post-verbal object position, needing the clitic pronoun to buttress it. As Suňer (1988) observes, this obligatory clitic doubling in Porteno Spanish affects accusative and dative pronouns, and not in the same way. The dative pronoun has to be doubled by a strong form of pronoun occurring in that position. However the optional doubling by such an anticipatory pronoun for some following full NP imposes no restriction on the NP in question – notice the nonspecific construal of the right-peripheral NP in (69). The accusative doubling on the other hand, also obligatory for object pronouns, and optional for some following full NP, nevertheless imposes a restriction on such doubled full NPs, that they be restricted to a referential construal. Indefinite construals of doubled object noun phrases are debarred. Looked at as an imperfection of the strong form of the pronoun, apparently needing to be buttressed in a regular position, this is an extremely puzzling phenomenon, as it is not so much the apparently expletive pronoun which needs the full form, but the full form which, contrarily, needs the expletive.

However, there is an alternative way of looking at these data. Suppose we assume that the first pronoun in such a chain decorates a fixed position in the tree structure. It is, then, the pronoun *ella* in (70) which forms the second member of the chain whose construal requires something additional. All we have to stipulate is that the strong pronouns are restricted to introduction into a tree structure ONLY in positions reserved for some special pragmatic effect (i.e. at a node LINKed to the primary structure or at an unfixed node). Equivalently the parsing procedure crashes if an attempt is made to use the update actions provided by such a pronoun at a fixed node in the structure. This is guaranteed by the abort action associated with the trigger $\uparrow \top$ which holds of any node within a tree except for the topnode.[34]

[34]We ignore the gender specification here. As a presuppositional property, this could either be expressed as a condition on action, or as a requirement, hence a filter on the output. We further ignore the prepositional marker *a* which we assume to be a kind of case-marker that does not project its own structure.

ella	IF	$?Ty(e)$	
	THEN	IF	$\uparrow \top$
		THEN	ABORT
		ELSE	put(Fo(**U**), Ty(e))
	ELSE	ABORT	

All we otherwise need are three assumptions that are independently motivated. Firstly, we allow that discrete strings may project the same output structure: either the full NP following the verb or a clitic pronoun preceding it may be used to decorate a fixed node in the structure. Despite their preverbal position, we take clitics to project onto a canonical position in the tree-structure, as do full NPs in non-object-pro-drop languages.[35] Secondly, LINK transitions at the right-periphery are available, in which case the pronoun in the clausal sequence that precedes must be interpreted independently of the right peripheral NP and from the preceding context, with the right-peripheral expression interpreted as coreferential with it. The final assumption that needs to be made is that there is a process of Final*Adjunction introducing an unfixed node which will merge with that structure just in case the propositional formula contains an outstanding metavariable with which the formula at the unfixed node can merge.

The restriction of strong pronouns to unfixed nodes and LINKed structures is a stipulation, but this is nothing more than a codification of their exceptional pragmatic properties (conveying more than just the anaphoric construal conveyed by the clitic form of pronoun). The effect of the additional condition in the lexical entry of *ella* is that the pronoun will not provide any output annotation of the structure if it is scanned at a fixed node within a containing structure. Hence the ungrammaticality of (71). It will however be able to decorate either a node which is LINKed to the primary structure, or one that is at an unfixed node to the topnode. (Notice that because this restriction is expressed as a condition on action, its sensitivity to tree specifications holding at nonfinal points in the construction process is unproblematic.) The fact that it may appear to be introduced at a subject node also does not pose a problem, since these are pro-drop languages, and the supposed subject can be taken to annotate an unfixed node that subsequently merges with some fixed subject node.

The difference in distribution between strong forms of accusative and dative pronouns can now be explained as follows. If the strong accusative form of the pronoun is taken to decorate a node LINKed to the primary structure, then it must be identified with some term in the primary structure in virtue of the LINK relation, but, in addition, it will be construed as referential:[36] for this structure to be constructed, there is no restriction on the clitic pronoun, but it must be construed as indexical. (There is no evidence that accusative pronouns have developed into expletive forms.) The pairing of the two forms of pronoun for the dative without any structure-specific restriction on the dative itself turns on the fact that the dative pronoun has evolved in Spanish to lose its bottom restriction, hence allowing expletive uses. We know this because dative pronouns in Spanish in all dialects have developed an extended distribution, allowing clitic doubling of datives to be completely unrestricted, as in (69) applying even to quantified forms (a

[35] Given the lack of isomorphism between position in a string and relative position in the tree structure, nothing precludes the existence of procedures for two different positions in a string being used to decorate the same node in a tree structure as long as these actions are complementary. The tension in orthodox analyses as to what relative position in the hierarchical configuration to allot clitics, given that full NPs are taken to fill the canonical position after the verb, does not arise.

[36] The lack of any occurrence of a full term in the primary structure and the pronoun in the LINKed structure is, I take it, due to the pragmatic inappropriacy of using a name first followed by an indexical use of the pronoun as a reminder. Note that there is no absolute restriction on pronouns in such positions given the acceptability of examples with emphatic use of post-predicate pronouns such as *He's a swine, him* (cf. **John's a swine, him* and *He's a swine, John*).

doubling not expected on a LINK analysis for such end-placed constituents). Accordingly, if the dative pronoun decorating the fixed node is construed as lacking any bottom restriction, then there may be a successful sequence of Final*Adjunction to introduce an unfixed node, which the full NP is taken to annotate, with subsequent Merge.

The upshot of this is that there will be two available strategies for parsing a dative clitic pronoun such as *les*. Identified indexically, it can be paired with referential NPs, with these taken to decorate a LINKed structure – the clitic pronoun decorating a fixed position in the regular way. However, lacking any bottom restriction, the metavariable projected by the clitic pronoun may also be substituted by the terms projected by the full array of quantified NPs. Final*Adjunction may apply to provide a node to be decorated by the right-peripheral quantified NP which will then merge with the node duly decorated by the clitic pronoun. As we would expect, the second full pronoun is optional, as in both types of case, a regular indexical construal of the clitic pronoun is available. Moreover, if a full NP is taken to decorate the fixed position in the tree directly as introduced by the verb, then there will be no clitic pronoun. But if a full NP is taken to decorate either the topnode of some LINKed structure or a node constructed by Final*Adjunction then the update provided by some first term is essential: otherwise, with Spanish not being object pro-drop, no propositional formula will have been completed, hence the optionality of clitic doubling with full NPs. In the case of the strong pronouns, defined to occur ONLY in these positions, the presence of a clitic pronoun will always be essential.

Further confirmation of this account comes from the same availability of narrow scope interpretations for a clitic doubled indefinite occurring in Porteno Spanish at the right periphery as in Malayalam, Greek, Turkish and Japanese that we saw earlier – but only for dative clitic-doubled NPs. Suñer 1991 reports that (73) allows an interpretation in which the right-peripheral clitic-doubled NP has a narrow-scope interpretation – as we would expect on an analysis invoking application of Final* Adjunction:

(73) Todos los candidatos les han dicho la verdad a algunos electores.
all the candidates them have said the truth to some voters
[Porteno Spanish]
'Every candidate told the truth to some voters.'

(74), which differs from (73) primarily in being a clitic-doubled direct object, to the contrary has no such interpretation, but only a wide-scope interpretation in which the assertion is made about some particular set of candidates –as we would expect, given that by analysis the object clitic retains its bottom restriction allowing only a linked structure analysis of clitic doubling:

(74) Todos los electores los eleigieron a algunos de los candidatos.
all the voters them voted for some of the candidates
'Every voter voted for some of the candidates'

Stepping back from the details of Porteno Spanish, notice first that in generalising the property of the dative clitic pronoun to include so-called expletive uses, the distribution of the pronoun becomes wider, absorbing regular and such 'expletive' uses. In this way, the concept of expletive becomes epiphenomenal, replaced by this broader concept. Secondly, it should be recalled that there is not perfect symmetry in the the two processes of *Adjunction. *Adjunction itself, the left-periphery variant, applies at a node as driven by a "normal form constraint" (Kempson et al 2001 and footnote 15) which dictates that all unfixed nodes are evaluated as the tree unfolds, node by node, until the position at which Merge can take place is established, the Merge process being a merging of two individual nodes. Final*Adjunction on the other hand induces an unfixed node once a propositional structure is complete, so there is no process of evaluation as a construction process unfolds: the process of Merge is, rather, a merging of two

subtrees in which one is able to contain the other as a subtree, thereby providing a formula update for at least one metavariable contained therein.

Finally, despite the lack of identity in the two forms of *Adjunction, we nevertheless expect symmetry at both peripheries in construal of any NP-pronoun doubling pairs for which the metavariable that the pronoun provides as annotation has lost its bottom restriction. Thus there is in Romance a mirror-image at the right periphery of the effect that we saw at the left periphery in which left dislocation effects are analyzable BOTH as a pair of linked structures AND in terms of an unfixed node within a single structure. Hence the blurring at the right periphery of the available construals for subject nodes in pro-drop languages, just as at the left periphery.

4 Right-Node Raising.

We have so far seen the applicability of projecting LINKed structures and unfixed nodes in characterizing right peripheral constituents. As noted earlier, the building of LINK relations can be between nodes of arbitrary type, and accordingly we might expect strings whose analysis involves projection of both LINK relations and Final*Adjunction. More specifically, we might expect the occurrence of strings whose interpretation is induced as LINKed structures of which the projection of the second involves application of Final*Adjunction, yielding a composite right-dislocation effect. With this in mind, we turn to Right Node Raising (RNR) structures.

These are paired structures in which some first constituent is left incomplete while a second structure is introduced, with an expression at the right periphery then doing double duty by providing an interpretation that completes the construal of both conjuncts:

(75) John criticized, and then Mary reassured, that woman from Birmingham.

(76) John gave to Mary, and subsequently Harry retrieved from Sue, the notes from Ruth's course that John had diligently taken.

(77) John doubted, but Harry insisted, that Susan was happy.

(78) John was keen, but Harry was determined, to get to the final.

(79) John passed on, and Harry distributed, the notes from Ruth's course to any student that asked for them.

This process is invariably signalled by intonation, and constituents of various types can be presented right-peripherally in this way (see (77)-(78) and (81)). In verb-final languages, the right-peripheral item is characteristically a verb:[37]

(80) Hiroto-ga ringo-o Tami-ga nashi-o tabeta. [Japanese]
Hiroto$_{SUB}$ apples Tami$_{SUBJ}$ pears$_{OBJ}$ ate.
'Hiroto ate apples and Tami ate pears.'

(81) Peter ist den Berg hinauf und Martin ist den Berg hinunter gegangen.
Peter is the hill up and Martin is the hill down gone
[German]
'Peter has gone up and Martin has gone down the hill.'

But more than one constituent can be dislocated, as in (79) and (82)-(83) (so-called non-constituent extraction):

[37] Such constructions have sometimes been analyzed as forwards gapping, e.g. Ross 1967.

(82) Maria hat Hans, and Klaus hat Peter ein grosses Stück Kuchen gekauft.
Maria has Hans and Klaus has Peter a big piece of cake bought.
[German]

'Maria has bought Hans a big piece of cake and Klaus has bought Peter a big piece of cake.'

(83) Hiroto-ga kinou, Tami-ga kesa, nashi-o tabeta. [Japanese]
Hiroto$_{NOM}$ yesterday, Tami$_{NOM}$ this morning, pears$_{ACC}$ ate
'Hiroto ate pears yesterday and Tami ate pears this morning.'

This type of example displays two serious problems for standard frameworks. Not only is there apparent right dislocation of a nonconstituent, but there is in consequence a resulting conjunction of nonconstituents. Finally, though characteristically indicative of some constituent missing from a final position in both clauses from which it appears to have been dislocated, Right Node Raising does not (pace Levine 2001) impose any constraint that the constituent in question be final in the string, as witness (76). So even a string-theoretic characterization of right-node raising data is not unproblematic.

The challenge is whether the combination of a LINK relation and Final-*Adjunction can be used to reflect these notoriously problematic properties. Such nonstandard constituents might appear to be best expressed in terms of string-movement (or string-deletion at PF, see Hartmann 1998), hence outside the remit of the grammar formalism, strictly speaking. If this is the right stance, albeit negative, such data would be intransigent also for a framework like DS, since processes of update are exclusively defined over partial semantic structures, and not over (structure defined over) strings. However, there is a straightforward account within Dynamic Syntax, following the dynamics of the parse process, if we make a small number of additional assumptions, all either a generalization of what the framework already provides, or a natural extension of it. The first, the extension, is that intonation can give clues as to what structure is to be built. This is an aspect of the input which we have so far ignored altogether and indeed the analysis of prosodic information within the DS system remains an open question. However, in such a system, with an explicit parsing-oriented perspective, sensitivity to intonation is entirely expected: intonation forms part of the phonetic signal and is thus available to induce procedures of interpretation during the course of a parse. We suppose, then, that intonation can have the effect within the predicate of signalling the ad hoc construction of a metavariable as an interim Fo value, indicating that the containing structure is left incomplete at the current stage of the interpretation process (we provide the mechanisms for doing this below).

The second assumption is that correlative structures are a generally available form of structure, as a generalization of the concept of linked trees so far defined. Correlatives are adjacent propositional structures, sharing a common term at the level of representation of content. These are familiar in Hindi, where the canonical process of relative clause construal involves use of a relative pronoun in one structure and a demonstrative in the other:

(84) a. ve do laRkiyaaN Lambii haiN jo khaRii haiN. [Hindi]
those two girls tall be-PR who standing be-PR
'Those two girls who are standing are tall.'

b. jo laRkiyaaN khaRii haiN ve do Lambii haiN.
which girls standing be-PR those two tall be-PR
'Which girls are standing, those two are tall.'

Correlative structures also occur in English in so-called extraposition-from-NP structures:

(85) An employee left early, who Bill said was sick.

Such correlative structures might be analyzed as involving a construction-specific LINK relation between a complete $Ty(t)$ expression to another and a second adjoined LINKed structure on which is imposed the additional requirement of a copy of some term contained in the first. However there is reason to think that such structures are the consequence of interaction of two more general strategies in combination – the construction of a LINK relation simpliciter, and the imposition of a shared formula requirement on the LINKed structure. The reason for this separation of the building of a LINK relation and the sharing of a term in the resulting structures is that it opens up the possibility of a principled account of coordination within the framework, with coordination seen as the result of building an accompanying tree across a LINK relation with only the constraint that such a LINKed tree shares the type of the node which is input to this process (see Marten 2001):[38]

(86) Bill came into the room and Sue immediately left.

Supposing, then, that we analyze *and* in these terms, with the type of trigger for its actions and the type of requirement on the constructed node constrained only by type identity:[39]

		IF	$Ty(X)$
(87)	*and*	THEN	$\texttt{make}(\langle L\rangle), \texttt{go}(\langle L\rangle), \texttt{put}(?Ty(X))$
		ELSE	ABORT

Then, secondly, we impose the requirement of a shared term in a subset of such cases as a separate computational action:

LINK Dependency

$$\frac{\begin{array}{c}\{Tn(a), Ty(t), \ldots \{(MOD)Tn(a), \ldots Ty(X), Fo(\alpha), \ldots\} \ldots\}, \\ \{\langle L^{-1}\rangle Tn(a), ...?Ty(t), \Diamond\}),\end{array}}{\begin{array}{c}\{Tn(a), Ty(t), \ldots \{(MOD)Tn(a), \ldots Ty(X), Fo(\alpha), \ldots\} \ldots\}, \\ \{\langle L^{-1}\rangle Tn(a), ...?Ty(t), ?\langle D\rangle Fo(\alpha), \Diamond\} \\ MOD \in \{\langle\uparrow_0\rangle, \langle\uparrow_1\rangle, \langle L^{-1}\rangle\}^*\end{array}}$$

This LINK dependency rule imposes the weakest of conditions on where in the two substructures the shared term may appear, and is in effect nothing more than a condition on the output formulae decorating the two linked structures that they share a common subterm.

With this generalized application of the LINK relation, we have what we need for Right Node Raising. Consider the incremental processing of (75) repeated below, in which the process of constructing one structure is interrupted to introduce a second conjunct, and the term necessary to complete both is provided as a final set of steps in the parse process:

(75) John criticized, and then Mary reassured, that woman from Birmingham.

Given the signal of incompleteness by intonation, a metavariable is constructed as annotation to the object node induced by the first predicate, satisfying its type requirement. The first conjunct is compiled and completed retaining the metavariable with its associated formula requirement. A process of LINK transition is then licensed by the lexical actions of *and*, and the requirement for a copy of that variable is imposed as a condition on successful completion of the following tree by an application of the LINK dependency rule. In parsing the second

[38] It is arguable that this separation of the construction of a *LINK* relation from such imposition of requirement on the new node introduced is general, but we leave this issue on one side.

[39] Other conjuncts may impose further requirements on the type of the trigger and the LINK structure.

conjunct, the intonation licenses the assumption that a further metavariable may be introduced. This variable has to be identical to that used to construct the structure for the first conjunct, in order to fulfil the requirement imposed by the LINK transition. The interpretation of the second conjunct is duly compiled, like that of the first conjunct containing as a sub-term a metavariable as the object argument. At this point, application of Final*Adjunction introduces the node to be decorated by construal of the right peripheral noun phrase, a node which is then merged with the LINKed structure. Once the Merge process has led to the instantiation of the metavariable in the second conjunct, then, by anaphoric update, the metavariable in the first conjunct will be substituted by the same value, in (75') the formula, *(that, x, woman(x))*. The overall result is:

(75') $Fo(Criticise(John, (that, x, Woman(x))) \wedge Reassure(Mary, (that, x, Woman(x))))$

The process is displayed in Figure 9.

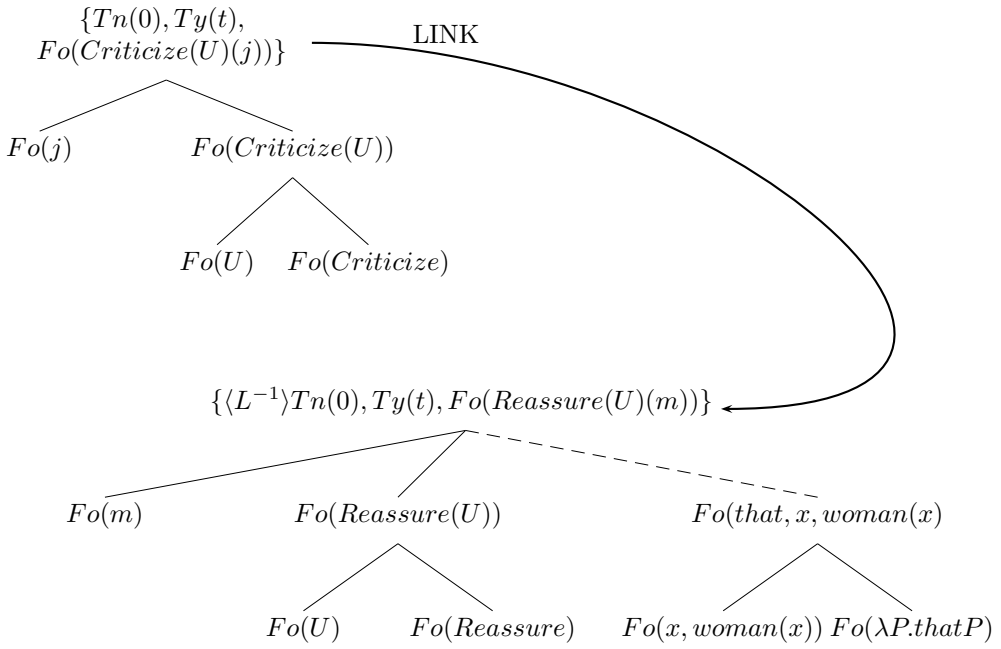

Figure 9: Right-Node Raising as in (75)

The rule for inserting the metavariable is, we assume, defined in the lexicon as an encoding of phrasal incompleteness, signalled by phrase-final intonation:

Lexical Metavariable Insertion

IF	$?Ty(X)$	
THEN	IF	$?\langle\uparrow_0\rangle\langle\uparrow^1_*\rangle?Ty(e \rightarrow t)$,
	THEN	$\mathrm{put}(Fo(\mathbf{U}), Ty(X), ?\exists\mathbf{x}.Fo(\mathbf{x}));\ \mathrm{go}(\uparrow_0))$,
	ELSE	ABORT
ELSE	ABORT	

Although free of lexical input, this move is not a license for overgeneration. In the first place, this update is restricted to applying within the construction of a predicate node; and, secondly, it introduces a requirement that cannot be fulfilled immediately after the lexical actions have been carried out. This is because the final step in the sequence of actions moves the pointer away from the node decorated by the metavariable as *Fo* value. This precludes Substitution as an immediately subsequent operation (see section 1) and thus there must be further elaboration of the tree to satisfy the requirement, i.e. an application of Final*Adjunction.

Although not problematic from the point of view of the grammaticality of the output, postulating such "free-ride" processes in the lexicon without phonological input does pose problems for the psychological parsing process as it substantially increases the set of choices at any point during the parse. This is where the characteristic prosody of Right Node Raising becomes significant: by its use, the speaker signals to the hearer the incompleteness of the proposition under construction, through the modification of the normal prosodic contour. In other words, the speaker makes manifest to the hearer the possibility that a non-canonical operation must be performed to yield a well-formed final representation. It is in this sense that we consider the intonation to license the introduction of a metavariable without lexical input. We assume, that is, that prosody does not give rise to specific parsing actions, and that intonational contours are not directly associated with lexical actions (following Ladd 1996: 98 ff.).[40]

There is a striking difference between our analysis and all others, which is a consequence of building semantic trees, and not trees defined over the string. In characterizing the right-peripheral constituent as unfixed locally within the structure projected from the SECOND conjunct, and then merged with it, the occurrence of the same formula decorating a node within the structure projected from the FIRST conjunct is secured solely through the anaphoric properties of the metavariable. This leads us to expect an asymmetry not available to any other analysis that context-sensitive conditions may be satisfied in the second conjunct without requiring satisfaction also in the first:[41]

(88) John read but he hasn't understood any of my books.

(89) *John hasn't understood but he has read any of my books.

In this connection, we hypothesize that *any* as a negative polarity item projects an indefinite term as *Fo* value only in the presence of a negative (or 'affective') feature decorating its locally dominating propositional type node:

any

[40] We are grateful to Bob Ladd for some discussion of this matter.

[41] This analysis notably sidesteps the problem faced by all movement analyses of Right Node Raising (eg Postal 1998) in which the right-dislocated element c-commands all other expressions in the string. It also sidesteps the problem confronting in-situ analyses such as Hartmann 1998 (with deletion in the first conjunct) which would preclude any such asymmetry.

IF	?Ty(e)	
THEN	IF	$\uparrow_* NEG$
	THEN	$\texttt{make}(\langle\downarrow_1\rangle), \texttt{go}(\langle\downarrow_1\rangle),$
		$\texttt{put}(Fo(\lambda P.(\epsilon, P)), Ty(cn \rightarrow e)), \texttt{go}(\langle\uparrow_1\rangle),$
		$\texttt{make}(\langle\downarrow_0\rangle), \texttt{go}(\langle\downarrow_0\rangle), \texttt{put}(?Ty(cn))$
	ELSE	ABORT
ELSE	ABORT	

The NPI condition is met by the structure projected from the second conjunct in (88), hence the update is licensed, and a successful action of Merge takes place. The object node associated with the first conjunct of (88), on the other hand, being decorated with the same metavariable as imposed on the development of the second conjunct, then gets updated with whatever value is assigned to that second occurrence. This being the indefinite term projected by *any*, the presence of this term is duly licensed in the structure projected from the first conjunct despite the lack of negation. Sensitivity to the presence of negation is not required for the indefinite term itself: it is merely a condition on the tree in which the lexical item *any* is to provide an update. On the other hand, in (89), in which the negation occurs in the first conjunct but not the second, the NPI is not licensed in the second conjunct, and the example is duly ungrammatical.

Similarly, clashes in the selectional properties between the predicates in the two conjuncts will be more tolerated if resolved solely with respect to the second conjunct but not if resolved solely with the first. Hence, (90) is preferable to (91), as (92) is preferable to (93).

(90) John prefers but Sue would rather not eat meat.

(91) *John prefers but Sue would rather not to eat meat.

(92) John intended to, but Sue prevented him from, submitting a paper to *LI*.

(93) *John intended to, but Sue prevented him from, submit a paper to *LI*.

These asymmetry data translate straightforwardly into many other languages, and we cite here comparable negative polarity data from Hindi and Malayalam:

(94) John-ne parhaa lekin voh samjhaa nahĩ meri koi kitaabẽ. [Hindi]
John-Erg read but he understand-past not my any books
'John read but hasn't understood any of my books.'

(95) *John-ne samjhaa nahĩ lekin voh parhaa meri koi kitaabẽ.
John-Erg understood not but he read-past my any books
'John has not understood but has read any of my books.'

(96) John vaayiccu pakshe avanu manasillay-illa ente oru pusthakavum. [Malayalam]
John read but he_{NOM} understood not my one book-npi
'John read but he hasn't understood any of my books.'

(97) *John-inu manasillay-illa pakshe vaayiccu ente oru pusthakavum.
John_{DAT} understood not but read my one book-npi
'John hasn't understood but he has read any of my books.'

(98) John-inu manasillay-illa pakshe vaayiccu ente oru pusthakam. [Malayalam]
John_{DAT} understood not but read my one book
'John hasn't understood but he has read one of my books.'

There is evidence from Hindi of an entirely different sort that buttresses the analysis nicely.[42] Hindi has case-marking that varies according to the type and form of the verb. Transitive verbs require the subject noun phrase to be marked ergative in the past tense only. The form required is otherwise nominative, including in the plain future, with the exception that if the future is modal in form, then the case form required is dative. This then provides us with a test for the analysis of Right-Node Raising. On the account provided, we should expect asymmetry between the case marking for a subject which is "postposed" out of both conjuncts – that is, interpreted relative to the second conjunct but with a null form in the first conjunct interpreted as identical to that final-placed noun phrase. Such a subject noun phrase should be required to match the case requirement of the verb in the second conjunct, while licensing a mismatch with the case requirement of the verb in the first. Contrarily, a subject noun phrase marked to match the verb in the first, but to mismatch with that of the second, should not be wellformed. This is exactly what we find:

(99) us aurat-ko ignore kiyaa aur abhi usko samadhan karnaa parhega
that woman-Dat ignore did and now she-Dat reassure do will have to
John-ko.
John-Dat
'John ignored that woman and will now have to reassure her.'

(100) *us aurat-ko ignore kiyaa aur abhi usko samadhan karnaa parhega
that woman-Dat ignore did and now she-Dat reassure do will have to
John-ne.
John-erg
'John ignored that woman and will now have to reassure her.'

(101) us aurat-ko samaadhan kiyaa aur abhi usko ignore kareega John.
that woman-Dat reassure did and now she-dat ignore will do John
'John reassured that woman and will now ignore her.'

(102) *us aurat-ko samaadhan kiyaa aur abhi usko ignore kareega John-ne.
that woman-Dat reassure did and now she-dat ignore will do John-Erg
'John reassured that woman and will now ignore her.'

We thus have welcome independent evidence of an analysis initially proposed solely on the basis of the English data.

The analysis also matches data independently observed in the literature. First, the restriction that Right-Node Raising does not apply to subject noun phrases is ensured by the step of inserting a variable only within a predicate structure, and is not reflected in the LINK transition itself:

(103) *Mary annoyed and was rude, Sue.

Nevertheless, (104) is precluded on two counts:

(104) *Mary likes and that woman, John dislikes.

Either there is the free-ride step of inserting a variable within the processing of the second conjunct, in which case movement of the pointer away from the node decorated by the meta-variable precludes application of Merge. Or, should no such application of variable insertion

[42] See George (In preparation) for further discussion of these data. We are grateful to her for bringing them to our attention.

take place in parsing that conjunct, Merge will apply directly to the object node, leaving the requirement for a second copy of the variable from the first structure imposed by the LINK transition unsatisfied.

Secondly, contrary to assumptions normally made in the literature, although incompleteness will normally only be straightforwardly expressible at some recognized right periphery of the first clause, this is not necessary to the characterization of the semantic structure, hence the possibility of non-final constituents in the conjuncts being construed through RNR as in (76). Furthermore, since, in principle, there may be more than one such variable in an incomplete structure, with Meta-Variable insertion and the correlative imposition of an additional requirement on the LINKed structure both able to apply recursively, this process of Final*Adjunction may occur more than once, subsequent Merge happening successively. Thus apparent non-constituent right dislocation as illustrated in (79)-(82) and (105)-(107) is straightforwardly accounted for in our analysis. Note in this connection that the order of the dislocated constituents need not be in their canonical order, as in (106)-(107):

(105) Bill offered, and Sue actually gave, the princely sum of 100 dollars to the best student in the year.

(106) Bill offered, and Sue actually gave, to the best student in the year the princely sum of 100 dollars.

(107) John passed on and Harry distributed to any student that asked the notes from Ruth's course.

As we would expect in the light of the earlier analysis of the expletive *it*, expletives can give rise to a copying of their projected metavariable across a LINK transition, and we get RNR effects:

(108) It is likely but it is not unreasonable that our analysis will fail.

Finally, note that "dislocation" from a strong island is licensed in our account of RNR:

(109) John wants to buy and Harry knows the man who is willing to sell, a van Gogh.

(110) Bill likes the man who sells, but Sue detests the woman who buys, obscene photographs of British politicians.

There is no restriction on where in the LINKed structure, the two copies of the constructed variable(s) should occur, allowing occurrences within a LINKed structure projected from a relative clause. This analysis does not result from any weakening of the locality restriction associated with Final*Adjunction, but from the freedom associated with the lexical metavariable insertion process, which imposes no constraint on where in a structure a metavariable can be inroduced, and the weak modality associated with the copy introduced by the LINK dependency rule, the LINKed structure being required to have a copy of the anticipatory term anywhere in the subsequently developed structure. Nevertheless the node projected from the right-peripheral item is constructed as an unfixed node within whatever local tree is constructed from the immediately preceding incomplete clausal string, with which it will, in all well-formed completions, duly unify. Thus, such apparent long-distance dependencies are licensed by Merge on the right periphery applying locally within some $Ty(t)$ subtree.

In sum, given just the assumption of a constructed metavariable at a fixed node in a tree, the process of construal can be analyzed as a regular sub-variant of a LINK transition, this analysis of RNR relying otherwise on concepts applied to both left and right periphery phenomena.[43]

[43]Though Right-Node Raising applies freely to dislocate arbitrary parts of constituents, the process of Heavy

5 Summary.

We have now provided an account of a number of right peripheral constructions in English, using the tree construction devices that are necessary to analyze the left periphery within DS terms, viz. using the concepts of unfixed nodes and LINK structures. Pronoun Doubling constructions are analyzed as involving a LINK transition from a completed $Ty(t)$ to a type e tree, an analysis of which the backgrounding topic construal is a consequence. *It* Extraposition and Subject Inversion have been analyzed in terms of a right unfixed node whose resulting formula replaces the metavariable projected by the expletive, and the obligatory clitic doubling of some forms of Spanish have been analyzed in terms of the potential availability of both forms of analysis. Finally, Right Node Raising has been modelled using a combination of building LINKed structures and right unfixed nodes. Almost all these data are intransigent for most frameworks. Rightward movement in Kayne-style accounts has been modelled as involving Topic and Focus projections below the VP projection, in addition to the higher Topic and Focus projections, an account which is little more than a description of the data with a great deal of movement machinery. Right Node Raising has long been recognized as problematic for movement explanations, as, more recently, has Porteno Spanish. And Pronoun Doubling, with its requirement of coreference is often, simply, set aside.[44] Analysis of these constructions can, to the contrary, be given in DS terms with minimal stipulation. And the array of data corresponding to the right peripheral backgrounding topic and contrastive emphasis noted in many languages are faithfully modelled (see Herring 1994 for extensive Tamil data).

In stepping back from the details of individual structures, the most striking property is how much less variation there is in the discrete forms of tree development available at the right periphery than at the left periphery; and the dynamics of tree growth reflects this directly. As figure 10 displays, there are morphological differences between different types of construction, according, amongst other things, as to whether the input variable which allows the propositional structure to be provisionally compiled is triggered by a pronoun, or by a verb, but the resulting structure does not reflect these different forms of input.

NP Shift is more restricted. In the first place, as noted above, Right Node Raising targets a range of different types of expression, whereas Heavy NP Shift only targets noun and prepositional phrases (which in DS we take to have the same type, see Marten forthcoming). Secondly, RNR is reported to permit preposition stranding while Heavy NP Shift is said not to, even in languages like Modern Irish where preposition stranding is not elsewhere permitted (McCloskey 1988), as illustrated for English in (iii,iv). Thirdly, RNR permits a rightward dependency into noun phrases, something only marginally tolerated with Heavy NP Shift, see (v-viii).

iii ?Mary brought her only copy of the latest Chomsky manuscript for, but Bill quickly took it away from, that rather flaky student in Philosophy.

iv *Bill retrieved the manuscript from, as quickly as possible, that rather flaky student in Philosophy.

v John's a student of, and Mary's an assistant of, that new professor from York.

vi John's a student and Mary's a professor, of Theoretical Linguistics.

vii *Mary's a professor of at the University of Kinross, Theoretical Linguistics.

viii ??Mary's a professor at the University of Kinross, of Theoretical Linguistics.

Furthermore Heavy NP Shift is a process idiosyncratic to SVO languages such as English, and it signally lacks the idiosyncratic form of intonation displayed universally in Right Node Raising constructions, suggesting that the most appropriate analysis might be lexical. Since an account of Heavy NP Shift will demand an account of prepositional phrases and VP adjuncts, which we have not provided here, we leave Heavy NP Shift on one side, merely noting that the the difference between the two constructions turns on data which are not entirely robust.

[44] See Cecchetto (1998)'s account of left and right dislocation in Romance in which in a footnote he grants that his account will not explain the co-indexing in such constructions between pronoun and following c-commanded NP, but sets the problem aside on the grounds that it is a problem for everyone and so can be ignored.

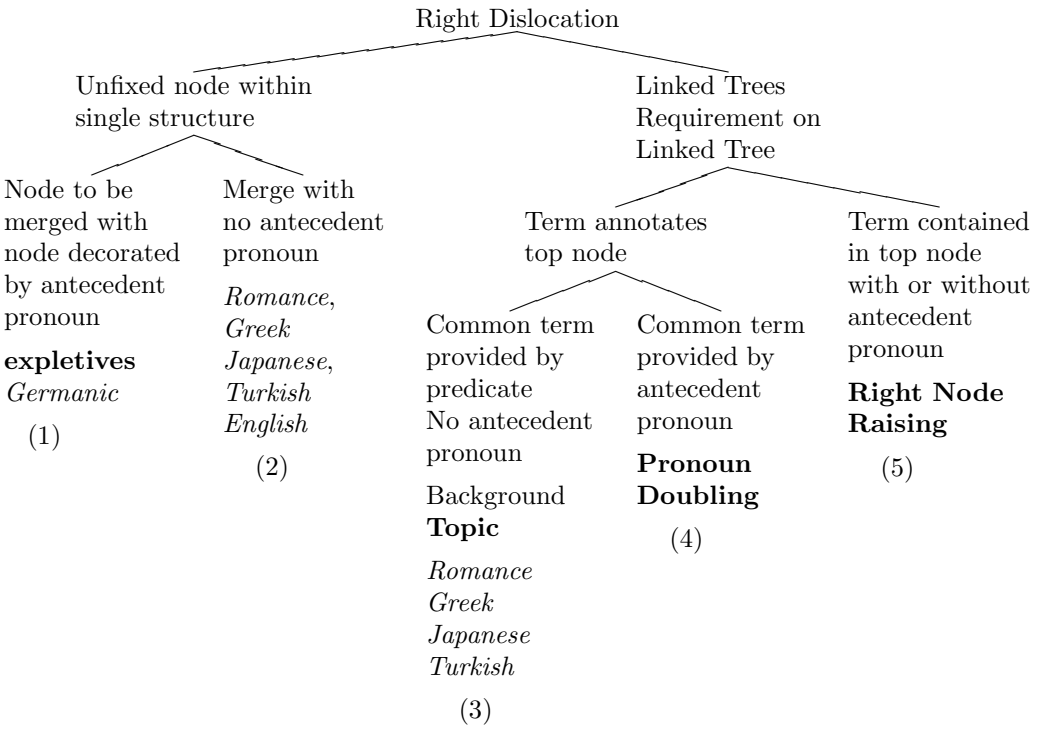

Figure 10: The Family of Right dislocation effects

Unlike the corresponding classification of left periphery phenomena, in which all subdivisions present discrete forms of update, columns (1)-(2) of figure 10 present the same forms of result from the update process; as do (3)-(4). So viewed exclusively in terms of tree growth, this is a much slimmer list of types of variation than is displayed by left-periphery data: there are only three structure types, the third a composite of the first two. At the left periphery, in applying *Adjunction, nodes are introduced in advance of the primary projection of structure, hence underspecified in at least one aspect, and awaiting a fixed position, and this process is subject to a number of restrictions – whether what is projected must be a terminal node, and where in the subsequent tree it must be identified. Applications of Final*Adjunction however serve only to provide content to nodes otherwise not yet provided with a fixed value. All languages make such unfixed nodes available, and all languages allow LINKed structures to be introduced subsequent to the projection of a propositional structure. There is no variation as to whether such underspecification as remains is resolved at a fixed and terminal node, or within an individual tree. These concepts make no sense at the right periphery: the structure by definition is already complete and all that remains is either to identify one incomplete term within it, or to add to the information provided by that formula. The much reduced variation displayed at the right periphery is thus reflected directly in the dynamics of building up partial structures – a bonus for our analysis. Moreover, just as in the left-periphery, in pro-drop structures the string can be analyzed in more than one way – either as a pair of LINKed structures, or as a single string with one or more unfixed nodes, so that columns (2) and (3) describe the very same data, blurring the distinctiveness of the two structural types, exactly as the left periphery. The table omits the one further right-periphery phenomena – the fragment forms of ellipsis. We have not included these since they present, we suggested, a discrete propositional structure constructed from the elliptical form, allowing modifications or revision of the preceding proposition. But

one might note, in closing, the property that these share with the construal of right-peripheral expression as LINKed structures – both presume on the completeness of the interpretation of the preceding string.

It is not without coincidence that the dynamics of DS explanations regularly correspond to more informal, functional explanations. As Herring expressed it in her illuminating introduction to a set of Tamil data, "afterthoughts are characterized by a loose, communicatively-based association between original utterances and after-the-fact modification. For antitopics, the association is conventionalized via the pragmatic bond between the two components of the utterance. Emphatic postposing represents the most bonded or "syntacticized" postposing type, in that the postposed nominal is an argument of the main clause itself. In support of the continuum-like nature of this relationship, I present evidence that native speakers blur the boundaries between the individual types by mixing functional and intonational features to represent intermediate degrees of bondedness." Exactly so. The DS model provides a basis for formally reconstructing what functionalists have been urging for some time – that the syntax of natural languages should be captured in formalisms that reflect the dynamics of left-right processing.

Bibliography.

Aissen, J. Topic and Focus in Mayan. *Language* 1992. 68.1 43-80.

Anagnastopoulou, A, van Riemsdijk, H. and Zwarts, F. (eds.) 1997. *Leftward Movement*. Amsterdam: John Benjamins.

Belletti, A. 1999. Inversion as focalization and related questions. *Catalan Working Papers in Linguistics* 7, 9-45.

Büring and Hartmann, K. 1997. 'The Kayne mutiny'. In Beerman, D., LeBlanc, D., Riemsdijk, H. van, (eds.) 1997. *Rightward Movement*, 9-80. Amsterdam: John Benjamins.

Blackburn, Patrick and Wilfried Meyer-Viol. 1994. Linguistics, logic, and finite trees. *Bulletin of Interest Group of Pure and Applied Logics* 2, 2-39.

Cann, Ronnie. 2001. How pronominal are expletive pronouns? In. Dekker, P. and van Rooy, R. (eds.) *Proceedings of the 13th Amsterdam Colloquium*.

Cann, Ronnie. Ruth Kempson, Lutz Marten, Masayuki Otsuka, and David Swinburne. 2001. 'What goes left and what goes right'. Submitted to Adger, D. ed. *Syntactic Peripheries* Oxford: Oxford University Press.

Cecchetto, C. 1998. A comparative analysis of left and right dislocation in Romance. *Studia Linguistica*

Chomsky, Noam. 1981.*Lectures on Government and Binding*. Dordrecht: Foris

Cinque, G. 1990. *Types of A' Dependencies* . Cambridge Mass: MIT Press.

Culicover, P. and Levine, R. 2001. Stylistic inversion in English: a reconsideration.*Natural Language and Linguistic Theory* 19, 283-310.

Eijck, J. van and H. Kamp 1997. 'Representing discourse in context'. In van Benthem, J. and ter Meulen, A. (eds.) *Handbook of Logic and Language*,179-239. Amsterdam: Elsevier.

Fernando, T. 2001. Three processes in natural language interpretation. To appear in *Festschrift for Solomon Feferman*, ASL Lecture Notes.

Gregoromichelaki, E. 2001. MSc Dissertation KCL.

Hartmann, K. 1998. Right Node Raising and Gapping: Interface conditions on prosodic deletion. Ph.D Thesis Frankfurt.

Herring, S. 1994. 'Afterthoughts, antitopics, and emphasis: the syntactization of postverbal position in Tamil' in Butt, M. King, T. Ramchand, G. (eds.) *Theoretical Perspectives on Word Order in South Asian Languages*,119-152. CSLI.

Jespersen, O. 1927. *A Modern English Grammar on Historical Principles*.

Kayne, R. 1994. *The Anti-symmetry of syntax*. Cambridge Mass: MIT Press.

Kempson, R. 1995. Semantics, pragmatics and interpretation. In Lappin, S. (ed.) *Handbook of Semantic Theory*, 561-98. Oxford: Blackwell

Kempson, Ruth. and Wilfried Meyer-Viol. 2001. Indefinites and Scope Choice. In Bezuidenhout, A. (ed.).. MIT Press.

Kempson, Ruth, and Wilfried Meyer-Viol, and Dov Gabbay. 1999. "Towards a dynamic account of VP Ellipsis". In Lappin, S. and Benmamoun, E. (eds.) *Fragments and Ellipsis Construal*, 227-290. Oxford: Oxford University Press.

Kempson, R. Meyer-Viol, W, and Gabbay, D. 2001. *Dynamic Syntax: The Flow of Language Understanding*. Oxford: Blackwell.

Kural, 1997. Postverbal constituents in Turkish and the LInear correspondence axiom. *Linguistic Inquiry* 28, 498-520.

Ladd, D R (1996) *Intonational Phonology*. Cambridge, Cambridge University Press.

Lappin, S. 1995. The interpretation of ellipsis. In Lappin, S. (ed.)*The Handbook of Contemporary Semantic Theory*, pp.145-76. Oxford: Blackwell.

Levine. R. 2001. The extraction riddle: just what are we missing? *Journal of Linguistics* 37, pp. 145–76.

McCawley, J. 1982. Parentheticals and discontinuous constituents. *Linguistic Inquiry* 13, 91-

106.
McCawley, J. 1988. *The Syntactic Phenomena of English.* Chicago: Chicago University Press
Mahajan, A. 1997. Rightward scrambling. In Beerman, D., LeBlanc, D., Riemsdijk, H. van, (eds.) 1997. *Rightward Movement*, 186-214. Amsterdam: John Benjamins.
Montrul, S. 1995.
Ordonez, F. 1997. Postverbal asymmetries in Spanish. *Natural Language Linguistic Theory* 16, 313-46.
Pinto, M. 1997. *Licensing and interpretation of inverted subjects in Italian.* Ph.D. University of Utrecht.
Postal, P. 1998 *Three Investigations of Extraction.* Cambridge Mass: MIT Press.
Ranta, A. 1994. *Type theoretic Grammar.* Oxford: Clarendon Press.
Reinhart, T. 1991. Elliptic conjunctions: non-quantificational LF. In Kasher, A. *The Chomskyan Turn.* Oxford:Blackwell.
Rizzi, L. 1997. The fine structure of the left periphery. In Haegeman, L. (ed.) *Elements of Grammar.* Kluwer.
Ross, J.R. 1967. Constraints on Variables in syntax. Ph.D thesis. MIT
Sells, P. 1998. Postposing in Japanese. ms. Stanford.
Steedman, M. 1996. *Surface Structure and Interpretation.* MIT Press.
Suňer, M. 1988. The role of AGreement in clitic doubled constructions' *Natural Language and Linguistic Theory.* 6.
Suňer, M. 1990 'Two properties of clitics in clitic-doubled constructions' in Huang, J. and May, R. *Logical Structure and Linguistic Theory*, 233- 52. Dordrecht, Kluwer.