Production Pressures, Syntactic Change and the Emergence of Clitic Pronouns*

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Abstract

With syntax seen as a set of strategies for the progressive construction of semantic representations (Kempson et al. (2001); Cann et al. (2005)), we argue that the heterogeneous properties of individual clitic systems can be seen as routinised reflections of an earlier language system in which commonly made production choices in determining word-order sequencing in a language were driven by cognitive least-effort considerations. The case study is the diachronic development of clitic pronouns in Medieval Spanish from Latin. We argue that effects of scrambling in Latin are reflected in the individual clitic or clitic clusters of Medieval Spanish, which display the different tree-growth sequences that are distinguishable in the previous system as the basis of scrambling, with interpolation effects the remaining reflex of those general mechanisms. At the heart of the explanation is the claim that case specifications are defined as restrictions on growth of semantic representation. The constraints on clitic clustering known as the Person Case Constraint are then seen as a consequence of a constraint on structural growth that no more than one underspecified structural relation can be licensed at a time, an explanation that we argue can be upheld despite apparent counter-examples in virtue of alternative strategies which the parsing perspective makes available for any string-structure pairing.

1   Introduction

In this paper, we argue that syntactic change can arise from the interaction of syntactic mechanisms and pragmatic constraints on interpretation as the point of departure. The effect of the latter is to narrow down the options available; and the choices made can then get stored as routines for interpretation specific to individual lexical items, subsequently becoming encoded as part of the lexical specification of these forms. This observation is a regular functionalist characterisation of grammaticalisation via routinisations associated with language use (Givon and others following). Our contribution is to provide a specification of this for one instance, the development of pre-verbal clitic pronouns in Medieval Spanish from the Latin weak pronouns[1], within a formal framework, and to do so in such a way that we are not merely able to articulate in detail the correspondence between word order effects and clitic distributions, but also to provide an explanation of what are otherwise puzzling gaps in these clitic distributions, such as the Person Case Constraint, which in other frameworks are problematic, and require special stipulation. While the results are tentative in addressing, in this paper, solely pre-verbal clitics, nonetheless the principled account offered for the Person Case Constraint is indicative of the explanatory value of shifting into a dynamic parsing-oriented syntactic perspective.

Our case study is the early positioning and idiosyncratic clustering of pronominal clitics in Medieval Spanish and the parallelism between these clitics and earlier Latin scrambling (free constituent-order) patterns. In particular, we argue that the clustering of clitics in a relatively early position in a clausal sequence is a calcified set of reflexes of the mechanisms underpinning scrambling. The theoretical framework in which this account is specified is that of Dynamic Syntax (Kempson et al. (2001), Cann et al. (2005)), a framework which enables us to provide an explanation of the Person Case Constraint in terms of general tree-growth principles. The grammar of a language, according to this framework, is a set of parsing actions for building up information in context some of which are general, some of which are specific to individual words and phrases.

We begin our account of the development of the pre-verbal pronominal clitics in Spanish by providing a sketch of Latin scrambling following **?**. As part of this, we show how cognitive constraints determine what is a prevalent given before new effect in many free word-order languages, and then we show how through routinisation, these can come to be lexically encoded with individual weak forms of pronoun as providing a set of triggers all of which determine their relatively early placement. We also show how the processes of construal which the clitic pronouns determine are themselves reflexes of

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[1]Throughout we shall use the term "clitic" pronoun co-extensively with 'weak pronoun'. Nothing hangs on this.

earlier general processes for building up interpretation on line. The result, from a synchronic perspective, is a set of emergent lexical patterns that appear to lack either structural or semantic motivation; the systematicity underpinning these patterns can only be seen to make sense within the diachronic perspective. From a synchronic perspective, then, such phenomena constitute stored macros of actions which a child has to learn in gaining competence in using the clitic pronouns; but this is nevertheless grounded in an ongoing interaction between production processes and the emergent system itself. The further significance of the account is that the diachronic process is seen as involving a feeding relation between general cognitive constraints on usage and articulation of lexical encodings in the core language system, a perspective precluded by standard competence-performance assumptions (though see Hawkins 2004).

2 Background: Clitic and scrambling puzzles

The background against which this account is set is the challenge posed by both clitic clustering and by scrambling phenomena which are normally not seen as related.[2]

2.1 Clitic mysteries

The templatic behaviour of clitic clustering is one of the most puzzling syntactic phenomena displayed in natural languages. Right across unrelated language-families, wherever clitic-pronoun systems emerge, they seem resistant to either semantic or syntactic explanation. Yet, despite very considerable lexical idiosyncracy, these systems overall display remarkable similarities, as we shall see, in the RANGE of patterns they make available.

Pronominal clitics are typically weakened quasi-affixal, quasi-pronominal devices, with a characteristic preference for occurring at some relatively early position in a finite clausal sequence, in some languages immediately following some first constituent or word, in other languages immediately preceding the verb. The first of these, the second-position clitic placement (as seen in the Balkan languages, Medieval Spanish, Portuguese, among others), is hosted by a heterogeneous set of categories, commonly including complementisers, *wh* expressions, negation-marker, focused expressions, relative pronouns, verbs (if nothing else precedes), and in some cases conjunction markers[3]:

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[2]This observation of parallelism between scrambling and clitic placement has been independently observed by Martins (2002), but given the framework she adopts, her observation cannot be reflected in the analysis she provides.

[3]All illustrations are from 13th century Medieval Spanish; and are taken from a corpus of Medieval Spanish collected by Miriam Bouzouita culled from the *Fazienda de Ultramar*, which dates from around 1230. All Medieval Spanish examples given are from this text

(1) … *quien* **te** *algo* *prometiere* *..*
        who 2.CL-IO something would-promise
     'the one who would promise something to you.'
     Data from Rivero 1997

(2) *Quant* **le** *connocio* *Abdias, homillo***sle**
     when 3M.CL-DO recognised.3sg Abdias lowered-CL-CL
     'When Abdias recognised him, he bowed for him.'

(3) *Que* **te** *dixo* *Heliseus?*
     What 2.CL-IO said.3sg Heliseus
     'What did Heliseus tell you?'

(4) *Non* **los** *destroyré* *[...]*
     not 3.CL-DO will-destroy.1sg [...]
     'I will not destroy them [...].'

(5) *.ij. mios fijos* **te** *dexaré* *[...]*
     two my sons 2.CL-IO will-leave.1sg [...]
     'My two sons, I will leave you [...].'

(6) *Con aquellas* **se** *aiunto* *Salomon* *[...]*
     with those CL-REFL slept.3sg Salomon [...]
     'With those women, Salomon slept (joined himself) [...].'

(7) *Oyo***l** *Ruben* *[...]*
     heard.3sg-CL-DO Ruben [...]
     'Ruben heard it [...]

The environments which act as triggers for early clitic placement are subject to minor variation across languages as to what categories it includes, and resists any unitary syntactic characterisation. Out of the languages with this second-position placement of clitics, only some license the interpolation of other expressions between the clitic and the verb, as in (1): Modern Portuguese does not allow such interpolation except very peripherally and Cypriot Greek, otherwise so similar to Medieval Spanish, precludes interpolation altogether. The puzzle, from a syntactic perspective, is what this array of variation can be grounded in: why should clitics occur in these positions, the pre-verbal positioning in particular being a position from which the corresponding full NP is quite generally precluded (precluded, that is, unless the language licenses interpolation)?

Construal of clitics is also puzzling, as, for some clitics, their argument-role is fully determined by their form, but for others it is not. Accusative

unless stated otherwise.

clitic pronouns in romance for example are relatively clearcut in indicating a direct-object argument. Dative pronouns on the other hand invariably display variation, with very considerable indeterminacy as to what the intrinsic significance of dative-labelling amounts to. The precise function of the dative case is indeed notoriously hard to pin down, and, despite being the lowest in frequency of all the oblique cases in Latin according to a count of Hoecke (1996), is nonetheless reported by him as having been described in the Greco-Latin tradition as dividing into at least ten distinct types, from the marking of direct and indirect objects through to widely varying semantic uses, including possession, advantage, result and 'interest'. He himself provides a characterisation of dative construal neutral between these as "grounding the event structure in relation to the speech participants", a weak characterisation that is illustrated by examples such as:

(8) *an tibi   quisquam   in   curiam*
     Q   you.DAT anyone.NOM.SG into senate-house.ACC.SG
     venienti   assurexit?
     coming.DAT.SG get-up.3SG.PERF
     'Did anyone get up for you (to your benefit) when you came into the senate house?'

                                                         Cicero Pis. 26

(9) *quid mihi   Celsus   agit?*
     what me.DAT Celsus.NOM.SG do.3.SG.PRES
     'How, pray, is Celsus?' (Lit. 'What to me Celsus does?')

                                                       Horace Ep. 1, 3, 15[4]

Following this Latin usage, the first and second dative clitic pronouns in the Romance languages are commonly associated with a large number of distinct construals, the particular range varying from language to language, and even from environment to environment. For example, first and second person clitics have a single form which may variously be construed as reflexive, direct or indirect object, or as ethical-datives, (10).

(10) *Testimonias* **me**   *sed*   *oy*
      witnesses   1.CL-IO be.imp today
      'Be witnesses on my behalf today.'

Yet another aspect of the clitics puzzle is that where there is more than one clitic in a clausal string, they almost invariably cluster together, so that for any statement purporting to restrict the occurrence of the clitic pronoun to immediately following some preceding category of expression or immediately preceding some verbal form, the statement has to be complicated by the fact that another clitic may intervene between it and such a host:

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[4]The phrase *quid agis?* in Latin is generally used for 'How are you?'.

(11) e   ella dixo**gelo**   [...]
      and   she   told.3sg.CL-IO.3sg.CL-DO [...]
      'And she told it to him [...].'

(12) ca   ya   non   **telo**   mandava matar
      because already   not   2.CL-IO.3sg.CL-DO I-order   to-kill
      'because I do not order you any longer to kill him.'

      Data from Granberg 1988: 132

Finally, there is the complication that the relative ordering of these clitics may vary between closely related languages and even within a single language without any distinction of interpretation – French pairs of third person clitics occur only in a DO-IO sequence but pairs of third and first/second person clitics occur only in the inverse IO-DO sequence (as in the Spanish example (11)): the basis for such clusterings is thus generally agreed not to have a semantic basis. But there is also morphological idiosyncracy, so that a purely phonological explanation doesn't seem appropriate either - in particular restrictions on Spanish clustering differ according as the neutral dative form *se* is construed as ethical dative, indirect object, or reflexive. There is also notorious variation across dialects, with 'leista' effects in which the dative *le* appears to be incorporating accusative uses, but with also 'loista' and even 'laista' dialects in which it is rather the masculine *lo* (or feminine form *la*) which is becoming the form that can cover both direct and indirect object construals. Such rampant variability might seem indicative of homonymy, not worthy of anything other than lexical listing, but this leaves quite unexplained why this type of pattern recurs so regularly across the broad range of clitic systems

The intransigence of clitic positioning to syntactic, semantic, or phonological explication has led to debates as to whether these clusters interact with syntactic processes at all. In minimalist analyses, variant clitic properties are seen by some as associated with distinct features, hence distinct triggers for movement, inducing movement of the clitic to the requisite checking site (Cardinaletti (forthcoming)), others see them as subject only to feature-geometry forms of explanation (Cuervo 2005), yet others a mixture of the two (Adger and Harbour (2006)) There have been debates over which clitics should have which features, what processes they trigger and, for those that argue for feature geometries, whether there should be rules making reference to concepts of domination displayed on the feature hierarchy (Heap (2005)). In the majority of cases, the specifications proposed lack independent motivation, and so amount to little more than stipulated invocation of syntactic structure or feature geometry to directly reflect the idiosyncratic orders observed. Cardinaletti's account of the array of idiosyncracies displayed in Italian (Cardinaletti (forthcoming)) involves distinguishing *gli* (the realisation of dative *le* when immediately preceding *lo*) as having a +person feature

while its alternative realisation *le* has only a +number feature without that person feature. Rivero (2007), in addressing cluster properties in association with Spanish psych predicates, defines a newly distinctive mental-state +m feature, whose positing critically provides the necessary count of feature-strength to determine appropriate orderings on which her account depends. Adger and Harbour and others argue over whether there should be binary Participant, Author, and Hearer features over and above other features assigned, and there are debates as to whether Person should be posited as a feature at all (Anagnostopoulou (2005) "No", Rivero (2007) "Yes" with both overt and covert variants) and over whether features should be binary (the Adger and Harbour (2006) account of the problematic morphological gaps posits both binary and non-binary features). Cuervo (2005) defines template positions onto which feature complexes have to be mapped (eschewing a movement-based account), and though noting the problems raised by morphological gaps, provides no account of them. Against these, structural accounts persist: Ormabazal and Romero (2007) for example argue for an agreement-based account, that for any language displaying VP-internal agreement, no more than one such agreement pairing is possible.

In other theoretical frameworks things are little better. In optimality-theoretic frameworks, for example, the set of constraints is defined is highly particular to particular clusterings involving for example *PERSONRIGHT*, *PERSONLEFT*, *EDGEMOST(Dat)*, *EDGEMOST(Acc)*, and *PARSE* constraints (Grimshaw (2001), Legendre (2003)), all defined to allow appropriate flexibility under appropriate conditions; but with the consequence that there is no restriction on possible clusterings, the constraints doing no more than matching the facts. In yet other attempts (Monachesi (2005), Anderson (2005)), such clustering is taken to motivate the postulation of a morphology component defined as independent of either syntax and semantics, a move which means that lack of independent explanation of the data is turned into a design feature of the grammar. Licensed co-occurrences per language are defined as varying morphological templates onto which the language-sequences have to be mapped, with no attempt in that system to explain why such clustering behaviour should occur.

The overall impression from this increasing wealth of literature devoted to clitics is that there is little indication of anything approaching a principled explanation.

2.2 Word Order Variation

There is an unexpected twist on clitic variability which in this paper we wish to bring out. Clitic sequencing by definition involves sequences of weak pronominal NP expressions, in the Romance languages, in various combinations both before the verb and after it. Such sequencing is redolent of Latin freedom of word order, since in both Latin and in the clitic systems

sequenced NP-expressions are presented in combination with the accompanying verb. We shall argue that far from being a trivial observation, this is indeed the source of the explanation.

Latin constituent order variation is syntactically free in simple clauses at least, with NPs able to occur in any order and with any one or more NP able to occur before the verb, or after it. In consequence, there is no apparent indication from the order itself how the various parts are to be semantically combined:

(13) *Catullus   Lesbiam   amavit*
     Catullus.NOM Lesbia.ACC loved.3.SH.PERF
     'Catullus loved Lesbia.'

   Lesbiam Xerxes amavit.
   Amavit Xerxes Lesbiam.
   Amavit Lesbiam Xerxes.
   Lesbiam amavit Xerxes.
   Xerxes amavit Lesbiam.

It is, of course, the case specifications of the NPs that determine the construal of the arguments they project, relative to the verb, rather than anything intrinsic to the ordering in the string. So it should be no surprise to find variability in order in Medieval Spanish in the one set of nominals, the clitic pronouns, that retain some aspect of the Latin case system which was otherwise entirely lost. Thus, clitic pronouns occur both before and after the verb in Medieval Spanish. The assumption that case determines construal is however only partially true, in that, as with most case-marking systems, much of the Latin case system is syncretic, with only partial determinism of thematic role from the morphological form of the NP-expressions. nominative and accusative forms of nouns are syncretic invariably in the neuter and also regularly in the plural of the consonant stems. In the development of the Romance languages, phonological changes caused massive syncretism within nominal paradigms giving rise in Vulgar Latin to just two or three forms in many cases. For example, the first declension classical forms *rosa, rosam, rosā, rosas, rosarum,* (singular nominative, accusative, ablative and plural accusative, genitive, respectively) are reduced to *rosa* while the late form *rose* stands for the rest of the paradigm, except for the dative/ablative plural. Ultimately, this led to a loss of case distinctiveness amongst the Romance languages (except for Romanian which retains oblique/non-oblique forms in certain declensions) became general for NPs in Medieval Spanish. Syncretism also affected the weak pronominal system so that in medieval Spanish some clitics are not differentiated as to accusative/dative cases, *me* and *te* being obvious examples.

Despite such variable determinism in the case system in Latin, word order freedom extends beyond mere local "scrambling", as constituents can be dislocated even across clausal boundaries:

(14) *Stercilinum   magnum   stude   ut   habeas*
      dunghill.ACC big.ACC ensure.IMP.SG that have.2.PS.SING
      'See that you have a large dung hill'

<div align="right">Cato De Re Rust. 6</div>

In these classic long-distance dependency constructions, case specifications cannot be seen as contributing anything more than a constraint on their construal, given their arbitrary dislocation from the expression on which they depend.

    Nevertheless, despite such flexibility, word order in Latin is very far from being a total free-for-all. Even though more than one constituent can be dislocated and placed at the left periphery, in all cases involving dislocation from an embedded finite clause, there is invariably a restriction that all the constituents so dislocated must be interpreted as local to each other, as in (15, 16):

(15) *Ventus   ad praefurnium   caveto   ne*
      wind.NOM to furnace-door.ACC beware.IMP NEG-COMP
      accedat
      come near.3SG
      'Take care that the wind doesn't blow on the furnace door.'

<div align="right">Cato op. cit. 38</div>

(16) *digitum   supra terram   facito   semina*
      finger.ACC above earth.ACC make.IMP *seeds*.NOM/ACC
      emineant
      project.3PL
      'Make the seeds project a finger above the earth.'

<div align="right">Cato op. cit. 46</div>

This rigid local pairing of NP-expressions receives an echo in the subsequent clitic systems that emerged, with their rigid ordering before the verb, but essential locality with respect to each other.[5] Until quite recently, surface

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[5]Long-distance scrambling, and its alternant multiple long-distance scrambling, is, in the Japanese literature, generally analysed as distinct from *wh*-movement, but this assumption depends on theory-specific assumptions on the correspondence between *Move Alpha* and feature-triggering, which scrambling lacks. See Kempson and Kiaer (forthcoming) for an alternative view in which the two are identified. The existence of more than one such expression as a multiple long-distance dependency is highly problematic for all frameworks where long-distance dependency is expressed as a nonlocal relationship between fronted linguistic expression and invisible site. In minimalist explanations, the only way to explain why two or more such moved NPs should be subject to a strict co-argument constraint is either to analyse one of the NPs as adjunct to the other, or to posit empty verb movement or so-called *Remnant Movement*; but all such moves lack justification other than their apparent necessity to yield the facts (Koizumi (2000), Takano

word order had been taken to be a linearisation matter to be handled as a surface property not impinging on the structural core of syntax-internal mechanisms. But this leaves unexplained the rigid locality of any two such dislocated expressions relative to each other, a pattern that occurs quite generally with clitic sequences which cannot be split in the same manner as multiple long-distance dependencies.

What we argue is that the patterns attributable to scrambling are indeed reflected in the distribution of medieval Spanish clitics: and we will set out an account that formally defines an explanation in these terms. In informal terms, local scrambling requires constructive use of case (Nordlinger (1998)), with case specifications determining argument role in the presented structure in an on-line way in Latin. Long-distance scrambling, in which an expression can be dislocated arbitrarily far from its dependency site, indicates to the contrary that some case specifications do not perform any such local constructive role, but merely act as some kind of filter on appropriate identification of where they contribute to the overall structure. Multiple long-distance scrambling, in which pairs of such dislocated expressions may occur together at some early position in a string, can be modelled by a mechanism that induces an essentially localised sub-structure, to be resolved in the overall structure as a unit. Finally, parenthetical construals can be available for any expression, so that some expressions can be analysed as in some sense independent of the structure within which they are contained. It is then the effects of these general mechanisms that underpin what has been seen as requiring clitic template specifications, with the various effects displayed in the distribution of clitics being modelled as a calcification of the sequences of actions which had in the earlier Latin system been induced by these general mechanisms, in different combinations.

An account of scrambling has been argued for in detail elsewhere with respect to Japanese and Korean (Cann et al 2005, Kempson and Kiaer forthcoming). Our primary aim in this paper is to show how that account can be reapplied to Latin and used to tackle the notorious intransigency of clitic facts as displayed in Spanish to provide a diachronically principled account not merely of clitic positioning, but of the range of variability and clustering that occurs in clitic clusters. We shall by no means solve the full set of clitic mysteries: in particular we do not provide any explanation of the individual stages through which one clitic system might evolve into a subsequent distinct clitic system (see Bouzouita this volume for a modelling of how the positioning of the clitic *lo* evolved from Medieval through Renaissance to Modern Spanish). All that we hope to achieve is a demonstration

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(2002)). In categorial grammar frameworks, the analogous problem arises that with no local contiguity of the paired argument expressions with the verb they need to be associated with, the only option is to assume a process of verb-union of the paired verb-sequences, but this removes any basis for deciding how to pair up argument expressions and verbs appropriately (Kiaer (2007)).

of the potential for a new range of explanations of clitic behaviours which a dynamic perspective offers. The more general significance of the account to be sketched is the fact that syntactic, even morpho-syntactic idiosyncracies, can be explained as resulting from the progressive effect which general cognitive constraints may have over time on an evolving linguistic system. And the analysis will open up a perspective in which case can be analysed in essentially procedural terms.

3   Towards a Dynamic Syntax of Latin

The novel property of Dynamic Syntax as a syntactic theory is that the concept of structural underspecification and growth of interpretation intrinsic to processing is taken as the core syntactic notion. The syntax of the natural-language system is thus defined as a set of strategies for establishing the interpretation of some string of words in the order in which they appear, reflecting possibilities for choice in on-line parsing. The process involves the incremental development of tree structures representing a semantic interpretation for a string which are decorated by labels that progressively provide the information needed to determine the appropriate interpretation. Generation is defined in exactly the same terms: the very same rules apply in production as in parsing,the only difference between production and parsing being that whereas the parser may not know in advance the interpretation to be constructed, the producer in contrast must do so (Purver and Otsuka 2003, Purver et al. (2006)). Hence, in generation there is from the outset a 'goaltree' which represents the interpretation to be conveyed, together with a defined constraint that in generation, each update step licensed by the parsing mechanism has to constitute an enrichment towards completing that 'goal tree' (formally a subsumption relation is required to hold between the parse tree and the goal tree (Purver and Otsuka, 2002)).

As the basis of the processing system is parsing, we begin by defining the general parsing strategies used in the framework. The starting point of this process is a tree with just a rootnode and a requirement to construct some propositional formula. The endpoint is a fully decorated binary branching tree structure encoding functor-argument structure of a familiar sort.[6] As figure 1 displays, each completed interpretation is represented as a binary-branching tree whose rootnode is the propositional formula established and its daughter nodes the various sub-formulae that together yield this formula.

The process of tree-growth is the sole basis of syntactic explanation: a sentence is defined to be well-formed just in case there is at least one possible route through that process that leads to a complete propositional tree with

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[6] Fo is a predicate that takes a logical formula as value, Ty a predicate that takes logical types as values, Tn a predicate that takes tree-node addresses as values, e.g. $Tn(0)$ being the rootnode. The $\Diamond$ is a pointer, indicating the node currently under development.

INITIAL STEP   FINAL OUTPUT

$?Ty(t), \Diamond$ $\leadsto$ $Ty(t), (Amare'(Lesbia'))(Catullus'), \Diamond$

$Catullus',$ $Amare'(Lesbia'),$
$Ty(e)$ $Ty(e \rightarrow t)$

$Lesbia',$ $Amare',$
$Ty(e)$ $Ty(e \rightarrow (e \rightarrow t))$

Figure 1: Parsing *Catullus Lesbiam amavit* 'Catullus loved Lesbia.'

no requirements outstanding (see below).[7] Tree growth involves the emergent unfolding of partial trees, whose node-relations and node-decorations all get progressively specified. Transition steps between partial trees are determined by a combination of general computational actions and lexical actions that are triggered by parsing words in the order in which they are presented in some string, together defining a monotonic process of tree-growth. These computational and lexical actions are expressed in exactly the same terms, that of growth along any of the dimensions associated with decorations on the trees defined by the system. Moreover, both sets of actions are defined using exactly the same vocabulary[8], allowing in principle for computational actions to become associated with particular lexical items and so targets for possible routinisation. The only essential differences between computational and lexical actions are that the former are, without exception, optional and not triggered by particular phonological (or orthographic) input, while the latter are so triggered and the actions they determine must be run.

ANY aspect of tree construction or decoration may be partial. Accordingly, tree-relations, tree-decorations, type and formula specifications may all be only partially specified. Central to this process is the concept of requirement ?X for any decoration X representing a type, formula or treenode address. For example, decorations on nodes such as $?Ty(t)$, $?Ty(e)$,

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[7]Quantification is expressed in terms of variable-binding term operators, so that quantifying NPs like all other NPs are of type e. The underlying logic is the epsilon calculus, the formal study of arbitrary names, with term-expressions whose internal structure is made up of an epsilon binder, ϵ, a variable, and a restrictor: e.g. $\epsilon, x, Man'(x)$. Since in Latin, nouns project full specification of terms, the structure defined to be projected by *servum* would be a subtree of which the quantifying term is the topnode, dominating a subtree decorated with binder, variable, and restrictor specification. We leave all details on one side.

[8]This differs from the theory put forward in Kempson et al. 2001 and Cann et al. 2005).

$?Ty(e \to t)$ etc. express requirements to construct formulae of the appropriate type on the nodes so decorated; $?\exists \mathbf{x}.Fo(\mathbf{x})$ a requirement to provide a fixed formula specification; and $?\exists x Tn(x)$ a requirement to provide a fixed treenode address. The underpinning formal system is a logic of finite trees (LOFT: Blackburn and Meyer-Viol (1994)) with two basic modalities, $\langle\downarrow\rangle$ and $\langle\uparrow\rangle$, such that $\langle\downarrow\rangle\alpha$ holds at a node if α holds at its daughter, and its inverse, $\langle\uparrow\rangle\alpha$, holds at a node if α holds at its mother. Function and argument relations are distinguished by defining two types of daughter relation, $\langle\downarrow_0\rangle$ for argument daughters, $\langle\downarrow_1\rangle$ for functor daughters (with their inverses $\langle\uparrow_0\rangle, \langle\uparrow_1\rangle$). Domination relations are then definable through Kleene star operators, e.g. $\langle\uparrow_*\rangle Tn(a)$ for some node identified as dominated by treenode $Tn(a)$; a node decorated as $\langle\uparrow_*\rangle Tn(a), ?\exists x Tn(x)$ is a node that though introduced into the emergent tree has not yet been assigned a fixed treenode relation. Such modal statements can be used to formulate modal requirements. These may be general requirements, eg the requirements on an introduced proposition-requiring node for an argument-daughter node and a predicate-daughter node: such a node would be decorated with $?Ty(t)$, $?\langle\downarrow_0\rangle Ty(e)$, $?\langle\downarrow_1\rangle Ty(e \to t)$. Such requirements constitute subgoals on a wellformed derivation, and are filters on the output.

Requirements may also however be defined as lexically imposed filters on output: and this is the initial basis for modelling case specifications where this is structurally definable. For example, a nominatively marked expression is defined as projecting onto a subject node of the emergent tree an output filter requirement of the form $?\langle\uparrow_0\rangle Ty(t)$ (the requirement that its immediately dominating node be of a formula of type t); an accusatively marked expression projects onto the immediate argument-daughter node of some emergent predicate-requiring node the requirement $?\langle\uparrow_0\rangle Ty(e \to t)$. Thus case specifications, like all other generalisations, are expressed in terms of possible forms of tree growth. And so it is that a range of what in other frameworks are taken to be morphological or syntactic properties can in this framework be expressed as requirements on growth of semantic representation.[9]

Restrictions at the interface of syntax and semantics are also naturally expressible in these terms. An uncontroversial aspect of underspecification of content is that associated with anaphoric expressions, their intrinsic contribution to interpretation being that they provide only some partial specification of any occasion-specific interpretation, the particular value being determined by the context relative to which the uttered expression is under-

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[9]The specification of case in these terms is naive in the sense that it assumes that particular cases determine directly the semantic function of the term projected by some noun phrase. This is not generally true (e.g. nominative expressions may be a semantic object in some passive construction while other cases have 'semantic' counterparts). Some effects of this are noted below, but a more sophisticated theory of case in DS remains to be articulated.

stood. In this representational perspective, this is expressed by defining all such context-dependent expressions as projecting an interim place-holding device, adding to the basic *Formula* vocabulary the metavariables $\mathbf{U}, \mathbf{V}..$, each associated with a requirement for a fixed value to be provided either from the context so far accrued in the interpretation process or subsequently from within the construction process. Whatever restrictions there are on the domain within which individual anaphoric expressions have to be construed are also defined in tree-growth terms as constraints on the (sub)-tree within which the values of metavariables have to be found. For example, in the case of reflexives, the value for the projected metavariable has to be found at some node $Tn(a)$ along a path $\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle\langle\downarrow_0\rangle Tn(a)$ from the node being decorated by the reflexive – that is from some co-argument along some unspecified but uninterrupted functor spine. Conversely, metavariables projected by pronouns cannot take such a local value, a constraint expressed as part of the process of substitution (see Kempson et al. 2001:97).

3.1   Scrambling

More controversially, the very same perspective is adopted with what in other frameworks is taken to constitute evidence of either feature passing (Sag et al. (2002)) or syntactic movement (e.g. Hornstein et al. (2005)). Instead of positing morphologically empty sites in a string which are paired with some non-contiguous (left-peripheral) expression as a basis for articulating the contribution of that expression to interpretation of the string, a parsing-based perspective that follows the dynamics of processing of strings in real time is set out as the basis for modelling long-distance dependency, positing under-specification of the tree-relation needed to establish the contribution of the dislocated expression in question to the overall interpretation at the early point in the string at which it occurs. One core mechanism is the license to construct a node dominated by some proposition-requiring node whose tree-relation is not fully specified with respect to that node. This is achieved by a rule of **Adjunction* (read 'star-adjunction') which creates an "unfixed" node with precisely this property, described in the tree-logic language as $\langle\uparrow_*\rangle Tn(a)$ with respect to some treenode $Tn(a)$. The exact role of such unfixed nodes is thus not specified at the point of introduction in the emergent tree structure, but is required to be determined at some later stage in the grammatical process. Such treenode underspecification is characteristically resolved upon parsing a following verb, whose lexical specification induces actions of tree-growth that introduce an array of argument-nodes, with one of which the unfixed node may unify.

There is also a more locally-restricted process of introducing unfixed nodes (*Local*Adjunction*), for which an argument-node is constructed that is also underspecified with respect to some type-t-requiring node but with a tighter constraint that this relation be local to the point from which the

underspecified tree relation is constructed. This is characterised on its introduction as having a modality $\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle Tn(a)$ with respect to some treenode $Tn(a)$. This modality specifies that the unfixed node is an argument ($\langle\uparrow_0\rangle$) that is related to an unspecified series of functor nodes to the dominating node ($\langle\uparrow_1^*\rangle$). This has the effect of ensuring strict locality within a single predicate-argument array. Both underspecified tree relations are twinned with a requirement for update ($?\exists\mathbf{x}.Tn(\mathbf{x})$) so that a subsequent fixed treenode relation must be provided in all wellformed derivations.

A defining property of trees and the nodes they contain is that a node in a tree is uniquely defined by its relation to all other nodes in the containing tree (**?**). This has a consequence for the tree construction process that there can only be one unfixed node of a type at a time in any partial tree, as all such nodes are characterisable only by their relatively weak modality. This is not a constraint that has to be externally imposed: any duplication of some tree relation simply induces the immediate collapse of any such putative pair of nodes, which invariably leads to an incoherent treenode decoration unless the individual decorations of the duplicated nodes are compatible. This restriction has an important role to play in determining the way unfixed nodes are progressively introduced and updated, and the result, as we shall see, is an account of Latin word order effects covering both *short-* and *long-*distance scrambling.

A common basis for crosslinguistic variation is the minor variation that lexical actions for related categories of expression in the differing languages may display. For example, with its relatively free word order and possibility of pro-drop, the parsing of a Latin verb induces a propositional structure whose argument nodes are decorated with metavariables, capturing the effect of null pronouns in such languages without the assumption that these exist as parts of a *linguistic* string. The left hand side of the following display provides the lexical actions to be carried out by a parse of *amavit* 'loved', with the resulting partial tree shown on the right.[10]

(17)

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[10]The applicability of specific rules or lexical actions depends on appropriate positioning of the pointer, $\diamondsuit$, and while there is considerable freedom of the pointer back down a tree in anticipation of further development of nodes, movement of the pointer up the tree is highly restricted, and possible only if the type-requirement on some node has been satisfied, and then, only to the immediate mother node or, in the case of unfixed nodes, to the node from which the underspecified relation was constructed.

$amavit$
IF $?Ty(t)$
THEN $\text{put}(Tns(PAST))$;
            $\text{make}(\langle\downarrow_0\rangle); \text{go}(\langle\downarrow_0\rangle)$;
            $\text{put}(Ty(e), Fo(\mathbf{U}_{3sg}), ?\exists\mathbf{x}.Fo(\mathbf{x}))$;
            $\text{go}(\langle\uparrow_0\rangle); \text{make}(\langle\downarrow_1\rangle); \text{go}(\langle\downarrow_1\rangle)$;
            $\text{put}(?Ty(e \to t))$;
            $\text{make}(\langle\downarrow_1\rangle); \text{go}(\langle\downarrow_1\rangle)$;
            $\text{put}(Fo(Amare')$,
            $Ty(e \to (e \to t)), [\downarrow]\bot)$;
            $\text{go}(\langle\uparrow_1\rangle); \text{make}(\langle\downarrow_0\rangle); \text{go}(\langle\downarrow_0\rangle)$;
            $\text{put}(Fo(\mathbf{V}), Ty(e), ?\exists\mathbf{x}.Fo(\mathbf{x}))$
ELSE   Abort

$$?Ty(t), Tns(PAST)$$

$$Ty(e), \mathbf{U}_{3sg}, \quad\quad ?Ty(e \to t)$$
$$?\exists\mathbf{x}.Fo(\mathbf{x})$$

$$Ty(e), \mathbf{V}, \quad Ty(e \to (e \to t)),$$
$$?\exists\mathbf{x}.Fo(\mathbf{x}), \diamondsuit \quad\quad Amare'$$

This property is not shared by verbs in non-pro-drop languages whose argument nodes, as projected from the verb, bear the weaker characterisation of the requirement $?Ty(e)$, without metavariables, thereby imposing the requirement of morphologically explicit argument expressions.
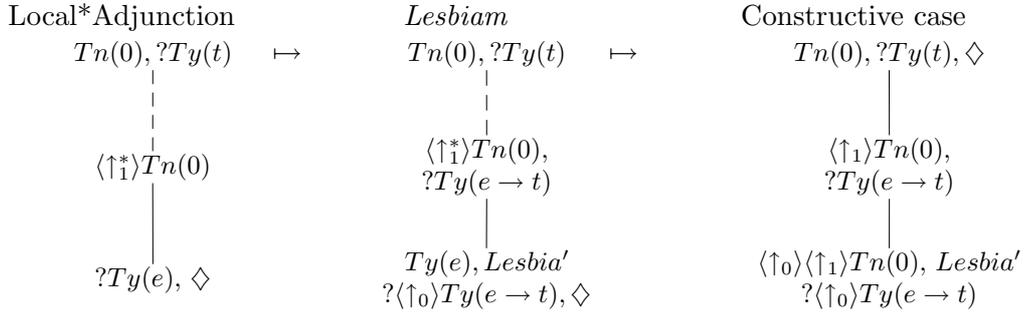
Lexical projection of propositional structures interacts with the construction of nodes by application of Local*Adjunction prior to the parse of some verb, where scrambling effects are driven by constructive use of case.

(18)   *Lesbiam*   *Catullus*   *amavit*
        Lesbia.ACC   Catullus.NOM   love.3SG.PERF
        'Catullus loved Lesbia.'

as noted, case specifications, as defined in lexical entries, are filters on the required output, ensuring that the term projected by some nominal expression is fixed in an appropriate position. However, case-marking may be used constructively to immediately induce an update of the underspecified tree relation, by a step of abduction, that guarantees the ultimate satisfaction of the output filter. The succession of steps required for the processing of (18) begins with the parsing of the accusative noun *Lesbiam* as decorating a locally unfixed node. Abduction proceeds in two steps: from the case constraint $?\langle\uparrow_0\rangle Ty(e \to t)$ on the argument-node to an annotation on the mother of $?Ty(e \to t)$, to ensure that the accusative requirement is satisfied; and then from $\langle\uparrow_1^*\rangle Tn(0)$ to $\langle\uparrow_1\rangle Tn(0)$ to satisfy the tree-node requirement on the functor node.[11]
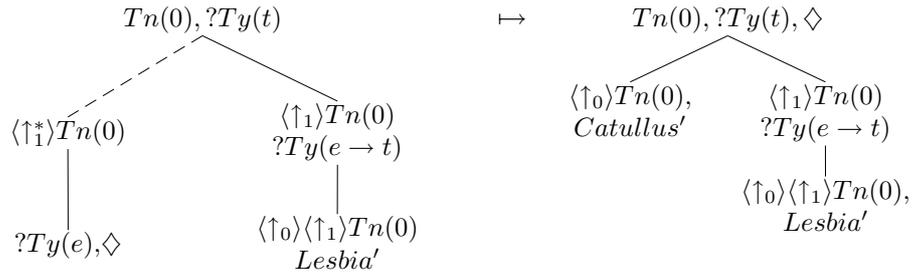
(19)

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[11]This sequence of steps can apply to all argument relations including subject: the Kleene* intrinsic to defining $\langle\uparrow_*\rangle$ and other operators is satisfied by the empty set, so $\langle\uparrow_0\rangle\langle\uparrow_*^1\rangle Tn(a)$ is true also of the subject relation.

Local*Adjunction   *Lesbiam*   Constructive case

$$Tn(0), ?Ty(t) \quad \mapsto \qquad Tn(0), ?Ty(t) \quad \mapsto \qquad Tn(0), ?Ty(t), \diamondsuit$$

$$\langle \uparrow_1^* \rangle Tn(0) \qquad\qquad \langle \uparrow_1^* \rangle Tn(0), \qquad\qquad \langle \uparrow_1 \rangle Tn(0),$$
$$\qquad\qquad ?Ty(e \rightarrow t) \qquad\qquad ?Ty(e \rightarrow t)$$

$$?Ty(e), \diamondsuit \qquad\qquad Ty(e), Lesbia' \qquad\qquad \langle \uparrow_0 \rangle \langle \uparrow_1 \rangle Tn(0),\ Lesbia'$$
$$\qquad\qquad ?\langle \uparrow_0 \rangle Ty(e \rightarrow t), \diamondsuit \qquad\qquad ?\langle \uparrow_0 \rangle Ty(e \rightarrow t)$$

A second step of Local*Adjunction takes place, and the parsing of *Catullus* is then taken to fix the value of the underspecified tree relation $\langle \uparrow_0 \rangle \langle \uparrow_1^* \rangle Tn(0)$ of Local*Adjunction into $\langle \uparrow_0 \rangle Tn(0)$ providing the basis for satisfying the nominative-induced requirement $?\langle \uparrow_0 \rangle Ty(t)$:

(20)

$$Tn(0), ?Ty(t) \qquad\qquad\qquad \mapsto \qquad\qquad Tn(0), ?Ty(t), \diamondsuit$$

$$\langle \uparrow_1^* \rangle Tn(0) \qquad \langle \uparrow_1 \rangle Tn(0) \qquad\qquad \langle \uparrow_0 \rangle Tn(0), \qquad \langle \uparrow_1 \rangle Tn(0)$$
$$\qquad\qquad ?Ty(e \rightarrow t) \qquad\qquad Catullus' \qquad\qquad ?Ty(e \rightarrow t)$$

$$?Ty(e), \diamondsuit \qquad \langle \uparrow_0 \rangle \langle \uparrow_1 \rangle Tn(0) \qquad\qquad\qquad \langle \uparrow_0 \rangle \langle \uparrow_1 \rangle Tn(0),$$
$$\qquad\qquad Lesbia' \qquad\qquad\qquad Lesbia'$$

The result is that the relation between the argument node and the dominating node is fixed at the point of parsing the noun phrase, possibly well before the verb is processed. The output-filter restrictions of case-specifications serve thus to induce the update of an unfixed node to a fixed relation as each unfixed node is introduced. The actions of the verb then serve to fill out the remainder of the propositional structure to yield the appropriate output tree. These lexical actions operate exactly as before, giving rise to a duplication in the description of the tree of both subject and object nodes with the already constructed nodes being matched with nodes decorated by metavariables. This duplication of nodes harmlessly collapses into a single description for each affected node because metavariables are not part of the object language of formulae, but merely place-holders for such formulae. Therefore, the effect of the nodes constructed from parsing the two initial noun phrases is to provide the values for the metavariables projected by the verb.

The restriction that there can be only one unfixed node at a time remains satisfied, despite the application of procedures to build these nodes twice over. Nothing dictates which of these argument expressions is placed first,

so the sequence of actions involving Local*Adjunction followed by a tree-update process reflecting the particular case specification can occur in any order, reflecting the freedom of constituent order which Latin displays.[12] Given the restriction to only one unfixed node of a type at a time, this type of derivation is available only upon the assumption that on-line update of the tree relation is available, so no particular fixing of rule-order application is required: all other derivations will be precluded. And so it is that successful derivations to yield an interpretation of examples such as (18) can be built up incrementally.

This is by no means the only type of tree-growth sequence however. The first expression *Lesbiam* might be taken to decorate an unfixed node introduced through the non-local step of *Adjunction. In this case, by assumption, the case specification serves merely as a filter on update that is not immediately enriched to a fixed position, and in consequence no other unfixed node can be introduced by this step. As a discrete operation, Local*Adjunction nevertheless remains available for the processing of some matrix subject NP that might follow (*Catullus* in (18)). The consequence is that the sequence of strategies for constructing a string-interpretation pairing is by no means unique. Indeed arguably the only major difference in the way *Adjunction and Local*Adjunction apply lies in the fact that immediate case-update to a fixed tree relation cannot take place in the former, because there is no presumption that the term is local to the primary predicate-argument array.

Unlike this alternative derivation of (18), a derivation involving *Adjunction is of course needed essentially for dependencies that are not local.

(14) *Stercilinum   magnum   stude   ut   habeas*
      dunghill.ACC big.ACC ensure.IMP.SG that have.2.PS.SING
      'See that you have a large dung hill'

Furthermore, this similarity of processes underpinning long-distance and short-distance scrambling effects provides an immediate explanation for multiple long-distance dependency effects. With both processes involving the building of an unfixed node, we expect the possibility of a feeding relation between *Adjunction and Local*Adjunction, resulting in multiple long-distance dependency. Consider (16), repeated below:

(16) *[digitum   supra   terram]   facito   semina   emineant*
      finger.ACC above earth.ACC make.IMP *seeds*.NOM project.3PL
      'Make the seeds project a finger above the earth.'

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[12]Equally, such NPs could be placed after the verb, since both for the application of the actions triggered by the verb and for applicability of Local*Adjunction, the pointer needs to be at the type-*t*-requiring node. We leave all details about post-verbal clitic placement for another occasion. In rigid verb-final languages, it is the details of tense-specification which ensure finality of the verb: see Cann et al 2005.

In the DS account, these data are directly expected. *Adjunction allows the construction of a propositional unfixed node decorated with the requirement $?Ty(t)$. Within in this unfixed propositional domain successive steps of Local*Adjunction may apply to construct partial propositional structures of the sort seen above in the parse of (18), yielding partial trees such as figure 2.[13] In this way a sequence of argument nodes can be constructed in which

$$Tn(0), ?Ty(t)$$

$$?Ty(t), \langle\uparrow_*\rangle Tn(0), Tn(b)$$

$$\langle\uparrow_0\rangle Tn(b) \qquad \langle\uparrow_1^*\rangle Tn(b)$$
$$Digitum', ?\langle\uparrow_0\rangle Ty(t)$$

$$?\langle\uparrow_0\rangle Ty(e \to t),$$
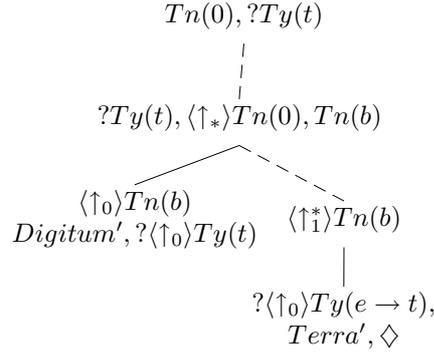$$Terra', \diamondsuit$$

Figure 2: Parsing *digitum (supra) terram*.

only the last of these remains with its local tree relation not updated. The position of the cluster of argument nodes is then resolved at some subsequent point in the construction process, in (16) with the introduction of the propositional complement argument of *facito* to yield the tree in figure 3). What is notable about such intermediate structures in the present connec-

$$Tn(0), ?Ty(t)$$

$$?Ty(t), \langle\uparrow_*\rangle Tn(0), Tn(b) \qquad \mathbf{U}_{Hearer} \qquad ?Ty(e \to t)$$

$$\langle\uparrow_0\rangle Tn(b) \qquad \langle\uparrow_1^*\rangle Tn(b) \qquad\qquad ?Ty(t), \diamondsuit \qquad Facere'$$
$$Digitum', ?\langle\uparrow_0\rangle Ty(t)$$

$$?\langle\uparrow_0\rangle Ty(e \to t),$$
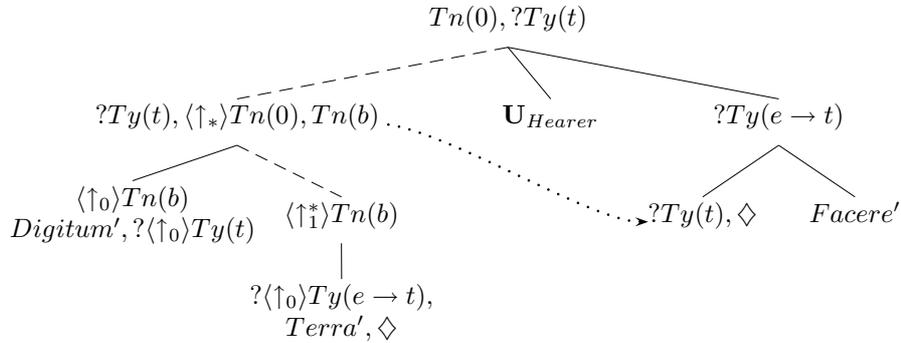$$Terra', \diamondsuit$$

Figure 3: Parsing *digitum (supra) terram facito*.

tion is the construction of proposition-requiring structures which, at some intermediate juncture, may contain only an array of argument nodes, as yet lacking the predicate node which is essential to completing that structure. This pattern is strikingly similar to intermediate structure projected from clitic clusters prior to the processing of the verb, given the same left-right

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[13]Many details of the analysis are omitted here, including the effect of the preposition *supra*. The essence of the analysis stands, however.

perspective on how structures for construal are incrementally built up, as we shall see in due course.

There is one further general tree-construction strategy yet remaining before we have anything approximating to a complete sketch of the mechanisms which the DS framework licenses. There are also mechanisms for building paired structures, where structures are taken to be twinned by being the result of a construction process which ensures the sharing of some term in two such so-called linked trees. This process is defined in DS for construal of relative clauses, clausal adverbials, and also external topic constructions. Such secondary structures have an attendant requirement that the newly introduced proposition-requiring tree have somewhere within it a copy of that term (specified as $?\langle\downarrow_*\rangle Fo(\alpha)$: see Cann et al. (2005) for details).[14]

The significance of this process in connection with clitics is that the con-

$$\langle L \rangle Tn(0), Fo(\alpha), Ty(e) \qquad Tn(0), ?Ty(t), ?\langle\downarrow_*\rangle Fo(\alpha)$$

Figure 4: Building Link transitions for relative-clause and left-dislocation construal

struction of such twinned structures can always be posited as an available strategy, without there having to be any duplication of two expressions or appropriately construed anaphoric expression in the second structure, as the specification of verbal actions induces a pronoun-style of decoration of the subject node. So in the wake of having constructed such a linked tree providing a term of type e as context for the processing of some subsequent subject specification, the specification of some full propositional structure from a subsequent verb will impose the requirement that one of its arguments be identified with the term provided by that first constructed tree, all without any morphologically explicit anaphoric device. An interpretation for an NP-verb sequence could be constructed using such a sequence of actions, only imposing the relatively weak anaphoric connection between that initially induced structure and the subsequent emergent propositional structure associated with the following verb that one argument of the verb will be identified with the term projected from that NP. And should that NP be a dative clitic pronoun, it may constitute some additional add-on to the remainder of the clausal sequence, without any further duplication of the information that it provides. Consider how the analysis of (9) might proceed.

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[14]The process of inducing such pairs of semantic trees is permitted by defining an additional modal operator in the tree logic $\langle L \rangle$, and its inverse $\langle L^{-1} \rangle$; and a rule is defined to yield a transition from an arbitrary node in one tree across a LINK relation to the topnode of a new propositional tree.

(9) *quid   mihi   Celsus   agit?*
     what   me.DAT Celsus.NOM.SG do.3.SG.PRES

'How, pray, is Celsus?' (Lit. 'What to me Celsus does?')

Parsing the interrogative *quid* proceeds via *Adjunction to give an unfixed node and then, since all computational actions are optional, one move could be to construct a node LINKed to the main propositional node with the requirement to construct a term ($?Ty(e)$). The dative pronoun is parsed and the node is decorated with a metavariable constrained to be substituted by a term that denotes the speaker (figure 5).[15]

$$Ty(e), \langle L \rangle Tn(n), \mathbf{U}_{SPEAKER}$$
$$\Uparrow$$
$$Horatius'$$

$$?Ty(t), Tn(n), \Diamond$$
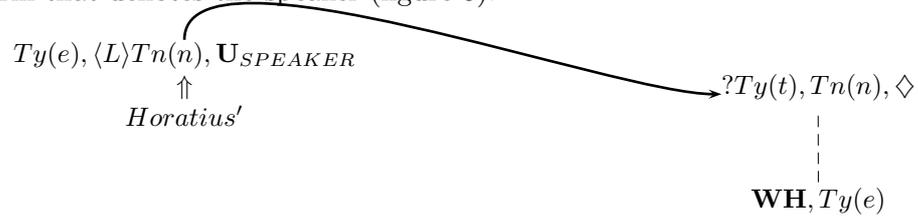
$$\mathbf{WH}, Ty(e)$$

Figure 5: Parsing *quid mihi*

By assumption, in this context, the node is not decorated with a case constraint to find a particular function for the term so constructed and the parse of the main clause continues. We end up with a tree like that in figure 6 where the speaker is only tangentially associated with the event denoted by the main verb, allowing, through normal inference driven by relevance considerations, a range of relations to be construed between Horace and what he has said.

$$Ty(e), \langle L \rangle Tn(n), Horatius'$$

$$Ty(t), Tn(n), (Agere'(\mathbf{WH}))(Celsus')$$

$$Ty(e), Celsus' \qquad Ty(e \to t), Agere'(\mathbf{WH})$$

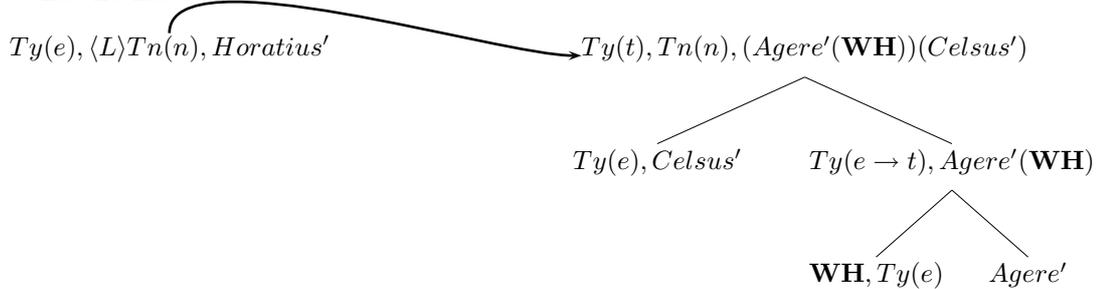$$\mathbf{WH}, Ty(e) \qquad Agere'$$

Figure 6: Parsing *quid mihi Celsus agit?*

The topic-LINK structure will of course give us yet another means of building up interpretation even for simple clausal sequences. In particular,

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[15]In this analysis, no term is shared between the LINKed structure and the main proposition, making it like an analysis of gapless topics in languages like Chinese (see Wu 2005). however, an alternative would be to relate the term that substitutes for the 1st person metavariable with an event variable that is shared between both structures. See Cann and Wu 2007 for an analysis of the Chinese *bei* construction along these lines.

this is applicable to (21) as *praemium* itself lacks any definitive case-marking that might preclude such an opening action-sequence:

(21)
Praemium	Xerxes	proposuit
a reward	Xerxes	offered

'Xerxes offered a reward'

Even the parsing of *Xerxes* following the parse of *praemium* can be taken to be the trigger for inducing a transition onto such a linked structure, which the actions associated with *Xerxes* could be taken to decorate (a transition in any case needed for expressions to be construed as in any way parenthetical to the string in which they are contained). The consequence of this flexibility is that there are a number of moves available at any stage of a parse sequence, in particular in the early stages when so little structural specification is as yet determined. There is the availability of building linked structures; there is the possibility of building an unfixed node; and there is the possibility of successively introducing and immediately updating introduced argument node relations. And all these for one and the same string, with one and essentially the same interpretation. Far from this constituting an unwarranted spurious ambiguity, this is an expected side-effect of defining a parsing-directed grammar formalism. Alternative strategies for achieving string-interpretation pairings are anticipated; and this gives a flexibility which is extremely useful in ongoing communication. It means one may be able to understand one's interlocutor without having had to recover exactly the same mode of presentation as them, an advantage which Bouzouita (this volume) exploits to provide a basis for seamless language change.

3.2   Processing pressures, word order and pragmatics

Taking a processing perspective on grammatical structure allows us to consider contextual factors in the definition of well-formed strings within some language and explain pragmatically determined tendencies that may become calcified through processes of language use. General constraints on production and parsing will ensure that speakers and hearers maximise the use of context to cut down the need to search the lexicon for words expressing appropriate meanings or to employ inference to determine what is being conveyed. One clear effect of such pressure to induce variation in word order, whether grammatically marked, as in (e.g.) passive, or not, as in scrambling. Relevance theory, with its tradeoff between cognitive effect and expenditure of effort will tend to encourage the appearance of given material early on in a clause, rather than later. Hence, in Latin, as in all other languages, anaphoric expressions which enable argument terms to be identified independently of processing the verb, often appear early in the clause. Such positioning provides a means of minimizing the search within

a given context to establish construal of pronominals as early as possible. In relying on context, speakers/hearers need the search for a substituend to be over as small a domain as possible by general relevance considerations. Accordingly, unless there is reason to the contrary, the position of an anaphoric expression requiring context-identification will be as early as possible in the setting out of propositional structure – quite literally, a minimisation of what constitutes the context. This is of course no more than a relevance-based explanation of this well known given-before-new ordering.

However, there is more to be said, as different uses of pronouns in Latin developed into discrete encodings in the subsequent Romance languages of what had been merely different types of usage in the earlier language. In the earlier Latin system, pronouns, like other nominal constituents, could be used either to provide some initial term which constitutes a point of departure for what follows, or to provide a contrast, an update to what follows. From a DS perspective, the first such effect would constitute the projection of a pair of independent linked structures, the second structure to be developed relative to the context provided by the first with a requirement of a shared term in the tree to be constructed. The second type of construal would involve the construction of an unfixed node by *Adjunction, decorating this with the term indicated by the initially placed expression, with anticipation of delay in updating this initially constructed node. Synchronic studies of other languages provide evidence that both such devices are non-canonical and hence characteristically associated with stress or distinguishing intonation as a signal that some non canonical form of construal is required.[16] Of course, we have no direct evidence of stress or prosody for a language such as Latin, but at the very least such contemporary evidence is suggestive:[17]

(22) **A:** *Tibi*   *ego*   *dem?*   **B:** *Mihi*
          you.DAT I.NOM give.1.SG.SBJ.PRES   me.DAT
     hercle   *uero.*
      by Hercules   in truth
     '**A:** Am I to give it to YOU?' '**B:** Yes, by god, to ME.'

Plautus,Pseud. 626

(22) could be analysed in DS terms as being associated with the construction of a node introduced by *Adjunction to be decorated by a term

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[16]It has been argued in detail by Kempson and Kiaer in connection with verb-final languages that distinctive intonation is an important determinant of appropriate strategies for build up of the intended form of interpretation, in particular to signal long-distance dependency effects, that depend on departing from the canonical build up of information locally.

[17]The pronouns noted in (22:104) are taken by Adams (1994) to be illustrative of an emphatic use "often marked by placement of the pronoun at the head of its clause".

representing the hearer.[18] Such a device induces actions that by definition mark an emergent propositional boundary, being associated with introduction of a proposition-requiring node (decorated with $?Ty(t)$) without any decorations other than the imposition of such a requirement. If, in anticipation of explaining the split that occurred between stressed and unstressed uses of pronouns, we turn to what the non-stressed uses of pronouns have in common, it is simply that they will lack this property: they will NOT be associated with those very structural devices which serve to identify some initiation of an emergent propositional structure, they will solely have a regular anaphoric function of context dependence. An interesting example of this occurs in (23) in which a Strong pronoun (*ego*) appears immediately before the two weak pronouns (*te, ei*):

(23)   *quod*   *scribis*   *de*   *illo*   *Preciano*
      what   write.2SG.FUT   about   that.ABL.SG   Precianus.ABL.SG
      iure consulto,   **ego**   **te**   **ei**   *non*
      jurist.ABL.SG   I.NOM   you.ACC   him.DAT.SG   not
      desino   *commendare.*
      abandon.1SG.PRES   commend.INF
      'Whatever you write about that jurist, Precianus, **I** do not stop recommending you to him.'

                                                Cicero. Ad Fam. 7.8.2

Other linguistic indicators of the emergence of a propositional structure include following focused elements, expressions containing a negative element, complementizers (25), relative pronouns, (24), subordinate temporal adverbials, and verbs (26): indeed this is the only property common to this structurally heterogeneous set (examples culled from Adams (1994)):[19]

(24)   *quae*   ***tibi***   *nulla*   *debetur*
      which.NEUT-PL   you.DAT   no.NEUT-PL   is-owed
      'nothing of which is owed to you.'

                                                Cicero, In Act. 1.16

(25)   *rogo*   *ut*   ***mi***   *mittas*   *dalabram*
      ask.1SG.PRES   that   me.DAT   send.2SG   mattock.ACC.SG
      'I ask that you send to me a mattock.'

                                                Terentianus 251.27

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[18]The verb is omitted because the predicate, like the structural patterning, is recoverable from the context.

[19]For visibility reasons, we have highlighted in bold the weak pronouns under consideration. Examples of the other types of left-edge identifiers can be found in Kempson and Bouzouita 2005, Bouzouita this volume.

(26) *delectarunt*   ***me***   *tuae*   *litterae*
      delighted.3PL.PRES   me.ACC   your   letter.NOM.PL
      'I was delighted with your letter.'

<div align="right">Cicero, Ad Fam. 9.16.1</div>

Like their "strong" counterparts, positioning of pronouns under this use will be driven by relevance considerations for these, by assumption, are ever-present. This provides the functionalist underpinnings that explain the weak pronoun usage. What these share is the characteristic that, once an emergent propositional structure is identified by some OTHER expression, they will get placed as closely following as possible, decorating some locally unfixed node duly updated through its case specification, and so, like the strong pronouns, hugging the left edge of any such emergent structure as closely as commensurate with them NOT constituting a stressed/contrastive use.[20]

4   Latin to Medieval Spanish

We now have everything in place to sketch out the assumptions a parsing perspective on grammar formalisms would lead us to expect in the explanation of the emergence of the Romance languages from Latin. Medieval Spanish contains a codification of what had become two phonologically and functionally discrete uses of earlier pronominal forms: strong and clitic. What the clitic pronouns display is two distinct types of property. On the one hand, since they constitute the only remaining reflex of earlier nominal case-marking, their triggers are a direct reflex of the earlier set of environments that yielded pragmatic identification of propositional boundary marking, now encoding this information directly as calcified reflexes of that earlier more liberal system. On the other hand, the structures they severally induce are the retained reflex of the case dynamics of Latin, with lexically specified actions that yield the types of structural update that had been freely available in the earlier language. Now, however, each individual lexical specification associated with some clitic projects one or more specific sequences of actions, the range of different types of updates available only being seen across the set of clitics as a whole.

4.1   Placement of clitic pronouns: the production pressures

We turn first to explaining the early position in a string at which clitic pronouns cluster; and this is where the production pressures constraining

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[20]Following Sperber and Wilson (1995), if there are specific inferential effects to justify commensurate enlargement of the context to be searched, this would explain the lack of tightness of fit that Adams (1994) notes of weak pronoun positioning in Latin, even assuming that the effects are clause by clause (or "colon" by "colon" to use his terminology).

Latin word order come into play.[21] The weak pronouns of Latin, as noted above, occur as close to the left-edge of a clause as possible, but not quite at the edge - they were not the left-edge occurrences as these by definition were the OTHER subset of pronouns which were invariably associated with their decoration of unfixed and linked nodes, with the type of distinctive construal and unreduced stress associated with those strategies. In the subsequent Medieval Spanish system the clitic pronouns share this distribution (for a detailed account see Bouzouita, 2002, in preparation; Bouzouita and Kempson, 2006):

(27)　*Esto　es　　el　pan　de　Dios　que　**vos**　da　　　a*
　　　this　be.3SG　the　bread　of　God　that　CL　give.3SG　to
　　　comer
　　　eat.INF
　　　'This is the bread of God that he gives you to eat.'

(28)　*e　dizie　　que　**lo**　tenie　　del　　prior　de　Sancti*
　　　and　said.3SG　that　CL　had.3SG　of-the　prior　of　Saint
　　　Johannis
　　　John
　　　'And he said that he got it from the prior of Saint John.'
　　　Data from Granberg 1988: 46

(29)　*Connocio-**la**　　Jacob*
　　　recognised.3sg-CL　Jacob
　　　'Jacob recognised her.'

Such left-peripheral items in Latin may consist of a sequence of NPs (Devine and Stephens, 2006), as in (16) for full noun phrases and (23) for pronominals, a pattern which persists in Medieval Spanish with clitic pronouns:

(30)　*Et　los　dioses　**me**　quisieron　　mal　e　**me**　**lo**　quieren*
　　　And　the　gods　CL　wanted.3PL　harm　and　CL　CL　want.3PL
　　　'And the gods wanted to harm me and they still want to.'
　　　Data from Granberg 1988: 235

What is striking about Medieval Spanish is that what had been a purely pragmatically determined distribution in Latin had become encoded, a distribution no longer subject to inferential calculation as to what would constitute an optimal production choice, but a set of categorical restrictions, albeit complex.

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[21]This section is independently reported in Bouzouita and Kempson 2005, and represents joint work by Bouzouita and Kempson in conjunction with Cann.

4.2   The emergence of clitic pronouns in Medieval Spanish

We do not set out a formal specification of these triggering environments here: this is a primary concern of the Bouzouita paper in this volume, which traces the shift in triggering environments between Medieval Spanish and the present time. We, rather, turn to the actions which arise in these various structural environments which the clitic pronouns severally induce.

One striking property of the Romance clitic systems is that the clitic system that emerged very early on in each Romance language had already in place a complex system displaying the array of variants itemised earlier: the accusative clitic displays a fixed interpretation, the dative clitic displays a large range of interpretations, including an item-specific reflexive clitic itself also with a broad range of uses, and there are also idiosyncratic clitic clusters.[22]

One might justifiably ask how could it be that such complex systems could emerge apparently without some long gestation period. The beginnings of answer comes from the observation that despite notorious idiosyncracies in any one system of clitics, nevertheless, considered as a system, the range of effects displayed in each is strikingly similar. Some clitics fully determine their construal, being associated with a fixed structural configuration, such as the non-syncretic accusative forms, *lo*, *los*. and their feminine-marked counterparts which signal only direct object function.

(31)   *Al*   *senor*   **lo**   *faras.*
       To the   gentleman   3sg.CL-DO   you-will   do

       'You will do it to/for the gentleman.'
       Data from Granberg 1988: 135

(32)   *cuando*   **lo**   *ganó*
       When   3sg.CL-DO   he   won

       'When did he win it?'
       Data from Granberg (1988): 135

Other clitics have forms which do not fully determine their case role, with the effect that their contribution to the emergent structure may not be able to be determined immediately, but only in combination with the verb with which they are associated:[23]

(33)   *Yo*   **vos**   *defiendo*   *que*   *non*   *vengades*   *y*   *màs*   *et*
       I   2sg.CL-IO   insist   that   not   you-come   and,   more,   and
       si   *non*   *ho*   **vos**   *cegaré*   *et*   **vos**   *mataré*
       if   not   I   2pl.CL-DO   I will blind   and   2pl.CL-DO   I will kill

---

[22]We illustrate with Medieval Spanish, but the phenomenon, though with individual variants, repeats itself in each emergent Romance system.

[23]Notice in (33) the initial strong pronoun *yo* 'I'.

I forbid you to come and if not, I will blind you and kill you
Data from Granberg 1988: 235

In this example, the first occurrence of *vos* is construed as indirect object, the second as direct object; but the morphological input is undifferentiated between these. Then there are the clitic clusters, which occur in the same relative position as the singleton occurrences, sometimes written as a single item, such as *me lo* in (30), above.[24]
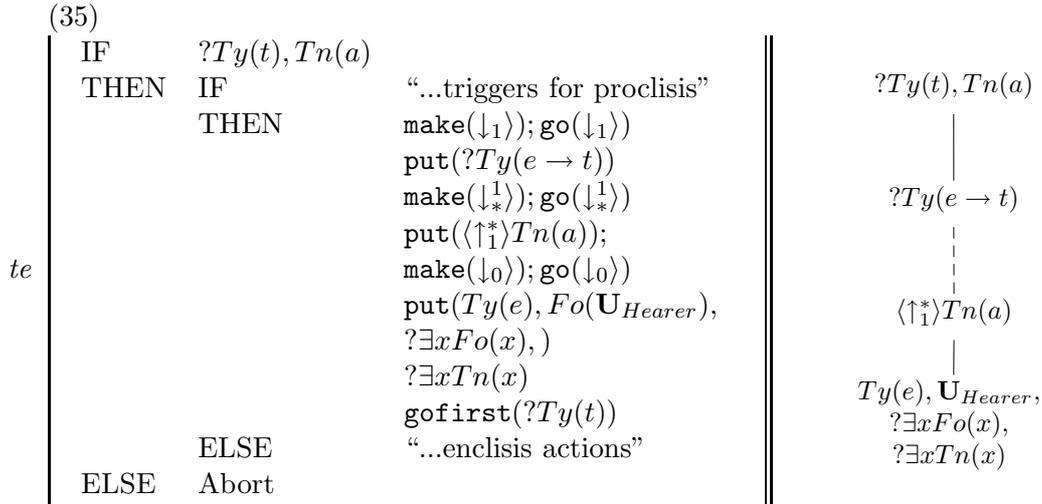
Looked at as a whole, taking a step back from the individual heterogeneity, there is striking similarity between this set and the array of patterns which the various word-order and related case-inducing effects of Latin. The pronouns that display immediate fixing of their argument role in the emergent structure can be said to follow the pattern of constructive use of case displayed in the short-scrambling effects of Latin, with the steps of Local*Adjunction and enrichment of that unfixed node to a fully determined role, now lexicalised as a routine. To see this, compare the occurrence and construal of the pronoun *lo* in (31) with the derivation earlier set out for the NPs in (18). In both types of case, the parsing leads to the immediate construction of a fixed structural relation between the argument node and its dominating type-*t*-requiring node. To capture this parallel, all that is required is to analyse the pronoun *lo* as itself inducing the actions otherwise effected by Local*Adjunction plus the subsequent enrichment associated with constructive use of case, hence creating and decorating a fixed argument node immediately dominated by a predicate-requiring node. See Bouzouita this volume for detailed specifications of *lo* at different time points, but the following indicates the sorts of ACTION required:[25]

(34)

lo	IF	$?Ty(t)$		
	THEN	IF	.... "proclisis triggers"	
		THEN	$\texttt{make}(\langle\downarrow_1\rangle); \texttt{go}(\langle\downarrow_1\rangle);$	
			$\texttt{put}(?Ty(e \rightarrow t))$	
			$\texttt{make}(\langle\downarrow_0\rangle); \texttt{go}(\langle\downarrow_0\rangle);$	
			$\texttt{put}(Ty(e), \mathbf{U}_{Masc}, ?\exists\mathbf{x}.Fo(\mathbf{x}))$	
			$\texttt{gofirst}(?Ty(t))$	
		ELSE	...."enclisis actions"	
	ELSE	Abort		

$$?Ty(t)$$
$$|$$
$$?Ty(e \rightarrow t)$$
$$|$$
$$Ty(e), \mathbf{U}_{Masc}, ?\exists\mathbf{x}.Fo(\mathbf{x})$$

---

[24]Notice in passing how, in the first conjunct of (30), it is unclear whether the dative-marked expression is really serving as argument to what is a nominal *mal* or whether it is merely an indicator that "grounds the event structure in relation to the speech participants" as de Jonge's characterisation of what the dative intrinsically encodes indicates.
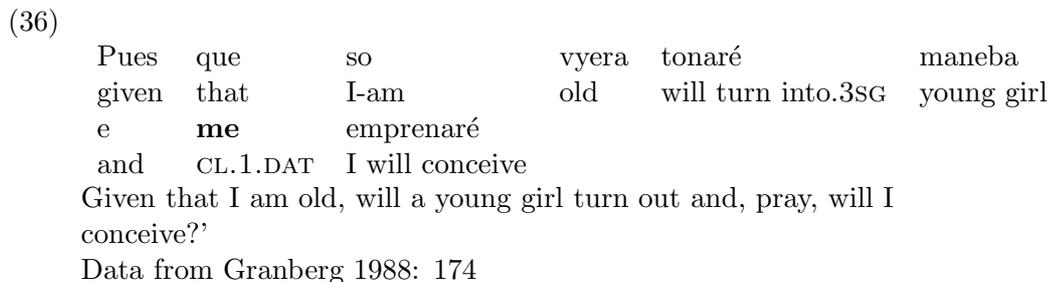
[25]In the lexical specifications, we focus exclusively on the form of update the clitics provide, leaving the complex specification of the environments that trigger these on one side, because, though the actions of the individual clitics and clitic complexes differ, the specification of environments is identical for each. See Bouzouita this volume, Bouzouita and Kempson 2006, for details.

Secondly, there are the cases where the morphology fails to provide the basis from which a specific argument role can be identified. The first and second person pronouns, and dative specifications more generally are proto-typical cases of this type, illustrated by (33). Arguably, these reflect the failure to establish a fixed node; and we might well thus see these as initiating instead the actions associated with Local*Adjunction:

(35)

te

IF	$?Ty(t), Tn(a)$		
THEN	IF	"...triggers for proclisis"	
	THEN	$\texttt{make}(\downarrow_1\rangle); \texttt{go}(\downarrow_1\rangle)$	
		$\texttt{put}(?Ty(e \rightarrow t))$	
		$\texttt{make}(\downarrow_*^1\rangle); \texttt{go}(\downarrow_*^1\rangle)$	
		$\texttt{put}(\langle\uparrow_1^*\rangle Tn(a));$	
		$\texttt{make}(\downarrow_0\rangle); \texttt{go}(\downarrow_0\rangle)$	
		$\texttt{put}(Ty(e), Fo(\mathbf{U}_{Hearer}),$	
		$?\exists xFo(x),)$	
		$?\exists xTn(x)$	
		$\texttt{gofirst}(?Ty(t))$	
	ELSE	"...enclisis actions"	
ELSE	Abort		

$?Ty(t), Tn(a)$

$?Ty(e \rightarrow t)$

$\langle\uparrow_1^*\rangle Tn(a)$

$Ty(e), \mathbf{U}_{Hearer},$
$?\exists xFo(x),$
$?\exists xTn(x)$

This characterisation of te is neutral with respect to whether it conveys an object or indirect object construal, reflecting the lack of specification in position along the functor spine of some yet to be specified predicate, exactly in the manner of *Local*Adjunction*.

As we've seen, this only scratches the surface of any account of datives in Spanish, this sequence of actions totally leaving on one side the ethical dative use. However, there is reason to think that a specification of dative-construal in (Medieval) Spanish in terms of ambiguity as between an albeit weak argument-specifier and indication of scenario-perspective is correct: the ethical dative construal, taken over from Latin, can co-occur with another dative form under a distinct type of construal, a pattern quite unlike case specifications in general. Indeed the ethical dative can be added to any independently licensed string. The remainder of the string is then construed as some projection of how the event described pertains to the individual picked out by the dative-marked expression.

(36)

Pues	que	so	vyera	tonaré	maneba
given	that	I-am	old	will turn into.3SG	young girl
e	**me**	emprenaré			
and	CL.1.DAT	I will conceive			

Given that I am old, will a young girl turn out and, pray, will I conceive?'

Data from Granberg 1988: 174

With the first and second person pronoun dative forms, this yields an interpretation of how the event described relates to either one of the speech participants, in (36) the speaker perspective being set by use of the dative clitic *me*. As discussed above in relation to Latin (figure 6), this is naturally expressible in DS terms as a reflex of a LINK transition to a node in a tree independent of the predicate-argument structure, with the ethical dative pronoun decorating the node of that quasi-independent structure. Indeed, we can include as part of the actions associated with the form *me* in Medieval Spanish exactly the same actions as induced by the form in Latin, viz.: the decoration of a $?Ty(e)$ node with a first person metavariable just in case that node is a LINK structure:[26]

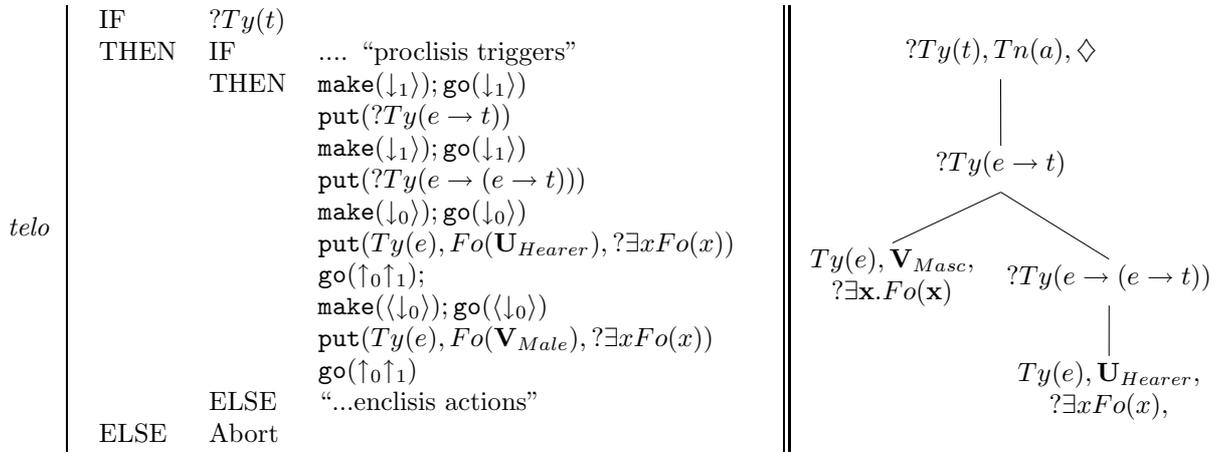(37)
me

IF	$?Ty(e)$			
THEN	IF	"proclisis"		
	THEN	IF	$\langle L \rangle \top$	
		THEN	$\mathbf{put}(\mathbf{U}_{SPEAKER})$	
	ELSE	...		

$\langle L \rangle Tn(a),$ $\quad$ $Tn(a),$
$\mathbf{U}_{SPEAKER}$ $\quad\quad$ $?Ty(t)$
$\quad Ty(e)$

Such an analysis has an immediate benefit: it means that the overall account now has the array of variants the DS framework would lead one to expect appropriately filled out. As part of the set of lexically induced tree relations associated with clitic specifications, we have the induction of a fixed node relation which the clitic pronoun is taken to decorate, the induction of a locally unfixed node relation with the clitic decorating the unfixed node, and the induction of a LINK node relation with the clitic decorating this independent one-node structure.

4.3   Clitic Clusters

There is then one further option that we expect, given Latin as the point of departure. We expect there to be some reflection of the NP-sequencing so characteristic of Latin scrambling. This is immediately suggestive of clitic clusters whose emergence is otherwise unexpected and which match the sequencing effect of building up interpretation from sequences of case-marked NPs by a sequence of actions of *Local*Adjunction* and enrichment to a fixed tree relation; these too are thus no more than part of the expected pattern. All that is needed for their analysis is the lexical specification of a sequence of actions introducing a cluster of argument nodes from a given type-*t*-requiring node, mimicking the result of the composite sequence of actions of Local*Adjunction plus enrichment of tree-relation to yield the appropriate cluster of argument nodes so eminently displayed in any sequence of NPs in

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[26]The parse of the clitic does not here construct a LINKed node, as this option remains open as a general rule in Medieval Spanish to account for ethical (and other) datives involving full noun phrases.

a free scrambling language. Putting together the lexical actions associated with parsing *te* and *lo*, given above, would yield the tree structure, in (38).

(38)

$$?Ty(t), Tn(a), \diamondsuit$$

$$?Ty(e \to t)$$

$$Ty(e), \mathbf{V}_{Masc}, ?\exists\mathbf{x}.Fo(\mathbf{x}) \qquad \langle\uparrow_1^*\rangle Tn(a)$$

$$Ty(e), \mathbf{U}_{Hearer},$$
$$?\exists xFo(x),\ ?\exists xTn(x)$$

And these correspond precisely to what we would expect from a lexicalised compound specification *te lo*. In this structure, the position of the metavariable projected by *te* remains unfixed and yet in the environment of an immediately subsequent *lo*, all of the forms *te*, *me*, and *se* may only be construed as dative notwithstanding their syncretic form, since the direct object construal is unavailable – that position being duly decorated by a distinct metavariable. Hence, by routinisation of the various actions involved, the actual encoding of *te lo* that results would involve construction of a *fixed* pair of indirect-object and direct-object nodes, rather than the actions of Local*Adjunction and some subsequent enrichment. In consequence, the form *te* as a subpart of *telo* has a notably narrower characterisation than its independently defined form.[27] The set of lexical actions that are required and the tree they induce are given in (39):

(39)

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[27]Trivially, this definition could retain the precise sequence of operations used for the individual clitics, involving Local*Adjunction, enrichment, return of the pointer between the actions associated with one clitic and overlapping `make, go` instructions, but we would take such listing to reduce through reasons of formal economy and the psychological process of routinisation.

$$
telo
\begin{array}{|ll}
\text{IF} & ?Ty(t) \\
\text{THEN} & \text{IF} \quad\quad \text{.... "proclisis triggers"} \\
& \quad\quad \text{THEN} \quad \texttt{make}(\downarrow_1)); \texttt{go}(\downarrow_1)) \\
& \quad\quad\quad\quad\quad \texttt{put}(?Ty(e \to t)) \\
& \quad\quad\quad\quad\quad \texttt{make}(\downarrow_1)); \texttt{go}(\downarrow_1)) \\
& \quad\quad\quad\quad\quad \texttt{put}(?Ty(e \to (e \to t))) \\
& \quad\quad\quad\quad\quad \texttt{make}(\downarrow_0)); \texttt{go}(\downarrow_0)) \\
& \quad\quad\quad\quad\quad \texttt{put}(Ty(e), Fo(\mathbf{U}_{Hearer}), ?\exists x Fo(x)) \\
& \quad\quad\quad\quad\quad \texttt{go}(\uparrow_0\uparrow_1); \\
& \quad\quad\quad\quad\quad \texttt{make}(\langle\downarrow_0\rangle); \texttt{go}(\langle\downarrow_0\rangle) \\
& \quad\quad\quad\quad\quad \texttt{put}(Ty(e), Fo(\mathbf{V}_{Male}), ?\exists x Fo(x)) \\
& \quad\quad\quad\quad\quad \texttt{go}(\uparrow_0\uparrow_1) \\
& \quad\quad \text{ELSE} \quad \text{"...enclisis actions"} \\
& \text{ELSE} \quad \text{Abort}
\end{array}
$$

Tree (right):

$$?Ty(t), Tn(a), \Diamond$$

$$?Ty(e \to t)$$

$$Ty(e), \mathbf{V}_{Masc}, ?\exists \mathbf{x}.Fo(\mathbf{x}) \qquad ?Ty(e \to (e \to t))$$

$$Ty(e), \mathbf{U}_{Hearer}, ?\exists x Fo(x),$$

In this macro of actions, the tree relations induced are fully fixed despite the systemic underspecification intrinsic to *te*. This is the proper reflection of the diachronic process that gave rise to the clustered clitic sequence. The encoding of this composite sequence of actions as a cluster takes place via routinisation of the most common construal. So the mystery of why such clustered clitic sequences should occur at all, with their fixed locality relative to each other fades away in this processing perspective. They simply form one of an expected range of types of action that became routinised over time in the shift from the freer scrambling system into a more restricted clitic system. As in the earlier Latin system, the construction of such a cluster of argument nodes can be associated with the introduction of an intermediate node from which this sequences of actions takes place, hence allowing the effect of clitic climbing as displayed in (12). The only difference between these is that in the earlier Latin system, such non-contiguity of paired NPs was not lexically fixed, so in principle could be non-locally established, hence across a complementizer-induced proposition-requiring boundary (subjunctive-marked). In the clitic system, with the shift in actions from being a generally available computational device to a macro of actions for a particular lexically stored sequence, these get restricted to a locally characterisable domain, hence only across a finite-nonfinite sequence of verbs. Note that this pattern parallels that shown in Latin non-finite contexts, as illustrated in (23) above and thus little has apparently changed between the earlier system and Medieval Spanish in this regard.

The range of effects we see displayed in the clitic pronouns of Medieval Spanish is thus broadly the range of effects seen in local scrambling, that is, the strategies associated with local constituent order variation of the Latin system.[28] This is precisely what we would expect in a transition in

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[28] The only pattern which is not displayed is the use of case retained simply as an output filter, but as we shall see briefly below, this is illustrated by Greek *me, mou*, where the first person forms for accusative and dative/genitive are symptomatic of the less syncretic system than in Spanish or Italian.

which the availability of case specifications on a general basis disappears, being replaced by case specifications only within the pronominal system. As noted above, in the DS framework, general computational actions and lexical actions are expressed in exactly the same terms. Lexical actions, like their general counterpart, characteristically induce the construction of nodes in some partial tree in addition to providing decorations for the nodes which the actions associated with the word in question triggers. Thus a shift in tree-update actions from a sequence of general actions to a composite macro of actions associated with an individual word is exactly what one might expect in a shift from general formulation to lexical specification. And in this shift, any one word would normally be associated with only one such sequence of actions (unless its precursor in the source language was ambiguous): and so it is that the various clitic pronouns reflect one or other such action-sequence. Seen in processing terms, the clitic-template phenomenon is thus a freezing of scrambling strategies, hence explicable as a progressive shift, each lexical specification reflecting one of a set of strategies for early NP placement.

Even the existence of interpolation throughout the period of Medieval Spanish is expected, in which the clitic is separated from the verb, as in (1) repeated here:

(1) ... *quien* **te** *algo* *prometiere* *..*
     .. who 2.CL-IO something would-promise ..
     'The one who would promise something to you.'

The occurrence of NPs able to occur between clitic (cluster) and verb is precisely what would be expected of a system intermediate between a free-scrambling system and a fully lexicalised one. Such interpolation effects are no more than continuing applicability of computational use of just those actions which are becoming increasingly routinised in association with specific lexical triggers. This is confirmed by the fact that the verb in Medieval Spanish can be ordered after a full sequence of NPs, following the Latin pattern:

(40) *la* *muger* *esto* *a* *su* *marido* *faze.*
      the wife this to her husband does
      'The wife does this to her husband.'

Or in which interpolation occurs with apparent climbing as in (41), indicating the persistence of abductive strategies in the development of early Spanish:

(41) *que* **vos** *mal* *quieren* *fazer*
      that CL.2PL.DO harm they-want do.INF
      'That they want you to do harm.'

This is all exactly as we would expect. Loss of interpolation could only take place once the association of triggers for clitic construal had become fully encoded, if the expressive power of the evolving system is to be retained. We thus expect the availability of computational actions associated with the construction and update of locally unfixed nodes throughout the period within which this lexicalisation shift is taking place.

4.4 The Person Case Constraint

Confirmation of this form of explanation can be gleaned from the novel perspective it provides for addressing the puzzle of what are systematic gaps in available clitic clusterings. Though some gaps are random, some never, or almost never, occur. Most well-known of these are the so-called Person Case Constraint, of which there are two variant forms. Of these, the most widespread is that construal of either first and second person forms as an accusative can never co-occur with third person dative, a restriction which holds in all the Romance languages as long as we keep distinct the various usages of the dative clitic as ethical, reflexive, and impersonal. Thus, though there are occurrences of first or second person construed as dative followed by third person accusative in Medieval Spanish, just as in other Romance languages, as in (30) above and (42) below, there is no reported occurrence of construal of either as accusative, with dative third person:

(42) *agora quiero uos lo descubrir*
    now want1.SG youPL it revealINF
    'Now I want to reveal it to you.'
    Data from Granberg 1988: 176

The lack of first or second person Accusative forms with a third person dative is a puzzling gap if such clitic forms are thought to be a mere listing of possible morphological forms. There is also a further restriction displayed by a subset of these languages: that first and second person pronominal forms should not co-occur.[29] In this case, the restriction is less definitive, and indeed even in modern Spanish, a long way further down the historical chain, such examples are wellformed, a problem which we return to:

(43) **Te me** *recomendaron.*
    you me they-recommend
    'They recommended you to me.'

                                        [Modern Spanish]

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[29]This is not the situation in Latin:

i. *qui* **me** **tibi** *fecerit* *hostem*
   who.NOM.SG me.ACC you.DAT make.3SG.PERF enemy.ACC
'who would make me an enemy to you.'   Lucan DBC 1.

(44) ... *te   me deje ver*
           you me   let   see
      '(may God) let you see me

Such gaps are mysterious, apparently lacking either syntactic or semantic explanation; and they have been taken to be diagnostic of the need for a separate morphology component in which such restrictions can at least be defined (Anderson (2005), Monachesi (2005)). Indicative of the fact that this is not simply a matter of lack of need to express relations between human participants, they can all be side-stepped by realizing one of these arguments as a strong pronoun or full NP:[30]

(45) Se   de   nos   te   non   partes..
      If   from us   CL-DO   not   depart....
      If you do not leave us   [Data from Rivero 1997]

(46) Con   el   so manto   a amas   las   cubrió
      With the   his mantle to both   them$_{ACC}$ he-covered
      He covered both with his mantle.

In all such cases, the phenomenon is lost a little in the free translation, but,more literally, in (45), the string is construed as 'If from us you do not part yourself...'.

In the face of the various challenges which these clustering facts present, many authors settle for a discrete morphological form of explanation, not characterising the phenomenon within the syntactic domain at all (see eg Nevins (2007). Rivero (2007)).

Such arguments are potentially embarrassing for the DS framework too, as they threaten the very strong DS claim that grammar design needs no more than the articulation of the process of mapping from phonological specification of individual word (cluster) onto semantic representation. However, the DS framework has a natural explanation to offer for such gaps, with one additional assumption about dative-case specification. This is the assumption that dative marked nominals are underspecified with respect to the semantic function they perform: direct object, indirect object, reflexive, adjunct (ethical and other semantic uses). Thus, of necessity, they must be under-specified with respect to their structural relation within any predicate-argument structure.

With this assumption that dative construal involves an underspecification of any tree relation, all variants of the Person Case Constraint fall into place: both morphological gaps follow from the tree-logic restriction that

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[30]This phenomenon is notably redolent of the Bantu restriction that there can ever be only one object clitic, construable either as direct or indirect object, which, equally, is not a restriction on the numbers of argument nodes that are licensed, but a restriction merely a restriction on whether these can be realised by weakened clitic/agreement-marking mechanisms: see Marten and Kempson 2007.

there can be no more than one underspecified tree relation of a type at any point in the tree-growth process. Let us take the more comprehensively satisfied restriction first, the preclusion of any co-occurrence of first or second case specifications as accusative with a third person specification as dative (the so-called strong form of the Person Case Constraint: Bonet (1995), Nevins (2007), Ormabazal and Romero (2007)). Recall that there was no need of stipulation that there should be only one unfixed node of a type at a time: in all putative cases where more than one such underspecified tree-relation might be introduced, they collapse as undifferentiatable, with all cases where the resulting treenode decoration is inconsistent being necessarily debarred. This is precisely the scenario which these morphological gaps present. Given the analysis of dative as intrinsically underspecified as to whether the node being decorated is a direct or indirect object (or a semantically weak adjunct), the syncretic first and second person forms will be predicted not to co-occur with any such form, irrespective of order, since they too have a form that fails to discriminate between the various argument roles they can satisfy. Upon an analysis of tree growth that reflects this underspecification both must be taken to decorate an unfixed node. Neither 1st or 2nd person markers could accordingly ever be constructed together with a third person dative marker, let alone be constructed sufficiently often to get routinised into a stored clustered form: both are defined as inducing the construction of a locally unfixed node without any case basis for inducing appropriate update ahead of the verb.

Their lack of co-occurrence is immediately predicted. The encoding of clitic sequences might itself specify fixed tree-relations for the paired nodes, but, since these arise from routinisations of earlier general processes, there is no possibility of these becoming established as lexical clusters, if those clusters cannot be produced. Hence their lack of occurrence in the established clitic system. It is not the occurrence of these syncretic forms construed as indirect object with an accusative third person form which is problematic. Indeed, it is not the specific construals of these pronouns that provide the appropriate explanation for the oddity of the precluded forms. It is the fact that these forms, being syncretic, are associated with inducing only the building and decorating of some locally unfixed argument-relation, and so cannot co-occur with a dative or any other case-specification which is itself associated with inducing exactly the same weak tree relation.

This explanation should, without doubt, carry over to anticipate equally that co-occurrence of first and second person pronouns should also be impossible. Surprisingly, however, many cases are fully acceptable in Modern Spanish and they occurred albeit rarely in Medieval Spanish also:

(47) *No   te   me   acerques*
     Not   CL   CL   come-closer
     'Don't come closer to me.'

[Mod.Spanish]

(48) *y   te   me devuelven   vivo*
      and   you   me bring-back   alive
      'and may he bring you back to me alive
      (may he bring you back alive for my benefit).'

Examples like these are widespread, and have been taken by some to indicate that this restriction is no more than a reflection of the fact that declarations involving ditransitives in which both participants described are human are not common as scenarios, hence with no reflection in the clitic clusterings that emerged.

However, it is notable that there are several strategies for construal available in principle for analysing such clitic sequences, only one of which threatens to involve the precluded multiplication of unfixed tree relations. On the one hand, the occurrence of *te* in (47) could be taken to decorate a node in an independent linked structure, in a manner similar to that suggested above with respect to the ethical dative. With Spanish being a pro-drop language no other morphological would be needed to yield the appropriate copy of the term in question as subject of the predicate *acerques*. It has independently been noted by van Hoecke 1996 that ethical datives and argument-construal of datives merge seamlessly into one another, in particular for all first and second person clitic pronouns, since all first and second person specifications by definition constitute specification of the speech participants and their relation to the event described, which is the hallmark of the ethical dative. Analogously, though not involving a subject construal, (48) could be taken as having the first-person pronoun *me* decorate a linked structure, so that the action of bringing back the hearer alive is presented as being to the benefit of the speaker, a clear We accordingly expect examples such as (47)-(48) to be wellformed at all stages of Spanish, despite the preclusion by the system of two unfixed nodes of a type at a time. More generally, since all the dative clitics, first, second and third person, all allow ethical dative construals, on this account, we expect all combinations to be wellformed, even though not perhaps occurring often enough to have become a stored, routinised pairing.

There is yet a further form of explanation for the rare cases of co-occurring first and second person clitics that can be observed in Medieval Spanish, as indicated by the scribal transcription of the pair of clitics in (49) below:

(49) *Qui-d   nos   dio   pro   alcalde?*
      Who-CL.2.SG.DO   CL.1.PL.IO gave.3.SG as   mayor?
      'Who gave you to us as mayor?'

Notice the phonological cliticisation of the second person on the *wh* form, suggesting a different form of explanation. This is that it is the *wh* expression

plus its enclitic which form a cluster, these being the result of an early step of
*Adjunction feeding the building of clustered subject and object argument
nodes associated with that first unfixed node, exactly as in the multiple
long-distance dependency forms such as (16). Under this derivation, the
subsequent occurrence of *nos* will be able unproblematically to decorate
a node locally unfixed with respect to the root, even though the ultimate
position of the first cluster is itself not resolved until the verb is parsed.
Indeed, we would anticipate that systematic exceptions to the person case
constraint might arise according as the parsing of the string does not treat
the sequence of clitics as clustered together, but as in potentially different
domains, as in this example, given the analysis to be provided for the left-
peripheral *wh* expression.

The explanation of the Person Case Constraint as a consequence of for-
mal properties of trees and tree growth has the marked bonus of being in
terms of a strong structural restriction, hence one that would be expected
to apply on a broad cross-linguistic basis. It should be noted, moreover,
that it is the flexibility of a parsing-based system which makes such an ex-
planation possible: there is very generally more than one possible sequence
of steps available for establishing a string-interpretation pair. Indeed, as is
argued for in detail in Bouzouita this volume, this is what makes seamless
diachronic change possible.[31]

However, this account is not problem-free; it might be said to fall into
the trap of identifying case-underspecification with structural underspeci-
fication, equating gaps in a paradigm with syncretism. As pointed out by
Adger and Harbour, accounts which turn on case syncretism as reflecting rel-
ative weakness of specification are at best insufficient, since the same restric-
tion is displayed in clitic systems with no syncretism in the clitic forms. In
particular, this is displayed by Greek, with its distinct nominative/genitive
forms for both first/second person subject and object marking. Yet, as it
turns out, such examples buttress the DS account, for they illustrate the
one further type of tree growth that the DS system leads us to expect. So
far, we have itemised the induction of an unfixed argument node subject to
immediate enrichment, the induction of a linked structure, and the build-
ing of sequences of locally unfixed nodes from an intermediate node. But
we haven't had an instance analogous to the core mechanism underpinning
long-distance dependency, which is the specification of case as decorating an
unfixed node which does NOT induce immediate update. But this is the sce-
nario provided by Greek, which Adger and Harbour cite as problematic for
syncretism-based accounts for the Person Case Constraint. In these cases,
the morphological specification for direct and indirect object arguments is

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[31] It is of course relatively hard on this set of assumptions to establish lack of wellformed-
ness: to be ungrammatical, there must be no possible derivation for which an appropriate
string-interpretation pairing can be established (see Cann et al. (2007) for an account of
wellformedness within the DS framework).

distinct. If however, we assume that one of the options for tree growth that might get calcified is precisely such a non-constructive use of case, then we have the basis for analysing Greek, while also getting the bonus, finally, of completing the picture of possible calcification updates that clitic systems might reflect. For, upon such an analysis, the morphologically distinctive forms would nevertheless be subject to the Person Case Constraint precluding their occurrence either with each other or with the dative on exactly the same grounds as the syncretic forms: their decoration of an unfixed node would preclude their co-occuring in a string with any other form which induced the same relatively weak structural relation. So one type of problem isn't a problem for the analysis at all - to the contrary, it buttresses it.

Thus though the account of the data offered is far from comprehensive, the strength of the cross-linguistic explanation it provides suggests it may nevertheless provide the best explanation currently available, stemming from general principles of the parsing-directed base system and uncontroversial assumptions about the atrophying of a case-rich system.

5   Summary

Overall, we have set out a framework for characterising scrambling effects in language that explains syntactic limitations these display in virtue of the ongoing process of building up interpretation along a time-linear perspective. We then characterised the templatic, highly idiosyncratic distributions of medieval Spanish clitics in terms of various routinisations of these general processes, to yield a putative basis for why such complex systems could arise in such a short span of time. The complexity is no more than is to be expected from routinisations set up to accommodate the regularly recurring sequences of computational actions licensed in the earlier system. What we have not provided is a step-by-step account of the fine structure whereby the syntactic changes indicated took place, electing, rather, to look at the type of update which the various case specifications induce. Since such an account is a necessary condition for any robust account of syntactic change, the account set out here has done no more than set out preliminaries for a detailed specification of the diachronic sequence. Indeed, Bouzouita this volume uses this general perspective to provide a detailed account of the diachronic development of one such Spanish clitic, *lo*, detailing transitions from the mixed medieval Spanish placement of clitics placement through to the modern Spanish distribution (in which *lo* along with other clitics in finite clauses immediately precedes the verb). Nevertheless we have set out an outline of how clitic pronouns could have emerged from the clitic-lacking system of Latin. The account is one which not only provides a basis for formulating the puzzling heterogeneity of any individual clitic system, but also provides a principled explanation for the Person Case Constraint, an

explanation which any account of clitic placement needs if it is to be more than a stipulatory list. The more general significance of the account is how substance can be given to the functionalist claim that syntactic change can emerge from purely pragmatic pressures on construal without jeopardising the commitment in the explanation to formal modelling of the processes involved.

References

J. Adams. Wackernagel's law and the position of unstressed personal pronouns in classical latin. *Transactions of the Philological Society*, 92:103–178, 1994.

D. Adger and D. Harbour. The person case constraint. *Syntax*, 4, 2006.

E. Anagnostopoulou. Strong and weak person restrictions: a feature checking analysis. In L. Heggie and F. Ordonez, editors, *Clitics and affixation*, pages 199–235. Benjamins, 2005.

S. Anderson. *Aspects of the theory of clitics*. Oxford University Press, Oxford, 2005.

P. Blackburn and W. Meyer-Viol. Linguistics, logic and finite trees. *Bulletin of Interest Group of Pure and Applied Logics*, 2:2–39, 1994.

E. Bonet. Feature structure of Romance clitics. *Natural Language and Linguistic Theory*, 13:607–647, 1995.

M. Bouzouita. *Clitic Placement in Old and Modern Spanish*. Msc, Kings College London, 2002.

M. Bouzouita. *Clitic Placement in the History of Spanish*. Phd, King's College London, in preparation.

M. Bouzouita and R. Kempson. Clitic placement in old and modern spanish: a dynamic account. In O. Nedergaard Thomsen, editor, *Competing Models of Linguistic Change*. John Benjamin, 2006.

R. Cann, R. Kempson, and L. Marten. *The Dynamics of Language*. Elsevier, Oxford, 2005.

R. Cann, R. Kempson, and M. Purver. Context wellformedness: the dynamics of ellipsis. *Research on Language and Computation*, 5, 2007.

A. Cardinaletti. On different types of clitic clusters. In K. Demuth and C. de Cat, editors, *The Romance-Bantu Connection*. Benjamin, forthcoming.

M.L. Cuervo. Clitics: three of a perfect pair. MIT generals paper, 2005.

J. Devine and L. Stephens. *Latin Word Order: Structured Meaning and Information.* Oxford University Press, Oxford, 2006.

R. Granberg. *Object Pronoun Position in Medieval and Early Modern Spanish.* Phd, University of California Los Angeles, 1988.

J. Grimshaw. Optimal clitic position and the lexicon in romance clitic systems. In G. Legendre, J. Grimshaw, and S. Vikner, editors, *Optimality Theoretic Syntax*, pages pp.205–240. MIT Press, Cambridge, Mass, 2001.

D. Heap. Constraining optimality: Clitic sequences and feature geometry. In L.Heggie and F.Ordó nez, editors, *Clitic and Affix Combinations: Theoretical perspectives*, pages pp.81–102. Benjamin, Berlin, 2005.

van Hoecke, W. The Latin dative. In W. van Belle and Langendonck W. van, editors, *The Dative: Volume I Descriptive Studies*, pages 3–38. Benjamins John, Amsterdam, 1996.

N. Hornstein, J. Nunes, and K. Grohmann. *Understanding Minimalism.* Cambridge University Press, Cambridge, 2005.

R. Kempson and J. Kiaer. Japanese scrambling and the grammar-parser correspondence. In H. Hoshi, editor, *Language, Mind and Brain: Perspectives from Linguistics and Cognitive Neuroscience.* Kuroshio, Tokyo.

R. Kempson, W. Meyer-Viol, and D. Gabbay. *Dynamic Syntax.* Blackwell, Oxford, 2001.

Jieun Kiaer. *Processes and Interfaces in Syntactic Theory: the case of Korean.* PhD thesis, King's College London, 2007.

M. Koizumi. String-vacuous overt verb raising. *Journal of East asian Linguistics*, 9:227–85, 2000.

G. Legendre. What are clitics? evidence from Balkan languages. *Phonological Studies*, 6:89–96, 2003.

A-M. Martins. The loss of ip-scrambling in portuguese: Clause structure, word order variation and change. In D. Lightfoot, editor, *Syntactic Effects of Morphological Change.* Oxford University Press, Oxford, 2002.

P. Monachesi. *A Study of Romance Clitics.* Oxford University Press, Oxford, 2005.

A. Nevins. The representation of third person and its consequences for person-case effects. *Natural Language and Linguistic Theory*, 25:273–313, 2007.

R. Nordlinger. *Constructive Case.* CSLI, Stanford, 1998.

J. Ormabazal and M. Romero. Ordering and linearizing rightward movement. *Natural Language and Linguistic Theory*, 25:315–347, 2007.

M. Purver and M. Otsuka. Incremental generation for dialogue. *ACL workshop proceedings*, 2002.

Matthew Purver, Ronnie Cann, and Ruth Kempson. Grammars as parsers: Meeting the dialogue challenge. *Research on Language and Computation*, 4(2-3):289–326, 2006.

M. L. Rivero. Oblique subjects and person restrictions in Spanish: a morphological approach. In R. D'Alessandro, S. Fischer, and G. Hrafnbjargarson, editors, *Agreement restrictions*. de Gruyter, 2007.

Ivan Sag, Thomas Wasow, and Emily Bender. *Syntactic Theory: A Formal Introduction.* CSLI Publications, Stanford, 2002.

D. Sperber and D. Wilson. *Relevance: Communication and Cognition (2nd editn).* Blackwell, Oxford, 1995.

Y. Takano. Surprising constituents. *Journal of East Asian Linguistics*, 11: 243–301, 2002.