A Dynamic Account of the Person Case Constraint in Greek

Stergios Chatzikyriakidis
King's College, London

Ruth Kempson
King's College, London

Abstract

In this paper we argue that the Person Case Constraint, generally presumed to be an irreducible morpho-syntactic constraint on clitic pronoun combinations is a direct consequence of processing considerations. Adopting the Dynamic Syntax (DS) perspective of Cann et al. (2005) and Cann & Kempson (2008) in which syntax is defined as the monotonic incremental growth of semantic structure, with structural underspecification and update as the core syntactic notion, we argue that the PCC is wholly due to general restrictions on tree-growth: that these should underpin observed gaps in possible clitic combinations is due to clitics being calcified reflexes of previously available tree-growth update-sequences whose variability is the source of word order variation. We argue that the PCC is the consequence of a tree-logic restriction that only one unfixed node can be present in a tree at any stage in the tree growth process. Strong evidence for this account comes from Pontic Greek, whose preclusion of 3rd person clitic clusters emerges as a consequence of this constraint, in sharp contrast to feature-based accounts which, in being defined to match the license for these combinations in other languages, would directly preclude these data, thus pointing towards a feature-free account of the PCC.

1 Introduction

The PCC is a clitic co-occurrence restriction, which states that a dative clitic cannot co-occur with a 1st/2nd person accusative clitic. The restriction is found across a remarkable number of both related and unrelated languages, spanning from Romance and Greek to Kiowa and Basque (see Rezac 2008b for the Basque data and Adger & Harbour 2007 for the Kiowa data). The examples below from Spanish and Standard Modern Greek (SMG) exemplify the restriction:

(1) *Le me ha dado
it.CL-DAT me.CL has given
'S/he has given me to him.' [Spanish]

(2) *Mu se exi δosei
me.CL-DAT you.CL-ACC has given
'He/She/It has given you to me.' [SMG]

The above restriction is referred to in the literature as the strong PCC version. A so-called 'weak' version has been claimed to exist in varieties of Catalan, Italian

and Spanish (Bonet 2007, Bianchi 2006 and Cuervo 2002).[1] Under this looser version of the restriction, the ban is not against datives in general but only against 3rd person datives. The weak PCC version precludes clusters of a 3rd person dative plus a 1st/2nd person accusative clitic but allows combinations of a 1st/2nd person dative plus a 1st/2nd person accusative:[2]

(3) Te m' ha recomanat la Mireia
you.CL me.CL has recommended the Mireia
'Mireia has recommended me to you/you to me.' [Catalan-Bonet, 2007]

(4) Lui mi ti presento
he me.CL you.CL introduces
'He introduces me to you/ you to me.' [Some varieties of Italian]

(5) *Gli mi ha dato
them.CL-DAT me.CL-ACC has given
'He/She has given me to them.' [Some varieties of Italian]

In SMG, only the strong version of the constraint is attested and SMG clitic sequences equivalent to (3)-(5), are all ungrammatical. The same facts hold for Grecia Salentina Greek (GSG) and Cypriot Greek (CG):

(6) *Mu se eδose
me.CL.DAT you.CL.ACC gave
'S/He/It gave you to me .'[SMG]

(7) *Eδoke mu se
gave me.CL.DAT you.CL.ACC
'S/He/It gave you to me .'[CG]

(8) *Mu se edike
me.CL.DAT you.CL.ACC gave
'S/He/It gave you to me. '[GSG, Chatzikyriakidis 2010]

Pontic Greek (PG,) on the other hand, is idiosyncratic as regards person restrictions. PG allows (at least for some speakers) sequences of two 1st/2nd person clitics. PG is thus subject only to the strong PCC constraint:

(9) Eδikse/eneδikse m esen
showed.3SG me.CL you.CL
'(S)he/It showed you to me.' [PG]

[1] See Chatzikyriakidis & Kempson (2009) for arguments that the weak PCC is not a robust constraint in these varieties and as such should not be attributed to a general syntactic property.

[2] There is another version of the constraint exhibited in Romanian in which case sequences of a dative clitic and a 1st person accusative are licit while sequences of a dative plus a 2nd person accusative are ungrammatical. Furthermore, no PCC restrictions arise with postverbal singular clitics but do however arise with postverbal plural clitics. See Savescu (2007, 2009) and Nevins & Savescu (2008) for the relevant data.

At first sight, the PCC seems puzzlingly to resist a principled syntactic explanation. Furthermore, the restriction cannot be derived on the semantic grounds that such constructions are semantically rare, since in every language exhibiting the constraint, there is an equivalent syntactic construction to express the precluded PCC combination, a fact noted in the literature as a repair (Bonet 2007, Rezac, 2008a among others): in the grammatical examples shown below, taken from SMG and French, the dative clitic is replaced by a preposition plus strong form of the pronoun.

(10) Me sistisan se sena
me.CL-ACC introduced to you.ACC
'They introduced you to me.' [SMG]

(11) Je t' ai presenté à lui
I you.CL have introduced to him
'I introduced you to him.' [French]

The literature on the PCC is extensive and ranges from functional approaches like Haspelmath (2004), in which the PCC is taken to result from infrequent usage of such constructions, to morphological accounts arguing for a separate level of morphology like Bonet (1991, 1994) and Heap (2005), or to purely minimalist syntactic accounts, in which the PCC is argued to derive from general mechanisms of the Probe/Agree system (Bejar & Rezac 2003, Anagnostopoulou 2003,2005, Rezac 2008a,b, Adger & Harbour 2007, Nevins 2007 and Michelioudakis 2009 among others). Due to space limitations, we will not review any of these papers here (see Chatzikyriakidis & Kempson 2009 and Chatzikyriakidis 2010). In what follows, we present an alternative Dynamic Syntax (DS) account of the PCC, in which all reference to features is replaced with notions of incrementality and treegrowth, both of which are central to the DS framework in which core syntactic notions such as short and long distance dependencies, are defined in terms of (locally) unfixed tree relations with requirements for subsequent update (these diagrammatically indicated with dashed line).

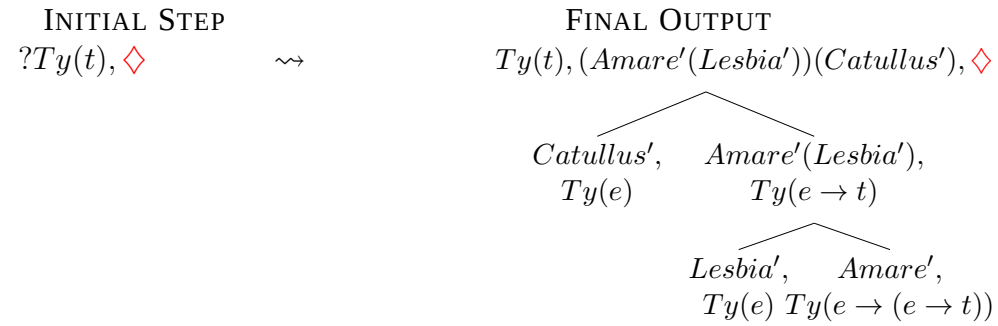
2 The Martins' (2002) Observation and Latin Scrambling

In Martins (2002), a very interesting observation is made. It is argued that clitic positioning can be seen as a reflection of word-order patterns of an earlier system. For example, clitic clustering in the Romance languages reflects the word order patterns of the earlier Latin system. Cann & Kempson (2008) as well as Chatzikyriakidis & Kempson (2009), concurring with the Martins observation, set out a formal account of this claim, arguing that clitics in Romance can be seen as calcified processing strategies used in the earlier Latin system. According to such an account, the set of processing strategies used in Latin scrambling are those governing the clitic systems of Romance languages. The framework in which this account is formulated

is Dynamic Syntax (Cann *et al.* 2005), in which grammars of natural language are defined in terms that directly reflect parsing in real time, so involving context-dependent incremental growth of semantic representations, where these representations are formally defined in terms of predicate-argument tree structures. The tree structures are binary, with nodes labelled with a formula and its type. There are two basic types e and t, following formal semantic notation, with predicate type $(e \rightarrow t)$, transitive verb $(e \rightarrow (e \rightarrow t))$, etc. All DPs project low type, hence type e terms rather than a higher type (see Kempson *et al.* 2001); and there is no type lifting or composition of functions. The core of the syntax is expressed in the concept of tree growth, as in the mapping from an initial very partial tree - the single-node tree with just a decoration constituting a requirement for a formula of propositional type - onto a final tree in which this assigned goal is established. The initial input and one such final output is illustrated below for a parse of *Catullus Lesbia Amavit* :

(12) *Catullus Lesbia Amavit* 'Catullus loved Lesbia'[3]

(13)



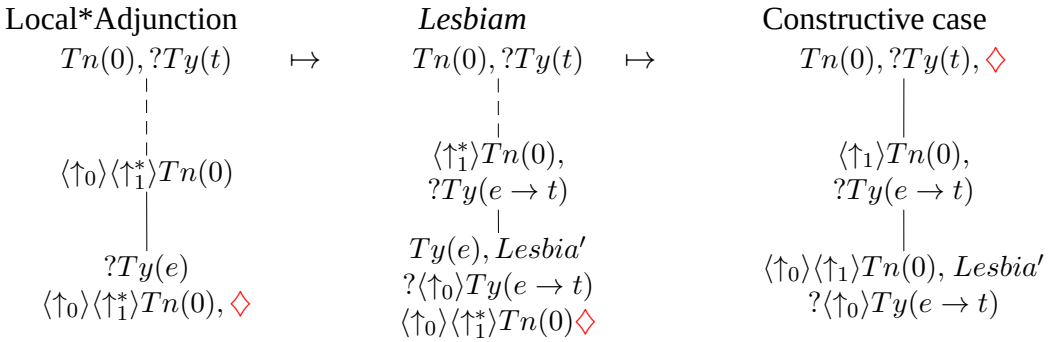
Formally, the concept of requirement, $?X$ for any X is critical: what drives the tree growth, e.g above the requirement $?Ty(t)$, the requirement for a formula of type t, is the imposition of requirements all of which have to be met in any wellformed output subject to an additional constraint that all information provided by the words must be incrementally implemented in the growth process in the provided order given that there are no movement operations, no re-ordering of the string. Rather syntactic operations are defined in terms of monotonic growth of partial trees: processing is strictly incremental reflecting the word order of the string. The growth process is defined by interaction between *computational actions* and lexical actions, both defined in exactly the same tree-growth terms. The core concept is that of underspecification and update, with not only underspecified formulae (anaphoric expressions projecting a place-holding metavariable formula of type e updated by substitution), but also underspecified tree relations. Such underspecified tree relations involve the license to build unfixed nodes, which may be either updated locally

[3]We illustrate the assumptions of the framework with Latin since, in the Romance case, we have a clear source language without clitics, out of which the various clitic-displaying Romance languages subsequently developed.

(matching A dependencies), or be updated with no such locality restriction (long-distance dependency). There are also linked adjunct trees, that in general share a term through encoded anaphoric devices (the burden of eg relative pronouns). Latin, being a free word order language is assumed to make use of both unfixed and locally unfixed nodes as well as the incremental building of *LINKed* (adjunct) structures. Both parsing and production make use of the same process of tree growth, and these mechanisms are taken to be the core of the syntax of natural-language grammars.

The crucial point in these accounts for the purpose of this paper is the actions induced by parsing different kinds of case marking NPs. It is argued that case marking can be used in the following three senses: a) as constructive case b) as output filter case and c) as underspecified case. These three forms of case along with the use of the LINK strategy are argued by Cann & Kempson (2008) and Chatzikyriakidis & Kempson (2009) to be the four parsing strategies responsible for the Latin scrambling system. Constructive case refers to a situation where case marking provides unambiguous information as regards the NP's structural position in the tree structure. Constructive case fixes the unfixed node's address the NP it is parsed on (if parsed on an unfixed node) by updating the underspecified relation of the unfixed node (the underspecified treenode address) to a fixed relation (fixed treenode address). For example in the parse of *Lesbiam Catullus amavit* 'Catullus loved Lesbia', *Lesbiam* is parsed on a locally unfixed node. The case marking of *Lesbiam*, signalling an accusative direct object, updates the unfixed node's address by simply providing it with the requisite fixed treenode address (argument daughter relation indicated with $\langle\uparrow_0\rangle$, functor relation with $\langle\uparrow_1\rangle$, unfixed relations with Kleene * operations over these, and the unrestricted $\langle\uparrow\rangle$, which captures the regular concept of being dominated by):

(14) Parsing *Lesbiam* in *Lesbian Catullus amavit*

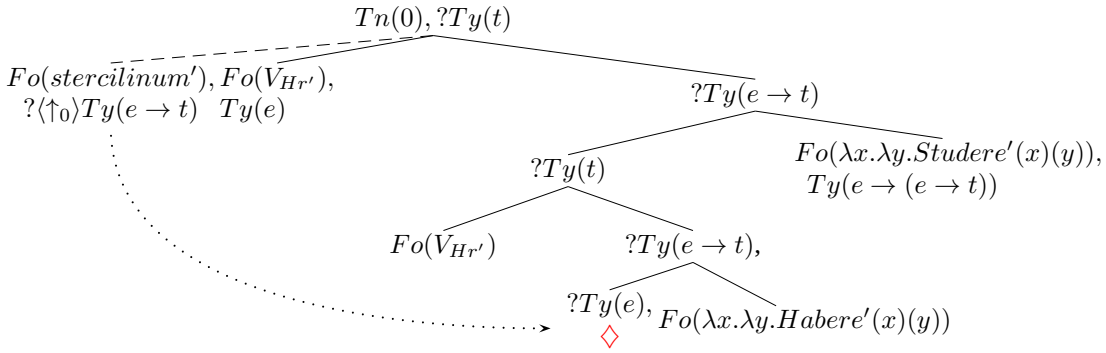


Case can also act as an output filter, indeed this is the core notion of case, with case specifications constraining update sites for an unfixed node without fixing that treenode relation. For example, in the left-peripheral construction of (15), the left

dislocated *stercilinum* is parsed as decorating an unfixed node, with the lexical entry projecting the specification $?\langle\uparrow_0\rangle Ty(e \rightarrow t)$ along with type and formula values. This specification ensures that the NP must end up on an argumental node (0 node) immediately dominated by a node carrying a predicate type ($e \rightarrow t$). What this means is that the NP must be parsed as projecting a direct object, no matter how deeply embedded that node will turn out to be:

(15) Stercilinum magnum stude ut habeas
dunghill.ACC big ensure.2SG that have.2SG
'Ensure that you have a large dunghill.'

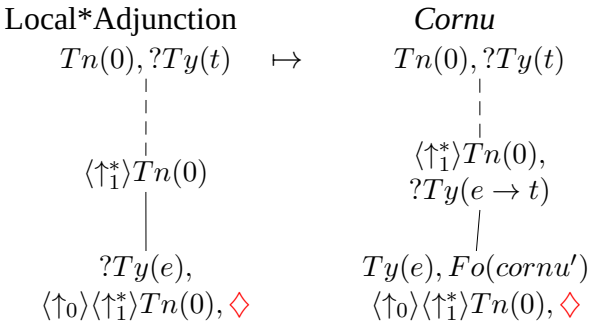
(16) Parsing *stercilinum magnum stude ut habeas*[4]



The last type is the underspecified case. This type of case is unable to fix or even restrict the potential fixing sites of an unfixed node. Latin neuter nouns (4th declension) illustrate this well, being highly syncretized in their singular forms with one form covering accusative, dative and ablative. Given this syncretism, and assuming that all three constitute a single lexical entry, this entry should encode this underspecification to match the syncretism. In other words the template approach to such Latin forms as discrete homonyms is false, a misleading pedagogical heuristic. In order to do that, we take this type of case not to provide any update information with respect to treenode addresses or output node filters, so that, as below, when *cornu* is parsed on a locally unfixed node there is no structural update:

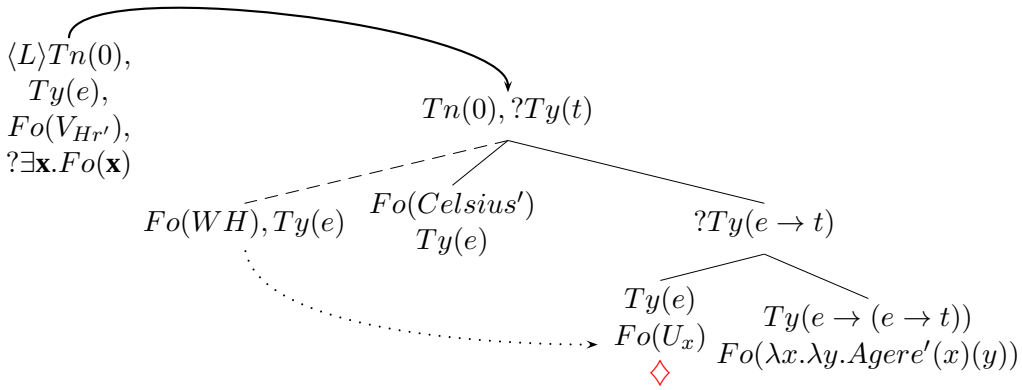
(17) Parsing *cornu*

[4] $V_{Hr'}$ is a metavariable constrained to be identified as the hearer, $V_{Sp'}$ a metavariable to be identified as the speaker.



The fourth parsing strategy used in Latin scrambling does not involve the projection of unfixed nodes but rather induces pairs of separate trees, i.e. LINKed trees, for some types of LINK transition imposing the requirement of a shared term. This strategy is used to encode relative clause construals, topicalized subjects, and other related structures. In the case of topicalized subjects, the subject is parsed on a partial tree containing only a type *e* node which is LINKed to a type *t* requiring tree, with an imposed requirement for a copy of that formula within the main tree. Such a requirement is not however always a necessary condition for such adjoined stress. For example, so-called ethical datives may involve an NP that is interpreted only very loosely with respect to the main proposition to which it is adjoined, expressing a number of weak relations to this proposition ranging from affinity to anger and irony. It is this weak relation that Cann & Kempson (2008) and Chatzikyriakidis & Kempson (2009) encode as a LINK relation lacking any requirement of the NP's formula value in the main tree:

(18) quid tibi Celsius agit?
what you.DAT Celsius does
'How, pray, is Celsius?'



In the above structure, the ethical dative is parsed on a LINK structure analogous to HTLD elements (note its tree-node identifier $\langle L\rangle Tn(0)$), lacking only the requirement for a copy of the term in the main tree.

3 The PCC as a Restriction on Underspecification

Following through on this proposal, Cann & Kempson (2008) and Chatzikyriakidis & Kempson (2009) argue that Romance clitics encode one of the aforementioned four strategies existing in the Latin scrambling system. Non-syncretized clitics, for example 3rd accusative clitic Spanish *lo* are assumed to match the constructive case strategy (following Bouzouita (2008a,b). Hence, 3rd person accusative clitics project fixed structure (as indeed in most Greek variants). Datives and 1st/2nd person clitics however are assumed to be structurally underspecified, 1st/2nd person accusative clitics by virtue of being case syncretized whereas non syncretized dative clitic forms like *le* by virtue of the dative being structurally underspecified as regards its construal (argumental, benefactive-malefactive, possessor, ethical datives among its various functions). That is, dative and 1st/2nd person clitics project a locally unfixed node without output filter, matching in effect the underspecified case of the Latin system. The proposed specifications for Spanish clitics *me/te, le* and *lo* in Spanish taken from Chatzikyriakidis & Kempson (2009) are shown below:

(19) Lexical entry for *me*/*te*

IF	$?Ty(t), Tn(a)$	
THEN	IF	$[\downarrow_1^+]?Ty(x)\mid$ $Mood(Imp)$
	THEN	$\texttt{make}(\langle\downarrow_1^*\rangle); \texttt{go}(\langle\downarrow_1^*\rangle);$ $\texttt{make}(\langle\downarrow_0\rangle); \texttt{go}(\langle\downarrow_0\rangle);$ $\texttt{put}(\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle Tn(a));$ $Ty(e), Fo(U_{Sp'/Hr'}), ?\exists\mathbf{x}.Fo(\mathbf{x})$ $?\exists\mathbf{x}.Tn(\mathbf{x})); gofirst(?Ty(t))$
	ELSE	abort
ELSE	abort	

(20) Lexical entry for *le*

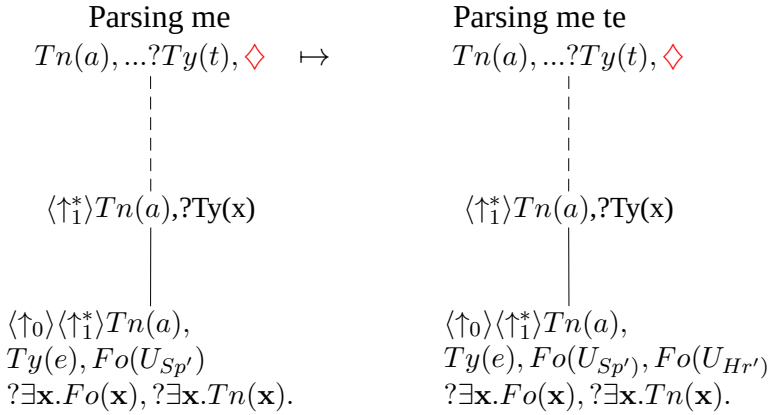
IF	$?Ty(t), Tn(a)$	
THEN	IF	$[\downarrow_1^+]?Ty(x)\mid$ $Mood(Imp)$
	THEN	$\texttt{make}(\langle\downarrow_1^*\rangle); \texttt{go}(\langle\downarrow_1^*\rangle);$ $\texttt{make}(\langle\downarrow_0\rangle); \texttt{go}(\langle\downarrow_0\rangle);$ $\texttt{put}(\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle ?Tn(a);$ $Ty(e), Fo(U_x), ?\exists\mathbf{x}.Fo(\mathbf{x})$ $?\exists\mathbf{x}.Tn(\mathbf{x})); gofirst(?Ty(t))$
	ELSE	abort
ELSE	abort	

(21) Lexical entry for *lo*

IF	$?Ty(t)$	
THEN	IF	$[\downarrow_1^+]?Ty(x)\mid$ $Mood(Imp)$
	THEN	$\texttt{make}(\langle\downarrow_1\rangle);\texttt{go}(\langle\downarrow_1\rangle);$ $\texttt{make}(\langle\downarrow_0\rangle);\texttt{go}(\langle\downarrow_0\rangle)$ $\texttt{put}(Ty(e), Fo(U_x), ?\exists\mathbf{x}.Fo(\mathbf{x}));$ $gofirst(?Ty(t))$
	ELSE	abort
ELSE	abort	

Given these lexical entries, the PCC follows directly via a hard-wired treegrowth constraint which prohibits the projection of two unfixed nodes of the same type. Given that each node is uniquely identified via its treenode address, the system does not allow two nodes with the same underspecified treenode address, since these two will collapse into one node via treenode identity. This constraint, the "one unfixed node at a time" constraint, is a general restriction on tree-growth that will straightforwardly predict the PCC facts in the following manner: given that dative and 1st/2nd person clitics project locally unfixed nodes, any combination of the aforementioned clitics will be absolutely ruled out by the constraint just sketched. For example, in parsing *me te*, we end up with one locally unfixed node (since the two locally unfixed nodes will collapse into being the same node) carrying both a metavariable with a *Sp'* restriction as well as a metavariable with a *Hr'* restriction. Update of one of the two metavariables will not update the other and vice versa. The process of parsing *me te* is shown below:

(22) Parsing *me te*



Such an account will not exclude cases where one of the clitics of a pair is a strong pronoun. This is because, under standard DS assumptions (Kempson *et al.* 2001 and Cann *et al.* 2005 among others), strong pronouns will involve a type *e* trigger, and be parsed either in a fixed treenode position in case the verb has already

been parsed or on an unfixed node in case they are preverbal.However, in the latter case the "no more than one unfixed node at a time" constraint is not operative in the presence of a clitic parsed on a locally unfixed node, because the two unfixed nodes will have distinct treenode addresses, i.e. one being on a regular unfixed node specified as $\langle\uparrow^*\rangle Tn(a)$ whereas the other on a locally unfixed node specified as $\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle Tn(a)$. In that sense the restriction will be relevant only to nodes with the same underspecified address and not to those defined across a structurally distinct unfixed relation.

The account proposed by Cann & Kempson (2008) and Chatzikyriakidis & Kempson (2009) is intriguing in that the PCC derives from a very general principle of the tree-growth system. However, Greek might seem problematic for such an account since no syncretism is found in 1st/2nd person clitics, at least in the singular. The solution to this problem proposed by Chatzikyriakidis & Kempson (2009) (see also Chatzikyriakidis 2009b for a similar and Chatzikyriakidis 2009a for a different approach) is based on the assumption that 1st/2nd person accusative clitics are also underspecified but, unlike in the analogous Romance cases, the singular 1st/2nd person accusative clitics carry a filter that only imposes the fixing site of the unfixed node as a direct object without any potential for immediate update:

(23) Lexical entry for 1st/2nd person accusative clitics in SMG

IF	$?Ty(t), Tn(a)$	
THEN	IF	$[\downarrow_1^+]?Ty(x)\mid$ $Mood(Imp)$
	THEN	$\texttt{make}(\langle\downarrow_1^*\rangle); \texttt{go}(\langle\downarrow_1^*\rangle);$ $\texttt{make}(\langle\downarrow_0\rangle); \texttt{go}(\langle\downarrow_0\rangle);$ $\texttt{put}(\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle Tn(a);$ $Ty(e), Fo(U_{Sp'/Hr'}), ?\exists\mathbf{x}.Fo(\mathbf{x})$ $?\exists\mathbf{x}.Tn(\mathbf{x}), ?\langle\uparrow_0\rangle(Ty(e \rightarrow t))); gofirst(?Ty(t))$
	ELSE	abort
ELSE	abort	

The fact that of the clitics of SMG that are associated with inducing an unfixed node, it is only 1st/2nd person accusative clitics that contain a filter on output determining some case specification, though a stipulation, is buttressed by the full paradigm of 1st/2nd person clitics. Though singular 1st/2nd person clitics are non-syncretic, their plural counterparts are syncretized with respect to case (*mas.*1PL, *sas.*2PL), so the non-syncretism which we have taken to be definitive of an output-filter specification is in contrast to 3rd person clitics that are non-syncretic across the board. If a unitary analysis of 1st/2nd person clitics in Greek is to be provided, there are then two choices, either to encode plural clitics as projecting fixed nodes, or to encode singular clitics as projecting unfixed nodes despite their non-syncretic forms. The first option is clearly on the wrong track, since it will predict that plural 1st/2nd person clitics can only be interpreted as either direct or indirect objects but

not both. On the other hand, the second option can be naturally encoded given the analysis just proposed, i.e. assuming that 1st/2nd person accusative clitics, even though unfixed, can be defined as projecting a case-filter on output while nevertheless not incrementally fixing the structural relation. Adger & Harbour (2007) also explain syncretism in the Greek case by referring to the non-syncretic plural forms, albeit with different argumentation (see Adger & Harbour 2007 for the relevant argumentation).

3.1 Pontic Greek Person Restrictions

Vindication that at least the strong PCC effects are grounded in this tree-growth constraint comes from Pontic Greek (PG), a dialect which disallows any combinations of 3rd person clitics, a fact that has not been noticed before in the literature:[5]

(24) *Edek aton ato/a
gave.GAVE him.CL it/these.CL
'I gave it to him' [Chatzikyriakidis, 2010]

(25) *Edek ats ato/a
gave.GAVE them.CL it/these.CL
'I gave it to them' [Chatzikyriakidis, 2010]

PG is syncretic across the board in the sense that all clitics can appear as either direct or indirect objects. Recall that the illicit 3rd person combinations would be a major challenge to feature oriented explanations (Bejar & Rezac 2003, Anagnostopoulou 2003,2005, Rezac 2008a, Nevins 2007 and Adger & Harbour 2007 and Michelioudakis 2009), since it is very hard to see how such constructions would be precluded in clitic systems where a person/participant/author feature is taken to be the culprit behind person restrictions. Assuming an analysis of clitics in PG where these project locally unfixed nodes, the above facts are straightforwardly captured.

A further intriguing fact is that PG seems to exhibit the weaker version of the constraint at least for some speakers with clusters of a 1st plus a 2nd person clitic or vice versa being licit :[6]

(26) Eδikse/eδeknise m ese(n)
showed.3SG me.CL you.CL
'S/He/It showed you to me.'

(27) Eδikse/eδeknise s eme(n)
showed.3SG you.CL me.CL
'S/He/It showed me to you.'

[5] Drettas (1997) presents a table with the possible clitic clusters excluding 3rd person clitic clusters, but examples where 3rd person clitic are judged as ungrammatical are not provided.

[6] Similar constructions are reported in Michelioudakis & Sitaridou (2010) for Romeyka Pontic.

So, how are cases like this going to fit within the account proposed? It seems that a wholly natural explanation arises within the account sketched by taking a closer look at the PG data. The 1st/2nd person clitic forms used in the above cluster constructions (*m/s*) can only be used in cluster constructions (contrary to the other three clitic forms, i.e. *me,em,eme(n)/se,es,ese(n)* 'me/you' that can appear only in single clitic constructions), where they are interpreted as indirect objects:

(28) E*δ*eknise m ese(n)
showed.3SG me.CL you.CL
'S/He/It showed you to me.'

(29) *E*δ*eknise me/em/eme(n) ese(n)
showed.3SG me.CL you.CL
'S/He/It showed you to me.'

(30) *Entoke m
gave.3SG me.CL
'S/He/It hit me.'

(31) *Edeke m avuto to vivlio
gave.3SG me.CL this.ACC the.ACC book.ACC
'S/He/It gave me this book.'

As aleady said, forms m/s are always interpreted as indirect objects. But if this is true, then they are not underspecified anymore, and as such do not project a locally unfixed node. The consequence is that a cluster containing one of these forms *m/s* will not be subject to the "one unfixed node at a time constraint", since only one locally unfixed node will exist after parsing a cluster like the one in (26). In effect, clusters like these are parsed as involving one single entry (analogous to the documented Spanish *selo*, see Cann & Kempson 2008), where the *m/s* forms first fix their position in the indirect object node and the other clitic projects an unfixed node:

(32) Lexical entry for *m ese(n)* 'to me you'

IF	$?Ty(t)$	
THEN	IF	$\langle\downarrow_1^+\rangle Ty(x)$
	THEN	$\texttt{make}(\langle\downarrow_1\rangle);\texttt{go}(\langle\downarrow_1\rangle);$
		$\texttt{make}(\langle\downarrow_1\rangle);\texttt{go}(\langle\downarrow_1\rangle);$
		$\texttt{make}(\langle\downarrow_0\rangle);\texttt{go}(\langle\downarrow_0\rangle);$
		$\texttt{put}(Ty(e), Fo(U_{Sp'}), ?\exists\mathbf{x}.Fo(\mathbf{x}));gofirst(?Ty(t));$
		$\texttt{make}(\langle\downarrow_1^*\rangle);\texttt{go}(\langle\downarrow_1^*\rangle);$
		$\texttt{make}(\langle\downarrow_0\rangle);\texttt{go}(\langle\downarrow_0\rangle);$
		$\texttt{put}(\langle\uparrow_0\rangle\langle\uparrow_1^*\rangle Tn(a), Ty(e), Fo(V_{Hr'}), ?\exists\mathbf{x}.Fo(\mathbf{x}), \texttt{go}(\langle\uparrow_0\rangle\langle\uparrow_1\rangle));$
		$gofirst(?Ty(t))$
	ELSE	abort
ELSE	abort	

Thus, the peculiar characteristics of PG in allowing clusters of a 1st plus a 2nd person clitics and vice versa, but disallowing 3rd person clitic clusters altogether, receives a straightforward explanation under the account proposed. This success provides strong confirmation of the proposed style of explanation – in terms of calcified processes of tree growth, for its success is in striking contrast to minimalist PCC accounts which, in being set up with features covering only the data previously observed, would exclude the new PG data that we have presented altogether. However the significance of this result stretches further than this, as it is the idiosyncracies of clitic placement data that have led to proposals for a morphology component (or sub-component) over and above that of either phonology or syntax within which specific vocabulary can be set up to describe features and feature-specific constraints on the one hand (Anagnostopoulou 2003,2005, Adger & Harbour 2007, Nevins 2007 among others) or clitic templates and clitic-template constraints on the other (Bonet 1991, 1994, Cuervo 2002, Heap 2005 and Monachesi 2005 among others). Given the success of the current account, stemming as it does from a principle of tree growth that is itself the core of processing in real time, the need for any such expansion of the theoretical vocabulary is unwarranted. More generally, this results strongly suggests that there is rich potential to be gained by shifting to a characterisation of natural-language grammars in terms of the dynamics underpinning on-line processing.

References

Adger, D., & Harbour, D. 2007. Syntax and Syncretisms of the Person Case Constraint. *Syntax* 10.2-37.

Anagnostopoulou, E. 1997. Clitic Left Dislocation and Contrastive Left Dislocation. In: Anagnostopoulou, E., Van Riemsdjik, H., & Zwarts, F. (eds), *Materials on Left Dislocation* (Linguistik Aktuell 14). Amsterdam: Benjamins, 151-192.

Anagnostopoulou, E. 2001. Two Classes of Double Object Verbs: The Role of Zero Morphology. In: van Oostendorp, M., Anagnostopoulou, E. (eds.), *Progress in Grammar: 20 Years of Grammaticamodellen*. Meertens Institute, electronic book.

Anagnostopoulou, E. 2003. *The Syntax of Ditransitives: Evidence from Clitics*. Mouton de Gruyter.

Anagnostopoulou, E. 2005. Strong and Weak Person Restrictions: A Feature Checking Analysis. In: Heggie, L., & Ordó nez, F., (eds), Clitics and Affixation. Amsterdam: Benjamins, 199-235.

Bejar, S., & Rezac, M. 2003. Person Licensing and the Derivation of PCC Effects. In: Prez-Leroux A. & Roberge,Y., (eds.), *Romance Linguistics: Theory and Acquisition*, John Benjamins, 49-62.

Bianchi, V. 2006. On the Syntax of Personal Arguments. *Lingua* 116.

Bonet, E. 1991. *Morphology after Syntax: Pronominal Clitics in Romance*. PhD thesis, MIT.

Bonet, E., 1994. The Person Case Constraint: A Morphological Approach. In: Harley, H., & Philips, C., (eds), *The Morphology Syntax Connection*. MIT, Cambridge, MA, 33-52.

Bonet, E. 2007. The Person Case Constraint and Repair Strategies. To appear in: Alessasndro, R., Fischer, S., & Hrafnbjanson, G. H. (eds), *Person Restrictions*. Mouton de Gruyter.

Bouzouita, M. 2008a. At the Syntax-Pragmatics Interface: Clitics in the History of Spanish. In: Cooper, R., & Kempson, R. (eds), *Language Evolution and Change*. Cambridge: Cambridge University Press.

Bouzouita, M. 2008b. *The Diachronic Development of Spanish Clitic Placement*. PhD Thesis, King's College, London.

Cann, R., & Kempson, R. 2008. Production Pressures, Syntactic Change and the Emergence of Clitic Pronouns. In: Cooper, R. & Kempson, R., (eds), *Language in Flux: Dialogue Coordination, Language Variation, Change and Evolution*. King's College, London publications, 221-263.

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

Chatzikyriakidis, S. 2009a. Clitics in Grecia Salentina Greek: A Dynamic Account. *Lingua* 119.1939-1968.

Chatzikyriakidis, S. 2009b. The Person Case Constraint in Modern Greek: A Unified Dynamic Syntax Account. *Newcastle Working Papers in Linguistics* 15, 40-62.

Chatzikyriakidis, S. 2010. *Clitics in four Dialects of Modern Greek: A Dynamic*

Account. PhD Dissertation, King's College, London.
Cuervo, M.C. 2002. *Spanish Clitics: Three of a Perfect Pair*. Generals paper, MIT, 2002.
Drettas, G., 1997. *Aspect Pontiques*. Association de recherches pluridisciplinaires (Paris).
Haspelmath, M., 2004. Explaining the Ditransitive Person - Role Constraint. Electronic form article. Available at: http://www.constructions-online.de/articles/35/DPRC0102-moddoulos.rtf.pdf.
Heap, D. 2005. Constraining optimality: Clitic sequences and feature geometry. In: Heggie, L., & Ordó nez, F., (eds.) *Clitic and Affix Combinations*. John Benjamins.
Iatridou, S. 1995. Clitics and Island Effects. In: Bhatt, R., Garrett, S., Han, C.H., & Izvorsky, R., (eds), *Penn working papers in Linguistics* 2.11-31.
Kallulli,D. 2000. In: Beukema, F., & Den Dikken. M., (eds.) *Clitic Phenomena in European Languages*, 209-248. Amsterdam: John Benjamins.
Kempson, R., Meyer-viol, W., & Gabbay, D. 2001. *Dynamic Syntax: The Flow of Language Understanding*. Blackwell Publishing.
Martins. A-M, 2002. The loss of ip-scrambling in portuguese: Clause structure, word order variation and change. In: Lightfoot, D., (ed), *Syntactic Effects of Morphological Change*. Oxford University Press, Oxford, 2002.
Michelioudakis, D. 2007. *Ethical Datives and Argument Structure in Modern Greek.* Unpublished Mphil dissertation, University of Cambridge.
Monachesi, P. 2005. *The verbal complex in Romance: a case study in grammatical interfaces.* Oxford University Press.
Nevins, A., 2007. The Representation of Third Person and its Consequences for Person-Case Effects. *Natural Language and Linguistic Theory* 25(2).273-313.
Nevins, A. and Săvescu, O. 2007. An Apparent Number Case Constraint in Romanian: The Role of Syncretism. In: Silvina Montrul et. al (eds.), *Romance Linguistics 2008*, John Benjamins.
Nicol, F. 2005. Romance Clitic Clusters: On Diachronic Changes and Cross-linguistic Contstraints. In: Heggie, L., & Ordó nez, F., (eds), *Clitics and Affixation*. Amsterdam: Benjamins, 141-198.
Rezac, M. 2008a. *Phi across Modules*. Unpublished monograph, Laboratoire de Linguistique de Nantes.
Rezac, M. 2008b. The Syntax of Eccentric Agreement: The Person Case Constraint and Absolutive Displacement in Basque. *Natural Language and Linguistic Theory* 26.61-106.
Săvescu, O. 2007. Challenging the Person Case Constraint: Evidence from Romanian. In: Camacho, J., Flores-Ferran, N., Sanchez, L., Deprez, V. & Jose Cabrera, M. (eds), Romance Linguistics 2006. *Selected Papers from the 36th Linguistic Symposium on Romance Languages (LSRL)*, New Brunswick, March-April 2006. John Benjamins.

Săvescu, O. 2009. *A Syntactic Analysis of Pronominal Clitic Clusters in Romance: The View from Romanian*. PhD Dissertation, New York University.