A Proof-theoretic Approach to French Pronominal Clitics°

Scott Martin
Ohio State University

Abstract

This paper sketches an account of the behavior of French pronominal clitics in CVG, a proof-theoretic categorial grammar formalism. The approach shown here differs from most categorial analyses of French clitics in that it treats clitics as noun phrases rather than as functions that operate on under-saturated verb phrases. Basic French cliticization, clitics in infinitival constructions, and both auxiliary and non-auxiliary clitic climbing are analyzed.

1. Introduction

Cliticization in French is a set of phenomena in which pronominal complements to a verbal host are systematically realized as affixes. Linguistic generalizations about these phenomena have been structured using several different frameworks, with Sag & Miller's (1997) HPSG treatment of French clitics as morphological affixes being the most comprehensive and successful. Categorial accounts of cliticization phenomena, among them Kraak (1998) for French and Morrill & Gavarro (1992) for Catalan, have largely analyzed clitics as functors over under-saturated verb phrases. Stabler (2001) and Amblard (2006) are two recent approaches to French clitics in the Minimalist Grammar formalism, both of which treat them as syntactic elements with certain feature sets.

In this paper, I give a preliminary account of some of the phenomena involving French clitics using Convergent Grammar (CVG), a categorial grammar framework that uses natural deduction with hypothetical proof.[1] This treatment is limited to a subset of what Bonami & Boyé (2005) call French Pronominal Clitics (FPCs), specifically, those FPCs that appear as verbal complements. From Kraak (1998) I borrow the idea of a specialized combinatory mode for FPC attachment to a verbal host (analogous to her $\bullet_{ca}$) that is "stronger" than normal Complement Merge and reflects the status of clitic attachment as a process more morphological than syntactic. In contrast to Kraak's and much other work on FPCs in categorial frameworks, however, the account sketched here partly follows the work of Stabler and Amblard in analyzing FPCs not as functors over verb phrases but as sets of morphological features that also represent a syntactic and semantic argument, much like ordinary NPs.

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[1] Pollard (2007) provides an introduction to CVG.

Drawing on Sag & Miller's work on French clitics as inspiration, the analysis reflected here relies mainly on properly-structured lexical axioms to describe the behavior of FPCs. Basic instances of cliticization are considered as well as more complicated situations, such as argument composition and the interaction of FPCs with infinitivals. However, this paper does not take a firm stance on the question of whether cliticization phenomena should be considered syntactic or morphological, since CVG's tectogrammatical terms represent syntactic dependency relations and do not necessarily correspond exactly to surface word order or prosodic form.

2. Pronominal Complement Clitics in French

French verbs take canonical complements in a manner that resembles complement selection for their English analogs: the verbal head combines with its complement(s) to the right and with its subject to the left to form a finite or infinitive clause. When certain complements are pronominalized, however, they can optionally appear to the immediate left of the verb in a variant form as **proclitics**. The following data, replicated in part from (1) in Sag & Miller (1997), show the verb *voir* 'to see' with its complement realized both canonically and as a proclitic:[2]

(1) a. Marie voit Jean. 'Marie sees Jean.'
b. Marie voit **lui**. 'Marie sees him.' [**boldface** = prosodic stress]
c. Marie le voit.
Marie ACC.3S sees
'Marie sees him.'

The cliticized configuration is given in (1c), with the complement in its clitic form (*le*) instead of the canonical one (here *Jean*, or *lui* with appropriate stress).

Among the other distinctive characteristics of complement FPCs noted by Kraak (1998), the ones that bear most on the account given here are that:

- as verbal complements, they do not co-occur with their non-pronominal or non-cliticized versions (exemplified in (1)).

- they do not serve as the complement to bare past participles. This fact gives rise to an instance of the phenomenon known as "clitic climbing":

(2) a. *Marie a le vu. 'Marie saw him.'
b. Marie l'a vu.
Marie ACC.3S has seen
'Marie saw him.'

Here, (2a) is unacceptable because although the clitic *le* is the accusative complement of *vu*, it must be realized on the tense auxiliary form *a* as in (2b). However, causatives and certain verbs of perception exhibit different behavior. For these verbs, it is possible for some of their arguments to be realized as clitics on the upstairs verb and some on the downstairs one:

[2] I adopt Bonami & Boyé (2005)'s scheme here for annotating morphological features.

(3) Jean le fera la réparer.
Jean ACC.3S make.FUT ACC.3FS repair
'Jean will make him repair it.'

(From Abeillé et al. (1995, example (2a)).)

- No syntactic material except another clitic can intervene between an FPC and its host verb. This fact distinguishes cliticized complements from their canonical counterparts in which certain adverbials can occur between a verb and its complements:

(4) a. Marie l'a souvent dit à lui.
Marie ACC.3S has often said to him
'Marie has often said it to him.'

b. Marie l'a dit souvent à lui.
Marie ACC.3S said often to him
'Marie has often said it to him.'

c. Marie le lui a souvent dit.
Marie ACC.3S DAT.3S has often said
'Marie has often said it to him.'

d. *Marie le lui souvent a dit.
Marie ACC.3S DAT.3S often has said
'Marie has often said it to him.'

e. *Marie le souvent lui a dit.
Marie ACC.3S often DAT.3S has said
'Marie has often said it to him.'

(Example (4d) is from Kraak (1998, (7d)).) Here, (4d) and (4e) show the disallowed intervention of the adverbial *souvent* 'often' between an FPC and its host verb, while (4b) demonstrates the allowable intervention of *souvent* in the canonical form.

- they are normally realized on the verb they complement, illustrated here with an embedded infinitival:

(5) a. *Marie le veut voir. 'Marie wants to see him.'

b. Marie veut le voir.
Marie wants ACC.3S to see
'Marie wants to see him.'

The cliticized accusative *le* here is the complement of the infinitive *voir*, and does not to attach to the upstairs verb *veut*.

These are the most basic facts about cliticization of declarative verbal complements in French. FPCs also occur in passive constructions and in constructions like those in (6):

(6) a. i. Pierre reste fidèle à Jean.
'Pierre remains faithful to Jean.'

ii. Pierre lui reste fidèle.
Pierre DAT.3S remains faithful
'Pierre remains faithful to him.'

b. i. Marie connaît la fin de l'histoire.
'Marie knows the end of the story.'

ii. Marie en connaît la fin.
Marie GEN.3S knows the end
'Marie knows the end of it.'

(Both are from Sag & Miller (1997, example 3).) Constructions involving FPCs like those in (6) are similar to the clitic climbing that occurs with auxiliaries like *avoir* (as shown in (2)).

In §3., I sketch an analysis of the basic facts about cliticization in some of the situations described above.

3. Accounting for the Data

Sag & Miller (1997) give extensive argumentation for considering clitics as morphological rather than syntactic in nature. Their account constrains the inflectional paradigm of French verbs, treating clitics as pronominal affixes that reduce the valence requirements of a given verb. In examining French clitics from a deductive perspective, Kraak (1998) instead describes cliticization as occurring on a "sliding scale" between morphology (affix-host attachment) and syntax (complement selection). The view presented here is more in line with Kraak's in that it uses CVG tectogrammatical proof terms to describe the combinatoric potential of functions and arguments.

However, this account diverges from Kraak's and most other categorial grammar treatments in that it construes FPCs as regular pronominal NPs, instead of formulating them as functors over under-saturated verb phrases. This approach allows the semantics to be nearly identical between canonical and cliticized forms by specifying a separate mode of complement selection specifically for clitics.

3.1. FPCs as a Local Dependency

Because cliticization differs from the canonical form of complement selection ($\multimap_{\mathrm{C}}$) in various ways, a separate implication mode, called $\multimap_{\mathrm{PC}}$ (for *proclitic*), is used. As a local implication mode, it has *modus ponens* (elimination) but not hypothetical proof (introduction), which is used in CVG for non-local extractions. The elimination (or "merge") rule for $\multimap_{\mathrm{PC}}$ is as follows:[3]

Proclitic Merge
If $\Gamma \vdash a, x : A, C \dashv \Delta$
and $\Gamma' \vdash f, v : A \multimap_{\mathrm{PC}} B, C \supset D \dashv \Delta'$
then $\Gamma, \Gamma' \vdash ({}^{\mathrm{PC}}\ a\ f), v(x) : B, D \dashv \Delta, \Delta'$

[3] A CVG sign is a triple made up of the prosodic/phonological form, syntactic tectogrammatical term, and semantic content. For brevity, I omit the prosodic element and only include the syntactic tecto-term and semantic denotation.

This rule formalizes the affixation of clitics to a verbal host, taking into account both the syntactic and semantic proof terms. This new $\multimap_{\mathrm{PC}}$ implication mode allows lexical axioms to specify the cliticized complement mode of combination as opposed to the canonical one, and is central to the account of clitic behavior sketched here. As a mnemonic meant to reflect French word order in derivational history, function application for $\multimap_{\mathrm{PC}}$ writes an FPC to the left of its host. This rule also states that hypotheses present in both the syntactic context (to the left of $\vdash$) and the semantic co-context (to the right of $\dashv$) of both premises are propagated into the conclusion. This ensures that the application of this rule does not have any effect on any non-local extractions (filler-gap path information), stored quantifiers, or anaphoric pronouns.

With this new implication mode and merge rule, an account of FPC behavior as demonstrated in §2. is possible that requires no other machinery than the CVG merge rules described in Pollard (2007). All that remains is to correctly specify the necessary lexical axioms. First are the canonical forms of the verbs and complements:[4]

$$\vdash \mathsf{Marie}, \mathsf{marie}' : \mathrm{Nom}, \mathrm{Ind}$$

$$\vdash \mathsf{Jean}, \mathsf{jean}' : \mathrm{Acc}, \mathrm{Ind}$$

$$\vdash \mathsf{lui}_1, a : \mathrm{Acc}, \mathrm{Ind}$$

$$\vdash \mathsf{voit}_1, \lambda_y \lambda_x \mathsf{see}'(x, y) : (\mathrm{Acc} \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin}), \mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})$$

The new type Pcl is assigned to proclitics in order to differentiate them from their canonical counterparts. Here, *voit* selects a complement of type $\mathrm{Acc} \setminus \mathrm{Pcl}$ to indicate that it does not combine with proclitics in canonical complement position: the set complement specifies all inhabitants of type Acc *except* those that inhabit Pcl. Next, the lexicon is extended to reflect the syntactic/morphological features of *le* and the cliticization mode of complement selection for *voir*:

$$\vdash \mathsf{le}, b : \mathrm{Acc} \cap \mathrm{3Sg} \cap \mathrm{Pcl}, \mathrm{Ind}$$

$$\vdash \mathsf{voit}_2, \lambda_y \lambda_x \mathsf{see}'(x, y) : (\mathrm{Acc} \cap \mathrm{Pcl}) \multimap_{\mathrm{PC}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin}), \mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})$$

These axioms allow the following proof terms for the data in (1):[5]

(7) a. $\vdash ({}^{\mathrm{SU}}\ \mathsf{Marie}\ (\mathsf{voit}_1\ \mathsf{Jean}^{\mathrm{C}})), \mathsf{see}'(\mathsf{marie}', \mathsf{jean}') : \mathrm{Fin}, \mathrm{Prop}$

b. $\vdash ({}^{\mathrm{SU}}\ \mathsf{Marie}\ (\mathsf{voit}_1\ \mathsf{lui}_1{}^{\mathrm{C}})), \mathsf{see}'(\mathsf{marie}', a) : \mathrm{Fin}, \mathrm{Prop}$

c. $\vdash ({}^{\mathrm{SU}}\ \mathsf{Marie}\ ({}^{\mathrm{PC}}\ \mathsf{le}\ \mathsf{voit}_2)), \mathsf{see}'(\mathsf{marie}', b) : \mathrm{Fin}, \mathrm{Prop}$

Aside from the different implication mode, the only difference between the canonical form of *voit* (voit_1) and the cliticized variant (voit_2) is that the argument to voit_2 must be of the intersective type $\mathrm{Acc} \cap \mathrm{Pcl}$. The type $\mathrm{3Sg}$ represents the argument's agreement

[4]The basic tectogrammatical types used here are Nom for nominative NPs, Acc for accusative NPs, and Fin for finite clauses. The hyperintensional types Ind, the type of individual concepts; and Prop, the type of propositions, are the basic semantic types. In addition to the new combinatory mode $\multimap_{\mathrm{PC}}$, implicative tectogrammatical types are constructed using $\multimap_{\mathrm{SU}}$ and $\multimap_{\mathrm{C}}$, which invoke Subject Merge and Complement Merge, respectively.

[5]For clarity, the proof terms given in this account show the semantics but not the co-context as quantification, wh-phrases, and anaphoric binding are not discussed here.

features. So stated, this selectional restriction ensures that voit_2 can only combine in cliticized mode with accusative complements that are also proclitics, as desired. It is important to note that not only are the semantics of both variants of *voit* identical, but both cliticized and canonical complements are of the same semantic type (Ind) as well.

3.2. "Clitic Climbing" and Tense Auxiliaries

The axioms for tense auxiliaries are structured so that they take the complements of their verbal complement. Past-participial verbs in turn need to be specified in such a way that the proclitic merge rule does not apply to them. This approach is reminiscent of the argument composition approach employed by Sag & Miller (1997) and Abeillé et al. (1998). The axioms necessary to describe the "climbing" behavior in (2) are the following:

$$\vdash \mathsf{a}_A, \lambda_v v$$
$$: ((A \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Psp})) \multimap_{\mathrm{C}} ((A \cap \mathrm{Pcl}) \multimap_{\mathrm{PC}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin})),$$
$$(\mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})) \supset (\mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop}))$$

$$\vdash \mathsf{vu}, \lambda_y \lambda_x \mathsf{see}'(x, y) : (\mathrm{Acc} \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Psp}), \mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})$$

The tense auxiliary form a (from *avoir*) is schematically defined to combine with a verb in past participial form missing its complement, of polymorphic type A, to yield a finite sentence missing both that same A complement and a nominative subject. In this way, the A-type complement is "passed along" from the past participle to the tense auxiliary, whose semantics are just to apply the identity function to the meaning of its past-participial complement.

A proof term that correctly predicts the allowed form of (2b) is then possible:[6]

(8) $\vdash ({}^{\mathrm{SU}}\ \mathsf{Marie}\ ({}^{\mathrm{PC}}\ \mathsf{le}\ (\mathsf{a}_{\mathrm{Acc}}\ \mathsf{vu}^{\mathrm{C}}\ ))), \mathsf{see}'(\mathsf{marie}', b) : \mathrm{Fin}, \mathrm{Prop}$

No proof is available for the disallowed form in (2a) because the lexical axiom vu only uses the $\multimap_{\mathrm{C}}$ mode of implication, and as a result proclitics can not directly combine with it.

3.3. FPCs in Infinitival Constructions

Ensuring that cliticized complements of infinitival complements stay on the infinitive-form verb, as depicted in (5), can also be accomplished with well formulated lexical axioms. This ends up being simply a matter of making sure that infinitive-form verbs can take proclitic complements and the verbs that select infinitivals can not:

$$\vdash \mathsf{voir}_1, \lambda_y \lambda_x \mathsf{see}'(x, y)$$
$$: (\mathrm{Acc} \cap \mathrm{Pcl}) \multimap_{\mathrm{PC}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Inf}), \mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})$$

$$\vdash \mathsf{veut}, \lambda_P \lambda_x \mathsf{want}'(x, P(x))$$
$$: (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Inf}) \multimap_{\mathrm{C}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin}), (\mathrm{Ind} \supset \mathrm{Prop}) \supset (\mathrm{Ind} \supset \mathrm{Prop})$$

The semantic representation of *veut* given here is the "equi" version of the denotation $\lambda_{P \in \mathrm{Prop}} \lambda_{x \in \mathrm{Ind}} \mathsf{want}'(x, P)$ that might be used where *veut* takes a sentential complement, as in *Marie veut qu'elle gagne* 'Marie wants that she wins'.

With the lexicon so extended, a proof term for (5b) can be derived:

[6] Note that the tectogrammatical proof term in (8) does not describe the phonological elision between *le* and *a* that occurs in French.

(9) $\vdash ({}^{\mathrm{SU}}\ \mathsf{Marie}\ (\mathsf{veut}\ ({}^{\mathrm{PC}}\ \mathsf{le\ voir})^{\mathrm{C}}\ )), \mathsf{want}'(\mathsf{marie}', \mathsf{see}'(\mathsf{marie}', b)) : \mathrm{Fin}, \mathrm{Prop}$

A derivation for (5a) is not possible because veut does not employ the $\multimap_{\mathrm{PC}}$ mode of combination required for FPCs.

3.4. FPCs and Non-auxiliary Composition

Extending CVG to account for FPCs that combine with argument composition verbs other than auxiliaries, whose behavior is exemplified in (6), requires defining special lexical axioms for those verbs. Similar to the data examined so far, "non-local pronominal affixation" (in the terminology of Sag & Miller (1997)) is very short distance in nature, and as such employs the local implication $\multimap_{\mathrm{PC}}$ that was introduced to handle procliticization. It is not necessary to invoke CVG's hypothetical proof machinery for handling extraction phenomena to explain the data in (6).

Here, a strategy is adopted of composing a predicative adjectival (for example, *fidèle*) or transitive verb (like *connaît*) with a version of its complement that is itself expecting a complement. The necessary extensions to the lexicon for the data in (6a) are the following:[7]

$\vdash \mathsf{Pierre}, \mathsf{pierre}' : \mathrm{Nom}, \mathrm{Ind}$

$\vdash \mathsf{lui}_2, d : \mathrm{Dat} \cap 3\mathrm{Sg} \cap \mathrm{Pcl}, \mathrm{Ind}$

$\vdash \mathsf{fidèle}, \lambda_y \lambda_x \mathsf{faithful}'(x, y) : (\mathrm{Dat} \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Adj}),$
$\mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})$

$\vdash \mathsf{reste}, \lambda_P \lambda_y \lambda_x \mathsf{remain}'(P(x, y))$
$: ((\mathrm{Dat} \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Adj})) \multimap_{\mathrm{C}} ((\mathrm{Dat} \cap \mathrm{Pcl}) \multimap_{\mathrm{PC}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin})),$
$(\mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})) \supset (\mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop}))$

These axioms describe *fidèle* as an adjective missing a dative complement to form an adjectival small clause and the form of *rester* that takes an adjectival complement that is itself missing its complement. These extensions permit a proof term for (6a-ii):

(10) $\vdash ({}^{\mathrm{SU}}\ \mathsf{Pierre}\ ({}^{\mathrm{PC}}\ \mathsf{lui}_2\ (\mathsf{reste}\ \mathsf{fidèle}^{\mathrm{C}}\ ))), \mathsf{remain}'(\mathsf{faithful}'(\mathsf{pierre}', d)) : \mathrm{Fin}, \mathrm{Prop}$

(A full derivation of (10) is given in Figure 1 in the appendix.) With a few further extensions to the lexicon, (6b) can also be accounted for:

$\vdash \mathsf{connaît}, \lambda_f \lambda_y \lambda_x \mathsf{know}'(x, f(y))$
$: ((\mathrm{De} \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} \mathrm{Acc}) \multimap_{\mathrm{C}} ((\mathrm{De} \cap \mathrm{Pcl}) \multimap_{\mathrm{PC}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin})),$
$(\mathrm{Ind} \supset \mathrm{Ind}) \supset (\mathrm{Ind} \supset \mathrm{Prop})$

$\vdash \mathsf{fin}, \mathsf{end}' : \mathrm{N}, \mathrm{Ind}$

$\vdash \mathsf{la}, \lambda_f \lambda_x f(x) : \mathrm{N} \multimap_{\mathrm{SP}} ((\mathrm{De} \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} \mathrm{Acc}), \mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Ind})$

$\vdash \mathsf{en}, e : \mathrm{De} \cap \mathrm{Pcl}, \mathrm{Ind}$

[7] This account assumes the analysis of predicatives given by Pollard (2006) pp. 52–65, for example, for adjectival small clauses of the type $\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Adj}$.

Here, *connaît* is formulated as just an ordinary transitive verb except that it selects an accusative complement that is itself missing its De complement. The definite article *la* is treated as a function from common nouns (type N) to possessive NPs (functions from canonical *de*-phrases to accusatives), using the specifier combinatory mode $\multimap_{\mathrm{SP}}$. The clitic *en* is represented as an axiom whose type is the intersection of De and Pcl. These axioms allow a proof term like the one in (10) for (6b-ii):

(11) $\vdash ({}^{\mathrm{SU}}\ \mathsf{Marie}\ ({}^{\mathrm{PC}}\ \mathsf{en}\ (\hat{\mathsf{connaît}}\ (\mathsf{la}\ \mathsf{fin}^{\mathrm{SP}}\ )^{\mathrm{C}}\ ))), \mathsf{know}'(\mathsf{marie}', \mathsf{end}'(e)) : \mathrm{Fin}, \mathrm{Prop}$

The lexical axioms introduced here predict that FPCs in non-auxiliary composition contexts behave in a way largely parallel with that of FPCs that combine with auxiliary verbs. The main difference between FPCs with auxiliaries and with non-auxiliaries is that the complement types for non-auxiliaries must be more constrained than the free-ranging polymorphic complement allowed by auxiliaries. Since this approach does not appeal to CVG's unbounded dependency machinery, instead relying on axioms that specify the $\multimap_{\mathrm{PC}}$ local dependency, these instances of cliticization are guaranteed to remain short-distance. If FPCs in non-auxiliary composition contexts were construed as non-local extractions, it would be difficult to rule out constructions like (12), for example, which do not occur in French:[8]

(12) *Marie lui$_i$ reste certaine que Céline a donné le livre $\_\_i$.

4. Conclusions and Future Work

This paper sketches a proof-theoretic account of the behavior of FPCs as complements. For local cliticization, a new valence implication mode $\multimap_{\mathrm{PC}}$ is introduced to differentiate procliticization from the canonical form of verbal complement selection. Combined with properly-formulated lexical axioms, this new mode can account for some of the behavior of FPCs, including the basic instances of cliticization, FPCs in infinitival constructions, and two forms of "clitic climbing" via an argument composition analysis.

The analysis given here departs from traditional categorial analyses of cliticization by construing FPCs as special instances of NPs. An advantage of this approach is that a cliticized complement has identical semantics and a nearly identical tectogrammatical form as its canonical counterpart. This fact, in combination with the new $\multimap_{\mathrm{PC}}$ mode of implication for FPC affixation, allows lexical axioms to more strictly constrain the behavior of FPCs in comparison to other types of verbal complements. This ability may be central to correctly predicting, for example, the distribution of *souvent* as shown in (4).

This approach suffers, however, from the proliferation of lexical axioms that must occur since all verbs that take complements need at least two distinct representations in the lexicon. Such a requirement would have especially adverse implications for computational applications like parsing. Since very often, as with voit_1 and voit_2, the canonical form of a verb closely resembles its cliticized variant, it is clear that a lexical rule associating these forms is crucial to the success of this type of approach. The instances of auxiliary and non-auxiliary composition presented here are also largely similar between cliticized and non-cliticized versions. A general account of FPCs in French along the lines of the analyses presented here must include a mapping between these similar forms that captures their common linguistic and information-structural characteristics.

[8] This example is due to Carl Pollard (personal communication of March 18, 2008).

Future work on FPCs will aim to develop a correspondence between canonical and cliticized verb forms that predicts FPC behavior in a general way. This work will need to account for multiple clitic constructions, the rigid (and sometimes idiosyncratic) ordering of FPC clusters, agreement between FPCs and past participles, FPCs in passive, causative, and perceptual-verb constructions, and the enclitic attachment to imperative-form verbs in French.

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Appendix A: Full Derivation

$$\dfrac{\vdash \mathsf{Pierre} : \mathrm{Nom} \qquad \dfrac{\vdash \mathsf{lui}_2 : \mathrm{Dat} \cap \mathrm{3Sg} \cap \mathrm{Pcl} \qquad \dfrac{\vdash \mathsf{reste} : ((\mathrm{Dat} \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Adj})) \multimap_{\mathrm{C}} ((\mathrm{Dat} \cap \mathrm{Pcl}) \multimap_{\mathrm{PC}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin})) \qquad \vdash \mathsf{fidèle} : (\mathrm{Dat} \setminus \mathrm{Pcl}) \multimap_{\mathrm{C}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Adj})}{\vdash (\mathsf{reste}\ \mathsf{fidèle}^{\mathrm{C}}) : (\mathrm{Dat} \cap \mathrm{Pcl}) \multimap_{\mathrm{PC}} (\mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin})}}{\vdash (^{\mathrm{PC}}\ \mathsf{lui}_2\ (\mathsf{reste}\ \mathsf{fidèle}^{\mathrm{C}})) : \mathrm{Nom} \multimap_{\mathrm{SU}} \mathrm{Fin}}}{\vdash (^{\mathrm{SU}}\ \mathsf{Pierre}\ (^{\mathrm{PC}}\ \mathsf{lui}_2\ (\mathsf{reste}\ \mathsf{fidèle}^{\mathrm{C}}))) : \mathrm{Fin}}$$

$$\dfrac{\vdash \mathsf{pierre}' : \mathrm{Ind} \qquad \dfrac{\vdash d : \mathrm{Ind} \qquad \dfrac{\vdash \lambda_P\lambda_y\lambda_x\mathsf{remain}'(P(x,y)) : (\mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})) \supset (\mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})) \qquad \vdash \lambda_y\lambda_x\mathsf{faithful}'(x,y) : \mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})}{\vdash \lambda_y\lambda_x\mathsf{remain}'(\mathsf{faithful}'(x,y)) : \mathrm{Ind} \supset (\mathrm{Ind} \supset \mathrm{Prop})}}{\vdash \lambda_x\mathsf{remain}'(\mathsf{faithful}'(x,d)) : \mathrm{Ind} \supset \mathrm{Prop}}}{\vdash \mathsf{remain}'(\mathsf{faithful}'(\mathsf{pierre}', d)) : \mathrm{Prop}}$$

Figure 1: Full derivation of (10), with tecto-terms (above) and semantic terms (below) given separately for space considerations.