The morphology of trapping and climbing in French causatives

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In this paper, we shall discuss how the treatment of morphological periphrasis (Vincent & Börjars, 1996; Popova & Spencer, 2013; Bonami, 2015) can be integrated into the framework of Information-based Morphology (IbM – Crysmann & Bonami, 2015), an inferential-realisational theory of inflection couched in terms of typed feature structures.

French verb morphology provides a rich set of synthetic and analytic forms. Among the latter we find the so-called composed tenses (e.g. *passé composé*) and the near tenses, such as the *passé récent* and the *futur proche*. Recently, Aguila-Multner & Crysmann (2020a,b); Aguila-Multner (2023) have argued that clitic climbing can equally be understood as morphological periphrasis. Thus, the morphosyntax of French verbs provides an ideal testing ground to study the interaction of different periphrastic dependencies.

1 Background: clitic climbing as periphrasis

The division of labour between morphology and syntax in Romance clitic climbing has been the subject of some debate. Based on Zwicky & Pullum (1983)'s lexicalist view of the clitic–affix distinction, the 'clitics' involved have been shown to be lexical affixes (Miller, 1992). Their ability to 'climb' to an auxiliary, as in (1), therefore requires an explanation.

(1) La professeure la   lui   a écrite.
     the professor   DO.3SG.F IO.3SG has written
     'The professor wrote it to her.'

Miller & Sag (1997) and Abeillé & Godard (1996, 2002) have proposed that such cases involve syntactic raising of the arguments the affixes correspond to: under this view, clitic climbing verbs are argument composition auxiliaries which inherit their complement's argument structure, providing a syntactic explanation for clitic climbing. Aguila-Multner & Crysmann (2020a), on the other hand, have proposed that clitic climbing is a consequence of inflectional periphrasis: under this view, clitic climbing verbs are periphrastic auxiliaries able to host part of the lexical verb's morphology, including morphological exponence of its pronominal arguments. Figure 1 illustrates the core mechanisms of the periphrasis approach: essentially, inflectional morphology introduces morphosyntactic requirements (including the auxiliary's *l(exemic)id(entity)*, and, possibly, pronominal affixes – *praf*) on a feature REV(ERSE)-SEL(ECTION), which is percolated in syntax and terminated by an ancillary element, such as the tense auxiliary *avoir*.

Causative constructions provide an interesting testing ground for these competing approaches. Not only are these constructions clitic climbing contexts – clitics may climb to
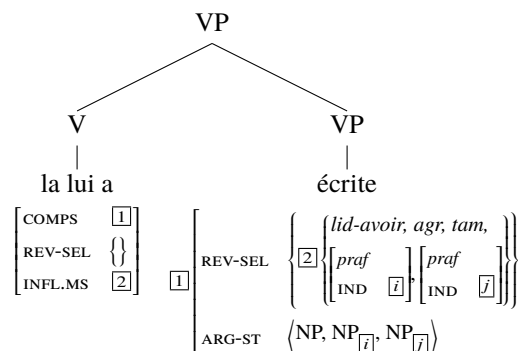
Figure 1: Periphrasis by reverse selection (adapted from Aguila-Multner & Crysmann, 2020a)

causative *faire* 'make' (2) – but they are also clause union constructions (Aissen & Perlmutter, 1976), displaying various idiosyncratic syntactic properties.

(2) La professeure la   lui   fait écrire.
     the professor   DO.3SG.F IO.3SG makes write.
     'The professor makes her write it.'

Aguila-Multner & Crysmann (2020b) have shown that the morphological approach based on periphrasis simplifies over the argument composition approach to clause union in a number of ways. In particular, the periphrastic approach places the locus of clause union at the bottom of the construction at the level of the lexical infinitive: this means that decisions regarding argument realisation are made at the most relevant level, where the previous approach required percolation of lexical information in phrase structure to access it from the argument composition auxiliary. This results in a simpler treatment of subject marking, *by*-phrases, and clitic trapping, which depend on argument structure, on lexical semantics, and on the intrinsic status of morphological arguments respectively. The approach further simplifies the associated phrase structure, maintaining a traditional hierarchical structure rather than the flat structure projected by the argument composition auxiliary.

2 French causatives: processes of grammatical function change interacting

French causative constructions display an interesting interplay of processes of grammatical function change. Firstly, the construction can be conceived of as a periphrastic causative, i.e. a two-word form expressing addition of a causer argument (Aguila-Multner, 2023). Thus the lexical infinitive in (3) below is a causativised form, its subject

(*Louise*) being demoted to an indirect object (*à*-NP) to make room for the new subject (*la professeure*).

(3) La professeure fait écrire une lettre à Louise.
the professor makes write a letter to Louise
'The professor makes Louise write a letter.'

Secondly, as noted in the previous section, causativisation of an infinitive can combine with morphological realisation of arguments. In the standard case, this results in clitic climbing: the morphological arguments of the lexical verb are realised on *faire*, as in (4).

(4) La professeure la lui fait écrire.
the professor DO.3SG.F IO.3SG makes write
'The professor makes her write it.'

As discussed by Aguila-Multner & Crysmann (2020b), this can be understood as periphrastic realisation of a morphological property. However, a different pattern can also surface in some cases,[1] namely downstairs affixation:

(5) Cela fait lui en vouloir à Louise.
this makes IO.3SG GEN be_mad to Louise
'This makes Louise be mad at her.'

Furthermore, a certain class of French pronominal affixes (which we can call *reflexives* in a broad sense) can mark more complex grammatical function change. This includes not only true reflexives or reciprocals, as in (6), but most interestingly medio-passives, in which *se* marks the promotion of a direct object to subject, the erstwhile subject being generically interpreted, as in (7).

(6) Louise et Matthieu se rencontrent.
Louise and Matthieu REFL.3 meet
'Louise and Matthieu meet each other.'

(7) Ce problème se remarque facilement.
this problem REFL.3 notices easily
'This problem is noticed easily.'

Again, the combination of these processes with causativisation can result in two different patterns: upstairs realisation as in (8), or downstairs realisation, as in (9). This time, a meaning alternation obtains from the difference: as shown by the translation, upstairs realisation corresponds to a medio-passivised causative, while downstairs realisation expresses a causativised medio-passive.

(8) Ce problème peut se faire remarquer à
this problem can REFL.3 make notice to
des néophytes.
INDEF.PL neophytes
'This problem can be shown to neophytes.'

(9) Son ampleur fait se remarquer facilement le
its scale makes REFL.3 notice easily the
problème.
problem
'Its scale makes the problem be noticed easily.'

As proposed by Aguila-Multner (2023),[2] the dataset in (3)–(9) can be treated as a permutation in the order of three processes of grammatical function change: mapping of arguments, causativisation, and medio-passivisation. The iconic ordering of the latter two is evidenced by the contrast between medio-passivised causatives and causativised medio-passives, while the contrast between upstairs and downstairs realisation of pronominal arguments can be explained by ordering between the first two. Aguila-Multner proposes to treat this permutation in terms of freely ordered lexical rules: Figure 2 illustrates the implementation of the causativisation process as a lexical rule, augmenting the argument structure of a verb with a causer argument; Figure 3 illustrates the reflexivisation process as a lexical rule, coindexing one NP element of the argument structure to the first element; Figure 4 illustrates a medio-passivisation lexical rule, promoting a direct object to subject.

$$
\begin{bmatrix}
\text{VFORM} & \textit{nonfinite} \\
\text{SUBJ} & \langle \text{NP}_{\boxed{i}} \rangle \\
\text{COMPS} & \langle \text{NP}_{\boxed{j}}[\textit{à/bare/par/de}] \rangle \oplus \boxed{c} \\
\text{INFL} & [\text{MS} \quad \boxed{m} \cup \{\textit{cause-lid}, \boxed{i}\, \textit{agr}\}] \\
\text{DTR} & \begin{bmatrix} \text{SUBJ} & \langle \text{NP}_{\boxed{j}} \rangle \\ \text{COMPS} & \boxed{c} \\ \text{INFL} & [\text{MS} \quad \boxed{m}] \end{bmatrix}
\end{bmatrix}
$$
$$
\wedge \neg\, \text{member}(\begin{bmatrix} \textit{aff-ss} \\ \text{L}|\text{CONT} \quad \textit{expl} \vee \textit{ana} \end{bmatrix}, \boxed{c})
$$

Figure 2: Lexical rule for causativised verbs [3]

$$
\begin{bmatrix}
\text{SUBJ} & \langle \boxed{1}\, \text{NP} \rangle \\
\text{COMPS} & \langle \text{NP}[\textit{aff-ss}]_{\boxed{i}}:\textit{ana} \rangle \oplus \boxed{a} \\
\text{DTR} & \begin{bmatrix} \text{SUBJ} & \langle \boxed{1}\, \text{NP}_{\boxed{i}} \rangle \\ \text{COMPS} & \langle \text{NP}_{\boxed{i}} \rangle \circ \boxed{a} \end{bmatrix}
\end{bmatrix}
$$

Figure 3: Lexical rule for reflexives

However, the details of the morphological interface necessary for this line of analysis have not been developed until now. Crucially, to account for the possibility of downstairs realisation, a non-trivial assumption has to be made: that the causativisation process can apply to a fully inflected word form. I.e., in (10), the description to which the causativisation lexical rule applies needs to be that of the affixed word *vous en vouloir* – failing that, the morphology will receive

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[1]See Aguila-Multner (2023) for discussion of so-called trapping and of the factors that license such downstairs realisation in French causative constructions.

[3]The attached relational constraint bars *expl(etive)* or *ana(phoric)* affixal synsems (*aff-ss*) from being present on the daughter's COMPS list, in order to capture trapping of reflexives and inherent clitics, cf. (5). This constraint is satisfied in one of two ways: first, if there is no such argument on ARG-ST, there will trivially not be one on COMPS either. Second, if there is such an argument on ARG-ST, application of argument mapping will ensure it is suppressed on COMPS. Since argument mapping applies to signs of type *word*, this entails downstairs morphological expression.

$$\begin{bmatrix} \text{SUBJ} & \langle \boxed{1}\,\text{NP}_{\boxed{j}} \rangle \\ \text{COMPS} & \langle \text{NP}[\textit{aff-ss}]_{\boxed{j}}\!:\!\textit{ana} \rangle \oplus \boxed{a} \\ \text{DTR} & \begin{bmatrix} \text{SUBJ} & \langle \text{NP}_i \rangle \\ \text{COMPS} & \langle \boxed{1}\,\text{NP}_{\boxed{j}} \rangle \oplus \boxed{a} \end{bmatrix} \end{bmatrix}$$
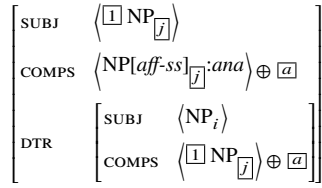
Figure 4: Lexical rule for medio-passives

as its input a combination of causativity and pronominal affixes, for which the only output is upstairs realisation, cf. **vous en fait vouloir*. Not only should causativisation be able to target inflected words, its output also needs to undergo inflection itself. This is not only to create the periphrastic dependency, but also to realise any pronominal argument corresponding to the downstairs subject: as exemplified in (10), such pronominals are always realised upstairs, even when the main affix cluster is realised downstairs.

(10) Cela lui   fait   vous   en   vouloir.
      this IO.3SG makes OBJ.2PL GEN be_mad
      'This makes her mad at you.'

In sum, an interface between morphology and syntax needs to be devised that can allow lexical rules of grammatical function change to apply to already inflected words, creating new lexical entries susceptible to further periphrastic inflection. In the following section we propose an IbM analysis of the morphological side of French causative constructions that attempts to meet these requirements.

3   An IbM analysis

In order to integrate a general treatment of periphrasis into the morphological component, the first and most obvious step is to follow Bonami (2015) and recognise delegation of properties to an ancillary element as a means of expression. To this end, we shall augment realisation rules with a set-valued feature DEL that will serve to represent the morphosyntactic features delegated for expression by the ancillary element in a periphrase (see Figure 8 for sample rule types). As captured in Figure 5, the properties delegated by individual rules (under RR) are unioned together on the word's global DLS feature.

Pronominal affixation constitutes morphological realisation of syntactic arguments, which preempts their realisation as syntactic complements. Following Miller & Sag (1997), we assume an argument mapping constraint as given in Figure 6 that excludes affixal synsems from valence lists and instead adds appropriate marking and index features to the morphosyntactic property set, which serves as "input" for morphological realisation.

The morphology of French pronominal affixation provides rules for both local exponence and periphrastic expression. As we have argued above, "clitic climbing" is always dependent on the existence of periphrasis, either tense periphrasis with *avoir/être* or a periphrastic causative. While existence of an independent periphrase can be considered a
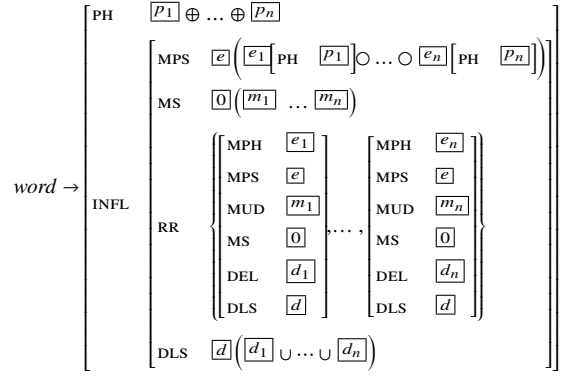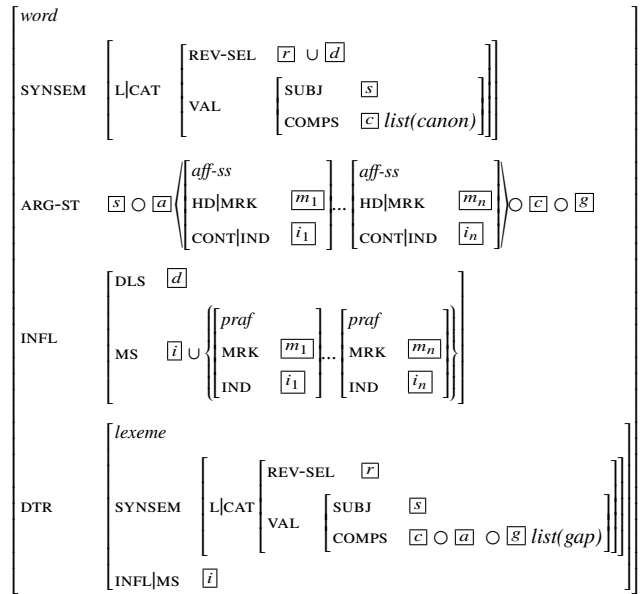
Figure 5: Well-formedness

Figure 6: Argument mapping (Aguila-Multner & Crysmann, 2020a)

necessary criterion, it is in itself not sufficient: e.g. the near tenses *passé récent* and *futur proche* are clearly analytic, but, nevertheless, they do not give rise to clitic climbing. Instead, we find local exponence of pronominal affixes on the lexical verb.

Figure 7 sketches the rules for local realisation. The rule types in the EXPO dimension provide the necessary pairing of features to be expressed (MUD) with the introduction of an exponent (MPH), complete with phonology and position class information. The COND hierarchy, by contrast, specifies the two situations where local exponence is possible: either if the word does not involve any periphrastic expression at all (empty DLS set), or else, if the periphrasis involves *aller* or *venir de*.

Rules for periphrastic realisation, by contrast, are given in Figure 8. Starting on the right of the hierarchy, we find the rule types for near tenses. As these tenses do not give rise to clitic climbing, their MUD value is restricted to TAM and agreement properties only, which are expressed analytically by selection of an infinitival stem (STM10) and selection
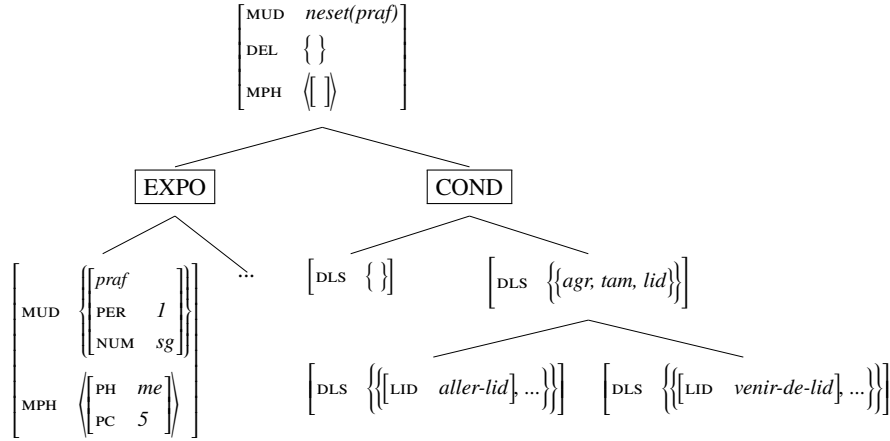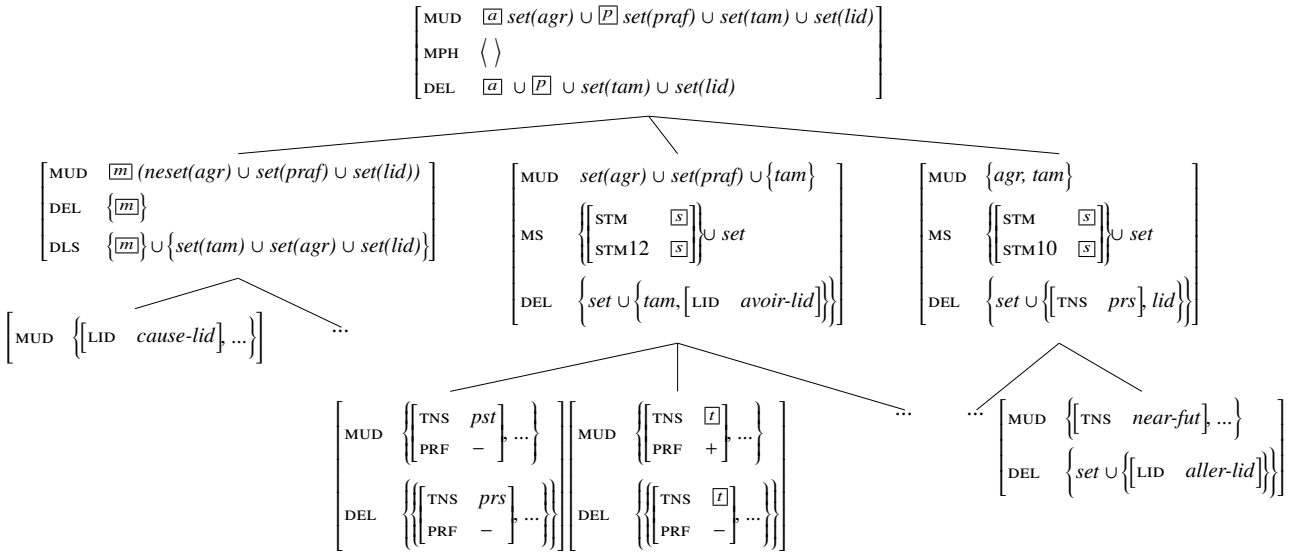
Figure 7: Local realisation

Figure 8: Periphrastic realisation

of, e.g., a present tense ancillary element, which also takes on expression of subject agreement properties. The subtypes pair the specific tense value to be expressed (in MUD) with selection of an appropriate ancillary element.

In the middle of the hierarchy, we find rules for tense periphrasis with *avoir/être*. Their MUD value includes a set of *praf* specifications, alongside TAM and subject agreement, capturing the potential for clitic climbing. Analytic expression of TAM involves, again, selection of a specific stem, here: a participial stem (STM12), and selection of an ancillary element. Delegation of *praf* and agreement properties to the ancillary element is captured by reentrancies between MUD and DEL. Subtypes illustrate the two uses of the *passé composé* as a simple past, and as a more compositional perfective.

Clause-union style periphrasis, finally, is represented on the left. In addition to selection of an appropriate ancillary element, e.g. *faire*, periphrastic expression of this type also involves delegation of agreement and *praf* properties. Subtypes of this rule type serve to constrain the range of ancillary elements that can feature in this type of periphrastic construction, which in addition to the causative verbs *faire* and *laisser*, includes the perception verbs.

Having laid out the essentials of local and periphrastic realisation, we shall finally turn to the treatment of trapping vs. climbing. As we have observed above, causativisation and reflexivisation can apply in either order: if reflexivisation applies before causativisation, the reflexive argument is bound by the downstairs subject. This order of application has the peculiar morphological effect that pronominal affixes pertaining to downstairs arguments cannot climb, with the notable exception of the downstairs subject. If reflexivisation applies after causativisation, the reflexive is bound by the causer. As for morphological realisation, we find climbing of all pronominal affixes in this case, rather than trapping. Taken together, morphological realisation must be able to apply both before (trapping) and after (climbing) causativisation.

We therefore conclude that inflected words can be submitted to further rules of grammatical function change, which we take to be lexeme-to-lexeme rules. Building on a recent proposal by Salehi & Koenig (2023), we assume a word-to-

lexeme rule as sketched in Figure 9 to resubmit an inflected word to rules such as the causativation rule. As an important side-effect, the rule registers the inflection applied up to this point by inserting it as a stem form to which further morphology may apply.

$$
\begin{bmatrix}
lexeme \\
\text{SYNSEM} \quad \boxed{s} \\[4pt]
\text{INFL} \quad \begin{bmatrix} \text{MS} \quad \left\{ \begin{bmatrix} stem \\ \text{STM} \quad \boxed{p} \end{bmatrix} \right\} \end{bmatrix} \\[14pt]
\text{DTR} \quad \begin{bmatrix}
word \\
\text{SYNSEM} \quad \boxed{s} \\
\text{PH} \quad \boxed{p} \\
\text{INFL|MS} \quad \{ [], [], \ldots \}
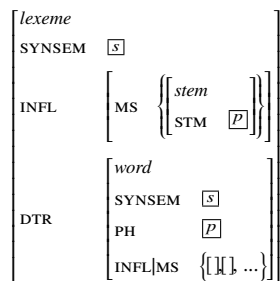\end{bmatrix}
\end{bmatrix}
$$

Figure 9: Word-to-Lexeme LR

The possibility of having more than one place where inflection can apply in the derivation of complex words certainly deviates from a more absolute view of the place of realisational morphology as applying only once to fully formed words. Nevertheless, the proposal made here is still far more restrictive than the kind of direct interleaving of lexical rules with morphophonological effects often adopted in HPSG.

Moreover, the need for multiple places to interface derivation with inflection has been forcefully argued for by Koenig & Michelson (2020) on the basis of Oneida. They observe that a class of derived nominals in Oneida can take as their basis verb stems that have already undergone some verbal inflection. Once turned into nouns by a derivational step, they can be further inflected with nominal morphology.

Before we close, we shall briefly discuss how the current setup can account for the interaction between different lexical rules of grammatical function change and its impact on morphological realisation.

Let us start with the simplest case of causativisation (cf. Figure 2) as the only rule of grammatical function change. Applying argument mapping to the output of this rule will insert morphosyntactic specification for all pronominal arguments, including downstairs pronominal objects and the erstwhile downstairs subject that has been demoted to direct or indirect object by the causativisation rule. Furthermore, the causative LR itself has added a requirement for morphological expression of causation. Since delegation to an ancillary element is the only way to express a causative, the respective rule in Figure 8 will apply, satisfying specification for pronominal affixes equally by delegation.

In case either the reflexive LR (Figure 3) or medio-passive LR (Figure 4) has applied to the output of the causative LR, the anaphoric element introduced by these rules will be coindexed with the additional causer subject. Morphologically, nothing much will change, with climbing – i.e. delegation of *cause-lid* and all pronominal affixes – as the most straightforward option.

Turning now to the opposite order, i.e. reflexive or medio-passive rules feeding causativisation, we find that direct application of the causative LR (Figure 2) to the output of either Figure 3 or 4 is blocked by the causative LR's constraint on COMPS not to have an intrinsic or anaphoric *aff-ss* complement. If, however, we apply argument mapping (Figure 6) to the output of reflexivisation, non-canonical synsems will be suppressed on COMPS, since argument conservation (Ginzburg & Sag, 2000) is a constraint on *word* (not *lexeme*). Concomitantly, the morphosyntactic property set of this word will be realised by inflectional morphology. Realisation of pronominal affixes typically will be local, using the rule types in Figure 7, given the causative LR has not applied yet at this point, and therefore there is no requirement for any periphrastic realisation. In order to apply the causative LR to this inflected word, it first needs to be converted into a lexeme by the rule in Figure 9: the most important effect of this rule is that it preserves the inflected form as a stem on which further morphology can operate. Application of the causative LR will essentially proceed as in the simple case given above: since all remaining downstairs complements are of type *canon-ss*, the only clitic that can climb as part of the periphrastic causative is the erstwhile downstairs subject, demoted to COMPS by the causative LR.

Given that we permit inflected words to be fed to rules of grammatical function change, an important question is that of overgeneration. E.g., we predict that downstairs cliticisation should in principle be possible with causatives even if the downstairs verb does not have any intrinsic or reflexive affixal arguments. Indeed, this is what we find in a number of situations: first, if a coordination of verbs is embedded under a causative, we find downstairs realisation when the verbs differ in the type or number of pronominal arguments they take. A most straightforward example is a coordination where the first VP contains the antecedent, and the second one a coreferential pronominal (11). Second, downstairs realisation can be chosen to avoid violations of morphotactic constraints on the clitic cluster: e.g. with causatives of ditransitives, we find the downstairs subject as a dative clitic on the causative verb, while the downstairs dative (and all other clitics) appear on the lexical verb (12). The very strong tendency to use climbing whenever possible can then be understood as a dispreference for splitting inflection without need.

(11) Elle a   fait écrire un poème aux   enfants et
      she has made write a poem to.the children and
      le   lire aux   parents.
      DO.3SG.M read to.the parents
      'She made the children write a poem and the parents read it.'

(12) Elle lui   a   fait leur   donner les cadeaux.
      she IO.3SG has made IO.3PL give   the presents
      'She made her give them the presents.'

4   Conclusion

In this paper we have discussed how the morphosyntax of clitic climbing and trapping in French causatives can be integrated with an inferential-realisational model such

as Information-based Morphology (IbM – Crysmann & Bonami, 2015). Building on earlier work by Aguila-Multner & Crysmann (2020a); Aguila-Multner (2023), who suggest an approach of clitic climbing as periphrastic realisation of pronominal affixes, we have provided a formalisation of periphrasis rules in IbM. Most specifically, we use a pair of features to capture rule-local delegation (DEL) to an ancillary element, as well as constrain the interaction of multiple periphrastic dependencies (DLS) at the global word-level. This distinction mimics that between MUD and MS for the expression and conditioning of morphosyntactic properties, as well as the more recent distinction between rule-local morphotactic contribution (MPH) and word-wide morphotactic constraints (DLS), cf. Crysmann (2023).

Finally, we addressed the interaction between causatives, reflexives and medio-passives, arguing that inflectional morphology can apply in two steps, thereby capturing the concomitant effects of clitic trapping vs. clitic climbing. By allowing inflected words to be submitted to further rules of grammatical function change, we provide for a clean separation between lexical rules and inflectional morphology, keeping the benefits of an inferential-realisational model while providing sufficient flexibility to address complex interactions of grammatical function change.

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