

Obligatory clitic expression, clitic omission, and the morphology-syntax interface

Alex Alsina

Pompeu Fabra University

Proceedings of the LFG'20 Conference

On-Line

Miriam Butt, Ida Toivonen (Editors)


2020

CSLI Publications

pages 5–25

<http://csli-publications.stanford.edu/LFG/2020>

Keywords: Clitics, reflexive clitic, clitics as morphology, Romance, Catalan, syntax-morphology interface, inflection.

Alsina, Alex. 2020. Obligatory clitic expression, clitic omission, and the morphology-syntax interface. In Butt, Miriam, & Toivonen, Ida (Eds.), *Proceedings of the LFG'20 Conference, On-Line*, 5–25. Stanford, CA: CSLI Publications. 

Abstract

In the Romance language Catalan, some verbs and some argument-structure configurations normally require the reflexive clitic; however, in certain constructions, the expected reflexive clitic is optionally missing; and, yet in other constructions, the reflexive clitic is obligatorily left out. The main theoretical claim is that so-called clitics in Romance, a special kind of affix, are licensed by syntax-morphology (SM) mapping principles so that a clitic is used if and only if it is required by an SM mapping principle. This approach has important implications for the syntax-morphology interface: words are not inserted in their inflected form in the syntax, contrary to standard LFG assumptions, but are inserted as lexemes and their inflected forms are licensed on the basis of the f-structure information.[†]

The goal of this paper is to explain a puzzle involving the reflexive clitic in the Romance language Catalan. Some verbs and some argument-structure configurations normally require the reflexive clitic; however, in some constructions, the same verbs and a-structure configurations appear to allow the reflexive clitic to be missing; and, yet in other constructions, the reflexive clitic is obligatorily left out. We thus have an alternation between obligatory expression of the reflexive clitic, optional omission of this clitic and obligatory omission of the clitic.¹

The main theoretical claim of the paper is that so-called “clitics”² in Romance, a special kind of affix, are licensed by syntax-morphology (SM) mapping principles – a type of principle proposed in Luís and Spencer (2005: 213–215) – so that a “clitic” is used if and only if it is required by an SM mapping principle. Such SM mapping principles license a “clitic,” whenever a given f-structure feature combination arises, and place the “clitic” in correspondence with a specific grammatical function. The morphology assigns phonological representations to “clitics” on the basis of the f-structure features that the “clitics” are linked to. This proposal makes full use of the LFG idea that different levels of representation are co-present and constrain each other. In particular, it assumes that the interaction between syntax and morphology is not one-way (with the morphology constraining the syntax, but not vice versa), as is generally assumed in LFG, and that the syntax may constrain the morphology as well. The present analysis assumes that the

[†] I thank the audience at LFG2020, in particular Ash Asudeh and Joan Bresnan, and two anonymous reviewers, for extremely valuable comments.

¹ Andrews’s 1990 Morphological Blocking Principle provides an explanation for some instances of obligatory clitic expression. But many cases remain unexplained.

² A terminological clarification is in order here. Given the evidence that so-called “clitics” in Romance are affixes (see footnote 3), it might be more appropriate to refer to them simply as affixes, leaving the term *clitic* in its technical sense for a phonologically dependent word that does not project a full phrase. However, since there is a long tradition in Romance linguistics of referring to the elements under investigation here as *clitics*, from now on I will use the term “*clitic*” (in quotes) for these elements, in order to make it clear that they are not clitics in the technical sense of the word and that no claims are being made about clitics in this sense.

syntax and the morphology constrain each other. This conception of the syntax-morphology interface not only provides for a simple analysis of the facts of the reflexive “clitic” in Catalan, but allows a considerable simplification of the framework.

We will first present the facts of the reflexive “clitic” in Catalan, showing the contexts in which it is obligatory, those in which it is optional, and those in which it is necessarily left out. We then present the analysis and, finally, the main conclusions are highlighted.

1 The distribution of the reflexive “clitic”

Verbal “clitics” in Catalan, as in Romance in general, are assumed here to be a special kind of affix that attaches to verb forms.³ They are prefixed to finite verbs except for imperatives and suffixed to imperatives and non-finite forms. The following chart gives the underlying form of the personal “clitics” (leaving out the so-called neuter “clitic” *ho* /u/ and the oblique “clitics” *en/ne* /n/ and *hi* /i/) when used as the only “clitic” in the word; the third person dative plural form for the formal register (/lʒ/) is shown in parentheses.

(1)

<i>Person</i>	<i>Reflexivity</i>	<i>Case</i>	<i>Gender</i>	<i>Singular</i>	<i>Plural</i>
3	Refl +				s
	Refl –	Dat +		li	lzi (lʒ)
		Dat–	<i>masc</i>	l/lu	lʒ/luz
			<i>fem</i>	la	lʒ
2			t	uz/buz	
1			m	nʒ/nuz	

The only “clitic” forms that are exclusively reflexive are the third person “clitics.” All “clitics” consisting of a consonant underlyingly in Catalan are realized phonetically as the consonant alone, as in (2), or with an epenthetic vowel before or after the consonant, depending on the phonological context.

1.1 Obligatory expression

Some constructions require the presence of a reflexive “clitic.” The “clitic” may signal either a lexical requirement imposed by the main verb of the construction or a binding of arguments at the level of argument structure.⁴ The lexical requirement is found with inherently reflexive verbs such as *adonar-se* ‘realize’ or *emportar-se* ‘take away’: the reflexive “clitic” cannot normally be left out, as in (2). The binding of arguments arises with verbs that are otherwise transitive or ditransitive, such as *veure* ‘see’, *donar* ‘give’

³ See the evidence presented by Bonet 1991, 1995 for Catalan, by Miller 1992 and Miller and Sag 1997 for French, by Crysmann 1997, Luís and Sadler 2003, and Luís and Spencer 2005 for Portuguese, by Monachesi 1999 for Italian, among others.

⁴ In addition, the third person reflexive “clitic” can also signal either passivization or impersonalization (see Yang 2019 and references cited there), which will not be considered here.

or *dutxar* ‘shower’: the reflexive “clitic” signals the binding of the logical subject and an internal argument of the predicate and cannot be left out without resulting in the loss of the binding interpretation and sometimes also in ungrammaticality, as in (3).

- (2) a. Aviat *(s') adonarà del problema.
soon CL.REFL.3 will.realize of.the problem
‘S/he will soon realize the problem.’
- b. No *(m') adono fàcilment dels meus errors.
not CL.1.SG realize.1SG easily of.the my mistakes
‘I don’t realize my mistakes easily.’
- c. *(S') haurien d' emportar aquestes maduixes.
CL.REFL should.3PL of take.away these strawberries
‘They should take away these strawberries.’
- (3) a. De sobte *(s') ha vist reflectida en el vidre.
suddenly CL.REFL.3 has seen reflected in the glass
‘She suddenly saw herself reflected on the glass pane.’
- b. Feia dies que no *(ens) vàiem.
make.IMPF days that not CL.1.PL see.IMPF.1.PL
‘We hadn’t seen each other in days.’
- c. Els jugadors *(es) donen la mà.
the players CL REFL.3 give the hand
‘The players shake each other’s hand.’
- d. Avui *(ens) hem dutxat amb aigua freda.
today CL.1.PL have showered with cold water
‘Today we took a cold shower.’

We refer to the “clitic” that occurs with inherently reflexive verbs, as in (2), as the inherent reflexive “clitic” and to the “clitic” that is associated with a semantically reflexive or reciprocal interpretation, as in (3), as the anaphoric reflexive “clitic.” There is no morphological difference between the two: the same forms are used and combine in the same way with other “clitics” and with the verbs. They differ in that the inherent reflexive “clitic” cannot be replaced by a non-reflexive “clitic,” whereas the anaphoric reflexive “clitic” can, losing the anaphoric interpretation.

The obligatoriness of the reflexive “clitic” that we see in (2)–(3) is satisfied even when it is not attached directly to the verb that requires it. The reflexive “clitic” may attach to an auxiliary verb or to a restructuring verb that selects a verb that requires the “clitic” and, in fact, there may be an indefinitely long sequence of auxiliaries and restructuring verbs between the reflexive “clitic” and the verb that requires it. The class of restructuring verbs includes a large number of verbs expressing meanings of modality, movement, beginning and ending, knowledge, etc. Examples are given in (4):

- (4) a. S' hauria pogut tornar a adonar
 CL.REFL.3 have.COND.3.SG been.able repeat.INF to realize.INF
 del seu error.
 of.the POSS.3 mistake
 'S/he might have realized his/her mistake again.'
- b. Ens vam voler començar a veure aviat.
 CL.1.PL PAST.1.PL want.INF start.INF to see.INF soon
 'We wanted to start seeing each other soon.'

The “clitic” that satisfies the reflexivity requirement in the most embedded verb in the sequence of verbs –*adonar* in (4a) and *veure* in (4b)– appears attached to a verb three words away from that verb (not counting the preposition *a*). This shows that the reflexive “clitic” cannot be assumed to attach at the morphological level to the verb that requires it. (4) illustrates the phenomenon of *clitic climbing*, whereby a “clitic” that satisfies a lexical requirement of a verb appears not attached to this verb, but to an auxiliary or restructuring verb in a sequence of such verbs. The reflexive “clitic” is also obligatory in cases such as (4) and could alternatively attach to any of the infinitives following the finite verb form. For (4b), for example, there are three other positions for the “clitic,” with the same meaning, as in (5):

- (5) a. Vam voler-*nos* començar a veure aviat
 b. Vam voler començar-*nos* a veure aviat.
 c. Vam voler començar a veure'*ns* aviat.

1.2 Optional “clitic” omission

The reflexive “clitic,” which is obligatory in (2)–(5), appears to be optional when the verb requiring it is an infinitive dependent on one of the causative verbs *fer* ‘make’ or *deixar* ‘let’, as an instance of the inherent reflexive, as in (6), or of the anaphoric reflexive, as in (7) (the latter based on GLC: 1021):

- (6) a. Això farà adonar (-se) els meus superiors
 this will.make realize.INF CL REFL.3 the my superiors
 de la dificultat.
 of the difficulty
 'This will make my superiors realize the difficulty.'
- b. No li deixis emportar (-se)
 not CL.DAT.3.SG let.2.SG take.away.INF CL REFL.3
 aquestes maduixes.
 these strawberries
 'Don't let her take these strawberries away.'
- (7) a. Els han fet donar (-se) la mà.
 CL.DAT.3.PL have made give.INF CL.REFL.3 the hand
 'They made them shake each other's hand.'

- b. Ens han fet dutxar (-nos) amb aigua freda.
 CL.1.PL have made shower.INF CL.1.PL with cold water
 ‘They made us take a cold shower.’

Even though the option of omitting the reflexive “clitic” is preferred in many cases of the type shown in (6)–(7), the possibility of expressing it cannot be excluded. And, in fact, this “clitic” is required whenever any of the complements of the infinitive dependent on the causative verb is expressed as a “clitic” attached to the infinitive. The genitive complement of *adonar-se* is expressed either as a PP introduced by *de*, as in (6a), or by the oblique “clitic” *en/ne*, as in (8a); the accusative object of *emportar-se* can be expressed by means of an accusative “clitic” such as *les*. When one of these “clitics” is attached to the infinitive, it must appear together with the reflexive “clitic,” as shown in (8): omitting the reflexive “clitic” results in unacceptability. This is the case not only with the inherent use of the reflexive “clitic,” as in (8), but also with its anaphoric use, as in (9). The anaphoric interpretation requires the reflexive “clitic,” so that the version of (9a) without that “clitic” is ungrammatical with the intended anaphoric reading, although acceptable with the interpretation that there is an unspecified recipient (‘They made them give it away.’).

- (8) a. Ell els farà adonar {-se ’n /*-ne}.
 he CL.ACC.3.PL.M will.make realize.INF CL.REFL.3 NE / NE
 ‘He will make them realize it.’
- b. Deixa -li emportar *(-se) -les.
 let CL.DAT.3.SG take.away.INF CL.REFL.3 CL.ACC.3.PL.F
 ‘Let her take them away.’
- (9) a. Els han fet donar {-se ’l
 CL.DAT.3.PL have made give.INF CL.REFL.3 CL.ACC.3.SG.M
 /*-lo} (el premi).
 CL.ACC.3.SG.M the prize
 ‘They have made them give it to each other (the prize).’
- b. Ens han fet dutxar *(-nos) -hi.⁵
 CL.1.PL have made shower.INF CL.1.PL HI
 ‘They made us shower in it.’

1.3 Obligatory “clitic” omission

When a non-reflexive “clitic” corresponding to a complement of the infinitive in a causative construction undergoes “clitic” climbing and appears attached to the causative verb (or higher up in the structure), the reflexive “clitic” that is optional in (6)–(7) and obligatory in (8)–(9) is obligatorily left out. The reflexive “clitic” in such cases is ungrammatical whether it is attached to the infinitive, as in (10a), (11a), and (12), or to the subordinating

⁵ Colloquially pronounced [du’fʌnzi] for *dutxar-nos-hi* and [du’fari] for *dutxar-hi*.

verb, as in (10b) and (11b).⁶ Leaving out the reflexive “clitic” in (10)–(12) makes all of these examples grammatical. The form corresponding to (12) in which the reflexive “clitic” is attached to the matrix verb is not given, because, with first and second person “clitics,” the reflexive form is identical to the non-reflexive form and that would result in a sequence of two identical first person “clitics,” which is excluded for morphophonological reasons.

- (10) a. Això els en farà adonar (*-se).
 this CL.ACC.3.PL.M NE will.make realize.INF CL REFL.3
- b. *Això se ’ls en farà adonar.
 this CL REFL.3 CL.ACC.3.PL.M NE will.make realize.INF
 ‘This will make them realize.’
- (11) a. No els hi deixis emportar (*-se).
 not CL.ACC.3.PL HI let.2.SG take.away.INF CL REFL.3
- b. *No se ’ls hi deixis emportar.
 not CL REFL.3 CL.ACC.3.PL HI let.2.SG take.away.INF
 ‘Don’t let her take them away.’
- (12) Ens -hi han fet dutxar (*-nos).
 CL.1.PL HI have made shower.INF CL.1.PL
 ‘They made us shower in it.’

1.4 Summary

The reflexive “clitic” is obligatory, as a general rule, in its inherent use and its anaphoric use. However, it appears to be optional when the verb that would normally require it is an infinitive dependent on a causative verb. But this optionality is only apparent, because the reflexive “clitic” is required on the infinitive when this verb form has other “clitics” attached to it, but cannot be expressed when the other “clitics” dependent on the infinitive are attached to the higher causative verb (or to a higher restructuring verb).

2 Explaining the facts

The fact that the reflexive “clitic,” which is required by particular verbs or a-structure configurations, is in certain constructions necessarily overt, in others optionally expressed, and yet in others necessarily unexpressed, I take to be strong evidence for the status of the reflexive “clitic” as an affix and, further, not as an affix within a morpheme-based approach to morphology, but as an affix within a realizational approach. If we assumed it was a

⁶ The “clitic” combination *els hi* (phon. [əlzi]) in (11a) corresponds in the colloquial register to one or two third person objects provided one is dative and one is plural (possibly, but not necessarily, the same one), irrespective of gender. The glossing reflects the idea that, in (11a), it corresponds to a third person plural accusative object and to a third person singular dative object, of either gender. The translation in (11) is one of many possible translations.

morpheme, with its own (sub)lexical entry, it would be very hard to explain that it could be unexpressed, even though there is a verb that requires it.

I also assume that the reflexive “clitic,” unlike most other “clitics” in Romance, is not the expression of an object (or an oblique) in both of the uses studied in this paper. This idea is quite uncontroversial for the inherent use of the reflexive “clitic,” as it does not alternate with a phrasal object. This idea is not so obvious when applied to the anaphoric reflexive “clitic,” as it does alternate with a phrasal object, but, according to the arguments presented in Grimshaw 1982, 1990, Alsina 1996, and others, it is unlike pronominal “clitics” and is analyzed as signaling a valence-reducing operation.

In what follows, I will present the analysis of the reflexive “clitic,” adopting these two assumptions (namely, that the reflexive “clitic” is an affix within a realizational approach to morphology and that it is not the expression of an object or an oblique). The analysis involves: (a) the licensing of an a-structure feature, [REF], by a specific class of verbs and by a specific a-structure configuration; (b) the licensing of a “clitic” as a verbal affix given certain f-structure features, on the assumption that a “clitic” is licensed if and only if there is a rule requiring it; and (c) the assignment of a phonological realization to a “clitic” on the basis of its f-structure features by specific rules (morphological realization rules, to use Luís and Sadler’s 2003 term).

2.1. Licensing of the a-structure feature [REF]

One of the licensing conditions for the reflexive “clitic” is the feature [REF]. This feature is present on a logical subject (or a-structure subject) –the most prominent argument at a-structure– under two circumstances. On the one hand, inherently reflexive verbs like *adonar-se* or *emportar-se* lexically specify that their logical subject is marked with the feature [REF]. Thus, the lexical entry of an inherently reflexive verb includes this information:

- (13) *Lexical information of inherently reflexive verbs:*
 [PRED ‘X < [REF]...>’]

(13) indicates that the most prominent argument role at a-structure includes the feature [REF]. As in Alsina 1996 and other work, I am assuming that a-structure is part of the PRED value and is a list of arguments represented by means of features and ordered by prominence, so that the leftmost argument in the list is the logical subject.

On the other hand, the binding of two argument roles at a-structure, one of which must be the logical subject, results in this argument having the feature [REF], as shown in (14).

- (14) *Anaphoric Reflexive Licensing Principle:*
 [PRED ‘X < []₁ ... []₁...>’] → [PRED ‘X < [REF]₁ ...>’]

Correspondence between elements at different levels of structure is shown by means of coindexation, which signals that the two bound arguments in (14)

map onto the same GF (in the process named a-structure binding in Alsina 1996). In this way, a GF may be linked to the feature [REF] in one of two ways: either because the verb of its clause is an inherently reflexive verb and, therefore, includes the information in (13) in its lexical entry or because the predicate of its clause involves an a-structure binding configuration, which triggers the principle in (14). The GF that is linked to [REF] is, in most cases, the subject, given that it corresponds to the logical subject and, as a default, the logical subject maps onto a subject. But as we shall see, it is not always the case that the GF linked to [REF] is the subject.

2.2. Licensing of “clitics”

We assume that “clitics” are a class of affixes that are licensed by syntax-morphology (SM) mapping principles, along the lines of Luís and Spencer (2005: 213–215). A “clitic” is licensed in the morphology of a verb if there is an SM mapping principle that requires it and cannot be used unless there is such a principle. Although this paper deals with the reflexive “clitic,” we will see how pronominal, or non-reflexive, “clitics” can be accounted for before turning to the reflexive “clitics.” The most general form of the “clitic”-licensing principle states, as in (15), that a pronominal non-subject is expressed as a “clitic.”

(15) *General “clitic”-Licensing SM Mapping Principle (CLI-LIC):*

$$\left[\begin{array}{l} \text{PRED} < \dots \theta_2 \dots > \\ \text{OBJ/OBL} [\text{PRED pro}]_2 \end{array} \right]_1 \Rightarrow [v \dots \text{cl}_2 \dots]_1$$

According to this principle, a verb that corresponds to an f-structure containing a pronominal object or oblique argument must include a “clitic” corresponding to that argument. An SM principle is a constraint on the correspondence between c- and f-structure that should be interpreted as follows: The f-structure specified on the left of the arrow in (15) maps onto a verb (its head in the c-structure) containing a “clitic” linked to a GF in that f-structure. SM mapping principles such as (15) interact in an OT fashion with two constraints:⁷ *Express GF*, (16), requiring GFs to have an overt expression, either as XPs or as affixes (i.e., penalizing pro-drop), and *Minimize Morphology*, (17), penalizing the use of affixes:

(16) *Express GF (EXP-GF):* A GF must be overtly expressed (as an XP or as an affix).

(17) *Minimize Morphology (MIN-MOR):* An affix obtains a violation mark.

By EXP-GF, all GFs, including those required by Completeness, should have expression, either in c-structure or in the morphology. MIN-MOR can be

⁷ See Bresnan 2000, Kuhn 2003, Alsina and Vigo 2014, 2017, among others, for proposals adapting Optimality Theory (OT) to LFG.

seen as an adaptation of Bresnan et al.'s (2016: 90) principle of Economy of Expression to the morphology that assigns a cost to affixes, such as "clitics." It is clear that these two constraints are partially conflicting and the two alternative rankings give different results.

It should be noted that, in the present conception of inflectional morphology, affixes, such as "clitics," are the realization, or spell-out, of syntactic features. This means that inflectional affixes do not carry syntactic features, and the words that contain these affixes do not carry the syntactic features associated with these affixes. This implies that the traditional LFG analysis of "pro-drop," subject-verb agreement, or pronominal incorporation, cannot be maintained in the present framework: e.g., the feature [PRED 'pro'] that is assumed to be carried by an object marker in Chicheŵa in Bresnan and Mchombo 1987 would here be part of the f-structure and interpreted as a particular affix by an SM mapping principle. This also implies that "clitic" doubling (the expression of a given GF by means of an independent pronoun and a pronominal affix) does not raise the issue of PRED feature unification.

In a constraint ranking in which EXP-GF outranks MIN-MOR (EXP-GF » MIN-MOR), a "clitic" is used only if the alternative is a null expression: a "clitic" is preferred over a pro-dropped argument. If we compare a structure in which a given argument is expressed only as a "clitic" with a structure in which the same argument has no expression, both structures receive a violation mark for one of the two constraints, but the latter structure gets a fatal violation of EXP-GF, making the "clitic" expression the optimal choice.

In the reverse ranking of the two constraints (MIN-MOR » EXP-FG), if we compare a "clitic" expression with a null expression of an argument, the "clitic" expression is a worse choice than the null expression, making argument pro-drop the optimal candidate. In this way, we capture the difference between languages with incorporated pronominals, such as "clitics," and languages with argument pro-drop. (See section 3 for the status of languages like English lacking both "clitics" and pro-drop.) The former are languages with the ranking EXP-GF » MIN-MOR.

In addition, if a "clitic"-licensing principle such as CLI-LIC (15) is ranked above MIN-MOR, we obtain a language with pronominal "clitic" doubling, a language in which pronominal non-subject arguments are expressed by means of a "clitic" and possibly also by means of a pronominal XP.⁸ In the reverse ranking, we have a language in which the "clitic" expression of a pronominal object or oblique is possible only when the pronominal XP is not used. That is, if the ranking is MIN-MOR » CLI-LIC, using a "clitic" to double a pronominal XP obtains a fatal violation of MIN-MOR, making "clitic" doubling ungrammatical. This is the situation we find in a language like Italian, where "clitic" doubling never arises.

⁸ As noted above, there are not two expressions with the PRED feature, but only one (the full pronoun), and so no general principle prevents this situation.

In languages where “clitic” doubling is found in limited situations, such as Catalan, we can assume the ranking MIN-MOR » CLI-LIC and that there are more specific “clitic”-licensing constraints that rank above MIN-MOR. A case in point would be the obligatory “clitic” doubling with first and second person objects, but space constraints prevent us from illustrating this situation. In general, “clitic” doubling is disallowed in Catalan: for example, the so-called neuter object “clitic” *ho* can be used, as in (18a), but cannot be used if the object is expressed by an independent pronoun, as in (18b):

- (18) a. *(Ho) diré.
 HO say.FUT.1.SG
 ‘I will say it.’
- b. (*Ho) diré això.
 HO say.FUT.1.SG that
 ‘I will say that.’

For (18a), a structure with the object “clitic” is in competition with a structure with a null object. The latter structure obtains a fatal violation of EXP-GF, making the structure with the “clitic” the optimal choice, even if this one has a violation mark for MIN-MOR. If the object is expressed by an XP, in (18b), EXP-GF is satisfied without a “clitic”; so, including a “clitic” merely incurs a violation of MIN-MOR and has no ameliorating effect.

The tableaux in (19) show how the competition between the word *ho diré* (with the “clitic”) and the word *diré* (without the “clitic”) is resolved differently in (18a) and (18b). The relevant constraint ranking is EXP-GF » MIN-MOR » CLI-LIC. The two competing candidates are a V linked to the same f-structure and EVAL chooses the best morphological structure for it given that syntactic information. Crucially, the input has an OBJ with the [PRED ‘pro’] feature that is provided by a general rule in (19a) (see section 3) and by the word *això* ‘that’ in (19b).

(19) a.

	[OBJ [PRED ‘pro’]]	EXP-GF	MIN-MOR	CLI-LIC
a.	ho diré		*!	
☞ b.	diré	*!		*

b.

	[OBJ [PRED ‘pro’]]	EXP-GF	MIN-MOR	CLI-LIC
a.	ho diré això		*!	
☞ b.	diré això			*

2.3. Licensing of the reflexive “clitic”

The principle that licenses a reflexive “clitic” differs from the other “clitic”-licensing principles in that the “clitic” is not licensed by being linked to an object or an oblique, but is licensed by a subject with the feature [REF]. We also need to assume that principle (20) ranks above MIN-MOR, as the reflexive “clitic” is realized even if the subject is overt.

(20) *SM mapping principle licensing reflexive “clitics”:*

$$\left[\begin{array}{l} \text{PRED} \quad \text{'X} < \dots [\text{REF}]_1 \dots > \text{' } \\ \text{SUBJ} \quad [\dots]_1 \end{array} \right]_2 \Rightarrow [\text{v} \dots \text{cl}_1 \dots]_2$$

This principle maps an f-structure whose subject corresponds to an argument role with the feature [REF] to a verb that includes a “clitic” linked to that subject. In general, logical subjects map onto the GF subject; so, in most cases, a GF linked to a [REF] argument is a SUBJ and, consequently, by the SM mapping principle (20), will license a “clitic” (a reflexive “clitic”). This is what we see in (2) and (3): the subject of the relevant clause is marked with the feature [REF] because the verb carries the information in (13), in (2), or because principle (14) applies, in (3): in both cases, the logical subject is assigned this feature and, as it maps onto the grammatical subject, principle (20) applies requiring a reflexive “clitic.” In example (2a), repeated as (21), the word *adonarà*, a form of the inherently reflexive verb *adonar-se*, has a logical subject with the feature [REF], which maps onto the subject. As this subject has the feature [REF], principle (20) applies requiring the verb to include a reflexive “clitic” (a “clitic” linked to the subject).

(21) Aviat *(s') adonarà del problema.
 soon CL.REFL.3 will.realize of.the problem
 ‘S/he will soon realize the problem.’

The information that the subject is linked to [REF] can travel a considerable distance when auxiliaries and restructuring verbs are involved. In example (4a), repeated as (22), although the auxiliary *hauria* is not a verb that requires its logical subject to be [REF], nor, for that matter, the restructuring verbs *pogut* and *tornar*, which intervene between it and the inherently reflexive verb *adonar*, these *light* verbs have the possibility of adopting the argument structure of their dependent verb as their own. Therefore, through a chain of restructuring, the auxiliary, as well as the two intervening light verbs, has an a-structure with a [REF] argument linked to the subject, causing principle (20) to apply.

(22) S' hauria pogut tornar a adonar
 CL.REFL.3 have.COND.3.SG been.able repeat.INF to realize.INF
 del seu error.
 of.the POSS.3 mistake
 ‘S/he might have realized his/her mistake again.’

Following the analysis of Alsina 1997 (see also Rizzi 1982, Aissen and Perlmutter 1983, and Rosen 1989), we can assume that each auxiliary and restructuring verb can form a complex predicate with its complement verb, which can result in a single PRED and a-structure for the sequence of verbs in (22). And when a complex predicate is formed, the least embedded verb in the sequence of verbs taking part in the complex predicate is the one that can host “clitics.” Thus, although the reflexive “clitic” in (22) morphologically

attaches to *hauria*, it satisfies a lexical requirement of the verb *adonar*. With restructuring verbs there is always an alternative control construction in which the complement verb, instead of forming a complex predicate with the restructuring verb, heads a complement clause whose subject is controlled by the subject of the restructuring verb. In such cases, “clitics” attach to the least embedded verb in the complement clause. See the evidence for this claim in Aissen and Perlmutter 1983 and Rizzi 1982, where it is observed that there is no semantic difference correlating with the syntactic difference.

To illustrate the analysis, consider the alternative position of the reflexive “clitic” in (23). The simplified f-structures corresponding to these examples are given in (24). (24a) contains a complex predicate involving the two verbs *pot* ‘can’ and *adonar* ‘realize’: it is a monoclausal structure in which the logical subject of *adonar* is the subject of the clause. (24b) is the control construction, in which *pot* takes an infinitival complement⁹ and its subject controls the complement’s subject.

- (23) a. Es pot adonar del seu error.
 CL REFL.3 can realize.INF of.the POSS.3 mistake
- b. Pot adonar -se del seu error.
 can realize.INF CL REFL.3 of.the POSS.3 mistake
 ‘S/he can realize his/her mistake.’

- (24) a.
$$\left[\begin{array}{l} \text{PRED 'can < [...]}_1 \text{ realize < [REF]}_1 \text{ [...] >>' } \\ \text{SUBJ [PRED 'pro']}_1 \end{array} \right]$$
- b.
$$\left[\begin{array}{l} \text{PRED 'can < [...]}_1 \text{ [...] >'} \\ \text{SUBJ } \boxed{1} \text{ [PRED 'pro']}_1 \\ \text{OBJ } \left[\begin{array}{l} \text{SUBJ } \boxed{1} \\ \text{PRED 'realize < [REF]}_1 \text{ [...] >'} \end{array} \right] \end{array} \right]$$

Structure (24a) satisfies principle (20) at the matrix level, so that the “clitic” is licensed on the least embedded verb of the clause, namely, *pot*, as in (23a). (24b) satisfies that principle in the embedded clause, and so the reflexive “clitic” is licensed on the least embedded verb of this clause, the infinitive *adonar*. Notice that, although the subject is shared between the matrix and embedded clauses in (24b), the conditions for application of (20) are not met at the matrix level, as [REF] is in the a-structure of the lower clause.

When a causative verb is involved, as in examples (6)–(12), the resulting structure resembles the situation with restructuring verbs, as a complex predicate can be formed with the dependent verb and an alternative

⁹ Adopting a reduced inventory of GFs, consisting only of SUBJ, OBJ, and OBL, for in-clause GFs, as in Alsina 1996 and Patejuk and Przepiórkowski 2016, the infinitival complement is designated by OBJ in (24b).

structure is possible in which the dependent verb heads a complement clause whose subject is controlled. As with restructuring verbs, what signals whether a complex predicate is formed or not is “clitic” climbing. If there is no “clitic” climbing, a complex predicate has not been formed with the dependent verb, which heads its own clause. If there is “clitic” climbing, a complex predicate has been formed between the causative or restructuring verb and the dependent verb. The important difference between causative verbs and restructuring verbs is that, when a complex predicate is formed with a causative verb, the logical subject of the dependent verb is not expressed as a subject of the resulting complex predicate, but as an object, dative or accusative depending on the a-structure of the dependent verb, since the agent or causer of the causative predicate maps onto the subject. When a control construction is used with a causative verb, the subject of the complement clause is controlled by the object of the causative control verb.

The alternative behavior of the causative verbs as light verbs in a complex predicate and as control verbs explains the optional appearance of the reflexive “clitic” in (6)–(7), as we see in (25), repeated from (6b):

- (25) No li deixis emportar (-se)
 not CL.DAT.3.SG let.2.SG take.away.INF CL REFL.3
 aquestes maduixes.
 these strawberries
 ‘Don’t let her take these strawberries away.’

If we have a control construction, the dependent verb *emportar* heads a clause containing a subject and an object. The subject of the embedded clause is controlled by the dative object of the causative verb. Since there is a subject of this clause and it is linked to a [REF] role in the clause because *emportar* is inherently reflexive, the SM mapping principle (20) requires the verb of the clause to include a “clitic” linked to the subject. This explains the option of having the reflexive “clitic” in (25). But if we have a complex predicate construction, the causative verb and the dependent *emportar* form a single complex predicate and there is no complement clause headed by *emportar*. The logical subject of *emportar* is the object of the complex predicate; even though it is marked as [REF], it cannot license a reflexive “clitic” because the SM mapping principle (20) needs a subject linked to [REF] in order to license a reflexive “clitic.” This explains the option of not having the reflexive “clitic” in a sentence like (25).

The presence of another “clitic” on the infinitive dependent on a causative verb makes the reflexive “clitic” on the infinitive obligatory, as shown (8)–(9), with (8b) repeated as (26):

- (26) Deixa -li emportar *(-se) -les.
 let CL.DAT.3.SG take.away.INF CL.REFL.3 CL.ACC.3.PL.F
 ‘Let her take them away.’

A “clitic” can attach to the infinitive that depends on a causative or restructuring verb when no complex predicate is formed involving the two verbs: this is the control construction, so that the infinitive heads its own clause. In this situation, any “clitic” corresponding to a dependent of the infinitive must attach to the infinitive. Since the infinitive has a subject linked to [REF], the SM mapping principle (20) requires there to be a “clitic” linked to the subject in the verb, in this case, the infinitive. In addition, the “clitic” corresponding to the accusative object also attaches to the infinitive.

“Clitic” climbing from an infinitive dependent on a causative verb signals a complex predicate construction, as in (27) (see (11)):

- (27) a. No els hi deixis emportar (*-se).
 not CL.ACC.3.PL HI let.2.SG take.away.INF CL REFL.3
- b. *No se 'ls hi deixis emportar.
 not CL REFL.3 CL.ACC.3.PL HI let.2.SG take.away.INF
 ‘Don’t let her take them away.’

Even though the dependent infinitive requires its logical subject to be [REF], because it is an inherently reflexive verb, the reflexive “clitic” cannot appear either on the infinitive or together with the other “clitics” higher up in the structure. When a causative complex predicate is formed, the subject of the predicate is the causer or logical subject of the causative predicate and the logical subject of the dependent infinitive is encoded as an object, a dative object in (27) (see Alsina 1996, 1997). Consequently, there is no subject linked to [REF] for the SM mapping principle (20) to license a “clitic” in the morphological structure of the verb, which explains the disappearance of the reflexive “clitic” in causative constructions.

2.4. Morphological realization rules for “clitics”

The last element that we need to consider in our analysis is the actual phonological realization of “clitics.” The SM mapping principles only tell us whether a “clitic” is licensed in the morphological structure of a verb and what GF it is linked to. It is the morphological realization rules that tell us what phonological form to assign to a “clitic” on the basis of its syntactic features (i.e. of the features of the GF that it is linked to), as the following rules illustrate for three of the “clitics”:

(28) Morphological realization rules:

- a. $cl_1 \Rightarrow /m/$
 $\left[\begin{array}{ll} \text{PERS} & 1 \\ \text{NUM} & \text{SG} \end{array} \right]_1$
- b. $cl_2 \Rightarrow /t/$
 $\left[\begin{array}{ll} \text{PERS} & 2 \\ \text{NUM} & \text{SG} \end{array} \right]_2$

$$\begin{array}{l}
\text{c.} \quad \text{cl}_3 \quad \Rightarrow /s/ \\
\quad \quad [\text{PERS } 3]_3 \\
\quad \quad [\text{REF}]_3
\end{array}$$

According to (28a), a “clitic” that is linked to a GF with the features of first person and singular is assigned the phonological representation /m/; (28b) assigns the phonological form /t/ to a “clitic” linked to second person singular; and (27c) provides the shape /s/ to a “clitic” with the syntactic features of third person and reflexive. It is interesting to note that the morphological realization rules for first and second person “clitics” make no reference to the reflexivity feature: a “clitic” is realized as /m/ if it is first person and singular regardless of whether it is linked to an object and, therefore, is not reflexive or it is linked to a subject and, therefore, is reflexive. The phonological distinction between reflexive and non-reflexive “clitic” is only made with third person “clitics.”

The final phonetic form of the combination of a verb with a “clitic” depends on allomorphy rules and phonological rules, such as the rules that insert epenthetic schwa before or after the underlying forms of the “clitics” given in (28), to give alternations such as [s]/[əs]/[sə], as in *s’adona*, *es pot adonar*, and *adonar-se*. (See Bonet 1991, 1995.)

3 Conclusions

The analysis of Catalan “clitics” presented here, which focuses on the reflexive “clitic,” involves three elements of the grammar, specifically, of the syntax and the syntax-morphology interface. First, we have the strictly syntactic features that “clitics” are sensitive to, such as the reflexivity feature or [REF]. We have argued that this feature is assigned to the logical subject of a predicate by means of two mechanisms: on the one hand, by the lexical information of inherently reflexive verbs, and, on the other hand, by a principle that assigns that feature whenever an a-structure binding configuration arises in a clause. Second, we have the principles that license “clitics” on the basis of particular f-structure information. These are the Syntax-Morphology (or SM) mapping principles one of which is the principle licensing reflexive “clitics”: this principle licenses a “clitic” linked to a subject with the reflexivity feature. On the assumption that a “clitic” must be used if licensed by an SM mapping principle and cannot be used unless licensed, we explain the fact that in many syntactic environments the reflexive “clitic” is obligatory, the fact that it appears to be optional in other environments, and the fact that it is obligatorily absent in yet other contexts. The third and final element of the analysis is the morphological realization rules, which assign phonological representation to “clitics” in the morphological structure of verbs on the basis of the syntactic features in the GFs that the “clitics” are linked to.

A distinguishing property of the present analysis is that it does not resort to morphological features (or m-features) that merely duplicate the

corresponding f-structure features in order to establish the mapping between the form of affixes and their syntactic function. Proposals such as Luís and Sadler 2003, Luís and Otaguro 2004, Luís and Spencer 2005, Dalrymple 2015, Dalrymple, Lowe, and Mycock 2019, among others, assume that the syntactic features that the morphology is sensitive to have a correlate in terms of m-features and that there is a mapping between m-features and f-structure features. For example, in Luís and Sadler 2003 the third person singular accusative “clitic” in Portuguese has the correspondence between m-features and f-structure information in (29):

$$(29) \quad \{ \text{ACC}, 3, \text{SG}, \text{M} \} \longrightarrow \begin{array}{l} (\uparrow \text{OBJ PRED})=\text{PRO} \\ (\uparrow \text{OBJ PER})=3 \\ (\uparrow \text{OBJ NUM})=\text{SG} \\ (\uparrow \text{OBJ GEN})=\text{M} \end{array}$$

Each of the m-features in (29), shown on the left of the arrow, has a perfect correlate in the f-structure, shown on the right. The m-features 3, SG, and M correspond to the f-structure features [PER 3], [NUM SG], and [GEN M], respectively. The only m-feature in (29) that does not seem to have a correlate in terms of f-structure features is the m-feature of case, which has the two values of ACC and DAT, as Luís and Sadler 2003 do not posit a corresponding f-structure feature of case; but this m-feature correlates perfectly with the GF distinction between OBJ and OBJ2, since an accusative “clitic” (with the m-feature ACC) corresponds to an OBJ and a dative “clitic” to an OBJ2. So, there is complete redundancy between f-structure features and the m-features that correspond to them.¹⁰ The present theory achieves an important degree of formal simplification, by not positing morphological features that have a perfect correlate with f-structure features, thanks to the idea that “clitics” are linked to a specific GF. This is not to say that morphological features do not exist, but their role is restricted to features that do not have a syntactic effect, such as morphological classes (declension classes, conjugation classes, etc.).

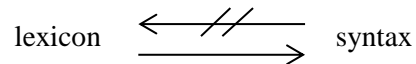
Another feature of the present proposal is that it makes full use of the LFG idea that the different modules and levels of representation are simultaneous and constrain each other. Standard versions of LFG (e.g. Bresnan et al. 2016) impose a restriction on this idea and adopt what we may call *lexical encapsulation* for the relation between words and the syntax. According to lexical encapsulation, the information in words may constrain the syntax, but syntactic information may not have any effect on the form of a word. In contrast, the view that is not constrained by lexical encapsulation –the view adopted here– allows principles or constraints to go in either direction: the form of words constraining the syntax and the syntax constraining the form of words. We can depict the two views regarding the syntax-morphology

¹⁰ This redundancy can be reduced by having rules that predict the m-features from the syntactic features, so that they are not all listed in lexical entries.

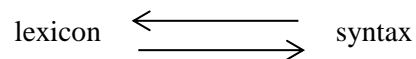
interface as follows, where we take the lexicon to be the module of the grammar in which morphology, or word-formation, takes place:

(30) Approaches to the syntax-morphology interface:

a. Approach with lexical encapsulation:



b. Approach without lexical encapsulation:



The approach without lexical encapsulation adopted here allows constraints to operate in both directions, as we have seen. To illustrate this point with the analysis proposed in this paper, the syntactic feature [REF] is licensed by a lexical item, through the information in (13), which is a constraint operating from the lexicon on the syntax, and the same feature is an essential part of the SM mapping principle licensing reflexive “clitics” (20), which is a constraint operating from the syntax on the lexicon. The feature [REF] is also assigned by principle (14), on the basis of a-structure information. This highlights the need for a multidirectional view of the correspondence between levels of representation.

The view proposed here demands changing the way the relation between words and the syntax has traditionally been seen in LFG. If we take a word consisting of a “clitic”-verb combination such as *em pentina* (CL.1.SG combs) ‘s/he combs me’, interpreting “clitics” to be affixes, the traditional assumption is that this word is inserted in the syntax carrying f-structure information about the PRED of the clause and about the OBJ. Specifically, it says that the OBJ of the f-structure corresponding to this word is a first person singular pronoun. This is usually done by assuming that the word carries a set of equations such as (\uparrow OBJ PRED)=‘pro’, (\uparrow OBJ PERS)=1, etc. In the view proposed here, the features of the object are not carried by the word *em pentina*, but are present in the f-structure in which this word is used (or, more precisely, in the f-structure that is linked to the X^0 node of this word in the c-structure). The word is inserted in the syntax specifying only the verb’s PRED feature. The SM mapping principles need to have access to the f-structure features of the object, such as its PRED feature, in order to license the “clitic” that is linked to it, as with principle (15), and the morphological realization rules, such as (28a), need to access the morphological structure, in which there is a “clitic,” and the f-structure to which this “clitic” is linked.

The features that the SM mapping principles and the morphological realization rules refer to cannot be assumed to be introduced by lexical items, since they are needed to generate the appropriate inflected form of verbs. Rather, they are introduced by a general principle. In the case of Catalan and other languages with “clitics” (or affixes corresponding to arguments of the

clause), we can assume that there is a rule that optionally introduces the feature [PRED ‘pro’] on all GFs corresponding to arguments of a verb, as well as the agreement features (person, gender, and number, taking any of the possible values of these features) of the same GFs. In this way, GFs that correspond to no lexical item in the c-structure may still have the necessary features to satisfy Completeness and to trigger the application of SM mapping principles and morphological realization rules, which provide those GFs with morphological expression in the form of “clitics” (affixes).

Languages that do not have either affixal expression of arguments or argument pro-drop, such as English, do not have the rule mentioned in the previous paragraph. Consequently, the features needed to satisfy Completeness must be introduced by lexical items. Which f-structure features are provided by rule (as opposed to provided by the lexicon) is a locus of cross-linguistic variation and we can assume that the inflectional morphology of a language (including “clitics” and other affixes) is generated by principles that are sensitive to rule-assigned f-structure features. See Alsina and Vigo 2017 for an analysis of Plains Cree morphology in line with the present proposal.

This approach to the syntax-morphology interface adheres to the *lexical integrity principle*. According to Bresnan and Mchombo (1995: 182), in LFG “the lexical integrity principle states that the morphemic structure of words differs from the c-structure of phrases both in constituents and principles of combination” and that words are the minimal, unanalyzable units of the c-structure (see also Mohanan 1995, among others). In other words, syntax is blind to morphology, as in Zwicky’s Principle of Morphology-Free Syntax, (Zwicky 1987: 650; see also O’Neill 2016: 244). On the other hand and counter to mainstream LFG, morphology is not blind to syntax, but, in the case of inflection, is generated by principles that are sensitive to the f-structure features of the syntactic structures in which a word is used.

References

- Aissen, Judith and David Perlmutter, 1983. Clause reduction in Spanish. In David Perlmutter (ed.), *Studies in Relational Grammar 1*, 360–403. Chicago: The University of Chicago Press.
- Alsina, Alex. 1996. *The role of argument structure in grammar: Evidence from Romance*. Stanford: CSLI Publications.
- Alsina, Alex. 1997. Causatives in Bantu and Romance. In Alex Alsina, Joan Bresnan, and Peter Sells (eds.), *Complex predicates*, 203–246. Stanford: CSLI Publications.
- Alsina, Alex and Eugenio M. Vigo. 2014. Copular inversion and non-subject agreement. In Miriam Butt and Tracy Holloway King (eds.), *Proceedings of the LFG14 conference*, 5–25. Stanford: CSLI Publications.

- Alsina, Alex and Eugenio M. Vigo. 2017. Fixing LFG to account for direct-inverse agreement: the case of Plains Cree. In Miriam Butt and Tracy Holloway King (eds.), *Proceedings of the LFG17 Conference*, 24–44. Stanford: CSLI Publications.
- Andrews, Avery. 1990. Unification and morphological blocking. *Natural Language and Linguistic Theory* 8: 507–557.
- Bonet, Eulàlia. 1991. *Morphology after syntax: Pronominal clitics in Romance*. Ph.D. dissertation, MIT. Distributed by MIT Working Papers in Linguistics.
- Bonet, Eulàlia. 1995. Feature structure of Romance clitics. *Natural Language and Linguistic Theory* 13: 607–647.
- Bresnan, Joan. 2000. Optimal syntax. In Joost Dekkers, Frank van der Leeuw, and Jeroen van de Weijer (eds.), *Optimality theory: phonology, syntax and acquisition*, 334–385. Oxford: Oxford University Press.
- Bresnan, Joan, Ash Asudeh, Ida Toivonen, and Stephen Wechsler. 2016. *Lexical-Functional Syntax*. Malden, MA: Wiley Blackwell.
- Bresnan, Joan and Sam A. Mchombo. 1987. Topic, pronoun and agreement in Chichewa. *Language* 63: 741–782.
- Bresnan, Joan and Sam A. Mchombo. 1995. The Lexical Integrity Principle. Evidence from Bantu. *Natural Language and Linguistic Theory* 13: 181–254.
- Crysmann, Berthold. 1997. Cliticization in European Portuguese using parallel morpho-syntactic constraints. In Miriam Butt and Tracy Holloway King (eds.), *Proceedings of the LFG97 Conference*. Stanford: CSLI Publications.
- Dalrymple, Mary. 2015. Morphology in the LFG architecture. In Miriam Butt and Tracy Holloway King (eds.), *Proceedings of the LFG15 Conference*, 64–83. Stanford: CSLI Publications.
- Dalrymple, Mary, John J. Lowe, and Louise Mycock. 2019. The interface to morphology. In Dalrymple, John J. Lowe, and Louise Mycock (eds.), *The Oxford reference guide to Lexical Functional Grammar*, 436–470. Oxford: Oxford University Press.
- GLC: Institut d’Estudis Catalans. 2016. *Gramàtica de la llengua catalana*. Barcelona: Institut d’Estudis Catalans.
- Grimshaw, Jane. 1982. On the lexical representation of Romance reflexive clitics. In Joan Bresnan (ed.), *The mental representation of grammatical relations*, 87–148. Cambridge: MIT Press.
- Grimshaw, Jane. 1990. *Argument structure*. Cambridge: MIT Press.

- Kuhn, Jonas. 2003. *Optimality-Theoretic syntax: a declarative approach*. Stanford: CSLI Publications.
- Luís, Ana and Ryo Otaguro. 2004. Proclitic contexts in European Portuguese and their effect on clitic placement. In Miriam Butt and Tracy Holloway King (eds.), *Proceedings of the LFG04 Conference*, 334–352. Stanford: CSLI Publications.
- Luís, Ana and Louisa Sadler. 2003. Object clitics and marked morphology. In Claire Beyssade, Olivier Bonami, Patricia Cabredo Hofherr, and Francis Corblin (eds.), *Empirical issues in syntax and semantics* 4, 133–153. Paris: Presses Universitaires de Paris-Sorbonne.
- Luís, Ana and Andrew Spencer. 2005. A paradigm function account of ‘mesoclitisis’ in European Portuguese. In Geert Booij and Jaap van Marle (eds.), *Yearbook of Morphology 2004*, 177–228. Dordrecht: Kluwer.
- Miller, Philip H. 1992. *Clitics and constituents in phrase structure grammar*. New York: Garland.
- Miller, Philip H. and Ivan A. Sag. 1997. French clitic movement without clitics or movement. *Natural Language and Linguistic Theory* 15: 573–639.
- Mohanan, Tara. 1995. Wordhood and lexicality: Noun incorporation in Hindi. *Natural Language and Linguistic Theory* 13: 75–134.
- Monachesi, Paola. 1999. *A lexical approach to Italian cliticization*. Stanford, CA: CSLI Publications.
- O’Neill, Paul. 2016. Lexicalism, the Principle of Morphology-free Syntax and the Principle of Syntax-free Morphology. In Andrew Hippisley and Gregory Stump (eds.), *The Cambridge handbook of morphology (Cambridge handbooks in language and linguistics)*, 237–271. Cambridge: Cambridge University Press.
- Patejuk, Agnieszka and Adam Przepiórkowski. 2016. Reducing grammatical functions in LFG. In Doug Arnold, Miriam Butt, Berthold Crysmann, Tracy Holloway King and Stefan Müller (eds.), *Proceedings of the Joint 2016 Conference on Head-driven Phrase Structure Grammar and Lexical Functional Grammar*, 541–559. Stanford: CSLI Publications.
- Rizzi, Luigi. 1982. *Issues in Italian syntax*. Dordrecht: Foris Publications.
- Rosen, Sara T. 1989. *Argument structure and complex predicates*. Ph.D. dissertation, Brandeis University.
- Yang, Fengrong. 2019. *Argument realization: Grammatical function and case assignment*. Ph.D. dissertation, Pompeu Fabra University.
- Zwicky, Arnold. 1987. Slashes in the passive. *Linguistics* 25: 639–665.