# LEXICAL-CONSTRUCTIONAL SUBSUMPTION PROCESSES IN THE LEXICAL CONSTRUCTIONAL MODEL: THE CASE OF JOIN AND ATTACH

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## 1. Introduction[1]

The nature of the relationship between grammar and lexicon has been the object of numerous studies that present different views attending to the type of relationship that is claimed to exist between these two components. Functional theories such as Role and Reference Grammar (RRG) (Van Valin 2005; Van Valin and LaPolla 1997) and Functional Discourse Grammar (Dik 1997; Hengeveld and Mackenzie 2008) claim that the morphosyntactic structure of predicates derives from their lexical structure by means of a set of linking rules, whereas cognitive and constructional models of linguistic description postulate the existence of a continuum from lexicon to grammar (Croft 2001; Goldberg 1995, 2002, 2006; Lakoff 1987; Lakoff and Johnson 1999; Langacker 1987, 2005).

The Lexical Constructional Model (henceforth LCM) as outlined in Ruiz de Mendoza and Mairal (2007a, 2007b, 2008) and Mairal and Ruiz de Mendoza (2006, 2008, 2009a, 2009b, 2011) combines assumptions from functional projectionist theories and constructional models adopting a non-eclectic but rather inferential[2] approach (Mairal and Ruiz de Mendoza 2009b) which aims to explore the relationship between lexical and syntactic meaning and provides a basis for the characterization of the logical structure of verbs, their semantic content (lexical templates) and the cognitive and pragmatic constraints which might block or, on the contrary, license the merging of lexical templates and other higher-level

constructions. From RRG, they adopt the "functional face of the model" (Ruiz de Mendoza and Mairal 2008: 1) whereas the constructional orientation of the model mainly derives from Goldberg (1995, 1998, 2002, 2006)[3].

The present contribution provides a description of the semantic representation of the verbs *join* and *attach,* which belong to the lexical subdomain of "putting things together", as presented in the paradigmatic organization of the lexicon in Faber and Mairal (1999), along with the structural patterns and alternations in which these predicates might participate (Levin 1993; Rappaport and Levin 1998). For the purposes of this research, I have been inspired by the theoretical framework of the LCM and by the methodological assumptions of Role and Reference Grammar, which have been proved valid tools for the analysis of position verbs. These are verbs that describe how to put things together (e.g. *join* and *attach*).

The remainder of this article is structured as follows. Section 2 includes information about the corpus and methodology used. Section 3 offers a description of the semantic representation of the verbs along with the structural patterns and alternations in which these predicates participate (Levin 1993). Section 4 provides a general overview of the LCM and deals with the representation of the lexical templates of the predicates under study, their logical structures (Van Valin and LaPolla 1997; Van Valin 2005) and the constructional templates of these verbs at the core grammar level of description. Finally, in section 5, by analyzing the interaction between the lexical and constructional templates of these lexical items, I aim to predict and explore the constraints which underlie the syntagmatic behavior of these verbs and present a simplified representation of lexical-constructional subsumption processes of these verbs at the core grammar level of description. With this modest study I also hope to help confirm the explanatory potential of the LCM for the study of the semantic and syntactic description of predicates.

## 2. Methodology

This study is restricted to the following senses of the verbs *join* and *attach* as defined in the *Macmillan Online Dictionary*: *Join:* "to connect two things" (transitive) (sense 2) or "to become connected at a particular point" (intransitive); *Attach:* "to fasten or join one thing to another" (transitive) (sense 1). The example sentences that have been analyzed in this research are all naturally-occurring data mainly withdrawn from the *British National Corpus* (*BNC*) (128 examples containing the predicate *join* and 28 containing the predicate *attach*) and, in the case of the predicate *attach,* from other sources such as the *Corpus of American Contemporary English* (COCA, 6 examples), the *Corpus of Historical American English* (COHA, 5 examples) and Google searches (55 examples)[4].

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Thus, examples such as those presented in Table 1, which include transitive and intransitive uses of the predicates *join* and *attach* both in their prepositional variants and the simple and *together* reciprocal alternations, will be accounted for by making use of the analytical tools provided by the Lexical Constructional Model and Role and Reference Grammar. We will also briefly refer to the lexical database of English, FrameNet[5], in order to better understand the semantics of the verbs under scrutiny:

| | JOIN | | ATTACH | |
|---|---|---|---|---|
| | **TRANSITIVE** | **INTRANSITIVE** | **TRANSITIVE** | **INTRANSITIVE** |
| **PREPOSI-TIONAL VARIANTS** | What you do is *join* the bell to the two middle, or deck, feathers with a strip of leather, threaded with a bell. | … each nucleotide consists of a common piece (which *joins* to other identical pieces to form the " string ") … | Now you *attach* your lead dog to a tree, … | De Brown (…) told me later that day (…) that they do this to knock off the remoras that *attach* to their sides. |
| **SIMPLE RECIPROCAL ALTERNATION** | This new plan also envisaged (…) *joining* the church and the halls. | When two 2nd Order rivers *join* (not a 1st and a 2nd), the much larger river is 3rd Order, and so on in a hierarchy of sizes. | _____ | _____ |
| ***TOGETHER* RECIPROCAL ALTERNATION** | The combine tool is used to *join together* the blade and the handle to make a single filled object | And when two black holes collided and *joined together* to form a single hole,… | These we *attach* three *together*, on the "ridge and furrow" system | _____ |

TABLE 1. Representative examples of the different patterns analyzed.

## 3. Semantic Representation of the Verbs Join and Attach: Structural Patterns and Alternations

In this section, we provide a detailed description of the semantic representation of the verbs *join* and *attach*, and present the verb classes these two predicates are claimed to belong to, following Faber and Mairal's (1999) verb subdomain classification, Levin's (1993) verb class organization, and Van Valin and Lapolla's (1997) verb class distinctions. Once we have examined the semantic description of the predicates *join* and *attach*, we will analyze the structural patterns and alternations in which these predicates participate (Levin 1993).

The lexical architecture of the domain of verbs of *position* as presented in the paradigmatic organization of the lexicon proposed in Faber and Mairal (1999), is structured in lexical subdomains, one of which is the verbal subdomain "putting things together", to which *join* and *attach* belong. These verbs come under three other higher levels or subdomains which are described as follows (Faber and Mairal 1999: 284):

1. To be in a particular state/condition/position, without moving, changing (STAY, LIE)
    1.1. to cause somebody or something to stay in a particular state/condition/ position (KEEP, MAINTAIN)
        1.1.1. to cause somebody or something to BE in a particular place/ position (PUT, PLACE)
            1.1.1.1. to put things together (JOIN, ATTACH)

In Levin's classification of English verbs, which is based on the organization of verbs in terms of their having similar semantic components and showing similar syntactic behavior (1993: 17), the verbs *join* and *attach* belong to the verbs of "combining and attaching" (Levin 1993:159ff), where different subclasses are distinguished according to whether their meaning involves a *result* or a *means* component. In the case in hand, *join* belongs to the verb subclass of "mix verbs" (Levin 1993: 159), which includes verbs that describe the *result* or *endstate* of their direct object. Within this group different subclasses are distinguished according to the preposition selected when taking a prepositional phrase complement. *Attach* belongs to the verb subclass of "shake verbs" (Levin 1993: 161), which are characterized because they describe the *manner* in which things are combined, and are also classified into different subclasses according to the preposition selected when taking a prepositional phrase as complement.

In order to obtain a more complete analysis of the semantic representation of the verbs *join* and *attach,* we have also resorted to the lexical database of English, FrameNet, which offers the semantic and syntactic combinatory possibilities of

each verb in each of its senses. Thus, the lexical unit *join* is included in two semantic frames[6], "cause to amalgamate" and "attach", which are distinguished because of the semantics underlying the parts that undergo the process of joining. In order to establish the differences between these two frames, the notion of symmetry is introduced to determine whether after the process of joining the entities are fused and form a new distinct whole which indicates the result of the amalgamation, showing a symmetrical relationship ("cause to amalgamate": *join together*), or "whether" there is no new entity involved ("attach"). In this latter frame, the manipulation of a Connector is required in order to physically connect two parts that show an asymmetrical relationship. However, in this frame we can find a second situation in which someone, using a Connector, causes two Items to be connected to each other, thus showing a symmetric relation or mutual attachment, very often together with the frame element Result represented by the adverb *together*, without creating a new entity.

As regards FrameNet's semantic description of *attach,* two lexical units are distinguished, the first belonging to the frame "inchoative attaching", and the second to the frame "attaching", which has already been described. In the frame "Inchoative attaching", an Item is attached to a Goal (the location at which the first Item is attached) using a Connector (usually introduced by the preposition *with*), and so Item precedes Goal, which in turn precedes Connector.

In order to present the structural patterns and alternations in which the predicates *join* and *attach* may participate, we have followed Levin's classification (1993). These verbs can be found in different alternations where the most basic patterns alternate with other forms in a near-paraphrase relationship (Levin 1993: 60). I will first present the most prototypical prepositional variants and will then show the constructions with which they alternate.

The basic structural pattern for the underlying semantic representation of the *transitive* uses of these predicates is constituted of three core arguments, two direct and one oblique, both patterns including prepositional variants:

  NP1 JOIN NP2 [PP (to) NP3] / NP1 ATTACH NP2 [PP (to) NP3]

a. What you do is join the bell to the two middle, or deck, feathers with a strip of leather, threaded with a bell. (BNC_CHE W_biography)

b. Now you attach your lead dog to a tree, or the sledge in front, or anything to keep your tow line taut. (BNC_A67 W_misc)

c. Once you've joined the male sperm with the female egg, it's a human being, … (corpus.byu.edu/time/- 1992/10/05)

The prepositional phrase complement, which introduces the third oblique argument, is typically introduced by the preposition *to*, although the preposition

*with* is also possible with the predicate *join*[7]. In these cases, someone or something (typically a machine or equipment) causes one thing to be physically connected to something else, very often by manipulating a connector (FrameNet) or fastener (Levin 1993: 164), which is typically introduced by the preposition *with*. In these cases, there seems to be an asymmetric relation between NP2 and NP3 and no new entity has been created after the joining or attachment of the entities.

From a purely syntactic perspective, the typical frame for the intransitive use of *join* requires a first core argument and a prepositional phrase complement introducing the second oblique argument[8]. The preposition assigned to the oblique argument is typically *to*: NP1 JOIN [PP to NP2], and although Levin does not include intransitive uses of *attach*, we have found intransitive examples following this pattern[9]. In these cases, there seems to be an asymmetric relation between NP1 and NP2:

d. … each nucleotide consists of a common piece (<u>which joins to other identical pieces</u> to form the " string "), … (BNC-AE7_W_non_ac_nat_science)

e. De Brown (…) told me later that day (…) that they do this to knock off <u>the remoras that attach to their sides</u>. (COCA- 2007_MAG_Field and Stream)

The predicate *join* is found in patterns with the preposition *with* too, NP1 JOIN [PP with NP2], in which case there also seems to be an asymmetric relation between NP1 and NP2:

f. The presence of wading birds was all that defined <u>the place at which the river joined with the sea</u>. (BNC-AEA_W_fict_prose)

The predicates *join* and *attach* participate in various *reciprocal alternations* which involve a shift of some phrase without affecting their transitivity, but allow more than one way of expressing their arguments, namely as direct core arguments (involving the absence of a prepositional phrase complement) or as oblique core arguments adpositionally marked. In the case in hand, *join* participates in both the simple reciprocal alternation and the *together* reciprocal alternation, whereas *attach* only participates in the *together* reciprocal alternation.

When the transitive *join* (NP1 JOIN NP2 [PP (with/to) NP3]) participates in the simple reciprocal alternation, the transitive reciprocal variant presents a direct core argument as object constituted by a conjoined noun phrase: NP1 JOIN [NP2 AND NP3], which presents some semantic constraints: the object must be a collective noun, i.e. the noun phrase must have a group interpretation; all the entities constituting the object NP must be of comparable status, i.e. they must be "of about the same size, rank or importance" (Kreidler 1998: 107), and there must be a symmetric relation between NP2 and NP3 (Levin 1993: 59).

g. This new plan also envisaged (…) <u>joining the church and the halls</u>. (BNC-B13_W_non_ac_humanities_arts)

However, a plural noun phrase as object is also common: NP1 JOIN [NP2 plural]

h.  If you are using hardboard or plywood, cut each of the four sides separately and <u>join them</u> with glue and nails. (BNC-EUR_W_non_ac_nat_science)

i.  The chain <u>joining the handcuffs</u> chinked … (BNC-C85_W_fict_prose)

In the *together* reciprocal alternation (transitive), *join* and *attach* also need a collective NP as object and a symmetric logical relation is established between the conjoined NPS.

> NP1 JOIN NP2 [PP (with/to) NP3]  / NP1 JOIN [NP2 AND NP3] TOGETHER
>
> NP1 ATTACH NP2 [PP (to) NP3]   / NP1 ATTACH [NP2 AND NP3] TOGETHER

j.  The combine tool is used to <u>join together the blade and the handle</u> to make a single filled object (BNC- HAC W_pop_lore)

k.  … and then <u>join the parts together</u> to make five sentences. (BNC-H7V_W_fict_prose)

l.  <u>These we attach three together</u>, on the 'ridge and furrow' system, as shown in sketch. (COHA-1865-NF_WoodwardsGraperies)

m.  … the Stardust Twins had found three small pieces of bone, <u>attached together</u> with a wire -- obviously a human artifact. (COCA- 1994-FIC_FantasySciFi))

Similarly, it is very common to find a plural noun phrase as object: NP1 JOIN/ ATTACH NP2 (plural) TOGETHER. The presence of *together* in the transitive alternation implies that, as is suggested in FrameNet, "the two entities that undergo the process of joining are fused or consumed and are no longer distinct entities but form now a whole". Thus, *together* indicates the result of the amalgamation (FrameNet) and is connected to phrases which indicate the "resulting configuration" (Levin 1993: 62). It is important to highlight here that in these cases it is very common for the new entity created as a result of the joining to be explicitly expressed in the sentence by means of a to-infinitive or a prepositional phrase (normally introduced by *in*).

As for the intransitive counterparts, only *join* participates in the simple reciprocal alternation: [NP1 AND NP2] JOIN[10]. The first argument is typically expressed by two noun phrases coordinated by the conjunction *and* showing a symmetric relation between NP1 and NP2 and also by a plural NP as subject ([NP1 plural] JOIN):

n.  <u>Bone, liver and lights join</u> at the sheer table. (BNC-H9V_W_fict_prose)

o.  When <u>two 2ⁿᵈ Order rivers join</u> (not a 1ˢᵗ and a 2ⁿᵈ), the much larger river is 3ʳᵈ Order, and so on in a hierarchy of sizes. (BNC-B1H_W_non_ac_soc_science)

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When intransitive *join* appears in the *together* reciprocal alternation (intransitive), *together* follows the verb and there is a symmetric relation between NP1 and NP2: [NP1 AND NP2] JOIN TOGETHER. As with the transitive *together* reciprocal alternation, a new entity is implied as a result of the joining.

p.  And when two black holes collided and <u>joined together </u>to form a single hole,… (BNC- FYX_W_non_ac_nat_science)

q.  .… all the amine molecules at the interface of the two liquids <u>join together </u>in a polymer. (BNC-A3Y_W_newsp_brdsht_nat_science)

## 4. Lexical and Constructional Templates for *Join and Attach*

The Lexical Constructional Model (LCM) is a meaning construction model whose *core* component accounts for the relationship between lexicon and grammar, where the subsumption or unification of lexical templates (lower-level semantic representations of the syntactically relevant content of a predicate) and constructional templates (higher-level semantic representations) gives rise to semantic interpretation (Butler 2009, 2013; Mairal and Ruiz de Mendoza 2006, 2008, 2009a, 2009b; Ruiz de Mendoza 2013; Ruiz de Mendoza and Mairal 2007a, 2007b, 2008). Lexical templates are the triggering point which provides the input required for the activation of rules which act as an interface between the lexical representation of verbal classes and the lexical representation of constructions in which such predicates occur. Thus, meaning is related to the syntactic level by means of interface mechanisms. Lexical-constructional subsumption processes are regulated by internal constraints (which refer to the semantic nature or status of some elements in the lexical and constructional templates) and external constraints (which explain grammatical processes on the basis of higher level conceptual and cognitive mechanisms: high-level metaphorical and metonymic mappings), both of which serve as licensing or blocking factors that filter out impossible combinations of lexical items with constructions.

For the description of the lexical and constructional templates of the lexical items *join* and *attach*, we have mainly resorted to the LCM. It presents a finer-grained analysis for meaning construction in terms of internal constraints associated with the semantic structure of predicates, an analysis not present in the FrameNet approach, in spite of the latter providing detailed semantic and syntactic information of predicates by presenting accurate definitions of the frames they belong to and their syntactic realizations. The LCM has been proved to be valid for lexical and constructional description "by endowing the semantic description with a higher

degree of systematicity, richness of detail, and typological adequacy" (Pérez Hernández and Peña Cervel 2009: 71)[11]. In our analysis, however, we have felt the need to incorporate analytical tools from Role and Reference Grammar such as *Aktionsart distinctions*, macro-role assignment and thematic relations to account for the interface mechanisms which link semantics and syntax enabling us to provide a thorough description of the lexical and constructional templates of the predicates concerned.

In order to build up the lexical and constructional templates for verbal predicates, we need to first ascertain the verb class to which these predicates can be ascribed. In doing so, we have relied on the theory of verb classes presented in the work of Valin and Lapolla (1997: 90ff.) and Van Valin (2005: 31ff.), which adopt a lexical decomposition approach in terms of the *Aktionsart* distinctions proposed in Vendler (1967) and the decompositional system put forward by Dowty (1979). Thus, the verb class ascribed to *join* and *attach* is "accomplishment" for the intransitive uses of the verb[12], which can be decomposed into the following semantic parameters: [- static], [- dynamic], [+ telic], [+ duration], [- punctual]. Accomplishment verbs can be said to "involve both a process that takes place over time [that is why they have duration and are not punctual], and an inherent endpoint of the process leading to a result state [that is why they are telic]" (Van Valin and Lapolla 1997: 43). As regards the transitive uses of these verbs, they are ascribed to the verb class "causative accomplishment", which can be paraphrased as "x CAUSES y and z to become joined/attached"[13].

The linking algorithm that is used in the LCM in order to build up the format of lexical templates has been developed stemming from the Logical Structures of RRG, which are used to represent the semantic and argument structure of predicates. These lexical templates include a semantic module (where lexical functions are specified; Mel'cuk 1989; Mel'cuk and Wanner 1996) and an *Aktionsart* module, which is based on RRG logical structures where constants, which are part of the vocabulary of the semantic metalanguage used in the decomposition, are represented in boldface followed by a prime; and variables, which are filled in by lexical items from the language that is being examined, are presented in normal font (Van Valin 2005: 45). For the purpose of this preliminary research, I will only work on the *Aktionsart* module.

| Predicate: | [SEMANTIC MODULE < lexical functions>] | [AKTIONSART MODULE < semantic primes >] |
| --- | --- | --- |

The lexical representation for predicates whose *Aktionsart* class is Accomplishment is presented through the following logical structure (LS) which consists of a state

predicate (a primitive) plus the BECOME operator (which codes change over some temporal span; Van Valin and LaPolla 1997: 104-105):

BECOME **predicate'** (x) or (x, y)

The intransitive use of *join* and *attach* includes the BECOME operator plus a locative predicate (**be-LOC'**) and two arguments, which can be represented as follows:

BECOME **be-LOC'** (x, y)

*Join/Attach*: BECOME **be-next to'** (x, y)

f. … the place at which the river joined with the sea.

BECOME **be-next to'** (sea, river)

Causative verbs have a complex structure consisting of two predicates linked by the operator-connective CAUSE, the first of which shows the causing action (or event, usually an activity predicate) and the second indicates the resulting state of affairs (Van Valin 2005: 42):
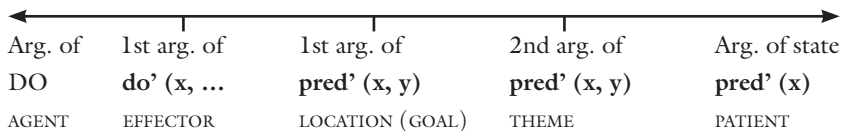
(α CAUSES β) à [**do'** …] CAUSE [BECOME **pred'** …]

*Join* and *attach* are examples of lexical causatives which are represented in their LS by the direct (coercive) connector CAUSE and which belong to the so called implicative causality, in which the resulting state of affairs is necessarily entailed: *\*Pam joined y and z, but y and z did not join* would not be regarded as correct (Van Valin 2005: 42). The following LS represents the semantic structure for causative accomplishment, which is associated to the transitive uses of *join* and *attach*:

[**do'** (x, Ø)] CAUSE [BECOME **be-next to'** (y, z)]

Once we have sketched the logical structures for these predicates, we should determine the thematic relations and the assignment of macroroles[14]. Thematic relations correspond to the five possible argument positions in logical structure following the "thematic relations continuum in terms of logical structure argument position" (Van Valin 2005: 58):

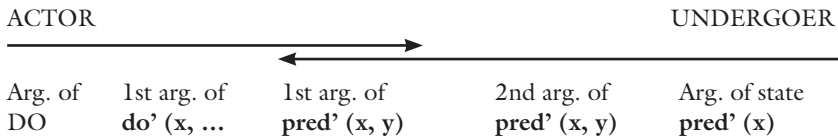| Arg. of DO | 1st arg. of do' (x, … | 1st arg. of pred' (x, y) | 2nd arg. of pred' (x, y) | Arg. of state pred' (x) |
|---|---|---|---|---|
| AGENT | EFFECTOR | LOCATION (GOAL) | THEME | PATIENT |

Thus, the thematic relations that can be ascribed to the arguments in the logical structures that have been presented so far are *effector*, which corresponds to the first argument of an activity (**do'** (x…)) and could be described as the doer of an action, which may or may not be willed or purposeful; the *theme*, which corresponds

to the second argument of a two-place state predicate of location (**predicate'** $(x, y)$), including participants which are placed, moved, transferred, etc.; and just in the middle of the continuum falls the first location argument of **predicate'** $(x, y)$, which in the case of the logical structure configuration "… BECOME **be-LOC'** $(x, y)$" is assigned the semantic role *goal*.

BECOME **be-next to'** $(x_{GOAL}, y_{THEME})$

[**do'** $(x_{EFFECTOR}, \emptyset)$] CAUSE [BECOME **be-next to'** $(y_{GOAL}, z_{THEME})$]

In order to determine the macrorole assignments the Actor-Undergoer Hierarchy (A-UH) (Van Valin 2005:126) has been followed:

| ACTOR | | | | UNDERGOER |
|---|---|---|---|---|
| Arg. of DO | 1st arg. of **do' (x, …** | 1st arg. of **pred' (x, y)** | 2nd arg. of **pred' (x, y)** | Arg. of state **pred' (x)** |

[ ⟶ = increasing markedness of realization of argument as macrorole]

Actor selection: highest ranking argument in LS

Undergoer selection:

Principle A: lowest ranking argument in LS (default)

Principle B: second highest ranking argument in LS

In the causative accomplishment predicate, there are two macroroles: taking the actor and undergoer selection principles, the first argument of the activity predicate is assigned the MR actor and the theme becomes the Undergoer. There is also a non-macrorole argument (the first argument of a locative predicate) which is assigned the preposition *to* or *with*, following Van Valin's preposition assignment rules[15].

[**do'** $(x_{EFFECTOR}, \emptyset)$] CAUSE [BECOME **be-next to'** $(y_{GOAL}, z_{THEME})$]

[X = Actor] [ Z = Undergoer]

As for the accomplishment predicates (intransitive structure), there is only one macrorole, [MR1 = U], which is assigned to the second argument of a two-place state predicate of location, **predicate'** $(x, y)$, x becoming a non-macrorole argument which is assigned the preposition *to* or *with*, following Van Valin's preposition assignment rules.

BECOME **be-next to'** $(x_{GOAL}, y_{THEME})$] [y = U]

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## 5. Constraints on the Lexical Constructional Subsumption Processes for *Join* and *Attach*

The lexical representation for predicates whose verb class or *aktionsart* is Accomplishment is presented through the following logical structure (LS), which corresponds to the intransitive use of *join,* and which consists of a state (a primitive) plus the operator BECOME:

BECOME **predicate'** (x) or (x, y)

BECOME **be-next to'** (x, y) or ( x Λ y)

As for causative accomplishment (α CAUSES β), the following LS represents the semantic structure for the transitive uses of *join* and *attach* in their maximum structure, in which we observe that two LSs are implied: an activity (α) and an accomplishment (β).

[**do'** (x, Ø)] CAUSE [BECOME **be-next to'** (y, z)]

In the examples in which *join* (and also *attach*) participates in the *together reciprocal alternation,* the LS is as follows:

[**do'** (x, Ø)] CAUSE [BECOME **be-next to'** (y, z) & BECOME **be-together'** (y Λ z)]

The idea that there is a possibility that a new entity comes into existence after the process of joining must be grasped in the logical structure of the causative accomplishment examples of *join* in the *together* alternation, which might be represented with the symbol Λ indicating that there are two simultaneous changes of state taking place and that there is a transformation implied, and that is why there is a new entity resulting from the joining:

[**do'** (x, Ø)] CAUSE [BECOME **be-next to'** (y, z) Λ BECOME **be-together'** (y Λ z)]

Once we have outlined the basic logical structures for the accomplishment and causative accomplishment predicates *join* and *attach* in their prototypical structures at the core grammar (or argument structure) level of description, we need to identify the argument-structure constructions into which these verb classes may be subsumed in the lexical-constructional linking process.

### 5.1. Transitive Structures

The transitive uses of these verbs are represented by a causative accomplishment logical structure with three arguments. In the prototypical prepositional variants, where prepositional marking is required, two prepositions where found in Levin's syntactic frames for *join* (*to/with*) and one for *attach* (*with*). According to the rule for assigning the preposition *to* in English (Van Valin and LaPolla 1997), the NP

marked by *to* is in every instance the first argument of a two-place state predicate embedded under BECOME operator in the LS, which is also a non-macrorole core argument:

> Assign *to* to the non-macrorole x argument in the LS segment: ... BECOME/ INGR **pred'** (x, y) (Van Valin and LaPolla 1997: 377).

Therefore, if only one of the arguments is candidate for macrorole assignment (as a result of there being a non-symmetric relation between y and z), then the rule for prepositional marking triggers the assignment of *to* to the non-macrorole core argument. The following simplified constructional template (CT) represents the transitive prepositional variants of *join* and *attach*:

> [**do'** (x, Ø)] CAUSE [BECOME **be-next-to'** (y, z)]
>
> [x= A]; [z = U]; [y = non macrorole (*to* assignment)]
>
> b. Now you [A] attach your lead dog [U: theme] to a tree [non-MR: goal], ...

However, *join* also allows the possibility of marking the NP3 by *with*. In this case, the preposition *with* is associated with its comitative use, which is possible when there is an alternation involved (Van Valin and LaPolla 1995: 379). Thus, with potential undergoer arguments, where we have conjoined NPs alternating with *NP with NP*, the generalization would be that if an argument, which would otherwise appear as a macrorole, does not, it is marked by *with*. The rule for assigning *with* in English reads as follows:

> Given two arguments, *x* and *y*, in a logical structure, with *x* lower than or equal to *y* on the Actor-Undergoer Hierarchy, and a specific grammatical status (macrorole, head of NP), assign *with* to the *y* argument if it is not selected for that status (Van Valin and LaPolla 1997: 379).

This possibility would be represented as follows in the LS/CT:

> [**do'** (x, Ø)] CAUSE [BECOME **be-next-to'** (y ∧ z)]

We assume that there is a single logical structure underlying the two following frames: [NP1 JOIN [NP2 AND NP3]] and [NP1 JOIN [NP2 WITH NP3]]. The two arguments in question are candidates for the same grammatical status (and this is reflected by using the lambda symbol which places the two arguments at the same level) as a result of there being a symmetric relation between all the participants constituting the object NP, which must fulfill the semantic constraint that they be of comparable status. Thus, if in the macrorole assignment phase, both y and z are chosen as undergoers (because they are either both themes or goals), there is no need for prepositional marking and the result is [NP1 JOIN [NP2 AND NP3]]:

> [**do'** (x, Ø)] CAUSE [BECOME **be-next-to'** (y ∧ z)]  [y and z = undergoer]
>
> g. This new plan also envisaged (...) joining the church [U] and the halls [U].

However, if only one of the potential undergoers is selected as undergoer, argument-marking preposition is required and the result would be [NP1 JOIN [NP2 WITH NP3]]:

[**do'** (x, Ø)] CAUSE [BECOME **be-next-to'** (y Λ z)]

[z = Undergoer]

[ y = non-macrorole oblique core argument < semantic constraint: the two potential macrorole candidates must be of comparable status and y must be of equal or higher rank in the AU-H] à prepositional marking = *with* >]

c. Once you've [A] joined the male sperm [U] with the female egg [Non-MR], …

To sum up, the two different syntactic prepositional realizations for *join* can be associated with different macrorole assignments. Thus, the difference between simple reciprocal alternations and their corresponding prepositional variants lies in the assignment of macroroles at the interface level. It is important to highlight that, unlike the rule for *to* marking, which refers to specific argument positions in logical structures, the rule for assigning *with* in English refers "to the macrorole assignment phase of the linking procedure" (Van Valin and LaPolla 1997: 379).

A.    [**do'** (x, Ø)] CAUSE [BECOME **be-next-to'** (y, z)] (x JOIN y TO z)

[x= A]; [z = U]; [y = non macrorole < semantic constraint: there is only one potential argument for U (always lower in the AU-H than z = theme), thus the non-macrorole argument (always higher in the hierarchy = goal) must be marked by *to*>]

B.    [**do'** (x, Ø)] CAUSE [BECOME **be-next-to'** (y Λ z)] (x JOIN y AND z)

[x= A]; [y and z = undergoer]

C.    [**do'** (x, Ø)] CAUSE [BECOME **be-next-to'** (y Λ z)] (x JOIN y WITH z)

[x= A]; [z = Undergoer]; [ y = non-macrorole oblique core argument < semantic constraint: the two potential macrorole candidates must be of comparable status and y must be of equal or higher rank in the AU-H] à prepositional marking = *with* >]

The abbreviated constructional templates presented so far for the basic transitive and intransitive constructions can be fused into higher-level characterizations when the verbs participate in the *together reciprocal* alternation. In this case, we assume that there is a resultative construction subsumed, which is not an inherent part of the predicate but a secondary predication. This assumption is close to Levin's claim that "it is possible that the together reciprocal construction may turn out to be a type of resultative construction" (1993: 62, 64).

In fact, as has been mentioned before, when *join* and *attach* participate in the *together* transitive reciprocal alternation, the conjoined or attached parts are no longer individual entities but are fused into a new entity, very often explicitly specified in the sentence by means of a prepositional phrase (typically introduced by *in*) or a to-infinitive clause.

> j. The combine tool is used to join together the blade and the handle *to make a single filled object*.

> k. … and then join the parts together *to make five sentences*.

Thus, this possibility of a new entity coming into existence after the process of joining must be grasped in the logical structure of the predicates, and it might be represented as follows:

> [[**do'** (x, Ø)] CAUSE [BECOME **be-next to'** (y, z)]
>
>    CAUSE (BECOME **be-together'** (y ∧ z)]
>
> LS1: [x = A]; [z = U]
>
> LS2: [z and y = U]

Similarly, in this alternation the resultative logical structure (BECOME **be-together'** (y ∧ z)), realized by the resultative phrase *together*, could be regarded as a simultaneous change of state taking place at the same time as the first one, (BECOME **be-next to'** (y, z)), which is part of the internal semantic configuration of the predicates *join* and *attach*; the resultative phrase "describes the state achieved by the referent of the noun phrase it is predicated of as a result of the action named by the verb" (Levin 1999: 100-01). This second change of state has to be explicitly specified in the logical structure as a secondary predication that is not governed by the verb. We could also add a third predication [BECOME **exist'** (w)] representing the new entity that comes into existence after the process of joining:

> [[**do'** (x, Ø)] CAUSE [BECOME **be-next to'** (y, z)]
>
>    CAUSE (BECOME **be-together'** (y ∧ z)]
>
>    CAUSE [BECOME **exist'** (w) **pred'**new concept (= y & z)]

In this sense, it can be claimed that in the causative accomplishment examples of *join* and *attach* when they participate in the *together* reciprocal alternation, there is a transformation involved. This would explain why there is a new entity resulting from the joining; as a result, it can be stated that in this alternation there is a built-in resultative construction. In this sense, we go along with Van Valin (2005: 238) when he claims that just as in lexical causative accomplishments an activity causes a change of state with a result, so resultative constructions also have a causative meaning and both the causing activity and the change of state are explicitly specified. Resultative constructions could be regarded as secondary small

predications which are not governed by the predicate and which show the end of the process or a final point of completion.

## 5.2. Intransitive Structures

The intransitive uses[16] of these verbs are represented by an accomplishment logical structure with two arguments. In the LS for the intransitive prepositional variant with *to,* there is an asymmetric relation between x and y, and thus there is just one macrorole potential argument (the lower position in the AU-H = theme), which automatically leads to the assignment of *to* to the non-macrorole argument, as indicated in the rule for assigning *to* in English (Van Valin and LaPolla 1997: 377):

BECOME **be-next to'** (x, y) [y = U]; [x = non-MR à prepositional marking *to*]

e. … the remoras that [U] attach to their sides [Non-MR].

As with their transitive counterparts, the corresponding intransitive prepositional variant (with the assignment of the preposition *with*) and the simple reciprocal intransitive alternations show a symmetric relation between x and y, which implies that the two constituents are given the same status, as a result of which they can both be assigned the macrorole undergoer. This is captured in the LS by means of the lambda symbol indicating that there is a symmetric relation between x and y, which would trigger the syntactic realization [NP1 AND NP2 JOIN], if the two arguments are marked as undergoers, or [NP1 JOIN WITH NP2], only if the second argument of the locative predicate is assigned the macrorole undergoer, in which case prepositional marking is required:

BECOME **be-next to'** ( x ∧ y) [x and y = Undergoer]

o. When two 2nd Order [U] rivers join, …

BECOME **be-next to'** ( x ∧ y) [y = Undergoer]; [x = non-MR]

f. … the place at which the river [U] joined with the sea [non-MR].

In the intransitive *together reciprocal alternation,* we observe that the presence of *together* has to be specifically represented in the LS of the predicate as another predication which describes another change of state, simultaneous with the first one and indicating the result of that first change of state. Here, again, we feel that the *together* intransitive reciprocal construction is in fact an example of a subsumed resultative construction which has been fused into a lower-level accomplishment semantic representation. Some might object that it is the telic nature of the predicate that shows the final point of completion, which is why telic verbs are sometimes called resultatives (Saeed 1997: 110). In our view, the resultative construction is a secondary predication that is not governed by the original predicate and one that adds a further specification that has be to represented as another predication:

[BECOME **be-next to'** (x, y)] CAUSE [BECOME **be-together'** (x Λ y)

    CAUSE [BECOME **exist'** (w) **pred'**new concept (= y & z)]

LS2: [x and y = U]

p. And when two black holes collided and joined together *to form a single hole,…*

q. … all the amine molecules at the interface of the two liquids join together *in a polymer.*

r. …large soft construction cushions that attach together *to make forts, playhouses, puppet theaters, tunnels, boats, and more.* (COCA-2003-MAG_USAToday)

## 6. Conclusion

Among the similarities that can be established between the two predicates *join* and *attach*, we can highlight the fact that they both fall within the same Aktionsart category, (causative) accomplishment, and that they can both appear in the *together* reciprocal alternation. One of the most salient differences between them is that *attach* can never be used with the comitative preposition *with* but only with *to*, which shows that there exists an asymmetric relation between the two entities being attached (x à y), and that the reciprocal interpretation in *attach* is only possible if the logical structure for *attach* is subsumed into the higher-level resultative construction, which would imply that the two entities are of comparable status and as a result a symmetric relation can be predicated between them (x « y). The difference between the prepositional variants and the reciprocal variants lies in the fact that the latter usually implies that a new entity is involved, very often explicitly specified in the syntax either in the form of a prepositional phrase or a *to*-infinitive purpose clause. Reciprocal alternations are the ones that show symmetric relations or mutual attachments. Inherently speaking, we can say that the predicates *join* and *attach* display an asymmetric relation between the entities that become connected, and that the reciprocal alternations in which they may occur contribute to the symmetrical relationship between the connected entities.

With this modest research, I have tried to show that in the lexical-constructional subsumption processes with *join* and *attach*, the internal semantic configuration of the lexical templates, external to the construction, can be affected by the subsumption of the resultative construction if the internal constraints on the status of the arguments of the locative predicate are satisfied. The fulfilling of the internal semantic constraints license the merging of the lexical templates and the higher-level resultative construction, very much in the line of Levin's suggestion that the *together* reciprocal alternation is in fact a resultative construction (1993: 62, 64).

# Endnotes

[1]. Financial support for this research has been received from the Spanish Ministry of Economy and Competitiveness (Grant number: FFI 2011-29798-C02-02).

[2]. It is not eclectic in the sense that it integrates insights from both cognitive and functional approaches but adopting a productive rather than a passive form of integration, by providing its own analytical instruments and set of postulates in order to achieve explanatory adequacy.

[3]. Ruiz de Mendoza and Mairal claim, however, that weaknesses can be found in both approaches. As regards the functional projectionist theories, the role of constructions in predicting morphosyntactic structure is ignored, and with respect to constructional models, they state that these models have not explored the restrictions that constrain the unification process of a particular construction and a particular lexical entry (2008:356).

[4]. Specific reference to the corpus will be provided next to the examples that are mentioned for the first time.

[5]. The FrameNet Project is developed by the International Computer Science Institute in Berkeley, California and is based on the theory of meaning called Frame Semantics, which derives from the work of the late Charles J. Fillmore and colleagues (Fillmore and Baker 2010). See: http://www.icsi.berkeley.edu/~framenet for details.

[6]. In Frame Semantics, the meaning of words is represented by means of semantic frames that describe events, relations or entities and the participants in them in the form of frame elements (FEs) (e.g. Instrument, Container, etc.). The different frames are illustrated by lexical units (LUs) belonging to each of them (https://framenet.icsi.berkeley.edu/fndrupal/about).

[7]. Examples of *join* with *into* have also been registered: *To join a new length of pipe* **into** *an existing inspection chamber, you*

*will have to break a hole in the wall of the chamber …* (BNC-43 HH6 W_instructional).

[8]. We will be making reference to the transitive and intrantsitive uses of the predicates under concern from a purely syntactic perspective. However, the intransitive uses can in fact be regarded as examples of the inchoative construction in which the true causal agent is implicit.

[9]. In Fillmore's semantic description of *attach*, the frame "inchoative attaching" is illustrated by means of intransitive examples; however, only the transitive uses of *join* are represented.

[10]. Levin states that *attach* cannot be found in the causative alternation and therefore does not show the intransitive form of any of the reciprocal alternations (1993:26-27); however, one example of intransitive *attach* participating in this alternation has been found in the COCA: *because now there are Squash Blox, Mongo Toys, LLC, Hoboken, N.J. –large soft construction cushions that attach together to make forts, playhouses, puppet theaters, tunnels, boats, and more* (COCA-2003-MAG_USAToday).

[11]. Furthermore, the LCM has been used in the design of FunGramKB, a multipurpose lexico-conceptual knowledge base for natural language processing (NLP) systems that has resorted to two theoretical models, the LCM and Role and Reference Grammar, in order to support the linguistic level of description (Periñán 2013; Periñán-Pascual and Mairal Usón 2011). Interested readers can get more information about FunGramKB in http://www.fungramkb.com/.

[12]. Van Valin and Lapolla (1997: 94) and Van Valin (2005: 37-39) provide tests for determining the Aktionsart classes.

[13]. Van Valin and LaPolla (1997: 97) state that all the spontaneous states of affairs have "a corresponding induced type", and that each of the basic *Aktionsart* classes (state, achievement, accomplishment, activity)

presents "a corresponding causative class", which is connected to the induced state of affairs. This is illustrated in example sentences such as *The ice melted* (Accomplishment) and *The hot water melted the ice* (Causative Accomplishment), which can be paraphrased as 'The hot water caused the ice to melt'.

[14]. The LCM is a meaning construction model and does not account for the way in which the linking between syntax and semantics takes place. As a result, the explanatory apparatus of Role and Reference Grammar, which has been proved to be valid for the linking of meaning to syntactic structure, has been followed, and, in particular, RRG lexical templates have been adapted as a natural extension of this model. Thus, macroroles, which are generalizations of the different types of sematic roles and serve to link the semantics of predicates to its syntax, are adopted as the triggering point in this interface mechanism.

[15]. See section 4 for a description of Van Valin's preposition assignment rules.

[16]. We remind the reader that from a constructional perspective the instransitive uses of these predicates are in fact examples of the inchoative construction.

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