Revista de Lenguas para Fines Específicos 30 (2024), pp. 103-130
http://dx.doi.org/XXXXXXXXXXXXXXX
ISSN: 2340-8561

Servicio de Publicaciones y Difusión Científica
Universidad de Las Palmas de Gran Canaria

Constructing meaning for natural language understanding: completing the English and Spanish *complain* verbs in the FunGramKB nuclear Ontology

Federico José Martín-Padrón[1] · https://orcid.org/0000-0002-0448-8416
Andrés Bello Institute of Linguistics, Universidad de La Laguna

ABSTRACT

This article engages with the population process of terminal concepts in the nuclear Ontology of FunGramKB. The methodology employed is based on the COHERENT procedure, as our aim is to work on the subontology of #EVENTS by inserting some of the English and Spanish *complain* verbs that have not been created yet. Although the basic concept +COMPLAIN_00 is lexicalized by some units, lexical items such as *boast*, *brag*, *object*, *reclamar*, and *clamar* have not been included. These will be subordinates of +SAY_00 and described in COREL language. It is our purpose in this investigation to develop the terminal concepts of $BOAST_00, $DISAGREE_00, $OPPOSE_00, and $DISAPPROVE_00, which will complete the subdomain of *complain* verbs in these languages.

Keywords: FunGramKB, terminal concepts, deep semantics, COREL, complain verbs

1. Introduction

The Functional Grammar Knowledge Base (FunGramKB) Suite is an ambitious base that consists of several modules that interact in order to decode meaning and form.

[1] **Corresponding author** – Departamento de Filología Inglesa y Alemana, Facultad de Humanidades, Sección Filología, Campus de Guajara, Apartado 456, 38200 La Laguna, S/C de Tenerife

Email: fmartinp@ull.edu.es

These modules, to be presented in Section 2, form the overall architecture of FunGramKB and may be grouped within the conceptual model, the lexical model or the grammatical model. With regard to the conceptual model, it is worth mentioning that, although there has been a considerable amount of research concerning the population of concepts and the nature of the Ontology in FunGramKB (Carrión Delgado, 2012; Felices-Lago & Ureña Gómez-Moreno, 2014; San Martín & Faber, 2014; Guerra García & Sacramento Lechado, 2014; Guerra García, 2014; Felices Lago, 2015; Felices Lago & Ureña Gómez-Moreno, 2020; and Hernández Hernández & Fumero-Pérez, 2021), some areas have not been completely clarified. In fact, there are conceptual domains which have been partially developed, but can be enlarged by adding new subordinate terms, leading to a fully lexicalized Ontology.

The main goal of this research is to populate the FunGramKB nuclear Ontology with the English and Spanish *complain* verbs that have not yet been created. This entails the elaboration and inclusion of their specific features into their conceptual information, working at the lexico-grammatical interface. Our proposal of lexical selection is based on Levin's (1993) preliminary organization of verb classes in English, which elaborates a classification based on the potential alternations in which a predicate participates. In the case of the *complain* verbs, Levin (1993) lists *boast, brag, complain, crab, gripe, grouch, grouse, grumble, kvetch*, and *object*. Since some of these lexemes already populate the Ontology, the construction of meaning starts with the verbs *boast* and *brag*. For the Spanish verbs, we have selected *reclamar* and *clamar*[2].

The method employed is based on the COHERENT (Periñán Pascual & Mairal Usón, 2011) procedure, which is suitable for the population of our Ontology rooted on deep semantics[3], as well as that proposed by Jiménez Briones & Luzondo Oyón (2011) that describes how to elaborate new concepts. As our interest lies in the

[2] The lexical selection for the Spanish verbs is based on the following criteria: (1) after consulting Casares's *Diccionario Idelológico de la Lengua* Española (1990), and Vox's *Diccionario Ideológico de la Lengua Española* (1995), only those lexical units related to the dimension of saying expressed by the *complain* verbs in Spanish are selected; (2) this leads to a reduced list of lexemes, from which several are discarded, since we have not found databases that offer significant grammatical information about them, e.g., the verb *quillotrarse*; and (3) in the last step, only *clamar* and *reclamar* are selected, as other lexemes, such as *quejarse* and *lamentarse* have been already developed in the FunGramKB Ontology.

[3] This characteristic is inherent to this knowledge base, consisting of a particular representation language, known as Conceptual REpresentation Language (COREL).

complain verbs, we have created the concepts $BOAST_00, $DISAGREE_00, $OPPOSE_00, and $DISAPPROVE_00 from the superordinate +SAY_00.

This work represents a cross-linguistic study of a subdomain of the verbs of saying, which posit a major challenge in the analysis and explanation of verbal behavior, revealing certain similarities in the lexicalization patterns of languages with respect to their superordinates and entities involved. Since FunGramKB is designed to work in Artificial Intelligence environments, the development of a robust lexicalized base becomes fundamental for its future and multiple applications. This research offers the possibility to be later applied in familiar natural language processing (NLP) tools such as ARTEMIS (cf. Cortés Rodríguez, 2016; Cortés Rodríguez & Mairal Usón, 2016; Díaz-Galán & Fumero-Pérez, 2016; Díaz Galán & Fumero-Pérez, 2017), and DEXTER (Periñán Pascual, 2015; Periñán-Pascual, 2018; Periñán-Pascual & Mairal Usón, 2018), among many others.

The structure of this paper is divided into six sections. Section 2 introduces the main theoretical tenets and the organization of FunGramKB, together with the explanation of concepts and the different types that the Ontology takes. Section 3 deals with the methodological procedures applied in this research in order to elaborate the creation of concepts and their statuses as terminal concepts. Section 4 focuses on the proposal of the new concepts for the nuclear Ontology. Section 5 represents the conceptual hierarchization of the new lexical items, whereas Section 6 highlights some concluding remarks.

2. **FunGramKB: an overview**

The multipurpose lexico-conceptual meaning knowledge base, FunGramKB [4] (Peñirán Pascual & Arcas Túnez, 2007, 2010, 2011; Mairal Usón & Peñirán Pascual, 2009a, 2009b, 2010; Peñirán Pascual & Mairal Usón, 2009, 2010, 2011; Jiménez Briones & Luzondo Oyón, 2011; Jiménez Briones, Luzondo Oyón and Pérez Cabello de Alba, 2011) was created to be employed by NLP systems in multiple tasks, such as automatic translation, and retrieval and extraction of information, among others. Apart from the multifunctional nature of this knowledge base, it is multilingual, since it has been modelled mainly from the research carried out in English and Spanish, but also, to a lesser extent, in other languages like Italian (Peñirán Pascual & Arcas Túnez, 2010). One of the defining traits of FunGramKB is that it is based on deep semantics, materialized through the COREL language, which is necessary for the

[4] More information can be found at www.fungramkb.com.

definition of the conceptual units. Moreover, conceptual relations may result from the application of certain processes of inheritance and inference on meaning postulates (henceforth MPs).

The proposal of FunGramKB is stratified by three macrolevels[5] which will lead to inferior interrelated levels: (1) the lexical level, including the Lexicon (container of morphosyntactic information of lexemes) and the Morphicon (an assistant in flexive morphology); (2) the grammatical level, which incorporates the Grammaticon[6]; and, lastly, (3) the conceptual level, subsuming the Ontology, Cognicon and Onomasticon. The following picture illustrates the components of FunGramKB:

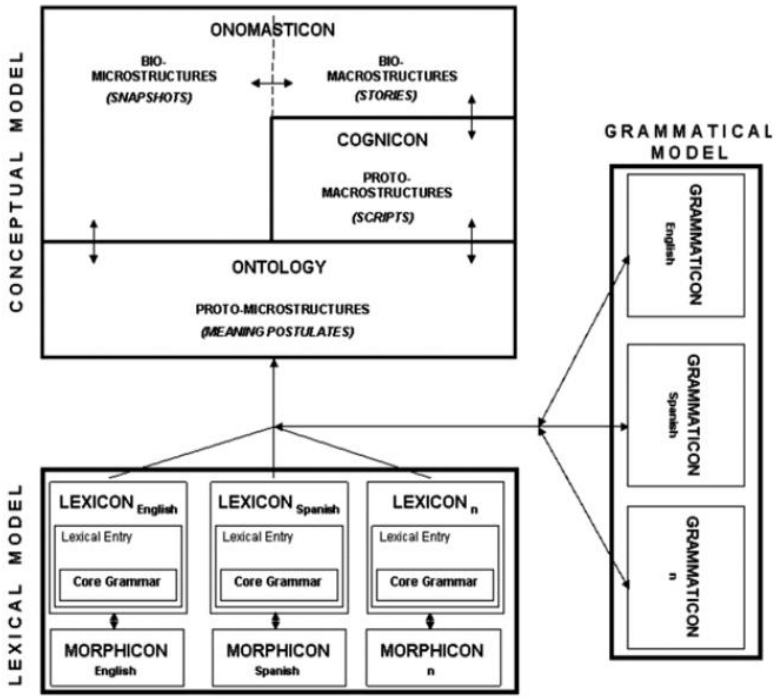

Figure 1. FunGramKB modular architecture (Jiménez Briones & Luzondo Oyón, 2011, p. 15).

5 Mairal Usón and Periñán Pascual (2009) explain that the lexical level is understood as linguistic knowledge, whereas the conceptual level refers to non-linguistic knowledge.

6 This level is conceived to act as a repository for the constructional schemas and their semantic representations (cf. Mairal Usón & Periñán Pascual, 2016). It is mostly rooted in the Lexical-Constructional Model (Ruiz de Mendoza & Mairal Usón, 2008; Mairal Usón & Ruiz de Mendoza, 2008, 2009; LCM) and Role and Reference Grammar (Van Valin & LaPolla, 1997; Van Valin, 2005; RRG), whose syntax-semantics linking algorithm is employed during the process.

As the ontological component is developed in Section 2.1., the Cognicon and the Onomasticon will be briefly introduced. Whereas the former represents the procedural knowledge and exemplifies the accumulation of schemas, the latter is developed to store encyclopedic knowledge about materializations on the entities and events, be they portrait schemas or stories.

2.1. Ontological structure: the nuclear Ontology and satellite ontologies

The fact that FunGramKB is based on deep semantics entails, as Jiménez Briones, Luzondo Oyón, & Pérez Cabello de Alba (2011, p. 17) comment, that

> La Ontología de FunGramKB está dotada de unas descripciones conceptuales de gran riqueza a las que luego se asocian una serie de unidades léxicas. […] cada pieza léxica siempre va a estar ligada a uno o más conceptos de la Ontología y, viceversa, cada concepto quedará lexicalizado por una o más palabras en los diferentes lexicones[7].

In order to lessen the subjectivity derived from the elaboration process of any ontology, seven ontological commitments are posited as inherent to this knowledge base (cf. Periñán Pascual & Arcas Túnez, 2010; Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba, 2011): (1) universality and linguistic motivation; (2) three levels of conceptual organization are recognized (metaconcepts, basic concepts, and terminal concepts); (3) thematic frames (TFs) and MPs are essential for the articulation of conceptual units; (4) since MPs govern concepts, those subordinate will share the superordinate of the MP, retaining their differences coded in the MP through the differentia; (5) subsumption is possible in FunGramKB, allowing the inheritance between concepts and their interrelation, manifested in the sole taxonomic relation, i.e., IS-A; (6) a conceptual unit can be subsumed by two or more concepts due to the multiple inheritance quality; and (7) in FunGramKB there is room for monotonic and non-monotonic inheritance. In other words, strict reasoning operators do not allow exceptions, but defeasible do. Non-monotonicity emulates the human mind, for it is possible that the machine continues to work with incomplete information.

---

[7] We provide the following English translation of the quotation: "The FunGramKB Ontology is endowed with rich conceptual descriptions that are associated to a series of lexical unit […] each lexical item is always linked to one or more than one concept in the Ontology and, vice versa, each concept will be lexicalized by one or more than one of the words stored in the lexicons".

The Ontology corresponds to semantic knowledge, resulting in a hierarchical representation of the concepts that exist in the speaker's mind (Periñán Pascual & Mairal Usón, 2011). However, although FunGramKB is linguistically motivated, the knowledge that is stored in the Ontology is not restricted to a particular language (Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba, 2011). Two well-defined models can be distinguished within the ontological space: one with a general purpose, namely, the nuclear Ontology, and the other with specific purposes, known as satellite ontologies. For the reason that this research concerns about the nuclear Ontology, its characteristics will be described.

Three subontologies, specifically, #ENTITIES, #EVENTS, and #QUALITIES form the Ontology in FunGramKB, each of them dealing with a different type of unit. Nouns are in #ENTITIES, #QUALITIES deal with adjectives and some adverbs, while verbs are encoded in #EVENTS. These three subontologies are populated by different conceptual units: metaconcepts, basic concepts and subconcepts, and terminal concepts.

2.1.1. Metaconcepts, basic concepts and subconcepts, and terminal concepts

Metaconcepts represent the superior level in the taxonomy and have, as a formal characteristic, the obligation to be written in capital letters and introduced by the symbol '#'. In the Ontology, there are metaconcepts such as #ABSTRACT, #TEMPORAL, #EMOTION, #COGNITION, #COMMUNICATION, among others, whose objective is to represent cognitive dimensions. Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba (2011, p. 20) explain that "a diferencia del resto de conceptos, estos no están ligados a ninguna unidad léxica y no están definidos mediante PPSS [Spanish for *Meaning Postulates*], de ahí que se les denomine "categorías ocultas"[8]." The following picture shows some metaconcepts:

[8] We provide the following English translation of the quotation: "Unlike the rest of the concepts, these are not linked to any lexical unit or defined through MPs, that is why they are known as '[hidden] categories'".

Figure 2. Event metaconcepts in the FunGramKB Ontology.

Basic concepts, whose final state results from the different phases condensed in the COHERENT methodology (Conceptualization + Hierarchization + Remodelling + refinemeNT; cf. Periñán Pascual & Mairal Usón, 2011) and the extraction of definitory vocabulary from the *Longman Dictionary*, are represented in capital letters, but they are introduced by the symbol '+'. These concepts develop, since they are used as definitory units, the elaboration of MPs and interfere in the selectional preferences of the TFs. Some examples of basic concepts are +MACHINE_00, +ENERGY_00, TIME_00, +MONEY_00, +FAUNA_00, +NETWORK_00, and +FLOCK_00, as Fig.3 highlights:

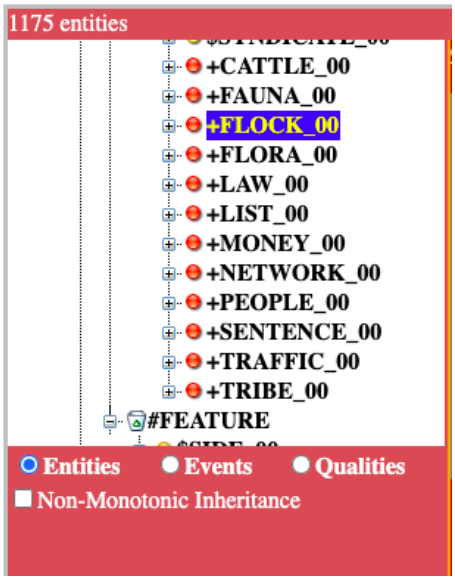

Figure 3. Basic concepts in the subontology of entities in FunGramKB.

The third type of concepts is referred to as *terminal concepts*. These result from the exhaustive search carried out in dictionaries, data bases, thesauri, etc. (Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba, 2011). Terminal concepts are headed by the symbol "$" and they diverge from basic concepts in that they lack definitory potential to engage in MPs (Mairal Usón & Periñán Pascual, 2009a). $METEORITE_00, $SIDE_00, $VIEW_00, $PROCEDURE_00, and $STAGE_00 are examples of some of the terminal concepts that populate the Ontology.

Those subconcepts, which do not appear in the hierarchical organization of FunGramKB, are "una especificación conceptual de un concepto básico o uno terminal ya existente"[9] (Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba, 2011, p. 22). These are preceded by a hyphen, '-', and, like the other concepts, they are always written in capital letters, as shown in Figure 4:

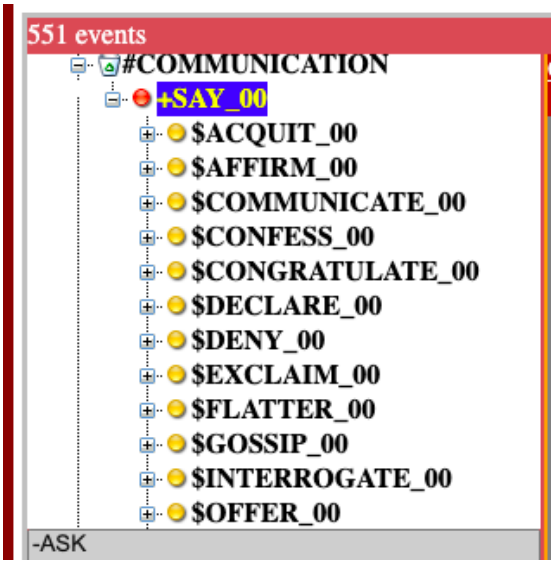

Figure 4. The subconcept -ASK in FunGramKB.

It seems necessary to highlight that the dynamics of the Ontology are based on circular movement among concepts, involving the possibilities of promoting or degrading, as Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba (2011, p. 22) state: "existe la posibilidad de que algún concepto terminal sea ascendido a la

[9] We provide the following English translation of the quotation: "a conceptual specification of an already existing basic or terminal concept".

categoría de básico [...] o, por el contrario, la degradación de un concepto básico a terminal"[10]. Figure 5 schematically explains such dynamics:

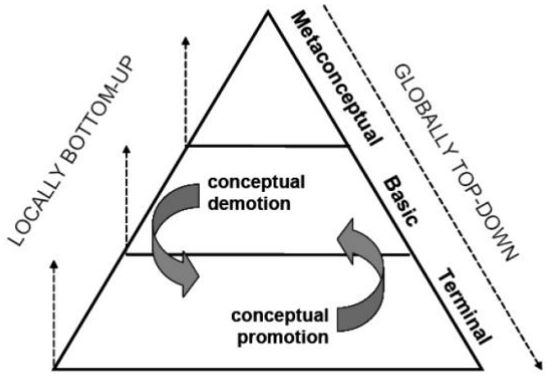

Figure 5. Promotion and degradation among basic and terminal concepts (Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba, 2011, p. 23).

Another pivotal feature concerning basic and terminal concepts is that they are provided with three aspects: (1) concepts are coined from "lexical motivation". That is to say, the concepts must be lexicalized in, at least, one language; (2) concepts do not equal the semantic primitives, as made abundantly clear by Periñán Pascual & Mairal Usón (2010, p. 18), of Goddard & Wierzbicka (2002); and (3) MPs and TFs are semantic characteristics of the concepts.

2.2. Thematic frames (TFs) and meaning postulates (MPs)

The concepts in the Ontology are defined by the TF and the MP, both considered semantic properties. The TF is defined as the conceptual construct in which the prototypical participants of a cognitive situation are detailed, being represented in COREL through the (x1), (x2), (x3), etc., variables. This can be widened by selectional preferences[11], if it is the case, as well as by the specific thematic role[12] (*Agent, Theme,*

---

10 We provide the following English translation of the quotation: "There exists the possibility that a terminal concept may rise to the category of basic [...] or, on the contrary, the downgrading of a basic concept to a terminal concept".

11 Selectional preferences can be inserted into the TFs or MPs, since "son restricciones conceptuales que se asocian prototípicamente a una situación cognitiva concreta [We provide the English translation of the quotation: "They are conceptual restrictions typically associated with a specific cognitive situation"]" (Jiménez Briones, Luzondo Oyón, & Pérez

Referent, Goal...). These have been partially taken from Dixon (1991) and Halliday (1985). For example, those basic and terminal concepts that inherit the characteristics of their superordinate #COMMUNICATION will have three obligatory thematic roles: (x1) Theme, (x2) unspecified Referent, and (x3) Goal. The basic concept #SAY_00 exemplifies this case:

CONCEPT:	+SAY_00
SUPERORDINATE(S):	#COMMUNICATION
THEMATIC FRAME:	(x1: +HUMAN_00)Theme (x2)Referent (x3: +HUMAN_00)Goal

Fig. 6 +SAY_00's TF and possible selectional preferences.

The MP is constructed with the purpose of offering more exhaustive information about a conceptual unit, and, for this, it is necessary to have established the prototypical actor of the TF. Therefore, the MP

> Es un constructo cognitivo que representa las características genéricas de un concepto, y recoge tanto nuestro conocimiento semántico como nuestro conocimiento del sentido común que, [...], a veces no aparece en ningún diccionario. Un PS está formado por:
>
> i. "e_1, e_2, e_3,...": predicaciones que representan rasgos. Cada una de ellas debe ir seguida de un evento y sus correspondientes participantes (p. e. (e1. +CHANGE_00 y sus argumentos)).
>
> ii. "x": los argumentos obligatorios del MT.
>
> iii. "f": satélites ([...] Manner, Purpose, Location, Reason, Condition, etc. [...]). Pueden ir seguidas de un concepto básico (p. e. (f1: +VIOLENT_00)Manner)) o de una predicación (f1: e2: +SAY_00) más sus participantes). (Jiménez Briones, Luzondo Oyón, & Pérez Cabello de Alba, 2011, pp. 24-25) [13].

Cabello de Alba, 2011: 25). Consult Jiménez Briones & Pérez Cabello de Alba (2011) for a detailed account on selectional preferences in FunGramKB and RRG.

12 Arguments included in the TF have to appear, too, in the MP, without referring to selectional preferences again, since these are inherited (Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba, 2011).

13 We provide the following English translation of the quotation: [It] is a cognitive construct which represents the generic characteristics of a concept, compiling our semantic knowledge as well as common knowledge that [...] sometimes is not found in a dictionary. A MP is formed by:

Note the terminal concept $REPORT_00 as an example in Figure 7, which has a MP understood as "the first participant (x1) says something (x2) to another person (x3), by a communicative means, that is, f1, such as the television, radio, or newspaper".

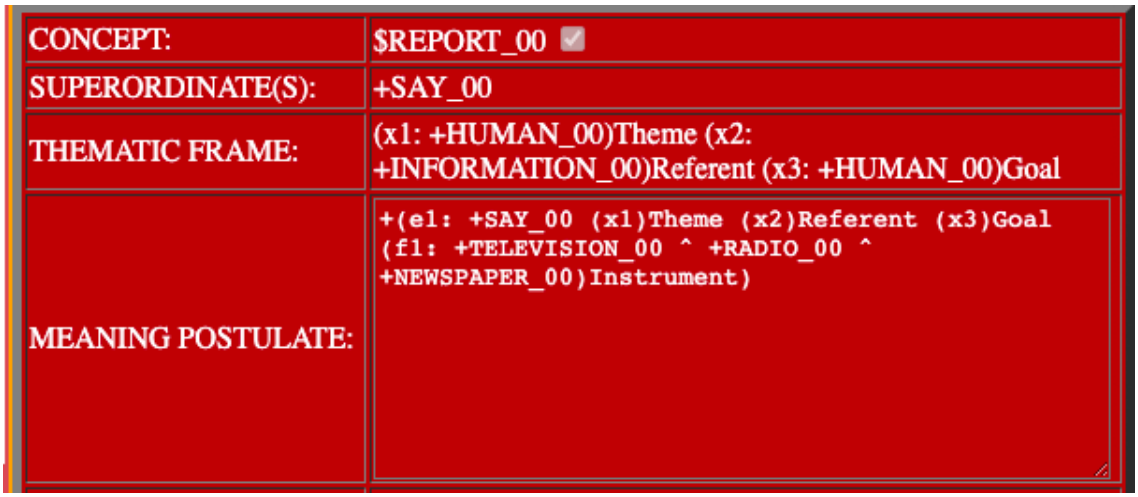

Figure 7. The conceptual information of $REPORT_00.

2.3. Conceptual Representation Language (COREL)

This language was created with the aim of describing in formal terms the notion of *concept* as a "representación mental estructurada"[14] (Periñán Pascual & Mairal Usón, 2010, p.19). COREL, therefore, emerges from "the language of thought hypothesis" (Fodor, 1975), and *dual theories* (Osherson & Smith, 1981; Landau, 1982, Armstrong et al. 1983), as Periñán Pascual and Mairal Usón (2010, p. 19) indicate. COREL grammar comprehends predications and operators.

---

i. "e_1, e_2, e_3,...": predications which represent features. Each of them must be followed by an event and its participants (e. g. (e1. +CHANGE_00 and its arguments)).

ii. "x": the obligatory arguments of the TF.

iii. "f": satellites ([...] Manner, Purpose, Location, Reason, Condition, etc. [...]). They may be followed by a basic concept (e. g. (f1: +VIOLENT_00)Manner)) or by a predication (f1: e2: +SAY_00) plus its participants).

[14] We provide the following English translation of the quotation: "structured mental representation".

2.3.1. Predications

In FunGramKB, a conceptual schema is made of one or more than one predication, which are identified by the indexed variable *e*, followed by a colon ':', and headed by a reasoning operator. Observe the MPs of the following examples, the event +ANNOY_00, in (1a), the entity[15] +ENERGY_00, in (1b), and the quality +SMALL_00, in (1c):

(1) (a) +(e1: +FEEL_00 (x1)Agent (x2)Theme (x3: +ANGRY_00)Attribute)

(b) +(e1: +BE_00 (x1: +ENERGY_00) Theme (x2: + SUBSTANCE_00) Referent) +(e2: +CREATE_00 (x3: +HUMAN_00) Theme (x1)Referent (f1: +COAL_00 ^ +WIND_00 ^ +SUN_00 ^+FUEL_00)Origin)

(c) *(e1: +BE_01 (x1)Theme (x2: +SMALL_00)Attribute) + (e2: BE_00 (x1) Theme (x3: +SIZE_00) Referent) *(e3: n +Be_01 (x1) Theme (x4: +BIG_00)Attribute)

(1a) reads as follows "something makes another entity angry". (1b), in a natural language, would be understood as "energy is a substance", "energy is created by humans from coal, wind, the Sun, fuel, etc.", and (1c) refers to "something typically small", "something which has a size", "something which is not typically big". Also, predications, created by basic and/or terminal concepts, may be of two types: free predications, which enunciate complete conceptual specifications, as seen in (1b), and bound predications, which are dependent to other predications in order to be able to clearly communicate a conceptual specification, as in (1a) and (1b). It is relevant to highlight the following specificities of bound predications

> i. Las predicaciones ligadas se presentan dentro de paréntesis redondos, los cuales sirven para marcar el ámbito de actuación del ligamiento cognitivo.
>
> ii. Solo pueden ligarse predicaciones continuas. Típicamente, suelen ligarse dos predicaciones, aunque pueden ser más.

[15] Entities entail the "principio de la entidad omnirreferencial" (omnireferential entity principle). Each predication of the MP must cite its definiendum by means of coindexation or explicitly. The fundamental reason for this is that each predication expresses a feature of the entity. Qualities, nevertheless, have to refer to the entity that assigns such quality (Periñán Pascual & Mairal Usón, 2010).

> iii. A partir de la segunda de las predicaciones ligadas, debe existir coindización hacia algunos de los participantes de la primera predicación. En realidad, esta es la característica más importante del ligamiento, ya que define la naturaleza de este fenómeno: en la primera predicación ligada aparece típicamente una entidad que requiere una especificación conceptual adicional que solo puede ser proporcionada por otra predicación.
>
> iv. Se omite el operador de razonamiento delante de cada una de las predicaciones ligadas. En cambio, el paréntesis de inicio del ligamento debe ir precedido por dicho operador[16]. (Periñán Pascual & Mairal Usón, 2010, pp. 29-30)

2.3.2. Operators

This category incorporates the following types of operators: (1) reasoning operators, (2) event operators, which subsume the triad TAM (tense, aspect and modality), as well as polarity, and (3) participant operators, taking quantifiers and logic operators.

As previously commented, this knowledge base assigns a reasoning operator to each predication, which may be strict, formally codified as '+', or, on the contrary, defeasible, headed by the sign "*".

Those operators for aspectuality, as one might expect, will point to the internal development of an event, revealing if it is an ingressive (*ing*), progressive (*pro*) or egressive (*egr*) operator. This is illustrated in the Figure 8 below:

---

16 We provide the English translation of the quotation:

i. Bound predications are introduced through round brackets, which mark the cognitive binding scope.

ii. Only continuous predications can be bound. Typically, this involves two predications, but more than two are also possible.

iii. From the second bound predication onwards, coindexation towards some participants of the first predication is required. This is the most important characteristic of the binding process, as it defines its nature: an entity usually appears, in the first predication, that requires another additional type of conceptual specification that can only be achieved through another predication.

iv. The operator of reasoning is omitted at the beginning of bound predications. Nevertheless, the round bracket needs to be preceded by such an operator.

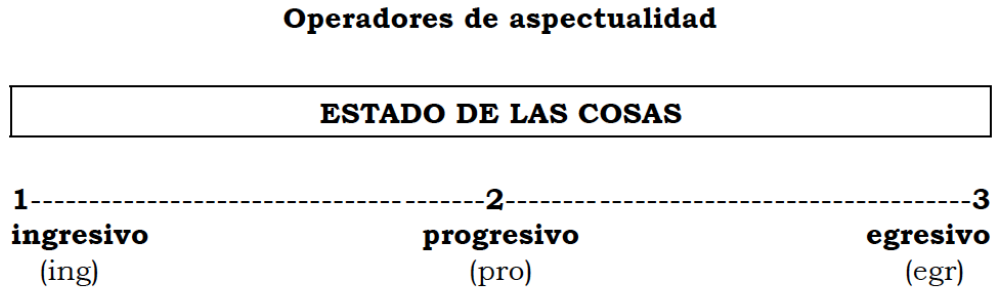

Figure 8. Aspectuality operators in FunGramKB (Periñán Pascual & Mairal Usón, 2010, p. 34).

Temporal operators fix the state of affairs of a predication in time, as shown in Figure 9:

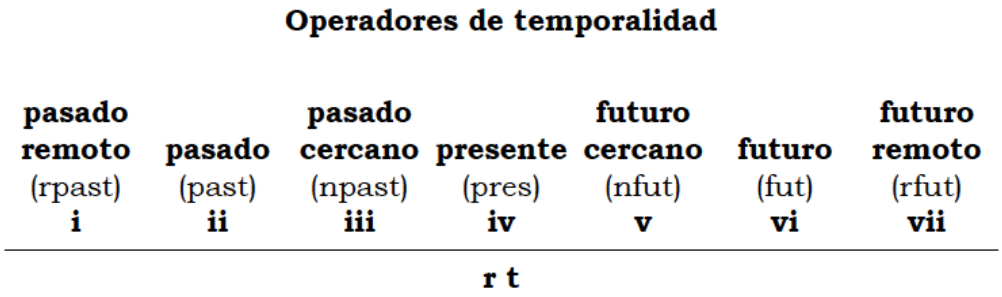

Figure 9. Temporal operators in FunGramKB (Periñán Pascual & Mairal Usón, 2010, p. 34) [17].

Concerning modality operators, these are further divided into epistemic (certain [*cert*], probability, [*prob*], and possibility [*pos*]), and non-epistemic (obligation [*obl*], advise [*adv*], and permission [*perm*]) operators. The polarity operator for negation is expressed through the *n.*

FunGramKB incorporates quantifiers and logic linking markers. The former ones are necessary, since "cada unidad conceptual que actúa como una preferencia de selección en un participante puede estar sometida a operadores que expresen cuantificación"[18] (Periñán Pascual & Mairal Usón, 2010, p. 35). In Figure 10, the most salient quantifiers are included:

[17] Rt stands for reference time. Past and future are ordered as remote past/future, past/future, and recent past/future.

[18] We provide the English translation of this figure: "Each conceptual unit that acts as a selectional preference in a participant may be affected by a quantifier operator".

Operadores de cuantificación

Rasgo	Valor
Cuantificador absoluto	1 | 2 | 3 | 4 ...
Cuantificador relativo	m | s | p
Cuantificador indefinido	i

Figure 10. Quantifier operators in FunGramKB (Periñán Pascual y Mairal Usón, 2010, p. 36)[19].

Logic linking markers comprehend several relations: conjunction '&', disjunction '|', and exclusion '^'.

3. **Methodology**

To establish a solid, proceduralized and revisable method for the creation of concepts is probably one of the greatest methodological achievements of the FunGramKB Ontology. This replicable process is mostly explained and presented by Jiménez Briones and Luzondo Oyón (2011), and further developed in Jiménez Briones, Luzondo Oyón and Pérez Cabello de Alba (2011), who focus on the systematization of the elaboration of terminal concepts. Some of the basic phases for their creation comprehend the following:

i. Predications are built from the entries found in dictionaries, recommending, for English, the *Longman Dictionary of Contemporary English*, and the *Cambridge Dictionary*, among others. For the Spanish language, it is suggested to employ the lexicographic information included in the *DRAE* (although it may result highly academic for this precise task, according to Jiménez Briones, Luzondo Oyón and Pérez Cabello de Alba (2011)), *CLAVE*, and the *Diccionario Salamanca*.

ii. Each terminal concept must have, at least, another concept in the Ontology to which it can be linked in one of the languages. Furthermore, it is strongly recommended to populate those terminal concepts which exhibit a palpable degree of differentiation compared to their superordinates.

iii. Once the concepts have been selected, it is necessary to translate the meaning of those lexemes into COREL language.

[19] We provide the English translation of this figure: (on the left column, from top to bottom) *feature, absolute quantifier, relative quantifier, indefinite quantifier*; (on the right column, from top to bottom) *value*.

iv. After collecting the potential hyponyms of a conceptual domain, those that share the genus with the hypernym will be selected, discarding the rest. This is a process that involves negotiation, as

> Ontological modeling is a fairly creative, subjective process in which constant decisions need to be made. [...] Although we need to pay attention to the genus of a given lexical item in order to decide whether to include such a lexical piece as a subordinate or not, one should not take it as a clear-cut law [...] since more often than not, dictionary entries tend to vary in their choice of superordinates. (Jiménez Briones & Luzondo Oyón, 2011, p. 24)

This is the main reason for which it is essential to consult different lexicographic resources from where definitions can be extracted, so that the knowledge engineer can decide, accordingly, the assignation of a superordinate to the lexeme that is to be created in the Ontology as a new concept. In this respect, being cautious is fundamental in determining if it is necessary to generate a new concept, or if that concept is to be lexicalized by another one already created in the Ontology. Jiménez Briones, Luzondo Oyón & Pérez Cabello de Alba (2011) indicate that the researcher must consult some thesauri for the onomasiological distribution of lexemes.

4. ***Complain*** **verbs in FunGramKB**

The FunGramKB Ontology has been populated with the basic concept +COMPLAIN_00, which is lexicalized by items such as complain, beef, bellyach, bemoan, bitch, bleat, gripe, grizzle, groan, grouse, grumble, kvetch, moan, murmur, mutter, sound off, whine, and whinge in English. For Spanish, lamentar and quejar lexicalize such a concept. In Section 4.1., it is explained why these are the selected predicates. Note Figure 11, which contains this information:

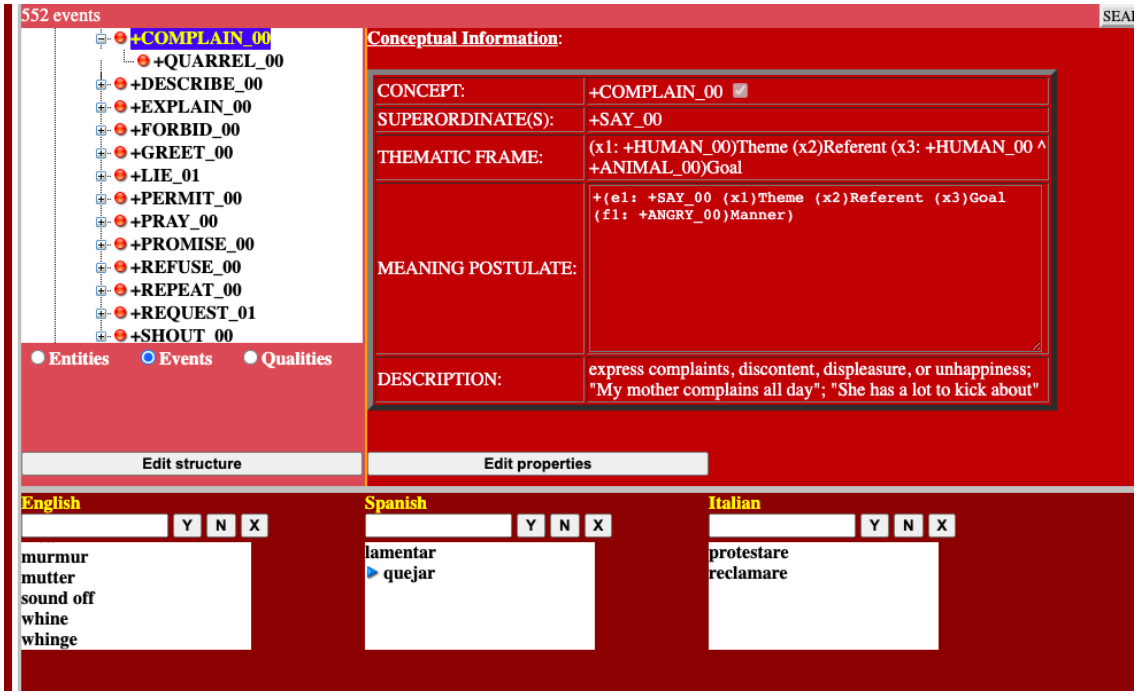

Figure 11. The concept +COMPLAIN_00 and its lexicalizers in English and Spanish.

Nevertheless, this concept is far from being wholly lexicalized, as other lexemes which are included in this domain have not been yet created in the Ontology. These lexical items are *boast, brag, reclamar* and *clamar*, which have been particularly selected on the following criteria: (1) they retain a high-level differentia in their semantic repository, which differentiates them from the rest of the domain and, due to such an aspect, do not have any other terminal concept to which they can be added; and (2) they are going to prompt the creation of more specific concepts in FunGramKB, as these new other concepts will be defined in their terms.

Before presenting the results of this investigation, it is imperative to briefly tackle the basic concepts +SAY_00 and +COMPLAIN_00.

+SAY_00 is the great superordinate of many other basic and terminal concepts of the #COMMUNICATION ontological cognitive dimension, being the same metaconcept its own hypernym, as seen in Figure 12:

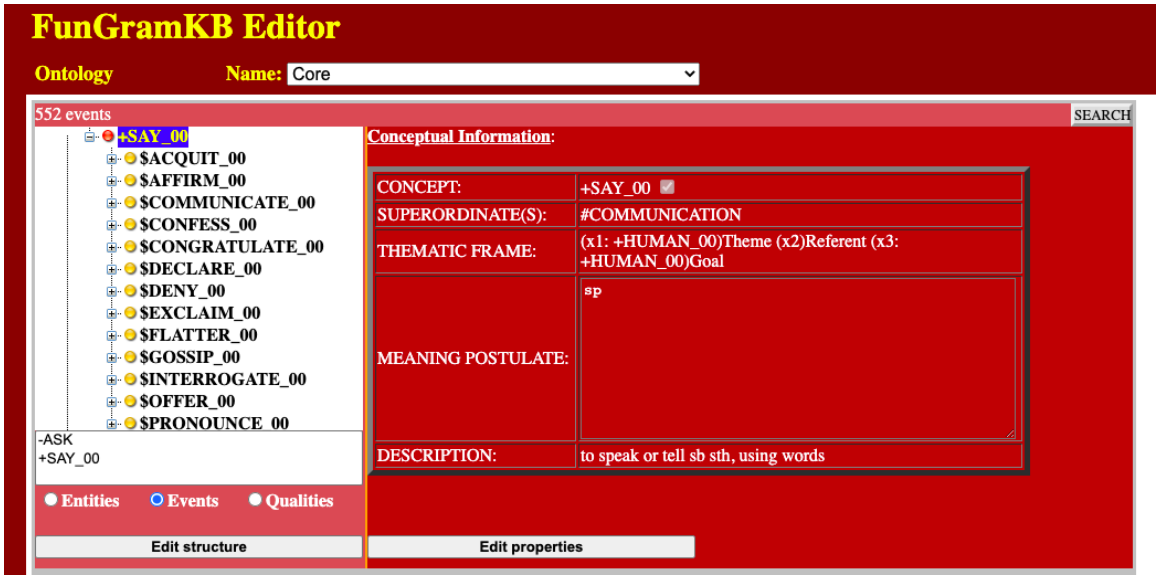

Figure 12. The concept +SAY_00 and some of its hyponyms.

Its MP is characterized, as explained in Section 2.2., by having three participants: (1) a *Theme*(x1), whose selectional preference is restricted by the basic concept +HUMAN_00; (2) a *Referent*(x2) without further restrictions; and (3) a *Goal*(x3), which also takes the selectional preference of the concept +HUMAN_00.

Concerning the basic concept +COMPLAIN_00, this will be the superordinate of some other *complain* verbs selected in this research, and its information is presented in Figure 13:

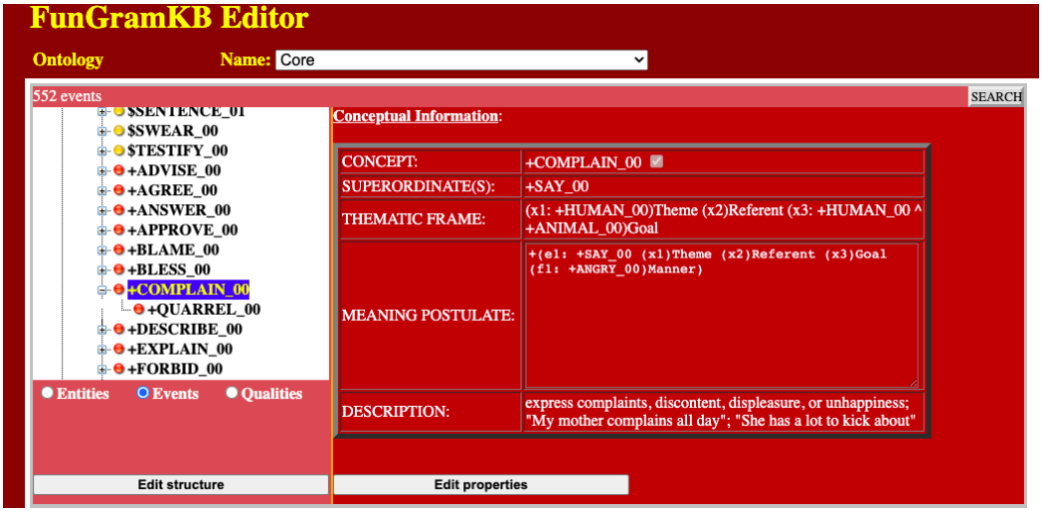

Figure 13. The concept +COMPLAIN_00 and some of its hyponyms.

The MP of +COMPLAIN_00 is inherited from SAY_00, that is: (x1: +HUMAN_00)Theme (x2)Referent (x3:HUMAN_00 ^ANIMAL_00)Goal.

4.1. Terminal concepts derived from the basic concept +SAY_00

These terminal concepts created for the Ontology inherit the information in the MP of their superordinate of +SAY_00. Therefore, after consulting English and Spanish thesauri[20], we have selected those lexemes related with the predicates *boast* and *brag*, leading to the following groupings:

Language	**Lexemes**
English	*brag, boast, crow, swagger, swank, gloat, show off*
Spanish	*alardear, presumir, vanagloriarse, jactarse, preciarse, alabarse, ufanarse*

Table 1. Lexemes related to boast and brag.

The following phase entails the decision regarding if these lexemes possess a really distinctive semantic feature as to produce the creation of a terminal concept in the Ontology. In order to do this, the *CLAVE*, *DRAE*, *Lexico.com* (Spanish [LEX]), *Longman Dictionary of Contemporary English* (L), *Cambridge Dictionary* (C), and *Lexico.com* (English [LEX]) have been consulted. Once these definitions have been listed and analyzed, *swagger, gloat*, and *show off* are discarded, since they do not bear a genus-relation type with the superordinate +SAY_00. The rest of the lexemes can be employed for the creation of a terminal concept. Although most of them have meanings related to the sense "to talk proudly about someone's doing", some of the selected lexical units are not directly defined by the hypernym basic concept, rather they will share the genus with other lexemes which lexicalize the concept +SAY_00, such as *boast*, *brag*, *jactarse* or *alabarse*. In other words, the terminal concept $BOAST_00 includes in its box of lexical units those that lexicalize this concept and their differentiae, which do not diverge to the extent of prompting the creation of another independent concept. After translating the definitions taken from the dictionaries into COREL language and having inherited the MP of the superordinate, Figure 14 contains the conceptual information of $BOAST_00:

CONCEPT:	**$BOAST_00**
SUPERORDINATE:	+SAY_00

[20] *The Longman Dictionary for English*, and Julio Casares's (1990) and Larousse's (2001) *Diccionario ideológico de la lengua española*.

CONCEPT:	**$BOAST_00**
THEMATIC FRAME (TF):	(x1: +HUMAN_00)Theme (x2)Referent (x3: +HUMAN_00)Goal
MEANING POSTULATE (MP):	+(e1: +SAY_00 (x1)Theme (x2)Referent (x3)Goal (f1: +PROUD_00)Manner) (f2: (e2: +HAVE_00 (x1)Theme (x2)Referent | past +DO_00 (x1)Theme (x2)Referent)Reason)
DESCRIPTION:	To talk proudly about what one's done or owns
LEXICAL UNITS RELATED TO THIS CONCEPT:	brag, swank, crow, alardear, presumir, vanagloriarse, jactarse, alabarse, ufanarse, gloriarse

Figure 14. The concept $BOAST_00 and its conceptual information.

The MP of $BOAST_00 reads as follows: there is a human entity, *Theme(x1),* the message, coded in the *(x2)Referent*, and the receiver, i.e., *(x3)Goal*. Moreover, there are further implications, since the selectional preference involves a satellite that requires that the manner in which the information is conveyed be *proudly*. The second satellite, i.e., *f2*, entails that the *Theme(x1)* must have something or done something in the past, which is encapsulated in the *Referent(x2).*

Object and *reclamar*, which have not been created in the Ontology, have +SAY_00 as superordinate. These two predicates do not lexicalize any other concept. Notwithstanding that there is the concept +AGREE_00, there has not been any attempt to generate a concept whose description takes the sense of *disagree*. Next to having realized an exhaustive search in dictionaries and thesauri in both languages, the following lexemes have been selected as being related to *object* and *reclamar*:

Language	**Lexemes**
English:	*object, disagree, disapprove, oppose, protest, dissent, defy, differ*
Spanish:	*reclamar, protestar, desaprobar, criticar, objetar, discrepar, oponerse*

Table 2. Lexemes related to object and reclamar.

The examination of the definitions of these lexical items suggest that *defy* is the only verb to be excluded, considering that its meaning is not defined in terms of *say*. The other lexemes are suitable to become lexicalizers of a terminal concept, which is subordinate to +SAY_00. As it occurs with $BOAST_00, some verbs have definitions

that are not direct daughters of the superordinate, but there are other lexemes that will define them. For example, *differ* takes *disagree* as archilexeme, whereas *disagree* takes *express*. Such lexical pieces are to be included into the informational box of the concept, as Figure 15 shows:

CONCEPT:	**$DISAGREE_00**
SUPERORDINATE:	+SAY_00
THEMATIC FRAME (TF):	(x1: +HUMAN_00)Theme (x2)Referent (x3: +HUMAN_00)Goal
MEANING POSTULATE (MP):	+(e1: +SAY_00 (x1)Theme (x2)Referent (x3)Goal) (f1: (e2: +HAVE_00 (x1)Theme (x4: +OPINION_00)Referent) (f2: e3: n +BE_00 (x4)Theme (x5)Referent)Attribute) (f3: e4: +HAVE_00 (x6)Theme (x7: +OPINION_00)Referent) (f4: e5: +BE_00 (x7)Theme (x5)Referent)Attribute)
DESCRIPTION:	To have a different opinion from someone else
LEXICAL UNITS RELATED TO THIS CONCEPT:	protest, dissent, differ, discrepar, disentir, protestar

Figure 15. The concept $DISAGREE_00 and its conceptual information.

The MP of $DISAGREE_00 is understood as: the *(x1)Theme* has a referent, namely, *(x4: +OPINION_00)Referent)*, which is not the same referent, that is, *(f3: e3: n +BE_00 (x4)Theme (x5)Referent)Attribute),* that the other participant has, which is *(e4: HAVE_00 (x6)Theme (x7: +OPINION_00)Referent) (f4: e5: +BE_00 (x7)Theme (x5)Referent)Attribute)*.

Oppose is suitable too for the creation of a new terminal concept from +SAY_00, due to the fact that in English and Spanish it involves the opposition and attempt to stop something from happening. Those lexemes whose definitions extracted from the dictionaries have *oppose* as genus will be included in its conceptual information. *Disapprove* also has its own terminal concept, as it requires the belief and/or pondering of something as not favorable. Figures 16 and 17 condense this information:

CONCEPT:	**$OPPOSE_00**
SUPERORDINATE:	+SAY _00
THEMATIC FRAME (TF):	(x1: +HUMAN_00)Theme (x2)Referent (x3: +HUMAN_00)Goal

CONCEPT:	**$OPPOSE_00**
MEANING POSTULATE (MP):	+ (e1: +SAY _00 (x1)Theme (x2)Referent (x3)Goal) + (e2: pos +DO_00 (x1)Theme (x4)Referent) (f1: (e3: n +EXIST_00 (x2)Theme)Purpose)
DESCRIPTION:	To disagree with someone and try to stop sth from happening
LEXICAL UNITS RELATED TO THIS CONCEPT:	object, oponerse, objetar, reclamar

Figure 16. The concept $OPPOSE_00 and its conceptual information.

CONCEPT:	**$DISAPPROVE_00**
SUPERORDINATE:	+SAY_00
THEMATIC FRAME (TF):	(x1: +HUMAN_00)Theme (x2)Referent (x3: +HUMAN_00)Goal
MEANING POSTULATE (MP):	+ (e1: +SAY_00 (x1)Theme (x2)Referent (x3)Goal) (f1: (e2: +THINK_00 (x1)Theme (x4)Referent) (f2: (e3: +BE_01 (x4)Theme (x5: +BAD_00)Attribute))Reason)
DESCRIPTION:	To say that something is bad or wrong
LEXICAL UNITS RELATED TO THIS CONCEPT:	desaprobar

Figure 17. The concept $DISAPPROVE_00 and its conceptual information.

The MP of $OPPOSE_00 can be paraphrased into *(x1)Theme* says something, *(x2)Referent*, to someone, *(x3)Goal*, to possibly do something to prevent *(x2)Referent* from happening. However, the terminal concept $DISAPPROVE_00 reads as follows: *(x1)Theme* says something, *(x2)Referent*, to someone, *(x3)Goal,* because *(x1)Theme* believes that *(x2)Referent* is not favorable, *(f1: (e2: +THINK_00 (x1)Theme (x4)Referent) (f2: (e3: +BE_01 (x4)Theme (x5: +BAD_00)Attribute))Reason)*.

4.2. Terminal concepts derived from the basic concept +COMPLAIN_00

Since most of the hyponyms of *complain* have already been inserted into the Ontology, it is necessary to decide on whether these lexemes may be able to prompt the generation of an independent terminal concept or rather they will be incorporated into +COMPLAIN_00. Then, those verbs that have not been yet

analyzed within FunGramKB are presented in this section: *grouch*, *crab*, and *clamar*. Once their definitions have been studied, we can conclude that *grouch* and *crab* lexicalize +COMPLAIN_00. Although the referent of the latter seems to be "something petty", this does not posit a strong semantic distinction to create another concept. *Clamar* does not allow the generation of a terminal concept either, seeing that its differentia is, exclusively, "to complain by shouting or crying", which can be semantically captured in COREL language in *(f1: +ANGRY_00) Manner).*

5. Hierarchization of $BOAST_00, $DISAGREE_00, $OPPOSE_00, and $DISAPPROVE_00

The COHERENT methodology (cf. Periñán-Pascual & Mairal-Usón, 2011) implies a hierarchization phase of the concepts included in the Ontology. As stated in Section 2.1., the arrangement is hierarchical based on a IS-A relation. Since subordinate concepts have to inherit the MP of their superordinates, process known as *subsumption*, these concepts that belong to the cognitive cluster of *complain* verbs take the MP of +SAY_00, as shown in their conceptual information. Therefore, the ontological taxonomy and the hierarchization of $BOAST_00, $DISAGREE_00, $OPPOSE_00, and $DISAPPROVE_00 can be seen in the following figure:

#EVENT
  #COMMUNICATION
    +SAY_00
      $BOAST_00^$DISAGREE_00^$OPPOSE_00$DISAPPROVE_00

Figure 18. Ontological taxonomy of the new terminal concepts related to complain verbs in the Ontology.

Observe that these terminal concepts are part of the #EVENT subontology, located in the metacognitive dimension of #COMMUNICATION. This means that each one of the terminal concepts proposed in this paper inherit the conceptual characteristics of their superordinates through a process of non-monotonic inheritance.

6. Conclusion

Ontological concept creation is an arduous process that requires the linguist to decide on specific aspects about a lexeme which not always are clear. Nevertheless, the COHERENT methodology allows us to establish a verifiable and schematic process, which, together with the COREL language, can represent the semantic information of a lexical piece in computational terms. In this paper, we have, therefore, semantically analyzed new terminal concepts derived from the superordinate +SAY_00, that binds them through inference and subsumption. Not

only these new lexemes, namely, $BOAST_00, $DISAGREE_00, $OPPOSE_00, and $DISAPPROVE_00 lexicalize part of the subdomain of *complain*, but also, they are widening the meaning previously stored in the Ontology. As stated in Section 1, this opens the possibility of further research with its computational implementation in NLP tools related to FunGramKB in order to revise what is feasible and those aspects that may be cumbersome. Furthermore, we have covered one of the most salient needs of the Ontology: its population and the introduction of new non-linguistic knowledge of the world.

Article history

Paper received: 09 January 2023
Paper received in revised form and accepted for publication: 29 April 2023

About the Author

Federico José Martín-Padrón is a PhD candidate with a research fellow (No. FPU20/00457) granted by the Spanish Ministry of Universities within the Formación de Profesorado Universitario (FPU) Program. He is a researcher of the Andrés Bello Linguistics Institute and the Department of English and German Studies at the University of La Laguna, Spain. His main areas of interest comprehend syntax and semantics. Currently, he is a team member of the well-established research group COSLING (Computational Semantics and Linguistic Engineering), whose members are developing a formalized grammar with the possibility of being technologically applied.

Declaration of Interest

The author hereby confirms that there are no identifiable conflicting commercial interests or personal associations that might have seemed to impact the research presented in this paper.

References

Armstrong, S. L., Gleitman, L. & Gleitman, H. (1983). What some concepts might not be. *Cognition, 13*, 263-308.

Carrión Delgado, M. G. (2012). Extracción y análisis de unidades léxico-conceptuales del dominio jurídico: un acercamiento metodológico desde FunGramKB, *RaeL, 11*, 25-39.

Cortés Rodríguez, F. J. (2016). Towards the computational implementation of Role and Reference Grammar: rules for the syntactic parsing of RRG Phrasal constituents. *Círculo de Lingüística Aplicada a la Comunicación*, *65*, 75-108.

Cortés Rodríguez, F. J., & Mairal-Usón, R. (2016). Building an RRG computational grammar. *Onomázein, 34*, 86-117.

Díaz Galán, A. & Fumero Pérez, M. C. (2016). Developing parsing rules within ARTEMIS: the case of do auxiliary insertion. In Periñán-Pascual, C. & Mestre Mestre, E. (Eds.), *Understanding meaning and knowledge representation.* (pp. 283-303). Cambridge: Cambridge Scholar Publishing.

Díaz Galán, A. & Fumero Pérez, M. C. (2017). ARTEMIS: state of the art and future horizons. *Revista de Lenguas para Fines Específicos, 23*(2), 16-40.

Dixon, R. M. W. (1991). A new approach to English Grammar on semantic principles. Clarendon Press.

Felices Lago, A. (2015). Foundational considerations for the development of the Globalcrimeterm subontology: a research project based on FunGramKB. *Onomázein, 31*, 127-144.

Felices-Lago, A. & Ureña Gómez-Moreno, P. (2014). FunGramKB term extractor: a tool for building terminological ontologies from specialized corpora. In Nolan, B. & Periñán-Pascual, C. (Eds.), *Language processing and grammars: the role of functionally oriented computational models*. (pp. 251-270). Amsterdam: John Benjamins Publishing.

Felices Lago, A. & Ureña Gómez-Moreno, P. (2020). Conceptualización de entidades terminológicas en una subontología de derecho penal: análisis del concepto superordinado +DRUG_00 en FunGramKB, *Revista de Lingüística y Lenguas Aplicadas, 15*, 15-25.

Fodor, J.A. (1975). The language of thought. Cambridge: Harvard University Press.

Guerra García, F. (2014). The interaction of non-linguistic and linguistic knowledge in FunGramKB. In Nolan, B. & Periñan-Pascual, C. (Eds.), *Language processing and grammars: the role of functionally oriented computational models*. (pp. 339-366). Amsterdam: John Benjamins Publishing.

Guerra García, F. & Sacramento Lechado, E. (2014). Exploring the thematic-frame mapping in FunGramKB. In Nolan, B. & Periñan-Pascual, C. (Eds.), *Language processing and grammars: the role of functionally oriented computational models*. (pp. 233-250).

Amsterdam: John Benjamins Publishing.

Goddard, C. & Wierzbicka, A. (2002). Meaning and Universal Grammar. Theory and empirical findings: Volume I. Amsterdam: John Benjamins Publishing.

Halliday, M. A. K. (1985). An Introduction to Functional Grammar. London: Arnold.

Hernández Hernández, E. & Fumero-Pérez, M. C. (2021). Población de conceptos terminales en la Ontología de Eventos y Entidades en FunGramKB. In Herrera Santana, J. L. & Díaz-Galán, A. (Eds.), *Aportaciones al estudio de las lenguas: perspectivas teóricas y aplicadas.* (pp. 203-2018). Berlin: Peter Lang.

Jiménez Briones, R. & Luzondo Oyón, A. (2011). Building ontological meaning in a lexico-conceptual knowledge base. *Onomázein*, *23*, 11-40.

Jiménez Briones, R. & Pérez Cabello de Alba, M. B. (2011). An account of selection restrictions in Role and Reference Grammar. *Revista Canaria de Estudios Ingleses*, *62*, 99-122.

Jiménez Briones, R., Luzondo Oyón, A. & Pérez Cabello de Alba, M. B. (2011). FunGramKB y la organización ontológica. *Anglogermánica Online 2011.*

Landau, B. (1982). Will the real grandmother please stand up? The psychological reality of dual meaning representations, *Journal of Psycholinguistic Research 11*(1), 47-62.

Levin, B. (1993). English verb classes and alternations: a preliminary investigation. Chicago: The University of Chicago Press.

Mairal Usón, R. & Periñán Pascual, C. (2009a). The anatomy of the lexicon component within the framework of a conceptual knowledge base. *Revista Española de Lingüística Aplicada*, *22*, 217-244.

Mairal Usón, R. & Periñán Pascual, C. (2009b). Role and Reference Grammar and ontological engineering. In Cifuentes, J. L., Gómez, A., Lillo, Mateo, J. & Yus, F. (Eds.), *Los caminos de la lengua. Estudios en homenaje a Enrique Alcaraz Varó*. (pp. 649-665). Alicante: Universidad de Alicante, Servicio de Publicaciones.

Mairal Usón, R. & Periñán Pascual, C. (2010). Teoría lingüística y representación del conocimiento: una discusión preliminar. In García Padrón, D. & Fumero Pérez, M. C. (Eds.), *Tendencias en lingüística general y aplicada*. (pp. 155-168). Berlin: Peter Lang.

Mairal Usón, R. & Periñán Pascual, C. (2016). Representing constructional schemata in FunGramKB Grammaticon. In Fleischhauer, J., Latrouite, A. & Osswald, R. (Eds.), *Explorations of the syntax-semantics interface*. (pp. 77-108). Düsseldorf: Düsseldorf University Press.

Mairal Usón, R. & Ruiz de Mendoza Ibáñez, F. J. (2008). New challenges for lexical representation within the lexical-constructional model. *Revista Canaria de Estudios Ingleses*, *55*, 137-158.

Mairal Usón, R. & Ruiz de Mendoza Ibáñez, F. J. (2009). Levels of description and

explanation in meaning construction. In Butler, C. & Martín, J. (Eds.), *Deconstructing construction*. (pp. 153-198). Amsterdam: John Benjamins Publishing.

Osherson, D. & Smith, E. (1981). On the adequacy of Prototype Theory as a theory of concepts. *Cognition*, *9*, 35-58.

Periñán Pascual, C. (2015). The underpinnings of a composite measure for automatic term extraction: the case of SRC. *Terminology, 21*(2), 151-179.

Periñán-Pascual, C. (2018). DEXTER: A workbench for automatic term extraction with specialized corpora. *Natural language engineering*, *24*(2), 163-198.

Periñán Pascual, C. & Arcas Túnez, F. (2007). Cognitive modules of an NLP knowledge base for language understanding. *Procesamiento del lenguaje natural*, *39*, 197-204.

Periñán Pascual, C. & Arcas Túnez, F. (2010). Ontological commitments in FunGramKB. *Procesamiento del lenguaje natural*, *44*, 27-34.

Periñán Pascual, C. & Arcas Túnez, F. (2011). Introducción a FunGramKB. *Anglogermánica Online 2011*.

Periñán Pascual, C. & Mairal Usón, R. (2009). Bringing Role and Reference Grammar to natural language understanding. *Procesamiento del lenguaje natural*, *43*, 265-273.

Periñán Pascual, C. & Mairal Usón, R. (2010). La gramática de COREL: un lenguaje de representación conceptual. *Onomázein*, *21*, 11-45.

Periñán Pascual, C. & Mairal Usón, R. (2011). The COHERENT methodology in FunGramKB. *Onomázein*, *24*, 13-33.

Periñán-Pascual, C. & Mairal Usón, R. (2018) "A framework of analysis for the evaluation of automatic term extractors". *VIAL - Vigo international journal of applied linguistics*, *15*, 105-125.

Ruiz de Mendoza Ibáñez, F. J. & Mairal Usón, R. (2008). Levels of description and constraining factors in meaning construction: an introduction to the Lexical Constructional Model. *Folia Linguistica*, *42*(2), 355-400.

San Martín, A. & Faber, P. (2014). Deep semantic representation in a domain-specific ontology: linking EcoLexicon to FunGramKB. In Nolan, B. & Periñan-Pascual, C. (Eds.), *Language processing and grammars: the role of functionally oriented computational models*. (pp. 271-296). Amsterdam: John Benjamins Publishing.

Van Valin, R. D., Jr. (2005). Exploring the syntax-semantics interface. Cambridge: Cambridge University Press.

Van Valin, R. D., Jr. & LaPolla, Randy J. (1997). Syntax. Structure, meaning, and function. Cambridge: Cambridge University Press.

Dictionaries and thesauri

Cambridge Dictionaries Online. (2021). Retrieved from https://dictionary.cambridge.org/es/

Casares, J. (1990). Diccionario ideológico de la lengua española. Barcelona: Gustavo Gili, S.A.

Diccionario Clave (en línea). (2021). Retrieved from http://clave.smdiccionarios.com/app.php

Diccionario de la Real Academia Española. (2021). Retrieved from https://www.rae.es/

Lexico.com (Oxford Dictionaries Online). (2021). Retrieved from https://www.lexico.com/en

Lexico.com Spanish Version (Oxford Dictionaries Online). (2021). Retrieved from https://www.lexico.com/es

Longman Dictionary of Contemporary English Online. (2021). Retrieved from https://www.ldoceonline.com/es-LA/

Vox. (1995). Diccionario ideológico de la lengua española. Barcelona: Biblograf, S.A.