Ontological Semantics in Role and Reference Grammar

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OUTLINE

- Challenges for NLP: The SEMANTIC WEB.
- Challenges for RRG semantics.
- Towards a computational application in RRG.
- FunGramKB: A conceptualist approach.
- An overview of the ontology, the lexicon and the morphicon.
- Future lines of research.

Challenges for NLP

- The Semantic Web.
- Intelligent agents: Crosslinguistic information retrieval.
- Crosslinguistic intelligent search engines: Google, Yahoo etc.
- NLP and linguistics.

Computation

- Develop a linguistic model based on MEANING

Could the LCM be a real alternative?

- Generate a knowledge based --→ ONTOLOGY and a REASONER

Challenges for RRG semantics

- Lexical templates: a development of RRG's logical structures (cf. predicate-centered approach).
- Based on aktionsart distinctions.
- The metalanguage consists of:
  - Primes or constants.
  - Operators.
  - Variables

Lexical Representation

Verb Class	Logical Structure	Example	Instantiation of LS
State	**predicate'** (x) or (x,y)	see	**see'** (x,y)
Activity	**do'** (x, [**predicate'** (x) or (x,y)]	run	**do'** (x,[**run**' (x)])
Achievement	INGR **predicate'** (x) or (x,y), *or* INGR **do'** (x, [**predicate'** (x) or (x,y)]	pop	INGR **popped'** (x)
Semelfactive	SEML **predicate'** (x) or (x,y) SEML **do'** (x, [**predicate'** (x) or (x,y)]	glimpse	SEML **see'** (x,y)
Accomplishment	BECOME **predicate'** (x) or (x,y), *or* BECOME **do'** (x, [**predicate'** (x) or (x,y)]	receive	BECOME **have'** (x,y)
Active accomplishment	**do'** (x, [**predicate$_1$'** (x, (y))] & BECOME **predicate$_2$**' (z,x) or (y)	drink	**do'** (x,[**drink**' (x,y)]) & BECOME **consumed'** (y)
Causative accomplishment	α CAUSES ß where α, ß are LS of any type	kill	[**do'** (x, ∅)] CAUSE [BECOME [**dead'** (y)]

Advantages

- Logical structures provide a nice formalism in terms of a consistent representational metalanguage.

- They are typologically adequate representations (cf. Van Valin, 2006). .

Problems

- Logical structures only capture those aspects of the meaning of a word that are syntactically visible.
- What about semantic and pragmatic parameters that are also part of the lexical knowledge of a word?
- The type of primes need further semantic decomposition since there is a lot of inconsistency in the representations.

Inconsistency in the use of primes

- **Lack of systematicity**

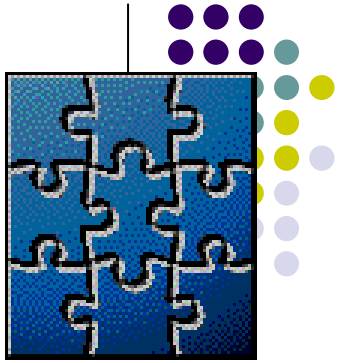
Activity predicates

sing	**do'** (x, [**sing'** (x)])
walk	**do'** (x, [**walk'** (x)])
drink	**do'** (x, [**drink'** (x)])

State pedicates

melt:	BECOME **melted'** (x)
shatter:	INGR **shattered´** (x)
break:	**do'** (x,ϕ)] CAUSE [BECOME **broken'** (y)]

Semantic decomposition



learn	BECOME **know'** (x, y)
receive	BECOME **have'** (x, y)
kill	[**do'** (x, ∅)] CAUSE [BECOME [**dead'** (y)]
show:	[**do'** (x, ∅)] CAUSE [BECOME [**see'** (y, z)]
cook:	[**do'** (x,ϕ)] CAUSE [BECOME **baked'** (y)]

Why lexical templates?

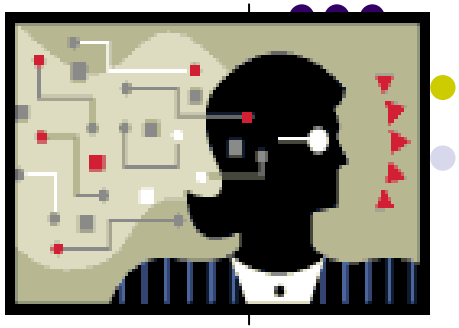
RRG Logical Structures

Cross-linguistic validity ?	Yes ☑	
Enhanced semantic component ?		No ☑

Challenge:
to enrich logical strucrtures with pragmatic and semantic parameters

- Compare:
  - *mandar* (‘command’), *ordenar* (‘order’), *decretar* (‘decree’), *preceptuar* (‘set up a precept’), *preinscribir* (‘preregister’).
  - *cautivar* (‘captivate’), *arrebatar* (‘seize’), *arrobar* (‘entrance’), *embelesar* (‘enrapture’), *extasiar* (‘send into an ecstasy’), *hechizar* (‘bewitch’)

First proposals



Speech verbs and *promise*

do’ (**x,** [**express** (α).**to** (β).**in.language**.(γ)’ (x,y)])
do’ (**x,** [**express** (α).**to** (β).**in.language**.(γ)’ (x,y)])CAUSE [BECOME **obligated’** (x, w)
α = w; β = y (Van Valin and LaPolla, 1997)

Remember

BECOME think.again (x) **about something.be.in.mind.from.before** (y)
(Van Valin and Wilkins, 1993)

***Contact-by-impact* verbs**

[[**do´** (w, [**use.tool.**(α).**in.**(β).**manner.for.**(δ)´ (w, x)] CAUSE
[**do´** (x, [**move.toward´** (x, y) & INGR **be.in.contact.with´** (y, x)], α = x.

(Mairal, 2002, 2003)

Lexical representation schema

[semantics = qualia structure] + logical structure = predicate

- Set of semantic parameters that differentiate one predicate from others within the same domain;
- Description of the event structure and the set of grammatically salient properties.

Towards a new formalism Pustejovsky's qualia

Constitutive (QC): the relation between an object and its constituent parts, e.g. material, weight, parts and component elements.

Formal (QF): that which distinguishes it within a larger domain, e.g. orientation, magnitude, shape, dimensionality, color, position

Telic (QT): its purpose and function.

Agentive (QA): factors involved in its origin or 'bringing it about'

Examples

captar:

[{Q_F: MagnObstr **think'** (x, y) / Q_T:
Culm **know'** (x, y)}] **know'** (x, y)

Change of state verbs

eventstr:

[**do'** (x, e_1)]$_{E1}$ CAUSE [BECOME/INGR **pred´**(y)]$_{E2}$

qualiastr**:**

{Q_F: MANNER **pred'** (y)

Q_A: e_1: **Oper** x, z <Instr>

Q_T: E_2}

break:

[{Q_F: *broken'* (y) / Q_A: **do'**(x, *break_act'*)}]

do' (x, Ø) CAUSE [BECOME/ INGR *broken'* (y)]

Challenge

- Convert RRG semantics (the LCM) into a model based on MEANING that allows:
  - REASON
  - INFER
  - RETRIEVE
  - MULTINLINGUAL INFORMATION

Towards a computational implementation of RRG

- The development of a knowledge base.
- FungramKB.
- The ontology.
- The lexicon.
- Towards a conceptualist framework: Conceptual Logical Structures.
- The Lexical-Conceptual Linkage.

OVERVIEW TO FUNGRAMKB

FunGramKB

A MULTIPURPOSE LEXICO-CONCEPTUAL KNOWLEDGE BASE FOR NLP SYSTEMS

OVERVIEW TO FUNGRAMKB

FunGramKB

A MULTIPURPOSE LEXICO-CONCEPTUAL KNOWLEDGE BASE FOR NLP SYSTEMS

MULTIFUNCTIONAL

MULTILINGUAL

OVERVIEW TO FUNGRAMKB

FunGramKB

A MULTIPURPOSE LEXICO-CONCEPTUAL KNOWLEDGE BASE FOR NLP SYSTEMS

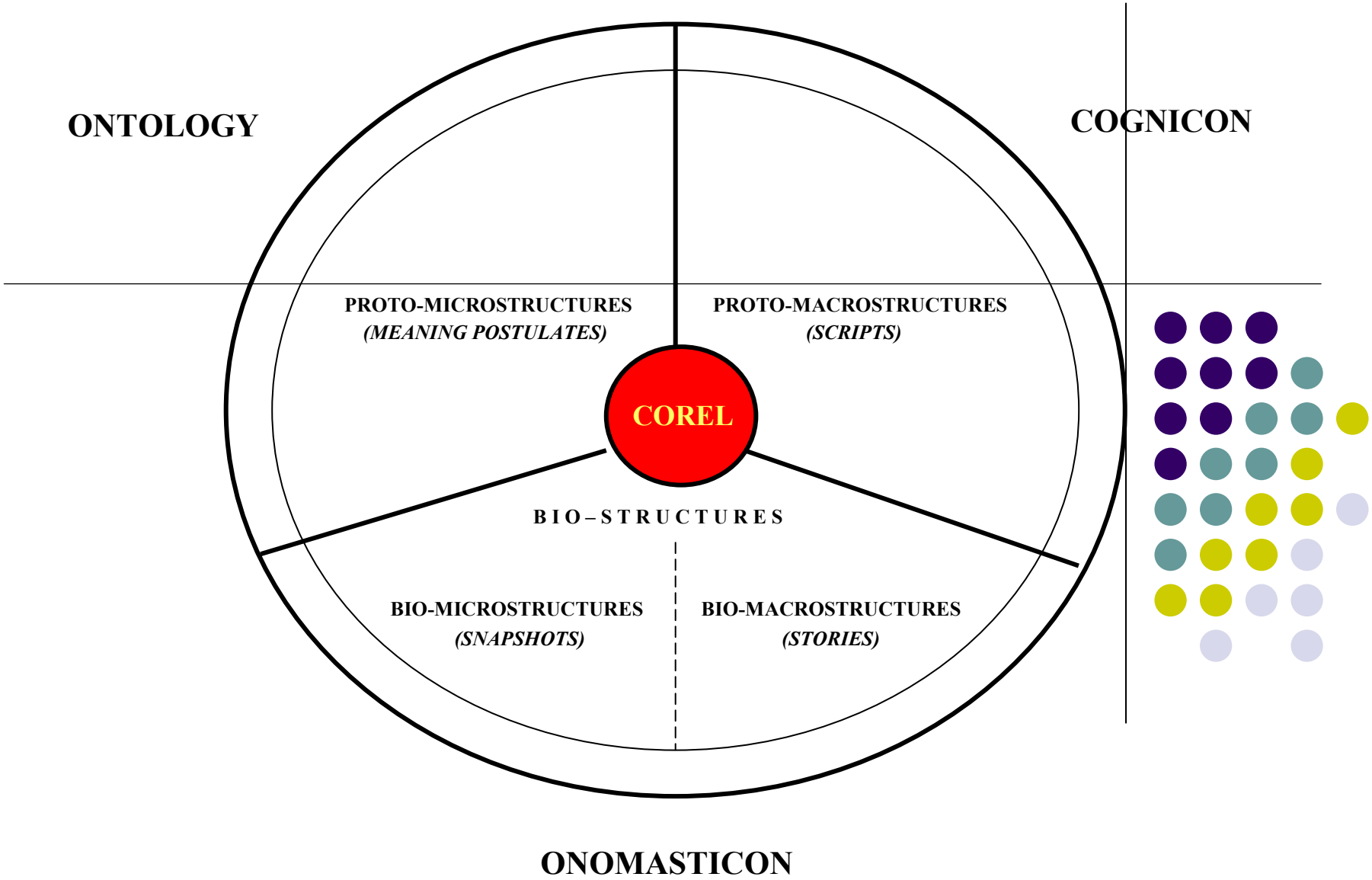
Lexical Level

* LEXICON
* MORPHICON

Conceptual Level

* ONTOLOGY
* COGNICON
* ONOMASTICON

COGNITIVE KNOWLEDGE AND COREL



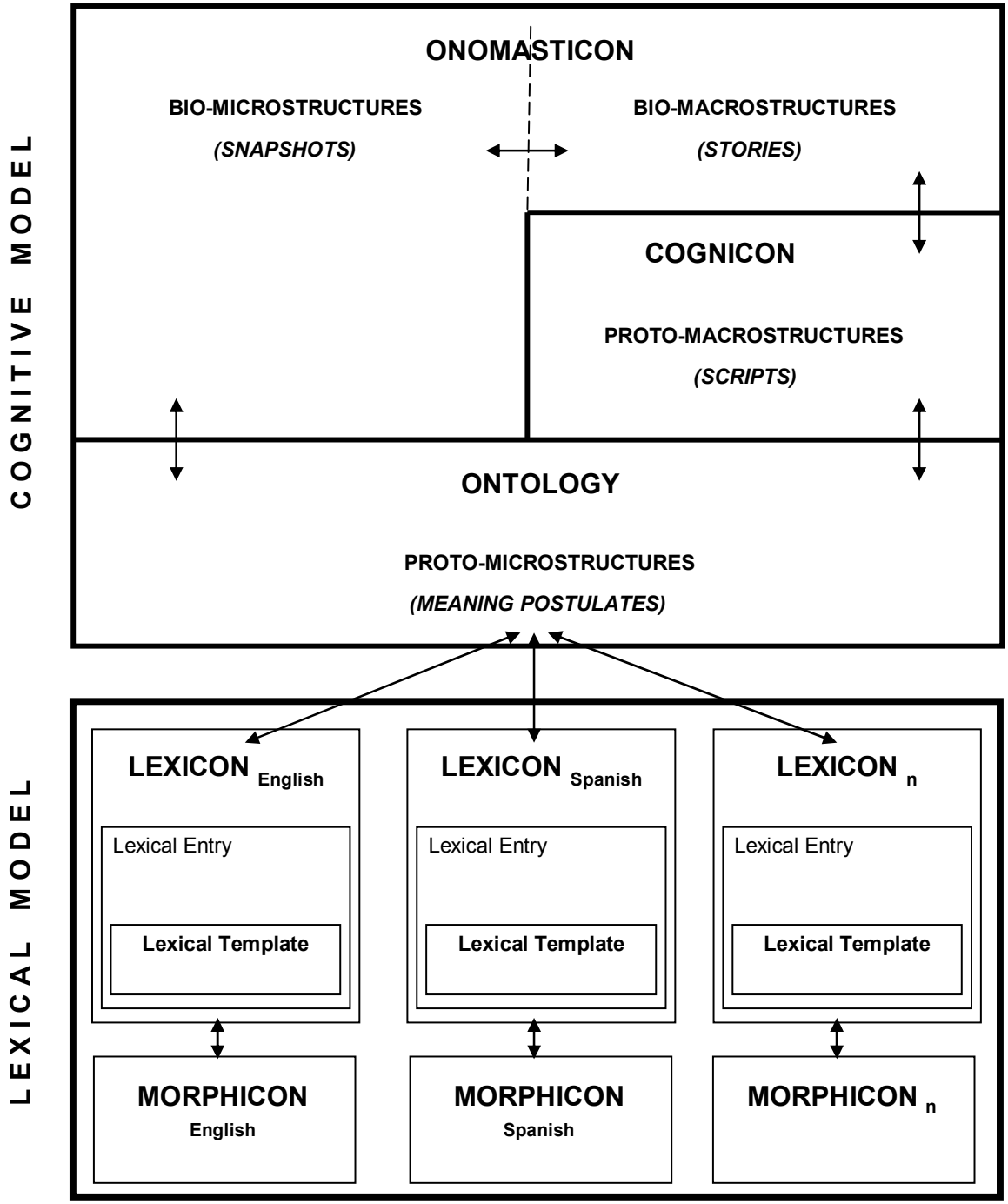
The cognitive level

(cf. Periñán and Arcas, 2007, 2008: Periñán and Mairal, 2009; fc))

- The ontology: hierarchical structure of all the concepts a person has in mind.
- The cognicon: stores procedural knowledge by means of cognitive macrostructures, e.g. script-like schemata.
- The onomasticon: stores information about instances of entities.

Conditions

- Concepts, as well as lexical entries and constructions, are defined.
- Our proposal is inspired in a deep semantics approach (cf. surface semantics).
- What forms part of the cognitive level MUST be defined.
- How? Meaning postulates.


COGNITIVE MODEL
ONOMASTICON
BIO-MICROSTRUCTURES
(SNAPSHOTS)
BIO-MACROSTRUCTURES
(STORIES)
COGNICON
PROTO-MACROSTRUCTURES
(SCRIPTS)
ONTOLOGY
PROTO-MICROSTRUCTURES
(MEANING POSTULATES)
LEXICAL MODEL
LEXICON English
Lexical Entry
Lexical Template
LEXICON Spanish
Lexical Entry
Lexical Template
LEXICON n
Lexical Entry
Lexical Template
MORPHICON English
MORPHICON Spanish
MORPHICON n

Deep Semantics vs Surface Semantics

Meaning representation

relational meaning

conceptual meaning

A typical bird has many feathers, two legs and two wings.

HAS_MERO_PART (bird, feather)
HAS_MERO_PART (bird, leg)
HAS_MERO_PART (bird, wing)

EuroWordNet

FunGramKB

*(e2: COMPRISE (x1: BIRD)Theme (x3: m
FEATHER & 2 LEG & 2 WING)Referent)

Deep Semantics vs Surface Semantics

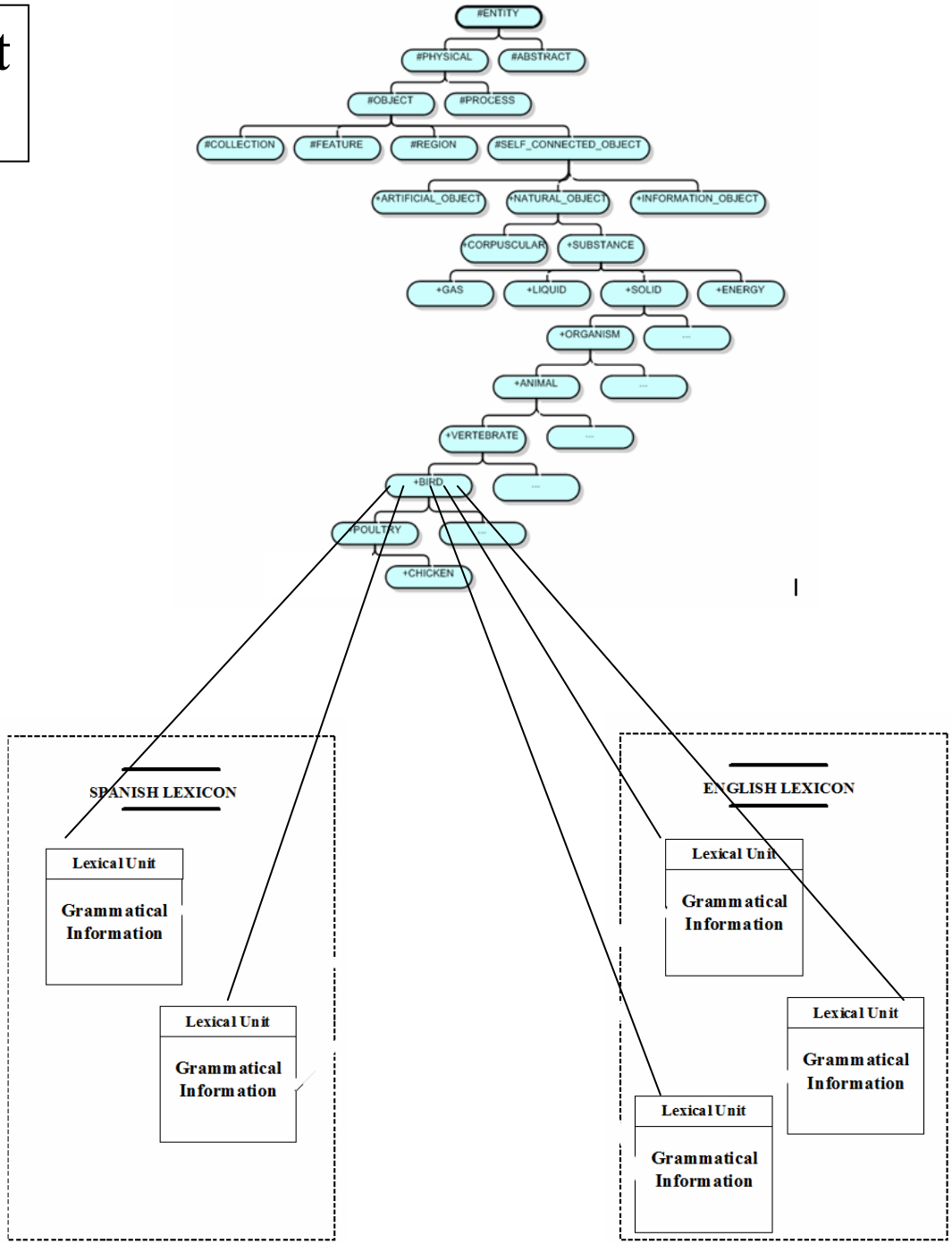
EuroWordNet

HAS_MERO_PART (bird, feather)
HAS_MERO_PART (pájaro, pluma)
HAS_MERO_PART (Vogel, Feder)
HAS_MERO_PART (uccello, piuma)
HAS_MERO_PART (oiseau, plume)

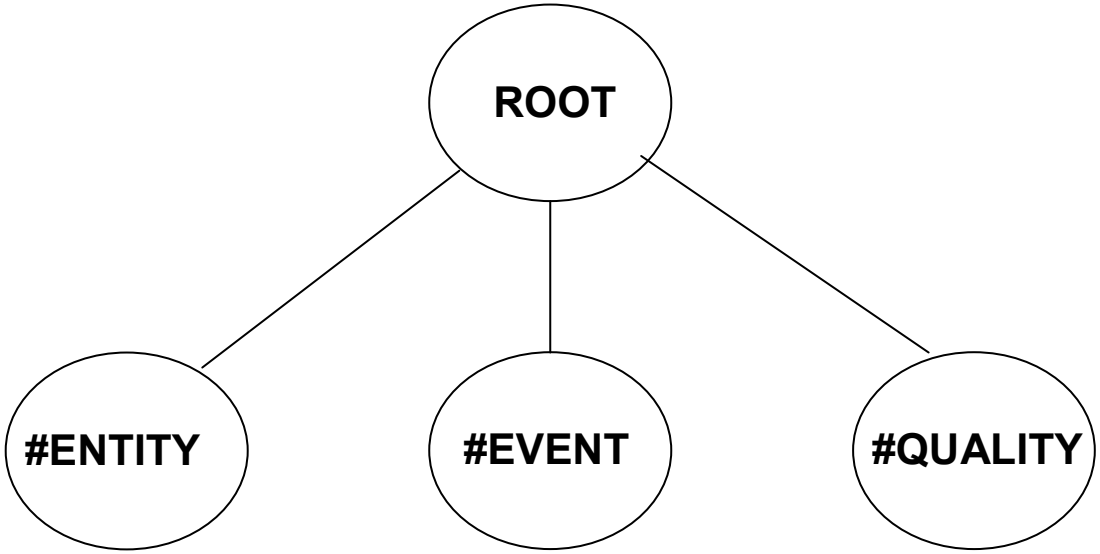
HAS_MERO_PART (bird, leg)
HAS_MERO_PART (pájaro, pata)
etc.

HAS_MERO_PART (bird, wing)
HAS_MERO_PART (pájaro, ala)
etc.

Conceptualist approach

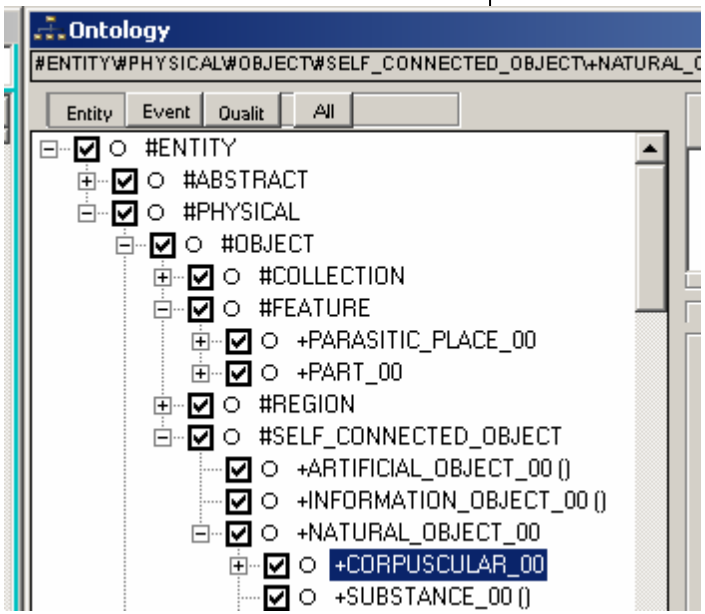


FUNGRAMKB ONTOLOGY



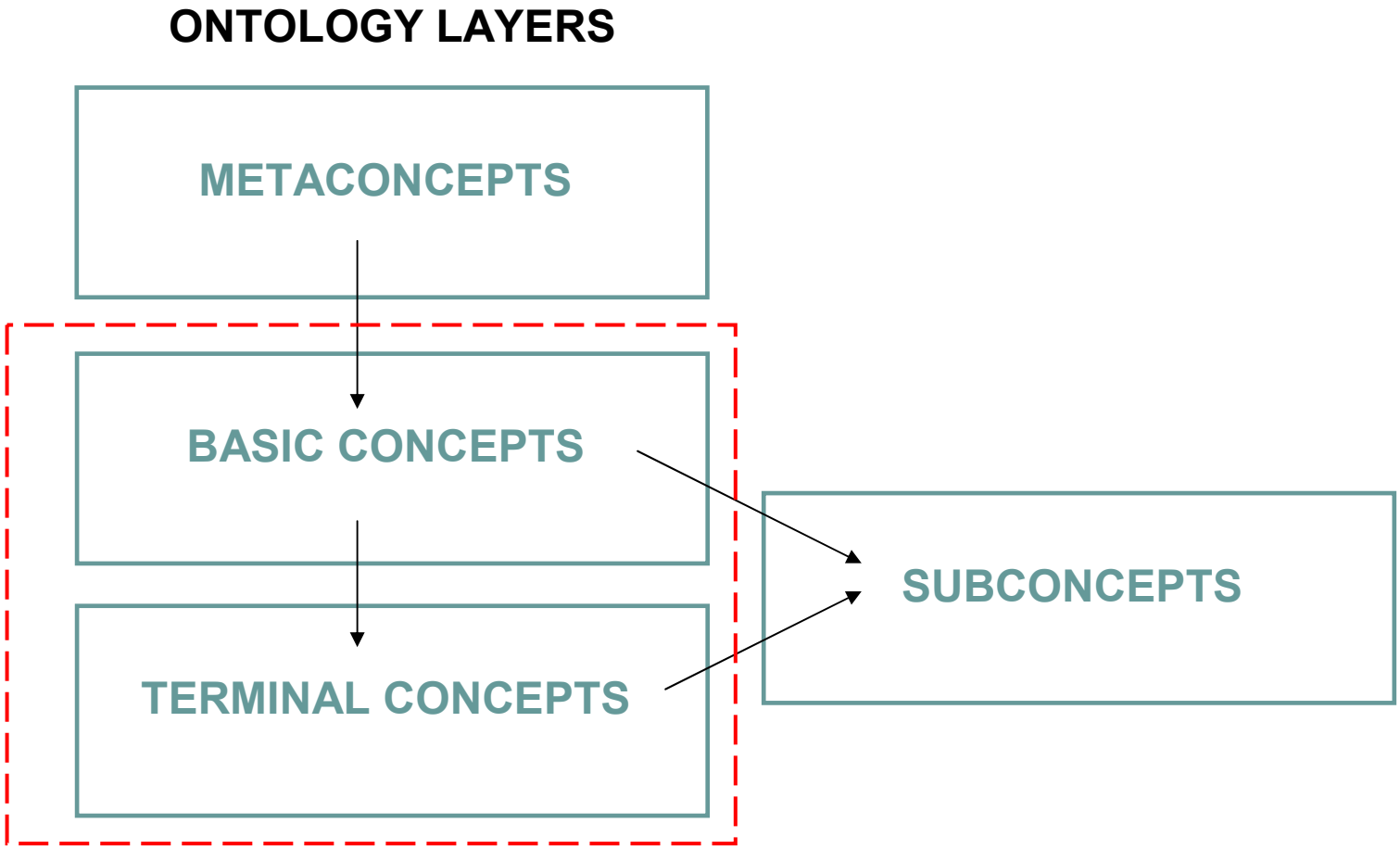
COREL Terms (FunGramKB Ontology)

Terms = Concepts from <u>FunGramKB ontology</u>



- **Symbiosis between universality and linguistic motivation**
- **Subsumption as the only taxonomic relation**
- **Four-layered ontological model**
- **Non-atomicity of concepts**
- **Meaning postulates as ontological organizers**

COREL Terms (FunGramKB Ontology)



COREL Terms (FunGramKB Ontology)

METACONCEPTS

DOLCE (Gangemi et al., 2002; Masolo et al., 2003)

Generalized Upper Model (Bateman, 1990; Bateman, Henschel and Rinaldi, 1995)

Mikrokosmos (Beale, Nirenburg and Mahesh, 1995; Mahesh and Nirenburg, 1995; Nirenburg et al., 1996)

SIMPLE (Lenci, 2000; Lenci et al., 2000; Pedersen and Keson, 1999; SIMPLE Specification Group, 2000; Villegas and Brosa, 1999)

SUMO (Niles and Pease, 2001a, 2001b)

#ENTITY

? #PHYSICAL

? #OBJECT

? #SELF_CONNECTED_OBJECT

? +ARTIFICIAL_OBJECT

? +CORPUSCULAR

? +SOLID

? +BALL

? $FOOTBALL

COREL Terms (FunGramKB Ontology)

1. #ENTITY

- 1.1 #ABSTRACT
  - 1.1.1 #ATTRIBUTE
    - 1.1.1.1 #PHYSICAL_ATT
    - 1.1.1.2 #PSYCHOLOGICAL_ATT
      - 1.1.1.2.1 #BEHAVIOURAL_ATT
      - 1.1.1.2.2 #COGNITIVE_ATT
      - 1.1.1.2.3 #EMOTIONAL_ATT
      - 1.1.1.2.4 #PERCEPTUAL_ATT
  - 1.1.2 #PROPOSITION
  - 1.1.3 #QUANTITY
    - 1.1.3.1 #TIME
- 1.2 #PHYSICAL
  - 1.2.1 #OBJECT
    - 1.2.1.1 #COLLECTION
    - 1.2.1.2 #FEATURE
    - 1.2.1.3 #REGION
    - 1.2.1.4 #SELF_CONNECTED_OBJECT
  - 1.2.2 #PROCESS

COREL Terms (FunGramKB Ontology)

2. #EVENT

- 2.1 #COMMUNICATION
- 2.2 #MATERIAL
  - 2.2.1 #CREATION
  - 2.2.2 #MOTION
    - 2.2.2.1 #TRANSFER
  - 2.2.3 #TRANSFORMATION
- 2.3 #PSYCHOLOGICAL
  - 2.3.1 #COGNITION
  - 2.3.2 #EMOTION
  - 2.3.3 #INTENTION
  - 2.3.4 #PERCEPTION
- 2.4 #STATIVE
  - 2.4.1 #EXISTENCE
  - 2.4.2 #RELATIONAL
    - 2.4.2.1 #CONSTITUTION
    - 2.4.2.2 #IDENTIFICATION
    - 2.4.2.3 #LOCATION
    - 2.4.2.4 #POSSESSION

COREL Terms (FunGramKB Ontology)

3. #QUALITY

- 3.1 #PHYSICAL
- 3.2 #PSYCHOLOGICAL
  - 3.2.1 #BEHAVIOURAL
  - 3.2.2 #COGNITIVE
  - 3.2.3 #EMOTIONAL
- 3.3 #QUANTITATIVE
- 3.4 #RELATIONAL_
- 3.5 #SOCIAL_
- 3.6 #SPATIAL
- 3.7 #TEMPORAL

FUNGRAMKB ONTOLOGY: SUBONTOLOGiES

1. #ENTITY
- 1.1 #ABSTRACT
  - 1.1.1 #ATTRIBUTE
    - 1.1.1.1 #PHYSICAL_ATT
    - 1.1.1.2 #PSYCHOLOGICAL_ATT
      - 1.1.1.2.1 #BEHAVIOURAL_ATT
      - 1.1.1.2.2 #COGNITIVE_ATT
      - 1.1.1.2.3 #EMOTIONAL_ATT
      - 1.1.1.2.4 #PERCEPTUAL_ATT
  - 1.1.2 #PROPOSITION
  - 1.1.3 #QUANTITY
    - 1.1.3.1 #TIME
- 1.2 #PHYSICAL
  - 1.2.1 #OBJECT
    - 1.2.1.1 #COLLECTION
    - 1.2.1.2 #FEATURE
    - 1.2.1.3 #REGION
    - 1.2.1.4 #SELF_CONNECTED_OBJECT
  - 1.2.2 #PROCESS

2. #EVENT
- 2.1 #COMMUNICATION
- 2.2 #MATERIAL
  - 2.2.1 #CREATION
  - 2.2.2 #MOTION
    - 2.2.2.1 #TRANSFER
  - 2.2.3 #TRANSFORMATION
- 2.3 #PSYCHOLOGICAL
  - 2.3.1 #COGNITION
  - 2.3.2 #EMOTION
  - 2.3.3 #INTENTION
  - 2.3.4 #PERCEPTION
- 2.4 #STATIVE
  - 2.4.1 #EXISTENCE
  - 2.4.2 #RELATIONAL
    - 2.4.2.1 #CONSTITUTION
    - 2.4.2.2 #IDENTIFICATION
    - 2.4.2.3 #LOCATION
    - 2.4.2.4 #POSSESSION

3. #QUALITY
- 3.1 #PHYSICAL
- 3.2 #PSYCHOLOGICAL
  - 3.2.1 #BEHAVIOURAL
  - 3.2.2 #COGNITIVE
  - 3.2.3 #EMOTIONAL
- 3.3 #QUANTITATIVE
- 3.4 #RELATIONAL_
- 3.5 #SOCIAL_
- 3.6 #SPATIAL
- 3.7 #TEMPORAL

CONCEPTUAL KNOWLEDGE SCHEMATA

MEANING POSTULATE (e.g. BIRD)

+(e1: +BE_00 (x1: +BIRD_00)Theme (x2: +VERTEBRATE_00)Referent)

*(e2: +COMPRISE_00 (x1)Theme (x3: m +FEATHER_00 & 2 +LEG_00 & 2 +WING_00)Referent)

*(e3: +FLY_00 (x1)Agent (x1)Theme (x4)Origin (x5)Goal)

SCRIPT (e.g. EATING AT A RESTAURANT)

*(e1: +ENTER_00 (x1)Agent (x2: +CUSTOMER_00)Theme (x3)Location (x4)Origin (x5: +RESTAURANT_00)Goal (f1: (e2: +BE_01 (x2)Theme (x6: +HUNGRY_00)Attribute))Reason)

*(e3: +TAKE_01(x7: +WAITER_00)Agent (x2)Theme (x5)Location (x8)Origin (x9: +TABLE_00)Goal)

*((e4: +SIT_00 (x2)Theme (x10: +CHAIR_00)Location)(e5: +BE_02 (x10)Theme (x9)Location (f2: m +NEAR_00)Position))

*(e6:+TAKE_01(x7)Agent (x11: $MENU_00 | $WINE_LIST_00)Theme (x5)Location (x12)Origin (x9)Goal)

.

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COREL Notation

MEANING POSTULATE (e.g. BIRD)

+(e1: +BE_00 (x1: +BIRD_00)Theme (x2: +VERTEBRATE_00)Referent)

*(e2: +COMPRISE_00 (x1)Theme (x3: m +FEATHER_00 & 2 +LEG_00 & 2 +WING_00)Referent)

*(e3: +FLY_00 (x1)Agent (x1)Theme (x4)Origin (x5)Goal)

COGNITIVE MACROSTRUCTURE (e.g. EATING AT A RESTAURANT)

*(e1: +ENTER_00 (x1)Agent (x2: +CUSTOMER_00)Theme (x3)Location (x4)Origin (x5: +RESTAURANT_00)Goal (f1: (e2: +BE_01 (x2)Theme (x6: +HUNGRY_00)Attribute))Reason)

*(e3: +TAKE_01(x7: +WAITER_00)Agent (x2)Theme (x5)Location (x8)Origin (x9: +TABLE_00)Goal)

*((e4: +SIT_00 (x2)Theme (x10: +CHAIR_00)Location)(e5: +BE_02 (x10)Theme (x9)Location (f2: m +NEAR_00)Position))

*(e6:+TAKE_01(x7)Agent (x11: $MENU_00 | $WINE_LIST_00)Theme (x5)Location (x12)Origin (x9)Goal)

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FunGramKB - Windows Internet Explorer

http://localhost:49176/FGKB/

FunGramKB

La configuración de intranet está ahora desactivada de forma predeterminada. La configuración de intranet es menos segura que la configuración de Internet. Haga clic aquí para ver opciones...

FunGramKB

a lexico-conceptual knowledge base for NLP

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FunGramKB Suite

FunGramKB Suite is a user-friendly environment for the semiautomatic construction of FunGramKB, a multipurpose lexico-conceptual knowledge base for natural language processing (NLP) systems.

On the one hand, FunGramKB is multipurpose in the sense that it is both multifunctional and multilingual. In other words, FunGramKB can be reused in various NLP tasks (e.g. information retrieval and extraction, machine translation, dialogue-based systems, etc) and with several natural languages.

On the other hand, our knowledge base is lexico-conceptual, because it comprises two general levels of information: a lexical level and a cognitive level. In turn, these levels are made up of several independent but interrelated components:

Lexical level

- The lexicon stores morphosyntactic information of words.
- The morphicon helps our system to handle cases of inflectional morphology.

Cognitive level

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Listo

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a lexico-conceptual knowledge base for NLP

- Resources
- FunGramKB Editor
  - Lexicon
    - English Lexicon
    - Spanish Lexicon
    - Constructicon
  - Morphicon
  - Ontology
  - Cognicon
  - Onomasticon
- Administrator

Log out

Resources

ENGLISH RESOURCES
Longman Dictionary of Contemporary English
English Collins Dictionary & Thesaurus
Cambridge Advanced Learner's Dictionary
BNC: British National Corpus
COCA: Corpus of Contemporary American English

SPANISH RESOURCES
DRAE: Diccionario de la Lengua Española (Real Academia)
CLAVE
Diccionario de Sinónimos y Antónimos (Espasa Calpe)
Diccionari de sentits verbals
ADESSE: Alternancias de Diátesis y Esquemas Sintáctico-Semánticos del Español
Base de datos sintácticos del español actual

FunGramKB Editor: Ontology - Windows Internet Explorer

http://localhost:49176/FGKB/edit/ontology.aspx

FunGramKB Editor: Ontology

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FunGramKB Editor

Ontology

298 events

SEARCH

- #EVENT
  - #COMMUNICATION
  - #MATERIAL
  - #PSYCHOLOGICAL
    - #COGNITION
    - #EMOTION
      - +FEEL_00
        - +ANNOY_00
        - +DISLIKE_00
        - +FEAR_01
        - +FORGIVE_00
        - +LIKE_00
        - +SUFFER_00
        - +WORRY_00

Entities Events Qualities

Edit structure

Conceptual Information:

CONCEPT:	+ANNOY_00
SUPERORDINATE(S):	+FEEL_00
THEMATIC FRAME:	(x1)Agent (x2: +HUMAN_00 ^ +ANIMAL_00)Theme
MEANING POSTULATE:	+(e1: +FEEL_00 (x1)Agent (x2)Theme (x3: +ANGRY_00)Attribute)
DESCRIPTION:	cause annoyance in; disturb, esp. by minor irritations: "Mosquitoes buzzing in my ear really bothers me"; "It irritates me that she never closes the door after she leaves"

Edit properties

English Y N X

annoy
bother
irritate
nettle
rile

Spanish Y N X

cabrear
dar rabia
enfadar
enojar
fastidiar

Italian Y N X

French

German

Bulgarian

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Edit structure | Edit properties

Insert child parent

OK

Delete selected concept...

and also its lexical units.

but not its lexical units.

OK

Rename selected concept into:

OK

Subordinate to:

#EVENT

OK

+FEEL_00

NO

Subconcept:

OK

NO

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FunGramKB Editor: Ontology

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Edit structure | Edit properties

THEMATIC FRAME:

```
(x1)Agent
(x2: +HUMAN_00 ^ +ANIMAL_00)Theme
```

Validate ? C

MEANING POSTULATE:

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

Validate ? C

DESCRIPTION:

```
cause annoyance in; disturb, esp. by
minor irritations: "Mosquitoes buzzing
in my ear really bothers me"; "It
```

Save ☑ Done

English	Spanish	Italian
Y N X	Y N X	Y N X
annoy	cabrear	

FunGramKB Editor: Ontology - Windows Internet Explorer

http://www.fungramkb.com/edit/ontology.aspx

Archivo Edición Ver Favoritos Herramientas Ayuda

DESCARGAS Buscar TV Jugar! Música Programas Cade... Noticias [516] Elinks

FunGramKB Editor: Ontology

FunGramKB Editor

Ontology

299 events SEARCH

- +SHINE_00
- +SOUND_01
- +WEAVE_00
- +WHISTLE_00
- +WRITE_00
- #MOTION
- #TRANSFORMATION
- +DO_00
- #PSYCHOLOGICAL
  - #COGNITION
  - #EMOTION
  - #INTENTION
  - #PERCEPTION
- #STATIVE

Entities Events Qualities

Edit structure

Conceptual Information:

CONCEPT:	+WRITE_00
SUPERORDINATE(S):	+CREATE_00
THEMATIC FRAME:	(x1: +HUMAN_00 ^ +ANIMAL_00)Theme (x2: +WRITING_00 ^ +IMAGE_00)Referent
MEANING POSTULATE:	+(e1: +CREATE_00 (x1)Theme (x2)Referent (f1: +PENCIL_00 ^ +PEN_00 ^ +MACHINE_00)Instrument (f2: +PAPER_00 | +WALL_00)Location (f3: +ON_00)Position)
DESCRIPTION:	to produce writing or images on paper

Edit properties

English Y N X

draw
print
▶ write

Spanish Y N X

dibujar
▶ escribir
imprimir

Italian Y N X

French Y N X

dessiner
▶ écrire
imprimer

German Y N X

schreiben

Bulgarian Y N X

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Archivo Edición Ver Favoritos Herramientas Ayuda

DESCARGAS Buscar TV Jugar! Música Programas Cade... Noticias [516] Elinks

FunGramKB Editor: Ontology

$WITHER_00
+FILL_00
+HARDEN_00
+HEAT_00
+IMPROVE_00
+INCREASE_00
+INFECT_00
+LENGTHEN_00
+MELT_00
+REPAIR_00
+SPLIT_00
+TIGHTEN_00
+TRANSLATE_00

Entities Events Qualitie

Concept Word in TF in MP

$WITHER_00 OK

#EVENT >> #MATERIAL >> +DO_00 >> +CHANGE_00 >> +DRY_01 >> $WITHER_00

[Close]

Edit structure Edit properties

English

Y N X

shrivel
wither

Spanish

Y N X

arrugar
marchitar
mustiar
pudrir

Italian

Y N X

French

Y N X

German

Y N X

Bulgarian

Y N X

Catalan

Y N X

FunGramKB Editor: Ontology - Windows Internet Explorer

http://www.fungramkb.com/edit/ontology.aspx

Archivo Edición Ver Favoritos Herramientas Ayuda

DESCARGAS Buscar TV Jugar! Música Programas Cade... Noticias [516] Elinks

FunGramKB Editor: Ontology

FunGramKB Editor

Ontology

299 events SEARCH

- SREMODEL_00
- +BEND_00
- +CLEAN_01
- +COOL_00
- +CURE_00
- +DAMAGE_00
- +DECORATE_00
- +DECREASE_00
- +DRY_01
  - SEVAPORATE_00
  - SWITHER_00
- +FILL_00
- +HARDEN_00

Entities Events Qualities

Edit structure

Conceptual Information:

CONCEPT:	$WITHER_00
SUPERORDINATE(S):	+DRY_01
THEMATIC FRAME:	(x1)Theme (x2: +PLANT_00 ^ +FRUIT_00)Referent
MEANING POSTULATE:	+(e1: +DRY_01 (x1)Theme (x2)Referent (f1: (e2: +BECOME_00 (x2)Theme (x3: +SMALL_00 | +WEAK_00)Attribute))Result (f2: (e3: ing +DIE_00 (x2)Theme))Result)
DESCRIPTION:	If plants wither, they become drier and smaller and start to die

Edit properties

English Y N X

shrivel
wither

Spanish Y N X

arrugar
marchitar
mustiar
pudrir

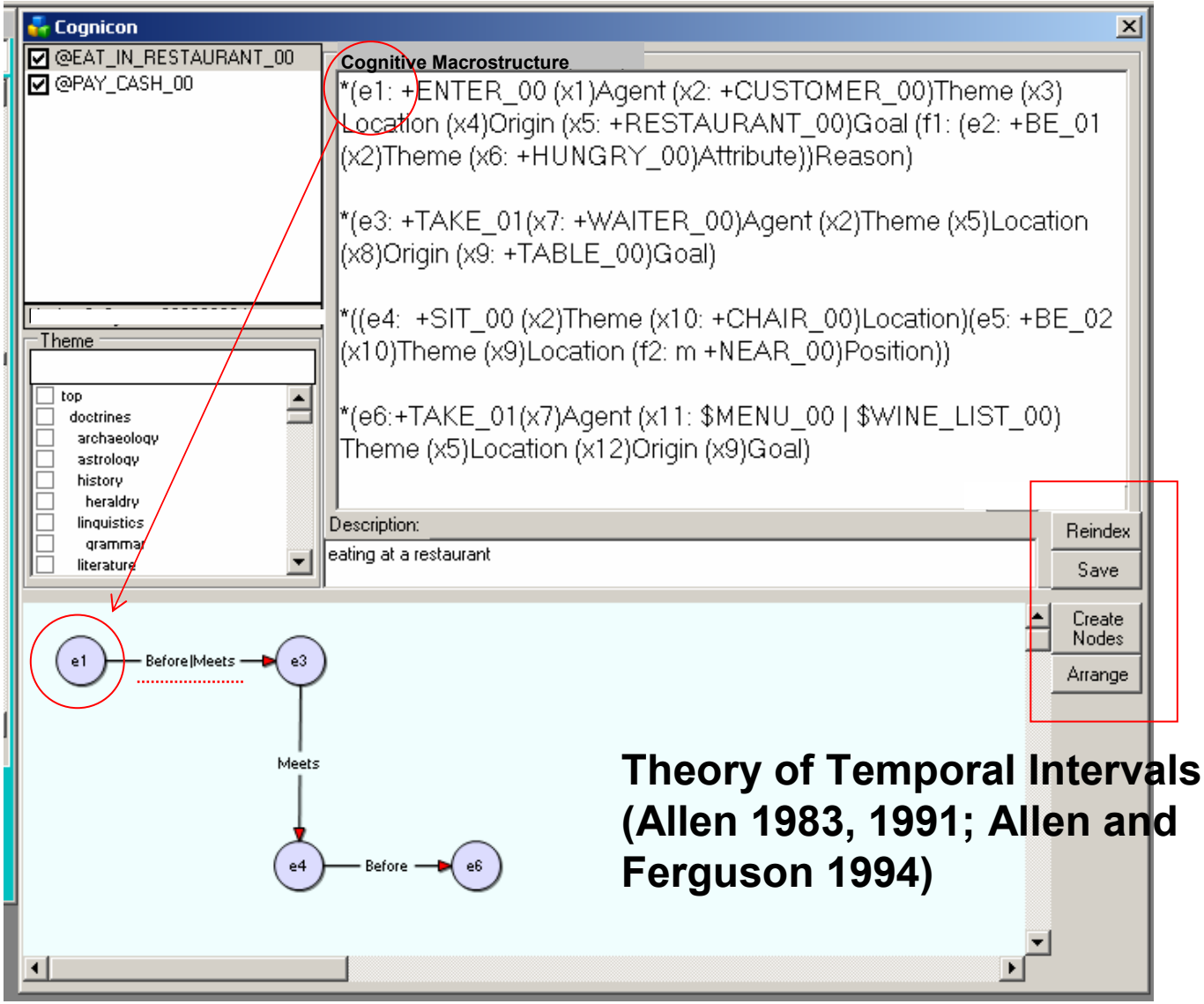
Italian Y N X

French Y N X

German Y N X

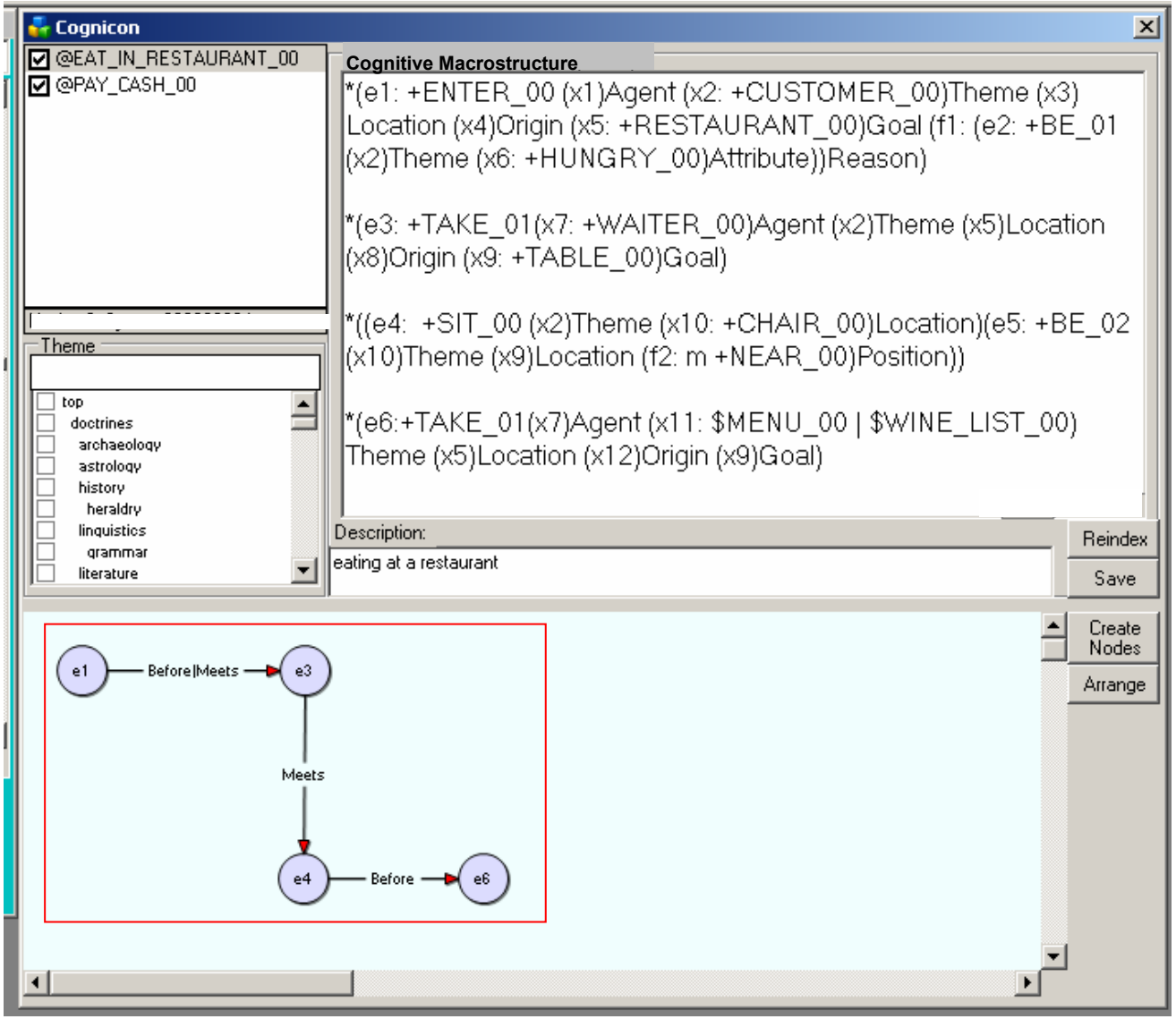
Bulgarian Y N X

COREL Notation



Theory of Temporal Intervals (Allen 1983, 1991; Allen and Ferguson 1994)

COREL Notation



FunGramKB Editor: English Lexicon - Windows Internet Explorer

http://localhost:49176/FGKB/edit/lexicon_en.aspx

FunGramKB Editor: English Lexicon

La configuración de intranet está ahora desactivada de forma predeterminada. La configuración de intranet es menos segura que la configuración de Internet. Haga clic aquí para ver opciones...

FunGramKB Editor

English Lexicon

break OK

a great deal of
a lot of
abbreviate
ability
abode
abridge
absent
absorb

A B C D E F G H I J
K L M N Ñ O P Q R S
T U V W X Y Z

151 / 2848 lexical units (3180 senses)

Part of Speech:

N V A [no filter]

break [+BREAK_00] OK

Conceptual Information:

LEXICAL UNIT:	break
CONCEPT:	+BREAK_00
SEMANTIC TYPE:	+dynamic, +telic, +control
THEMATIC FRAME:	(x1)Theme (x2: +CORPUSCULAR_00)Referent
MEANING POSTULATE:	+(e1: +DAMAGE_00 (x1)Theme (x2)Referent (f1: (e2: +SPLIT_00 (x1)Theme (x2)Referent))Result)
DESCRIPTION:	become separated into pieces or fragments; "The figurine broke"; "The freshly baked loaf fell apart"

Headword: break
Index: 05
Language: English

Done

MORPHOSYNTAX:

Graphical Variants:

You store graphical variants of the headword (e.g. colour-color).

FunGramKB Editor: English Lexicon - Windows Internet Explorer

http://localhost:49176/FGKB/edit/lexicon_en.aspx

FunGramKB Editor: English Lexicon

La configuración de intranet está ahora desactivada de forma predeterminada. La configuración de intranet es menos segura que la configuración de Internet. Haga clic aquí para ver opciones...

AktionsArt:

- State
- Activity
- Accomplishment
- Achievement

You determine the canonical lexical class(es) of the verb.

Lexical Template:

Variables: <-- no functions -->

Idiosyncratic features:

[MR <-- no value selected --> **], [U =** <-- no value selected --> **]**

Thematic frame mapping:

X = [no function] **, Y =** [no function] **, Z =** [no function]

A REMINDER OF FUNGRAMKB PARTICIPANTS:

```
THEME: Entity that, volitionally or not, performs an event.
REFERENT: Entity that is directly involved in the event caused by another entity.
```

Prepositions:

X = aboard Y N **Y =** aboard Y N **Z =** aboard Y N

Collocations:

X = Y N **Y =** Y N **Z =** Y N

FunGramKB Editor: English Lexicon - Windows Internet Explorer

http://localhost:49176/FGKB/edit/lexicon_en.aspx

FunGramKB Editor: English Lexicon

La configuración de intranet está ahora desactivada de forma predeterminada. La configuración de intranet es menos segura que la configuración de Internet. Haga clic aquí para ver opciones...

Constructions:

AFFECTING TRANSITIVITY:
alternations involving a change in the verb's transitivity

- Causative/inchoative alternation
- Conative alternation
- Induced action alternation
- Middle construction

PHRASE SHIFT:
alternations involving the shift of some phrase found with the verb but without a change in transitivity

- Apart-reciprocal alternation (intransitive)
- Apart-reciprocal alternation (transitive)
- As alternation

PHRASE ADDITION/REMOVAL:
alternations involving a change in the number of phrases found with the verb but without a change in transitivity, resulting in oblique subject alternations

- Abstract cause subject alternation
- Container subject alternation
- Instrument subject alternation
- Location subject alternation

MISCELLANEOUS:
other constructions

- Caused-motion construction (intransitive)
- Caused-motion construction (transitive)
- Cognate object construction

CLS Constructor

MISCELLANEOUS:

FunGramKB Editor: Spanish Lexicon - Windows Internet Explorer

http://localhost:49176/FGKB/edit/lexicon_sp.aspx

FunGramKB Editor: Spanish Lexicon

La configuración de intranet está ahora desactivada de forma predeterminada. La configuración de intranet es menos segura que la configuración de Internet. Haga clic aquí para ver opciones...

FunGramKB Editor

Spanish Lexicon

romper OK

a menudo
a salvo
a veces
abajo
abatido
abdomen
abecé
abecedario

A B C D E F G H I J
K L M N Ñ O P Q R S
T U V W X Y Z

234 / 2091 lexical units (2250 senses)

Part of Speech:

N V A [no filter]

romper [+BREAK_00] OK

Conceptual Information:

LEXICAL UNIT:	romper
CONCEPT:	+BREAK_00
SEMANTIC TYPE:	+dynamic, +telic, +control
THEMATIC FRAME:	(x1)Theme (x2: +CORPUSCULAR_00)Referent
MEANING POSTULATE:	+(e1: +DAMAGE_00 (x1)Theme (x2)Referent (f1: (e2: +SPLIT_00 (x1)Theme (x2)Referent))Result)
DESCRIPTION:	become separated into pieces or fragments; "The figurine broke"; "The freshly baked loaf fell apart"

Headword: romper

Index: 01

Language: Spanish

Done ☑

MORPHOSYNTAX:

Graphical Variants:

You store graphical variants of the headword (e.g. hierba-yerba).

FunGramKB Editor: Morphicon - Windows Internet Explorer

http://www.fungramkb.com/edit/morphicon_en.aspx

Archivo Edición Ver Favoritos Herramientas Ayuda

FunGramKB Editor

Morphicon

Log o

morphoRules morphoDB

Plural formation of English nouns

Delete New

Comment:

Plural formation of English nouns

Category: n

Input: sg **Output:** pl

Morpho-rule:

```
if("\b(?<root>\w+)(?<end>(s|sh|ch|x|z))\b") return "$& [${root}
${end}es]"
if("\b(?<root>\w+)(?<cons>[a-z-[aeiou]])(?<end>y)\b") return "$&
[${root}${cons}ies]"
if("\b(?<root>\w+)\b") return "$& [${root}s]"
```

Update ☑ Done

Test

entry, boy, business, cash, coach, jazz, matrix, game

entry [entries], boy [boys], business [businesses], cash [cashes], coach [coaches], jazz [jazzes

Internet 100%

FunGramKB Editor

Morphicon

Logout

morphoRules morphoDB

Update Done

PLURAL:

COMPARATIVE:

SUPERLATIVE:

3PSPRES:

PRESPART:

PAST:

PPART:

Delete New

n v a all

Webmaster: Carlos Periñán

Untitled Page - Windows Internet Explorer

http://www.fungramkb.com/edit/constructicon.aspx

FunGramKB Editor

Constructicon

Log o

- Instrument subject alternation
- Location subject alternation
- Locative alternation
- Locatum subject alternation
- Material subject alternation
- Middle construction
- Money subject alternation
- Natural force subject alternation
- Possessor object alternation
- Possessor subject alternation (intransitive)
- Possessor subject alternation (transitive)
- Preposition drop alternation
- Reaction object construction
- Reciprocal alternation (intransitive)
- Reciprocal alternation (transitive)
- Reciprocal object alternation
- Resultative construction
- Subjective-transitive/subjective-within-objective
- Substance/source alternation
- There-insertion
- Time subject alternation
- Together- reciprocal alternation (intransitive)
- Together-reciprocal alternation (transitive)
- Unexpressed object construction

Examples:

Tony abrió la puerta con una llave maestra. >>> La llave maestra abrió la puerta.

Tony broke the window with the hammer. >>> The hammer broke the

Meta-variables:

<C> Concept
<VAR> Variable
<CLS> Conceptual logical structure
<STA> State
<ACT> Activity

Source CLS:

[do (x, 0) CAUSE [do (w, 0) CAUSE [BECOME <C> (y)]

Target CLS:

[do (0, 0) CAUSE [do (w, 0) CAUSE [BECOME <C> (y)]

Variable: **Macroroles:** **Variable:** w **Thematic role:** Instrument

Update ☑ **Done**

Future projects

- Populate the multilingual knowledge base: up to 20000 words.
- Development of terminologica subontologies together with intelligent agents:
- Factoid questions: Who?; What?; When? +
    - HOW? And WHY?

- An ongoing project: UniLing.

Thanks a lot for your attention