The FunGramKB approach to constructional meaning

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RRG, LCM & FunGramKB
RRG
- Functional model
- Monostratal model
- Typologically-adequate model

LCM
- Projectionism
- Constructivism

FunGramKB
- Lexicon
- Grammaticon
The Lexicon
Basic: headword, index, and language.

Morphosyntax: graphical variant, abbreviation, phrase constituents, category, number, gender, countability, degree, adjectival position, verb paradigm and constraints, and pronominalization.

Core grammar: Aktionsart, lexical template and constructions.

Miscellaneous: dialect, style, domain, example and translation.
You determine the canonical lexical class(es) of the verb.

Variables: $x, y$

Idiosyncratic features:

$[\text{MR} \leftarrow \text{no value selected} \rightarrow ], [U \leftarrow \text{no value selected} \rightarrow ]$

Thematic frame mapping:

$x = \text{Theme}, y = \text{Referent}, z = [\text{no function}]$

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.
Constructions:

AFFECTING TRANSITIVITY:
alternations involving a change in the verb’s transitivity
- Conative alternation
- Causative/inchoative 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
- Locatum subject alternation

MISCELLANEOUS:
other constructions
- Caused-motion construction (intransitive)
- Caused-motion construction (transitive)
- Cognate object construction
## FunGramKB Lexicon

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aktionsart</td>
<td>Causative accomplishment</td>
</tr>
<tr>
<td>Lexical Template</td>
<td></td>
</tr>
<tr>
<td>Variables</td>
<td>x, y</td>
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<tr>
<td>Thematic-frame mapping</td>
<td>x = Theme, y = Referent</td>
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<tr>
<td>Idiosyncratic features</td>
<td>MR2</td>
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<tr>
<td>Constructions</td>
<td>Inchoative Construction</td>
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<td></td>
<td>Middle Construction</td>
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<td></td>
<td>Transitive Resultative Construction</td>
</tr>
<tr>
<td></td>
<td>Intransitive Resultative Construction</td>
</tr>
</tbody>
</table>

### freeze

Kernel-2 Construction
The Grammaticon
FunGramKB Grammaticon

FunGramKB Editor

a lexico-conceptual knowledge base for NLP

- FunGramKB Modules
- Resources
- Utilities
- Reviewers
- Administrator

Log out

Level 1-Constructicon

Level 2-Constructicon

Level 3-Constructicon

Level 4-Constructicon
He fried the egg in the pan.
An accurate definition???

There is no precise definition of (i) the notion of a productive unit in CxG, (ii) the way productive units are acquired step by step from incoming input utterances, and (iii) the combination operations that combine constructions into (an open-ended number of) new utterances. (Bod, 2009, p. 130)
What is a construction in FunGramKB?

**Construct vs. Construction**

**Construct**

Pairing of form and meaning

**Construction**

Construct whose meaning is derived synergistically

2 + 3 = 6
FunGramKB Grammaticon

CONSTRUCTS

NON-CONSTRUCTIONAL

CONSTRUCT

lexical meaning

ONTOMETRY

CONSTRUCTIONAL

CONSTRUCTION

constructional meaning

GRAMMATICON
FunGramKB Grammaticicon

Goldberg's CxG

He fried the egg in the pan.

FunGramKB

He fried the egg in the pan.
FunGramKB Editor

L1-Constraction

English

Spanish

Italian

French

Example:
The pond froze. >>> The pond froze solid.

a) CLS:
Aktionsart: ACC
Variables: y,w

Variable:
Thematic role:
Macrorole:
Phrases:
Syntax:
Prepositions:
Preferences:

b) COREL scheme:
+(e1: <EVENT> (f1: +BECOME_00 (x1: y)Theme (x2: w)Attribute))Result)

Save  ✔ Done
FunGramKB Grammaticon

a) CLS:
Aktionsart: ACC [help]

Variables: y,w

Variable: w [help]

Thematic role: Result

Macrorole:

Phrases: ADJP, PP [help]

Syntax: Nucleus

Prepositions: into

Preferences:

Assign Clear

b) COREL scheme:
+(e1: <EVENT> (f1: (e2: +BECOME_00 (x1: y)Theme (x2: w)Attribute))Result)
Intransitive Resultative Construction

construc

CLSS

Aktionsart

ACC

Variables

Type y

Type w

Role result

Phrase ADJP | PP

Syntax nucleus

Prep into

COREL scheme

+(e1: <EVENT> (f1: (e2: +BECOME_00 (x1: y)Theme (x2: w)Attribute)))Result)
FunGramKB Grammaticon

hybrid approach to constructional meaning
ARTEMIS: building the CLS
ARTEMIS

Argumental constructions in:

(i) the syntactic analysis

(ii) the logical structure
Argumental constructions in:

(i) the syntactic analysis

(ii) the conceptual logical structure
The juice froze black in the refrigerator.

\[
\text{<IF DEC} \quad \text{<TNS PAST} \quad \text{<be-in'} (\text{refrigerator}, [[\text{do'} (\text{juice}, [\text{freeze'} (\text{juice})])]]) \\
\text{CAUSE [BECOME black'} (\text{juice})])>>>
\]

\[
\text{<IF DECL} \quad \text{<Tense PAST} \quad \text{<CONSTR-L1 RESI} \quad \text{<CONSTR-L1 INCH} \\
\text{<AKT ACC [+FREEZE_00 (+JUICE_00-Referent, +BLACK_00)]} \\
(+\text{REFRIGERATOR_00-Location}) >>>>>
\]

- Ontological concepts
- Thematic roles
- Constructional operator
- Aktionsart operator
ARTEMIS

the RRG layered structure of the clause
ARTEMIS

standard LSC

enhanced LSC (unrefined tree)

SENTENCE

CLAUSE

CORE ← PERIPHERY

ARG NUC ARG ARG

SENTENCE

CLAUSE

L1-CONSTRUCTION ← PERIPHERY

L1-CONSTRUCTION

L1-CONSTRUCTION

CORE

ARG NUC ...

ARG
ARTEMIS

standard LSC

enhanced LSC (simplified tree)
The sentence "The juice froze" is analyzed in a tree structure. The tense is past. The concept "+FREEZE_00" is associated with the argument (ARG) and the predicate (PRED). The core (CORE) includes an NP (The juice), a PRED (froze), and a PRED-S (black). The L1-CONSTR templates have weights: 3 for RESI, 2 for INCH.
The juice froze black.

(S[]
  (CL[Tense='past']
   (CONSTR-L1[Template='RESI', Weight=3]
     (CONSTR-L1[Template='INCH', Weight=2]
       (CORE[Akt='ACC']
         (ARG[Type='y', Concept='+JUICE_00', Role='Referent', Macrorole='U']
           (NP[]
             (det[] the)
             (n[Num='sg'] juice)))))
   (NUC[]
     (PRED[Concept='+FREEZE_00']
      (v[] froze))))
  (NUC-S[]
    (PRED-S[Concept='+BLACK_00']
     (adj[] black))))
ARTEMIS

Automatically Representing TExt Meaning via an Interlingua-based System
Conclusions
• Integrating argumental constructions into the RRG model

• Narrowing the gap between the projectionist and constructivist approaches
Future research
• complex syntactic phenomena
• wider range of operators
• co-occurrence of constructions
• prepositions in the periphery
BIBLIOGRAPHY


Thank you!

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