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UNIVERSITÄT
TÜBINGEN

Faculty of Philosophy
General Linguistics

Syntax & Semantics WiSe 2020/2021

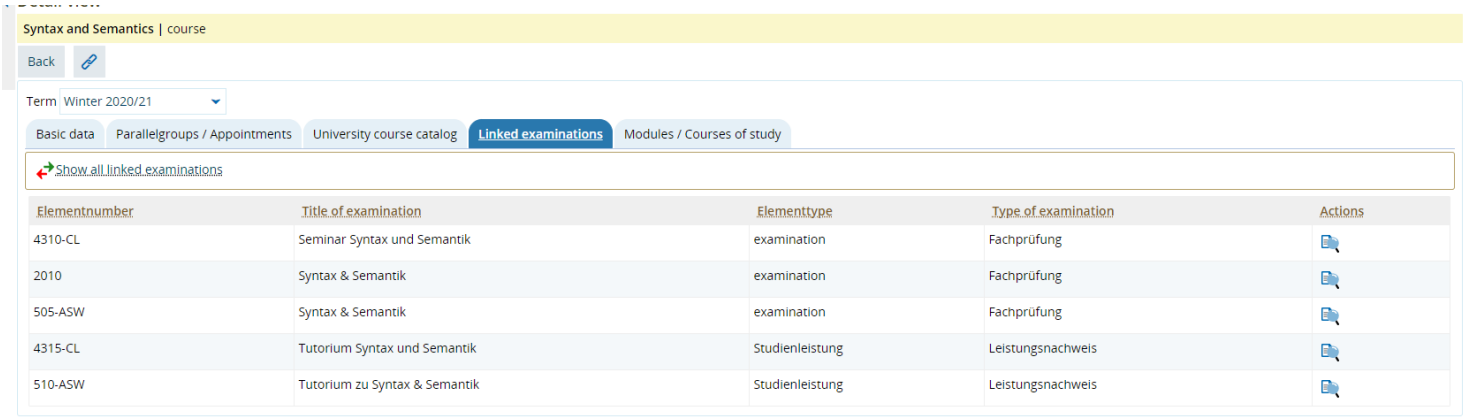
Lecture 16: Construction Grammar

14/01/2021, Christian Bentz

Overview

Organization: Exam Registration

- Exam registration opened December 7th 2020 and will end **February 8th 2021**.
- Make sure to sign up for both the course (i.e. exam) and the tutorial (if you need the ECTS for the tutorial.
- If you have further questions, please contact the "Prüfungsamt" directly.



Syntax and Semantics | course

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Term Winter 2020/21

Basic data | Parallelgroups / Appointments | University course catalog | **Linked examinations** | Modules / Courses of study

Show all linked examinations

Elementnumber	Title of examination	Elementtype	Type of examination	Actions
4310-CL	Seminar Syntax und Semantik	examination	Fachprüfung	
2010	Syntax & Semantik	examination	Fachprüfung	
505-ASW	Syntax & Semantik	examination	Fachprüfung	
4315-CL	Tutorium Syntax und Semantik	Studienleistung	Leistungsnachweis	
510-ASW	Tutorium zu Syntax & Semantik	Studienleistung	Leistungsnachweis	

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Section 1: Recap of Lecture 15

The Verb Phrase: Valence Information

Just as in earlier frameworks, in HPSG the **valence information** of a verb is explicitely modelled in a so-called **argument structure (ARG-ST)**, which combines information about the **specifier (SPR)**, i.e. the subject of a sentence, as well as the **complements (COMPS)**.

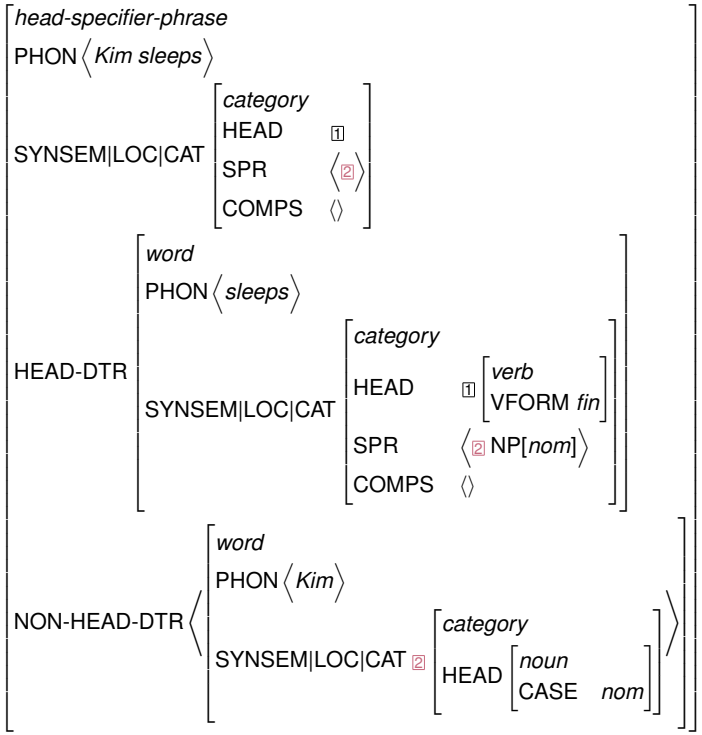
verb	SPR	COMPS	ARG-ST
sleep	⟨ NP[*nom*] ⟩	⟨ ⟩	⟨ NP[*nom*] ⟩
expect	⟨ NP[*nom*] ⟩	⟨ NP[*acc*] ⟩	⟨ NP[*nom*], NP[*acc*] ⟩
talk	⟨ NP[*nom*] ⟩	⟨ PP[*about*]⟩	⟨ NP[*nom*], PP[*about*] ⟩
give	⟨ NP[*nom*] ⟩	⟨ NP[*dat*], NP[*acc*]⟩	⟨ NP[*nom*], NP[*dat*], NP[*acc*] ⟩
serve	⟨ NP[*nom*] ⟩	⟨ NP[*acc*], PP[*with*]⟩	⟨ NP[*nom*], NP[*acc*], PP[*with*] ⟩

Adopted from Müller (2019), p. 269.

Note: For German, there is no distinction between COMPS and SPR, all the elements would be listed in COMPS.

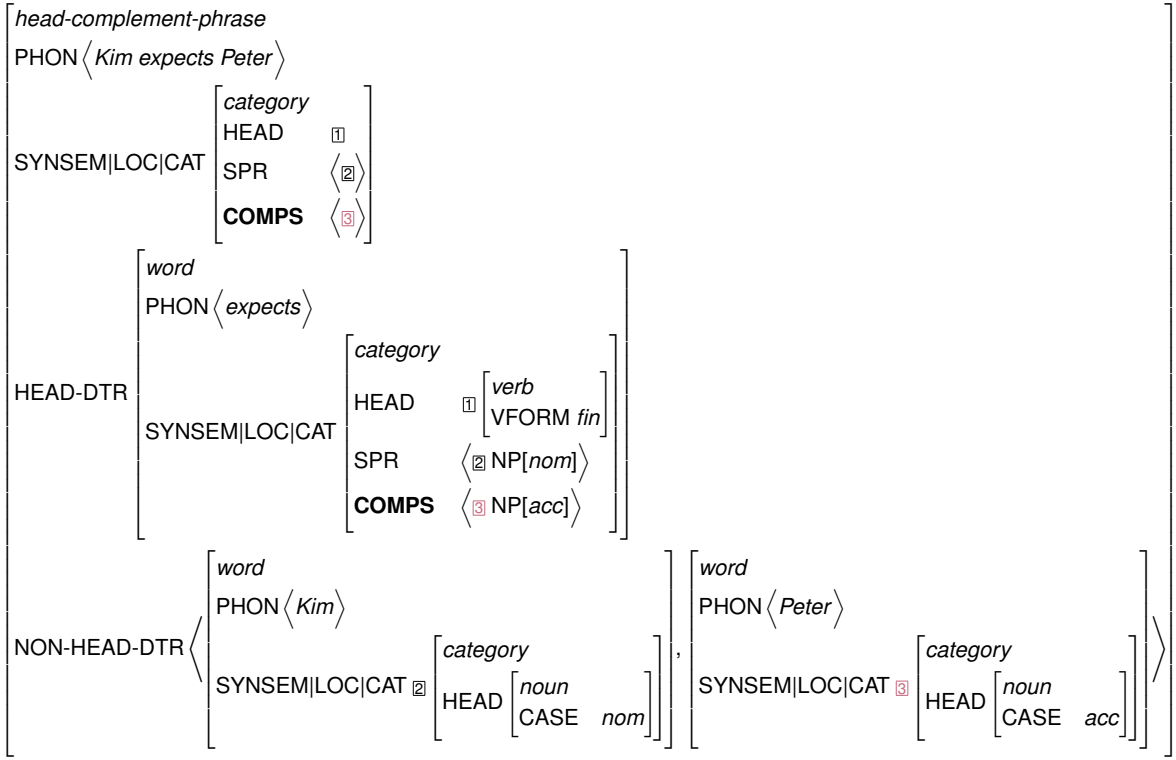
Example: Intransitive Sentence

The **SPR feature value** is then specified in the CAT feature of the NON-HEAD-DTR, namley as a noun (or NP) in the nominative case. Note that while nominative case here does not require inflection on a proper noun, it might on a pronoun, and is hence given for completeness.



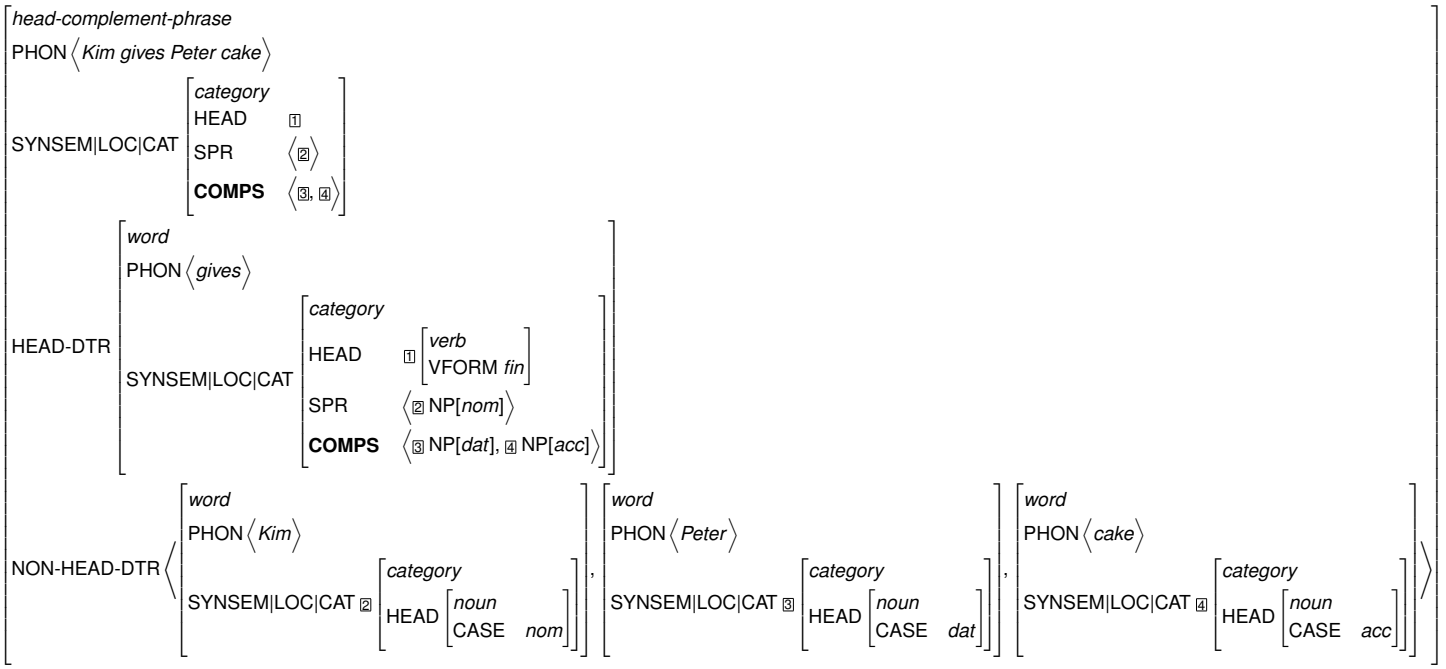
Example: Transitive Sentence

Transitive sentences are then straightforwardly handled by adding the object of the sentence to the complements list, and adding another word matrix to the list of NON-HEAD-DTRS. We then need to using different indeces (2 and 3) for structure sharing.



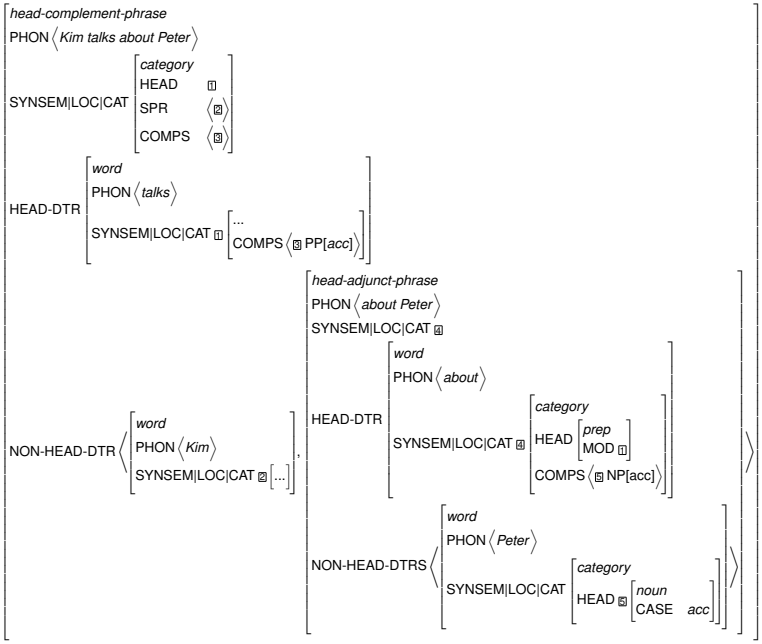
Example: Ditransitive Sentence

By extension, the exact same principle applies to **ditransitive sentences**.



Example: Sentences with Prepositional Phrases

Note that **prepositional phrases** are also handled via the COMPS list. Below is an example based on the valence information for *talk*, which takes an *obligatory subject NP* as SPR, and an optional prepostional phrase headed by *about* in the COMPS list. Importantly, the noun of the prepositional phrase is here not included in the highest level COMPS list, since it is rather a complement of the preposition (*about*).



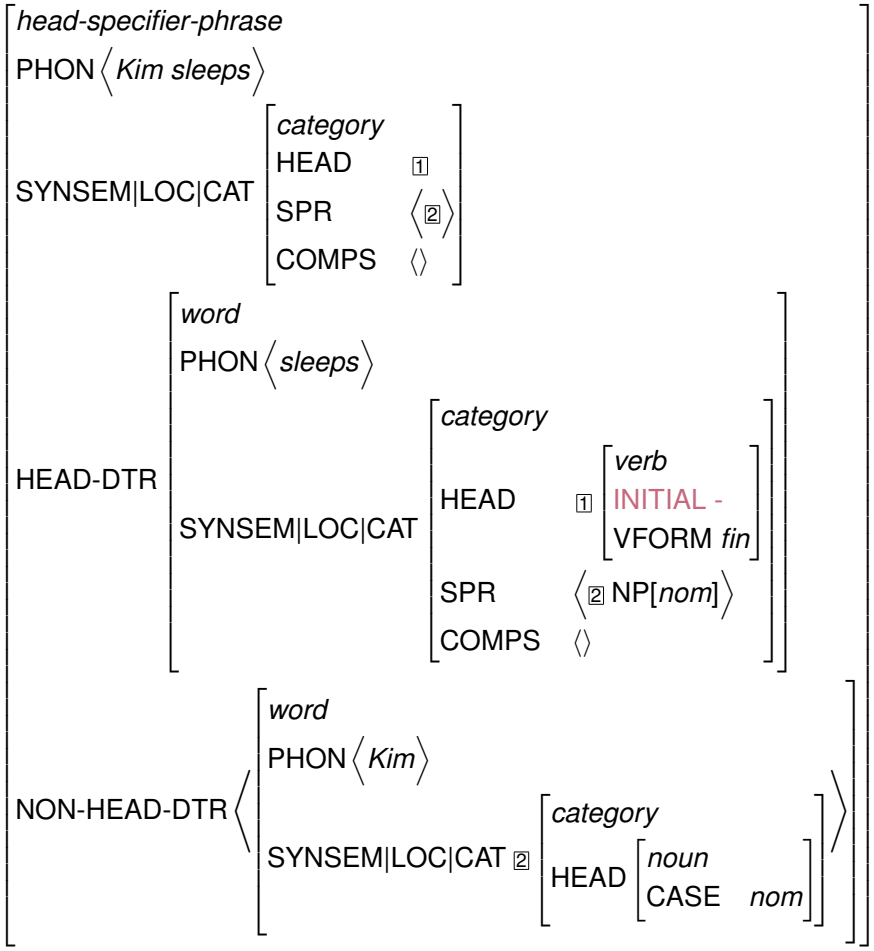
Feature Description (Simplified):

$$\begin{bmatrix} \textit{head-complement-phrase} \\ \text{PHON} \left\langle \textit{Kim gives Peter cake} \right\rangle \\ \text{HEAD-DTR} \begin{bmatrix} \textit{word} \\ \text{PHON} \left\langle \textit{gives} \right\rangle \end{bmatrix} \\ \text{NON-HEAD-DTR} \left\langle \begin{bmatrix} \textit{word} \\ \text{PHON} \left\langle \textit{Kim} \right\rangle \end{bmatrix}, \begin{bmatrix} \textit{word} \\ \text{PHON} \left\langle \textit{Peter} \right\rangle \end{bmatrix}, \begin{bmatrix} \textit{word} \\ \text{PHON} \left\langle \textit{cake} \right\rangle \end{bmatrix} \right\rangle \end{bmatrix}$$

Orders Licensed:

gives	Kim			Peter		cake	
	Kim	**gives**		Peter		cake	
	Kim			Peter	**gives**	cake	
	Kim			Peter		cake	**gives**

Example: Intransitive Sentence



Head-Complement Schema (binarized, head-initial)

A feature description of the type **head-complement-phrase** always has a list of complements which is structure shared (i.e. by using $\boxed{1}$ here). The head daughter in this feature description has a complements list which consist of $\boxed{1}$ and another *single* complement appended to it, which is represented by $\langle \boxed{2} \rangle$. The non-head daughter has a SYNSEM value which needs to be compatible with this first complement of the complements list.

Müller (2015), p. 7.

head-complement-phrase $\rightarrow$

$$\begin{bmatrix} \text{SYNSEM|LOC|CAT|COMPS } \boxed{1} \\ \text{HEAD-DTR|SYNSEM|LOC|CAT|COMPS } \langle \boxed{2} \rangle \oplus \boxed{1} \\ \text{NON-HEAD-DTRS } \langle \begin{bmatrix} \text{SYNSEM } \boxed{2} \end{bmatrix} \rangle \end{bmatrix}$$

Note: The append operator is used here with a single element in order to binarize the process of combining NON-HEAD-DTRS with the respective head. See a tree for illustration with a transitve verb in Müller (2015), p. 6. The single element is here taken from the beginning of the list reflecting the head-initial structure of English.

Head Feature Principle

We can then further add the so-called **Head Feature Principle**:

> *The HEAD value of any headed phrase is structure-shared with the HEAD value of the head daughter.*

This principle is central to HPSG, as it reflects the *head-driven* nature of the framework.

Müller (2019). Grammatical theory, p. 275.

head-complement-phrase →

$$\begin{bmatrix} \text{SYNSEM|LOC|CAT} \begin{bmatrix} \textbf{HEAD } \boxed{1} \\ \text{COMPS } \boxed{2} \end{bmatrix} \\ \text{HEAD-DTR|SYNSEM|LOC|CAT} \begin{bmatrix} \textbf{HEAD } \boxed{1} \\ \text{COMPS } \boxed{2} \oplus \langle \boxed{3} \rangle \end{bmatrix} \\ \text{NON-HEAD-DTRS} \langle \begin{bmatrix} \text{SYNSEM } \boxed{3} \end{bmatrix} \rangle \end{bmatrix}$$

Questions about HPSG

Is there a way of binarizing HPSG feature descriptions?

– Yes, though it is *not necessary* to have feature descriptions reflecting binary branching:

"In principle, there can be multiple non-head daughters. If we were to assume a flat structure for a sentence with a ditransitive verb, as in Figure 2.1 on page 54, we would have three non-head daughters."

Müller (2019), p. 271.

However, binarization is *possible* and preferred by Müller (for his German examples):

"The arguments of the verb are combined with the verb starting with the last element of the COMPS list, as explained in Section 9.1.2. [...] in Figure 9.12, the last element of the COMPS list is discharged first [...]."

Müller (2019), p. 296.

Questions about HPSG

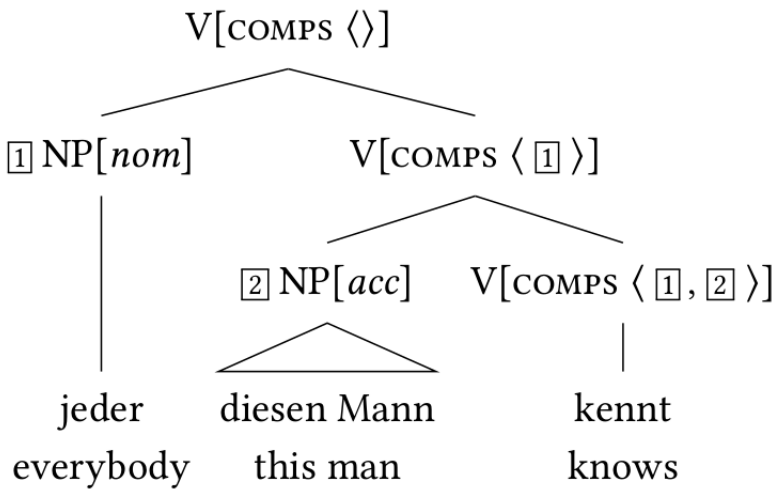


Figure 9.12: Analysis of constituent order in HPSG: unmarked order

Müller (2019), p. 296.

Questions about HPSG

How about structures with two prepositional phrases?

– According to an example by Pollard & Sag (1994), p. 264, both PPs would be construed as being part of the COMPS (here SUBCAT) list of the verb:

(1) Mary$_i$ talked to John$_j$ about himself$_j$.

(2) SUBCAT⟨ NP$_1$, PP[*to*], PP[*about*]:ana$_j$ ⟩

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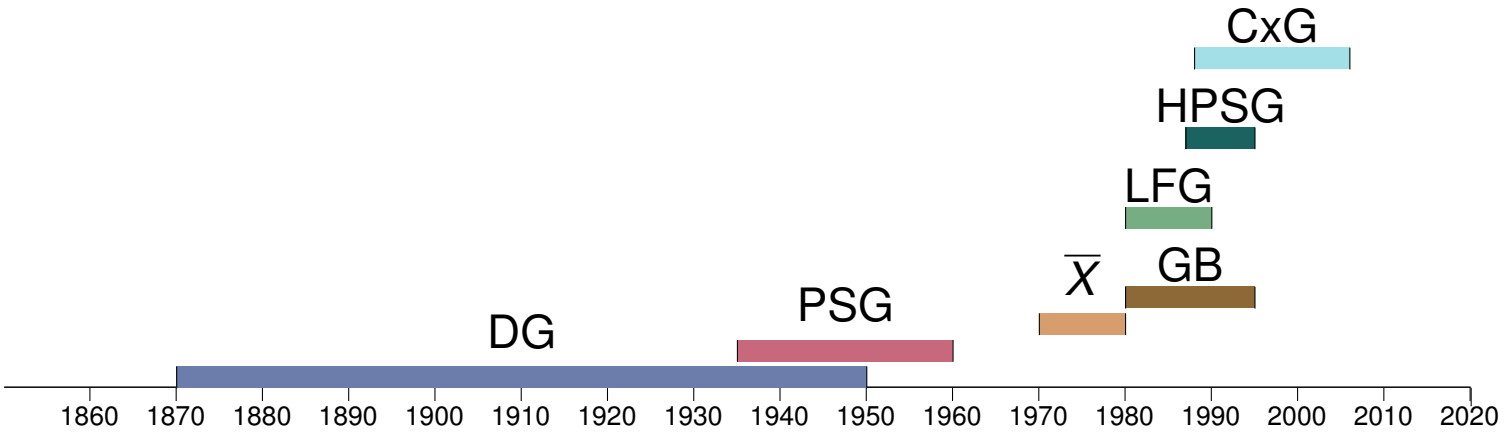
Section 2: Historical Notes on CxG

Historical Perspective

"Like LFG and HPSG, Construction Grammar (CxG) forms part of West Coast linguistics. It has been influenced considerably by Charles Fillmore, Paul Kay and George Lakoff (all three at Berkeley) and Adele Goldberg (who completed her PhD in Berkeley and is now in Princeton) (Fillmore 1988; Fillmore, Kay & O'Connor 1988; Kay & Fillmore 1999; Kay 2002; 2005; Goldberg 1995; 2006)."

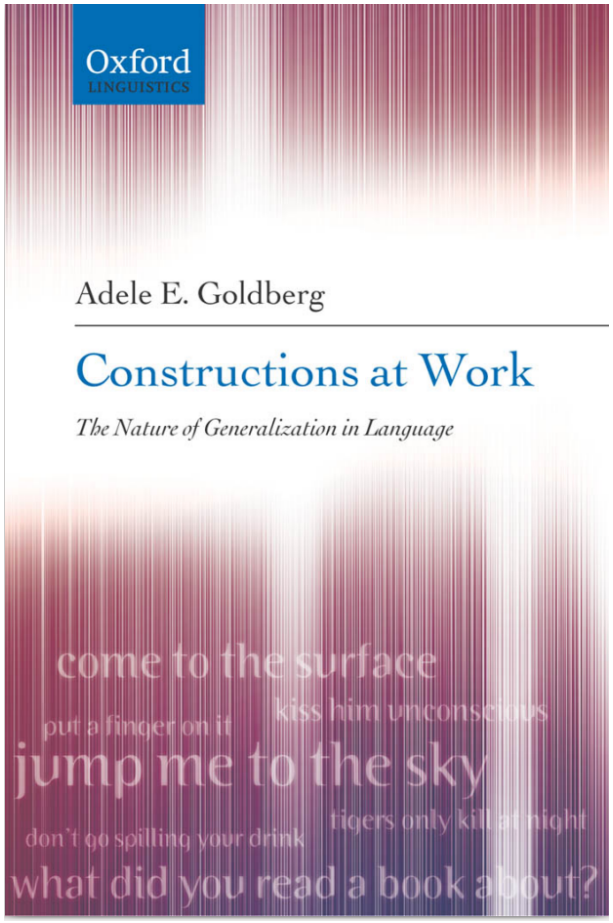
Müller (2019). Grammatical theory, p. 311.



The Term *Construction*

- "The primary motivation for the term [constructionist] is that constructionist approaches emphasize the role of grammatical *constructions*: conventionalized pairings of *form and function*."
- "[...] constructionist approaches generally emphasize that languages are learned – that they are constructed on the basis of the input together with general cognitive, pragmatic, and processing constraints."

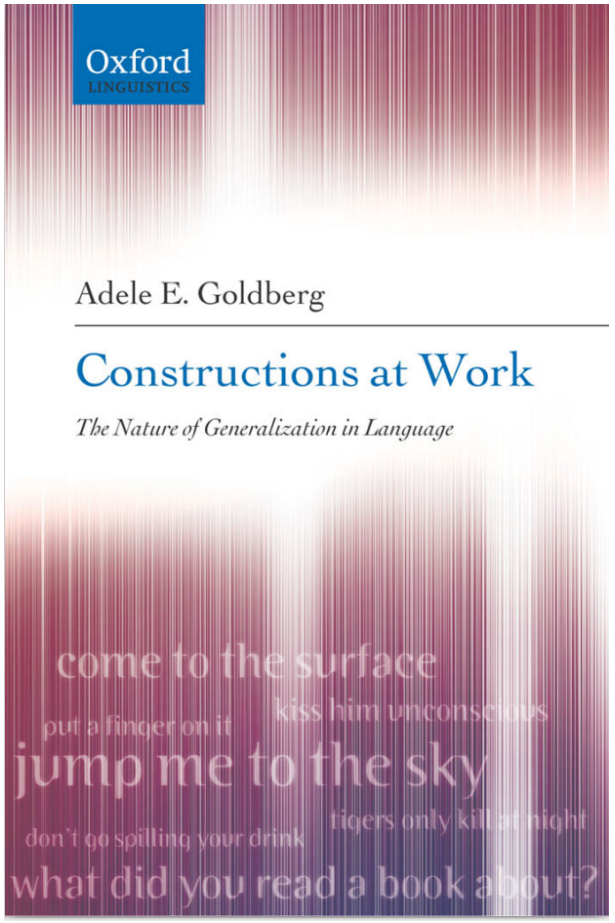
Golderg (2006). Constructions at work, p. 3.



CxG and Generative Grammar: Similarities

- "Constructionist approaches share certain foundational ideas with the mainstream "generative" approach [...]"
- "Both approaches agree that it is essential to consider language as a cognitive (mental) system;"
- "both approaches acknowledge that there must be a way to combine structures to create novel utterances;"
- "both approaches recognize that a non-trivial theory of language learning is needed."

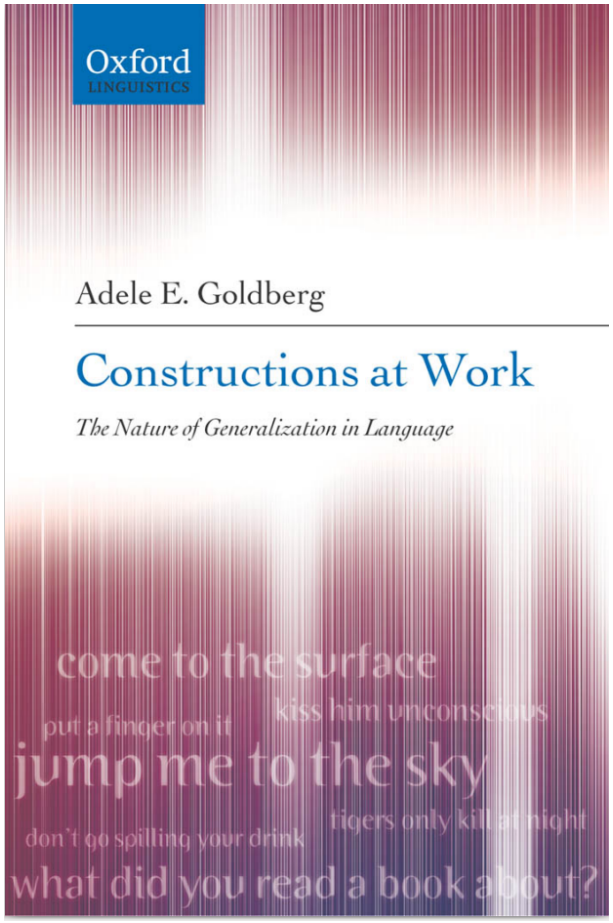
Golderg (2006). Constructions at work, p. 4.



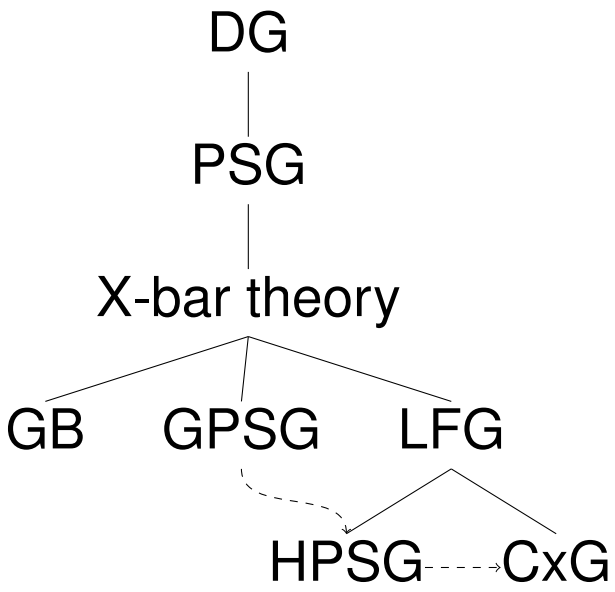
CxG and Generative Grammar: Differences

- "In other ways, constructionist approaches contrast sharply with the generative approach. The latter has held that the nature of language can best be revealed by studying formal structures independently of their semantic or discourse functions [...]"

Golderg (2006). Constructions at work, p. 4.



Syntactic Framework Tree



DG: Dependency Grammar
PSG: Phrase Structure Grammar
GB: Government & Binding
GPSG: Generalized Phrase Structure Grammar
LFG: Lexical Functional Grammar
HPSG: Head-Driven Phrase Structure Grammar
CxG: Construction Grammar

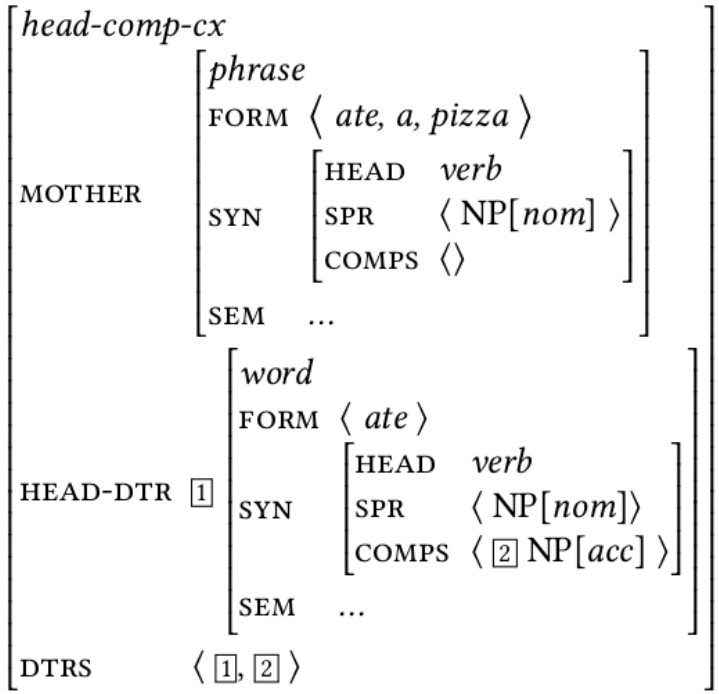
Types of Construction Grammar

- Berkeley Construction Grammar (main proponents: Fillmore, Kay)
- **Goldbergian/Lakovian Construction Grammar (Goldberg, Lakov)**
- Cognitive Grammar (Langacker)
- Radical Construction Grammar (Croft)
- Embodied Construction Grammar (Bergen, Chang)
- Fluid Construction Grammar (Steels)
- Sign-Based Construction Grammar (Sag)

Example: Sign-Based CxG

"HPSG is a strongly lexicalized theory, where phrasal dominance schemata have only been increasingly more used in the last ten years [...] Crucially, all phenomena that interact with valence receive a **lexical analysis** (Sag, Boas & Kay 2012: Section 2.3). In CxG, on the other hand, **predominantly phrasal analyses** are adopted due to the influence of Adele Goldberg."

Müller (2019), p. 362.



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Section 3:
Goldbergian Construction Grammar

Construction

"Any linguistic pattern is recognized as a **construction** as long as some aspect of its form or function is **not strictly predictable from its component parts** or from other constructions recognized to exist. In addition, **patterns are stored as constructions** even if they are fully predictable as long as they occur with **sufficient frequency**."

Goldberg (2006). Constructions at work, p. 5.

Example:
What is the bread **doing** on the fridge?
What was her name **doing** in my calender?
General pattern: **What** be[fin] X **doing** Y?

→ This is the so-called WXDY construction.

Remember Lecture 1: Form and Meaning

> "Every linguistic expression we utter has a meaning. We are therefore dealing with what has been referred to as **form-meaning pairs** (de Saussure 1916b). A word such as *tree* in its specific orthographical form or in its corresponding phonetic representation is assigned the meaning *tree'* [read: "tree prime"]. **Larger linguistic units can be built up out of smaller ones**: words can be joined together to form phrases and these in turn can form sentences."

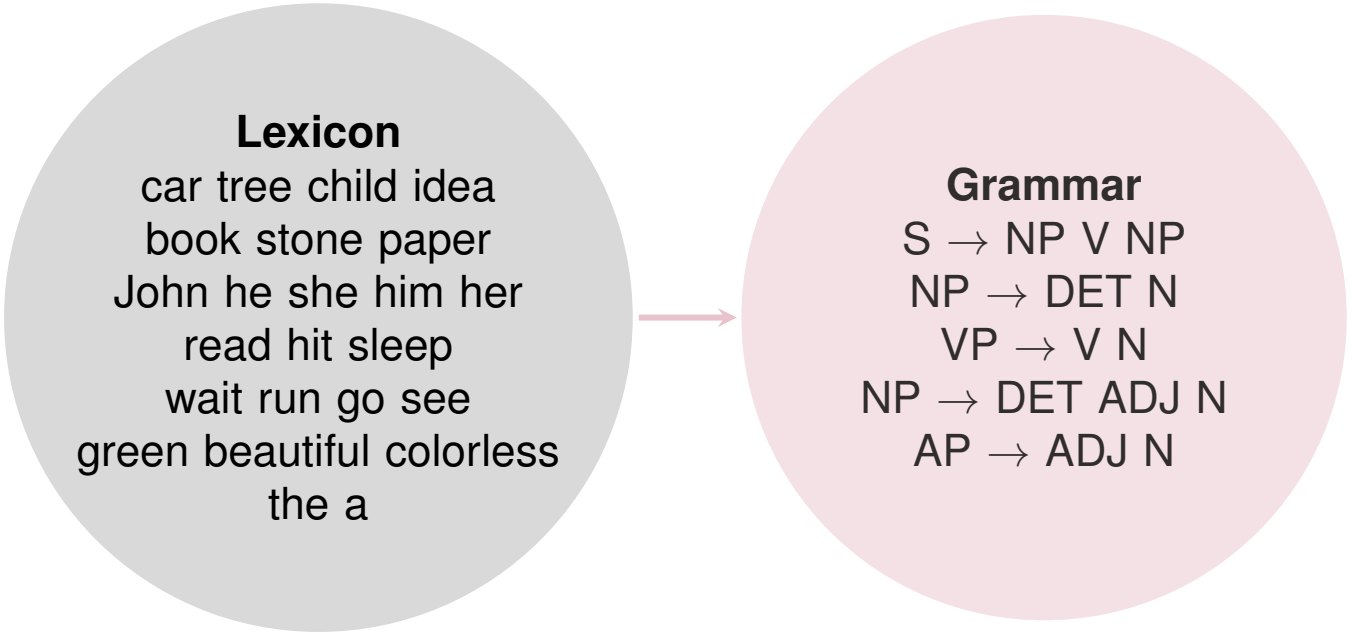
Müller (2019). Grammatical theory, p. 3.

Problem: Idioms

(3) Kim ha-t de-n Wald vor lauter
kim have-PRS.3SG ART-ACC.SG forest because.of all.the
Bäum-en nicht ge-seh-en
tree\-DAT.PL not PTCP-see-PTCP
literal translation: “Kim hasn’t seen the forest because of all the trees.”
actual meaning: Kim was so concerned with the details that s/he didn’t see the overall picture.

In the case of idioms (e.g. *kicking the bucket*), the intended meaning of the sentence is not a *linear combinatorial* derivation of its parts. Rather, a complex meaning is assigned to the **whole phrase**.

Traditional Idea of Grammar



Output

The child reads a book.
Colorless green ideas sleep.
The car hits the tree.
She runs.
etc.

What is stored in the Human Brain (Lexicon)?

- **PSG answer**: the set of terminals, i.e. lexical items **corresponding to words**.
- **GB answer**: lexical items **corresponding to words** *with some specification* of what syntactic rules they can be involved in (i.e. θ-roles (valency) for verbs)
- **HPSG answer**: lexical items **corresponding to words** with *exact specifications* of the specifiers, complements, argument structures they require.
- **CxG answer**: **constructions**, which can be morphemes, words, idioms, phrasal patterns.

Constructions

"**All levels of grammatical analysis involve constructions**: learned pairings of form with semantic or discourse function, including morphemes or words, idioms, partially lexically filled and fully general phrasal patterns."

Goldberg (2006). Constructions at work, p. 5.

TABLE 1.1. Examples of constructions, varying in size and complexity

Morpheme	e.g. *pre-*, *-ing*
Word	e.g. *avocado, anaconda, and*
Complex word	e.g. *daredevil, shoo-in*
Complex word (partially filled)	e.g. [N-s] (for regular plurals)
Idiom (filled)	e.g. *going great guns, give the Devil his due*
Idiom (partially filled)	e.g. *jog* <someone's> *memory, send* <someone> *to the cleaners*
Covariational Conditional	The Xer the Yer (e.g. *the more you think about it, the less you understand*)
Ditransitive (double object)	Subj V Obj1 Obj2 (e.g. *he gave her a fish taco; he baked her a muffin*)
Passive	Subj aux VPpp (PP_{by}) (e.g. *the armadillo was hit by a car*)

Beware Notational Confusion

Note that the way **constructions** are formulated within this framework can differ. Sometimes, POS (N, V) or grammatical functions (SUBJ, OBJ) are used to represent the "unfilled" elements, sometimes other variables such as X or Y are used, sometimes elements in in $< >$ are given. This is partly due to the fact that the examples are drawn from the literature, and different authors use different notations.

Examples:

- Complex word (partially filled): **[N-s]** (regular plurals)
- Idiom (partially filled): send **<someone>** to the cleaners
- Covariational Conditional: the **Xer** the **Yer**
- Ditransitive (double object): **Subj V Obj$_1$ Obj$_2$**

Beware Notational Confusion

For consistency, we will here use **POS symbols**. If necessary, these can be further specified by indices.

Examples:

- Complex word (partially filled): **[N-s]** (regular plurals)
- Idiom (partially filled): send $\mathbf{N}_{person(s)}$ to the cleaners
- Covariational Conditional: the $\mathbf{ADJ}_1$**-er** the $\mathbf{ADJ}_2$**-er**[1]
- Ditransitive (double object): $\mathbf{NP}_{Subj}$ **V** $\mathbf{NP}_{Obj_1}$ $\mathbf{NP}_{Obj_2}$

[1] The number indices are here used to indicate that normally a different adjective is used in the second position.

How to Identify a Construction?

In order to identify a **construction** we have to ask whether in a set of different words, phrases, sentences there are reoccurring elements that can be learned and used as a *fixed scaffolding* to built further sentences according to the same template.

Example (complex words):

- see**ing**
- laugh**ing**
- go**ing**
- sleep**ing**
- etc.

Construction: V-**ing**

Example (phrase):

- **into** the wild
- **into** a cinema
- **into** himself
- **into** blue
- etc.

Construction: **into** NP/PRON/ADJ

Example (sentence):

- **Go** do your homework
- **Go** tell him the truth
- **Go** get me pizza
- etc.

Construction: **go** $VP_{\textit{bare infinitive}}$

Adopted from Goldberg (2006), p. 54.

How to Identify a Construction?

Note that the reoccurring elements might not be material at "the surface" but the underlying sentence structure represented by POS symbols.

Example (sentence):

- He gave Pat a ball
- Pat baked George a cake
- The child handed her the book
- etc.

Construction: **NP**$_{Subj}$ **V NP**$_{Obj_1}$ **NP**$_{Obj_2}$

Multiple Constructions

"Constructionist theories do not derive one construction from another, as is generally done in mainstream generative theory. An actual expression typically involves the combination of at least half a dozen different constructions."

Goldberg (2006), p. 10.

(4) what did Liza buy Zach?

- *Liza*, *buy*, *Zach*, *what*, *do* constructions (i.e. individual words)
- ditransitive construction
- question construction (wh-word VP)
- subject-auxiliary inversion construction (aux Subj, i.e. *did Liza*)
- VP construction
- NP construction

Arguments for Constructions

- **Argument 1**: The idea that main verbs specify the valency of whole sentences does not match the **creative use of linguistic patterns**. Constructions are a better alternative to analyze the productivity of sentence patterns.
- **Argument 2**: There are many examples across languages of the world, where the overall **meaning of a sentence is not derivable from the component parts**, but is rather assigned to the whole construction.
- **Argument 3**: The distinction between "core" syntax and the "periphery" is arbitrary. **Constructions**, while often seen to be part of the periphery, might in fact constitute a **core property of language**.

Argument 1: The Problem of Valency

Remember from Lecture 2:

> *"Nous avons vu qu'il y avait de verbes sans actant, des verbes à un actant, des verbes à deux actants et des verbes à trois actants."*
>
> *Tesnière (1959). Éléments de syntaxe structurale, p. 238.*

Verb	V	V	V	V
Arguments	_	A	A A	A A A
Sentence Type:	impersonal sentence	intransitive sentence	transitive sentence	ditransitive sentence
Valency:	avalent (0)	monovalent (1), one-place predicate	bivalent (2), two-place predicate	trivalent (3), three-place predicate

Why Constructions? – Argument 1

"[...] the interpretation and form of sentence patterns of a language are not reliably determined by independent specifications of the main verb."

Goldberg (2006), p. 6.

Prototypical examples for traditional three argument verbs *give* and *put*:

(5) Chris gave Pat a ball.

(6) Pat put the ball on the table.

Creative examples going beyond typical valency patterns:

(7) He sneezed his tooth right across town.

(8) She smiled herself an upgrade.

(9) We laughed our conversation to an end.

Are these *intransitive*, *bitransitive*, *ditransitive*?

Why Constructions? – Argument 1

"Examples need not be particularly novel to make the point. Verbs typically appear with a wide array of complement configurations. Consider the verb *slice* and the various constructions in which it can appear [...] It is the **argument structure constructions** that provide the direct link between surface form and general aspects of the interpretation"

Goldberg (2006), p. 7.

(10) He sliced the bread. (transitive)
(11) Pat sliced the carrots into the salad. (caused motion)
(12) Pat sliced Chris a piece of pie. (ditransitive)
(13) Emeril sliced and diced his way to stardom. (way construction)
(14) Pat sliced the box open. (resultative)

Why Constructions? – Argument 2

"While English has some dramatic instances in which basic argument structure constructions convey contentful meaning, examples exist in other languages as well."

Goldberg (2006), p. 7.

Croatian (hbs, Indo-European)

(15) Pil-o mi se piv-o
drink-3SG.PAST I.DAT REF beer-NOM.3SG.NEUT
Lit. "To me, the beer drank itself": real meaning "I felt like drinking beer"

Why Constructions? – Argument 2

"Many languages have constructions in which no verb is expressed at all. These cases are prime examples of argument structure constructions, since their meaning cannot naturally be attributed to a (non-existent) verb."

Goldberg (2006), p. 8.

French (fra, Indo-European)

(16) tout le monde qui part en weekend
all the world who leaves in weekend
"Everyone is leaving for the weekend."

Russian (rus, Indo-European)

(17) Kirill v magazin
Kirill-NOM to store-ACC
"Kirill goes/will go to the store."

Why Constructions? – Argument 3

"Crucially, all linguists recognize that a wide range of **semi-idiosyncratic constructions** exists in every language, constructions that cannot be accounted for by general, universal, or innate principles or constraints."

Goldberg (2006), p. 14.

TABLE 1.2. Productive or semi-productive constructions that are unusual cross-linguistically and must be learned on the basis of the input

Construction Label	Example (reference)
Time *away* construction	*Twistin' the night away* (Jackendoff 1997b)
What's X doing Y?	*What's that fly doing in my soup?!* (Kay and Fillmore 1999)
Nominal Extraposition	*It's amazing the difference*! (Michaelis and Lambrecht 1996b)
Mad Magazine construction	*Him, a doctor*?! (Lambrecht 1990)
N P N construction	*house by house; day after day* (Williams 1994)
Stranded preposition construction	*Who did he give that to?*
Omitted determiners (and vocatives)	*I don't think, Mac/*cabby, that this is the best way to go.* (Zwicky 1974)

Why Constructions? – Argument 3

"Generative linguists argue that these constructions exist only on the **"periphery"** [...] – that they need not be the focus of linguistic or learning theorists. [...] Since every linguist agrees that the "peripheral", difficult cases must be learned inductively on the basis of the input, constructionists point out that there is no reason to assume that the more general, regular, frequent cases [i.e. **"core"** grammar] cannot possibly be."

Goldberg (2006), p. 14.

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Section 4: Basic Concepts in CxG (Goldbergian)

Basic Concepts in CxG (Goldbergian)

- Constituency ✓[2]
- POS ✓
- Heads ✓[3]
- Valency x[4]
- Grammatical Functions ✓

[2]Still marginally relevant for building construction patterns. For example, for learning the WXDY construction the learner needs to identify different constituents like X → NP, and NP → DET N.

[3]Headedness is still mentioned in some construction types, i.e. a prepositional phrase construction being headed by a preposition (e.g. Goldberg 2006, p. 36), but in other cases, e.g. sentence constructions without verbs (Goldberg, 2006, p. 7), there is arguably no head.

[4]At least in the Goldbergian variant, it is argued that *valency* does not play a role anymore.

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Section 5: Pros and Cons of CxG

Pros (Advantages)

- It is not based on an arbitrary distinction between **core and periphery of grammar**, but tries to cover all linguistic structures within the same framework.
- It has (arguably) high **psycholinguistic relevance** for both learning and processing.
- Since it abandons the ideas of headedness and valency, it is more flexible to deal with the **productivity and creativity** of human languages.

Cons (Disadvantages)

- It is unclear how to identify constructions without recurrence to more traditional analyses, such as **phrase structure rules** and **constituency**.
- CxG (depending on the particular framework) is often only **partially formalized**. Müller (2019), p. 357 argues that all fully formalized CxG variants (Sign-Based Construction Grammar, Embodied Construction Grammar, and Fluid Construction Grammar) are virtually equivalent to HPSG (since they largely use the same formal apparatus).

Section 6: References

References

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Thank You.

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