

# LEXICAL SEMANTICS & COGNITION

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# What is lexical semantics?



- Lexical semantics deals with the meaning of words, i.e. lexical semantics investigates how words mean.
- I am going to present research that is cognitively-oriented and fall under the so-called cognitive semantics.
- The major assumption is that general cognitive principles underline lexical semantics.

# My research

3

- Languages analyzed
  - Slavic
    - Bulgarian (South Slavic)
    - Russian (East Slavic)
    - Polish (West Slavic)
  - Germanic
    - English
    - German
  - Romance
    - Italian
- Editor of papers on about 30 typologically diverse languages

# The structure of the talk



- History of research
- Word-structure and word-formation semantics
- Suffix combinations as determinants of word meaning
- Semantic concepts in word-formation
- Semantic concepts in neuroscience
- Conclusions
- References

# Conceptual theory of metaphor

George Lakoff



## Metaphors & Embodied mind

- We use metaphors to explain complex phenomena
- Those metaphors significantly influence our lives
- Embodied mind – all aspects of cognition are shaped by aspects of the body

# Metaphors



## **OBLIGATIONS ARE PHYSICAL BURDENS.**

1. *She's **loaded** with responsibility.*
2. *She **shouldered** the task with ease.*
3. *She's **weighed down** with obligations.*
4. *She's **carrying a heavy load** at work.*
5. *I have **to get out from under** my obligations.*
6. *I have a **pressing** obligation.*

(see Riemer 2010: 246ff)

# Frame semantics

Charles Fillmore



## FrameNet

- Semantic frames are schematic representations of situation types, such as eating, buying, etc.
- A word activates the frame in which it is used
- Structured description of the lexicon in terms of lexical items and frames

# Semantic Frames



- Frame elements are the things that are worth talking about when a frame has been activated by a word:
  - ▣ **verbs of buying** and **selling** need to connect with a buyer, a seller, some goods, and some money, either explicitly in the sentence or implicitly in the situation in which they are used;
  - ▣ **verbs of revenge** have to involve an avenger, an offender, an injured party, and a punishment.



# FrameNet

- Project website:

- <https://framenet.icsi.berkeley.edu/fndrupal/home>

- Examples of framed sentences:

- ... [<sub>Cook</sub> the boys] ... GRILL [<sub>Food</sub> their catches] [<sub>Heating\_instrument</sub> on an open fire].

- [<sub>Punishment</sub> This attack was conducted] [<sub>Support</sub> in] RETALIATION [<sub>Injury</sub> for the U.S. bombing raid on Tripoli...

# Conceptual semantics

Ray Jackendoff



## Formalizing semantics

- Decomposition approach, i.e. breaking up of meanings into smaller parts
- Primitive conceptual elements and their rules of combinations are the building blocks of our mental representations of the world
- A finite set of abstract concepts and their rule-governed combinations derive the meanings of lexemes.

# Conceptual semantic analysis

## □ Bill went into the house.

[<sub>EVENT</sub> GO ([<sub>THING</sub> BILL],[<sub>PATH</sub> TO ([<sub>PLACE</sub> IN ([<sub>THING</sub> HOUSE])))]])

- The verb GO and its arguments
- GO realizes an identical conceptual meaning, that of EVENT, across all the sentences in which it appears:

[<sub>EVENT</sub> GO ([ ], [ FROM ([ ] ) ] ) ]  
[<sub>PATH</sub> TO ([ ] ) ]

- The bird went from the ground to the tree.
- The meeting has gone from Tuesday to Monday.

# Summing up



- Definitions at the level of word (lexeme)
- Lakoff and Fillmore – usage-base (data-driven) approaches to lexical semantics with bottom-up logic
- Jackendoff – decompositional approach; postulates a finite set of abstract concepts and their rules of combination; top-down logic; develops formalisms for the description and analysis of the meanings of lexemes

# Word structure: (De)composition

- Simple versus complex words
  - *man, table* versus *teach-er, friend-ship*
- Complex words consists of bases (roots) and affixes that either precede or follow the root
  - ▣ Affixes that precede the root are called prefixes:
    - *re-write, de-mobilize*
  - ▣ Affixes that follow the root are called suffixes:
    - *writ-er, employ-ee*
- Complex words can have more than one affix
  - *stud-ent-ship, care-less-ness*

# Derivation of complex words



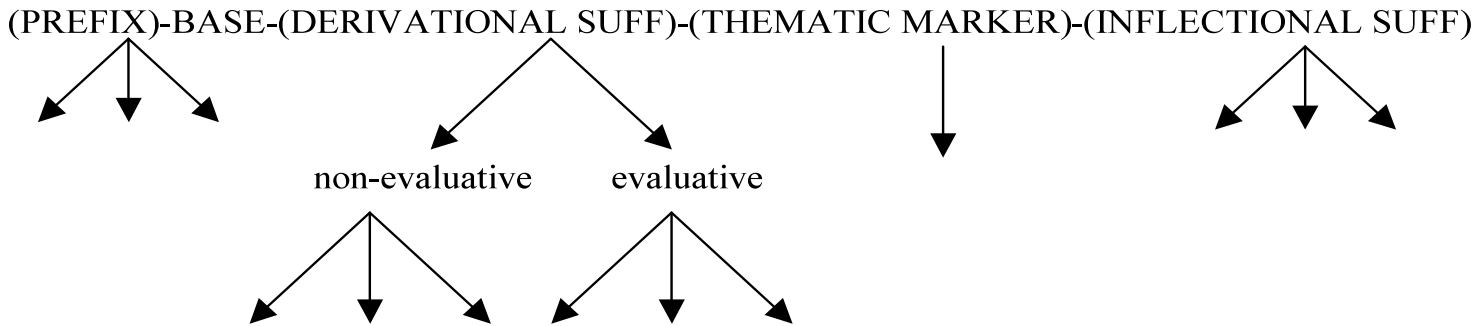
*real* → *real* + *-ize* →

→ *real* + *-iz* + *-ation* →

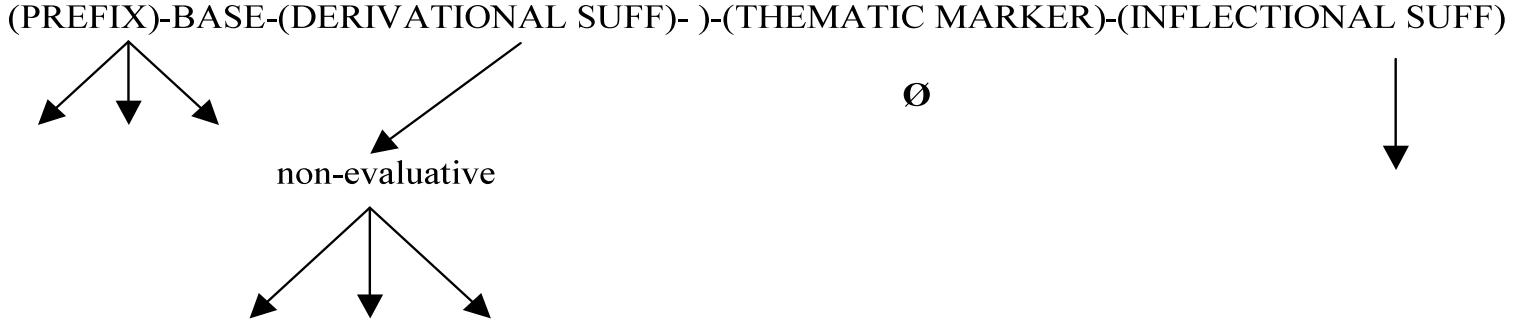
→ *real* + *-iz* + *-ation* + *-al*

# Slavic word versus English word

## Slavic word



## English word



# Word-formation semantics

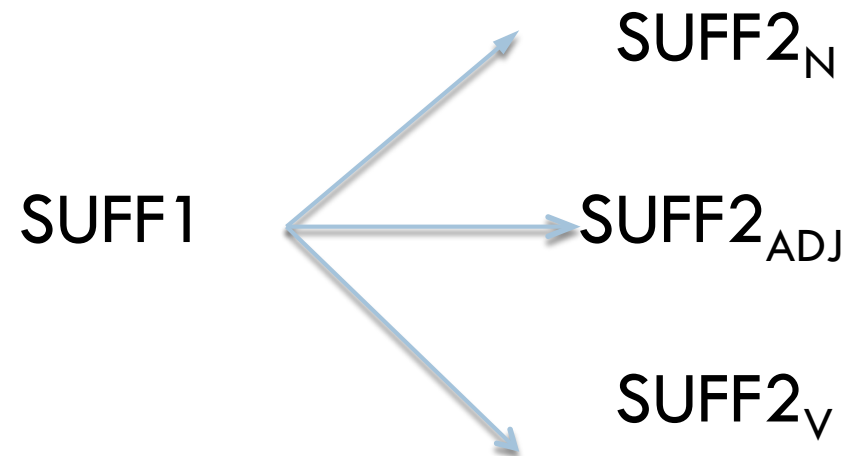


- Word-formation semantics is part of lexical semantics
- Semantics is assigned to morphemes (affixes)
- There is not much research on the topic, this is especially true for the languages of Europe



# Traditional analyses versus my approach

SUFF1 + all SUFF2 that follow it  
versus



- Cf. Gauss-Jordan elimination (Manova 2011c)

# -ist: A traditional analysis

SUFF1	Lexical category of SUFF1	Followed by SUFF2
<i>-ist</i>	N	<i>-dom, -ic, -y, -ize</i>

Data from Aronoff & Fuhrhop (2002), based on OED, CD 1994

# -ist: A cognitive analysis

SUFF1	Lexical category of SUFF1	SUFF2	SUFF2 suffixes of the same lexical category in numbers
<i>-ist</i>	N	N: <i>-dom</i> (2) ADJ: <i>-ic</i> (631), <i>-y</i> (5) V: <i>-ize</i> (3)	N: 1 <b>ADJ: 2</b> V: 1

Data from Aronoff & Fuhrhop (2002), based on OED, CD 1994

# Types of SUFF1-SUFF2 combination

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- ***Fixed (unique)***

- SUFF1 combines with only one particular SUFF2 of a major lexical category, N, V, ADJ

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- SUFF2 is semantically determined (based on intentional semantics)



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- SUFF2 is semantically determined (based on intentional semantics)

- ***Unpredictable***

- very few combinations are of this type

# Parts of speech 1



- The lexical-category specification of a suffix can be N, V and ADJ, and it is seen as cognitively defined in terms of semantic concepts
- Langacker's (1987) - conceptual analysis of parts of speech
- Croft (2001) – universal-typological theory of parts of speech

# Parts of speech 2

- Langacker (1987), based on **relationality** (i.e. +/- relational) and **way of scanning** (whether summarily scanned, i.e. conceived statistically and holistically, or sequentially scanned, i.e. mentally scanned through time), recognizes **things** (N), **processes** (V) and **modifiers** (ADJ).
- Croft (2001) defines objects, properties and actions in terms of four semantic properties: **relationality**, **stativity**, **transitoriness** and **gradability**. Thus prototypically, nouns name things or objects, verbs denote processes or actions, and adjectives are modifiers and express properties.

# Suffix-particular semantics: the concept of person (Italian)

28

No	SUFF1	SUFF1 Lexical category & semantics	SUFF2	Examples
1.	-aio	N person	N: <b>-ismo</b>	operaismo 'working class theory'
2.	-iere	N person	N: <b>-ismo</b> ADJ: -istico	giustizierismo 'avengerism' infermieristico 'nursing'
3.	-tore	N person	N: <b>-ismo</b> ADJ: -ico (1), -ale (>10)	conservatorismo 'conservatorism' pittorico 'pictorial', dittatoriale 'dictatorial'

Source CoLFIS, Bertinetto et al. 2005

# Suffix-particular semantics: the concept of person (Russian)

29

No	SUFF1	SUFF1 Lexical category & semantics	SUFF2	Examples
1.	-tel'	N person	N: <b>-stvo</b> , -ščina (2) <sup>1</sup> ADJ: <b>-skij</b>	<i>učitel'stvo</i> 'being a teacher; teachers (coll.)', <i>ljubitel'sčina</i> 'dilettantism', <i>učitel'skij</i> 'teacher's'
2.	-ač	N person	N: <b>-estvo</b> ADJ: <b>-eskij</b>	<i>trubačestvo</i> ( <i>Internet</i> ) 'being a trumpeter; trumpeters (coll.)', <i>trubačeskij</i> 'trumpeter's'
3.	-un	N person	N: <b>-stvo</b> , -ec ADJ: <b>-skij</b>	<i>opekunstvo</i> 'being a guardian; guardianship', <i>brexunec</i> (= <i>brexun</i> ) 'boaster', <i>opekunskij</i> 'guardian's'

<sup>1</sup>Number of types in the Russian National Corpus

# Suffix-particular semantics: persons are not things (Italian)

30

No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	<i>-tore</i>	N person	N: <i>-ismo</i> (1) ADJ: <i>-ico</i> (1), <i>-ale</i> (>10)	conservatorismo 'conservatorism' pittorico 'pictorial', dittatoriale 'dictatorial'
2.	<i>-tore</i>	N object	∅	

Source CoLFIS, Bertinetto et al. 2005

# Suffix-particular semantics: persons are not things (Russian)

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No	SUFF1	SUFF1 lexical category & semantics	SUFF2	Examples
1.	-tel'	N person	N: -stvo, -ščina (2) <sup>1</sup> ADJ: -skij	<i>učitel'stvo</i> 'being a teacher; teachers (coll.)', <i>ljubitel'sčina</i> 'dilettantism' <i>učitel'skij</i> 'teacher's'
2.	-tel'	N object	ADJ: -nyj	<i>ukazatel'nyj</i> 'indicatory'

<sup>1</sup>Number of types in the Russian National Corpus

# SUFF1 for Persons and Objects



- The further combinability of SUFF1, i.e. SUFF1-SUFF2 combinations help us differentiate between the following types of suffixes:
  - **synonymous** (the same combinability)
  - **homophonous** (different combinability)
  - **polysemous** (person and object suffixes are not polysemous, neither is there any metaphoric extension)



# Persons and objects in neuroscience



- Different types of objects have different representations in the brain, grounded cognition (under objects are humans, animals, things)  
(Martin 2007, Barsalou 2010)
- Face recognition differs from object recognition (the upside-down test)  
(Eysenck and Keane 2010, Kandel et al. 2012)

# Conclusions 1

- As persons and objects can be followed by different suffixes:
  - ▣ Persons and objects cannot be both put under things (contra Jackendoff)
  - ▣ Persons and objects are not metaphorically related (recall Lakoff's conceptual metaphors), nor are the suffixes that express the two concepts polysemous (contra Rainer 2005)
- As most combinations of suffixes are fixed and predictable:
  - ▣ Suffixes also seem to activate frames (recall Fillmore's frame semantics)

# Conclusion 2



- The lexical-category specification and intensional semantics of SUFF1 and SUFF2 play important roles in determining the meaning of words.
- In word-formation semantics, a number of semantic concepts undergo a number of combinations (recall Jackendoff's conceptual semantics).
- Primitive conceptual elements and their rules of combinations do appear the building blocks of our mental representations of the world but they seem associated not only with words but also with units smaller than words.



**Thank you!**

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All photos in the presentation are taken from the Internet.