COGNITIVE SEMANTICS

Understanding pattern of thoughts through language

NLP Course Seminar – Group 3

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MOTIVATION

Which of the following is an appropriate English sentence?

A) “kicked Tom the bucket.”
B) “Tom kicked the bucket.”
C) “bucket Tom kicked the.”
D) “the bucket kicked Tom.”

Obviously, it is B. Why is it so?

Important Fact

Language and speaker’s intuitions about language can be seen as a ‘window’ to the underlying cognitive system.
ROADMAP

1. Cognitive Linguistics
2. Cognitive Semantics
3. Image Schemas
4. Theory of Conceptual Structure
5. Encyclopedic Semantics
6. Conclusion
7. References
1. **Cognitive Linguistics**

- Cognitive Linguistics (CL) is a modern school of linguistics that understands language *creation, learning, and usage* as best explained by reference to human cognition.  
  -- Wikipedia

- Often described as a ‘movement’ or ‘enterprise’ because it is not as specific theory.

- Two important commitments of Cognitive Linguistics:
  - Generalization commitment
  - Cognitive commitment
1.1 Generalization Commitment

- A commitment to characterization of all aspects of human language.

- Cognitive linguists assume that there are common structuring principles that hold across different aspects of language like:
  - phonology (sound)
  - semantics (word and sentence meaning)
  - morphology (word structure)
  - syntax (sentence structure), and so on.
Some areas that are common across various aspects of language are:

- Categorization
- Polysemy
- Metaphor

Assumption:
Linguistic function of the mind is not modular.
1.2 COGNITIVE COMMITMENT

- A commitment to providing a characterization of general principles for language that accords with what is known about the mind and brain from other disciplines.

- Cognitive linguists specifically reject the claim that there is a distinct language module because:
  - **Attention**: profiling in language
    The general ability of language to provide ways of directing attention aspects of a scene is called **profiling** (Langacker 1987). For example,
    “The boy kicks over the vase.”
    “The vase was kicked over.”
1.2 COGNITIVE COMMITMENT (CONTD.)

- **Categorization**: fuzzy categories
  Categories formed by the human mind are rarely ‘neat and tidy’ just like fuzzy linguistic categories.

- **Metaphor**
  Metaphor is a conceptual rather than a purely linguistic phenomenon. (George Lakoff 1980; Mark Johnson 1999)

- **Assumption:**
  Linguistic function of mind not distinct from the cognitive aspects of mind.
1.3 COGNITIVE LINGUISTICS (CL) ASSUMPTIONS

CL assumes that Linguistic Function of mind is not modular.

CL assumes that Cognitive Function and Linguistic Function of mind are not different.
A model of meaning (cognitive semantics) has to be delineated before an adequate cognitive model of grammar can be developed.
1.5 **Cognitive v/s Generative**

<table>
<thead>
<tr>
<th>Cognitive Linguistics</th>
<th>Generative Linguistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assumes Linguistic Function of mind is not modularized.</td>
<td>Assumes Linguistic Function of mind is modularized according to various aspects of language.</td>
</tr>
<tr>
<td>Assumes Linguistic Function of mind is not different from its cognitive functions.</td>
<td>Assumes Linguistic Function of mind is different from its cognitive functions.</td>
</tr>
<tr>
<td>Assumes an encyclopedic view of linguistic meaning.</td>
<td>Assumes an dictionary view of linguistic meaning.</td>
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<tr>
<td>Cognitive linguistics emphasize on the role of meaning.</td>
<td>Formal approaches to linguistics, often emphasize on the role of grammar.</td>
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</tbody>
</table>
2. **Cognitive Semantics**

- The study of the relationship between experience, embodied cognition and language.

  -- Vyvyan Evans

- Scholars working in cognitive semantics investigate:
  - Knowledge representation (**conceptual structure**), and
  - Meaning construction (**conceptualization**)

- We refer meanings conventionally associated with words and other linguistic units as **Semantic Structure**.
2.1 Principles of Cognitive Semantics

- Four fundamental principles found from theories:

  1. Conceptual structure is embodied
     Exemplified by: Image Schema theory (Johnson)

  2. Semantic structure is conceptual structure
     Exemplified by: Theory of Conceptual Structure (L. Talmy)

  3. Meaning representation is encyclopedic
     Exemplified by: Frame Semantics (Fillmore)

  4. Meaning construction is conceptualization
     Exemplified by: Mental Space theory (Fauconnier)
2.2 CENTER PRINCIPLE OF COGNITIVE SEMANTICS

Embodiment

Conceptual Structure
Consists of conceptual representation including Image Schema (Johnson’s theory 1987)

Semantic Structure
Consists of meaning Units like lexical concepts (Talmy’s theory)
3. **Image Schema**

- An **image schema** is a recurring structure of, or within, our cognitive processes, which establishes patterns of understanding and reasoning.
- Embodied experience gives rise to image schemas within the conceptual system.
- **Image**
  - Its broad neurocognitive sense of mental imagery and not as exclusively indicating visual imagery.
- **Schema**
  - It means that image schema are abstract concepts consisting of patterns emerging from repeated instance of experience.
  - E.g., things —— pencil, container ——— teacup.
3. **Image Schema (Contd.)**

- The weaker claim:
  Image schemas give us a ‘vocabulary’ to talk about the different dimensions of spatial structure that languages care about

- The stronger claim:
  These dimensions are embodied -- our bodies constrain the way we observe and interact with the world. Therefore these schemas are universal
# 3.1 Partial List of Image Schemas

<table>
<thead>
<tr>
<th>Main Image Schema</th>
<th>Sub - Image schemas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Space</td>
<td>Up-down, front-back, left-right, near-far</td>
</tr>
<tr>
<td>Containment</td>
<td><strong>Container</strong>, in-out</td>
</tr>
<tr>
<td>Force</td>
<td><strong>Compulsion</strong>, <strong>Blockage</strong>, counterforce, diversion, <strong>Removal of restraint</strong>, <strong>enablement</strong></td>
</tr>
<tr>
<td>Identity</td>
<td>Merging, collection, splitting</td>
</tr>
<tr>
<td>Existence</td>
<td>Removal, bounded space, cycle, object</td>
</tr>
</tbody>
</table>
3.2 CONTAINER SCHEMA

- Structure elements: interior, boundary, exterior

- Dynamic nature of the containment schema is reflected in the various spatial senses of the English word *out*
  1. John went out of the room
  2. The honey spread out
3.3 FORCE SCHEMA

Fig-1 The COMPULSION IS

Fig-2 The BLOCKAGE IS

Fig-3 The REMOVAL OF RESTRAINT IS

Fig-4 The ENABLEMENT IS
3.4 Image Schema and Linguistic Meaning

- FORCE schema underlie the basic or root meaning of some auxiliary verbs in English.
- These meaning relate to socio-physical experience.

a) You **must** move your foot or the car will crash it  
   [COMPULSION Schemas ]

b) You **may** now kiss the bride  
   [REMOVAL OF RESTRAINT]

c) Ram **can** throw a ball over 100 meters.  
   [ENABLEMENT]
4. **Theory of Conceptual Structure**

- Language reflects conceptual representation by providing **Structural Meaning** or (**Schematic Meaning**).

- Meaning relates to structural properties of **referents** and **scenes**.

- Semantic structure encodes and externalizes these concepts in language.

- How language system provides meaning based on concepts derived from embodiment?
4.1 **Semantic Structure**

- Linguistics expressions refers to entities or describe situations or scenes.

- Entities and scenes can be concrete objects or subjective experiences. E.g. feelings

- Language conveys entities and scenes by reflecting or encoding the user’s **Cognitive Representation (CR)** or conceptual system

- The properties of language allow us to reconstruct the properties of the conceptual system
4.2 COGNITIVE REPRESENTATION

The bifurcation in the cognitive representation (CR)

- CONCEPTUAL STRUCTUREING SYSTEM
  Delineates structural properties of a given scene

- CONCEPTUAL CONTENT SYSTEM
  Provides rich contentful detail of a particular scene
4.3 Open – Closed Class Semantic System

- System of semantic structure is divided into two subsystems
  - Open-class semantic system
    - E.g. man, cat, table (nouns); run, eat (verbs); happy, sad (adj)
  - Closed-class semantic system
    - E.g. kick the bucket (idioms)
    - Grammatical words like in or the and
    - Bound morphemes like -er in singer
  - E.g. The hunter tracked the tigers
4.4 **Schematic Systems**

- Conceptual structuring system is based upon a limited number of large-scale **schematic systems** (“imaging systems”)

- Various schematic systems collaborate to structure a scene that is expressed via language

- Each system contributes different structural aspects of the scene, resulting in the overall outline of the scene’s skeletal framework
4.5 CONCEPTUAL STRUCTURING SYSTEM

The key schematic systems within the ‘Conceptual Structuring System’
4.5.1 The ‘Configurational System’

- Structures temporal and spatial properties associated with a scene
  - E.g. the division of a scene into parts and participants

- Further divided into **schematic categories**
  - Degree of extension

- Degree of extension relates to the degree to which matter (space) or action (time) are extended.

![Diagram showing Point, Bounded extent, and Unbounded extent with examples: speck, ladder, river.](image)
4.5.2 The ‘Perspectival System’

- Specifies the perspective from which one ‘views’ a scene

- Semantic category: perspectival location (deixis)

- Relates to the position of a perspective point from which a scene is ‘viewed’

- Interior perspective point
  - E.g. The door slowly opened and two men walked in.

- Exterior perspective point
  - E.g. Two men slowly opened the door and walked in.
4.5.3 The ‘Attentional System’

- Specifies how the speaker intends the hearer to direct his or her attention towards the entities that participate in a particular scene

- Windowing of attention
  - Initial and final windowing
    - E.g. The crate fell out of the plane into the ocean.
  - Initial, medial and final windowing
    - E.g. The crate fell out of the plane, through the air and into the sea.

- Path windowing
  - Window: focus attention on
4.5.4 The ‘force-dynamics System’

- Derives from **kinaesthesia** (our bodily experience of muscular effort or motion) and **somesthesias** (our bodily experience of sensations such as pressure or motion)

- **Physical force**
  - The ball **was rolling** along the beach.
  - The ball **kept rolling** along the beach.

- **Psychological force**
  - He **didn’t close the door**.
  - He **refrained from closing the door**.

- **Social force**
  - She’s **got to go to the park**.
  - She **gets to go to the park**.
5. **Encyclopedic Semantics**

- **Meaning** – Dictionary view vs. Encyclopedic view.

- Conceptual Structure captures encyclopedic meaning.

- Research has mainly focused on the way Semantic Structure is organized relative to conceptual knowledge structure.

- Lexical units can not be understood independent of larger knowledge structure.
5. **Encyclopedic Semantics (contd.)**

- **Characteristics.**
  - No principled distinction between semantics and pragmatics.
  - Encyclopedic knowledge is structured.
  - Encyclopedic meaning emerges in context.
  - Lexical items – points of access to Encyclopedic knowledge.
  - Encyclopedic knowledge is dynamic.
5.1 Theory of Frame Semantics

- **Frame** – Knowledge structure (schema) represented at the conceptual level which emerges from experiences.

- Meaning associated with a word can not be understood independent of the frames with which it occurs.

- Continually updated and modified due to ongoing human experience.
5.1.1 FRAMES IN COGNITIVE PSYCHOLOGY

- Two basic components
  - Attribute-Val Set
  - Structural Invariants
5.1.2 Consequences of Frame-Model

- Valence
  - concerns with number of arguments and semantic roles assumed by those arguments.

- Frames provide perspective
  - *coast* and *shore* – related to strip of land adjacent to sea with respect to different frames: Land Dwelling versus Seafaring.
5.2 Theory of Domains

- **Domains** – conceptual entities of varying level of complexity and organization.
  - Should provide background information against which lexical concepts can be understood e.g. hot, cold designates concepts in Temperature domain.

- **Domain matrix** – range of domains that structure a lexical concept e.g. bird.
5.2 THEORY OF DOMAINS (CONTD.)

- It can be described in terms of profile/base.
  - **Profile** – part of semantic structure on which the word focuses attention.
  - **Base** – not in focus, but it is necessary in order to understand profile.

- Types
  - Basic domain
  - Abstract domain
6. **CONCLUSION**

- Cognitive Linguistics with help of Cognitive Semantics gives an integrated view of language and thought.

- Main intuition behind all theories in Cognitive Semantics is to understand thoughts through language.

- The nature of conceptual organization arises from embodied experience.
7. REFERENCES


7. REFERENCES (CONTD.)


QUESTIONS ??????
THANK YOU .....
3.5 Some Properties of IS

- They can give rise to more specific concepts
- They are pre-conceptual in origin
- They derive from interaction with and observation of the world
- They are inherently meaningful
- They can be inherently complex
- They are not the same as mental images
- They are multi-modal