Cognitive semantics and the theory of embodiment

Outline

- Embodiment theory
  - What is cognition?
  - Embodied realism
  - Image schema theory
- Cognitive semantics
  - Conceptual and semantic structures
- Prototype categories
- Encyclopedic knowledge & frame semantics
- Conceptual metaphor theory
  - Conceptual metaphor
  - Conceptual blending

Embodiment theory

What is cognition?

- Using Fauconnier & Turner's (2002) catchphrase, cognition can be described as "the way we think".

- Broadly speaking cognition covers perception (including perceptive processes), experience, knowledge of the world (including socio-cultural knowledge and knowledge of language), mental structures, mental processes, emotions, etc.

Embodiment theory

What is cognition?

- Cognition is the establishment, maintenance, change, and general processing of **concepts** and **conceptual structure**.

- Concept(ual) = the key term for ‘all things having to do with thoughts’, be it ‘thought components’ or very complex ‘thought structures’.

Embodiment theory

What is cognition?

- Being part of general human cognition, language competence is conceptual.
  - Semantic structure is based on conceptual structure.
  - Linguistic processes are instances of psychological and perceptive processes.
  - Language systems follow the principles of general human cognition.

Embodiment theory

Embodied cognition

- A fundamental assumption in cognitive linguistics is that cognition is **embodied**.
- Cognition is based on the way that humans interact with the surrounding world through our bodily configuration and our perceptive capacities and limitations.

Embodiment theory

Embodied cognition

- As a consequence of the hypothesis of **embodied cognition**, all aspects of human cognition are **experientially based**, and conceptual structures are based on recurring experiences of interacting, through our bodies, with the surrounding world:

  “Experience is always an interactive process, involving neural and physiological constraints from the organism as well as characteristic affordances from the environment and other people for creatures with our types of bodies and brains. … Meaning comes, not just from "internal" structures of the organism … nor solely from "external" inputs, but rather from recurring patterns of engagement between organism and environment.” (Johnson and Lakoff 2002: 248)

Embodiment theory

Embodied cognition

- The one-to-one relation between knowledge and the real world, embraced in objectivism, is thus rejected in CL.

- Instead, **experiential realism** is embraced in which our reality is essentially based on representations of the real world which are filtered, as it were, through our particular human experience of interacting with the world.

Embodiment theory

Embodied cognition

- This quote captures the essence of experiential realism:

  “Experiential realism assumes that there is a reality ‘out there’. Indeed, the very purpose of our perceptual and cognitive mechanisms is to provide a representation of this reality, and thus to facilitate our survival as a species. … However, by virtue of being adapted to a particular ecological niche and having a particular form and configuration, our bodies necessarily provide one particular perspective among many possible and equally viable perspectives. Hence experiential realism acknowledges that there is an external reality that is reflected by concepts and language. However, this reality is mediated by our uniquely human experience which constrains the nature of this reality ‘for us’.” (Evans & Green 2006: 48)

Embodiment theory

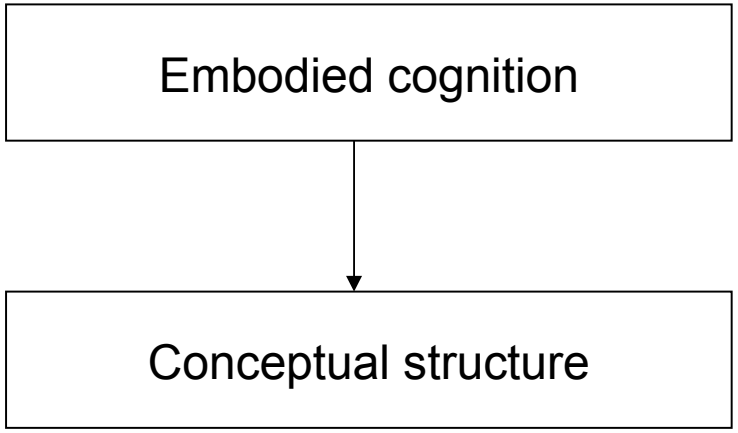
Embodied cognition

Embodied cognition

In embodiment theory, all cognition starts via our interaction with the world.

Embodiment theory

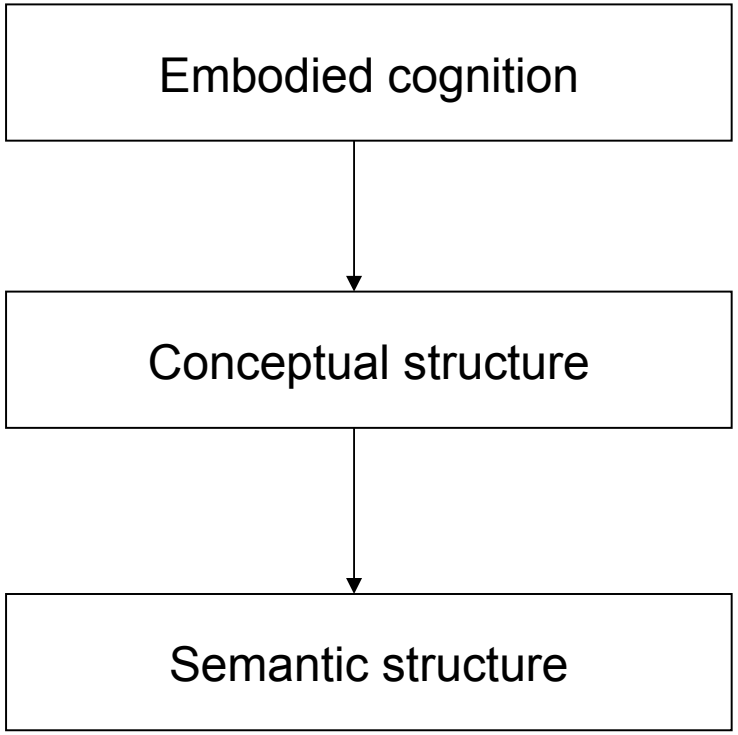
Embodied cognition



This serves as the basis of conceptual structures and processes.

Embodiment theory

Embodied cognition



Conceptual structure, in turn, is the basis of semantic structure.

Embodiment theory

Embodied cognition

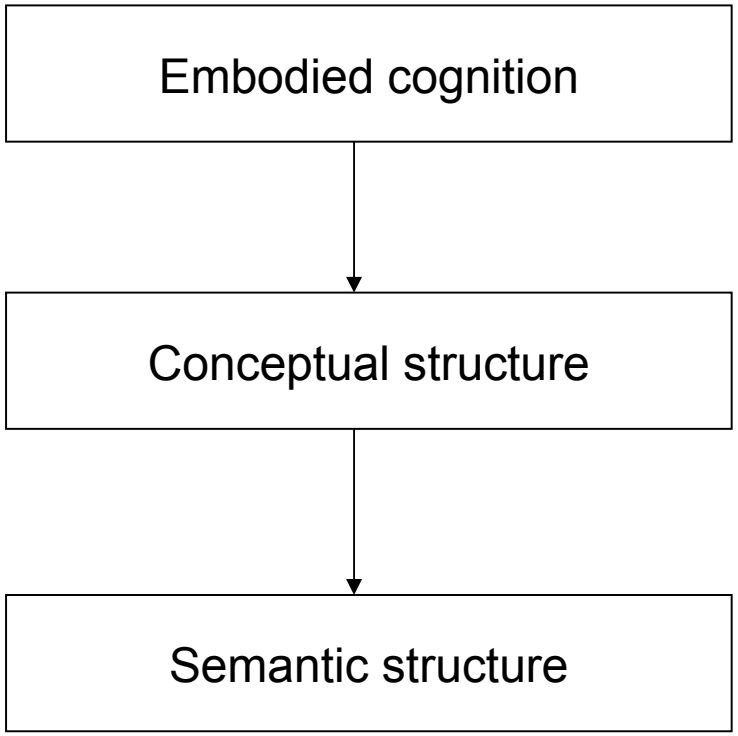


Figure adapted from Evans & Green (2006: 177)

Embodiment theory

Embodied cognition

- Does this mean that all human experience is universal across cultures?

Embodiment theory

Embodied cognition

- Does this mean that all human experience is universal across cultures?
  - Yes and no.

Embodiment theory

Embodied cognition

- Yes

Embodiment theory

Embodied cognition

- Yes
  - Very basic human experiences, spatial and otherwise, are probably universal, as described in the theory of **image schemata** (Johnson 1987).
  - This is reflected in the fact that most, if not all, languages have conventional ways of describing spatial relations, such as prepositions.

Embodiment theory

Embodied cognition

- No

Embodiment theory

Embodied cognition

- No
  - The way that complex experiences are conceptualized often differ across cultures.
    - This is exemplified by comparing the conceptualization the FUTURE in the Aymaran language and in English.
      - In English, the future is conceptualized as being before us, as reflected in TIME IS A MOVING OBJECT APPROACHING US and TIME IS STATIONARY AND WE MOVE THROUGH IT metaphors (Lakoff & Johnson 1980: 42-44).
      - In Aymara, the future is conceptualized as being behind us, as reflected by the grammaticalization of ‘nayra’ (EYE/SIGHT/FRONT) into a marker of past events, and the grammaticalization of ‘qhipa’ (BACK/BEHIND) into a marker of future events.

Image schema theory

Image schemata

- The theory of image schemata primarily associated with the work of Mark Johnson (Johnson 1987).
- The central idea is that at the heart of conceptual structure is a system of schematic representations of basic **sensory-motor experiences**.
- These representations are called **image schemata**.

Image schema theory

Image schemata

- Image schemata are **emergent** (they are established in tandem with our physical, sensory, and psychological development in early childhood). (Mandler 2004)

- Image schemata are generalizations over basic experiences of interaction with the physical world in early childhood.

Image schema theory

Image schemata

- Some examples:
  - SPACE: UP-DOWN, FRONT-BACK, LEFT-RIGHT, NEAR-FAR, CENTER-PERIPHERY, etc.
  - CONTAINMENT: CONTAINER, IN-OUT, FULL-EMPTY, CONTENT, etc.
  - LOCOMOTION: MOMENTUM, PATH, etc.
  - FORCE: COMPULSION, BLOCKAGE, REMOVAL OF RESTRAINT, ENABLEMENT, RESISTANCE, etc.

Image schema theory

Image schemata and linguistic semantics

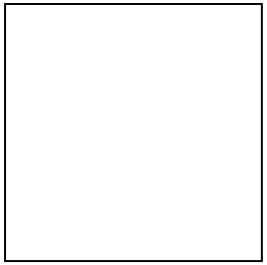
- Being **pre-conceptual**, image schemata are held to constitute the foundation of the conceptual system.
  - The basic image schemata figure as concepts.
  - Complex cognitive structures are combinations of image schemata into larger wholes.
- Via this, image schemata figure in linguistic semantics.

Image schema theory

Image schemata and linguistic semantics

- Many prepositions draw directly on image schemata:

CONTAINER



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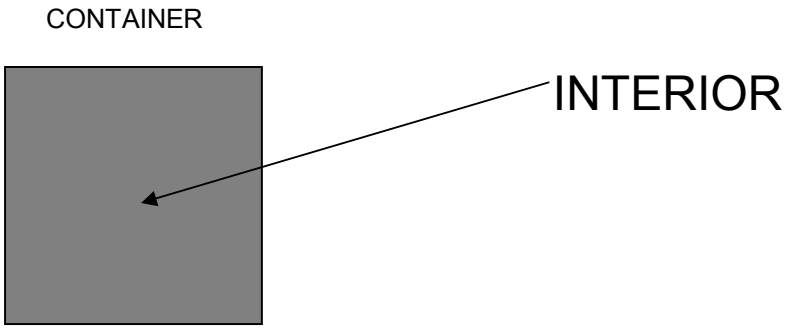

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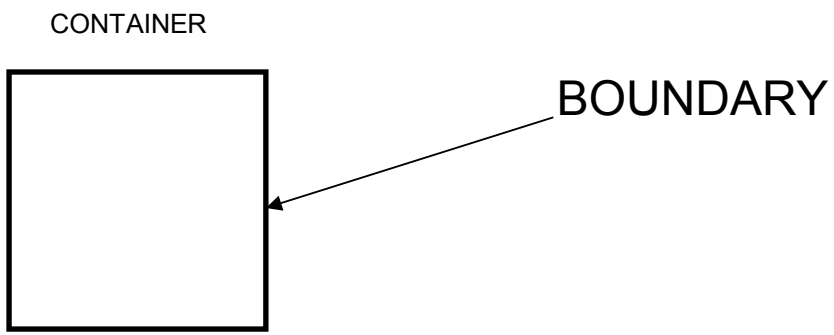

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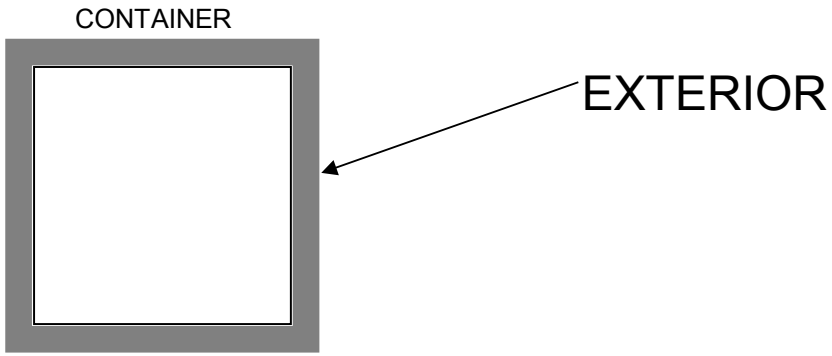

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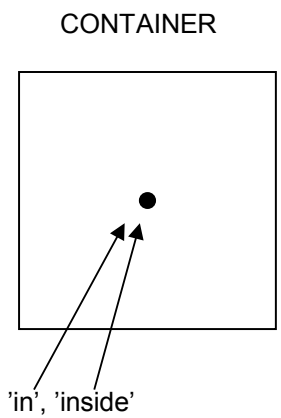

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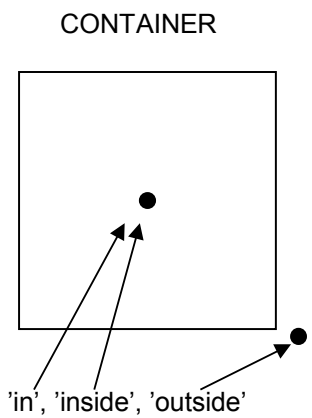

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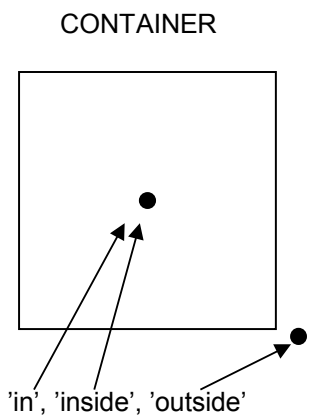

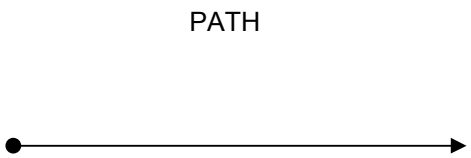

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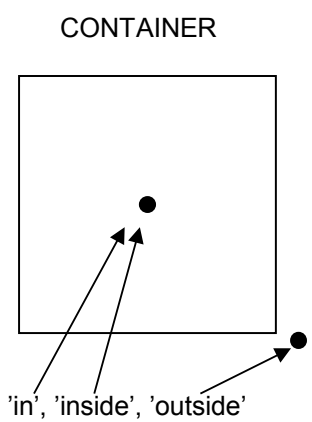

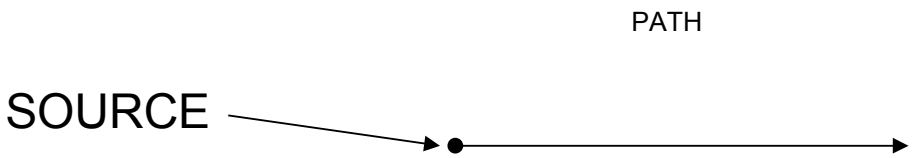

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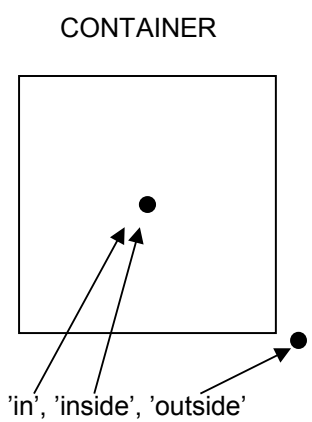

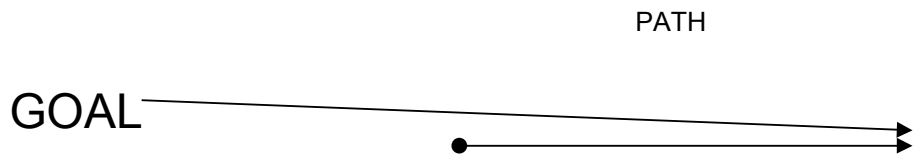

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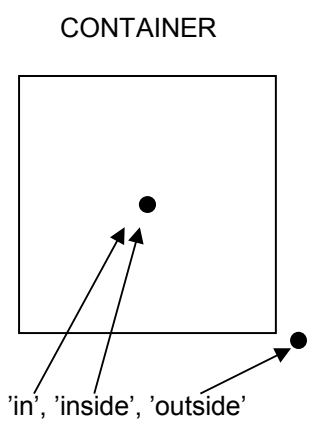

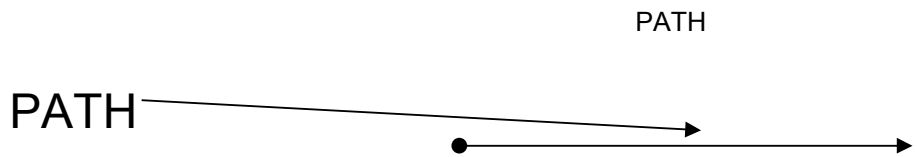

Image schema theory

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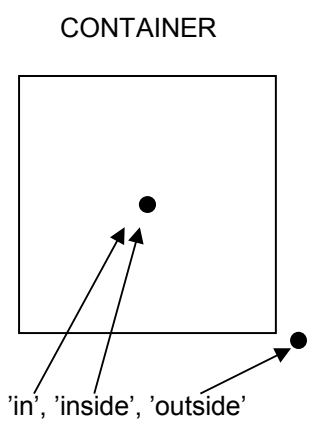

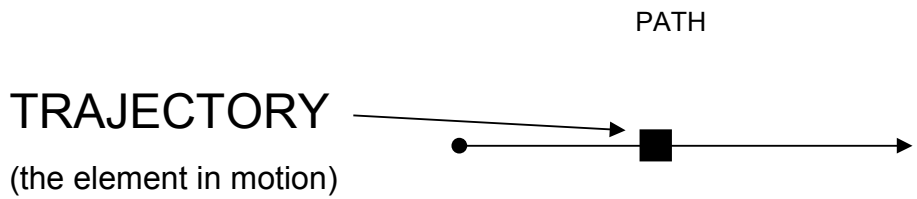

Image schema theory

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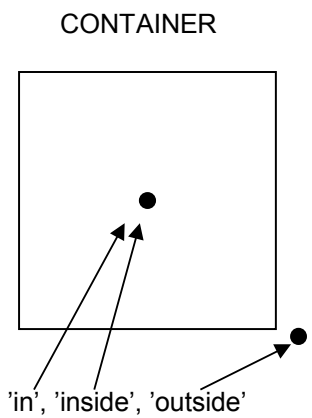

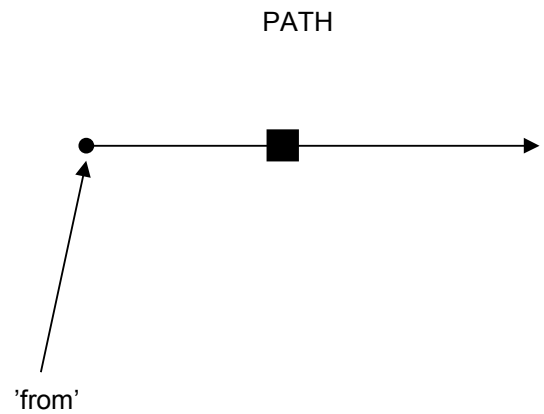

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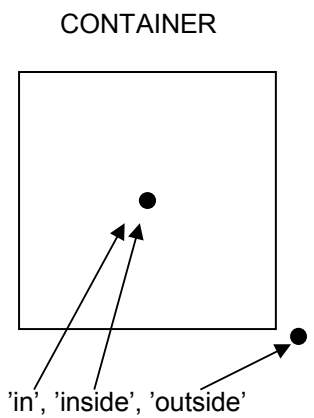

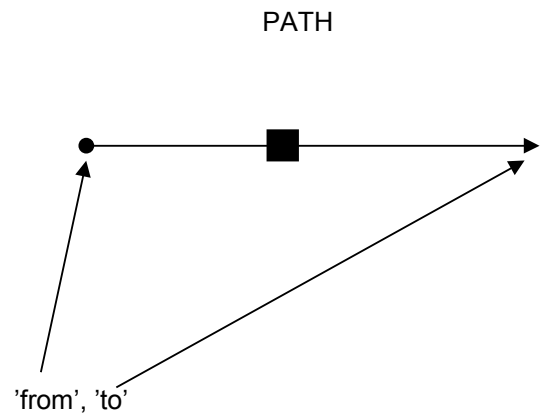

Image schema theory

Image schemata and linguistic semantics

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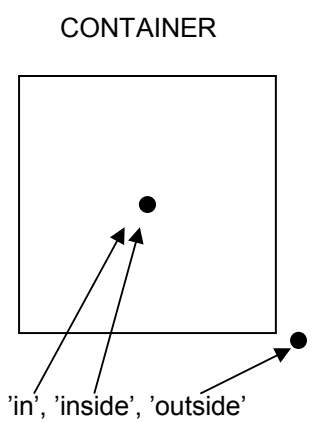

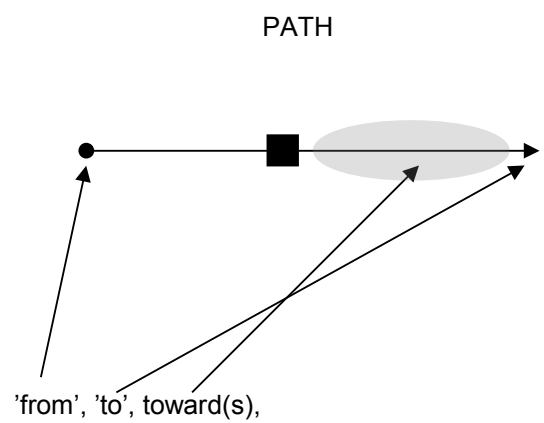

Image schema theory

Image schemata and linguistic semantics

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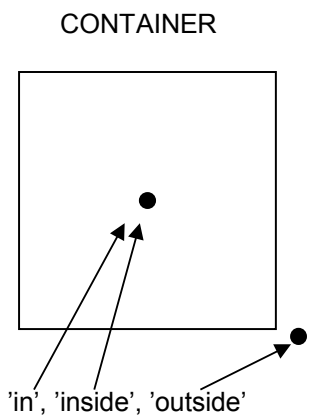

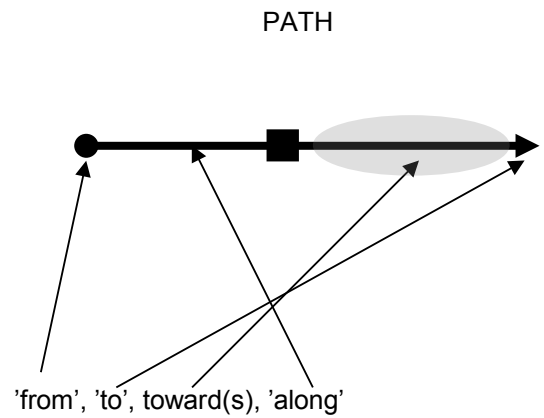

Image schema theory

Image schemata and linguistic semantics

- Many prepositions draw directly on image schemata:

Many prepositions also draw on combined image schemata.

Image schema theory

Image schemata and linguistic semantics

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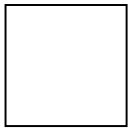

Many prepositions also draw on combined image schemata.

Image schema theory

Image schemata and linguistic semantics

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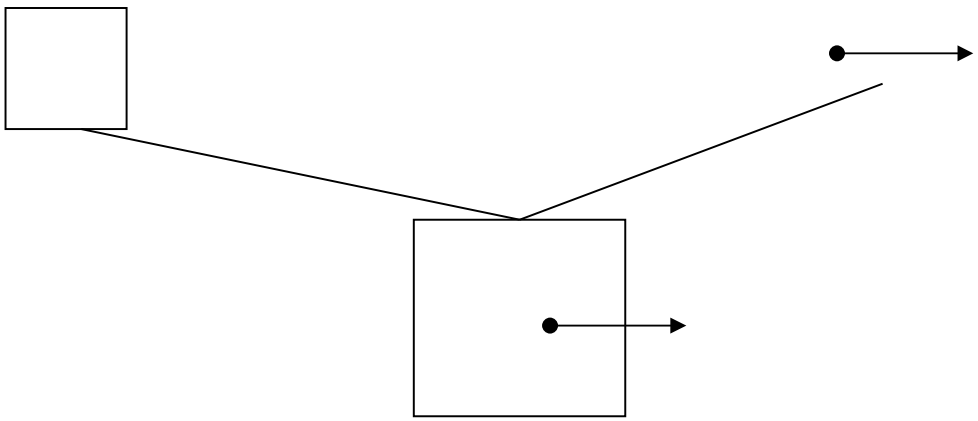

’out’, ’out of’

Many prepositions also draw on combined image schemata.

Image schema theory

Image schemata and linguistic semantics

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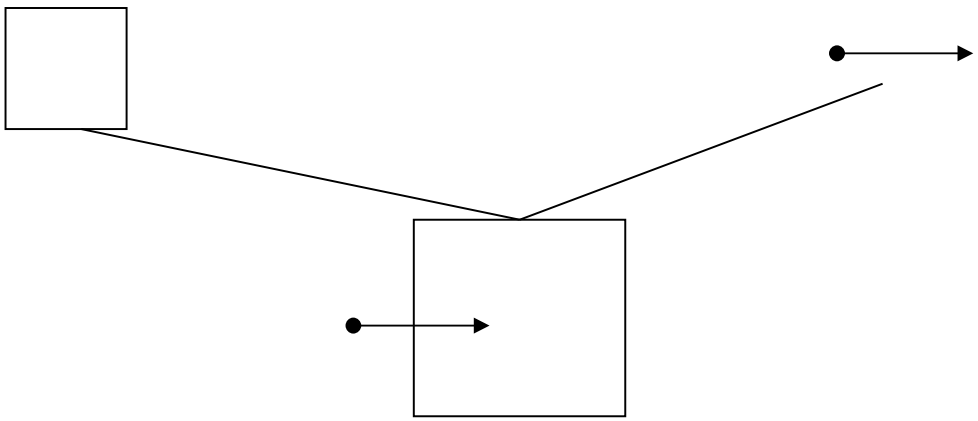


’in’, ’into’

Many prepositions also draw on combined image schemata.

Image schema theory

Image schemata and linguistic semantics

- TIME in English and Aymara
  - The Aymara marking of the PAST and the FUTURE is based on the FRONT-BACK schema.
  - The two basic time metaphors in English both involve the PATH schema:
    - TIME IS A MOVING OBJECT (e.g. 'X-mas is approaching') – TIME is the TRAJECTORY and we are the GOAL.
    - WE MOVE THROUGH TIME (e.g. 'We are nearing the deadline') – we are the TRAJECTORY and TIME is the PATH.

Image schema theory

Image schemata and linguistic semantics

- Constructional meaning
  - The **ditransitive construction** expresses TRANSFER OF POSSESSION:
    - S = DONOR
    - V = TRANSFER OF POSSESSION
    - IO = RECIPIENT
    - DO = ENTITY
  - TRANSFER OF POSSESSION draws on the PATH schema:
    - DONOR = SOURCE
    - ENTITY = TRAJECTORY
    - RECIPIENT = GOAL
    - TRANSFER OF POSSESSION = PATH

Image schema theory

Image schemata and linguistic semantics

- Constructional meaning II:
- The ’the X itself’-construction draws on the CENTER-PERIPHERY schema:
  - ’The monitor was broken, but the computer itself was okay’ (’the monitor’ = peripheral part of the computer)
  - ’Ignoring the suburbs, we went straight to the city itself’ (’the suburbs’ = peripheral part of the city)
  - ’The play itself was interesting, although the acting was slightly wooden’ (’the acting’ = peripheral part of the play)

Image schema theory

Image schemata and linguistic semantics

- Constructional meaning III:
  - Modal verb constructions draw on various FORCE-based image schemata:
    - Deontic ’must V’ draws on a COMPULSION schema
    - Deontic ’may V’ draws on a REMOVAL OF CONSTRAINT schema
    - Epistemic ’can V’ draws on a ENABLEMENT schema

Cognitive semantics

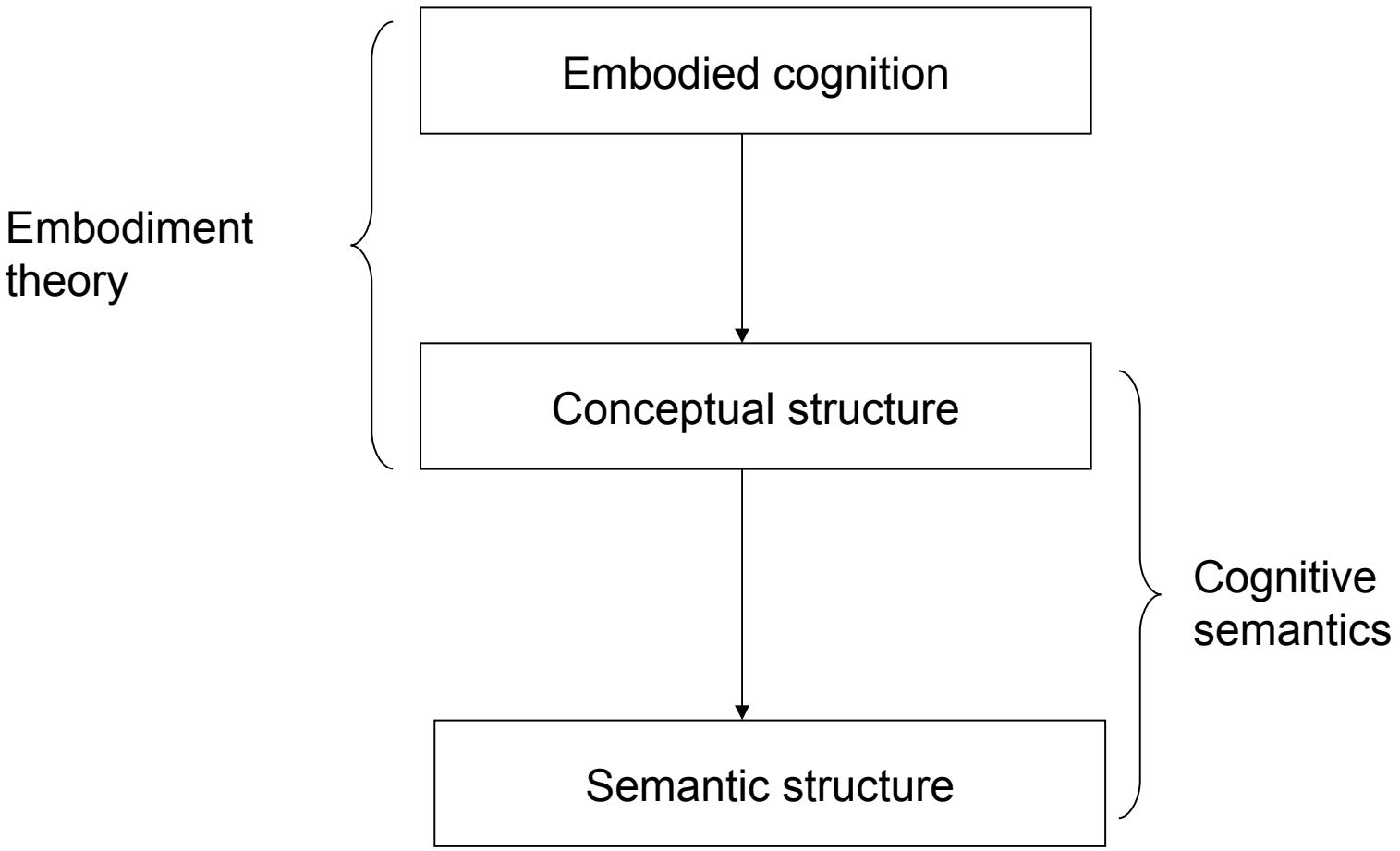
Conceptual and semantic structure

- Central to **cognitive semantics** are the works of Leonard Talmy, collected in Talmy (2000a, 2000b).

- While image schema theory focuses on the relation between embodied cognition and conceptual structure, Talmy's work focuses on the relation between conceptual structure and semantic structure.

Cognitive semantics

Conceptual and semantic structure



Cognitive semantics

Conceptual and semantic structure

- The basic thesis of cognitive semantics is that semantic structure, or linguistic meaning, reflects conceptual structure.

Cognitive semantics

Conceptual and semantic structure

- Language reflects conceptual structure by providing structural meaning, or schematic meaning, in encoding and externalizing conceptual structure in linguistic form.

- Talmy's work has focused on the linguistic encoding of **referents** (or participants) and **scenes** (or situations).

Cognitive semantics

Conceptual and semantic structure

- Conceptual structure, or **cognitive representation**, as linguistically encoded consists of two structuring systems:
  - **Conceptual structuring system**: delineates structural properties of a scene
  - **Conceptual content system**: provides rich and contentful detail of a particular scene.

Cognitive semantics

Conceptual and semantic structure

- The system of semantic structure is also divided into two subsystems:
  - **Open-class semantic system**: conceptual content expressed by **open-class items** in language.
  - **Closed-class semantic system**: conceptual content expressed by **closed-class items** in language.

Cognitive semantics

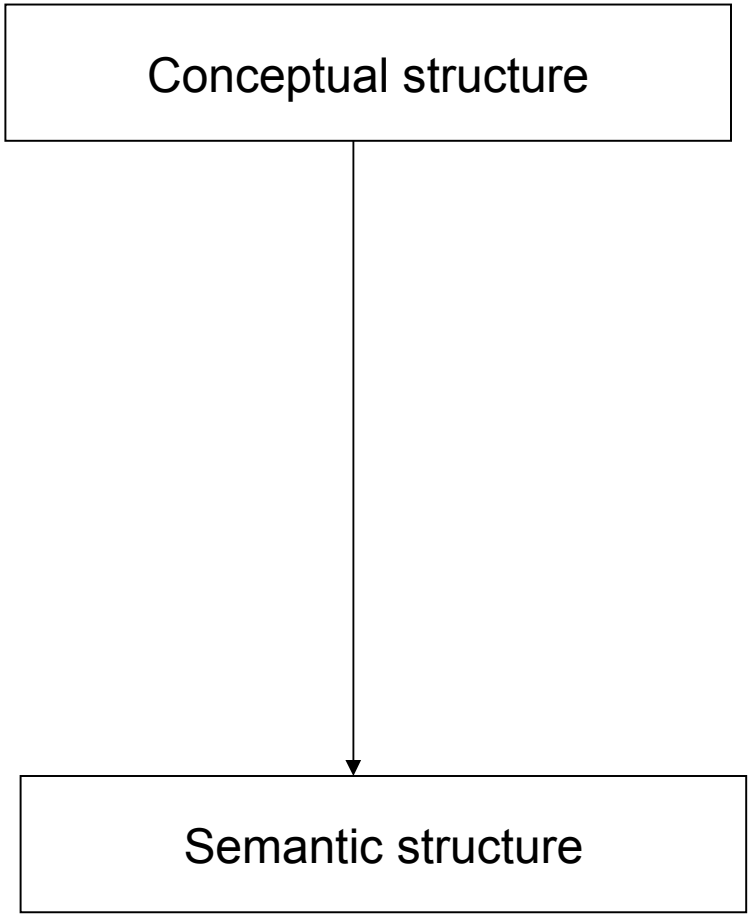
Conceptual and semantic structure

- Open-class items provide rich content, as in the case of verbs (’kill’, ’eat’, ’hover’, etc.), nouns (’hat’, ’face’, ’hammer’), adjectives (’angry’, ’green’, ’beautiful’), etc.

- Closed-class items provide structural content, as in the case of grammatical suffixes, auxiliary verbs, syntactic structures, syntactic functions and relations, grammatical word classes like conjunctions, infinitive markers, prepositions, etc.

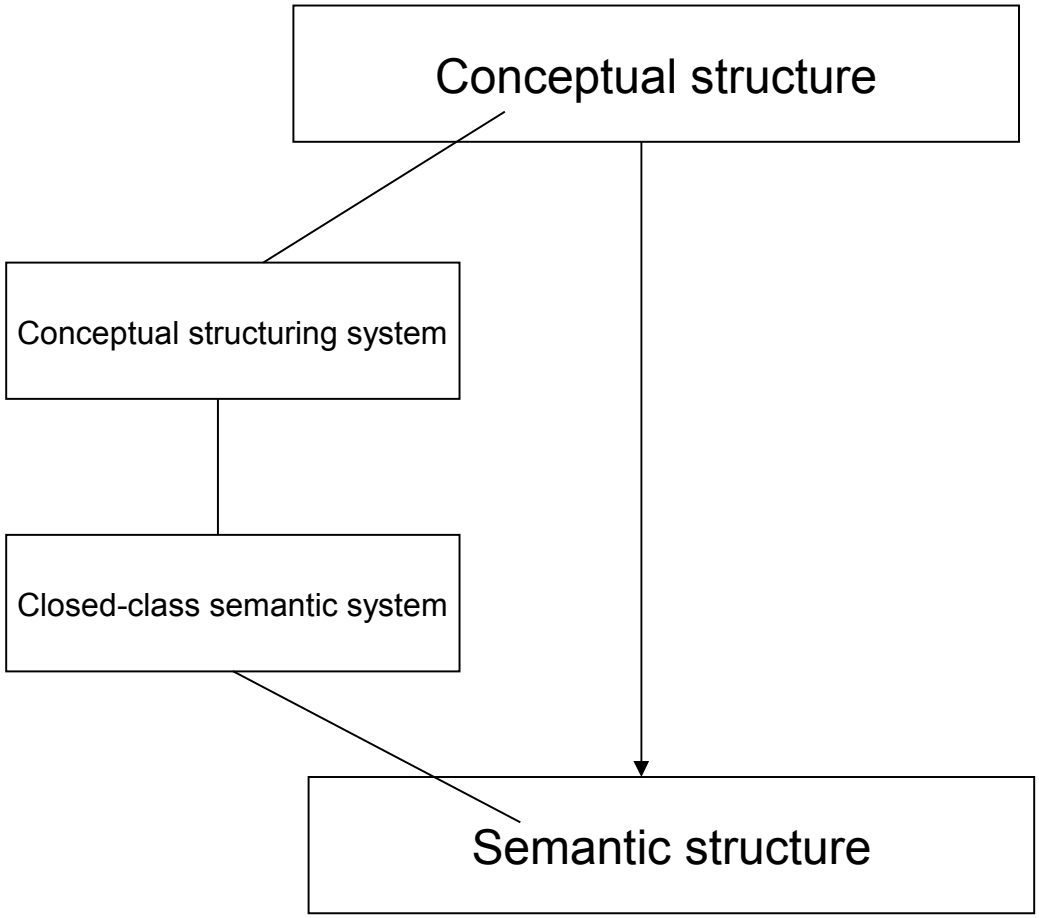
Cognitive semantics

Conceptual and semantic structure



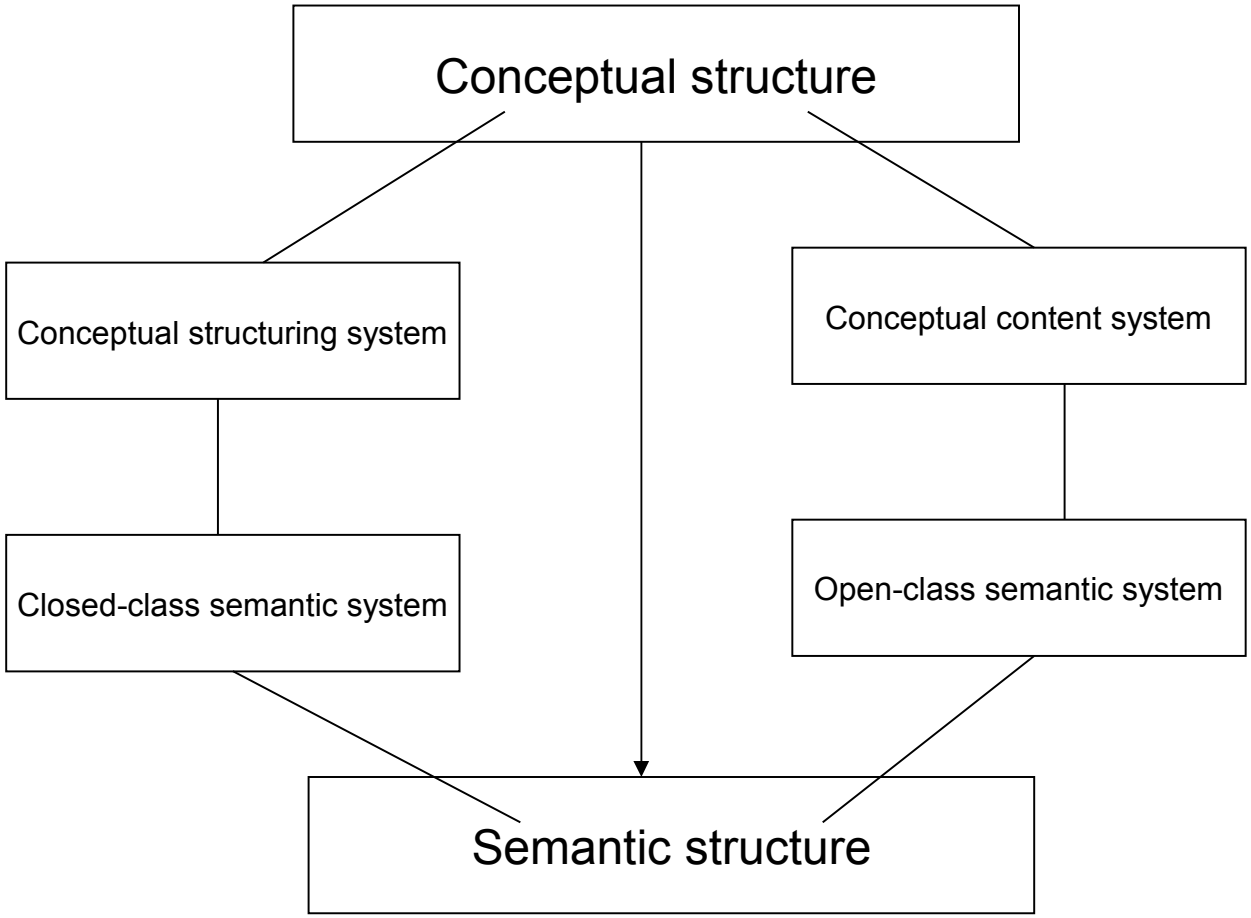
Cognitive semantics

Conceptual and semantic structure



Cognitive semantics

Conceptual and semantic structure



Cognitive semantics

Conceptual and semantic structures

- Note that the distinction between **grammar** (closed-class items) and **lexicon** (open-class items) is a bit at odds with the overall holistic view of language adopted in CL.

- Many cognitive linguists operate with a **grammar-lexicon continuum** (this is particularly prevalent in construction grammar).

Cognitive semantics

Conceptual and semantic structures

- In Talmy's model, the conceptual structuring system draws on four large-scale **structuring systems** that he calls the **schematic systems**.

- Each system covers a number of structural principles and processes which are based on embodied experience.

Cognitive semantics

Conceptual and semantic structures

- The four schematic systems:
  - **The configurational system**: structures temporal and spatial properties of a scene.
  - **Perspectival system**: specifies the perspective from which the scene is viewed.
  - **Attentional system**: specifies the interlocutor's direction of attention towards parts of the expressed scene.
  - **Force-dynamic system**: specifies the interrelations of force between elements of a scene.

Cognitive semantics

Conceptual and semantic structures

- Configurational system – some examples:
  - **Plexity**: ’*A* bird flew in’/’He sighed’ (**uniplex**) vs. ’Bird*s* flew in’/’He *kept* sigh*ing*’ (**multiplex**)
  - **Boundedness**: ’He drank *some* beer’ (**unbounded**) vs. ’He drank *a* beer’ (**bounded**)
  - **Degree of extension**: ’I *gulped down* a pizza’ (**point**), ’I *ate* a pizza’ (**bounded extent**) vs. ’I *was eating* a pizza’ (**unbounded extent**)

Cognitive semantics

Conceptual and semantic structures

- Perspectival system – some examples:
  - **Deictic distance**: ’this’ (**proximal spatial deixis**) vs. ’that’ (**distal spatial deixis**)
  - **Position of perspective point**: ’*The door opened* and two men entered’ (**interior position of perspective point**) vs. ’*The men opened the door* and walked in’ (**exterior position of perspective point**)
  - **Sequentiality**: ’There *are some houses in* the valley’ (**non-sequential perspective**) vs. ’There *is a house every now and then through* the valley’ (**sequentialized perspective**)

Cognitive semantics

Conceptual and semantic structures

- Attentional system – some examples of **windowing of attention**:
  - ’The crate fell out of the plane into the ocean’ (**initial** and **final windowing**)
  - ’The crate fell through the air’ (**medial windowing**)
  - ’The crate fell out of the plane’ (initial windowing)
  - ’The crate fell into the ocean’ (final windowing)

Cognitive semantics

Conceptual and semantic structures

- Force-dynamics system – some examples:
  - ’The ball was rolling along the beach’ (**neutral force**) vs. ’The ball kept on rolling along the beach’ (**overcoming of external counter-force**)
  - ’He didn’t close the door’ (**non-action**) vs. ’He refrained from closing the door’ (**psychological force resisting the urge to close the door**)
  - ’She’s got to go to the park’ (**compulsion**) vs. ’She gets to go to the park’ (**enablement**).

Cognitive semantics

Other models of cognitive semantic structures and processes

- In addition to Talmy's (2000a, 2000b) model of cognitive semantics, Langacker (1987, 1991) includes a model of cognitive processes and structures, as part of his **cognitive grammar** framework.

- Croft & Wood (2000; Croft & Cruse 2004) provide a model of **construal operations** encompassing the semantic processes proposed by Talmy, Langacker and others.

Prototype categories

Prototype categories: basic principles

- Rosch (1973) and Berlin & Kay (1969), among other cognitive scientists, found that humans operate, not with discrete Aristotelian categories embraced by rationalists and other objectivist thinkers, but with **prototype categories**.

- Cognitive linguists, such as Lakoff (1987), Taylor (1989, 1994) and Geeraerts (1998), found that prototype categories also apply to language.

Prototype categories

Prototype categories: basic principles

- Prototype categories are based on **goodness of exemplar** and **graded centrality** (BLACKBIRD and ROBIN are, in European cultures, more typical examples of the BIRD category than EAGLE and ALBATROSS, while PENGUIN and OSTRICH are even less typical examples).

- Prototype categories are **asymmetric** in structure in the sense that more prototypical members share more features with the category than non-protypical ones.

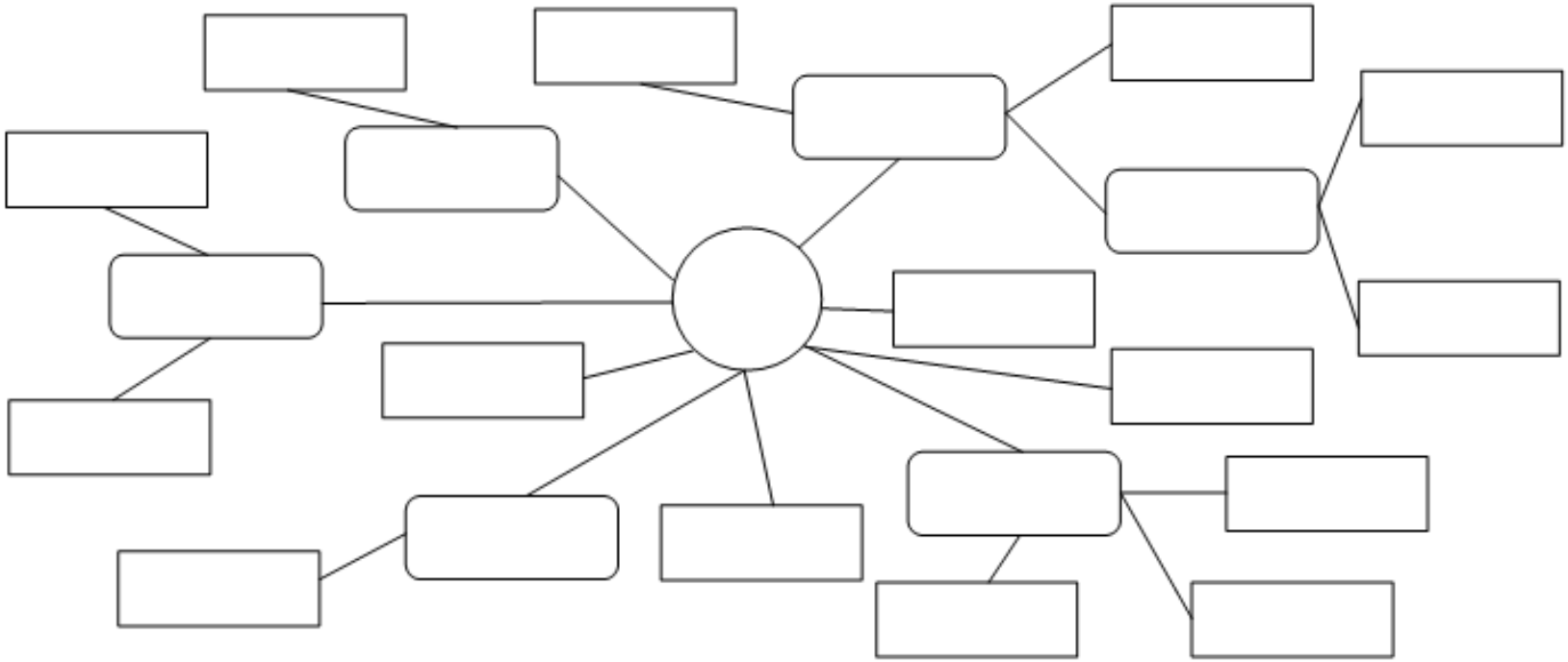
- Prototype categories are not discrete but have **fuzzy boundaries**.

- Prototype categories are generalizations over recurring experiences.

Prototype categories

Prototype categories: basic principles

- Prototypes are radially structured taxonomies:



More typical members are placed close to the **center**, and less typical ones are placed towards the **periphery**.

Prototype categories

Prototype categories: basic principles

- Radial structure described:

  “the … structure of the category is characterized by a dominant core (the prototypical instantiation of the category), surrounded by peripheral instantiations that deviate in one or more features from the central cases. The category does not consist of identical cases with equal weight, but the category is as it were held together by the presence of a predominant central case, less central and less frequent instantiations being related by similarity to the central case.” (Geeraerts 1997: 43-4)

Prototype categories

Prototype categories: basic principles

- Categories are organized into **levels of categorization** (e.g. Lakoff 1987; Ungerer and Schmid 1996; Croft and Cruse 2004):
  - **basic level**: the basic level provides concepts that are generic enough to provide the basic features of a category without being too abstract or too specific.Examples are DOG and CAT. Each provides enough identifiable features such as general shapes and behaviors that all members of the respective categories are believed to share.
  - **superordinate level**: the superordinate level provides very abstract concepts based only on a few identifiable features; superordinate level categories subsume basic level categories. PET, FURNITURE, and VEHICLE are examples of superordinate categories which subsume a large number of basic level categories sharing the few defining features provided by the superordinate categories. PET would, for instance, subsume CAT and DOG.
  - **subordinate level**: the subordinate level provides very specific subtypes of basic level categories and thus posits a considerable number of specific features. For instance, ALSATIAN, BASSET, and POODLE are subordinate level categories of DOG.

Prototype categories

Prototype categories in language.

- The complexities of **hyponymy** are based on category relations.
- **Lexical fields** are often based on category relations.
- **Polysemy** may involve category relations (e.g. 'card' referring to CREDIT CARD or POKER CARD, depending on the context)
- **Endocentric nominal compounds** in Germanic languages and **'de'-constructions** in Romance languages often express subordinate categories (e.g. 'baseball cap' refers to a subordinate category in the CAP category).
- Many **grammatical categories** display fuzzy boundaries (e.g. the present participle of English)
- Concepts can be linguistically **recategorized** as in a cup full of tea being referred to as a 'cup' and a cup full of pencils being referred to as a 'pencil holder'.

Encyclopedic knowledge and frame semantics

Encyclopedic knowledge and the conceptual content system

- An important tenet in CL is that linguistic semantics draws directly on **encyclopedic knowledge** of the world.

- The open-class items that provide the rich conceptual content do not carry truth-conditional meaning, but are entry points into **areas of encyclopedic knowledge**, or **regions in conceptual space**.

- This is a reaction against the objectivist approach to meaning of the dictionary view of lexical semantics (Haiman 1980).

Encyclopedic knowledge and frame semantics

Encyclopedic knowledge and the conceptual content system

- Encyclopedic knowledge is structured into prototype categories, **cognitive models**, and other types of cognitive structure.

- Cognitive models are holistic mental representations of recurring experiences (thus image schemata are types of cognitive model).

- Encyclopedic knowledge is shared, providing the **common ground**, or **worldview**, of a culture.

Encyclopedic knowledge and frame semantics

Frame semantics

- Lexemes do not ’have meanings’ in the traditional sense, but a lexeme is associated, per convention, certain areas of encyclopedic knowledge.

- This is the basic principle of Fillmore’s (1977, 1982) theory of **frame semantics**.

- In frame semantics, concepts are organized in holistic **mental representations** called **semantic frames**, or just **frames**.

Encyclopedic knowledge and frame semantics

Frame semantics

- Semantic frame defined:

  “By the term 'frame' I have in mind any system of concepts related in such a way that to understand any one of them you have to understand the whole structure in which it fits; when one of the things in such a structure is introduced into a text, or into a conversation, all of the others are automatically made available.” (Fillmore 1982: 111)

Encyclopedic knowledge and frame semantics

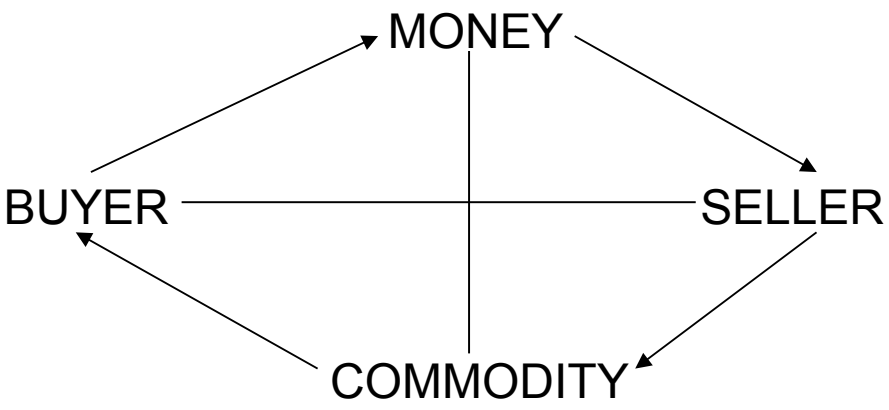
Frame semantics

- A lexeme will **evoke** an entire frame (that is, it will provide access to the area of encyclopedic knowledge that constitutes the frame).
- It **highlights** the concept it expresses against the entire frame.
- Thus, the understanding of the lexeme presupposes understanding of the entire frame.

Encyclopedic knowledge and frame semantics

Frame semantics

- An example is the COMMERCIAL TRANSACTION frame (Croft et al 2001)



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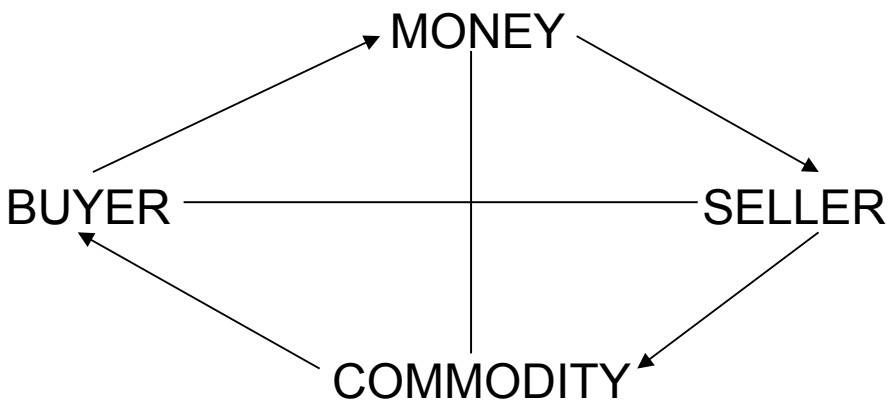

’I bought a new car’

Encyclopedic knowledge and frame semantics

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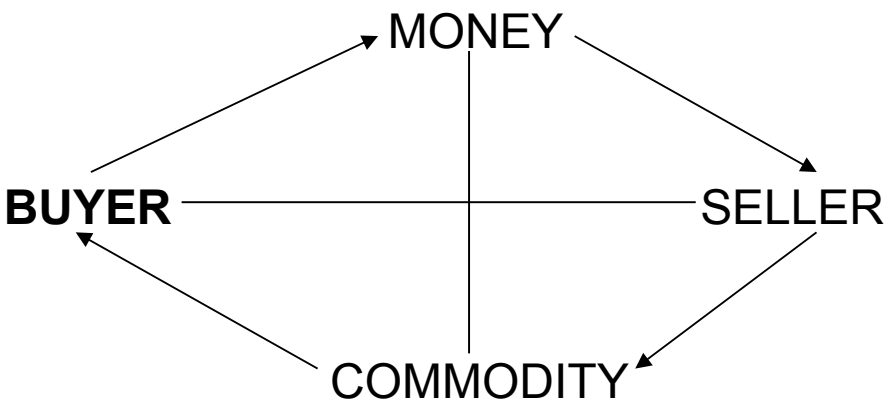

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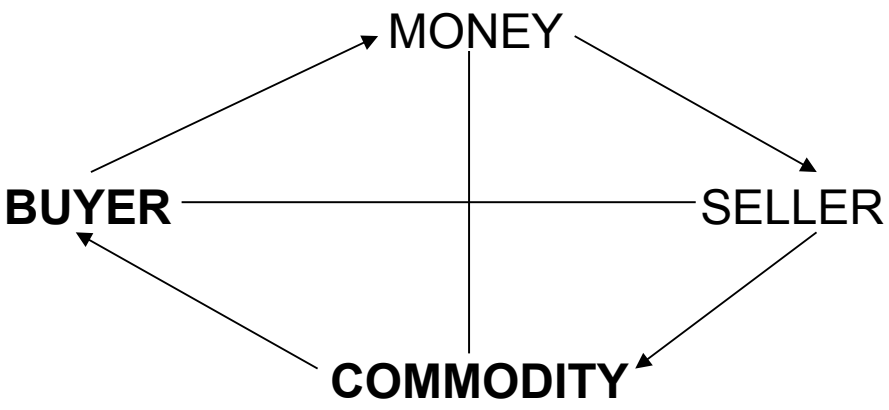

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Encyclopedic knowledge and frame semantics

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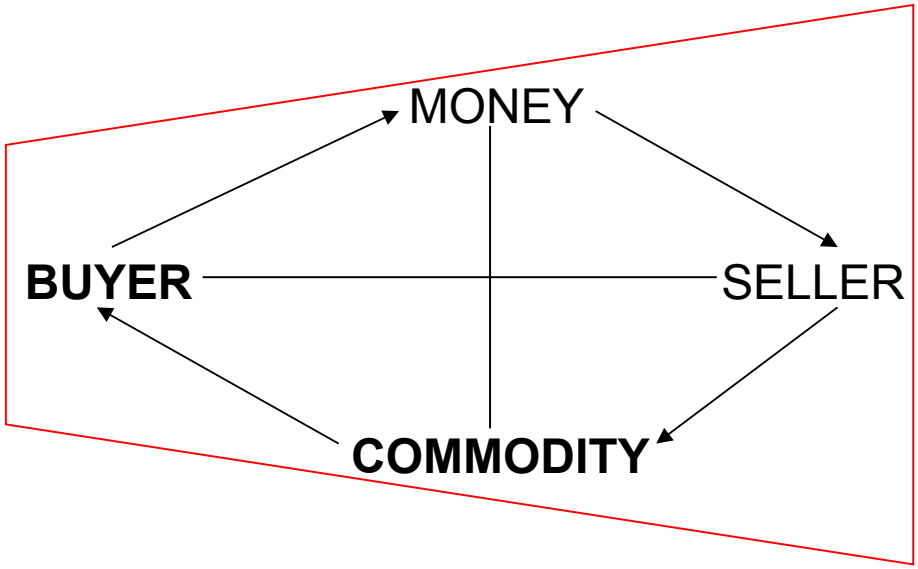

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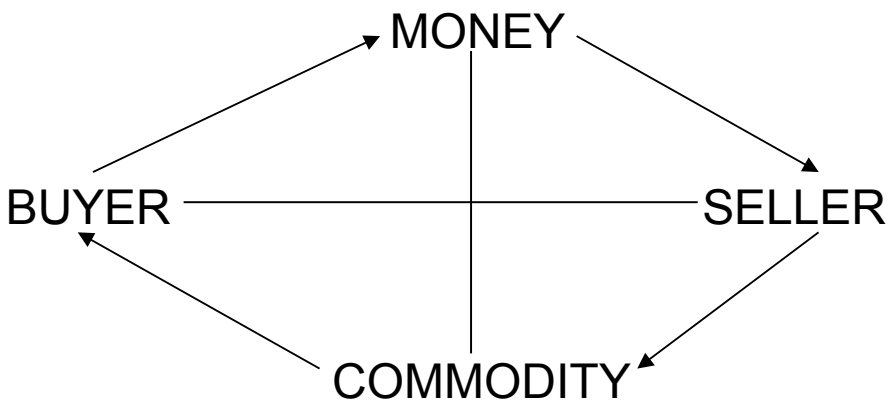

’She sold me a new car’

Encyclopedic knowledge and frame semantics

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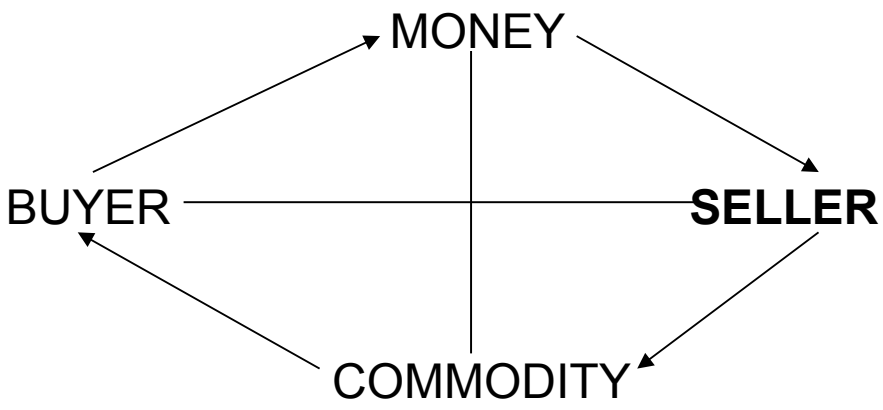

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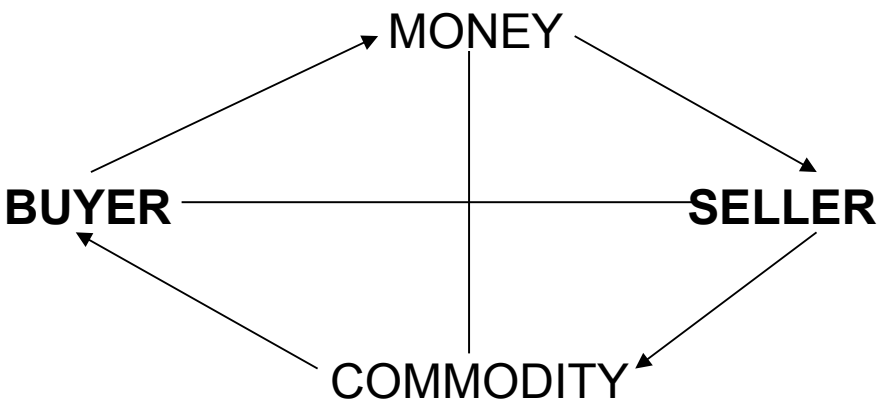

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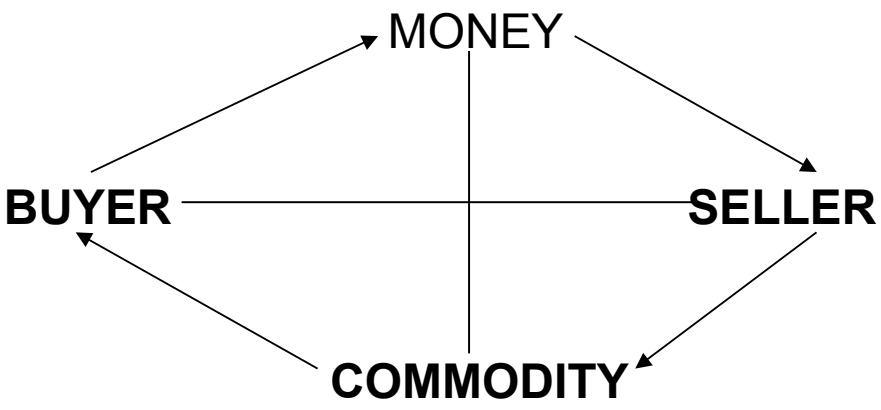

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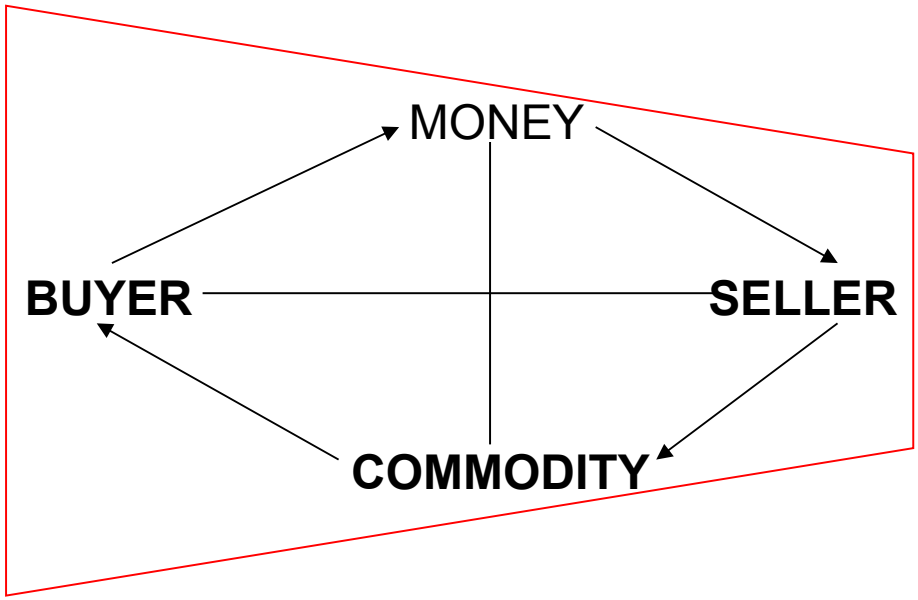

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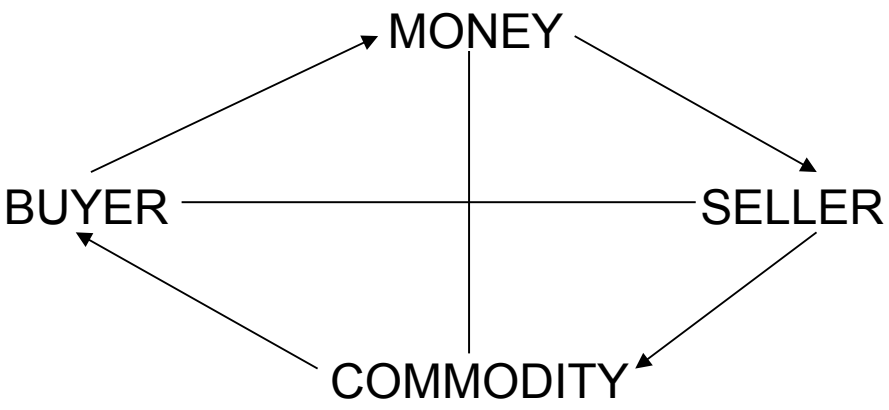

’I paid 1000 dollars’

Encyclopedic knowledge and frame semantics

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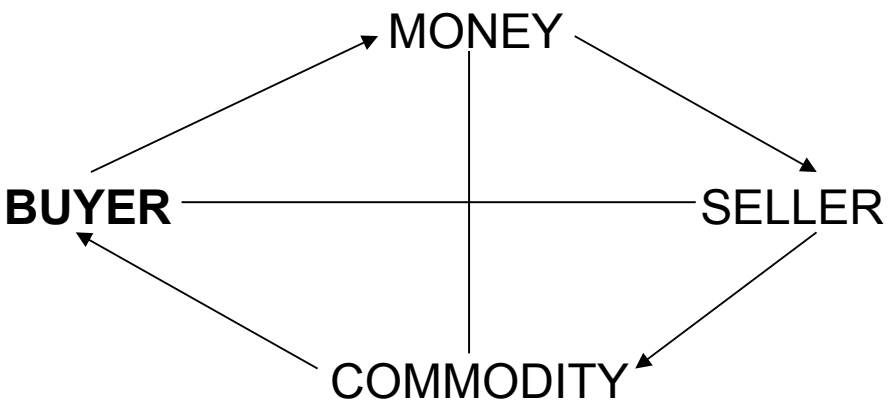

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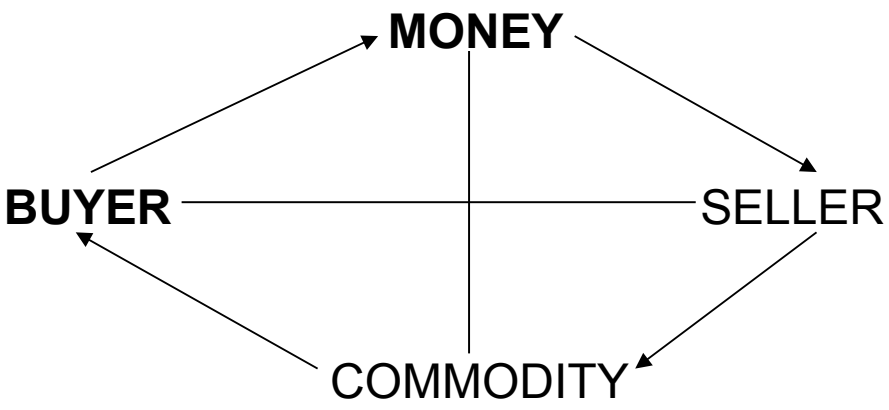

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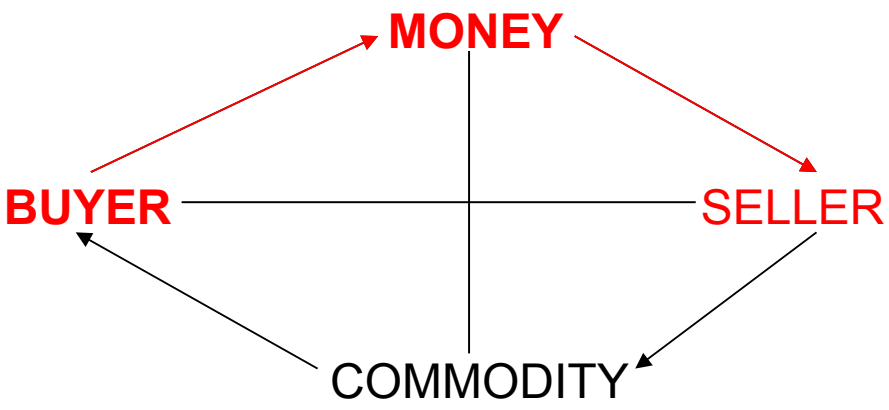


'**I** paid **1000 dollars**'

Encyclopedic knowledge and frame semantics

Frame semantics

- As mentioned earlier, lexical fields are often based on category relations.
- Another underlying structure that many lexical fields are based on is the semantic frame:
  - ’buy’, ’sell’, ’charge’, ’buyer’, ’seller’, ’value’, ’cost’ etc. constitute a lexical field which is based on the COMMERCIAL TRANSACTION frame.

Encyclopedic knowledge and frame semantics

Frame semantics

- Frames can be structuring devices in the sense that the same experience, or situation, can be represented, or **framed**, very differently via the choice of different lexemes:
  - ’Two residents wade through chest-deep water after *finding* bread and soda from a local grocery store after Hurricane Katrina came through the area in New Orleans, Louisiana.’
  - ‘A young man walks through chest deep flood water after *looting* a grocery store in New Orleans on Tuesday.’

(two different captions accompanying two very similar photos)

Encyclopedic knowledge and frame semantics

- Frame semantics
  - Frame semantics is a good example of the interdisciplinary nature of CL, as frame theory was adopted into CL from cognitive psychology, AI theory, and cognitive anthropology.
  - Frame semantics has, in turn, been adopted back into the above theories, and it also figures in various types of CDA, advertising studies and political science.

Conceptual metaphor theory

Conceptual metaphor

- **Conceptual metaphor theory** was one of the first systematic theoretical formulations in CL (Lakoff & Johnson 1980), and metaphors remain an important area of research in CL today.

- Lakoff & Johnson (1980) found that metaphors are not just located at the level of semantic structure but also at the level of conceptual structure.

- That is, we think in metaphors.

Conceptual metaphor theory

Conceptual metaphor

- Lakoff & Johnson (1980) found that we tend to impose metaphorical structures, at a conceptual level, on more abstract experiences.
- These **conceptual metaphors** are linguistically reflected.
- For instance, the concept of TIME is metaphorically conceptualized in a number of ways in Anglophone cultures:
  - ’Christmas is approaching’ (TIME AS MOVING OBJECT metaphor)
  - ’The years were slowly gnawing away at him’ (TIME AS CARNIVOROUS BEING metaphor)
  - ’This may buy me some minutes’ (TIME AS A COMMODITY metaphor)

Conceptual metaphor theory

Conceptual metaphor

- A conceptual metaphor consists of a **source domain**, or source frame, imposed upon a **target domain**, such that the target domain is conceptualized in terms of the source domain.

- The elements and structure of the source domain are thus **mapped** onto the target domain.

Conceptual metaphor theory

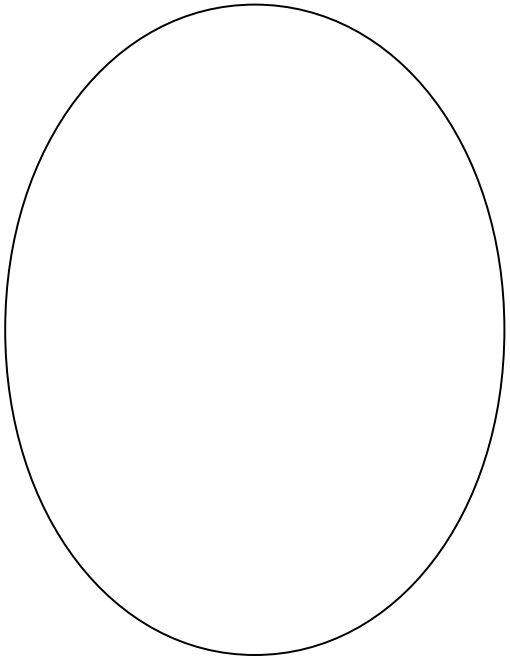
Conceptual metaphor

’This may buy me some minutes’
(TIME AS A COMMODITY)

Conceptual metaphor theory

Conceptual metaphor

TIME



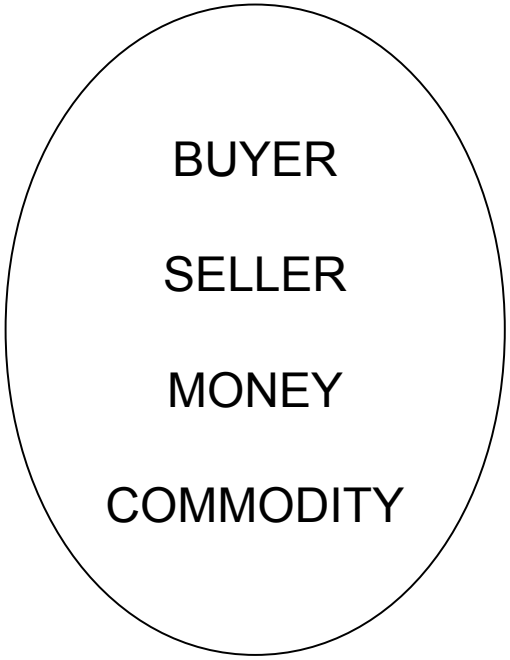
’This may buy me some minutes’
(TIME AS A COMMODITY)

Target domain

Conceptual metaphor theory

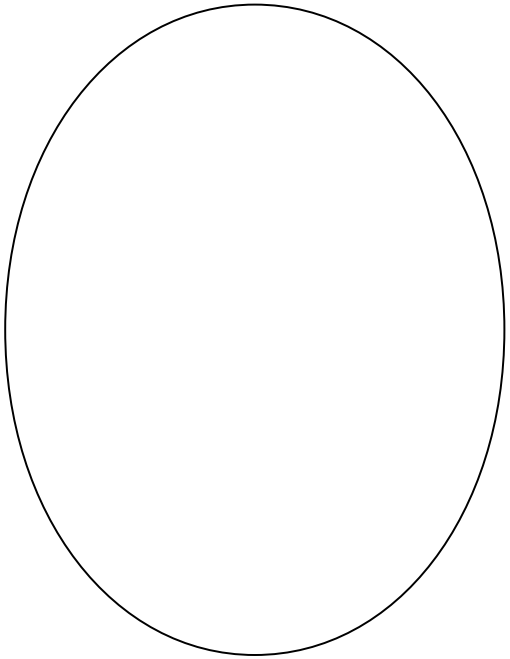
Conceptual metaphor

COMMERCIAL TRANSACTION



Source domain

TIME



Target domain

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Conceptual metaphor theory

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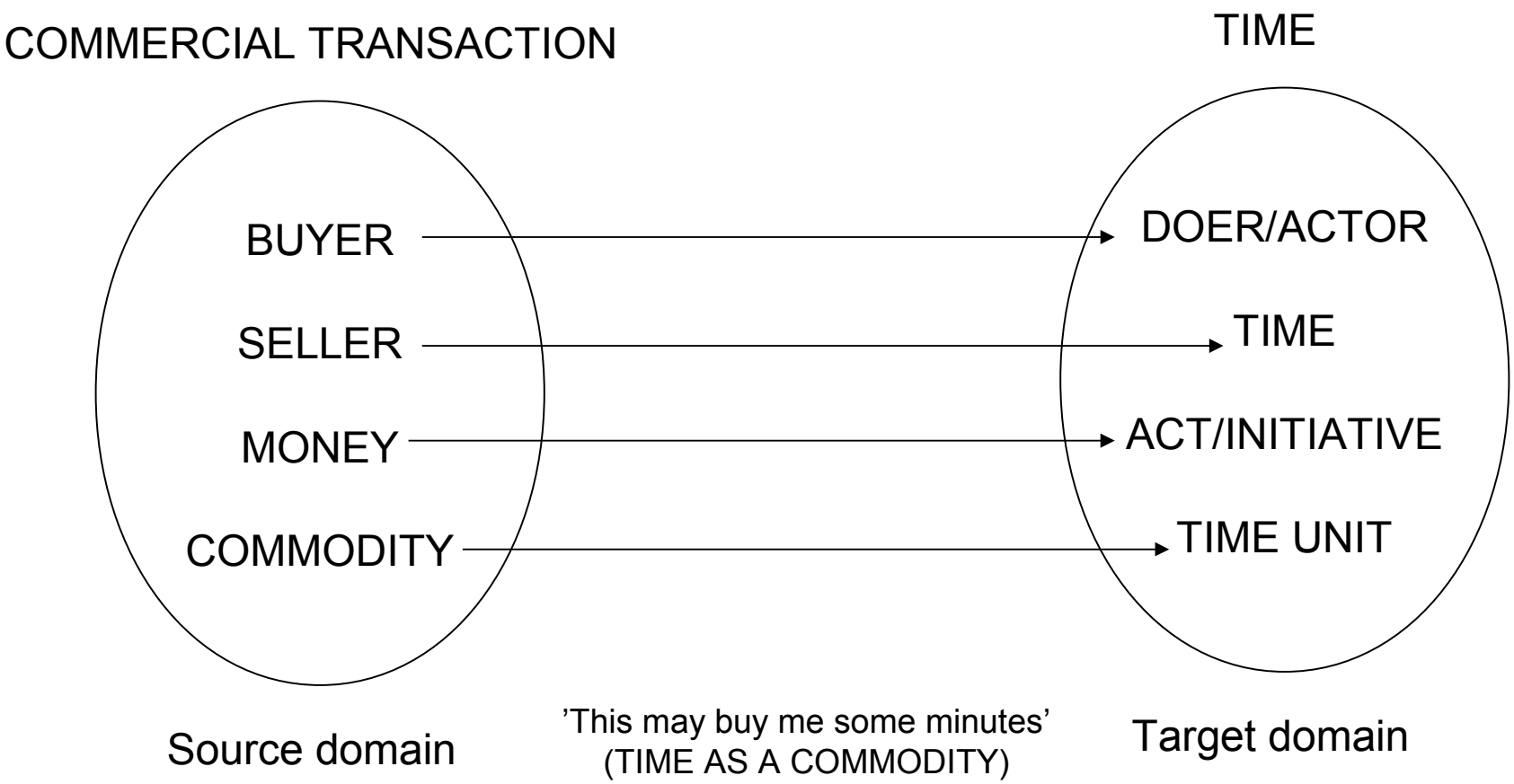


Conceptual metaphor theory

Conceptual metaphor

- The short hand formula for the structure of a conceptual metaphor is:

TARGET DOMAIN IS SOURCE DOMAIN

The TIME AS COMMODITY metaphor would then be represented as TIME IS A COMMODITY.

Conceptual metaphor theory

Conceptual metaphor

- Lakof & Johnson (1980) also found that many metaphors involve a direct metaphorical **projection** of basic image schemata upon the target domains in question.

- For instance, the description of mood along a vertical scale is based on the conceptual metaphors of GOOD IS UP and BAD IS DOWN which draw on the UP-DOWN image schema.

  – ’He’s down in a hole today.’

  – ’Cheer up.’

Conceptual metaphor theory

Conceptual metaphor

- Metaphors are **unidirectional**: the structure is mapped from source to target and not the other way round.
  - LOVE is often conceptualized as JOURNEYS, but JOURNEYS are not conceptualized as LOVE.
  - The unidirectionality principle even holds with metaphors that share the same domains, as the mappings are different:
    - ’He’s a regular computer’ (PEOPLE ARE MACHINES – the mechanical and functional features of machines are mapped onto people)
    - ’My computer hates me’ (MACHINES ARE PEOPLE – the emotional and behavioral features of people are mapped onto machines)

Conceptual metaphor theory

Conceptual blending

- Fauconnier & Turner (2002) found that not all metaphors are based on unidirectional mapping from a source domain to a target domain, but that many seem to draw different elements from two frames, or **mental spaces**, and combine them into a **blend** of the two mental spaces.

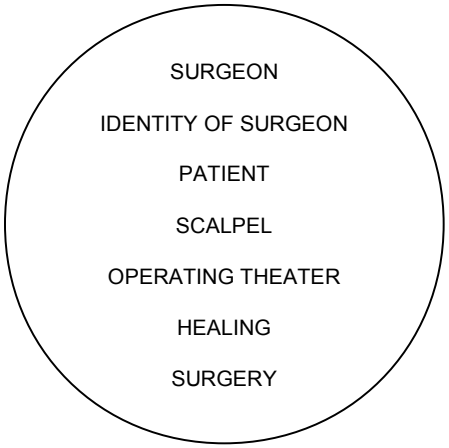
Conceptual metaphor theory

Conceptual blending

’That surgeon is a butcher’

Conceptual metaphor theory

Conceptual blending



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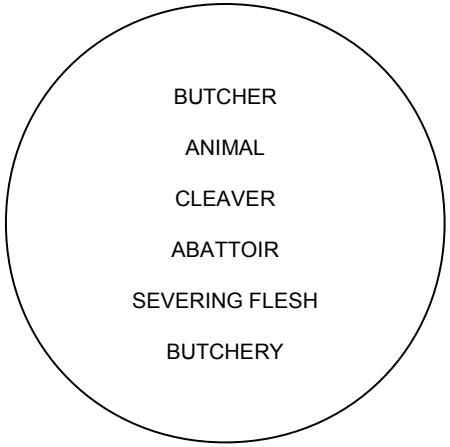

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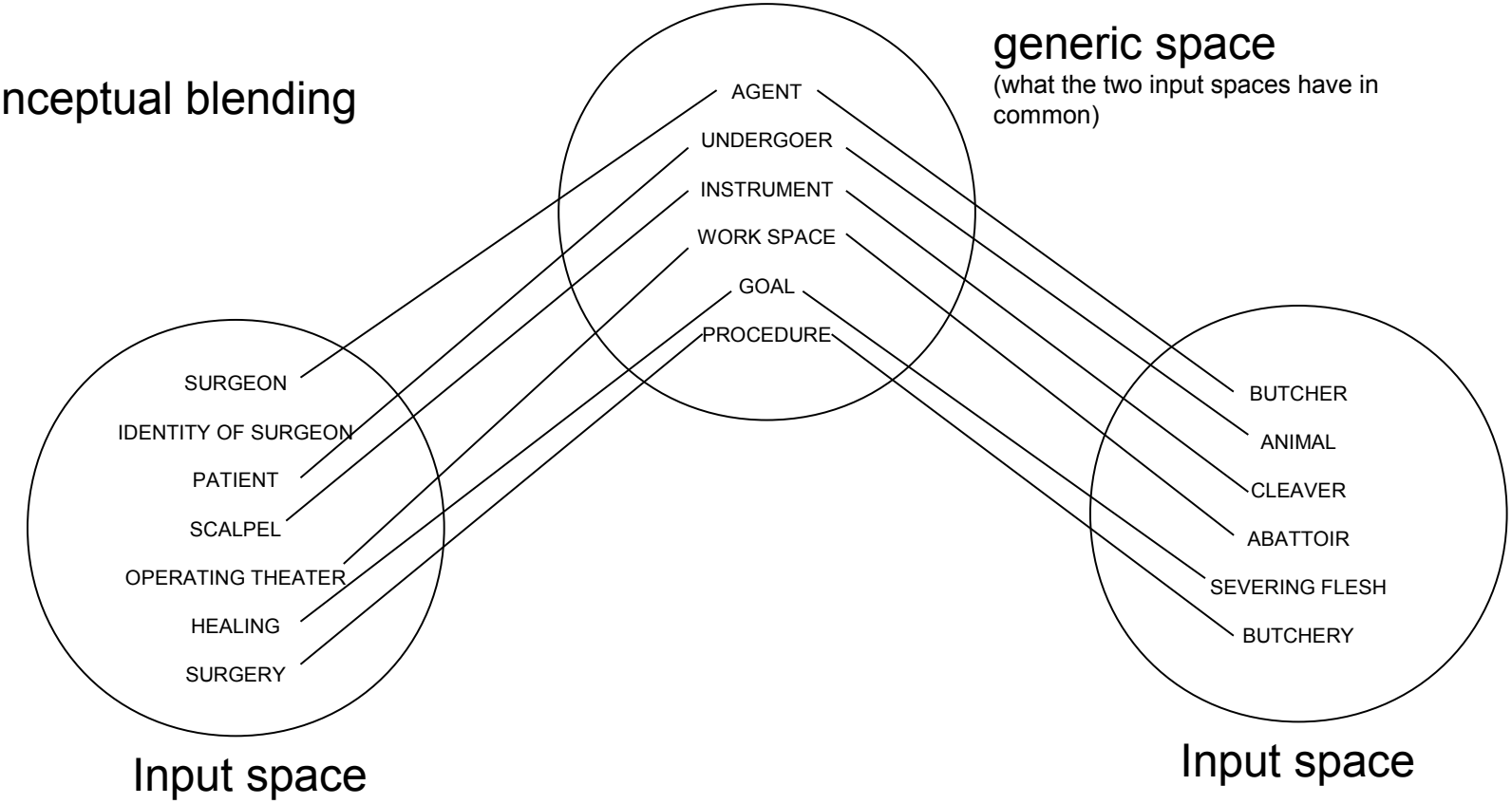
’That surgeon is a butcher’

Conceptual metaphor theory

Conceptual blending



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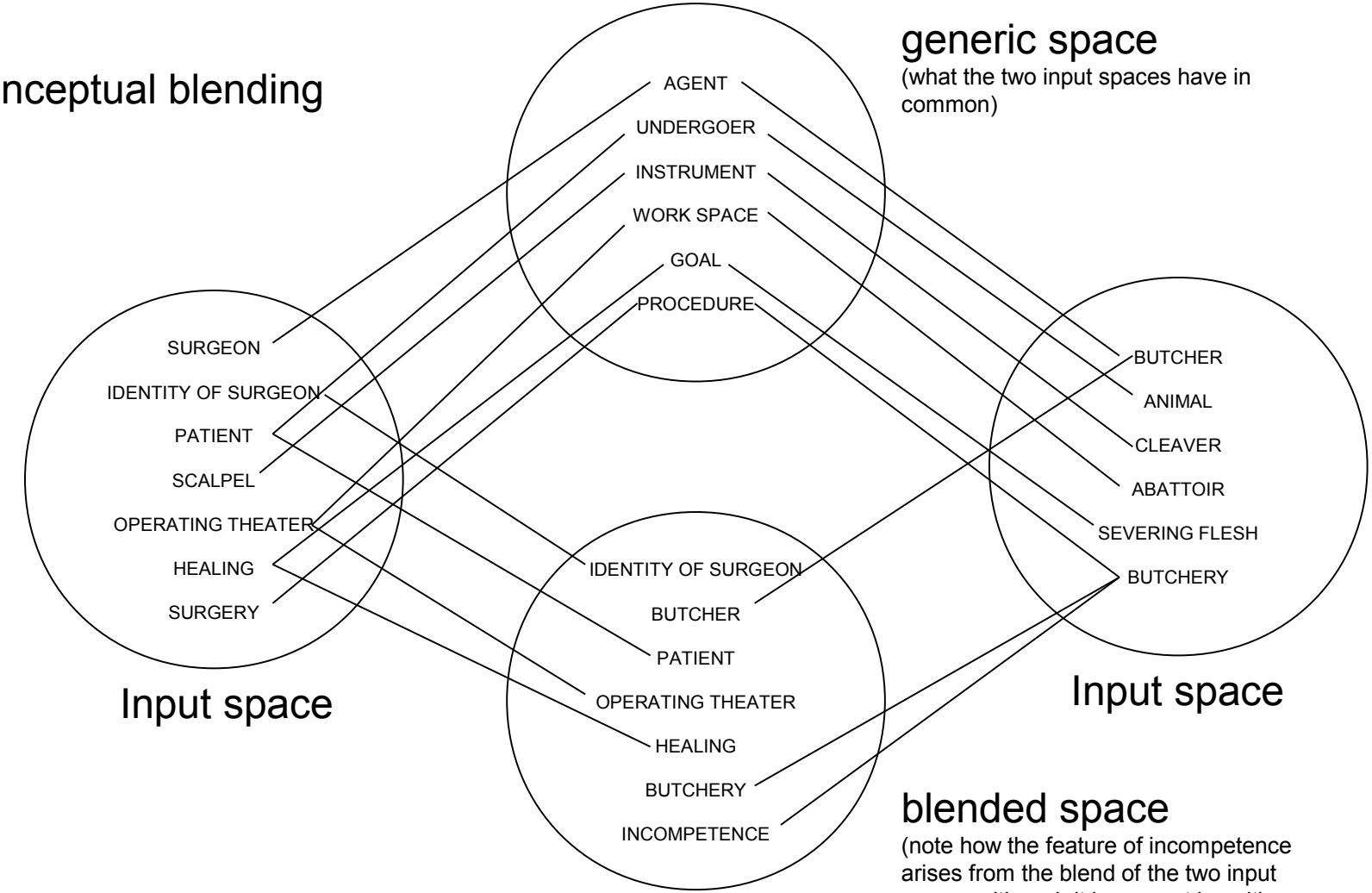

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