
Thematic Roles in Linguistics

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Outline

- Fillmore – Cases
 - useful generalizations, fewer sense distinctions,
- Jackendoff – Lexical Conceptual Structure
 - Thematic roles are defined by the predicates they are arguments to
- Dowty – Proto-typical Agents and Patients
 - A bag of “agentive” entailments
- Levin – Verb classes based on syntax
 - syntactic behavior is a reflection of the underlying semantics

The Case for Case,

Charles J. Fillmore

- Problems with Previous Work
- Case Theory

Thanks to Steve Bethard for the slides

Problems with previous work

- Focus on morphology, ignoring syntax
- The nominative (subject) was largely ignored
 - 'dative of separation', 'dative of possession', etc.,
- Assumption of Subject/Predicate division
- The classification criteria were not rigorous
 - Mix of syntactic, historical, and semantic
 - Use of a 'leftover' or 'residue' case

Case Theory

- Case relations occur in deep-structure
 - Surface-structure cases are derived

- A sentence is a verb + one or more NPs
 - Each NP has a deep-structure case
 - *A(gentive)*
 - *I(nstrumental)*
 - *D(ative) - recipient*
 - *F(active) – result, effected object*
 - *L(ocative)*
 - *O(bjective) – affected object, theme*

 - Subject is no more important than Object
 - Subject/Object are surface structure

Case Selection

- Noun types
 - Different cases require different types of nouns
 - E.g. $N \rightarrow [+animate]^{A,D}[X_Y]$
- Verbs frames
 - Verbs require arguments of particular cases
 - E.g.
 - *sad* [__D]
 - *give* [__O+D+A]
 - *open* [__O(I)(A)]

Case Theory Benefits

- Fewer tokens

- Fewer verb senses
- E.g. *cook* [__O(A)] covers
 - Mother is cooking the potatoes
 - The potatoes are cooking
 - Mother is cooking

- Fewer types

- “Different” verbs may be the same semantically, but with different subject selection preferences
- E.g. *like* and *please* are both [__O+D]

Summary

- Each verb is associated with a frame
 - Frames indicate the cases of each argument
- Language dependent surface phenomena
 - Subject/Object
 - Case markings
- From syntax to surface structure
 - Verb argument movement
 - Verb argument copying

Issues

■ Patient vs. Theme?

- *The kitten licked my fingers.*
- *The ascetic Shiva is smeared with ashes.*
- *The rascal was tarred and feathered and ridden out of town on a rail.*

■ Agents?

- *The sun melted the ice.*
- *The clothes dryer doesn't dry clothes well.*

Issues, Multiple roles?

- Θ -Criterion (GB Theory): each NP of predicate in lexicon assigned unique θ -role (Chomsky 1981).

$[_{\text{Agent (or Source)}} \textit{Esau}] \textit{ sold } [_{\text{Theme}} \textit{ his birthright}]$
 $[_{\text{Goal}} \textit{ to Jacob}] \textit{ for a } \underline{\textit{ bowl of porridge.}}$

$[_{\text{Goal}} \textit{ Esau}] \textit{ sold } \underline{\textit{ his birthright}}$
 $[_{\text{Source}} \textit{ to Jacob}] \textit{ for a } [_{\text{Theme}} \textit{ bowl of porridge}].$

Jackendoff

Lexical Conceptual Structures,

Ray Jackendoff

- Decomposition into primitive semantic predicates – Thematic Relations
- Thematic roles inherit their meaning from the relations they are in

Semantic Decomposition

- Markers

$\left[\begin{array}{c} \text{HORSE} \\ \text{RED} \end{array} \right]$ *the red horse*

- Functions

SEE(x,y) *the man saw the (red) horse*

SEE(x,HORSE)

SEE(THE MAN,THE HORSE)

SEE(X1, Y1)

Five Semantic Functions

- GO
- BE
- STAY
- LET
- CAUSE

GO – Change of location

The train traveled from Detroit to Cincinnati.

The hawk flew from its nest to the ground.

An apple fell from the tree to the ground.

The coffee filtered from the funnel into the cup.

[GO (x,y,z)
THROUGH THE AIR/DOWNWARD]

THEME GOES FROM SOURCE, TO GOAL

Full representation

[event GOPOSIT

([thing John],

[path FROM ([place AT (Denver))],

[path TO ([place AT (San Francisco))]])

[MANNER: Drivingly]]

Satellite framed vs. Verb framed motion verbs – *basis of LCS Interlingua*

Verb-framed: French, Spanish

GO (Theme, Source, **Goal**)

Manner

Traverse the lake by swimming

■ Satellite-framed: English

GO (Theme, Source, Goal)

Manner

Swim across the lake.

Mapping from Syntax to Semantics

/flaj/

+ V

+ [NP¹ _____ (from NP²) (to NP³)]

GO (NP¹, NP², NP³)

THROUGH THE AIR

BE – Stationary location

Max is in Africa.

The vine clung to the wall.

The dog is on the left of the cat.

The circle contains/surrounds the dot?

BE(x,y)

THEME IS AT LOCATION

BE (THE DOG, LEFT OF (THE CAT))

STAY – Durational stationary location

The bacteria stayed in his body.

Stanley remained in Africa.

Bill kept the book on the shelf.

STAY(x,y)

THEME IS AT LOCATION for a duration

STAY (STANLEY, AFRICA) (for two years)

Locational modes: POSIT, POSS, ID

The *train* traveled from *Detroit* to *Cincinnati*.

$\left[\begin{array}{l} \text{GO (x,y,z)} \\ \text{POSIT} \end{array} \right]$

Harry gave the *book* to the *library*.

$\left[\begin{array}{l} \text{GO (x,y,z)} \\ \text{POSS} \end{array} \right]$

The *book* belonged to the *library*.

$\left[\begin{array}{l} \text{BE (x,z)} \\ \text{POSS} \end{array} \right]$

Locational modes: POSIT, POSS, ID

The *bacteria* stayed in his *body*.

[STAY (x,z)
POSIT]

The *library* kept the *book*.

[STAY (x,z)
POSS]

Locational modes: POSIT, POSS, ID

*The *coach* changed from a *handsome young man* to a *pumpkin*.

[GO_{IDENT} (x,y,z)]

Princess Mia changed from an *ugly duckling* into a *swan*.

[GO_{IDENT} (x,y,z)]

Universal grammar?

Causation and Permission

CAUSE and LET

The *rock* fell from the *roof* to the *ground*.

[GO_{POSIT} (*x*, *y*, *z*)]

Linda lowered the *rock* from the *roof* to the *ground*.

[CAUSE (*a*, GO_{POSIT} (*x*, *y*, *z*))]

Linda dropped the *rock* from the *roof* to the *ground*.

[LET (*a*, GO_{POSIT} (*x*, *y*, *z*))]

INSTRUMENTS

Linda lowered the rock from the roof to the ground with a cable.

CAUSE (a, GO_{POSIT} (x,y,z))
Inst: i

Instruments only occur with causation.

CAUSE always has an *event* second argument.

Dollie caused Martin to be happy.

Lexical Conceptual Structure

concept	POSIT	POSS	IDENT
GO motional	go fall	receive inherit	become change
BE punctual	be contain	have own	be seem
STAY durational	stay remain	keep	stay remain
CAUSE(a,GO) CAUSE(a,STAY)	bring, take keep, hold	obtain, give keep, retain	make,elect keep
LET(a,GO) LET(a,BE)	drop,release leave, allow	accept, fritter permit	leave