

Thematic Roles

Saeed: Chapter 6.1-6.6

List of Basic Thematic Roles

- **AGENT**: the initiator of some action, capable of acting with volition.
 - *Jack ate the beans.*
- **PATIENT**: the entity undergoing the effect of some action, often undergoing some change of state.
 - *Sue mowed **the lawn**.*
- **THEME**: the entity which is moved by an action, or whose location is described.
 - *Fred threw **the rock**.*
- **EXPERIENCER**: the entity which is aware of the action or state described by the predicate but which is not in control of the action or state.
 - *Kim saw the deer.*

- **BENEFICIARY:** the entity for whose benefit the action was performed.
 - *Mary studied hard for **her mother**.*
- **INSTRUMENT:** the means by which an action is performed or something comes about.
 - *Fred opened the lock with **a paper clip**.*
- **LOCATION:** the place in which something is situated or takes place.
 - *The picture hangs **above the fireplace**.*
- **GOAL:** the entity towards which something moves, either literally or metaphorically.
 - *Lee walked **to school**.*
- **SOURCE:** the entity from which something moves, either literally or metaphorically.
 - *Sue ran **from the policeman**.*

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Additional Thematic Roles

- **ACTOR:** the entity which performs, effects, instigates, or controls the situation denoted by the predicate (supertype of AGENT):
 - ***The bus** hit a pedestrian.*
- **RECIPIENT:** a subtype of GOAL involved in actions describing changes of possession.
 - *Bill sold the car **to Mary***
- **PERCEPT/STIMULUS:** the entity which is perceived or experienced.
 - *Mary fears **thunder**.*

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Tests for Thematic Roles

– *Fred mowed the lawn.*

- **ACTOR**

– What **X** did was...

- *What **Fred** did was mow the lawn.*

- **PATIENT**

– What happened to **Y** was...

- *What happened to **the lawn** was that Fred mowed it.*

– What X did to **Y** was...

- *What Fred did to **the lawn** was mow it.*

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How many Thematic Roles can an NP have?

- Chomsky's 1981 Theta Criterion

– There must be a one-to-one correspondence between noun phrases and thematic roles.

- Jackendoff 1990: two-tier approach

– **Sue hit Fred.**

Theme	Goal	(thematic tier)
Actor	Patient	(action tier)

– **Pete threw the ball.**

Source	Theme	(thematic tier)
Actor	Patient	(action tier)

– **Bill entered the room.**

Theme	Goal	(thematic tier)
Actor		(action tier)

– **Bill received a letter.**

Goal	Theme	(thematic tier)
		(action tier)

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Thematic Roles and Grammatical Relations

- Particular verbs allow certain mappings between grammatical relations and thematic roles:
 - Jack broke the ice with a hammer. Gina raised the car with a jack.
 - A hammer broke the ice. A jack raised the car.
 - The ice broke. The car rose.
- Possible Universal Subject Hierarchy:
 - AGENT > RECIPIENT/BENEFICIARY > THEME/PATIENT > INSTRUMENT > LOCATION
 - A language that allows a subject at a particular spot on the hierarchy, also allows a subject anywhere to the left on the hierarchy.
 - English: “This table seats eight”, etc.

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Thematic-Role Grid (θ -grid)

- Lexicon specifies thematic roles associated with arguments of a verb (subjects [external argument] & complements, not adjuncts):
 - **put** V: <AGENT, THEME, LOCATION>
 - Fred_{AGENT} put the glass_{THEME} on the table_{LOCATION}
- Verb subclasses share the same θ -grid:
 - TRANSFER VERBS:
 - V: <AGENT, THEME, RECIPIENT>
 - give, lend, supply, pay, donate, contribute
 - V: <RECIPIENT, THEME, SOURCE>
 - receive, accept, borrow, buy, purchase, rent, hire

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Problems with Thematic Roles

- Variation within thematic roles:
 - John touched the lamp with his toe.
 - The captain rubbed the cricket ball with dirt.
 - Henry squeezed the rubber duck in his hands.
 - Alison smashed the ice cube with her heel.
- What semantic basis do we have for characterizing thematic roles?

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Dowty's 1991 Solution

- Thematic roles are not semantic primitives, but are defined in terms of entailments.
- A sentence A entails a sentence B if any time A is true, B is also true:
 - A: This is a red pen.
 - B: This is a pen.
- AGENT Entailments:
 - *x murders y, x nominates y, x interrogates y*
 - x does some volitional act.
 - x intends this to be the kind of act named by the verb.
 - x causes some event to take place involving y.
 - x moves or changes externally.

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- Thematic roles should be viewed as **prototypes**, where there may be different degrees of membership:
- Properties of the Agent Proto-Role
 - a. volitional involvement in the event or state.
 - b. sentience (and/or perception)
 - c. causing an event or change of state in another participant.
 - d. movement (relative to the position of another participant).
- Properties of the Patient Proto-Role
 - a. undergoes change of state.
 - b. incremental theme (i.e. theme changes incrementally as action incrementally proceeds: e.g. *mow the lawn*).
 - c. causally affected by another participant.
 - d. stationary relative to movement of another participant.

- ***Maggie pruned the roses.***
 - Volitionality, sentience, causation, movement
 - Prototypical Agent
- ***Joan felt the heat as the aircraft door opened.***
 - Sentience, causation, movement
 - Less prototypical Agent: Experiencer
- ***The scalpel cut through the muscle.***
 - Causation, movement
 - Still less prototypical Agent: Instrument
- ***Maggie pruned the roses.***
 - Change of state, incremental theme, causal affectedness, stationary
 - Prototypical Patient
- ***Roberto watched the game.***
 - Incremental theme
 - Less prototypical Patient: Percept

Predicting Links between Grammatical Relations and Thematic Roles (Dowty)

- Argument Selection Principle: In predicates with grammatical subject and object, the argument for which the predicate entails the greatest number of Proto-Agent properties will be lexicalized as the subject of the predicate; the argument having the greatest number of Proto-Patient entailments will be lexicalized as the direct object.
- Corollary 1: If two arguments of a relation have (approximately) equal numbers of entailed Proto-Agent and Proto-Patient properties, then either or both may be lexicalized as the subject (and similarly for the object).
- Corollary 2: With a three-place predicate, the non subject argument having the greater number of entailed Proto-Patient properties will be lexicalized as the direct object and the non-subject argument having fewer entailed Proto-Patient properties will be lexicalized as an oblique or prepositional object....

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- Example 1:
 - Captain Nemo sank the ship with a torpedo.
 - volitionality, sentience, causation, movement
 - The torpedo sank the ship.
 - causation, movement
 - The ship sank.
 - movement
- Example 2:
 - John fears thunder.
 - sentience
 - Thunder scares John.
 - causation

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Identifying Verbal Subclasses

- Psychological verbs type 1:
V: <EXPERIENCER, STIMULUS>
– *admire, enjoy, fear, like, love, relish, savour*
- Psychological verbs type 2:
V: <STIMULUS, EXPERIENCER>
– *amuse, entertain, frighten, scare, interest, please, surprise, thrill*

Describing Argument-Changing Alternations (Levin 1993)

He banged the broom-handle on the ceiling.
He banged the ceiling with the broom-handle.
She tapped the can against the window.
She tapped the window with the can.

V: <AGENT, INSTRUMENT & THEME, LOCATION>
NP NP PP

V: <AGENT, LOCATION, INSTRUMENT & THEME>
NP NP PP

bang, bash, beat, hit, knock, pound, rap, tap, whack

Describing Morphological Rules (Mithun 1991)

- Lakhota

– awáʔu	‘I brought it.’	AGENT
– waktékte	‘I’ll kill him.’	AGENT
– amáʔu	‘He brought me .’	PATIENT
– maktékte	‘He’ll kill me .’	PATIENT
– wapsiča	‘I jumped.’	AGENT
– wahi	‘I came.’	AGENT
– mak ^h úže	‘I’m sick.’	PATIENT
– maxwá	‘I’m sleepy.’	PATIENT

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Characterizing Passive Voice

- Grammatical relations change, thematic roles remain the same:

- **Kim murdered Lee.**

SUBJECT	DIRECT OBJECT
AGENT	PATIENT

- **Lee was murdered by Kim**

SUBJECT	OBLIQUE OBJECT
PATIENT	AGENT

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