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.*
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*.

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)
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.

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>
    - FredAGENT 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
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?

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.
• 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
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
  – makʰúže  'I’m sick.'  PATIENT
  – maxwá  ‘I’m sleepy.’  PATIENT

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