Thematic Proto-Roles and
Argument Selection,
David Dowty,
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Thanks to Michael Mulyar

Computational Language and EducAtion Research
C L E A R

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Context: Thematic Roles

- Thematic relations (Gruber 1965, Jackendoff 1972)
- Traditional thematic roles types include:
  Agent, Patient, Goal, Source, Theme, Experiencer, Instrument (p. 548).
- "Argument-Indexing View": thematic roles objects at syntax-semantics interface, determining a syntactic derivation or the linking relations.
- Θ-Criterion (GB Theory): each NP of predicate in lexicon assigned unique θ-role (Chomsky 1981).

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Problems with Thematic Role Types

- Thematic role types used in many syntactic generalizations, e.g. involving empirical thematic role hierarchies. Are thematic roles syntactic universals (or e.g. constructionally defined)?
- Relevance of role types to syntactic description needs motivation, e.g. in describing transitivity.
- Thematic roles lack independent semantic motivation.
- Apparent counter-examples to θ-criterion (Jackendoff 1987).
- Encoding semantic features (Cruse 1973) may not be relevant to syntax.

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Problems with Thematic Role Types

- Fragmentation: Cruse (1973) subdivides Agent into four types.
- Ambiguity: Andrews (1985) is Extent, an adjunct or a core argument?
- Symmetric stative predicates: e.g. "This is similar to that" Distinct roles or not?
- Searching for a Generalization: What is a Thematic Role?

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Proto-Roles

- Event-dependent Proto-roles introduced
- Prototypes based on shared entailments
- Grammatical relations such as subject related to observed (empirical) classification of participants
- Typology of grammatical relations
- Proto-Agent
- Proto-Patient

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Proto-Agent

- Properties
  - Volitional involvement in event or state
  - Sentience (and/or perception)
  - Causing an event or change of state in another participant
  - Movement (relative to position of another participant)
  - (exists independently of event named)
    *may be discourse pragmatic

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Proto-Patient

- Properties:
  - Undergoes change of state
  - Incremental theme
  - Causally affected by another participant
  - Stationary relative to movement of another participant
  - (does not exist independently of the event, or at all) *may be discourse pragmatic

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Argument Selection Principle

- For 2 or 3 place predicates
- Based on empirical count (total of entailments for each role).
- Greatest number of Proto-Agent entailments → Subject; greatest number of Proto-Patient entailments → Direct Object.
- Alternation predicted if number of entailments for each role similar (nondiscreteness).

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Worked Example: Psychological Predicates

Examples:

Experiencer Subject	Stimulus Subject
x likes y	y pleases x
x fears y	y frightens x

Describes "almost the same" relation

Experiencer: sentient (P-Agent)

Stimulus: causes emotional reaction (P-Agent)

Number of proto-entailments same; but for stimulus subject verbs, experiencer also undergoes change of state (P-Patient) and is therefore lexicalized as the patient.

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Symmetric Stative Predicates

Examples:

This one and that one rhyme / intersect / are similar.

This rhymes with / intersects with / is similar to that.

(cf. *The drunk embraced the lamppost. / *The drunk and the lamppost embraced.*)

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Symmetric Predicates: Generalizing via Proto-Roles

- Conjoined predicate subject has Proto-Agent entailments which two-place predicate relation lacks (i.e. for object of two-place predicate).
- Generalization entirely reducible to proto-roles.
- Strong cognitive evidence for proto-roles: would be difficult to deduce lexically, but easy via knowledge of proto-roles.

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Diathesis Alternations

Alternations:

- Spray / Load
- Hit / Break

Non-alternating:

- Swat / Dash
- Fill / Cover

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Spray / Load Alternation

Example:
Mary loaded the hay onto the truck.
Mary loaded the truck with hay.

Mary sprayed the paint onto the wall.
Mary sprayed the wall with paint.

- Analyzed via proto-roles, not e.g. as a theme / location alternation.
- Direct object analyzed as an Incremental Theme, i.e. either of two non-subject arguments qualifies as incremental theme. This accounts for alternating behavior.

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Hit / Break Alternation

John hit the fence with a stick.
John hit the stick against a fence.

John broke the fence with a stick.
John broke the stick against the fence.

- Radical change in meaning associated with *break* but not *hit*.
- Explained via proto-roles (change of state for direct object with break class).

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Swat doesn't alternate…

swat the boy with a stick

*swat the stick at / against the boy

- Dowty suggests subtle semantic reasons for why these verbs do not alternate in terms of type of effect on patient.
- Hit alternation explained via relative significance of movement to participants.
- Are there semantic differences between types of direct objects, e.g. between effecter and affected type arguments in diathesis alternations, necessitating a different syntactic analysis?

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Fill / Cover

Fill / Cover are non-alternating:
Bill filled the tank (with water).
*Bill filled water (into the tank).

Bill covered the ground (with a tarpaulin).
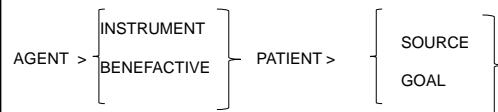**Bill covered a tarpaulin (over the ground).*

- Only goal lexicalizes as incremental theme (direct object).

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Unaccusativity

- Proto-roles give an elegant non-derivational description of unaccusativity.
- Unaccusatives select a P-Patient.
- Cognitive reasons for the Proto-Role Hypothesis.

Dowty's Hierarchy (English)

$$
\text{AGENT} > \begin{bmatrix} \text{INSTRUMENT} \\ \text{BENEFACTIVE} \end{bmatrix} - \text{PATIENT} > \begin{bmatrix} \text{SOURCE} \\ \text{GOAL} \end{bmatrix} -
$$

Participants

Conclusion

- Dowty argues for Proto-Roles based on linguistic and cognitive observations.
- Three main areas of analysis: symmetric predicates, diathesis alternations, unaccusativity
- Objections: Are P-roles empirical (*hit* class)? Are P-roles event dependent (possibly in need of revision, e.g. something like p-patients named by event vs. p-patients defined by event)?