From lexical semantics to argument realization

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Some Preliminary Considerations

• The syntactic performance is determined by the meaning of the lexicon
• But what elements of meaning are relevant?
• What semantic properties could map to syntax?
  • Color $\rightarrow \times$ (not relevant)
  • Loud speech (*bellow, shout*) vs. Soft speech (*murmur, whisper*) $\rightarrow \times$
  • Manner of speaking vs. Content of speaking $\rightarrow \checkmark$ (relevant)
    (1) a. Evelyn whispered at Marilyn
        b. *Evelyn said at Marilyn
    (2) a. Claudia grumbled about the new management
        b. *Claudia proposed about the new management
Many verbs participate in one or more **diathesis alternation**:

- Splash vs. Smear
  - Locative alternation
    (6) a. The pigs splashed mud on the wall
    b. Mud splashed on the wall

- “Causative/Inchoative” alternation
  (7) a. We smeared mud on the wall
  b. *Mud smeared on the wall
• When all aspects of argument realization are taken into account it becomes clear that there is an intricate system of cross-classification among verbs

• Any theory of lexical semantics should make clear “what verb classes have in common” and “what sets them apart from each other”

  • As phonology:
  • natural classes/verb classes
  • distinctive feature/grammatically relevant meanings
Cross-linguistically Comparing

• There are certain kinds of verbs and verb classes whose argument expression comes close to being uniform across languages
  • **AGENT-PATIENT VERBS**
    • An agent acts on and causes a change in a patient, as *kill, cut*
    • all transitive, with the agent subject and direct object patient
  • Cross-linguistically variation
    • **PSYCH-VERBS**

• To predict which semantic classes of verbs will be uniform, and which will not be
Semantic Role List

• Earliest account: Fillmore’s case grammar (1968), Gruber’s thematic relations (1965)

• Also known as “case frame” (Fillmore) or “theta-grid” (Stowell 1981)

• “In a semantic role list, grammatically-relevant aspects of a verb’s meaning are represented by a list of labels identifying the role that each of the verb’s arguments plays in the event it denotes” → “participant” role, or “semantic” role

• For example
  • *Cut* → “Agent, Patient”
  • *Put* → “Agent, Theme, Location”

• Semantic roles: (1) unanalyzable, (2) defined independently of the meaning of the verb, (3) the set of them is small in size
The Properties Common to Semantic Role List Approaches

• A predetermined set of labels that identify arguments
• Each verbs is associated with the relevant list of semantic roles
• Roles:
  • Agent (A), the instigator of the event
  • Object (O), the entity that moves or changes or whose position or existence is in consideration
  • Instrument (I), the stimulus or immediate physical cause of an event
  • Goal (G), the place to which something moves
The Primary Motivations

• Handling the problem of argument realization
• Semantic roles are meant to bring out similarities and differences in verb meaning that are reflected in argument expression

• *Break* vs. *Hit*
  (9) a. John broke the window with a rock
      b. A rock broke the window
  (10) a. John hit the fence with a stick
       b. A stick hit the fence
(11) a. The window broke
    b. *The fence hit

(13) a. I broke his leg/ *I broke him on the leg
    b. I hit his leg/ I hit him on the leg

• The difference cannot be attributed to idiosyncratic properties of them
• Reflect a more general, presumably semantic, property
  • **Break**: Agent, Instrument, Object  (**Break** Verbs: bend, crack)
  • **Hit**: Agent, Instrument, Place  (**Hit** Verbs: slap, stroke)

• Each class of verbs is characterized by the number and semantic roles of the participants associated with the class members
Problems for Semantic Role List Approach

• Lack identifying tests which can be consistently applied
  • *With* can signal instrument (*cut with knife*), comitatives (*work with Pat*), and themes (*spray a wall with paint*)

• “Role fragmentation” (Dowty 1991):
  • the subdivision of a single role into multiple roles

• How to determine the right “grain-size” to use in the definition of semantic roles?
  • Coarse-grained vs. Finer-grained analysis
  • Subject: immediate cause vs. agent (which is subsumed by immediate cause)
The typical semantic role inventory itself lacks any internal organization

- Why a patient might have more in common with a goal than with an agent?
- Patient and possessional goal: both can be direct object
- Goal and benefactive: assigned the same case (cf. 給)

Two semantic roles may appear to a single NP (Jackendoff 1972):

- The SUBJ of “run” may be both an agent and a theme.

There are verbs which appear to have two arguments bearing the same role (Dowty 1991)

- John resembles Tom. = Tom resembles John \(\rightarrow\) same role??

There is just an unstructured list of semantic roles

- How to distinguish a possible set from an impossible one?
- “Agent, Patient, Instrument” vs, “Goal, Experiencer, Instrument”
Circumvention of The Problems

- Certain arguments may be assigned more than one role → dual role assignment
  - Jackendoff: THEMATIC and ACTION tiers

- Dowty (1991): AGENT PROTP-ROLE and PATIENT PROTO-ROLE
From Semantic Role Lists to Representations of Events

• It is unclear where the particular set of semantic roles derives from. More structured theories whose organizing principles are spelled out are needed:

• Jackendoff (1972, 1976): **Predicate decomposition**
  • PRIMITIVE PREDICATES and CONSTANT (Lavin and Hovov)
  • SEMANTIC STRUCTURE and SEMANTIC CONTENT (Grimshaw 1993)

• Predicates decomposition → Event structure representation
  • Verbs are taken to denote events
  • Roles are derived from the possible event structure schemata
Three Conceptualization of Event

• Three kind of event structure schemata:
  • the localist approach
  • The aspectual approach
  • The causal approach

• Each take a distinct position to which aspect of the conceptualization of events is pertinent to the mapping to syntax
The Localist Approach

• That events involving **motion and location in space** are central to the construal of all events
  • Motion events: involves a thing and the path that it travels along
  • Location event: involves a thing and a location
• Thematic Relations Hypothesis (TRH)
  • “In any semantic field of events and states, the principal event, state, path, and place functions are a subset of those used for the analysis of spatial motion and location”
  
  (24) a. John kept the car in the garage → positional field
     b. John kept the book → possessional field
     c. John kept Andy happy → identificational field
Semantic Structure - Jackendoff (1990)

• Predicates decomposed as:
  • BE at, MOVE to, ACT on
  • “Keep”: CAUSE and STAY
  
  John kept the car in the garage.
  
  John kept the book.
  
  John kept Amy happy.

• Two layers of semantic relation:
  - **THEMATIC TIER**: encoding the localist aspect of an event
  - **ACTION TIER**: encoding agent-patient relations

  • Central to causal approach to event structure
  • Strongly implicated in subject and object selection
Thematic vs. Actional tiers

- John hit Mary.
- It appears that while the localist approach accounts for many aspects of event construal, it does not play an important role in subject and object selection.
The Aspectual Approach

• Aspect classes were originally proposed to account for phenomena that did not involve argument expression: interpretation of tense, distribution of time adverbials and available entailments (Dowty 1979):
  • *Sam worked in an hour.
  • Sam wrote the report in an hour.
  • Sam was working $\rightarrow$ he has worked.
  • Sam was writing on a report $\rightarrow$ *he has written a report.

• Verbal aspect (aktionsart): activity, accomplishment, achievement, state...

• Tenny (1987, 1992, 1994) developed this approach to argument realization:

• The Aspectual Interface Hypothesis (AIH)
  • The universal principle of mapping between thematic structure and syntactic argument structure are governed by aspectual properties.
Aspectual Interface Hypothesis

- Two aspectual properties are relevant for argument realization (cf. Dowty’s “incremental theme”)
  - **MEASURING OUT**: Translating a poem
    - the progress through the task is measured by the point in the poem.
  - **DELIMITEDNESS**: Pushing a cart to a store.
    - The goal of the motion specifies the change of location and delimits the event.

- The argument which measures out an event is always a **direct object**.

- If an argument participates in the delimitation of an event, it must be an **internal argument** (syntactically close to the verb), either direct or indirect.

- (29) Measuring-Out Constraint on Direct Internal Argument
- (30) The Terminus Constraint on Indirect Internal Arguments
Evidences of AIH

• PP in oblique: which is part of the VP?

(32) a. *Terry pushed the cart into the barn, and Bill did so into the yard
    b. Terry read the book in the barn, and Bill did so in the yard.

• Prototypical transitive verbs (e.g. destroy, cut, open)
  • The direct object of these verbs typically measure out the event.
  • Verbs that deviate from the prototype are less likely to be transitive:
    • Verbs of perception or psych verbs that often have objects that
      neither measure out nor delimit the event show a greater
      degree of variation cross-linguistically.
• Verbs of creation (e.g., *build, carve, write*)
  • *Tom wrote a letter.*
  • *letter* is an EFFECTED OBJECT (OBJECT OF RESULT), not a AFFECTED OBJ or a patient
  • *letter* measures out and delimit the event → direct OBJ
  • Typically Accomplishment verbs
Questions against to AIH

- Jackendoff: AFFECTEDNESS, rather than MEASURING OUT
  - Tenny: affected argument is one that measures out and imposes delimitedness on the event
  - An affected argument is not necessarily a measure
    (34) What John did to the bread was chew/knead/jiggle/spin it
  - Locative inversion of some activity verb: Activity, by definition, do not have a measure argument

- But how about creation verb?

- Affectedness and measuring out are relevant to different semantic classes of verbs
Tenny and Unaccusative Hypothesis

• Unaccusative Hypothesis (Perlmutter 1978):
  Two classes of intransitive verbs:
  • Unaccusative: the surface Subj is the underlying object.
  • Unergative: the surface Subj is the underlying subject.

• Their membership is semantically determined:
  • Telicity (Zaenen 1993, Van Valin 1990)

• Tenny’s account:
  • The theme argument of manner-of-motion verbs measures out the event when it is delimited, so it would be expected to be an underlying object.

  The ball rolled to the cave.
The Causal Approach

• Events are causal chains: a series of segment, each of which relates two participants in the event; a single participant may be involved in more than one segment.

  • a simple event is a segment of the causal network
  • simple events are nonbranching causal chain
  • a simple event involves transmission of force
  • a transmission of force is asymmetric, with distinct participants as initiator and endpoint
• Prototypical event type: prototypical transitive event
  • *Sandy broke the window.* \(\rightarrow\) involves a three-part causal chain
    • *Sandy acts on the window.*
    • *The window changes state.*
    • *The window is in a result state (i.e., broken)*

• Non-prototypical transitive event: are “coerced” into the mold by being conceptualized as if they involve such an asymmetrical transfer of force:
  • Verbs of spatial location: *lean, sit, put*
  • As if Theme antecedes the Location in a causal chain.
Causal Approach vs. Semantic Role List

• A causal perspective on event structure is implicit in many semantic role list approach

• Agent, Instrument, Patient, name important individuals in a causal chain

• Advantage over semantic role list:
  • By delineating an explicit model of event structure, the causal approach is able to differentiate the sets of roles that are necessarily interconnected in some way from roles that are not.
Causal vs. Localist Approach

- Some researchers recognize both localist and causal dimension of event

- Culicover and W. Wilkins: two sets of semantic role
  - Perceptual or extensional roles: looking at the event in the world that is being described → source, location, goal
  - Action or intentional roles: categorize objects according to their status as actors in an action → agent, patient, instrument

- Jackendoff: Thematic Tier and Action Tier
Argument realization

• The force-dynamic relationships are central to the formulation of argument realization rules

• Subject and object are the realization of the arguments at each end of the causal chain lexicalized by a verb

• Oblique arguments
  • Two subclasses: according to where they are located with respect to the initiator and endpoint (precede or follow the endpoint)
  • Antecedent roles: instrument, manner, means, cause
  • Subsequent roles: benefactive, recipient, result
Causal vs. Aspectual Approach

- With Prototypical Agent-Patient Vs: Both approaches can predict the direct object
  - *She cut the rope*

- With *wipe/rub, jiggle/chew*: Causal approach may take advantage
  - *I am wiping the table* → The direct OBJ is not a measure.
  - What I did to the table was wiping it

- Better in handling Locative alternation: Delimitedness cannot explain the difference
  - *Pat sprayed paint on the wall.* vs. *Pat sprayed the wall with paint.*
    → Asymmetrical transfer of force and the affected object is different

- *read/study*: treated differently
  - Causal: no clear transfer of force → not prototypical transitive event
  - Aspectual: have measuring object → no different from the causative change of state verbs
• Creation verbs
  • *I wrote a letter*
  • Object: *Not affected* (but *effected*, thus can be a measure)
  • Not conform to the prototypical transitive event
  • But involving an asymmetric transfer of force \(\rightarrow\) express an object

• AFFECTEDNESS is relevant here

• Whether the nonagentive arguments of verbs such as *wipe, rub, jiggle, chew, read, study, draw, and build* should be as direct OBJ or not
Summary

• Three approaches to event structure could serve as the starting point for a theory of argument realization

• Localist approach
  • does not have a significant contribution to make to the understanding of argument expression

• Aspectual approach
  • Measure out and Delimitedness
  • Say little about subjecthood

• Causal approach
  • Force-dynamic relationships are central to the formulation of argument realization
  • Has more contribution to make to the realization of arguments as subject