

Lexical Semantics

Week 8: Semantic roles

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1 Motivation

Verbs describe events or situations involving participants, usually represented by noun phrases:

- the verb's arguments are marked differently in terms of case/word order
- different arguments play different roles in the event or situation denoted by the whole sentence
- there are certain broad classes of verbs, which can be characterized by the fact that their participants (arguments) seem to have the same sort of relationship to the main action:

(1) **Verbs of hitting:** hit, bash, beat, kick, punch, smack, strike, tap, whack

a. *Examples:*

- i. Jerry kicked the ball.
- ii. The manager smacked the table.

b. *Event/situation:* one object or individual impacts another

c. *Participants:*

- i. SUBJECT: the hitter
- ii. OBJECT: the thing being hit/impacted

(2) **Verbs of (psychological) experience:** frighten, amuse, anger, surprise

a. *Examples:*

- i. The sudden bang frightened the children.
- ii. The actor amused his audience.

b. *Event/situation:* one object or individual produces a psychological reaction in another

c. *Participants:*

- i. SUBJECT: the inducer
- ii. OBJECT: the individual experiencing the psychological effect

- these verbs classes occur cross-linguistically
- these patterns are also associated with certain restrictions on the types of participants
 - (3) #The tree hit the wall.
Only ok if the tree has fallen down
 - (4) #The sudden bang frightened the stone.
- grammatical relations like SUBJECT and OBJECT are too general to capture these distinctions
 - subjects seem like do-ers, but objects have different relationships to the action
 - and even the role played by a subject can change under operations like passivization:
 - (5) The ball was kicked.
 SUBJECT: the thing being impacted

1.1 What is a semantic role?

Semantic roles are labels for the types of participants that an event/situation can involve.

- also called *participant roles*, *thematic roles*, *theta roles*
- looking at the set of semantic roles associated with a particular verb tells us a lot about its meaning
- if semantic roles are assigned from a small, well-defined set, then we can use this information to derive other kind of properties of the verb (such as the class it belongs to)
- we need to make certain assumptions to define a useful set of roles

Assumptions about the set of roles:

1. There is a relatively small, predefined set of semantic roles
2. Each role has a definition that applies across a range of verbs
 - so, while associating a role with a verb tells us something about its meaning, the set of roles isn't all there is – the definition of a role is independent of the meaning of a verb, or the other semantic roles it assigns
3. Every argument of every verb can be assigned a semantic role
4. Every argument of every verb has only one semantic role
 - as indicated in Davis (2011) and Levin & Rappaport Hovav (2005), this assumption is sometimes challenged

5. Every argument of a verb has a different role – no verb assigns the same semantic role to two arguments

Based on these assumptions:

- the set of roles needs to be large enough to cover all of the relationships that noun phrases have to verbs
- but not so large that we cannot make generalizations
- next week, we'll see a particular case study involving verbs of hitting and breaking (Fillmore 1970)

2 A representative set of semantic roles

1. AGENT: the instigator of the event denoted by the predicate, capable of acting with volition to bring the event about; has control over the event.
2. PATIENT: the entity undergoing the effect of the event denoted by the predicate; typically, it undergoes some change of state or location, but minimally it is impinged on by the event. (See *Caution I*)
3. INSTRUMENT: the means by which an action is performed; an immediate physical cause of an event.
4. NATURAL FORCE: an inanimate instigator of an event.
5. LOCATION: the place where something is situated or takes place.
6. SOURCE: the entity from which something moves.
7. GOAL: the entity to which something moves. (See *Caution II*.)
8. RECIPIENT: an animate entity which receives something that is transferred. (See *Caution II*.)
9. EXPERIENCER: the perceiver in a perception event or the participant experiencing a psychological state denoted by a predicate; typically lacks control over bringing the event about.
10. STIMULUS: the participant which is the “stimulus” or trigger in a perception or emotional reaction event.
11. BENEFACTIVE: the entity benefiting from the event denoted by the predicate.
12. COMITATIVE: the participant who helps the agent carry out the event.

Some assignments:

- (6) Sue threw the ball into the basket.
AGENT PATIENT GOAL

- (7) *The key opened the door.*
 INSTRUMENT PATIENT
- (8) *I put the papers into the folder.*
 AGENT PATIENT GOAL
- (9) *Patrick rowed a boat from Dover to Calais.*
 AGENT PATIENT SOURCE GOAL
- (10) *Mary admires her parents.*
 EXPERIENCER STIMULUS
- (11) *The ball rolled into the rabbit hole.*
 PATIENT GOAL
- (12) *Larry gave the papers to Terry.*
 AGENT PATIENT RECIPIENT
- (13) *The sun melted the ice.*
 NAT. FORCE PATIENT
- (14) *Sandy washed the dishes for Mandy.*
 AGENT PATIENT BENEFACTIVE
- (15) *The lake froze.*
 PATIENT
- (16) *Mary talked to her boss with Blake.*
 AGENT RECIPIENT COMITATIVE

- **Caution I:**

The term “patient” and a related term “theme” are used in many different ways in the linguistics literature. For some, a patient necessarily undergoes a change of state; it is an entity that is affected in a strong sense. For others, a patient is impinged on by the agent, but not necessarily caused to change state or location. On the broad interpretation, the objects of *break*, *flatten*, *hit*, *pound*, *shoot*, *wipe* are all patients; on the narrow interpretation, only the objects of *break* and *flatten* are. Some researchers take location and motion events to be special, distinguishing a notion “theme” to label the entity which moves or is located. For example, the ball is the theme in *the ball rolled down the hill*. The label “patient” is reserved for entities that are affected in an event in any other way.

- **Caution II:**

A “goal” role is sometimes distinguished from a “recipient” role, as we have done here (cf. Kearns 2000). Recipient is reserved for the animate entity who receives something in an event that involves transfer of possession, as with the verb *give*, or the communication of information, as with the verb *teach*. Others use the “goal” role for both the literal goals of motion events and the more metaphorical goals of transfer of possession and communication of information events.

3 Diagnostic tests for some semantic roles

As per the second assumption for a theory of semantic roles, there must be certain features or criteria that allow us to define or at least determine the semantic role of any particular NP argument. Here are some common ‘diagnostics.’

3.1 Agents

There is a lot of work on trying to define the notion of AGENT, and researchers do not always agree. Some frequent properties:

- agents are the ‘instigating’ participants in an event
- agents are capable of acting consciously to bring the event about

These criteria involve control and volitionality, so some diagnostics for agents involve creating contexts that require deliberate action (and thus test for these properties)

1. **Modification by agentive adverbials:** *deliberately, intentionally, on purpose, carefully*

- if the action taken by a (usually subject) NP can be sensibly modified by one of these adverbials, it indicates that the argument is volitional and/or in control of the event, so it is often an agent

(17) *Kim opened the door.*

AGENT PATIENT

a. Kim deliberately opened the door.

(18) *The wind slammed the door.*

NAT. FORCE PATIENT

a. #The wind intentionally slammed the door.

(19) *The door opened.*

PATIENT

a. #The door opened on purpose.

(20) *Shelby heard the burglar.*

EXPERIENCER STIMULUS

a. #Shelby carefully heard the prowler.

2. **Persuasion contexts:**

- if the sentence can be the complement of *promise* or *persuade*, it indicates that the subject/instigator is volitional

(17) Kim opened the door.

b. Kim promised to open the door.

c. Sally persuaded Kim to open the door.

- (18) The wind slammed the door.
 - b. #The wind promised to open the door.
 - c. #Sally persuaded the wind to open the door.
- (19) The door opened.
 - b. #The door promised to open.
 - c. #Sally promised to open the door.
- (20) Shelby heard the burglar.
 - b. #Shelby promised to hear the burglar.
 - c. #Sally persuaded Shelby to hear the burglar.

3. Imperative voice:

- if the sentence can occur in the imperative, then the subject is an entity that can be instructed (also a volitionality test)

- (17) Kim opened the door.
 - d. Open the door, Kim!
- (18) The wind slammed the door.
 - d. #Slam the door, wind!
- (19) The door opened.
 - d. #Open, door!
- (20) Shelby heard the burglar.
 - d. #Hear the burglar, Shelby!

4. Topicalization with *do*:

- this is a test for instigation/action rather than volitionality: if the NP can be the *X* in *What X did was*, then it is either an agent or in some cases a natural force.

- (17) Kim opened the door.
 - e. What Kim did was open the door.
- (18) The wind slammed the door.
 - e. What the wind did was slam the door.
- (19) The door opened.
 - e. #What the door did was open.
- (20) Shelby heard the burglar.
 - e. #What Shelby did was hear the burglar.

3.2 Patients

1. Topicalization with *happen*:

- If an NP argument can be the *X* in *What happened to X was ...*, then it is something that was affected or acted on: this picks out the broad interpretation of PATIENT (see *Caution I*).

(21) *Kim broke the window.*

AGENT PATIENT, NARROW

a. What happened to the window was that Kim broke it.

(22) *Connor wiped the table.*

AGENT PATIENT, broad

a. What happened to the table was that Connor wiped it.

(23) *Sandy saw the movie.*

EXPERIENCER STIMULUS

a. #What happened to the movie was that Sandy saw it.

2. Middle constructions:

- this test only works for transitive verbs, and picks out the narrow notion of patient: move the NP into subject position and add a manner adverbial to form a *middle* construction (related to passives, but not quite a passive).

(21) Kim broke the window.

b. Windows break easily.

(22) Connor wiped the table.

b. ??Tables wipe easily.

(23) Shelby saw the movie.

b. #Movies see easily.

3.3 Instruments

1. Paraphrase with *use* or *by means of*:

- since instruments are the tools used for some event or action, you can test an NP *X* by using a paraphrase with *use X to*

(24) *Kim broke the window with a hammer.*

AGENT PATIENT INSTRUMENT

a. Kim used a hammer to break the window.

b. Kim broke the window by means of a hammer.

2. Answers to *how* questions:

- instruments can be questioned using *how* – though so can manners, e.g. *with enthusiasm*

(24) Kim broke the window with a hammer.

c. How did Kim break the window?

A: With a hammer.

3.4 Comitatives

1. Paraphrase by *together with*:

- this test distinguishes instruments and comitatives, both of which can be introduced by the preposition *with*

(25) *Kim washed the dishes with Mandy.*

AGENT PATIENT COMITATIVE

a. Kim washed the dishes together with Mandy.

(26) *Compare: #Kim broke the window together with a hammer.*

2. Conjunction with the subject:

- comitatives can be moved into subject position by using a conjunction

(25) Kim washed the dishes with Mandy.

b. Kim and Mandy washed the dishes.

(27) *Compare: ??Kim and a hammer broke the window.*

3.5 Semantic roles and grammatical relations

A caution:

- many semantic roles are associated with particular prepositions – e.g., instruments are often introduced by *with*, goals by *to*, sources by *from*, benefactives by *for*
- but prepositions don't uniquely mark roles: comitatives are also introduced by *with*, recipients also by *to*

(28) a. Kim read the book *with a magnifying glass*.

INSTRUMENT

b. Phil read the book *with Kim*.

COMITATIVE

(29) a. Kim sent the book *to London*.

GOAL

b. Kim sent the book *to Phil*.

RECIPIENT

- subjects can be agents, themes, patients, instruments, and experiencers

(30) a. *Kim* broke the window with a hammer.

AGENT

b. <i>The key</i> opened the door.	INSTRUMENT
c. <i>Alex</i> hated the book.	EXPERIENCER
d. <i>The window</i> cracked.	PATIENT
e. <i>The ball</i> rolled into the gutter.	THEME

4 Problems with semantic roles

Despite their initial appeal, semantic roles turn out to have serious problems:

- as seen in the lack of consensus on how to use roles like PATIENT and THEME, it has been very difficult to choose a small set of roles to cover all of the argument possibilities for all verbs
- boundaries of some roles are unclear – some verbs seem to require more granularity than others
 - should the broad or narrow notion patient be used?
 - are agent and natural force distinct roles or should we combine them into an ACTOR or even a CAUSER role?
- diagnostics for roles are not foolproof
 - for our purposes, the ones above are fine, but be aware that there are cases where they break down
 - the problem with diagnostics (the reason they are not foolproof) is that they are developed on the basis of observation
 - we need to have a clearer theory of how or why these entailments/properties are associated with particular semantic roles
- some NPs for some verbs resist designation:
 - what roles do the objects of *avoid*, *resemble*, *memorize* take?
 - (31) a. Jones avoided mushrooms at dinner.
 - b. Jones avoided Sally at dinner.
 - (32) a. Monica resembled Cindy.
 - b. Cindy resembled Monica.
 - c. Monica and Cindy resembled each other.
 - d. Monica resembled the Mona Lisa.
 - e. ?The Mona Lisa resembled Monica.
- certain roles co-occur in certain types of events, but we don't have rules specifying what combinations of roles verbs can have or not
 - motion events: patients, sources, goals
 - change of state events: agents, instruments, patients
 - no verb classes with: experiencer, instrument, benefactive

ideally, we'd like a theory that explains why this doesn't happen!

5 The middle construction

The middle construction (which can be used to test for patients) bears a superficial resemblance to the intransitive use of a causative alternation verb like *break*, but is NOT the same thing:

- (33) a. Crystal breaks easily.
b. Fresh-baked bread cuts well.

- (34) a. *Walls hit easily.
b. *Planets see easily on clear nights.

- the object of a transitive verb is the subject of its middle use: compare (35a) with (35b).
- for causative alternation verbs, the object of the transitive is the subject of the intransitive: compare (36a) with (36b).

- (35) a. The chef cut *the fresh-baked bread*. transitive verb
b. *Fresh-baked bread* cuts easily. middle use of transitive
- (36) a. The clumsy clerk broke *the crystal vase*. transitive use of *break*
b. *The crystal vase* broke. intransitive use

The two cases can be distinguished on semantic grounds:

- a middle construction describes a property of its subject and does not refer to a specific event.
 - (33a) describes a property of crystal and not any particular event of crystal-breaking
 - on the other hand, the intransitive use in (36b) describes a specific event in which a crystal vase changes state (breaks)
- Agency:
 - an implicit agent is understood in the middle construction – e.g. *crystal breaks easily* when an agent attempts to break it/hits it accidentally, etc.
 - no implicit agent for (36b)
 - the adverbs that are characteristic of the middle construction often describe the agent's involvement in the type of events described (e.g., *easily*) as easily does in the examples.
- generally: a wider range of verbs is found in the middle construction than in the causative alternation
 - *cut* has a middle, but does not have an intransitive variant (it is not a causative alternation verb)

- (37) a. Sally cut the fresh-baked bread.
b. *The fresh-baked bread cut.

6 References

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