HG2002 Semantics and Pragmatics

Participants

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Lecture 6
Location: HSS Auditorium

Overview

- Revision: Situations
  - Verb Types
  - TAM: Tense, Aspect and Modality
  - Mood and Evidentiality
- Thematic Roles
  - Grammatical Relations and Thematic Roles
  - Verbs and Thematic Role Grids
  - Problems with Thematic Roles
  - The Motivation for Identifying Thematic Roles
  - Voice
- Classifiers and Noun Classes
- Next Lecture: Chapter 7: Context and Inference

Revision: Situations

Summary of Situation

- Verb/Situation Types
  - Stative
  - Dynamic
    - Punctual
    - Durative
      - Telic/Resultative
      - Atelic
- Tense/Aspect and Time: R, S and E
- Modality
  - Epistemic
  - Deontic: Permission, Obligation
- Evidentiality

Situation Types

Situations	Stative	Durative	Telic	Examples
State	+	+		*desire, know*
Activity	–	+	–	*run, drive a car*
Accomplishment	–	+	+	*bake, walk to school, build*
Punctual	–	–	–	*knock, flash*
Achievement	–	–	+	*win, start*

Tense and Time

- Locate a situation to a point in time:
  S = speech point; R = reference time: E = event time
  - Simple Tense
    - Past ($R = E < S$) *saw*
    - Present ($R = S = E$) *see*
    - Future ($S < R = E$) *will see*
  - Complex Tense
    - Past Perfect ($E < R < S$) *had seen*
    - Present Perfect ($E < R = S$) *had seen*
    - Future Perfect ($S < E < R$) *had seen*

Aspect in General

- **Perfective** focus on the end point
  - **Completive** *I built the building*
  - **Experiential** *I have built the building*
- **Imperfective**
  - **Progressive** *I was listening/I am listening*
  - **Habitual** *I listen to the Goon Show*
- Different languages grammaticalize different things

Mood: Knowledge vs Obligation

- **Epistemic modality**: Speaker signals degree of knowledge.

  (1) *You can drive this car* (You are able to)

- **Deontic modality**: Speaker signals his/her attitude to social factors of obligation and permission.
  - **Permission**

    (2) *You can drive this car* (You have permission to)

    (3) *You may drive this car*
  - **Obligation**

    (4) *You must drive this car* (You have an obligation to)

    (5) *You ought to drive this car*

Mood more Generally

- Grammatical Inflection used to mark modality is called **mood**
  - **indicative** expresses factual statements
  - **conditional** expresses events dependent on a condition
  - **imperative** expresses commands
  - **injunctive** expresses pleading, insistence, imploring
  - **optative** expresses hopes, wishes or commands
  - **potential** expresses something likely to happen
  - **subjunctive** expresses hypothetical events; opinions or emotions
  - **interrogative** expresses questions

- English only really marks imperative and subjunctive, and then only on ***be***

  (6) *Be good!*

  (7) *If I were a rich man*

Participants

Thematic Roles

In this section we talk about the relations between the participants in a situation and the situation itself.

- **Thematic roles** are parts of the sentence that correspond to the participants in the situation described
- They classify relations between entities in a situation
- Also known as
  - Deep case (Fillmore, 1968)
  - Thematic roles; Theta roles; θ-roles
  - Semantic Roles; Participant Roles

Roles link different alternations

(8) *Kim patted Sandy*

(9) *Sandy was patted by Kim*

- Which is the **Subject** and which the **Object** in these sentences? **?**
- What are the thematic roles of Kim and Sandy? **?**

Thematic Roles

- **AGENT** (takes *deliberately, on purpose, what did X do?*)

  A participant which the meaning of the verb specifies as doing or causing something, possibly intentionally.

  - The initiator, performer of controller of an action; typically volitional, typically animate
  - Typically SUBJECT

  (10) *Kim kicked Sandy*
  (11) *The ogre leaped into the fray*
  (12) *The student watched the video*

- (**ACTOR**) generalization of **AGENT** that allows non-volitional, non-actor: if you use this, then **AGENT** is restricted to animate, volitional participants

➢ **PATIENT** (*What happened to X?*)

A participant which the verb characterizes as having something happen to it, and as being affected by what happens to it.

- ➢ The undergoer of an action
- ➢ Undergoes change in state usually, both animate and inanimate
- ➢ Typically OBJECT

(13) *Kim kicked Sandy*

(14) *The ogre ate the dog*

(15) #*The student watched the video*

(16) #*I heard a sound*

➢ THEME

A participant which is characterized as changing its position or condition, or as being in a state or position.

- ➢ Moved, location or state is described
- ➢ Typically OBJECT

(17) *Hiromi put the book on the shelf*

(18) *Freddy gave you the chocolate*

(19) *The book is on the shelf*

(20) *The protagonist died*

(21) **The dog walked home*

➢ EXPERIENCER

A participant who is characterized as aware of something.

- ➢ Non-volitional, displaying awareness of action, state
- ➢ Typically SUBJECT

(22) *Liling heard thunder*

(23) *Jo felt sick*

(24) *The lecturer annoyed the students*

BENEFICIARY

- for whose benefit the action was performed
- Typically indexed by ”for” PP in English
  or OBJECT in ditransitive verbs

(25) *They made me a present*

(26) *They made a present for me*

LOCATION

- Place
- Typically indexed by locative PPs in English

(27) *I am living in Indonesia*

(28) *It is on the table*

GOAL

- towards which something moves (lit or metaphor)
- Typically indexed by ”to” PP in English
  or OBJECT in ditransitive

(29) *She handed the form to him*

(30) *She handed him her form*

SOURCE

- from which something moves or originates
- Typically indexed by ”from” PP in English

(31) *We gleaned this from the Internet*

STIMULUS

- Usually used in connection with EXPERIENCER

(32) *The lightning scared them*

(33) *I don't like the lightning*

INSTRUMENT/MANNER

- Means by which action is performed
- Can be indexed by "with" PP in English

(34) *I ate breakfast with chopsticks*

Split Themes

- Jackendoff (1990) suggests
  - **action tier** (actor-patient)
    ACTOR, AGENT, EXPERIENCER, PATIENT, BENEFICIARY, INSTRUMENT
  - **thematic tier** (spatial)
    THEME, GOAL, SOURCE, LOCATION

Theta-Grid

- Have a semantic **valence** (**theta-grid**)
  - ***give***: V ⟨AGENT, THEME, BENEFICIARY⟩
  - underlined role maps to subject
  - order of roles allows prediction of grammatical function
- This is used to link the meaning with the realization
- Distinguish between
  - **participant roles** depend on the verb — in the grid (**arguments**)
    - In general, if it takes part in an alternation: it should be in the grid.
  - **non-participant roles** combine freely — not in the grid (**adjuncts**)
    - If there can be multiple instances: it should not be in the grid.

Theta-Grids (continued)

- Theta Grids/subcategorization are properties of meta-lexemes
  - For a given sense they are constant:
    hand: V ⟨AGENT, THEME, BENEFICIARY⟩ (NP, NP, NP)
    - *I handed Kim the book*:
  - passivization changes the grid:
    handed: V ⟨BENEFICIARY, THEME, AGENT⟩ (NP, NP, PP:by)
    - *Kim was handed the book by me*:
  - Can change with alternations, voice, …
- Theta Roles are semantic NOT syntactic
  - Never SUBJECT, OBJECT, ADJECTIVE, …

Some Issues

- Every theory has a different set of roles
- From 8 to 42! (two groups at NTT)
- How useful is the notion of PATIENT if it encompasses all these?

(35) *The genie touched the lamp with their nose.*
(36) *The baby rubbed the lamp with its hands.*
(37) *The baby squeezed the rubber toy with its hands.*
(38) *She cracked the mirror with a stone.*

Linking Grammatical Relations and Thematic Roles

- Thematic roles typically map onto grammatical functions systematically
  - AGENT is usually the subject
  - PATIENT is usually the object

- It is possible to predict how arguments are linked to the verb from their thematic roles, and hence their grammatical functions.

(39) *Jo broke the ice with a pickaxe*
⟨AGENT, PATIENT, INSTRUMENT⟩ (NP, NP, PP:with)

(40) *The pickaxe broke the ice*
⟨INSTRUMENT, PATIENT⟩ (NP, NP)

(41) *The ice broke*
⟨PATIENT⟩ (NP)

Other Predicates

- Adjectives (normally theme)

  (42) *John is tall* ⟨THEME⟩
  (43) *John is cold [to touch]* ⟨THEME⟩
  (44) *John is/feels cold* ⟨EXPERIENCER⟩
  different adjectives in e.g., Japanese
  tsumetai "cold (to touch)" vs *samui* "(feel) cold"

- Predicative Copula (treat second NP as predicate)

  (45) *John is a boy* ⟨THEME⟩

- Identity Copula (reversible)

  (46) *Kim is my teacher* ⟨THEME, THEME⟩?
  (47) *My teacher is Kim* ⟨THEME, THEME⟩?

Thematic Hierarchy

- The higher you are in the hierarchy the more likely to be subject (then object, then indirect, then argument PP, then adjunct PP)

$$\text{AGENT} > \left\{ \begin{array}{l} \text{GOAL/RECIPIENT} \\ \text{BENEFICIARY} \end{array} \right\} > \left\{ \begin{array}{l} \text{THEME} \\ \text{PATIENT} \end{array} \right\} > \text{INSTRUMENT} > \text{LOCATION}$$

- Generally true across languages

Dowty's Proto-Arguments

- The AGENT Proto-Role
  - Volitional
  - Sentient (and/or perceptive)
  - Causes event or change of state;
  - Movement
- The PATIENT Proto-Role
  - Change of state
  - Incremental theme (i.e. determines aspect)
  - Causally affected by event
  - Stationary (relative to movement of proto-agent).

Dowty's Argument Selection Principle

- when a verb takes a subject and an object
  - the argument with the greatest number of Proto-Agent properties will be the one selected as SUBJECT
  - the one with the greatest number of Proto-Patient properties will be selected as OBJECT

- Try: ***threw*** — ball, the man, the dog

- Relatively predictive, but what about sentences such as: *The hunger killed him*?

Alternations

- Many verbs have multiple theta-grids

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

⟨AGENT, PATIENT, INSTRUMENT⟩

b. *The hammer broke the window*

⟨INSTRUMENT, PATIENT⟩

c. *The window broke*

⟨INSTRUMENT⟩

(49) a. *I cut the cake with the knife*

⟨AGENT, PATIENT, INSTRUMENT⟩

b. *This cake cuts easily*

⟨PATIENT⟩

- The relations between them are called **alternations**

Voice

- Another alternation that changes the number of arguments is **voice**: passive, middle

(50) **Transitive Passive**

a. *Kim ate Sandy*

b. *Sandy was eaten (by Kim)*

(51) **Ditransitive Passive**

a. *Abraham gave Brown chocolate*

b. *Abraham gave chocolate to Brown*

c. *Chocolate was given to Brown (by Abraham)*

d. *Brown was given chocolate (by Abraham)*

(52) **Transitive Middle** (or just causative/inchoative)

a. *They open the gate very quietly*

b. *The gate opens very quietly*

(53) **Intransitive Middle**

a. *The knife cuts the cake well*

b. *The knife cuts well*

Why so many possibilities?

- So we can emphasize different participants
- We may not know all the participants
- We may not care about all the participants
- There are also lexical alternations

(54) *Kim killed Sandy* vs *Sandy dies*

(55) c.f. *Kim melted the ice* vs *the ice melted*

(56)

金が	氷を	溶かした	*vs*	氷が	溶けた
Kim-ga	koori-wo	tokashita		koori-ga	toketa
Kim-SBJ	ice-OBJ	*melt:trans*		ice-SBJ	*melt:intrans*

Classifiers

Classifiers and Noun Classes

- Many languages include special ways to classify nouns
  - Noun Classifiers (Bantu, Yidi , …)
  - Numeral Classifiers (Chinese, Malay, Japanese, …)
    - English group nouns: ***flock, mob, group, pack, …***
  - Gender (German, Spanish, …)

- Classifiers can be marked on the noun, on the verb, on a separate word (a classifier) or on all words

Examples

(57) *Bulumba walba malan*
CL:HABITABLE CL:STONE flat.rock
"a flat rock for camping" Yidi (Dixon, 1977)

(58) *se-biji epel* "1.CL:round apple" Malay

(59) 一张纸 *yi-zhang zhi* "1.CL:flat paper" Mandarin

(60) *der Hund* "the:male dog" German

(61) *den Madchen* "the:neuter girl" German

What gets Classified?

- **Taxonomic Class**: Human, Animal, Tree, Female
- **Function**: piercing, cutting, writing instrument, for eating/drinking
- **Shape**: long, flat, round (1D, 2D, 3D)
- **Consistency**: rigid, flexible
- **Size**: grab in fingers, hand, $<$ human, $>$ human
- **Location**: towns
- **Arrangement**: row, coil, heap
- **Quanta**: head, pack, flock

Noun Classes in Bantu

Class	Semantics
1/2	sg/pl human
3/4	sg/pl plants, foods, non-paired body parts
5/6	sg/pl fruits, paired body parts, …
7/8	sg/pl inanimate
9/10	sg/pl animals
11/12	sg/p long objects, abstracts
13	small objects, birds
14	masses
15	infinitives

Other elements in the sentence agree with the noun (class 8)

(62) *Vi-su vidogo viwili hi-vi amba-vy-o nili-vi-nunua*
vi-knife vi-small vi-teo this-vi which-vi 1.s-vi-buy
ni vi-kali sana
be vi-sharp very
These two small knives which I bought are very sharp

Classification

- Is there a system for classifying nouns in a language that you speak? **?**
  - What are the criteria for classification? **?**
- Semantic change?
  - How do you classify `watermelon`? (or what gender is $\sim$) **?**
  - How do you classify a `grain (of rice)` **?**
  - How do you classify a `human` **?**
  - How do you classify a `robot` **?**

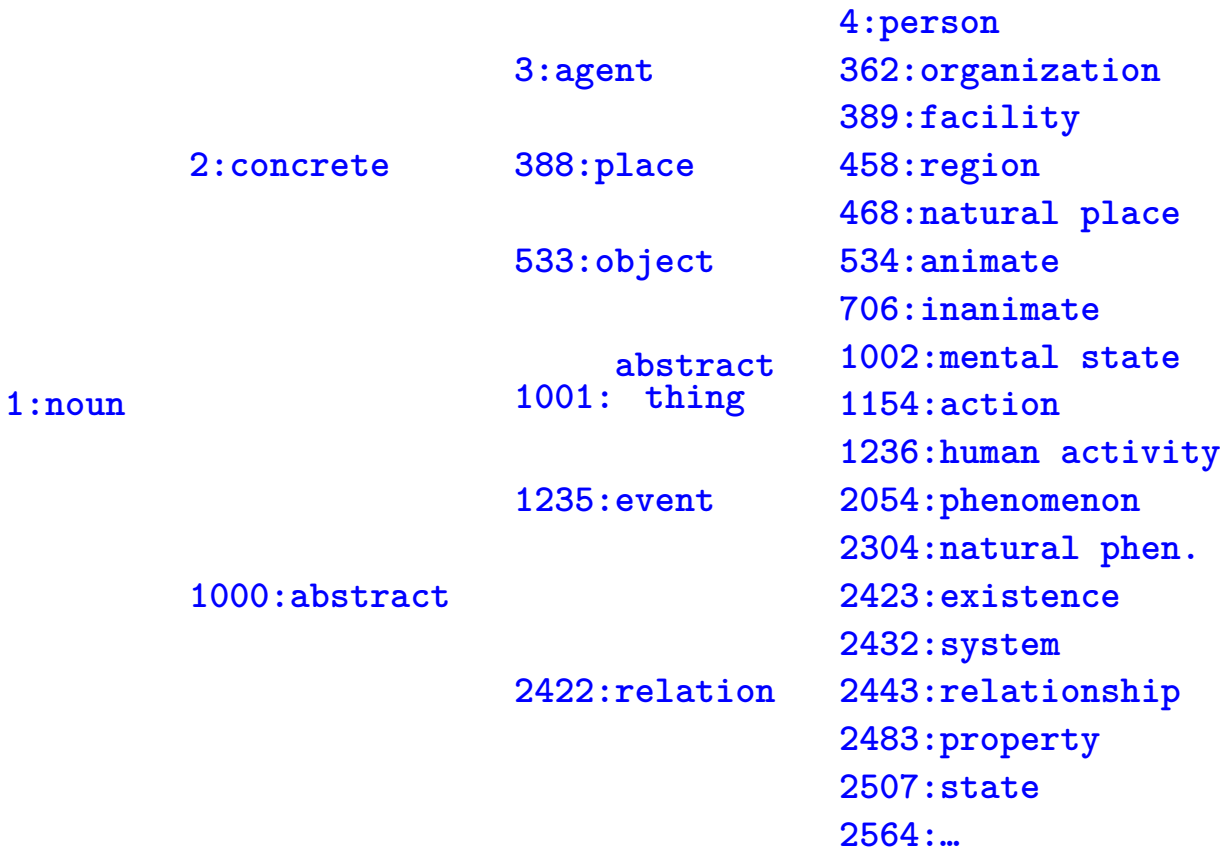
Classifiers in Japanese and Chinese

- Testing Classifier use in Japanese and Chinese:
  - Associate classifiers with semantic classes (in an ontology) by hand
  - Most sortal classifiers select for some kind of semantic class
  - 20% of the classes require more than one classifier
    choose the most common one
  - class `961:weapon`:
    -chō “knives”, *-hon* “long thin things”, *-furi* “swords”, *-ki* “machines”

- Each language took around two weeks

- Currently redoing this with WordNet and associating semi-automatically from a corpus (URECA projects available)

Top four levels of the Goi-Taikei ( ) Ontology



- A rich ontology used for Japanese, English, Chinese and Malay
- 2,710 semantic classes (12-level tree structure) for common nouns

Japanese Classifiers

CLASSIFIER		Referents classified	No.	%	Sample Class
None		Uncountable	794	29.3	`3:agent`
-kai	( )	events	703	25.9	`1699:visit`
-tsu	( )	abstract/general	565	20.9	`2:concrete`
-nin	( )	people	298	11.0	`5:person`
-ko	( )	concrete objects	124	4.6	`854:fruit`
-hon	( )	long thin objects	52	1.9	`673:tree`
-mai	( )	flat objects	32	1.2	`770:paper`
-teki	( )	liquid	21	0.8	`652:tear`
-dai	( )	mechanical items furniture	18	0.7	`962:machinery`
-hiki	( )	animals	12	0.6	`537:beast`
Other		38 classifiers	91	3.4	
Total		47 classifiers	2,710	100	

Chinese Classifiers

CLASSIFIER	Referents classified	No.	%	Sample Class
None	Uncountable referents	765	28.2	`3:agent`
(次)	events	692	25.5	`1699:visit`
(个)	general/people	655	24.1	`2:concrete`
(位)	people (*honored*)	68	2.5	`228:doctor`
(块)	big objects	61	2.2	`461:land`
(人)	people	39	1.4	`92:descendants`
(条)	long thin objects	33	1.2	`417:route`
(片)	parts/pieces	25	0.9	`2578:flake`
(张)	big flat objects	23	0.8	`773:board`
(名)	people (*respected*)	22	0.8	`351:expert`
(滴)	liquid	20	0.7	`652:tear`
(件)	incidents	19	0.7	`1717:contract`
Other	70 classifiers	293	10.8	
Total	81 classifiers	2,710	100	

Language Differences

- 47 Japanese classifiers at the level of semantic classes
  81 Chinese classifiers at the level of semantic classes
  - Around the number a human typically uses (30–80)
    More classifiers at the noun level (default classifiers)
  - Chinese uses more classifiers than Japanese
    Chinese has more specific classifiers

- No classifiers assigned to 800 semantic classes
  - Uncountable, abstract nouns (e.g. *greed, lethargy*)
  - Empty classes

Noun Classes vs Classifiers

	Noun classes	**Classifiers**
Size	Small Finite Set	Large Number (low hundreds)
Realization	Closed Grammatical System	Separate Morpheme
Marking	Also outside the noun word	Only in the noun phrase

- Gender (noun class in e.g., German)
  - typically 3 (Masculine, Feminine, Neuter)
  - marked as inflection
  - marked on determiners, adjective and nouns
- Numeral Classifiers (in e.g., Japanese)
  - typically 30-80 in common use, hundreds exist
  - separate classifier phrase (numeral/interrogative+classifier)
  - classifier phrase modifies noun

Summary

- Semantics motivates syntax
  - But most generalizations fail to cover all examples
- Argument structure and thematic roles link predicates and their arguments
  - Remember the basic roles and examples
- Dowty's Argument Selection Principle
  prototypical agents and patients are subjects and objects
- Problems with thematic roles
- Noun Classes and Classifiers

Acknowledgments and References

- Video: *Does your dog bite* excerpt from *The Pink Panther Strikes Again* directed by Blake Edwards, starring Peter Sellers. The Pink Panther Strikes Again is the fifth film in The Pink Panther series and was released in 1976.
  - It shows issues of reference and cooperation in dialog

```
Closeau
   Good day.
   My name is Professor Guy Gabroir...
   medieval castle authority from Marseilles.
   Tell me, do you have a room?
Clerk
    I do not know what a "reum" is.
Closeau
    A Zimmer.
Clerk
    Ah! A room!
```

Closeau

That is what I have been saying, you idiot.

Room.

Does your dog bite?

Clerk

No.

Closeau

Nice doggy.

Dog

Grrrr <BITE>

Closeau

I thought you said your dog did not bite.

Clerk

That is not my dog.

*

References

Emily Bender. 2013. *Linguistic Fundamentals for Natural Language Processing: 100 Essentials from Morphology and Syntax*. Synthesis Lectures on Human Language Technologies. Morgan & Claypool.

Robert M.W. Dixon. 1977. *A Grammar of Yidin*. Cambridge.

Robert M.W. Dixon. 1986. Noun classes and noun classification in typological perspective. In Colette Craig, editor, *Noun Classes and Categorization*, volume 7 of *Typological Studies in Language*, pages 105–12. John Benjamins, Amsterdam.

David R. Dowty. 1991. Thematic proto-roles and argument selection. *Language*, 67:574–619.

Charles J. Fillmore. 1968. The case for case. In Emmon Bach and Robert T. Harms, editors, *Universals in Linguistic Theory*, pages 1–88. Holt, Rinehart and Wilson, Inc, New York.

Ray Jackendoff. 1990. *Semantic Structures*. MIT Press, Cambridge, MA.

Beth Levin. 1993. *English Verb Classes and Alternations*. University of Chicago Press, Chicago, London.

Kyonghee Paik and Francis Bond. 2002. Spatial representation and shape classifiers in Japanese and Korean. In David Beaver, Stefan Kaufmann, Brady Clark, and Luis Casillas, editors, *The Construction of Meaning*, pages 163–180. CSLI Publications, Stanford.