

Sentence Meanings and Truth -II

HUL243

1/08/2024

- ▶ Express sentence meanings in terms of their truth values
- ▶ Translate from sentences to logical form
 1. Your house is on fire and the fire brigade is on its way
 2. If it rains I'll go to the movies
 3. The key was on the table or in Mohan's pocket
 4. I will make the donation today or next week

Representing inference

- ▶ Modus ponens

1. a. If Anu left work early then she is in the gym.
b. Anu left work early

c. She is in the gym

$$1. \ p \rightarrow q$$

$$\begin{array}{c} p \\ \hline q \end{array}$$

► Modus tollens

1. a. If Anu has arrived then she is in the pub.
b. Anu is not in the pub

c. Anu has not arrived

$$1. p \rightarrow q$$

$$\frac{\neg q}{\neg p}$$

Entailment

- ▶ More on sentence relations
 1. The anarchist assassinated the emperor
 2. The emperor died
- ▶ In the pair of sentences above, 1 is said to **entail** 2
- ▶ If we read sentence 1 and know it to be true, then of course sentence 2 is true
- ▶ Entailment is not like inference—we don't have to reason to get from 1 to 2
- ▶ We *know* it : this is because of the knowledge of English

- ▶ Entailment defined by truth

A sentence **p** entails a sentence **q** when the truth of the first (**p**) guarantees the truth of the second (**q**) and the falsity of the second (**q**) guarantees the falsity of the first (**p**)

- ▶ If **p** (The anarchist assassinated the emperor is true), is **q** (The emperor is dead) true?
- ▶ If **q** (The emperor died) is false is **p** (The anarchist assassinated the emperor) also false?
- ▶ Then p entails q
- ▶ If p is false, we cannot say anything about q (it could be true or false!)

- ▶ If **p** (The anarchist assassinated the emperor is true), is **q** (The emperor is dead) true? Yes
- ▶ If **q** (The emperor died) is false is **p** (The anarchist assassinated the emperor) also false?
- ▶ Then p entails q
- ▶ If p is false, we cannot say anything about q (it could be true or false!)

- ▶ If **p** (The anarchist assassinated the emperor is true), is **q** (The emperor is dead) true? Yes
- ▶ If **q** (The emperor died) is false is **p** (The anarchist assassinated the emperor) also false? Yes
- ▶ Then p entails q
- ▶ If p is false, we cannot say anything about q (it could be true or false!)

- ▶ Entailment represented as a relation (When p is true, q is true)
- ▶ The below table is not a ‘real’ truth table

p		q
T	\rightarrow	T
F	\rightarrow	T or F
F	\leftarrow	F
T or F	\leftarrow	T

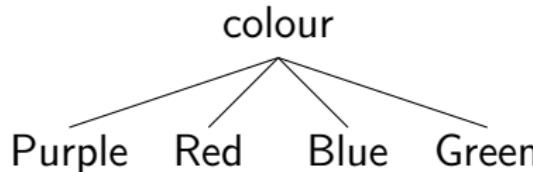
- ▶ We read the first line as : when p is true, q is true
- ▶ when p is false, q could be true or false
- ▶ when q is false, p is false
- ▶ when q is true, p could be true or false

Entailment: Lexical

- ▶ Entailment relation is given to us by linguistic structure (we don't need to check a fact in the world)
- ▶ The source of entailment may be lexical or syntactic
- ▶ The relationship of entailment in the previous example is the lexical relationship between *assassinate* and *die*
- ▶ The meaning of *assassinate* contains the meaning of *die*

Hyponymy

- ▶ Hyponymy between lexical items is a source of entailment
- ▶ *assassinate* is a **hyponym** of *die*
- ▶ the noun *dog* is a hyponym of *animal*
- ▶ The hyponym is a more specific meaning of a more general or superordinate term
- ▶ Below, purple, red, blue, green are hyponyms of colour
- ▶ As the super-ordinate term, colour is known as the **hypernym**



WordNet

WordNet Search - 3.1

- [WordNet home page](#) - [Glossary](#) - [Help](#)

Word to search for:

Display Options:

Key: "S:" = Show Synset (semantic) relations, "W:" = Show Word (lexical) relations

Display options for sense: (gloss)

Noun

- S: (n) [hitch](#), [hobble](#), **limp** (the uneven manner of walking that results from an injured leg)

Verb

- S: (v) [limp](#), [gimp](#), [hobble](#), [hitch](#) (walk impeded by some physical limitation or injury)
 - [direct hypernym](#) / [inherited hypernym](#) / [sister term](#)
 - S: (v) [walk](#) (use one's feet to advance; advance by steps)
 - S: (v) [travel](#), [go](#), [move](#), [locomote](#) (change location; move, travel, or proceed, also metaphorically)
 - [derivationally related form](#)
 - [sentence frame](#)
 - S: (v) **limp** (proceed slowly or with difficulty)

Entailment: syntactic

- ▶ Other sources of entailment are syntactic
 1. The Harappans built this city
 2. This city was built by Harappans
- ▶ The active and passive versions of the same sentence will entail one another
- ▶ The relationship of entailment allows us to define paraphrases: sentences which have the same set of entailments

Other semantic relations

- ▶ Synonymy
 - 1. Alice owns this laptop
 - 2. This laptop belongs to Alice

p	q
T	→ T
F	→ F
T	← T
F	← F

- ▶ In this table p and q will always have the same truth values

Other semantic relations

- ▶ Contradiction

1. He is a murderer but he's never killed anyone
2. Now is not now

p	q
T	\rightarrow F
F	\rightarrow T
T	\leftarrow F
F	\leftarrow T

- ▶ In this table p and q will always have the opposite truth values

Presupposition

- ▶ In the following examples, 1 is said to **presuppose** 2
 - 1. He's stopped turning into a werewolf every full moon
 - 2. He used to turn into a werewolf every full moon
 - 1. I do regret leaving Dubai
 - 2. I left Dubai
 - 1. His wife is a genius
 - 2. He has a wife

Presupposition

- ▶ Presupposition seems to resemble entailment – it is an ‘automatic’ relationship having no reasoning
- ▶ But in some ways, presupposition differs– and is sensitive to context

1. John's brother has just got back from Canada
 2. John has a brother
- What is the relationship between the sentences in terms of truth relations ?

p		q
T	→	T
F	→	T
T or F	←	T

- If **p** is true, then **q** is true
- If **p** is false, then **q** is still true
- If **q** is true, then **p** could be either true or false

Presupposition

p	q
T	\rightarrow T
F	\rightarrow T
T or F	\leftarrow T

1. The mayor of Delhi isn't in town today
 2. There is a mayor of Delhi
- ▶ Negating the presupposing sentence doesn't affect the pre supposition

Entailment

p	q
T	\rightarrow T
F	\rightarrow T or F
F	\leftarrow F
T or F	\leftarrow T

1. I didn't see my father today
 2. I saw someone today
- ▶ Negating the entailing sentence destroys the entailment

Presupposition failure

- ▶ In the following examples 1 presupposes b
 - 1. Ronald is a vegetarian
 - 2. Ronald exists
- 1. The King of France is bald
- 2. There is a King of France

II.—ON DENOTING.

By BERTRAND RUSSELL.

By a "denoting phrase" I mean a phrase such as any one of the following: a man, some man, any man, every man, all men, the present King of England, the present King of France, the centre of mass of the Solar System at the first instant of the twentieth century, the revolution of the earth round the sun, the revolution of the sun round the earth. Thus a phrase is denoting solely in virtue of its *form*. We may distinguish three cases: (1) A phrase may be denoting, and yet not denote anything; *e.g.*, "the present King of France". (2) A phrase may denote one definite object; *e.g.*, "the present King of England" denotes a certain man. (3) A phrase may denote ambiguously; *e.g.*, "a man" denotes not many men, but an ambiguous man. The interpretation of such phrases is a matter of considerable difficulty; indeed, it is very hard to frame any theory not susceptible of formal refutation. All the difficulties with which I am acquainted are met, so far as I can discover, by the theory which I am about to explain.

- ▶ When does the failure arise ? When there is no referent for the nominal/referring entity
- ▶ If there is no Ronald, or King of France then what's the status of the presupposing sentence ??
- ▶ Are they false, or are they neither true nor false?

- ▶ If q is false, the status of p is dubious
- ▶ Such a grey area is known as a ‘truth value gap’

p		q
T	→	T
F	→	T
T or F	←	T
?($T \vee F$)	←	F

Russell's solution

- ▶ Russell tried to analyze definite descriptions as complex expressions
 1. The King of France is bald is True iff
 - 1.1 at least one thing is the king
 - 1.2 at most one thing is the king
 - 1.3 whatever is the king is bald
- ▶ The King of France is bald is False if there is no king of France

When and how do speakers use definite nominals ?

- ▶ There is usually an **interactional** condition on referring
- ▶ A speaker's use of a name or definite description usually carries a guarantee that the listener can identify the referent
 1. Ghanshyam is bringing us a box of mangoes
 2. You are unlikely to use the referring expression 'Ghanshyam' unless I know who it is
- ▶ What conventions underlie a speaker's use of definite nominals?

Given vs new information

- ▶ If the referring expression is old information, then it is given information
- ▶ Usually in the sentence, given information is backgrounded, new information is foregrounded (highlighted)
 1. John's brother came back from Canada
- ▶ In this sentence *John's brother* is backgrounded by being placed in a noun phrase
- ▶ The second assertion *came back from Canada* is being foregrounded as the main verb is associated with it

Lexical triggers for Presuppositions

- ▶ Names give rise to presuppositions of existence
- ▶ Other kinds of presuppositions are sometimes produced by particular words
- ▶ Presuppositions are triggered by **factive** verbs
 1. Shyam realized that Mira had COVID
 2. Shyam thought that Mira had COVID
 3. Mira had COVID
- ▶ *Realize* presupposes 3 but *thought* doesn't
- ▶ Similarly, compare *regret* and *consider*, where *regret* is the factive verb

- ▶ Some verbs of judgement produce presuppositions
 1. John blamed me for telling her
 2. John accused me of telling her
 3. I told her
- ▶ Here the verb **blame** produces the presupposition in 3, but 2 does not.

References

John Saeed *Semantics*. Ch 4