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Lecture 11 Sentential Connectives: Ambiguity or Semantic Deficit?

1. English sentential connectives: ‘and’, ‘or’, ‘therefore’, ‘because’, ‘since’, ‘but’, ‘before’, ‘as’, ‘even though’, ‘if ...then’, ...

   logical operations: conjunction (‘and’, ‘but’), disjunction (‘or’), implication (‘if ... then’), equivalence (‘if and only if’), negation (‘no’, ‘not’, ‘it is not the case that’).

   Connectives in propositional logic:

conjunction (*and*)	$\wedge$, &
disjunction (*or*)	$\vee$
implication (*if ... then*)	$\rightarrow$
equivalence (*if and only if*)	$\leftrightarrow$, $\equiv$
negation (*not*).	$\neg$, $\sim$

   truth-functional connectives

   ?therefore, because, before

2. *Negation* $\neg$, $\sim$

   ‘not’, ‘it is false that’, ‘it is not the case that’, ‘it is incorrect that’, ‘it is not true that’, ‘it is wrong that’

p	$\neg p$
t	f
f	t

   Negation in English:

   ‘Non-students are not allowed.’
   ‘I didn’t think that Tom would win.’
   ‘Toby *didn’t* eat your sandwich.’
   ‘Toby didn’t eat your *sandwich*.’
   ‘Grandma isn’t “feeling lousy”, she is indisposed.’
   ‘Phydeaux didn’t “shit the rug”, he pooped on the carpet.’
   ‘The glass isn’t half full – it is half empty.’
   ‘I didn’t catch mongeese – I caught mongooses.’
   ‘The king of France is not bald.’ (cf. ‘Clive James is not bald.’)
   ‘The king of France is *not* bald; there isn’t any king of France.’

3. METALINGUISTIC NEGATION (cf. Horn 1985): a means for objecting to a previous *utterance* on any grounds, including the way it was pronounced. It is not analysable as ‘It is not true that *p*’. It is not the proposition that is denied

but the assertability. In metalinguistic negation style, presupposition, or implicature are negated.

Presupposition: a relation between sentences where if sentence S1 presupposes sentence S2, the truth of S2 follows from S1; if S2 is false, then S1 has no truth value. If S1 is false, then S2 is true.

S1		S2
t	→	t
Ø	←	f
f	→	t

S1: ‘The farmer hasn’t stopped beating his donkey.’
presupposes
S2: ‘The farmer was beating his donkey.’

Entailment: a relation between sentences where the truth of the second sentence S2 necessarily follows from the truth of the first (S1):

S1		S2
t	→	t
f	←	f
f	→	t ∨ f

S1: ‘I bought some tulips.’
entails
S2: ‘I bought some flowers.’

Implicature negated:
‘John didn’t *manage* to solve the problem; it was quite easy for him to solve.’
‘Bill hasn’t forgotten that today is Friday because today is Tuesday.’
(conventional implicature negated)

‘I’m not happy – I’m ecstatic.’
‘*Some* men aren’t chauvinists – *all* men are chauvinists.’
‘Max doesn’t have three children, he has four.’
(conversational implicature negated)
vs. ‘Tom doesn’t have three children, he has two.’
(ordinary, descriptive negation of the truth-conditional content)

Incorporated negation does not work for metalinguistic negation:
* ‘He is *un*intelligent – he is a genius.’

4. *Conjunction* ‘and’ ∧, &

The compound sentence with a conjunction is true if all of its conjuncts are true.

p	q	$p \wedge q$
t	t	t
t	f	f
f	t	f
f	f	f

‘Bill fell off the horse and broke his arm.’
p = ‘Bill fell off the horse.’
q = ‘Bill broke his arm.’
$p \wedge q$ is true iff p is true and q is true.

Conjunction in English:

‘John and Bill own a car.’ (collectively or distributively)
‘Sue and Bill are divorced.’ (conjunction inside the simple sentence)
‘He jumped on the horse and rode away.’ (sequence of events: $p \wedge q \neq q \wedge p$).
‘I dropped the camera and it broke.’ (consequence)
‘Touch me and I will hit you.’ (= ‘If you touch me, then I will hit you.’, an implication)

‘and’, ‘and then’, ‘and therefore’
‘Bill fell off the horse and broke his arm.'
‘She became pregnant and got married. But her father would prefer her to get married and become pregnant.’
$p \wedge q = q \wedge p$

Are such English sentences ambiguous due to different senses of ‘and’?
Do all the readings have the same logical form?
Is logical form the same thing as semantic representation?

‘Mary went to the bank.’
‘Little girls and boys were playing.’
vs
‘I broke my leg and went to the hospital.’

5. *Disjunction* ‘or’ $\vee$

The disjunction is false when both the simple sentences (disjuncts) are false. If at least one disjunct is true, the disjunction is true.

p	q	$p \vee q$
t	t	**t**
t	f	t
f	t	t
f	f	f

inclusive disjunction: the truth of both disjuncts is allowed.

exclusive disjunction (∨) , 'but not both'
Note: Exclusive disjunction is often used in English but **does not belong to propositional logic**:

p	q	p (∨) q
t	t	**f**
t	f	t
f	t	t
f	f	f

'He likes either red wine or white wine.' (exclusive)
'Your money or your life!' (exclusive)
'She is either happy or rich.' (inclusive?)
'Every citizen or permanent resident is eligible for unemployment benefit.' (inclusive)
? 'It is snowing or raining.' (inclusive in logic; exclusive and unnatural in English when the speaker knows that it is snowing)
'They appoint coloured people - or should I say blacks - to prominent posts.' (style)
the role of pragmatics: when one can say *p*, one should not say $p \vee q$ (cf. 'It is snowing or raining').

6. *Implication* 'if', 'if ... then', 'provided', 'whenever', ('unless') →
'If it is raining, then it will be wet.'

An implication (also called material implication) expresses a causal connection between an antecedent and a consequent. In logic, an implication is true when the antecedent is false or the consequent is true. It is only false if the antecedent is true and the consequent is false:

p	q	p → q
t	t	t
t	f	f
f	t	**t**
f	f	t

p is a sufficient condition for q but not a necessary one.

Implication in English:

? 'If penguins are birds then semantics is a study of meaning.'
? 'If penguins are mammals then they have wings.'
'If 2 + 2 = 5, then I am a winner.'
'If 2 + 2 = 5, then I am a loser.'
'If 2 + 2 = 4, then I am a winner.'
'If you cook the main course, I shall make the dessert.'

Stylistic reasons:
'If you are thirsty, there is some beer in the fridge.'
'If I may say so, you look tired.'

Conditional perfection:
'If' is often used as equivalence ('if and only if' (iff)):

'If the weather is nice, we will go out.'

In logic, if the antecedent is false, the implication is true by default.
$p \rightarrow q = \neg p \vee q$
'If I am right, I owe you £10.' $(p \rightarrow q)$
'Either I am wrong or I owe you £10.' $(\neg p \vee q)$

7. *Equivalence*

'if and only if', 'exactly when', 'only when', 'only if' $\leftrightarrow, \equiv$
In English 'if' is often used as equivalence:
'I will help you if you are too busy to do it yourself.'

p	q	$p \leftrightarrow q$
t	t	t
t	f	f
f	t	f
f	f	t

The equivalence (biconditional) is true only when both sentences have the same truth value.
$p \leftrightarrow q = (p \rightarrow q) \wedge (q \rightarrow p)$

'Tom will help you if and only if you ask him.'
q is the necessary condition for *p*

Q: To what extent does propositional logic help specify the meaning of connectives in English?

Suggested reading:
Introductory:
Kearns 2000, ch 2.2
Riemer 2010, chs 6.2-6.3
Jaszczolt 2002, ch 4
de Swart 1998, ch 3.4.1-3.4.4
Allwood et al. 1977, ch 4
Saeed 1997, ch 4.2

More advanced/detailed:
Horn 1985
Atlas 1979, 1989
Carston 1988, 1996, 2002
Geurts 1998
Kempson 1979, 1986
Cohen 1971
Lycan 2001