

# Implicature Computation and Attitude Predicates

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## Introduction

The traditional view of Pragmatics:  
Pragmatics is independent of syntax and semantics.

The output of syntactic and semantic  
computation is passed on to the pragmatic system

Example: Scalar implicatures

Traditional view: Implicatures are introduced after the whole computation of syntax and semantics is done.

Chierchia (2001): Implicatures are generated locally and projected compositionally

Today's talk: mostly along with Chierchia

However, implicature computation takes place at where a proposition is combined with an attitude predicate.

— slide #2

## Japanese Contrastive Topic

### Japanese Contrastive Topic

- (1) a. Dare-ga paatii- ni ki-ta-no?  
(Who came to the party?)
- b. JOHN-wa ki-ta  
John-Top come-Past  
'As for John, he came.'  
(Implicature (roughly): I don't know about others)
- c. JOHN-ga ki-ta.  
John-Nom come-Past  
'John came.' (complete answer)

— slide #4

## Japanese Contrastive Topic

The propositions that cannot induce implicatures are not compatible with Contrastive Topics.

- (2) #Minna-**wa** kita.  
Everyone-C<sub>Top</sub> came  
(no implicature is possible)

The asserted proposition ‘Everyone came’ is the strongest (most informative) among the alternatives (‘Some people came’, ‘Most people came’ etc.)

There is no room to implicate.

Not compatible with Contrastive *wa*.

— slide #5

## Hara (2004, To appear)

### Presuppositional Requirement

Contrastive Topics always induce scalar implicatures that express the uncertainty of the alternatives (Hara 2004)

I employed the mechanism developed by Sauerland (2001) to compute implicatures.

I proposed that if a sentence contains a C<sub>Topic</sub>, it presupposes a particular set of scalar alternatives.

A scalar alternative becomes an implicature ‘only if the scalar alternative is stronger than the assertion.’

In our case, since C<sub>Topic</sub>-marked sentences always induce implicatures, they must have a scalar alternative stronger than the assertion in order to be interpreted properly.

— slide #7

## Presupposition

- (3) nanninka-wa ki-ta  
Some-people-C<sub>Top</sub> come-Past  
Some people came.  
(Implicature: It's possible that not everyone came.)
- (4) CONTRASTIVE(<B, T>) (1st version)
- a. asserts: B(T)
  - b. presupposes:  $\exists T' [T' \in ALT_C(T) \ \& \ B(T') \text{ entails } B(T) \ \& \ B(T) \text{ doesn't entail } B(T')]$
  - c. implicates:  $\forall T' [T' \in ALT_C(T) \ \& \ B(T') \text{ entails } B(T) \ \& \ B(T) \text{ doesn't entail } B(T')] \rightarrow Poss(\neg B(T'))]$

— slide #8

## C-Topic Induces Implicatures

- (5) a.  $\exists x [ [person(x)][come(x)]]$  (=B(T))  
b. Stronger Scalar Alternative:  $\forall(x) [[person(x)][came(x)]]$  (=B(T'))  
c. Implicature:  
 $Poss (\neg \forall(x) [[person(x)][came(x)]])$   
(= $\neg B(T')$ )

This is similar to but not exactly the same as Büring's (1997) analysis of German Topic-Focus contour

— slide #9

## Conventional Implicature

In Grice (1975), implicatures are divided into two types:

Conversational

Conventional

**Question** Is the scalar implicature that arises with *wa* conversational or conventional?

**Hara (To appear)** Conventional

— slide #10

## Argument 1: Detachability

Grice (1975) says:

Conversational implicature: undetachable

Conventional implicature: detachable

— slide #11

## Argument 1: Detachability

The implicature with *wa* is detachable since it depends on the particular lexical item *wa*.

- (1) a. Dare-ga paatii- ni ki-ta-no?  
(Who came to the party?)
- b. JOHN-**wa** ki-ta  
John-Top come-Past  
'As for John, he came.'  
(Implicature: I don't know about others)
- c. JOHN-ga ki-ta.  
John-Nom come-Past  
'John came.' (complete answer)

— slide #12

## Argument 2: Uncancellability

Grice (1975) also says

Conversational implicature: cancellable

Conventional implicature: uncancellable

The implicature with *wa* is uncancellable.

- (2) #Minna-**wa** kita.  
Everyone-CTop came  
(no implicature is possible)
- (6) a. Did John and Mary come to the party?  
b. #John-wa kita-kedo, Mary-mo kita.  
John-CTop came-but, Mary-Add came  
'John<sub>CTop</sub> came, but Mary came, too'

— slide #13

# Strength Condition

## Chierchia 2001

It is a well-observed fact that a conversational scalar implicature is suspended in a DE context.

- (7) a. 'John read 3 books.'  
(Scalar Implicature: not 4)
- b. 'If John reads 3 books, he passes.'  
(Local Scalar Implicature Lost →  
He will pass even if he reads 4.)

— slide #15

## Chierchia 2001

Scalar implicatures are compositionally computed

The computation of the strong values (plain meaning + implicature) must be subject to the Strength Condition.

- (8) Strength Condition:  
The strong value cannot become weaker than the plain value

— slide #16

## Implicature and DE

- (9) 'If John reads 3 books, he passes.'  
(Natural interpretation: He will pass even if he reads 4.)

Chierchia says

If we keep a locally computed implicature in a DE context, it would yield a weakening of information.

Therefore, it must be removed in a DE context

Let us go through how the weakening takes place step by step.

— slide #17

## Chierchia 2001

the local conversational implicature  $|x : \mathbf{read}(j)(x) \wedge \mathbf{book}(x)| \not\geq 4$

if it were not removed, the strong value of the whole sentence would be

$[|x : \mathbf{read}(j)(x) \wedge \mathbf{book}(x)| \geq 3 \wedge |x : \mathbf{read}(j)(x) \wedge \mathbf{book}(x)| \not\geq 4] \rightarrow \mathbf{pass}(j)$

Now, let us compare this with the plain meaning of the whole sentence,

$|x : \mathbf{read}(j)(x) \wedge \mathbf{book}(x)| \geq 3 \rightarrow \mathbf{pass}(j)$

— slide #18



## Plain meaning

	local	pass(j)	global
	$ x : \mathbf{read}(j)(x)  \geq 3$ $\wedge \mathbf{book}(x) \geq 3$		$ x : \mathbf{read}(j)(x)  \geq 3$ $\wedge \mathbf{book}(x) \geq 3$ $\rightarrow \mathbf{pass}(j)$
John read 2	0	1	1
John read 2	0	0	1
John read 3	1	1	1
John read 3	1	0	0
John read 4	1	1	1
John read 4	1	0	0

— slide #19

## Strong meaning

	local	pass(j)	global
	$ x : \mathbf{read}(j)(x)  \geq 3$ $\wedge \mathbf{book}(x) \geq 3$ $\wedge  x : \mathbf{read}(j)(x)  \not\geq 4$		$[ x : \mathbf{read}(j)(x)  \geq 3$ $\wedge \mathbf{book}(x) \geq 3$ $\wedge  x : \mathbf{read}(j)(x)  \not\geq 4]$ $\rightarrow \mathbf{pass}(j)$
John read 2	0	1	1
John read 2	0	0	1
John read 3	1	1	1
John read 3	1	0	0
John read 4	0	1	1
John read 4	0	0	1

— slide #20

## Weakening

	plain	strong
	$ x : \mathbf{read}(j)(x)  \geq 3$ $\wedge \mathbf{book}(x) \geq 3$ $\rightarrow \mathbf{pass}(j)$	$[ x : \mathbf{read}(j)(x)  \geq 3$ $\wedge \mathbf{book}(x) \geq 3$ $\wedge  x : \mathbf{read}(j)(x)  \not\geq 4]$ $\rightarrow \mathbf{pass}(j)$
John read 2	1	1
John read 2	1	1
John read 3	1	1
John read 3	0	0
John read 4	1	1
John read 4	0	1

← Stronger!!

— slide #21

## Weakening

The plain meaning is stronger than the strong meaning.

This violates the Strength Condition

Therefore the implicature must be removed.

Consequently, in a DE context, only the plain meaning is retained for the subsequent computation.

— slide #22

## Chierchia 2001

Two separate application rules for DE and non-DE contexts

(10) Strong Application

Suppose  $\alpha = [\beta \ \gamma]$ , where  $\beta$  is of type  $\langle a, b \rangle$  and  $\gamma$  of type  $a$ . Then:

$$\begin{cases} \llbracket [\beta \ \gamma] \rrbracket^S \\ \llbracket \beta \rrbracket^S (\llbracket \gamma \rrbracket^S), \text{ if } \llbracket \beta \rrbracket^S \text{ is not DE} \\ \llbracket \beta \rrbracket^S (\llbracket \gamma \rrbracket) \wedge \neg(\llbracket \beta \rrbracket (\gamma^{ALT})), \text{ otherwise} \end{cases}$$

✂ S is removed

— slide #23

## *wa* within *if*-clause

### *wa* and Strength Condition

The implicature induced by *wa* cannot be suspended in a DE context.

- (11) \*John-ga hon-o 3-satsu-**wa** yom-eba, goukaku-suru.  
John-Nom book-Acc 3-Class-Top read-if, pass-do  
'If John reads 3<sub>CTop</sub> books, he passes.'

— slide #25

## *wa* and Strength Condition

With *wa*-induced implicatures, the ungrammaticality of (11) can be accounted for along the same line with Chierchia.

If we kept the locally computed implicature “John doesn’t read 4 books,”

the conditional antecedent has more content; thus, as a whole, the strong meaning would become weaker, violating the Strength Condition.

Therefore, the local implicature must be removed according to Chierchia.

*Wa* requires implicatures, however.

the sentence (11) crashes.

— slide #26

## Problem

However, if *wa* is further embedded within an attitude predicate, the sentence becomes acceptable.

- (11) \*John-ga hon-o 3-satsu-**wa** yom-eba, goukaku-suru.  
‘If John reads 3<sub>CTop</sub> books, he will pass.’
- (12) John-ga hon-o 3-satsu-**wa** yonda-to kyouju-ga shinjite ir-eba,  
John-Nom book-Acc 3-Class-Top read-Comp prof-Nom believe be-Comp,  
goukaku-suru.  
pass-do  
‘If the professor believes John read 3<sub>CTop</sub> books, he will pass.’

— slide #27

## Problem

The whole sentence keeps the locally computed implicature, “The professor doesn’t believe John reads 4 books”.

This should also yield a weakening of information at the matrix derivation, which is not allowed in Chierchia’s theory.

— slide #28

## Solution

Proposal: Each implicature is attributed to an attitude-bearer.

Implicatures are introduced when a proposition is applied to some attitude predicate

The Strength Condition does not apply at each step of derivation

Rather, it is checked within the set of doxastically accessible worlds for the local attitude-bearer

— slide #29

## Example

The following sentence is ambiguous

- (13) nanninka-**wa** kita-to Mary-ga shinjite-iru  
some-people-CTop come-Comp Mary-nom believe-Prog  
Mary believes some<sub>CTop</sub> people came

depending on:

which attitude-bearer (the speaker or Mary) is responsible for the implicatures

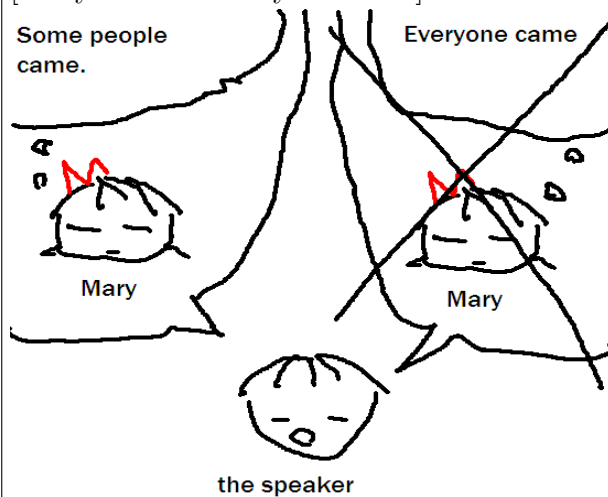
which propositions are contrasted;

i.e. what propositions are in the alternative set.

— slide #30

## Locus of Implicatures

Global: The speaker asserts [Mary believes some people came] and the speaker doesn't assert [Mary believes everyone came].



— slide #31

## Movement of Implicature Operator

Proposal:

- there is an island-sensitive movement of an implicature operator
- The implicature operator is part of the lexical meaning of *wa*.

What does *wa* do?

At the base position, *wa* generates scalar alternatives (e.g. {one, some, most, every}) and introduces an implicature operator.

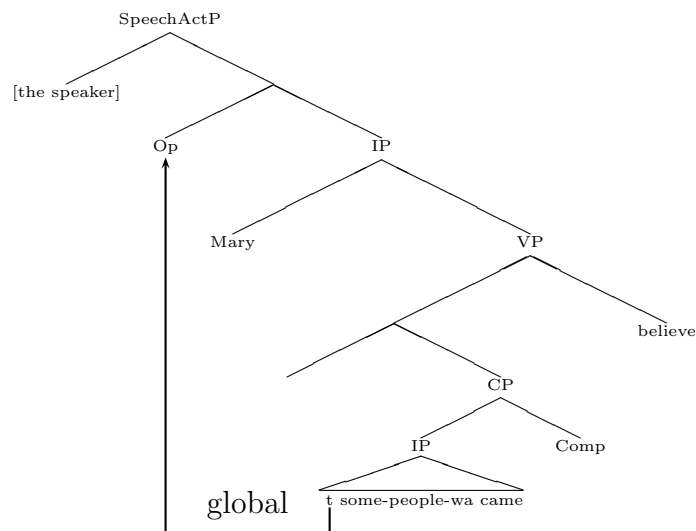
The implicature operator moves to the clause-initial position, and computes the implicature by picking an alternative stronger than the plain meaning.

— slide #32

## Movement of Implicature Operator

- (13) nanninka-wa kita-to Mary-ga shinjite-iru  
 some-people-C<sub>Top</sub> come-Comp Mary-nom believe-Prog  
 Mary believes *some*<sub>C<sub>Top</sub></sub> people came

(14)



— slide #33

## Adjunct Island Violation

Now, we can account for the contrast between these sentences:

- (11) \*John-ga hon-o 3-satsu-**wa** yom-eba, goukaku-suru.  
'If John reads 3<sub>CTop</sub> books, he will pass.'
- (12) John-ga hon-o 3-satsu-**wa** yonda-to kyouju-ga shinjite ir-eba,  
John-Nom book-Acc 3-Class-Top read-Comp prof-Nom believe be-Comp,  
goukaku-suru.  
pass-do  
'If the professor believes John read 3<sub>CTop</sub> books, he will pass.'

— slide #34

## Adjunct Island Violation

In (12), the operator finds the attitude-bearer within the adjunct clause.

Therefore, *wa* is licensed as an indication of the professor's uncertainty about alternatives

- (15) [.AdjunctP [ ... Op [ [XP t [XP three books ] -wa ] read Comp ] professor believe ] if ] ((12))

— slide #35



## Adjunct Island Violation

In (11), there is no attitude-bearer within the *if*-clause.

Therefore, the operator has to target the global implicature (the speaker's uncertainty)

However, this movement is blocked as an adjunct island violation.

- (16) \* [speaker] [ Op [ ... [AdjunctP [IP John t 3-books-wa read ] if ]]]] (11)

— slide #36

## Structural Account

a syntactic account like movement for a semantic/pragmatic object like implicature???

- (17) \*moshi pro nihongo-wa dekir-eba, shuushoku-ni yuuri-da.  
 if pro Japanese-CTop capable-Comp job-hunting-for advantage-Cop  
 'If you can speak Japanese<sub>CTop</sub>, it is easy to find a job.'
- (18) Nihongo-wa moshi pro pro dekir-eba, shuushoku-ni yuuri-da.  
 Japanese-CTop if pro pro capable-Comp job-hunting-for advantage-Cop  
 'As for Japanese, if you can speak it, it is easy to find a job.'

Having a Contrastive within a conditional *per se* should be ok semantically.

Plausible to attribute the ungrammaticality to its structure.

— slide #37

## Revising the Definition

We need to revise the definition of *wa*

(4) CONTRASTIVE(<B, T>) (1st version)

- a. asserts:  $B(T)$
- b. presupposes:  $\exists T' [T' \in ALT_C(T) \ \& \ B(T') \text{ entails } B(T) \ \& \ B(T) \text{ doesn't entail } B(T')]$
- c. implicates:  $\forall T' [T' \in ALT_C(T) \ \& \ B(T') \text{ entails } B(T) \ \& \ B(T) \text{ doesn't entail } B(T')] \rightarrow Poss(\neg B(T'))]$

— slide #38

## Revising the Definition

Two reasons to revise this model:

1. The model does not fit the Epistemic Containment Principle (ECP)

**ECP** A quantifier cannot bind a variable across an epistemic modal. (von Stechow and Iatridou 2003)

2. The notion of attitude-bearer must be included in the model

— slide #39

## Revising the Definition of *wa*

Instead of using the epistemic modal, *Poss*, I use quantification over worlds doxastically accessible to the attitude-bearer (Heim 1992, von Stechow and Iatridou 2003):

- *Must p* asserts that *p* is true in **all** worlds doxastically accessible to the attitude-bearer
- *Poss p* asserts that *p* is true in **some** worlds doxastically accessible to the attitude-bearer

— slide #40

## Epistemic items

Bill said:

“It is possible that John is home”

Bill’s doxastically accessible worlds



— slide #41

## New Definition of $wa$

(19) CONTRASTIVE( $w$ )( $x$ )(B)(T) (final version)

- a. asserts:  $B(T)(w)$
- b. presupposes:  $\forall w' \in \min_w[w' \in \text{Dox}_x(w)] : \exists T'[T' \in ALT_C(T) \ \& \ B(T')(w') \text{ entails } B(T)(w') \ \& \ B(T)(w') \text{ doesn't entail } B(T')(w')]$
- c. implicates:  $\exists w' \in \min_w[w' \in \text{Dox}_x(w)] : \forall T'[T' \in ALT_C(T) \ \& \ B(T')(w') \text{ entails } B(T)(w') \ \& \ B(T)(w') \text{ doesn't entail } B(T')(w')][B(T')(w')=0]$

— slide #42

## Conclusion

Chierchia (2001) has proposed that implicatures are generated locally and projected compositionally.

Implicatures induced by Japanese Contrastive Topic provide evidence for the local computation of implicature; however, their properties are not fully compatible with Chierchia's analysis.

Implicature computation should take place in a larger cycle than Chierchia's, namely at the position where a proposition is combined with an attitude predicate.

— slide #43

## Conclusion

this semantic/pragmatic account is implemented in the syntax by postulating an implicature operator that moves to an attitude predicate

I also revise the definition of *wa* so that it incorporates the idea of attitude-bearer.

— slide #44

## Preview: Other Adjuncts

- (20)
- a. \*Kinou Mary-wa uchi-ni kita **toki**, daremo i-nakat-ta.  
yesterday Mary-CTop house-dat came when, anyone exist-Neg-Past  
'When Mary came to our house, no one was home.'
  - b. \*Kinou Mary-wa uchi-ni kuru **mae**, daremo i-nakat-ta.  
yesterday Mary-CTop house-dat come before, anyone exist-Neg-Past  
'Before Mary came to our house, no one was home.'
  - c. \*Kinou Mary-wa uchi-ni kita **ato**, minna-de shokuji-o shita.  
yesterday Mary-CTop house-dat came after, everyone-with meal-Acc did  
'After Mary came to our house, we had meal together.'

— slide #45

## Preview: Other Adjuncts

- (21) Kinou Mary-wa uchi-ni kita **node**, kodomo-ga yorokon-da.  
yesterday Mary-CTop house-dat came because, children-Nom happy-Past  
'Because Mary came to our house, the children became happy.'

Evidential Projection (Cinque 1999, Tenny 2002)

— slide #46

## Preview: Cross-Linguistic Implication

English 'obviously'

(Tredinnick 2004)

- (22) a. Mary is upset **because** it is obvious that John doesn't love her. (ambiguous)  
b. Mary is upset **because** obviously John doesn't love her. (unambiguous)
- (23) a. \*Mary will be upset **if** obviously she fails the exam.  
b. \*Mary got upset **after** obviously she failed the exam.  
c. \*Mary was single **before** obviously she met John.  
d. \* Mary got upset **when** obviously she failed the exam.

— slide #47

## Preview: Cross-Linguistic Implication

German 'ja'

- (24) Ja  $\alpha$  is appropriate in a context  $c$  if the proposition expressed by  $\alpha$  in  $c$  is a fact of  $w_c$  which - for all the speaker knows - might already be known to the addressee. (Kratzer 1999)
- (25) Maria ist ärgerlich, **weil** John ja sie nicht liebt  
Maria is angry, because John  $\bar{J}A$  her not love  
'Maria is angry, because John JA doesn't love her.'

— slide #48

## Preview: Cross-Linguistic Implication

- (26) a. \*Maria wird ärgerlich sein, **wenn** sie ja die Prüfung nicht besteht  
Maria will angry be, if she  $\bar{J}A$  the exam not pass  
'Maria will be angry, if she JA doesn't pass the exam.'
- b. \*Maria wurde ärgerlich, **nachdem** sie ja die Prüfung nicht bestanden hatten  
Maria got angry, after she  $\bar{J}A$  the exam not passed have  
'Maria is angry, after she JA didn't pass the exam.'
- c. \*Maria wurde allein, **bevor** sie ja John getroffen hatte  
Maria was single, before she  $\bar{J}A$  John met have  
'Maria was single, before she JA met John.'
- d. \*Maria wurde ärgerlich, **als** sie ja die Prüfung nicht bestanden hatten  
Maria was angry, when she  $\bar{J}A$  the exam not passed have  
'Maria is angry, when she JA didn't pass the exam.'

— slide #49

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