Truth, Meaning, and Normativity in Inquisitive Semantics and Pragmatics

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(based on joint work with Ivano Ciardelli and Floris Roelofsen)

www.illc.uva.nl/inquisitive-semantics

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I owe much to
Inés Crespo's MSc thesis:
Normativity and interaction: from ethics to semantics
ILLC (2009)

Semantics and Pragmatics

Semantics

- Recursive assignment of meanings to the sentences of a language
- Here: a language of propositional logic

Pragmatics

- Concerns the communicative use of the language by the participants in a conversation
- Here: purely exchanging information about the world

Semantics and Pragmatics

- Two levels of interpretation
- The way you construct the semantics influences the pragmatics

“Meaning is Normative”

- Not in any obvious way in my picture of the semantic level of interpretation
- More obviously so at the level of pragmatics, where a group of participants in a conversation interact with the particular purpose of exchanging information

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- But the type of meanings the semantics assigns to sentences may have an effect on our explanations of normativity of meaning at the pragmatic level
- Inquisitive semantics assigns meanings to sentences which more easily come with an informal story that directly relates semantic content to pragmatic usage in the exchange of information by the participants in a conversation

Semantic Interpretation

Conjecture

- The semantic interpretation of a sentence by a competent language user is by and large not the performance of an action
- Under normal circumstances the primary semantic uptake of a sentence by a language user is an automated process

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- Of course, under special circumstances the outcome of such an uptake may put you into some sort of deliberate (re)action
- In a cooperative informative conversation you even *should* react if you cannot transform the uptake into a real update
- But then we are at the pragmatic level

Pragmatic Ingredients

- A language user is identified with her information state, a non-empty set of (possible) worlds
- At certain stages, an information state may embody an issue, modeled as a subdivision of a state in a number of alternative substates, alternative possibilities
- In order to be able to communicate that one has an issue, we will let the language be such that questions can be expressed in it, or more generally, inquisitive sentences
- Conversations are ruled by the global pragmatic principle:

  Enhance the Common Ground!
- That is our source of normativity

Common Ground

- The common ground is an information state
- ”the set of possible worlds compatible with what speaker and hearer can be presumed to take for granted at a given point in the conversation” [Stalnaker]
- The common ground is established by the conversation, it is a public social entity

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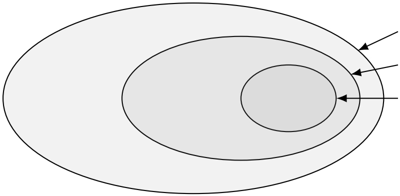
- For a state to count as the common ground at a particular stage of the conversation, the states of all participants (private) in the conversation should be included in the common ground (public)
- Conversational principle: Maintain the Common Ground!
- This is a social norm, the collective responsibility of the participants in the conversation, they should act accordingly



An individual information state, the internal, and the external common ground.

- What is not depicted is that individual states and the common ground may embody an issue, i.e., they may be subdivided in a number of alternative possibilities

Shared Language Assumption

Atoms

- Atomic sentences are either true or false in a world
- $V(p)$: the set of worlds where atomic sentence p is true
- I (must) assume that the language users share the same language
- What $V(p)$ is belongs to the common ground
- Convention!

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- I am absolutely begging the question here of the normativity of meaning at the basic semantic level
- But of course we *should* use a common public language to start with for there to be any chance of exchanging information

Truth and Informativeness

- Standard semantics recursively defines truth relative to a world for the sentences of the language
- $|\varphi|$: the set of worlds where φ is classically true, the classical notion of a proposition
- $|\varphi|$ represents the informative content of φ
- Entailment: $|\varphi| \subseteq |\psi|$, in every world where φ is true, ψ is true as well, i.e., φ is at least as informative as ψ
- φ is not informative iff $|\varphi| = \omega$ (or $|\varphi| = \emptyset$)
- We could do without the notion of truth, and recursively state the semantics directly in terms of the notion of informative content

Truth and Meaning

Two dimensions of meaning

- To the extent that truth is an essential semantic notion, it only concerns one dimension of meaning: informative content
- Questions are not true (or false), they are not informative in any direct sense, but they are (can be) meaningful
- There is at least one other dimension of meaning besides informativeness: inquisitiveness

- Look at an assertion, like an atomic sentence p, as a proposal to enhance (update) the common ground
- Look at a question as proposing alternative ways to enhance (update) the common ground

A third dimension of meaning: Attentiveness

(1) John might be in London.

(2) John is in London.

(3) Is John in London?

Main contrasts

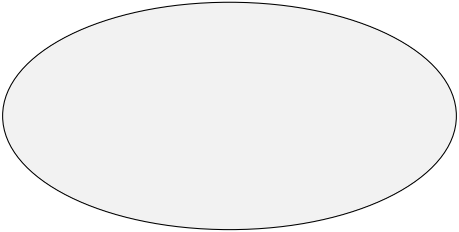
- (1) differs from (2) in that it does not provide the information that John is in London
- (1) differs from (3) in that it does not request information
- ‘ok’ is an appropriate response to (1), but not to (3)

Main intuition

- The semantic contribution of (1) lies in its potential to draw attention to the possibility that John is in London

The Traditional Picture

- Meaning = informative content
- Providing information = eliminating possible worlds



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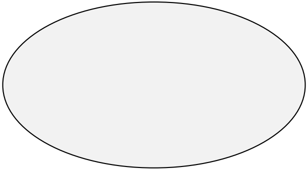

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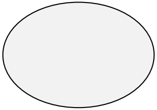

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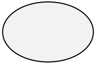

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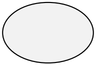
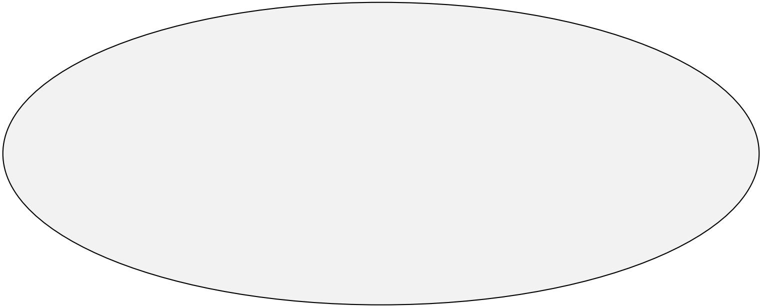


- Only captures purely descriptive language use
- Does not reflect the cooperative nature of communication

The Inquisitive Picture

- Propositions as proposals
- A proposal consists of one or more possibilities
- A proposal that consists of several possibilities is inquisitive



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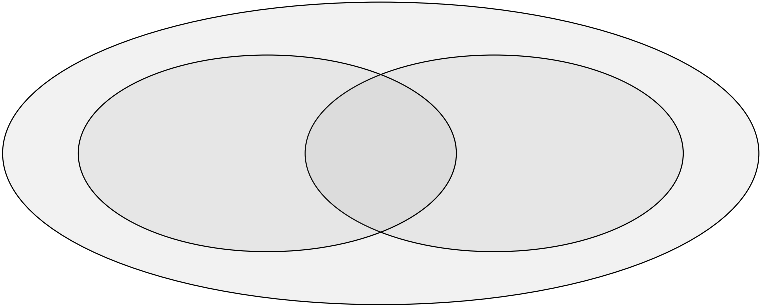

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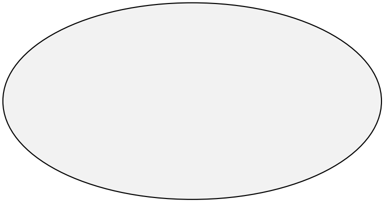

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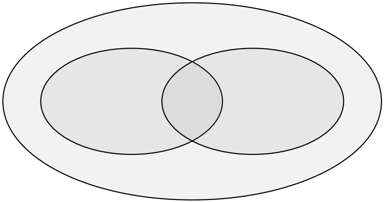

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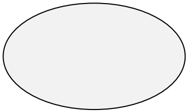


A Propositional Language

Basic Ingredients

- Finite set of proposition letters $\mathcal{P}$
- Connectives $\neg$, $\wedge$, $\vee$, $\rightarrow$

Abbreviation

- Non-informative closure: $?\varphi := \varphi \vee \neg\varphi$

Semantic Notions

Basic Ingredients

- (possible) world: function from $\mathcal{P}$ to $\{0, 1\}$
- Possibility: set of worlds
- Proposition: set of alternative possibilities

Notation

- $[\varphi]$: the proposition expressed by φ
- $|\varphi|$: the truth-set of φ (set of indices where φ is classically true)

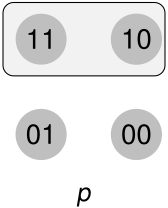
Classical, Inquisitive, Informative Sentences

- φ is classical iff $[\varphi]$ contains exactly one possibility
- φ is inquisitive iff $[\varphi]$ contains more than one possibility
- φ is informative iff $\bigcup[\varphi] \neq \omega$ Fact: $\bigcup[\varphi] = |\varphi|$

Atoms

For any atomic formula φ: $[\varphi] = \{\ |\varphi|\ \}$

Example:

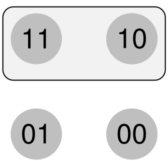


Negation

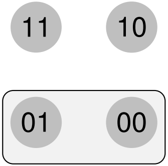
Definition

- $[\neg\varphi] = \{\ \overline{\bigcup[\varphi]}\ \}$
- Take the union of all the possibilities for φ; then take the complement

Example, φ classical:



$[p]$



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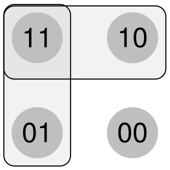
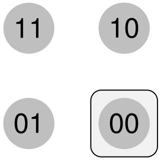
Example, φ inquisitive:



$[\varphi]$



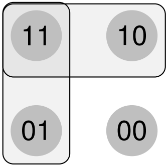
$[\neg\varphi]$

Disjunction

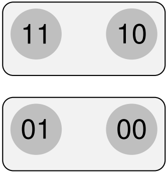
Definition

- $[\varphi \vee \psi] = [\varphi] \cup [\psi]$

Examples:



$p \vee q$



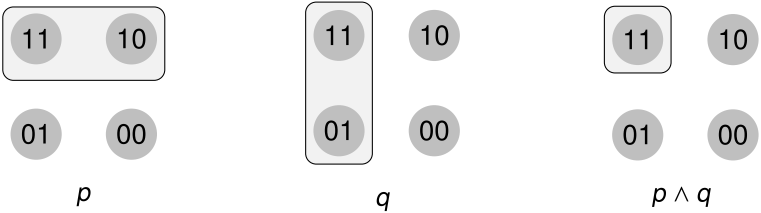
$?p \;\; (:= p \vee \neg p)$

Conjunction

Definition

- $[\varphi \wedge \psi] = \{\alpha \cap \beta \mid \alpha \in [\varphi]$ and $\beta \in [\psi]\}$
- Pointwise intersection

Example, φ and ψ classical:



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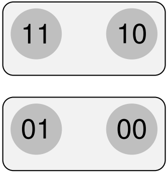
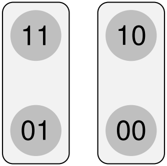
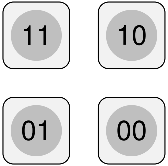
Example, φ and ψ inquisitive:



$?p$



$?q$



$?p \wedge ?q$

Conditionals

Definition

- $[\varphi \to \psi] = \sqcap\{\{\alpha \Rightarrow \beta \mid \beta \in [\psi]\} \mid \alpha \in [\varphi]\}$

- Let Σ be a set of sets. By $\sqcap\Sigma$ we denote the pointwise intersection of all the sets $\pi \in \Sigma$:
  $\sqcap\Sigma := \{ \bigcap_{\pi\in\Sigma} f(\pi) \mid f$ a choice function$\}$

- For simplicity, we define $\alpha \Rightarrow \beta$ in terms of material implication: $\alpha \Rightarrow \beta := \overline{\alpha} \cup \beta$
- More sophisticated treatments of conditionals could in principle be plugged in here

Conditionals (continued)

Definition

- $[\varphi \rightarrow \psi] = \sqcap\{\{\alpha \Rightarrow \beta \mid \beta \in [\psi]\} \mid \alpha \in [\varphi]\}$
- $\sqcap\Sigma$ gives the pointwise intersection of the propositions $\pi \in \Sigma$

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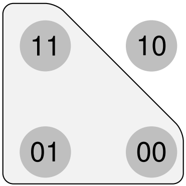
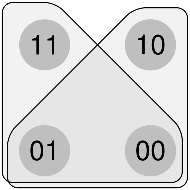
- So, there is one possibility in $[p \to q]$
- And there are two possibilities in $[p \to (q \vee r)]$ and in $[p \to ?q]$, they are inquisitive

Pictures, classical and inquisitive



$p \rightarrow q$

If John goes, Mary will go as well.



$p \rightarrow ?q$

If John goes, will Mary go as well?

Conditionals (continued again)

Definition

- $[\varphi \to \psi] = \sqcap\{\{\alpha \Rightarrow \beta \mid \beta \in [\psi]\} \mid \alpha \in [\varphi]\}$

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- $\sqcap\Sigma$ gives the pointwise intersection of the propositions $\pi \in \Sigma$

- Note, if $[\psi]$ contains a single possibility β, then Σ contains as many propositions π, as there are possibilities $\alpha \in [\varphi]$, where each such proposition $\pi = \{\alpha \Rightarrow \beta\}$
- Hence, $\sqcap\Sigma$ will also consist of a single possibility
- If the consequent of a conditional is not inquisitive, as in $(p \vee q) \rightarrow r$, the conditional isn't inquisitive either

Conditionals (final example)

(4) If John goes to London or to Paris, will he fly British Airways? $(p \vee q) \rightarrow ?r$

- Since there are two possibilities for $p \vee q$ the proposition expressed by (4) is obtained by pointwise intersection of two propositions: one corresponds to $p \rightarrow ?r$ and one to $q \rightarrow ?r$
- There are two possibilities for $p \rightarrow ?r$ that correspond to $p \rightarrow r$ and $p \rightarrow \neg r$
- There are two possibilities for $q \rightarrow ?r$ that correspond to $q \rightarrow r$ and $q \rightarrow \neg r$
- Pointwise intersection delivers 4 possibilities for (4):

$(p \rightarrow r) \wedge (q \rightarrow r)$ $\quad$ $(p \rightarrow \neg r) \wedge (q \rightarrow r)$

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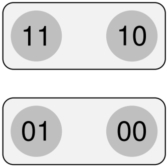
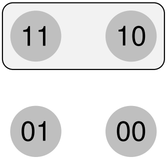
Questions, Assertions, and Hybrids

- φ is a question iff it is not informative
- φ is an assertion iff it is not inquisitive





Questions, Assertions, and Hybrids

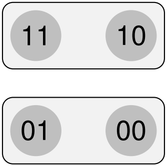
- φ is a question iff it is not informative
- φ is an assertion iff it is not inquisitive

- φ is a hybrid iff it is both informative and inquisitive
- φ is insignificant iff it is neither informative nor inquisitive

Significance and inquisitiveness

- In a classical setting,
  non-informative sentences are tautologous, i.e., insignificant
- In inquisitive semantics, some classical tautologies come to form a new class of meaningful sentences, namely questions
- Questions are meaningful not because they are informative, but because they are inquisitive

- Example: $?p := p \vee \neg p$



$p \vee \neg p$

Some Reflections on the Semantics

- There is nothing inherently normative in the formal semantic notion $[\varphi]$ as such
- What could be normative about a set of sets?

- But the formal semantics comes with an informal story about how to look upon a proposition $[\varphi]$
- That story relates propositions to their use in a conversation by those who participate in it
- Given the current stage of the common ground one can make certain judgements about whether a conversational move complies to it, given our general normative conversational principle: Enhance the common ground!

Pragmatics

- Gricean pragmatics generally assumes a truth-conditional semantics, which captures only informative content
- Gricean pragmatics is a pragmatics of providing information
- Inquisitive semantics enriches the notion of semantic meaning
- This requires an enrichment of the pragmatics as well
- We need not just a pragmatics of providing information, but rather a pragmatics of exchanging information

Transparency

Acceptability

- You should publicly announce unacceptability of the informative content in your state of a proposal made by another participant (Maintain the integrity of your own state)
- Questions, being non-informative, are always acceptable

Pragmatic interpretation

- If any participant does not accept a proposal, the proposal is cancelled, the common ground is not updated with the proposal (Maintain the Common Ground!)
- If no participant objects to a proposal, the common ground is and all individual states should be updated with the proposal (Enhance the Common ground!)

Sincerity

Informative Sincerity

- If you propose φ your state should support the informative content of φ
- Motivated by: Maintain the Common Ground
- Trivially met by questions

Inquisitive Sincerity

- If you propose φ every possibility for φ should be consistent with your state
- Motivated by: Enhance the Common Ground
- Redundant for assertions
- Secures that every fully compliant response to an inquisitive sentence should be acceptable

Compliance

Definition

- φ is compliant to ψ iff
  1. every possibility for φ is the union of a set of possibilities for ψ
  2. every possibility for ψ restricted to $|\varphi|$ is contained in a possibility for φ

- Compliance is a logical pragmatical notion of strict relatedness of a response φ to an initiative ψ
- Compliance in combination with informativess makes it possible to choose an optimal response, provided that your information state allows for it
- A compliant response φ to a sincerely made proposal ψ is bound to be acceptable for the participant who proposed ψ

Some Conclusions

- Truth may be a significant semantic notion, but it only relates to one dimension of meaning
- The meanings assigned to sentence by the current installments of inquisitive semantics are not inherently normative
- But it is the multi-dimensional semantic content assigned to sentences in inquisitive semantics that gives rise to a richer perspective on pragmatics
- We get a more detailed, and better to formalize picture of the normativity of meaning at the level of pragmatic interpretation

Inquisitive, informative, and attentive sentences

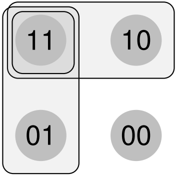
Definitions

- φ is informative iff it proposes to eliminate indices, i.e., $|\varphi| \neq \omega$
- φ is inquisitive iff $[\varphi]$ contains at least two maximal possibilities
- φ is attentive iff $[\varphi]$ contains a non-maximal possibility

Example

- $p \vee q \vee (p \wedge q)$ (*p* or *q* or both)

  informative, inquisitive, and attentive



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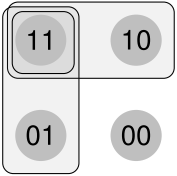


Might

Intuition

- $\Diamond p$ draws attention to the possibility that p, without providing or requesting any information

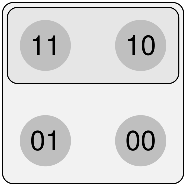
  More generally:

- $\Diamond \varphi$ draws attention to all the possibilities for φ, without providing or requesting information

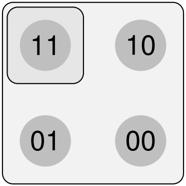
Implementation

- Define $\Diamond \varphi$ as an abbreviation of $\top \vee \varphi$

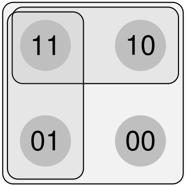
Illustrations



$\Diamond p$



$\Diamond(p \wedge q)$



$\Diamond(p \vee q)$

It might be rainy

It might be
rainy and windy

It might be
rainy or windy

Might meets disjunction and conjunction

Zimmermann's observation (NALS 2000)

- The following are all equivalent:

(5) John might be in London or in Paris. $\Diamond(p \vee q)$

(6) John might be in London
or he might be in Paris. $\Diamond p \vee \Diamond q$

(7) John might be in London
and he might be in Paris. $\Diamond p \wedge \Diamond q$

Might meets disjunction and conjunction

Further observation

- For the equivalence to go through, it is crucial that John cannot be both in London and in Paris at the same time

Szabolcsi's scenario

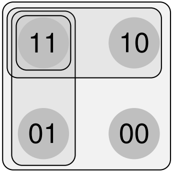
- We need an English-French translator, i.e., someone who speaks *both* languages. In that context, (10) is perceived as a useful recommendation, while (8) and (9) are not.

(8) John might speak English or French. $\Diamond(p \vee q)$

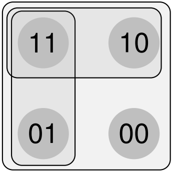
(9) John might speak English or he might speak French. $\Diamond p \vee \Diamond q$

(10) John might speak English and he might speak French. $\Diamond p \wedge \Diamond q$

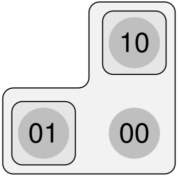
Might meets disjunction and conjunction



(a) $\Diamond p \wedge \Diamond q$



(b) $\Diamond p \vee \Diamond q$
$\equiv \Diamond(p \vee q)$



(c) $\Diamond p \wedge \Diamond q$
$\equiv \Diamond p \vee \Diamond q$
$\equiv \Diamond(p \vee q)$

- Whenever the disjuncts are mutually exclusive, as in (c), all three formulas are equivalent
- If the disjuncts are not mutually exclusive, then $\Diamond p \wedge \Diamond q$ differs from the other two in that it draws attention to the possibility that p and q both hold.
- This is what makes $\Diamond p \wedge \Diamond q$ a useful recommendation in Szabolcsi's scenario

Thank you!

Netherlands Organisation for Scientific Research

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