A semantic explanation of factive and wh-islands

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Islands in Contemporary Linguistic Theory
University of the Basque Country, Vitoria-Gasteiz
November 16-18, 2011
Propose that weak islands, rather than being arguments for an important constraint on representations in fact show an interpretive problem.
(cf. also Szabolcsi and Zwarts 1993, Honcoop 1998, Fox and Hackl 2007)

(1) a. Who do you wonder how to insult?
   b. *How tall do you wonder who should be?

(2) a. Who do you regret that John invited to the party?
   b. *How do you regret that John behaved?

But that will lead us to a second question: Intuitively, it seems that there are two different types of problems:

- semantic anomaly: #I am here and not here
- ungrammaticality: *How tall isn’t Bill?

Why does a problem of semantic interpretation lead to a second type of anomaly?
Weak Island Phenomena

(3) **Wh-Islands**
   a. Who do you wonder **how** to insult__?
      |__________________________|
   b. *How do you wonder **who** to insult__?
   c. *How tall do you wonder **who** should be__?
      |__________________________|

(4) **Factive Islands**
   a. Who does John **regret** that he invited to the party?
   b. *How does John **regret** that he fixed the car?
   c. *How tall does John **regret** that he is?

(5) **Negative Islands**
   a. Who didn’t John invite to the party?
   b. *How didn’t John behave at the party?
   c. *How tall isn’t John?
Weak Island Phenomena

A syntactic solution (Rizzi 1990, etc): Relativised Minimality

(6) Weak Islands

a. Who how/regret/not __?  
   |________________________________|

b. *How wh/regret/not __?  
   |________________________________|

c. *How tall wh/regret/not __?  
   |__________________________|
   X  

(7) a. AB A __?  
    |__________________________|

b. *A A __?  
   |__________________________|

b’. *A AB __?  
   |__________________________|
   X
Against a syntactic solution: Modal obviation

(cf. Fox and Hackl 2007)

- Recall the classic negative island violation:

  (8)   a.  *How tall isn’t John?
        b.  *How didn’t John behave at the party?

- An **existential** modal under negation **ameliorates** the violation:

  (9)   a.  How tall is John **not** allowed to be?
        b.  How was John **not** allowed to behave at the party?

- A **universal** modal under negation **does not ameliorate** the violation:

  (10)  a.  *How tall is John **not** required to be?
        b.  *How was John **not** required to behave at the party?

→ it seems that a constraint on representations of the type shown above is **not** what is behind these facts. Rather, some aspect of interpretation is the culprit.
Previous semantic accounts

  - Do not extend to obviation effects by modals
  - The proposal for presuppositional and wh-islands is only programmatic

- Domain specific accounts 1: Negative Islands

  Rullmann (1995)
  - Cannot predict the obviation effects by modals

  Fox and Hackl (2007), Fox (2007)
  - Similarity with the present proposal: The unacceptability of (negative) islands is due to there not being a maximally informative true answer

- Domain specific accounts 2: Factive Islands

  Oshima (2006)
  - Does not apply to factive islands created by degree expressions.
Plan

Extend the idea of Fox and Hackl (2007) to other types of weak islands:

- **The core idea developed here:**
  The unacceptable questions lead to a **contradiction** at some level

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- **Part 1:** Presuppositional Islands

- **Part 2:** wh-Islands

- **Part 3:** About various notions of analyticity and grammaticality
Part 1: Presuppositional Islands

- **Questions about individuals** with a variable in the scope of a factive verb:

  (11) **Who of these ten people does Mary regret that Bill invited?**

  \[ [[(11)]]^w = \{ \text{that Mary regrets that Bill invited } x \mid x \in \{ \text{these ten people} \} \} \]

  \[ = \{ \text{that Mary regrets that Bill invited Sue} \]
  \[ \text{that Mary regrets that Bill invited Jane} \]
  \[ \text{that Mary regrets that Bill invited Lea...etc} \]

- **Empirically**, it seems that the question above presupposes that for every \( x \) in the given domain, Bill invited \( x \):\(^1\)

  (12) **presupposition of (11):** \( \forall x \in \{ \text{these ten people} \} : \text{Bill invited } x \)

→ The context can easily satisfy the set of presuppositions that the question has:

  The presuppositions of the alternatives are independent from each other.

\[^1\] The presupposition of \( x \text{ regrets that } p \) might be that \( p \text{ is true and that } x \text{ believes } p \). This would not change the validity of the argument. (cf. Heim 1992, Karttunen 1973)
Explanation of factive islands with manners

- Manner questions that contain a factive verb are predicted to presuppose a contradiction.

(13) *How does Mary regret that John fixed the car?

(14) \[ [13]^w = \{ \text{that Mary regrets that John fixed the car in } \alpha \mid \alpha \in D_{\text{Manner}} \} \]

- The alternative propositions in the H/K denotation of the question range over a set of manners that contains contraries

(15) \[ [13]^w = \{ \text{that Mary regrets that John fixed the car properly,} \]

\[ \text{that Mary regrets that John fixed the car improperly,} \]

\[ \text{that Mary regrets that John fixed the car fast} \]

\[ \text{that Mary regrets that John fixed the car slowly etc.} \} \]

- A universal projection pattern for the presupposition embedded in the scope of the question will project a set of propositions that are contradictory:

(16) presupposition of the question in (13):

for every manner \( \alpha \in D_M \): John fixed the car in \( \alpha \)
Questions about manners

- **Assumption 1: Contraries**

  The domain of manners always contains contraries: every manner predicate has at least one contrary in the domain of manners.

  (17) Manners denote functions from events to truth values. The set of manners ($D_M$) in a context $C$ is a subset of $\{f \mid E \rightarrow \{0,1\} = \emptyset(E)\}$ such that for each predicate of manners $P \in D_M$, there is at least one contrary predicate of manners $P' \in D_M$, such that $P$ and $P'$ do not overlap: $P \cap P' = \emptyset$.

- **Assumption 2: Admissible Domains**

  The context might implicitly restrict the domain of manners (just as the domain of individuals), but for any manner predicate $P$, its contrary predicates will be alternatives to it in any context.

  (18) a.  {wisely, unwisely, etc…}
  b.  {fast, slowly, etc…}
‘D-linking’

In what manner does John regret that Mary fixed the car?

We are dealing with an identity question:

‘For what manner \( \alpha \), \( \alpha = 1\beta \) st. Mary regrets that John fixed the car in \( \beta \)?’

The factive presupposition is in the restrictor of the definite description

\[
\text{(the manner [ such that Mary regrets that John fixed the car that way] is } \alpha \text{. )}
\]

Presuppositions embedded in restrictors of quantifiers are independently known to project weakly or not at all [cf. Schlenker (2006)]:

(among these 10 boys) No one [who is aware that he is incompetent] applied

\rightarrow Presupposition of (19): there is a unique manner \( \beta \) st. Mary regrets that John fixed the car in \( \beta \)
Degree and *how many* questions

- **Assumption about Intervals:**
  - Schwarzschild and Wilkinson (2002), Schwarzschild (2004), Heim (2006): degree predicates denote relations between individuals and intervals:

  \[(\text{tall}) = \lambda I_{<d,t>} \cdot \lambda x. \text{ x’s height } \in I\]

  \[(22) \quad \text{[How tall is John?]}
  \]
  \[= \text{ ‘For what interval I, John’s height is in I?’}\]

- **Explanation of factive islands with degree predicates**

  \[(24) \quad a. \quad \text{[[*How tall do you regret that you are?]}}^{\text{w}}
  \quad = \text{ ‘For what interval I, you regret that your height is in I?’}\]

  \[b. \quad \text{---------[--------]}_1\text{-----------[--------]}_2\text{--------}\]

  \[(25) \quad \textbf{Presupposition} \text{ of (24):}\]

  \[\forall I \in D_1: \text{ you believe that your height } \in I\]

  ‘you believe your height to be contained in every interval’
Similar explanation to various other related phenomena

- **One time only predicates** (Szabolcsi and Zwarts 1993)

  (26)  
  a. **To whom** do you regret having shown this letter?  
  b. **From whom** do you regret having gotten this letter?

- **Extraposition Islands**

  (27)  
  *How** was it a surprise that John behaved?

- **Intervention by adverbs** (cf. de Swart 1992)

  (28)  
  *Combien as-tu **beaucoup/souvent/peu/rarement** consulté de livres?  
  how many have you **a lot/often/a little/ rarely** consulted of books  

  (29)  
  *Combien Marie a-t-elle **vite** mangé de gateaux?  
  How many Marie has-she **fast** ate of cakes
Extraposition Islands

Belong to the same class of interveners as factives: (cf. Honcoop 1998):

- When the extraposition stands with a factive inference \(\rightarrow\) island effects:

(30) It was a surprise that John behaved politely
    \(\textit{presupposes}\): (the speaker believes that) John behaved politely

(31) *How was it a surprise that John behaved?

- When there is no factive inference \(\rightarrow\) no island effect:

(32) It is dangerous for youngsters to drink wine at the party.
    \(\rightarrow\textit{does not presuppose}\) that youngsters drink wine at the party.

(33) How much wine is it dangerous to drink at a party?

(example due to Postal, cited in Szabolcsi (2006))
Contextual effects, “quasi presuppositions”

The presence or absence of this inference correlates with the island creating behavior of the intervener.

- **Adverbial interveners**: trigger a factive-like inference in some contexts. (Linebarger (1981), Simons (2001) and Schlenker (2006))

(34)  Bill ran fast
→ Inference: Bill ran

Its projection properties are much like that of real presuppositions:

(35)  None of these ten boys ran fast
     Inference: all of these ten boys ran

(36)  None of these ten boys solved the exercise twice.
     Inference: all of these ten boys solved the exercise

- **But**:

(37)  None of these ten boys searched the bags carefully
     ??→ everyone searched the bags
A correlation with island creating potential

Grammaticality seems to correlate with the strength of quasi-presuppositions:

- **Split constructions**: Some adverbs are robust interveners [cf. de Swart (1992)]

(38) *Combien as-tu beaucoup/souvent/peu/rarement consulté de livres? how many have you a lot/often/a little/ rarely consulted of books

(39) *Combien Marie a-t-elle vite mangé de gateaux? How many Marie has-she fast ate of cakes

But not all adverbs are interveners (cf. Obenauer 1984):

(40) ?Combien le douanier a-t-il soigneusement fouillé de valises How-many the customs-officer has-he carefully searched the suitcases?

- **Non-split constructions**: similar effects, but somewhat weaker:

(41) ???How much milk did John spill on his shirt often?
(42) ?How much milk did John spill on his shirt carefully?
Part 2.  Extending the Account to Wh-Islands

Dayal (1996) has proposed that a question presupposes that it has a most informative true answer.

(43) **Maximal Informativity Hypothesis (MIH)**
A question presupposes that it has a maximally informative true answer

Fox and Hackl (2007):  *Negative degree islands* arise because they violate Dayal’s condition, and hence are a presupposition failure.

I argue that some examples of *wh-islands* violate the MIH as well, hence result in a presupposition failure.

If there is no maximal answer, the statement for any answer that it is the complete answer would amount to a *contradiction*. 
**Wh-Islands and question embedding predicates**

■ *Wonder class predicates*

(44)  
   a. ?Who does Mary *wonder* whether to invite?  
   b. *How is Mary *wondering* whether to behave?  
   c. *How tall is the magician *wondering* whether to be?  

(45)  
   a. ?Which problem do you *wonder* how to solve?  
   b. *How do you *wonder* which problem to solve?  
   c. *How tall do you *wonder* who should be?  

■ *Know-class predicates*

(46)  
   a. Who does Mary *know* whether we should invite?  
   b. *How does Mary *know* whether to behave?  
   c. *How tall does Mary *know* whether she should be?  

(47)  
   a. ?Which problem do you *know* how to solve?  
   b. *How do you *know* which problem to solve?  
   c. *How tall do you *know* who should be?
Know

Let’s assume that

(48) \textbf{know} (w) (x, Q_H(w)) is true iff
\[ \forall p \in Q_H(w), \ x \ knows \ whether \ p \ is \ true \ in \ w \]

where, using a Hintikka-style semantics for attitude verbs

(49) ‘x knows whether p is true in w’ is true in w iff
for \( \forall w' \in \text{Dox}_x (w) \),
if \( p(w)=1 \), \( p \text{ in } w' \)
and
if \( p(w)=0 \), \( \neg p \text{ in } w' \)
,where \( \text{Dox}_x (w) = \{ w' \in W: x's \ beliefs \ in \ w \ are \ satisfied \ in \ w' \} \)
Questions about individuals

(50) a. **Who does Mary know whether she should invite?**

….assuming that the domain of individuals in the discourse is {Bill, John, Fred}:

b. { that Mary knows whether she should invite Bill ,
that Mary knows whether she should invite John,
that Mary knows whether she should invite Fred }

Given the lexical meaning of *know* and the discussion above, we might represent the set of propositions that (50)b describes as (51):

(51) { ∀w’ ∈ Dox_M(w), (if invB in w, invB in w’) ∧ (if ¬invB in w, ¬invB in w’),
∀w’ ∈ Dox_M(w), (if invJ in w, invJ in w’) ∧ (if ¬invJ in w, ¬invJ in w’),
∀w’ ∈ Dox_M(w), (if invF in w, invF in w’) ∧ (if ¬invF in w, ¬invF in w’)}

,where *invX* in *w* is a notational shorthand for *Mary should invite X in w*
Questions about individuals

A complete answer to Q is the assertion of a proposition in Q together with the negation of all the remaining alternatives in Q.

Let’s imagine that we assert *Mary knows whether she should invite Bill* as an answer

\[(52) \forall w' \in \text{Dox}_M(w), \text{if } \text{invB in } w, \text{invB in } w' \land \text{if } \neg\text{invB in } w, \neg\text{invB in } w' \land \exists w' \in \text{Dox}_M(w), (\text{invJ in } w \land \neg\text{invJ in } w') \lor (\neg\text{invJ in } w \land \text{invJ in } w'), \land \exists w' \in \text{Dox}_M(w), (\text{invF in } w, \land \neg\text{invF in } w') \lor (\neg\text{invF in } w \land \text{invF in } w')\]

Questions about individuals: no problem arises with complete answers: the meaning expressed above is a coherent one.
Wh-islands with questions about degrees

**Background assumption:** Degree questions range over intervals

(53)  $[\text{How tall is John?}]^w = \text{‘For what interval I, John’s height is in I?’}$

(54)  $[\text{John is I-tall}] = 1$ iff John’s height $\in I$;  *where I is an interval*

**Given this:**

(55)  *How tall does Mary know whether she should be?*

*Informally,*

(56)  \{ that Mary knows whether her height should be in $I_1$,  
      that Mary knows whether her height should be in $I_2$,  
      that Mary knows whether her height should be in $I_3$,  
      etc, for all intervals in $D_I$ \}
Now let's take 3 intervals:

(57) \{ \forall w' \in \text{Dox}_M(w), \ [\text{if } I_1(w)=1, I_1(w')=1] \land [\text{if } \neg I_1(w)=1, \neg I_1(w')=1] \\
\forall w' \in \text{Dox}_M(w), \ [\text{if } I_2(w)=1, I_2(w')=1] \land [\text{if } \neg I_2(w)=1, \neg I_2(w')=1] \\
\forall w' \in \text{Dox}_M(w), \ [\text{if } I_3(w)=1, I_3(w')=1] \land [\text{if } \neg I_3(w)=1, \neg I_3(w')=1] \} \\
where I_n(w) is a notational shorthand for Mary's height should be in I_n in w.

Imagine now that we were to state Mary knows whether her height should be in I_1 as a complete answer.

Now let's take 3 intervals:

(58) \[
\begin{array}{cccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccccc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Know

Asserting that Mary knows whether her height should be in \(I_1\) as a complete answer would amount to asserting the conjunction that she knows whether her height should be in \(I_1\) and that she does not know whether her height should be in \(I_2\) or \(I_3\):

\[
\forall w' \in \text{Dox}_M(w), \ [\text{if } I_1(w)=1, I_1(w')=1] \land [\text{if } \neg I_1(w)=1, \neg I_1(w')=1]
\]

and

\[
\exists w' \in \text{Dox}_M(w), (I_2(w)=1 \land I_2(w')\neq 1) \lor (\neg I_2 (w)=1 \land \neg I_2 (w')\neq 1)
\]

and

\[
\exists w' \in \text{Dox}_M(w), (I_3(w)=1 \land I_3(w')\neq 1) \lor (\neg I_3 (w)=1 \land \neg I_3 (w')\neq 1)
\]

However, the problem is that the meaning expressed by the tentative complete answer above is not coherent.
**Know**

- Suppose first that Mary’s height should be in $I_1$:

\[
\begin{array}{c|c|c|c}
\text{1} & \text{0} & \text{0} \\
\hline
\text{2} & \text{0} & \text{0} \\
\hline
\text{3} & \text{0} & \text{0} \\
\end{array}
\]

\[
\begin{array}{c|c|c|c|c|c}
\text{1} & \text{0} & \text{0} & \text{0} & \text{0} & \text{0} \\
\hline
\text{2} & \text{0} & \text{0} & \text{0} & \text{0} & \text{0} \\
\hline
\text{3} & \text{0} & \text{0} & \text{0} & \text{0} & \text{0} \\
\end{array}
\]

(60) $\forall w \in \text{Dox}_M(w), \ [\text{if } I_1(w) = 1, I_1(w') = 1] \land [\text{if } \neg I_1(w) = 1, \neg I_1(w') = 1]$

$\exists w' \in \text{Dox}_M(w), (I_2(w) = 1 \land I_2(w') \neq 1) \lor (\neg I_2(w) = 1 \land \neg I_2(w') \neq 1)$

$\exists w' \in \text{Dox}_M(w), (I_3(w) = 1 \land I_3(w') \neq 1) \lor (\neg I_3(w) = 1 \land \neg I_3(w') \neq 1)$

- The complete answer states that Mary does not know that her height should be in $\neg I_3$, i.e. the complement of interval $I_3$. It follows that for any interval in $\neg I_3$, Mary does not know that her height should be in it. Interval $I_1$ is contained in interval $\neg I_3$.

- But now we have derived that the complete answer states a contradiction: this is because it states that Mary knows that her height should be in $I_1$ and that she does not know that her height should be in $\neg I_3$, which is a contradiction.
Know

Suppose now that Mary’s height has to be in the complement of interval $I_1$:

$$\text{(62)} \quad \land_1 \overline{\text{1}} \ldots \overline{\text{2}} \ldots \overline{\text{3}} \ldots \overline{\text{d}} \ldots \overline{\text{M}} \ldots \overline{\text{m}} \ldots \overline{\text{1}}$$

$$\land_2 \overline{\text{1}} \ldots \overline{\text{2}} \ldots \overline{\text{3}}$$

$$\land_3 \overline{\text{1}} \ldots \overline{\text{2}} \ldots \overline{\text{3}}$$

$$\text{(63)} \quad \forall \overline{w'} \in \text{Dox}_M(w), \ [\text{if } I_1(w)=1, I_1(w')=1] \land [\text{if } \overline{I}_1(w)=1, \overline{I}_1(w')=1]$$

$$\exists \overline{w'} \in \text{Dox}_M(w), (I_2(w)=1 \land I_2(w') \neq 1) \lor (\overline{I}_2(w)=1 \land \overline{I}_2(w') \neq 1)$$

$$\exists \overline{w'} \in \text{Dox}_M(w), (I_3(w)=1 \land I_3(w') \neq 1) \lor (\overline{I}_3(w)=1 \land \overline{I}_3(w') \neq 1)$$

The complete answer states that Mary does not know that her height is in $\overline{I}_2$, i.e. the complement of interval $I_2$. From this it follows, that for any interval in $\overline{I}_2$, Mary does not know that her height is in it. Interval $\overline{I}_1$ is in interval $\overline{I}_2$.

But now we have derived that the complete answer states a contradiction: this is because it states that Mary knows that her height is in $I_1$ and that she does not know that her height is in $\overline{I}_3$, which is a contradiction.
We might illustrate the contradiction that arises with the following:

(64)  #Mary knows whether her height is btw 0 and 5 or between 5 and 10
But
She does not know whether her height is btw 0 and 3 or between 3 and 10
And
She does not know whether her height is btw 0 and 7 or between 7 and 10
Extensions to

- **Wonder-class predicates**

(65)  
*How tall does Mary wonder whether she should be?*

- **Embedded wh-constituent questions**

(66)  
a.  ?Which problem does Mary know how to solve?  
b.  *How tall does Mary know who should be?*

(67)  
{that Mary knows (for which x∈ {A,B,C}, x’s height is in I₁)  
that Mary knows (for which x∈ {A,B,C}, x’s height is in I₂)  
that Mary knows (for which x∈ {A,B,C}, x’s height is in I₃)  

{that M knows whether A’s height ∈ I₁  
that M doesn’t know whether A’s height ∈ I₂  
that M doesn’t know whether A’s height ∈ I₃  

that M knows whether B’s height ∈ I₁  
that M doesn’t know whether B’s height ∈ I₂  
that M doesn’t know whether B’s height ∈ I₃  

that M knows whether C’s height ∈ I₁  
that M doesn’t know whether C’s height ∈ I₂  
that M doesn’t know whether C’s height ∈ I₃}
Interim Summary

- Presuppositional, (Negative) and Wh-Islands are unacceptable because they lead to a contradiction.
  - **PRESUPPOSITIONAL ISLANDS:**
    A contradiction arises at the level of presuppositions.

- **(NEGATIVE ISLANDS) AND WH-ISLANDS:**
  The statement for any answer that it is the complete answer would express a contradiction.

- **BUT:** why would contradiction (or tautology) lead to ungrammaticality?
  Cf.

(68) #This table is red and not red
(69) #Every woman is a woman
(70) #It is not raining and John knows that it is raining

♦ These sentences might be semantically anomalous, but **not** ungrammatical
Part 3. Triviality and ungrammaticality

- Barwise and Cooper (1981): Existential Sentences

(71) There are some curious boys
(72) *There is every curious boy

- Proposed explanation: (72) is a tautology
- Assume that there denotes the individuals in the universe (D_e). Then \([\text{every}](\text{curious boy})(D_e)=1\), whatever the denotation of curious boys is in the model.

- von Fintel (1993) Exceptional constructions:

(73) Every boy but John smokes
(74) *Some boy but John smokes

- Proposed explanation: (74) is a contradiction
- Assume that the complement of but is the least you have to take out of the restrictor to make the statement true. (74) would entail then that no boy smokes and that someone other than John smokes.

L-triviality

- **Gajewski (2002):** There is a formally definable subset of trivial sentences (L-trivial sentences) whose members are systematically ungrammatical.

- To define L-triviality, we need a stronger sense of logical truth than usual:
  
  - **Standard notion of logical truth:** Replace uniformly every non-logical word by a variable of the appropriate type. Logical truth is defined as satisfaction for all assignments.

    Example: *it is raining or it is not raining* $\Rightarrow p$ or not $p$

  - **L-triviality:** a stronger notion of logical truth: replace every occurrence of a non-logical word by a distinct variable. Logical truth is defined as satisfaction for all assignments.

    Example: *it is raining or it is not raining* $\Rightarrow p$ or not $q$
**L-triviality**

**Examples:**

(75) *There is every curious boy
   a. Logical skeleton: [There [is [every P₁]
   b. Interpretation: [[every]] (I(P₁)) (Dₑ)

→ once we remove the identity of the non-logical expressions, we can still deduce the triviality

(76) #Every woman is a woman
   a. Logical skeleton: [Every [P₁ [is P₂]
   b. Interpretation: [[every]] (I(P₁)) (I(P₂))

→ once we remove the identity of the non-logical expressions, we cannot deduce the triviality any more

**Gajewski (2002):**
A sentence is ungrammatical if its logical form contains an L-trivial constituent sentence
L-triviality and Islands

(77) *How do you regret that John behaved?
   a. Logical skeleton of the question: \( \{NP_1 \ V_2 \ NP_3 \ V_5 \ \alpha_1 \ | \ \alpha \in D_{manner} \} \)
   b. Logical skeleton of the presupposition of the question
      \( NP_3 \) is \( V_5 \ \alpha_1 \) [and \( NP_3 \) is \( V_5 \ \alpha_2 \) and [\( NP_3 \) is \( V_5 \ \alpha_3 \)…etc…

the presupposition is contradictory independently of the value of the variables…

… provided we keep the variables in the alternative answers the same except the one corresponding to the question word

…and that \( V_2 \) is presuppositional
What is the relationship btw. logic and grammar?

I started with arguing that certain allegedly syntactic constraints of natural language interpretation should be thought of as showing an interpretive problem.

Now: Interpretive problems, on the other hand, are crucially constrained by logical properties, in that logical—vs—non-logical items play a different role. Moreover, this can be read off from the logical (syntactic) skeleton.

There is a deeper notion of contradiction, based on logical words.

Further, it seems we might need a distinction that is even more subtle.
Some questions for further research

Why the special provisos?

♦ What allows us to keep the variables in the alternatives other than the one corresponding to the question words fixed?

  § In fact a similar issue arises in the domain of focus interpretation (cf. also Fox and Hackl 2007)

♦ Why do presuppositions enjoy a special status?
Acknowledgements

I would like to thank
Klaus Abels, Emmanuel Chemla, Gennaro Chierchia, Danny Fox, Jon Gajewski, Irene Heim, Vincent Homer, Roni Katzir, Nathan Klinedinst, Giorgio Magri, David Pesetsky, Philippe Schlenker, Benjamin Spector and Anna Szabolcsi for comments, questions and suggestions at various stages of this work.

Special thanks to Benjamin Spector for the idea of using an interval semantics of degrees, and to Danny Fox for many discussions.

I would like to acknowledge financial support by the European Science Foundation (Euryi project on presupposition, to P. Schlenker), The Mellon Foundation and the Lichtenberg Kolleg, Göttingen.
APPENDIX 1: How many questions: scope ambiguity

An existential noun phrase such as *n-many books* can be understood as having scope over *want* or with a reconstructed scope under the attitude verb (Rullmann (1995), Cresti (1995), Fox (2000), Romero (1998)):

(78) How many books do you want to buy?

a. Wide scope reading:
‘For what interval I, there is a set of (particular) books X, |X|∈I, such that you want to buy X’

\[
[[\text{(78)}]]^w = \lambda p. \exists I \in D_1 [p = \lambda w'. \exists X [\text{book}(X)(w') \land |X| \in I \land \text{want} (\lambda w''. \text{buy}(you)(X)(w''))(w'')]
\]

b. Narrow scope (reconstructed) reading:
‘for what interval I, you want there to be a set of books X, |X|∈I, such that you buy X’
(i.e. What amount of books do you want to buy?)

\[
[[\text{(78)}]]^w = \lambda p. \exists I \in D_1 [p = \lambda w'. \text{want} (\lambda w''. \exists X [\text{book}(X)(w'') \land |X| \in I \land \text{buy}(you)(X)(w''))] (w')
\]
How many questions and presuppositional islands


(79) How many books do you regret that you bought?

a. **Wide scope reading:**
   ‘For what interval I, there is a set of (particular) books X, |X|∈I, such that you regret that you bought X’
   \[ \lambda p. \exists I \in D_1 [p= \lambda w’. \exists X [book(X)(w’) & |X|\in I & regret (\lambda w’’. buy (you)(X)(w’'))(w’)] \]

b. **#Narrow scope (reconstructed) reading:**
   ‘For what interval I, you regret that the number of books that you bought is in I’
   \[ \lambda p. \exists I \in D_1 [p= \lambda w’. regret (\lambda w’’. \exists X [book(X)(w’’) & |X|\in I & buy (you)(X)(w’’))](w’) \]

- **Explanation:**

**Presupposition of the wide scope reading:**
   \[ \forall X \in D_{books}. \ you \ Believe (\lambda w’. bought (you)(X)(w’))(w) \]
   ‘you believe you bought all the books in the domain’

**Presupposition of the narrow scope reading:**
   \[ \#\forall I \in D_1: \ you \ Believe (\lambda w’. \exists X [book(X)(w’) & |X|\in I & buy (you)(X)(w’)])(w) \]
   ‘For every interval, you believe that the number of books you bought is in that interval’
APPENDIX 2: Manner questions in wh-islands

At first sight, it looks as if the account could work here too:

(80) | politely | ¬politely |
    | impolitely | impolitely |

(81)  a. *How do you know whether to behave at the party?
      b. {that you know whether to behave politely, that you know whether to behave impolitely}

However, elsewhere (Abrusán 2007) I have argued that the domain of manners contains contraries, and not contradictories:

(82) | politely | ¬politely |
    | impolitely | impolitely |

A complete answer to a manner question below, e.g. You know whether to behave politely, will not be a contradiction
... but it might still be a violation of Maximize presupposition²:

² Thanks to E. Chemla (pc.) for this suggestion.
APPENDIX 2: Manner questions in wh-islands

(83)  *How do you know whether to behave?

A complete answer such as …

(84) You know whether you should behave politely. (vacuous presupposition: p ∨ ¬p)

...Will be predicted to be equivalent to:

(85) You know that you should not behave politely (presupposition: ¬p)

Maximize Presupposition! might rule out (84).

We can then derive that every complete answer to the question above, is a violation of the principle of Maximize Presupposition.

Then, we can say that for any question, if we are in a position to know in advance that every complete answer to it will be ruled out, then the question is infelicitous.
Manner questions

In the case of wonder however, the alternative is independently bad….

(86)  *How do you know whether to solve the problem?
   a. I know whether you should solve this problem fast
   b. I know that you should solve this problem fast

(87)  *How do you wonder whether to solve the problem?
   a. I wonder whether you should solve this problem fast
   b. #I wonder that you should solve this problem fast
   Which is independently bad…(e.g. Guerzoni, etc)

wonder-type verbs: express a mental questioning act, and therefore incompatible with declarative complements,

or a complement that is contextually equivalent to a declarative complement.
Selected References