

# Presuppositional and Negative Islands: A Semantic Account

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## Abstract

This paper proposes a new explanation for the oddness of presuppositional and negative islands, as well as the puzzling facts which show that these islands can be obviated by certain quantificational elements (cf. Fox and Hackl 2007). Previous analyses of these phenomena are shown to fail to solve these puzzles. The proposal rests on two independently motivated assumptions: (i) the idea that the domain of manners contains contraries and (ii) that degree expressions range over intervals (cf. Schwarzschild and Wilkinson 2002). It is shown that given these natural assumptions presuppositional and negative islands are predicted to lead to a presupposition failure in any context.

## 1 Introduction

It is well known that *wh*-words that range over individuals can escape weak islands, such as factive and negative islands illustrated below, while *wh*-words ranging over manners or degrees cannot:

- |     |  |                        |
|-----|--|------------------------|
| (1) | a. *How do you regret that John behaved? | <i>Factive island</i>  |
|     | b. Who do you regret that John invited?  |                        |
| (2) | a. *How many children don't you have?    | <i>Negative island</i> |
|     | b. Who didn't you invite?                |                        |

What is less well known is that the weak island violations such as the ones in (1)a and (2)a can in fact be ameliorated by certain well placed quantificational elements such as modals and attitude verbs. Fox and Hackl (2007), (partly based on Kuno and Takami 1997) have showed that negative degree islands such as (2)a above become perfectly acceptable if we place an existential modal in the scope of the negation, or a universal modal above the negation:

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|-----|--|
| (3) | a. How many children are you not allowed to have?  |
|     | b. How many children are you required not to have? |

Fox and Hackl (2007) only discuss the case of modals in negative degree questions, but we might observe that the same pattern obtains with negative manner questions if we place an existential modal in the scope of negation (cf. (4)). Further, attitude verbs above negation can obviate the island effect as well, as shown in (5):

- |     |   |
|-----|---|
| (4) | How was John not allowed to behave?           |
| (5) | How fast do you hope that Bill did not drive? |

For most speakers, factive islands can be also significantly ameliorated by placing an existential modal in the scope of a factive verb:

- |     |   |
|-----|---|
| (6) | a. ?How do you regret that John was allowed to behave?                        |
|     | b. ?How fast did you discover that John was allowed to drive on this highway? |

These facts pose a serious challenge for any account that argues that the intervention is caused by some syntactic property of negation or factive verbs (cf. the Relativised Minimality of Rizzi 1990 and much subsequent work), because it is rather unclear why adding an extra structural element such as a modal or an attitude verb should be able to obviate any syntactic intervention creating property that negation and factives might have. Further, we also need an explanation as to why precisely these modals and attitude verbs create the obviation effects, but not others. Universal modals in the scope of negation e.g. do not create obviation, as shown below (cf. also Fox and Hackl 2007):

- (7) \*How fast is John not required to drive?

It seems then that a semantic account for the island effects created by factives and negation is simply inevitable.

Interestingly enough however, despite a number of semantic proposals for weak islands, an explanation that is able to account for the different types of factive and negative islands as well as their obviation facts has not been available so far. While Szabolcsi and Zwarts (1993, 1997) offer a very elaborate account for intervention created by quantifiers and negation, their proposal for factive islands remains somewhat tentative. Neither do they notice the obviation facts discussed above, and hence they do not offer any explanation for them either. Honcoop's (1998) proposal is tailored for the Germanic *what-for* split, and is not clear that it is extendable to classic islands nor the obviation facts. At the same time, negative degree islands have enjoyed a great deal of specialized attention (Rullmann 1995, Fox and Hackl 2007), the latter offering an ingenious solution for the obviation problem in the case of negative degree questions as well, yet it has remained unclear whether these accounts can be extended to negative islands that arise with other extractees (e.g. islands created by manners), or to other types of islands, e.g. islands created by factives. Indeed Rullmann (1995) expresses skepticism that such a unified account is at all possible. Fox (2007) laid out a blueprint as for the conditions that an analysis of negative islands created by manner questions would have to fulfill, but himself does not provide such an analysis, nor does he discuss the case of factive islands. Finally, we might mention Oshima (2006), who proposed a partial account for certain cases of factive islands, yet his account does not extend to factive islands with degree questions, nor to the negative islands nor the obviation facts.

The present paper proposes a new semantic account for factive and other presuppositional islands that is easily extendable to negative islands as well. The central claim I make is that these islands arise because they are predicted to lead to a contradiction at some level. It is proposed that factive islands arise because manner and degree questions—but not questions about individuals—stand with a presupposition that is contradictory. As no context can entail a contradictory set of propositions, these questions always lead to presupposition failure. In the case of negative islands a contradiction arises in a different manner: I will observe that in these questions the condition according to which questions must have a unique most informative answer (cf. Dayal 1996) cannot be met. Therefore, any complete (exhaustive) answer to such questions is bound to state a contradiction. I argue that the reason why a contradiction arises in the case of manner and degree islands is based on two independently motivated assumptions about the domain of manners and degrees. The first is that the domain of manners contains contraries. The second is that degree predicates relate individuals to intervals (cf. Schwarzschild and Wilkinson 2002, Heim 2006). Thus according to this proposal the compositional semantics of questions supplies everything we need for the explanation of presuppositional and negative questions, without invoking any further special rules.

Besides the above mentioned new examples of modal obviation, the paper makes a couple of further novel empirical claims as well. I propose that the account for factive islands can be extended to other islands created by presuppositional items: I argue that this is the case with extraposition islands, certain adverbial interveners and islands created by *only*. I also notice the fact that we can observe a correlation between presupposition strength and the strength of islandhood: I show that this is the case in the case of extraposition islands and adverbial interveners. Finally, I will observe that *when* and *where* questions are also sometimes sensitive to negative islands, and show that this follows naturally from the present proposal.

As mentioned above, the proposal rests on the claim that the reason for the ungrammaticality of weak islands follows from the fact that they lead to a contradiction at some level. But why does this fact lead to ungrammaticality? It seems that we need to distinguish between contradictions that result from non-logical arguments, and contradictions that result from the logical constants alone. Gajewski (2002) argues that the second in fact plays an important role for natural language: sentences that express a contradiction or tautology by virtue of their logical constants are ungrammatical. The present proposal falls under Gajewski's (2002) generalization in that it proposes that the weak island violations lead to a contradiction independently of the particular choice of variables, i.e. due to the logical constants alone.

The paper is organized as follows: Section 2 presents a brief overview of the most important previous proposals, and points out their shortcomings. Section 3 starts with a presentation of a new approach to factive islands, in which I argue that these islands result from the fact that degree and manner questions are predicted to stand with a contradictory presupposition. This analysis is then extended in Section 3.4 to islands created by extraposition and adverbials, as well as *only* NPs, where I also give evidence which shows that the strength of the factive inference that a certain intervener generates in fact correlates with the strength of the island that it creates. Section 4 proposes an account for negative islands, which covers cases of manner and degree extraction as well as certain instances of islands created by *when* and *where* adverbials. Section 5 discusses the issue of contradiction, while Section 6 concludes the paper.

## 2. Previous proposals

### 2.1 Szabolcsi and Zwarts (1993, 1997)

The very first paper to propose that the weak island intervention facts should follow from semantic properties was Szabolcsi and Zwarts (1990). This paper proposed a theory which was based on the idea that DE operators cause intervention. This first theory was then substantially revised in Szabolcsi and Zwarts (1993, 1997) (henceforth Sz&Z). The revisions were mainly motivated by papers of de Swart and E. Kiss that have appeared in the meantime (de Swart 1992, Kiss 1993). These papers argued that weak island intervention should be thought of as a scope phenomenon, and also challenged the view that it is only DE operators that create intervention. Sz&Z attempt therefore at drawing a new demarcation line between the scope taking expressions that create intervention, and those that do not.

Below I briefly present Sz&Z's proposal, concentrating on the case of negative and factive islands<sup>1</sup>. They propose that each scopal expression (e.g. negation or quantifiers) can be thought of as Boolean operations on certain domain. More precisely, each scopal element in conjunction with a distributive verbal predicate can be interpreted as a Boolean combination

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<sup>1</sup> The biggest success of Sz&Z's proposal is the treatment of intervention caused by various quantifiers. As this paper does not present a proposal for intervention caused by quantifiers, the present account does not aim at replacing Sz&Z in its entirety, rather to propose an alternative for some parts of their proposal. (But see Abrusán (2007b) for a treatment of *wh*-islands, and a discussion of quantificational intervention.)

of singular predications. (8) below illustrates this idea with some examples (by assumption, the domain of students is given):

- (8)
- |      |                               |  |
|------|-------------------------------|--|
| i.   | John walked                   | $=W(j)$  |
| ii.  | John did not walk             | $=\neg(W(j))$  |
| iii. | No student walked             | $=\neg(W(j)\vee W(b)\vee W(m))$                                      |
| iv.  | Less than two students walked | $=\neg((W(j)\wedge W(b))\vee(W(j)\wedge W(m))\vee(W(m)\wedge W(b)))$ |
| v.   | Every student walked          | $=W(j)\wedge W(b)\wedge W(m)$  |
| vi.  | A student walked              | $=W(j)\vee W(b)\vee W(m)$  |

These observations can be generalized by saying that negation corresponds to taking Boolean *complement*, universal quantification corresponds to taking Boolean *meet*, etc. For a *wh*-phrase to take scope over a scopal element means that the operations associated with the scopal element need to be performed in the *wh*-phrase's denotation domain. In example (9), the *wh*-word ranges over individuals. As a straightforward consequence, the variable in the segment *John likes t* ranges over individuals too:

- (9) Who<sub>1</sub> doesn't John like t<sub>1</sub> ?

To arrive at the meaning of the question in (9), first the denotation of the segment *John likes t* needs to be computed. *John likes t* denotes the set of individuals that John likes. In other words, since the slot abstracted over is filled by an atomic individual, we end up with sets of individuals as denotations for predicates over individuals. As negation corresponds to taking Boolean complement, *John does not like t* is expected to denote then the complement of this set. All Boolean operations can be performed on sets of individuals, because the power set of any set of individuals forms a Boolean algebra. This is why negative questions about individuals are grammatical.

Why are then negative manner and degree questions ungrammatical? Let's first look at the case of manners.

- (10) How<sub>1</sub> did John behave t<sub>1</sub> ?  
 (11) \*How<sub>1</sub> didn't John behave t<sub>1</sub> ?

Sz&Z argue that manner predicates are collective. For this reason, the segment *John behaved in t* should not be thought of as a set of individual manners that characterized John's behavior. Rather, it denotes the unique collective manner in which John behaved, which we might write as  $\iota\alpha$  [j behaved in  $\alpha$ ]. The question in (10) then asks which (collective) manner is identical to this unique individual sum. In the case of the negative question, we should be wondering which collective manner (i-sum) corresponds to the complement of the ways in which John behaved. However, the complement of the collective manner in which John behaved is not guaranteed to be itself an i-sum. This is why the negative question is bad: it asks for the unique manner in which John did not behave: however, it is possible that there is no single manner that corresponds to the complement set of the ways in which John behaved.

More precisely, Sz&Z propose that the denotation domain of manners is a free join semilattice. Free join semilattices are structures that resemble Boolean algebras, but lack a bottom (zero) element. The fact that these structures are not closed under complementation means that it is not the case that for all items in the structure their complement is also a

member of the structure. Sz&Z propose that amounts and numbers denote in structures that are even poorer than a free join semilattice, namely (non-free) join semilattice and lattices, respectively. As these structures are also not closed under complementation, negation is predicted to cause intervention in the case of questions about amounts and manners as well. Notice an interesting aspect of the reasoning that Sz&Z present: the reason why a particular utterance of a negative island violation is bad is not because we know that given the context the complement of a particular collective manner or amount is not in the domain of manners, but because it is not the case that for every context, the complement can be defined.

How does Sz&Z treat the case of intervention caused by factive verbs? They argue that these verbs contain a Boolean operation in their meanings, namely conjunction, that makes them interveners for certain wh-phrases. Following Dukes (1992), they propose that a sentence with a factive matrix predicate can be paraphrased as follows:

- (12) I regret that John left  
       regret(I) (that John left) & fact (that John left)

The important point here, they argue, is that the paraphrase denotes conjunction, viz. intersection<sup>2</sup>. The reason why factive verbs cause intervention is that join semilattices or lattices are not closed under conjunction. Take the example of manners, i.e. a free join semilattice: as this structure does not contain the zero element, the conjunction of any two distinct sets, the zero element, is not an element of the domain of manners. Thus, factives cause intervention because it is not the case that the conjunction required by the factive verb does never lead out of the structure in which manners denote.

- (13) How do you regret that John left?  
       a. regret(you) (that John left\_\_\_) & fact (how John left \_\_\_)  
       b. For which manner  $\gamma$ ,  
            $\gamma = \iota\alpha$  [you regret that John left in  $\alpha$ ]  $\cap$   $\iota\beta$  [it is a fact that John left in  $\beta$ ] ?

Sz&Z argue that the same idea can be extended to response stance predicates such as *deny*, which also cause intervention (cf. Cattell 1978, Hegarty 1992). At the same time they argue that non-intervening verbs, that is the class of volunteered stance verbs (e.g. *think*) are not plausibly analysed as conjunctions.

Sz&Z's account is based on the very interesting idea that the difference between the good and the bad extractees is to be found in the properties of their domain. This idea, albeit in a completely different form, is also shared by the account that is developed in this paper, as well as by Fox and Hackl (2007), in yet another way<sup>3</sup>. Further, as far as the analysis of

<sup>2</sup> Starting from Stalnaker (1974), a number of analyses of presuppositions postulate conjunctive meanings for factive verbs such as *know*, whereby *x knows p* entails that *x believes p* and that *p* is true. (cf. also Schlenker 2006, Abusch 2002, Simons 2001.e.g.). But note that the analysis proposed in Sz&Z cannot be exactly this because the Stalnaker-type meaning could not produce a representation such as the one in (13), which seems to me to be what Sz&Z have in mind.

<sup>3</sup> Another related proposal is that of Honcoop (1998), who formulates a very interesting dynamic semantic account for *what-for* split constructions in Germanic languages, which are often taken to be sensitive to the same range of interveners as weak islands, and are therefore treated as sensitive to weak islands. However there are also a number of differences that cast doubt on the claim that the *what-for* split construction should indeed be subsumed under weak island violations. First, the range of elements that create intervention in the case of the *what...for* split: items such as *exactly 3*, or *at most 3* which do not create weak islands seem to be strong interveners on the case of the *what for* split. Second, and more importantly the *what for* split does not seem to show the effect of modal obviation: The examples below illustrate the case of German. (However, note that interestingly, the French *combien*-split does improve, cf. the discussion in Spector (2005). Therefore I will assume that the French *combien*-split—but not the *what for* split—belongs to the classic weak island cases).

negative islands is concerned, both the account advanced in this paper (as well as that of Fox and Hackl (2007) for negative degree questions) shares the idea in some form or another<sup>4</sup> that negative islands result from the fact complementation is not defined for some reason for the domain of manners and degrees. However, the account in Sz&Z also faces certain serious problems:

- i. Sz&Z's theory does not seem to be able to explain the modal obviation effects discovered by Fox and Hackl (2007). It is rather implausible that adding a modal should be able to turn the partially ordered domain of manners or degrees into sets, such that now the required algebraic operation could be performed<sup>5</sup>. The modal obviation facts therefore seem to constitute a serious problem for Sz&Z's account.
- ii. It seems that Sz&Z's account of factive verbs overgenerates: while they claim that their account correctly predicts that volunteered stance verbs do not have conjunctive part in their meanings and therefore do not cause intervention, there are a number of verbs that can be plausibly analyzed as having a conjunction in their meaning but are not interveners. One such verb is *sell*: it could be argued that this verb involves a conjunction in its meaning as well: namely we could analyze *John sold the car to Bill* as the conjunction of John gave Bill the car & Bill gave John the money (cf. Abusch 2002). Why is it that *sell* is not an intervener then? The same question might apply to change of state verbs, which are standardly analyzed as involving a conjunctive element in their meaning: E.g. *John opened the door* is said to involve the conjunction of *the door was closed* + *John caused the door to be open*. Why is *open* (nor any other change of state verb) not an intervener then? These remarks make it dubious that it is simply the conjunction in the meaning of factive verbs that makes them interveners.
- iii. If manners are indeed collective it is predicted that an utterance such as *John behaved politely and respectfully* should not straightforwardly entail that John behaved politely and that John behaved respectfully. Indeed Sz&Z bite the bullet and say "Intuitively the sum of any two behaviors seems like a candidate for a more complex behavior, possibly including contradictory cases like kindly and unkindly" (p.245, 1997). This move however seems counterintuitive to me, since conjunctions of manners do seem to entail their parts, contrary to what Sz&Z claim. This suggests that the idea that weak islands with manners result from manners being obligatorily collective might be on the wrong track, after all.
- iv. Sz&Z treat the different readings of *how many* questions as resulting from a pragmatic individuation of the domain of amounts. Since then however it has become standardly

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- |     |  |          |
|-----|--|----------|
| (1) | a. *Was hat Jan nicht für ein Buch gelesen?                | [German] |
|     | b. *Was hat Jan für ein Buch nicht gelesen?                |          |
|     | "What kind of book has Jan not read?"                      |          |
| (2) | a. *Was darf Jan nicht für ein Buch lesen?                 |          |
|     | b. *Was darf Jan für ein Buch nicht lesen?                 |          |
|     | c. Was für ein Buch darf Jan nicht lesen?                  |          |
|     | "what kind of book is Jan not allowed to read?"            |          |
| (3) | a. *Was ist Jan sicher für ein Buch nicht lesen zu wollen? |          |
|     | b. *Was ist Jan für ein Buch sicher nicht lesen zu wollen? |          |
|     | c. Was für ein Buch ist Jan sicher nicht lesen zu wollen?  |          |
|     | "What kind of book is Jan sure not to (want to) read?"     |          |

(judgements courtesy of Michael Wagner, pc.)

<sup>4</sup> As we will see, while for Sz&Z the complement was not defined in every context, for our account the problem will stem from the fact that the complement cannot be defined in any context.

<sup>5</sup> However, Anna Szabolcsi (pc.) suggests that an account for modal obviation similar in spirit to that offered in this paper might be possible to formulate in the framework of Sz&Z as well. The details of how such an analysis could work remain to be seen however.

accepted that the two readings result from a scope ambiguity (cf. Cresti (1995), Rullmann (1995), Romero (1998) among others). An account therefore that can treat the two readings in this fashion might be argued to be preferable.

## 2.2. Negative degree islands: Rullmann (1995) and Fox and Hackl (2007)

### 2.2.1 Rullmann (1995)

Rullmann (1995), inspired by von Stechow (1984)'s explanation for the negative island effects in comparative clauses, has argued that the negative island effect in questions can be explained if the negative degree question is analyzed as asking for a maximal degree. To derive such a meaning for degree questions, he adapts Jacobson's (1995) theory of free relatives to degrees. He proposes that degree questions receive the following interpretation:

- (14) How tall is John?  
 (15) a. What is the maximal degree  $d$  such that John is  $d$ -tall?  
       b. For what  $d$ ,  $d$  is the  $\max(\lambda d[\text{John is } d\text{-tall}])$   
       c.  $\text{Max}(D) = id[d \in D \wedge \forall d' \in D[d' \leq d]]$

If John's height is 6 feet, the expression  $\lambda d[\text{John is } d\text{-tall}]$  denotes the set of all heights smaller or equal to 6-feet. The maximum operator picks the largest degree in this set, in this case 6 feet. In the case of a negative degree question, the set of degrees in the scope of the maximum operator is the set of degrees such that John is not that tall:

- (16) \*How tall isn't John?  
 (17) a. What is the maximal degree  $d$  such that John is not  $d$ -tall?  
       b. For what  $d$ ,  $d$  is the  $\max(\lambda d[\text{John is not } d\text{-tall}])$

However this set lacks a maximum (i.e. a "largest element"), therefore the underlined part of the expression above is always undefined<sup>6</sup>. In fact, for Rullmann (1995), a similar problem will always arise as long as the sentence contains downward entailing element.<sup>7</sup> Somewhat counter-intuitively perhaps, we can observe that the effect of the DE operator is that the predicate of degrees  $P$  ( $\lambda d[\text{John is not } d\text{-tall}]$ ) is upward entailing with respect to its degree argument. More precisely, with  $d < d'$ , it licenses the inference from  $P(d)$  to  $P(d')$ :

- (18) a. 5 feet < 6 feet  
       b. John is not 5 feet tall  $\Rightarrow$  John is not 6 feet tall

We will call such predicates upward-scalar predicates. More generally then we might say that in Rullmann's (1995) system an upward scalar predicate of degree  $P$  should be incompatible with degree-questions, i.e. questions of the form "For what  $d$ ,  $d$  is the maximal degree in  $P(d)$ ?" should be unacceptable with such a  $P$ .

### 2.2.2. Wrong predictions

As Beck and Rullmann (1999) note, this approach predicts the wrong outcome for questions such as the one below:

<sup>6</sup> Rullmann (1995) in fact assumes an exact semantics for scalar predicates, but the explanation goes through as well:  $\lambda d[\text{Bill's height is } d]$  denotes a singleton set, the complement of which (all degrees greater or smaller than Bill's exact height) cannot have a maximum either.

<sup>7</sup> Downward entailing functions are those functions  $f$  for which for all  $X, Y$  in the domain of  $f$ , if  $X \subseteq Y$ , then  $f(Y)$  entails  $f(X)$ .

- (19) How tall is it sufficient to be (in order to play basketball)?

Suppose it is necessary and sufficient to be 7-feet tall. Then it is *a fortiori* sufficient to be 8-feet tall. Hence  $\lambda d. \text{ it is sufficient to be } d\text{-tall}$  is, in first approximation, upward-scalar. Therefore, (19) is predicted to be unacceptable by Rullmann (1995)'s theory. However, it seems perfectly acceptable. Notice that even if the context could restrict the domain of degrees somehow, making sure that there could be a maximum, Rullmann (1995)'s theory would still predict the wrong meaning for the sentence, because intuitively the sentence is felt to be asking for the *minimal* degree.

The second problem for Rullmann (1995)'s theory is the already mentioned observation made by Fox & Hackl (2007) (partly building on work by Kuno and Takami 1997), according to which an existential modal under negation renders the negative degree question acceptable:

- (20) How fast are we not allowed to drive?

The predicate  $\lambda d. \text{ we are not allowed to be } d\text{-fast}$  is still upward-scalar, hence predicted to be unacceptable by Rullmann's (1995) system, contrary to fact.

To remedy the problem with the questions involving *sufficient*, Beck and Rullmann (1999) propose to replace Rullmann's (1995) concept of maximal answer with the concept of the maximally informative answer, where the maximally informative answer is the conjunction of all true propositions in the question extension. Now the meaning of a degree question can be informally paraphrased as below:

- (21)  $\text{How}_d \phi(d)? = \text{What is the degree } d \text{ that yields the most informative among the true propositions of the form } \phi(d)?$

Beck and Rullmann (1999) show that this predicts the right results for questions involving *sufficient*: this is because now the question asks for the smallest degree sufficient to bake a cake.

However, as the authors themselves notice, while the account of Beck and Rullmann (1999) predicts the right results for the data in (19) and (20), now the basic explanation for the negative island effect is lost:

- (22) a. How tall isn't John?  
b. For what  $d$ , John isn't  $d$ -tall  
c. For what  $d$ , John is less than  $d$ -tall

Suppose that John's height is just below 6-feet. Then the set of true answers is:

- (23) {John isn't 6-feet tall, John isn't 6 ½-tall, John isn't 7-feet tall, ...}

Clearly *John isn't 6-feet tall* is the most informative answer. Yet the question seems unacceptable.

### 2.2.3. Fox and Hackl (2007)'s account: Dense scales

To remedy this situation, Fox and Hackl (2007) propose that the following hypothesis about degree scales should be assumed:



- (24) Measurement Scales that are needed for natural language semantics are always dense (*The Universal Density of Measurement* [UDM])

They argue that given the assumption that the set of degrees is now dense, there is no minimal degree that gives a maximally informative true proposition. Given this however, Dayal's (1996) presupposition which requires the conjunction of all the true answers (the most informative answer) to be an element of the question-extension can never be met, and negative degree questions will always result in presupposition failure. Imagine that in the case of (22) above John is exactly 6 feet tall. Then the set of all true propositions of the form John is not d-tall is the following:

- (25) { ..., John is not 6,000001 feet –tall, ..., John is not 6,05 feet tall, ....., John is not 6,1 feet-tall,..... }

The problem, according to Fox and Hackl's proposal is that there is no *minimal* degree d such that John is not d-tall. This is simply because for any  $d > 6\text{feet}$ , there is a  $d'$  such that  $d > d' > 6\text{-feet}$ . Therefore Dayal's condition cannot be met.

Fox and Hackl's (2007) proposal can neatly explain the modal obviation facts as well. Further examples are provided below:

- (26) How much radiation are we not allowed to expose our workers to?  
 (27) How much are you sure that this vessel won't weigh?

Suppose that the law states that we are allowed to expose our workers to less than 100 millisievert/year of radiation and says nothing more. It follows that the set of worlds compatible with the law is  $\{w: \text{the radiation is lower than } 100 \text{ millisievert/year}\}$ . So for any degree d of radiation below 100 millisievert/year, there is a permissible world in which the radiation is d. Hence for any degree of radiation smaller than 100 millisievert/year, we are allowed to expose our workers to that amount of radiation. On the other hand, we are not allowed to expose our workers to 100 millisievert/year. Therefore, 100 millisievert/year is the smallest degree such that we are not allowed to expose our workers to d. As a consequence, Dayal's condition can be met. More generally, predicates of the form  $\lambda d. \neg \alpha(P(d))$  or  $\lambda d. \Box(\neg P(d))$  can denote closed intervals, and therefore can obviate weak islands.

The account in Fox and Hackl (2007) makes the extremely important observation about modal obviation, and proposes a witty account to explain this pattern. Yet, we might ask some questions about the system that Fox and Hackl (2007) develop:

- i. F & H must extend this account even to cases where the domain of degrees is not "intuitively" dense, such as cardinality measures as in:

- (28) \*How many children doesn't John have?

Suppose Jack has exactly 3 children. Then he does not have 4 children, but he also does not have 3.5 children, or 3.00001 children... Naturally, this objection is addressed in Fox and Hackl (2007), who in fact take it to be an argument for a very strong modularity assumption. According to this, the knowledge that the number of children someone has is an integer is a form of lexical/encyclopedic knowledge. However, this knowledge is not purely logical, (given some reasonable notion of logicity). Fox and Hackl's (2007) claim is that Dayal's condition is computed only on the basis of the purely logical meaning of the question, i.e. is blind to contextual, encyclopedic or

lexical information. While Fox and Hackl do provide some intriguing arguments for this view (some of which are completely independent of degree-questions), I believe it is still worthwhile to investigate an alternative.

- ii. Second, we might wonder whether this approach can be extended to weak island extractees other than degrees? This question is also addressed in Fox (2007). He proposes that although UDM itself cannot be responsible for other types of extraction than questions about degrees, a broader generalization about non-exhaustifiable sets of alternatives can subsume both the cases that can be accounted for by the UDM, and other examples of non-exhaustifiability.

(29) *Fox (2007)'s generalization*

Let  $p$  be a proposition and  $A$  a set of propositions.  $p$  is *non-exhaustifiable* given  $A$ :  $[\text{NE } (p)(A)]$  if the denial of all alternatives in  $A$  that are not entailed by  $p$  is inconsistent with  $p$ .

Further, he conjectures, that any account for negative manner questions should then fall under the generalization in (29) above. He does not however himself propose such an account.

- iii. Third, we might wonder whether this analysis can be extended to weak island creating interveners other than negation? The account as it stands does not extend to presuppositional islands. Fox (p.c.) suggests that an analysis that is developed in the present paper might be adapted to the theory of Fox and Hackl (2007) as well. The exact details of how such an account would proceed remain to be seen at present.

### 2.3 Syntactic alternatives: Rizzi (1990), Cinque (1990) and newer developments

The basic idea behind all syntactic accounts of weak islands is the following: the contexts that create weak islands are roadblocks for movement. However, items that possess a special permit might still be able to go through. The points in (30) to (32) spell out how Rizzi (1990) implements this idea. The main insight in Rizzi (1990) (which builds on Obenauer 1984) however is not so much the technical implementation of the above idea, rather, an understanding of what constitutes roadblocks: roadblocks are items that are sufficiently similar to the moved item. This is in fact the central idea of ‘Relativised minimality’.

- (30)
  - i. Referential A-bar phrases have indices (where “referential” is to be understood as having a “referential” theta-role)
  - ii. Non-referential A-bar phrases do not have indices
- (31)
  - i. Binding requires identity of referential indices
  - ii. Referential A-bar, but not non-referential A-bar phrases can be connected to their trace by binding
- (32)
  - i. Non-referential A-bar phrases need to be connected to their traces by antecedent governed chain.
  - ii. An antecedent-chain is broken by intervening A-bar specifiers, or if the clause from which the non-referential A-bar phrase is extracted is not properly head governed by a verbal head

In other words, an antecedent chain is highly sensitive to intervention. However, referential A-bar phrases have a special property (the index) which allows them to resort to binding, instead of antecedent-government, to connect to their trace. Binding is an arbitrarily long-

distance relation that is not subject to interveners, therefore referential A-bar phrases will not be subject to the same locality conditions as the non-referential A-bar phrases. The idea of “Relativised Minimality” is manifested above by the fact that A-bar specifiers are interveners for the movement of the like A-bar phrases. Let’s look at an example:

- (33) \*How didn’t John behave?  
 (34) ?Which man didn’t John invite?

The reason why (33) is unacceptable in Rizzi’s (1990) system is that the *wh*-adverb (an A-bar phrase) needs to be connected to its trace via an antecedent government chain. However the negation in an A-bar position (the spec of CP) therefore it will intervene for the movement of another A-bar element. The *wh*-word in (34) on the other hand is referential, and therefore it can connect to its trace via binding.

Cinque (1990) (drawing on Comorovski 1989 and Kroch 1989) adds to the above theory that referential items need to be also D-linked in the sense of Pesetsky (1987) to be able to connect to their trace via binding. He motivates this by the observation that *wh*-phrases such as *how many dollars* or *who-the-hell*<sup>8</sup> seem to be sensitive to weak islands, despite the fact that they receive a referential theta-role according to Rizzi’s (1990) theory:

- (35) a. \*How many dollars did you regret that I have spent?  
 b. \*Who the hell are you wondering whether to invite?

The basic idea of Rizzi (1990) and Cinque (1990) have been implemented since then in various different forms, most importantly in the form of the *Minimal Link Condition* of Chomsky (1995) and its revision in Manzini (1998); and in a feature-based format in Starke’s (2001) theory of locality.

However, syntactic accounts face a number of non-trivial problems. (cf. also further discussions in Szabolcsi and Zwarts 1993/1997, Honcoop 1998, Rullmann 1995, Szabolcsi 2006):

- i. As Szabolcsi (2006) points out, negation can be cross-linguistically expressed as a head or a specifier or an adjunct, yet the island-creating behavior of negation does not vary cross-linguistically. This fact casts doubt on the idea that it is some syntactic property of negation that is the culprit for weak island creation.
- ii. It is not clear what, if at all, the syntactic difference between factive and response stance verbs on the one hand, and other attitude verbs on the other hand might be. Following Kiparsky and Kiparsky’s (1971) classic proposal, it has been traditionally assumed (cf. Cinque 1990) that the sentential complements of factive verbs have an

<sup>8</sup> As for *wh-the hell* expressions, I will (partly) follow Szabolcsi and Zwarts (1993) who point out that D-linking does not seem to be the minimal difference between *wh-the-hell* expressions and their plain counterpart. As for a felicitous use of an *wh-the-hell* expression, they cite the following example (attributed to Bruce Hayes): “If we know that whenever someone sees his mother, God sends purple rain, then upon seeing purple rain, I can ask: *Who the hell saw his mother?*” Szabolcsi and Zwarts (1993) argue that the example shows that the use of *wh-the-hell* expression requires unquestionable evidence that someone saw his mother. I believe, however, that what the example shows is rather the property of *wh-the-hell* expressions noted in den Dikken and Giannakidou (2002) that they induce obligatory domain-widening. In the example above, the salient domain of individuals is everyone in the world. Once we have such a wide domain in mind, the examples with *what-the-hell* expressions that involve negation improve as well: e.g. if we change the above scenario a bit, such that God sends purple rain whenever someone does *not* call his mother on her birthday, then, upon seeing purple rain, the following negative question becomes perfectly acceptable: *Who-the-hell didn’t call his mother?* As for *how-many* phrases, I will follow Rullmann (1995) who argues that the difference in the acceptability of such examples is that of scope, rather than D-linking.

extra layer of structure. While the exact technical details of the various implementations of Kiparsky and Kiparsky's (1971) idea differ, these proposals share the idea that it is this extra piece of structure that makes factives act as barriers for movement. It has been also proposed however, (cf. Haegeman 2006, de Cuba 2007, among others) that in fact complements of factive verbs have less structure than that of non-factive predicates: the reason why non-factives are not interveners is because the extra syntactic layer can serve as an 'escape hatch' for movement. As complements of factive verbs under these proposals have less structure, the 'escape hatch' strategy is not available for them, and they are doomed to be interveners. I take that this disagreement in the syntactic literature shows that no clear evidence exists as yet for a cross-linguistically stable syntactic difference between the complements of factive and non-factive verbs.

- iii. Most difficult are however the obviation facts by modals discussed by Fox and Hackl (2007) and in the introduction of this paper. As we have seen, universal modals above negation or existential modals under negation save negative degree questions:

- (36)
  - a. How much radiation are we not allowed to expose our workers to?
  - b. How much are you sure that this vessel won't weigh?

We have also seen that similar facts arise with certain attitude verbs. It is highly unlikely that a syntactic account could be extended to explain these facts: if negation is an A-bar intervener, the addition of a modal or an attitude verb should not be able to change this fact.

- iv. The effect called D-linking (or specificity under some approaches) is presented as a unitary phenomenon that is able, on its own, to ameliorate the island effects. I will however argue that rather the various examples that have been evoked to demonstrate the effects of so called D-linking do not in fact belong under the same hat: the so called D-linked interpretation of *how many* questions I will assume (following Rullmann 1995, Romero 1998, Fox 2000, among others) is just a wide scope reading of the indefinite, while other so called "D-linking" effects follow from reinterpreting the question as an identity question or as the question being able to range over multiple events.
- iv. Finally, the argument in favor of a semantic account also comes from Occam's razor: if there is independent evidence that there is a limitation on the meaning of the sentences that show island violations, these will remain in place even if these sentences could be excluded in syntactic terms as well. In other words, if we can reduce the explanation of these violations to follow from nothing else but the semantics of the sentences in question involved, it will make it simply redundant to postulate a separate syntactic machinery as well.

## 2.4 An alternative theory

In what follows I present an alternative semantic theory that can explain both factive and negative islands, certain other islands created by presuppositional items as well as the obviation phenomena introduced at the beginning of this paper. I first examine islands that arise with factive verbs and argue that based on certain natural assumptions about the domain of manners and degrees these questions are predicted to stand with a contradictory presupposition. I extend this analysis to other types of islands that arise with presuppositional elements, e.g. extraposition islands. It will be also observed that there is a correlation between

the strength of islandhood and the strength of presupposition, as manifested by adverbial interveners. I further show that the reason why *only* NPs cause intervention can be related to their presupposition as well. The second part of the paper looks at negative islands. I observe that the assumption that the domain of manners contains contraries and that degree predicates range over intervals provide a neat explanation of the negative island effect, including modal obviation. It is also proposed that a similar explanation is available for certain examples in which *wh*-words such as *when* and *where* manifest an island sensitive behavior.

The paper also discusses how the present account connects to some of the previous analyses reviewed above. The proposal in this paper shares the idea first introduced in Sz&Z according to which the differences between the island sensitive and the non-island sensitive elements is to be found in the nature of their quantificational domain—even if the proposal as to what exactly this difference is, is entirely different in the present paper. The proposal for negative islands that I will advance shares certain aspects both with the proposal of Sz&Z and that of F&H. Sz&Z argued that negative islands arose because the complement was not defined in every context. For my account the problem will stem from the fact that the complement cannot be defined in any context. On the other hand the present account has it in common with F&H's proposal that negative islands arise in cases where Dayal's (1996) presupposition that there be a most informative true answer cannot be met. While the present paper will concentrate on questions, I will also show that this proposal can also be extended to certain island effects in other structures, e.g. relative clauses with a definite head<sup>9</sup>.

### 3. Presuppositional Islands

In this section I look at islands created by presuppositional items, such as islands created by factive verbs and extraposition, as well as islands created by adverbs of quantification and *only*, which I argue in fact belong to the same group. I show that the reason for the unacceptability of these questions is that they lead to a contradiction which arises at the level of presuppositions of the question. For easier reference, let's list the group of interveners to be discussed in this section here:

#### Factive verbs:

- (37) a. Who did John regret that he invited to the party?  
 b. \*How did John regret that he behaved at the party?  
 c. \*How much milk does John regret that he spilled?

#### Extraposition:

- (38) a. Who was it scandalous that John invited to the party?  
 b. \*How was it scandalous that John behaved at the party?  
 c. \*How much milk was it a surprise that John spilled on his shirt?

#### Adverbs of quantification:

- (39) a. Who did you invite a lot?  
 b. \*How did you behave a lot?  
 c. \*How much milk did you drink a lot?

#### Only NP:

- (40) a. Who did only John invite to the party?  
 b. ??How did only John behave at the party?  
 c. \*How much milk did only John spill?

<sup>9</sup> Similarly to Sz&Z, I will not discuss islands that arise with *Why*-questions. The reason for this is that there is independent evidence that *why*-adjuncts in fact independently favor late insertion/ high attachment in the structure, cf. e.g. Ko (2005).

What the above interveners have in common is that they presuppose (that someone believes) the truth of their complement. As I will argue in this section, there are reasons to believe that questions that contain a variable (a *wh*-trace) in the scope of the presuppositional item stand with a set of presuppositions: the presuppositions of all the propositional alternatives in the Hamblin/Karttunen (henceforth H/K) denotation. However, this set of presuppositions turns out to be contradictory in the case of certain manner and degree questions. A set of contradictory presuppositions has the unpleasant consequence that the sentence is unassertable in any context: this is because there is no context in which all the presuppositions can be satisfied. Why will this set be contradictory? The problem is that there will always be two alternatives that are mutually incompatible, and yet will both have to be part of the set of presuppositions of the question. But since no context can entail two mutually exclusive propositions, there will never be a context in which an answer to manner or degree questions containing the above mentioned presuppositional items can be asserted<sup>10</sup>. The exception to this generalization will come from so called D-linked readings of manner questions, as well as wide scope readings of *how-many* questions, which are not predicted to lead to a contradiction. This, as I show, is a welcome result since these examples are famous (or notorious) for being acceptable, despite the factive/presuppositional context. In the case of questions about individuals, as the alternative propositions are independent from each other, no problem arises, and these questions are correctly predicted to be acceptable.

The section proceeds as follows. In Section 3.1 I show that the presuppositions of questions that contain a variable in the domain of a factive verb project in a universal manner. Section 3.2 discusses the cases of factive islands with manner and degree questions, including the cases of modal obviation already mentioned in the introduction of this paper. Section 3.3 extends the analysis to islands created by extraposition and certain weak triggers, such as adverbs. In Section 3.3.3 I also discuss the issue of response stance predicates which will be shown to pose a challenge, and finally I address the intervention created by *only* NPs, which will be argued to belong to the realm of presuppositional islands as well.

### 3.1 Presuppositions of questions

In this section it is observed that questions which contain a variable in the scope of a factive item are naturally understood in a way which suggests that their presupposition projects in a universal manner. I also discuss certain apparent counterexamples to this generalization, and argue that in these cases we are in fact dealing with a special type of identity questions, in the case of which the presupposition projected is simply invariant.

#### 3.1.1 Sets of partial propositions

The sentence in (41) triggers the presupposition that Bill is lucky:

(41) John knows that Bill is lucky

This means that the utterance of (41) requires that the context (the set of possible worlds in which the propositions that are taken to be true by the participants of the conversation are true) entail that Bill is lucky. I will assume as usual that the presupposition of the sentence above is triggered by the factive verb *know*. Technically, I will treat the presupposition as a definedness condition on the hosting sentence, similarly to Frege's treatment of the definite

<sup>10</sup> Similar reasoning about contradictory presuppositions leading to ungrammaticality was proposed in Heim (1984), Krifka (1995), Zucchi (1995), Lahiri (1998), Guerzoni (2003), Abels (2004), Abrusán (2007a).

determiner (cf. discussion and modern implementation in Heim and Kratzer 1998), although nothing crucial depends on this particular choice. According to this, the predicate *know* denotes a partial function, as shown in the lexical entry below:

$$(42) \quad \llbracket \text{know} \rrbracket = \lambda P. \lambda x. \lambda w: \underline{P(w)=1}. \text{knows}(x)(P)(w)$$

The compositional rules<sup>11</sup> (cf. Heim and Kratzer 1998, Guerzoni 2003) ensure that the definedness condition in the lexical entry (underlined above) projects to become the definedness condition of the whole sentence.

$$(43) \quad \llbracket \text{John knows that Bill is lucky} \rrbracket = \\ \lambda w: \underline{\text{Bill is lucky in } w}. \text{John knows that Bill is lucky in } w$$

What happens if we form a question based on a sentence that contains a presupposition trigger such as *know*? Now the H/K denotation of the question contains a set of partial propositions, as shown below.

$$(44) \quad \llbracket \text{Who knows that Bill is lucky?} \rrbracket^w = \\ \lambda p. \exists x [\text{person}(x) \ \& \ p = \lambda w': \underline{\text{Bill is lucky in } w'}. \text{John knows that Bill is lucky in } w']$$

Empirically it seems clear that the question retains the presupposition of its declarative counterparts, in other words (44) presupposes that Bill is lucky. In fact the persistence of presuppositions in questions is usually taken to be one of the most reliable diagnostics for determining whether the meaning of an expression is presuppositional. What happens if the question contains a variable in the scope of a factive verb? In the next section I will show that in the case of such questions the empirical fact seems to be that the projection pattern is universal. In the rest of the paper then I will take this fact at face value, remaining agnostic about which projection theory in particular makes the correct predictions. (e.g. Heim 1983, Beaver 2001, Guerzoni 2003, Schlenker 2006, Chemla 2008) Rather, the argument will go as follows: whatever the projection facts for questions about individuals that contain a factive verb turn out to be, this pattern can be expected to carry over to similar questions about manners and degrees. As projection turns out to be universal in the case of questions about individuals, it will be reasonable to assume that it is universal in the case of manner and degree questions as well.

### 3.1.2 Questions about individuals: universal projection

Let's start by examining questions about individuals containing a variable in the scope of a factive verb such as *regret*:

$$(45) \quad \text{Who among these ten people does Mary regret that Bill invited?}$$

Heim (1992) has argued that the factive verb *regret* triggers the following presupposition<sup>12</sup>:

<sup>11</sup> As discussed in Guerzoni (2003), what we need is a slightly revised version of Heim and Kratzer's (1998) Intensional Function Application Rule:

(4) *Intensional Function Application revised (IFA\*)*

If  $\alpha$  is a branching node and  $\{\beta, \gamma\}$  the set of its daughters then for any possible word  $w$  and assignment function  $g$ ,  $\alpha \in \text{dom}(\llbracket \ ]^{w,g})$  if  $\beta \in \text{dom}(\llbracket \ ]^{w,g})$  and if  $\llbracket \beta \rrbracket^{w,g}$  is a function whose domain contains  $\lambda w': \gamma \in \text{dom}(\llbracket \ ]^{w',g})$ , then  $\llbracket \alpha \rrbracket^{w,g} = \llbracket \beta \rrbracket^{w,g} (\lambda w': \gamma \in \text{dom}(\llbracket \ ]^{w',g}). \llbracket \gamma \rrbracket^{w',g})$

As noted in Guerzoni (2003), the output of this rule will inherit the definedness condition of the intensional functor, but not necessarily of its argument. Whether or not the definedness conditions of the argument will be inherited depends on the semantics of the functor itself.

- (46) *x regrets that p*  
*presupposes: x believes that p*

In other words the presupposition of *regret* requires that every belief world of the subject is such that it entails *p*. Given this, the denotation of the question above will look as follows:

- (47)  $\llbracket (45) \rrbracket^w = \lambda p. \exists x [x \in \{\text{these ten people}\} \ \& \ p = \lambda w': \text{Mary believes that Bill invited } x \text{ in } w']$ . Mary regrets that Bill invited *x* in *w'*

Now we might ask, what does the question in (45) presuppose? Empirically, it seems that it presupposes that for every *x* in the given domain, Mary believes that Bill invited *x*:

- (48) **presupposition of (45):**  $\forall x \in \{\text{these ten people}\} : \text{Mary believes that Bill invited } x$

We observe then that the projection pattern with factive verbs is universal<sup>13</sup>. In the case of a question about individuals the context can easily satisfy the set of presuppositions that the question has: The presuppositions of the alternatives are independent from each other. Note also that similar data about universal projection in constituent questions were observed in Guerzoni (2003)<sup>14</sup>.

I believe that universal projection is also at the heart of the contrast discovered in Szabolcsi and Zwarts (1996) between questions about individuals that involve a predicate that can be iterated vs. questions that contain *one time only* predicates:

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

Observe that the difference between the two questions above can be easily explained under the assumption that indeed the projection pattern of the presuppositions is universal. Given such a pattern, the example in (49)a presupposes that you have shown the letter to a number of people—which is an unproblematic presupposition. According to the universal projection pattern, the example in (49)b will likewise presuppose that you have gotten this letter from a

<sup>12</sup> This presupposition is weaker than what is often assumed in connection with factives, namely that the matrix context has to entail *p*. Heim (1992) however argues that such a presupposition seems in fact to be too strong for factive attitude verbs such as *regret*. (Although *know* might be an exception). Notice however that such a stronger presupposition would equally derive the contradiction that manner and degree islands show, just in an even stronger way.

<sup>13</sup> As Anna Szabolcsi (pc.) pointed out to me, we find weaker presupposition projection pattern with certain predicates such as *stop smoking*:

(5) Which of your friends has stopped smoking?  
However, we might observe that predicates such as *stop smoking* are independently known to be weak triggers:  
(6) I notice you are chewing on your pencil. Have you recently stopped smoking? (example due to B. Geurts)

<sup>14</sup> In chapter 3 of her dissertation, Guerzoni (2003) discusses the effects of minimizers and focus particles such as *even* in constituent questions. The latter are ambiguous between a biased and a neutral reading:

(7) A. Who will lift a finger to help us?  
b. Who even solved problem 2?

On the neutral reading, the question in (7)b seems to carry a “universal hard” presupposition, while on the biased reading it seems to have a “universal easy” presupposition, as described below:

(8) a. ‘ $\forall$  hard’ presupposition: for every contextually relevant person, having solved Problem 2 is LESS likely than solving any other problem  
b. ‘ $\forall$  easy’ presupposition: for every contextually relevant person, having solved Problem 2 is MORE likely than solving any other problem



number of people: This condition however is impossible to meet, since *get* is a *one time only* predicate, and (on the distributive reading that we are after here) it is only possible to get a letter from a single sender. In other words, the problem with (49)b stems from the fact that it stands with a presupposition that is impossible for any context to satisfy. In Section 3.2 I argue that essentially the same problem is at the heart of presuppositional islands created by manner and degree extraction: these questions also stand with a presupposition that is contradictory, and therefore cannot be satisfied in any context.

### 3.1.3 Identity questions<sup>15</sup>

Before moving on to the analysis of presuppositional islands, the following fact is worth pointing out in connection with examples that contain a *one time only* predicate. Interestingly, in certain cases it is possible to obviate the above effect, as shown by the example below:

(50) Who is the one that you regret having gotten this letter from?

This example is grammatical, despite the one-time only predicate contained in the question. Why should that be? I believe that what is going on in this case is the following. First observe that the question above is understood as an identity question, in other words it is concerned about the identity of a particular individual, one that is already salient in the context.

- (51) a.  $\lambda p. \exists x [p = \lambda w'. x = \iota y. \text{you regret that you got the letter from } y \text{ in } w']$   
 b. 'For what individual  $x$ ,  $x = \iota y$  such that you regret you got the letter from  $y$ ?'

Since the identity question contains a definite description, now in fact we have two presuppositions embedded in each other: the uniqueness presupposition of the definite description, and the factive presupposition triggered by *regret*:

- (52) Who is [<sub>uniqueness pres</sub> **the one** that you [<sub>factive pres</sub> **regret** having gotten this letter from]]?

Moreover, we might observe that the factive presupposition trigger is in the restrictor of the definite description, as shown below:

- (53) **the one** [ that you <sub>factive pres</sub> **regret** having gotten this letter from] is Bill

However, it is an independently known fact that presuppositions embedded in restrictors of quantifiers project weakly or not at all (cf. Schlenker 2006). This can be observed in examples such as the one in (54) below, which does not seem to stand with the inference that all of these ten boys are incompetent:

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

What seems to happen then in the case of (50) is that the factive presupposition that is embedded in the restrictor of the definite description fails to project, and it is only the uniqueness presupposition of the definite description that projects. However this presupposition is in fact invariant for all the propositions in the question:

- (55) Presupposition of (50):  
 the invariant uniqueness pr:  $\iota y. \text{you regret that you got the letter from } y$

<sup>15</sup> Thanks to Philippe Schlenker for a helpful discussion on this issue.

Since the uniqueness presupposition is invariant, the question itself will only presuppose that there is a unique individual which you regret having gotten the letter from. This presupposition in turn can be easily satisfied in any context, and hence the question is acceptable.

### 3.2 Presuppositional islands with factive verbs

In the previous section we have seen that questions that contain a bound variable in the scope of a presupposition trigger show a universal projection pattern. This property of questions leads to a problem in the case of *one time only predicates*, because it predicted a presupposition that no context could satisfy. The problem however was obviated in the case of identity question, in the case of which the factive presupposition got trapped in the restrictor of the definite description.

This is a very interesting observation from the perspective of weak island violations with manners and degrees. The reason is that it is well known that weak islands improve if the context provides a salient “referent”, if the *wh*-phrases in question can be understood as “D-linked” in the sense of Pesetsky (1987). In this section I will show how such a pattern can be predicted. The problem will be that in the case of manner and degree questions that contain certain presuppositional elements a universal projection pattern leads to a set of contradictory presuppositions. However, as we will see if the context provides a salient manner and therefore the manner question can be understood as an “identity” question, the projected presupposition will in fact be invariant and therefore a contradiction can be avoided. In the case of degree questions and the narrow scope reading of numeral questions a universal projection pattern will derive a contradiction, however under the wide scope reading a contradiction will not be predicted to arise.

#### 3.2.1 Questions about manners

This section examines manner questions that contain a variable in the scope of the factive verb. I will argue that given the assumptions about the domain of manners, such questions always stand with a contradictory set of presuppositions. As there can be no context that satisfies the presupposition of these questions, they always result in a presupposition failure.

##### ◆ About manner predicates and contraries

Let’s assume that manner predicates denote a function from events (e) to truth-values (t), or equivalently a set of events:

$$(56) \quad \llbracket \text{fast} \rrbracket = \{e \mid \text{fast } e\}$$

Extending Landman (1989)’s version of Link (1983) to manner predicates, I will assume that we form plural manners as illustrated below:

$$(57) \quad \llbracket \text{fast+carelessly} \rrbracket = \{ \{e \mid \text{fast } e\}, \{e \mid \text{careless } e\} \}$$

Given this way of forming plural manner predicates, we arrive at a structured domain, not unlike that of the domain commonly assumed for individuals (cf. Link 1983 and subsequent work). Let’s pause for a second and think about how a plural manner such as the one in (57) will be able to combine with a predicate of events. Since in this case we have sets of sets of events, predicate modification will not be able to apply in a simple fashion. Furthermore, if we look at an example such as the one below, we also want our semantics to predict that the running event in question was both fast and careless.

- (58) a. John ran fast and carelessly  
 b.  $\lambda w. \exists e [\text{run}(w)(e)(\text{John}) \wedge \text{fast+carelessly}(w)(e)]$

To resolve this type conflict and to derive the appropriate meaning, we will postulate an operator D that applies to plural manner predicates, much in the fashion of the distributive operator commonly assumed for individuals:

- (59)  $D(P_{PL}) = \lambda e. \forall p \in P_{PL} p(e)$

Let's look at an example of a positive question about manners. The H/K-denotation of the question will contain a set of propositions such as (60)b-c. Given our assumption that the domain of manners contains both singular and plural manner predicates, the question word *how* will range over both singular and plural manner predicates as well. Notice that I will assume that a question such as (60) talks about a contextually given event, which I will represent here by  $(e^*)$ . In other words the question in (60) is interpreted as 'How was John's running?'.

- (60) a. How did John run?  
 b.  $\lambda p. \exists q_{\text{manner}} [p = \lambda w'. \text{run}(w')(e^*)(\text{John}) \wedge q_{\text{manner}}(w')(e^*)]$   
 c. {that John ran fast, that John run fast+carelessly, etc..}

Given the D operator introduced above, the proposition that John run fast+carelessly will entail that John run fast and that John run carelessly. If this proposition is indeed the maximal true answer, we will conclude that John's running was performed in a fast and careless manner and in no other manner in particular.

The crucial assumption that I would like to introduce is that the domain of manners always contains contraries. The observation that predicates have contrary oppositions dates back to Aristotle's study of the square of opposition and the nature of logical relations. (cf. Horn (1989) for a historical survey and a comprehensive discussion of the distinction btw. contrary and contradictory oppositions, as well as Gajewski (2005) for a more recent discussion of the linguistic significance of contrariety). Contrariety is relation that holds between two statements that cannot be simultaneously true, though they may be simultaneously false. A special class of contraries are contradictories, which not only cannot be simultaneously true, but they cannot be simultaneously false either. Natural language negation is usually taken to yield contradictory statements (cf. e.g. Horn 1989).

- (61) Two statements are contraries if they cannot be simultaneously true  
 (62) Two statements are contradictories if they cannot be simultaneously true or false

A classic example of a pair of contrary statements is a universal statement and its inner negation (assuming that the universal quantifier comes with an existential presupposition) such as (63). Other examples of contrary statements include pairs of contrary predicates such as the sentences in (64), where it is impossible for a single individual to be both short and tall. Contrary negation is also often manifested in English by the affixal negation *un-*, such as e.g. in the case of pairs of predicates like *wise* and *unwise* (65):

- (63) a. Every man is mortal  
 b. Every man is not mortal (=No man is mortal)

- (64) a. John is short  
b. John is tall
- (65) a. John is wise  
b. John is unwise

What distinguishes then contrary predicates from contradictory predicates is that two contrary predicates may be simultaneously false: it is possible for an individual to be neither tall nor short, or neither wise or unwise. This is also shown by the fact that the negation of predicates is usually not synonymous with their antonyms: the statement that *John is not sad* e.g. does not imply that he is happy.

Similarly to other predicates then, the domain of manners also contains contraries. In fact I will claim that every manner predicate has at least one contrary in the domain of manners (which is not a contradictory). (66) summarizes the conditions on the domain of manners:

- (66) Manners denote functions from events to truth values. The set of manners ( $D_M$ ) in a context  $C$  is a subset of  $\{f \mid E \rightarrow \{1,0\}\} = \wp(E)$  that satisfies the following condition:
- i. 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:  $P \cap P' = \emptyset$ .

I will assume that the context might implicitly restrict the domain of manners, just as the domain of individuals, but for any member in the set  $\{P, P'\}$ , the other two members are alternatives to it in any context. Some examples of such pairs are shown below:

- (67) a.  $P$ : wisely; fast; by bus  
b.  $P'$ : unwisely; slowly; by car

#### ◆ Manner questions

Given the simple and rather natural assumption that the domain of manners always contains contraries, manner questions that contain a factive verb are predicted however to presuppose a contradiction. Let's look at the example below:

- (68) \*How does Mary regret that John fixed the car?

Since the alternative propositions in the H/K denotation of the question will be always ranging over a set manners that contains contraries, a universal projection pattern for the presupposition embedded in the scope of the question will project a set of propositions that are contradictory:

- (69)  $\llbracket \text{How does Mary regret that John fixed the car?} \rrbracket^w$   
 $= \lambda p. \exists \alpha [\alpha \in D_M \ \& \ p = \lambda w'. \text{Mary believes that John fixed the car in } \alpha \text{ in } w'. \text{Mary regrets that John fixed the car in } \alpha \text{ in } w']$

- (70) *Projected presupposition of the question in (68):*  
 $\rightarrow$  for every manner  $\alpha \in D_M$ : Mary believes that John fixed the car in  $\alpha$   
 $\rightarrow$  for every manner  $\alpha \in D_M$ : Mary believes that John's car fixing event  $e^*$  was in  $\alpha$

Recall that manner questions are understood as asking about a particular event, which in this case means that the proposition embedded under the attitude verb is understood as describing

a particular event  $e^*$ . However, it is not possible for a single event to be an element of all the manners in a given domain of manners, because these domains always contain contraries, as it was argued above. Therefore it is not possible for John to have fixed the car in all the ways given in the context, and as a consequence the question in (68) will always presuppose that Mary has an incoherent set of beliefs.

#### ◆ Obviation phenomena

Interestingly, the island violations above can be improved. The first way to improve these questions is shown by the examples below:

(71) What is the manner in which John regrets that Mary fixed the car?

Such examples are often described as involving D-linking, which tends to improve the acceptability of weak islands. What I would like to suggest is that in these cases again we are dealing with identity questions, the denotation of which can be represented as below<sup>16</sup>:

(72)  $\lambda p. \exists \alpha [\alpha \in D_M \ \& \ p = \lambda w'. \alpha = \iota \beta \text{ s.t. Mary regrets that John fixed the car in } \beta \text{ in } w']$   
 'For what manner  $\alpha$ ,  $\alpha = \iota \beta$  such that Mary regrets that John fixed the car in  $\beta$ ?'

The factive presupposition is again embedded in the restrictor of the definite description

(73) *the manner* [ *such that Mary regrets that John fixed the car that way*] is  $\alpha$

Since the projection pattern from the restrictors of quantifiers is very weak, as discussed e.g. in Schlenker (2006), the embedded factive presupposition will not project, only the presupposition of the definite description, which is invariant. Therefore the presupposition of the question is not contradictory.

(74) **Presupposition of (71):**  $\iota \beta$ . Mary regrets that John fixed the car in  $\beta$

Finally, note that the explanation for the above example remains the same for an analogous question with a resumptive NP, such as the one below:

(75) What is the manner such that John has fixed the car that way?

The second way of ameliorating factive island violations is by existential modals: as it was mentioned in the introduction of this paper, for most speakers, factive islands can be significantly ameliorated by placing an existential modal in the scope of a factive verb<sup>17</sup>:

(76) ?How do you regret that John was allowed to behave?

<sup>16</sup> Note that this explanation for the D-linking effect is dependent on there being a syntactic difference between the D-linked and the non-D-linked questions, i.e. it depends on the presence of the definite description at LF. I am therefore lead to assume that the LF representation even of the examples (if they indeed exist) in which a D-linking effect can be observed without an overt definite description is in fact similar to that in (72), in other words that they contain a covert definite description.

<sup>17</sup> The exact choice of the modal is important: some epistemic modals such as *might* e.g. are PPI's and therefore are independently excluded from appearing under factive verbs that license NPI's, e.g. *regret*.

Indeed the present approach predicts that a modal in the scope of a factive should ameliorate factive islands. The reason is that now the projected presuppositions are in fact not contradictory. Consider the question in (76)a above:

- (77)  $\llbracket (76)a \rrbracket^w$   
 $= \lambda p. \exists \alpha [\alpha \in D_M \ \& \ p = \lambda w'. \text{you believe that John was allowed to behave in } \alpha \text{ in } w'.$   
 $\text{you regret that John was allowed to behave in } \alpha \text{ in } w']$

This question only stands with the presupposition that for every manner, John was allowed to behave in that manner, which is not a contradictory set of propositions:

- (78) *Projected presupposition of the question above:*  
 $\rightarrow$  for every manner  $\alpha \in D_M$ : you believe that John was allowed to behave in  $\alpha$

Since the set of propositions that the question presupposes is not contradictory, the context can easily satisfy it, and therefore the question is acceptable<sup>18</sup>.

### 3.2.2 Degree questions<sup>19</sup>

This section examines first why degree questions that contain a factive predicate are unacceptable. The next section shows that an analogous restriction can be found with certain readings of *how many* questions. The crucial tenet on which the explanation of the island sensitivity of degree islands rests is the idea that degree questions range over intervals. In other words, following the proposals advanced in Schwarzschild and Wilkinson (2002), Schwarzschild (2004) and Heim (2006) I will assume that degree predicates denote relations between individuals and intervals (sets of degrees), as shown in (79). Given this, the denotation of a degree question will be as in (80):

- (79)  $\llbracket \text{tall} \rrbracket = \lambda I_{\langle d, t \rangle}. \lambda x_e. x \text{'s height} \in I$   
(80)  $\llbracket \text{How tall is John?} \rrbracket^w = \lambda p. \exists I [I \in D_I \ \& \ p = \lambda w'. \text{John's height} \in I \text{ in } w']$   
‘For what interval  $I$ , John’s height is in  $I$ ?’

Now the denotation of a degree question that contains a factive predicate can be represented as follows:

- (81)  $\llbracket * \text{How tall do you regret that you are?} \rrbracket^w$   
 $= \lambda p. \exists I \in D_I [p = \lambda w'. \text{regret}(\lambda w''. \text{your height} \in I \text{ in } w'') (w')]$   
‘For what interval  $I$ , you regret that your height is in  $I$ ’

Observe that any domain of degrees that has at least 2 degrees in it<sup>20</sup> will contain two non-overlapping intervals, which can be pictured as follows.

<sup>18</sup> Øystein Nilsen (pc.) has pointed out to me that embedding factive islands under presupposition “plugs” such as *believe* should also ameliorate factive islands, which however does not seem to be the case. The solution to this problem might lie in observing that even in this case the question would presuppose that someone believes someone else to necessarily have a contradictory set of beliefs, which might on its own be an infelicitous context for asking a question.

<sup>19</sup> The idea to use the interval semantics for degrees was originally suggested to me by Benjamin Spector (pc.) in the context of negative islands, cf. also Section (4.2) and Abrusán and Spector (2008).

<sup>20</sup> I assume that if a domain of degrees only has a single degree in it, the question will be infelicitous since it will always denote a tautology. Cf. also the discussion in Section 5.

(82) -----[-----]₁-----[-----]₂-----

Given the universal projection pattern, the question will stand with the following presupposition:

(83) **Presupposition** of (81):  $\forall I \in D_I$ : you Believe  $(\lambda w$ ' your height  $\in I$  in  $w')$  ( $w$ )  
'you believe your height to be contained in every interval'

However, since the domain of degrees always contains two non-overlapping intervals, this presupposition amounts to requiring that the subject have a contradictory set of beliefs, because it is not possible that someone's height be contained in two non-overlapping intervals. Since the question stands with a contradictory presupposition, it is infelicitous in any context and hence unacceptable.

### 3.2.3 How many questions: scope ambiguity

As it is well known, an existential noun phrase such as *n-many books* can be understood as having scope over *want* (84)a, or with a reconstructed scope under the attitude verb (84)b:

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

a. **Wide scope reading:**

'For what interval  $I$ , there is a set of (particular), books  $X$ ,  $|X| \in I$ ,  
such that you **want** to buy  $X$ '  
 $\lambda p. \exists I \in D_I [p = \lambda w'. \exists X [\text{book}(X)(w') \ \& \ |X| \in I \ \& \ \textbf{want}$   
 $(\lambda w''. \text{buy}(\text{you})(X)(w''))(w')]]$

b. **Narrow scope (reconstructed) reading:**

'for what interval  $I$ , you **want** there to be a set of books  $X$ ,  $|X| \in I$ , such that you  
buy  $X$ ' (i.e. What amount of books do you want to buy?)  
 $\lambda p. \exists I \in D_I [p = \lambda w'. \textbf{want} (\lambda w''. \exists X [\text{book}(X)(w'') \ \& \ |X| \in I \ \& \ \text{buy}(\text{you})(X)(w''))] (w')]$

The two readings have been extensively discussed, (cf. e.g. Rullmann 1995, Cresti 1995, Romero 1998, Fox 2000). The first reading is somewhat reminiscent of the *de re/de dicto* ambiguity (though cf. Rullmann (1995) for a list of important differences). In the syntactic tradition, the first reading is also often called the 'D-linked', or 'referential' reading, even though the latter terminology is rather misleading, as from a semantic point of view degree questions cannot be said to be 'referential' in any sense. It has been long observed that the two readings behave differently in the context of weak-island inducers (cf. Longobardi 1987, Rizzi 1990, Cresti 1995, Rullmann 1995): the narrow scope reading is sensitive to weak islands, but the wide scope reading is not. This is also true in the case of factive islands, as the example below shows:

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

a. **Wide scope reading:**

'For what interval  $I$ , there is a set of (particular) books  $X$ ,  $|X| \in I$ , such that you regret  
that you bought  $X$ '  
 $\lambda p. \exists I \in D_I [p = \lambda w'. \exists X [\text{book}(X)(w') \ \& \ |X| \in I \ \& \ \textbf{regret} (\lambda w''. \text{buy}(\text{you})(X)(w''))(w')]]$

b. **#Narrow scope (reconstructed) reading:**

‘For what interval I, you regret that the number of books that you bought is in I’  
 $\lambda p. \exists I \in D_I [p = \lambda w'. \text{regret}(\lambda w''. \exists X [\text{book}(X)(w'') \ \& \ |X| \in I \ \& \ \text{buy}(\text{you})(X)(w'')])] (w')$

The well known observation in the literature is that in the case of (85), only reading (a) exists, but reading (b) does not. This fact receives a straightforward explanation in the present approach. Notice that in the case of the wide scope reading the variable I is not in the scope of *regret*. Therefore the presupposition of each alternative in the H/K denotation of the question under the wide-scope reading will be invariant, and the inherited presupposition of the question will be as shown below:

(86) Presupposition of the wide scope reading:

$\forall X \in D_{\text{books}}. \text{you Believe}(\lambda w'. \text{bought}(\text{you})(X)(w'))(w)$   
 ‘you believe you bought all the books in the domain’

The presupposition of the wide-scope reading of the question says that for every set of books (in a given, contextually restricted domain) you believe you bought that set of books. This presupposition can be satisfied, if you bought all the books in a given domain. However in the case of the narrow scope reading the situation is different. As the variable I is in the scope of the factive verb *regret*, the presuppositions the alternatives in the H/K denotation of the question under the narrow scope reading will be different. A universal pattern of presupposition projection then will predict the following presupposition for the question:

(87) Presupposition of the narrow scope reading:

$\forall I \in D_I: \text{you Believe}(\lambda w'. \exists X [\text{book}(X)(w') \ \& \ |X| \in I \ \& \ \text{buy}(\text{you})(X)(w')]) (w)$   
 ‘For every interval, you believe that the number of books you bought is in that interval’

However, this presupposition is a contradiction. This is because it is not possible that the number of books that you bought be a member of every interval, as the set of intervals in any domain will contain many non-overlapping intervals. In fact as soon as the domain of degrees has as much as two degrees in it,  $d_1$  and  $d_2$ , the domain of intervals will contain at least two exclusive intervals (sets of degrees):  $\{d_1\}$  and  $\{d_2\}$ . Therefore the narrow scope reading of the question in (85) is predicted to stand with a set of contradictory presuppositions as soon as our domain contains two degrees. (If the domain only contains a single degree the question will denote a tautology). As before, a set of contradictory presuppositions means that the question cannot be stated in any context.

### 3.3 Extensions

In the previous section it was argued that raising a manner or a degree *wh*-word from the scope of a factive verb is impossible in most cases because such questions are predicted to stand with an incoherent presupposition. This was predicted if the presuppositions of the alternatives in the H/K denotation of the question project universally, i.e. the question presupposes the conjunction of the presuppositions of its alternatives. In this section I will argue that the reasoning presented above for factive verbs can be extended to certain islands created by extraposition (3.3.1) and certain adverbial interveners as well as some quasi-factive verbs (part-time triggers) (3.3.2). I will also point out a problem that arises in connection with



response stance predicates in Section 3.3.3, and finally I discuss the case of intervention by *only* in Section 3.3.4.

### 3.3.1 Extraposition Islands

A well known group of weak island inducers are the islands created by extraposition, such as (89) below. This group of island inducers is usually handled separately from factive islands in the literature. However it has been already observed by Honcoop (1998) that extraposition and factives should in fact belong to the same class of interveners. This is because whether or not extraposition creates weak islands depends on the factivity of the verb/noun involved in the construction. In other words, it is not so much the syntactic properties of extraposition that play a role in their island creating behavior, rather the factive inference they may stand with. When the extraposition is based on a noun/adjective that triggers a factive inference, the extraposition creates a weak island context. However, on the occasions that extraposition is not based on an adjective that has a factive inference, it does not give rise to weak islands either<sup>21</sup>. The example in (88) below clearly stands with a factive inference that (the speaker believes that) p:

- (88) It was a surprise that John behaved politely  
*presupposes:* (the speaker believes that) John behaved politely

Accordingly, the question based on this extraposition structure is predicted to be an island violation, which is indeed the case as shown by the example below:

- (89) \*How was it a surprise that John behaved?

The reasoning of course is the same as the one presented for factive verbs in the previous section: the question is predicted presuppose the conjunction of the presuppositions of the alternatives in the H/K denotation. However, as we have seen above, this set will always contain propositions that are mutually incompatible. Hence the set of presuppositions that the question stands with is always incoherent, therefore the question cannot be asked in any context.

In contrast, observe that certain other structures that can be classified syntactically as belonging to the class of extrapositions, do not stand with a factive inference:

- (90) a. It is possible that John behaved politely.  
       →does *not* presuppose that John behaved politely  
       b. It is dangerous for youngsters to drink wine at the party.  
       →does *not* presuppose that youngsters drink wine at the party.

Correspondingly, as one can observe by looking at the examples in (91) below, such extrapositions do not induce weak islands either.

- (91) a. How is it possible that John behaved?  
       b. How much wine is it dangerous to drink at a party?  
           *example (b) due to Postal, cited in Szabolcsi (2006)*

<sup>21</sup> The one exception in the literature to the above claim is the example from Cinque (1990):

(9) \*How is it time to behave?

I do not have an explanation for this fact. Also, modal obviation seems for some reason to be harder in the case of extraposition islands, cf. e.g. ???*How was it a surprise that John was allowed to behave?*

The questions above are acceptable, as predicted by the present theory, because they do not stand with any conflicting presuppositions<sup>22</sup>, in fact probably they do not trigger any presupposition at all.

### 3.3.2. Weak triggers

If the intervention by factive verbs and (factive) extraposition islands is indeed the result of the factive inference, we should find cases where the presence or absence of this inference correlates with the island creating behavior of the intervener. In this section I suggest that we might indeed observe such examples in the case of certain adverbial interveners which might trigger a factive-like inference in some but not other contexts. When the lexical content together with the context suggests a factive inference, we observe island inducing behavior, but not otherwise.

Pertinent examples are provided by the adverbial interveners such as *fast* or *twice*. In these cases the presence or absence of the factive inference correlates with the island creating behavior of the intervener. This also means that I propose that adverbial interveners in fact belong to the group of presuppositional islands. This is in contrast with most (indeed, all) of the literature on this topic, who claim that (quantificational) adverbial interveners argue for treating weak island intervention in terms of scope (e.g. Kiss 1993, de Swart 1992, Szabolcsi and Zwarts 1993, Honcoop 1998). However, I believe that rather than scope restrictions, the real culprit is again presuppositions. Linebarger (1981), and more recently Simons (2001) and Schlenker (2006) note that adverbs give rise to “quasi-presuppositions”, i.e. in some circumstances they create inferences that project in a presupposition-like fashion:

- (92) Bill ran fast  
→Inference: Bill ran

The projection properties of this inference seem to pattern with that of real presuppositions, at least in some circumstances, which argues that the inference is indeed a presupposition, (cf. Chemla 2007 on the projection differences between implicatures and presuppositions):

- (93) None of these ten boys ran fast  
Inference: all of these ten boys ran
- (94) None of these ten boys solved the exercise twice.  
Inference: all of these ten boys solved the exercise

However, not all adverbs seem to behave in the same way: the adverb *carefully*, e.g. seems to project rather weakly, if at all:

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<sup>22</sup> In some cases we might observe that the extraposition might stand with a presupposition that is somewhat weaker than typical factive inferences: e.g. the example below presupposes that *someone* believes or has proposed the truth of the complement. It seems that in these cases as well, we might observe an island inducing behavior:

- (10) It is true that bill behaved politely.  
→presupposes: *Someone believes that Bill behaved politely*
- (11) \*How is it true that Bill behaved?

However, this is not a peculiarity of extraposition islands. It has been observed that verbs that stand with such a presupposition, eg. *admit* (a.k.a. response stance predicates) in fact give rise to weak islands as well as discussed in section 3.3.3.

- (95) None of these ten boys searched the bags carefully  
 ???→everyone searched the bags

The curious fact that we can observe now is that the projection facts above seem to correlate with the island inducing behavior of the adverbs above. In particular, observe that quantificational adverbs such as *twice* and adverbs such as *fast*, which seemed to stand with a factive presupposition above, are also robust interveners in split constructions (cf. de Swart 1992).

- (96) \*Combien as-tu beaucoup/souvent/peu/rarement consulté de livres? [French]  
 How many have you a lot/often/a little/ rarely consulted of books  
 (97) \*Combien Marie a-t-elle vite mangé de gateaux?  
 How many Marie has-she fast ate of cakes

However, the adverb *carefully* e.g., which seemed to show a weak presuppositional behavior, has been reported not to induce a weak island effect:

- (98) ?Combien le douanier a-t-il soigneusement fouillé de valises?  
 How-many the customs-officer has-he carefully searched the suitcases  
 (cf. Obenauer 1984)

Non-split constructions also seem to be sensitive to adverbial interveners, however the effect is said to be somewhat weaker from the one we can observe in split constructions (cf. also den Dikken and Szabolcsi 2002):

- (99) ???How much milk did John spill on his shirt often?  
 (100) ???How much milk did John spill on his shirt quickly?  
 (101) ?How much milk did John spill on his shirt carefully?

What we can observe then is that quantificational adverbs and some other adverbs like *late*, *fast*, etc are more prone to triggering a “quasi-presupposition” than other adverbs: e.g. *carefully* does not seem to trigger a presupposition in the same fashion. Consequently, the former but not the latter seem to provoke intervention. The difference that we can observe between the various adverbs is probably triggered not so much by the particular adverbs themselves, but rather by the interaction of the context and the content of the whole sentence. And while such “quasi-presuppositions” are not yet well understood, given their (quasi-) factive inference, the explanation why *wh*-constructions that contain adverbs are sensitive to weak islands will be very similar to what we have seen above in the case of factive and extraposition islands. Further, as adverbs do not seem to be uniform in the strength of the quasi-presupposition they invoke, this analysis has the capacity to predict a certain amount of variation with respect to individual adverbs. This is a welcome result, because even quantificational adverbs do not seem to be particularly robust interveners in general (except in the French *combien*-split constructions).

### 3.3.3 A problem? Response stance predicates

It has been argued that the class of verbs that create weak islands also includes *response stance verbs* (cf. Cattell 1978, Hegarty 1992, Szabolcsi and Zwarts 1993, Honcoop 1998). Though not factive, these verbs are normally uttered in response to something that is assumed to be part of the common ground or to something that someone proposed to update the common ground with:

- (102) response stance verbs: deny, verify, admit, confirm, accept, acknowledge

These verbs are presuppositional in the sense that they “presuppose that their complements express assumptions or claims held by someone possibly other than the speaker which are part of the common ground” (Honcoop 1998, p.167).

- (103) *x denied that p*  
presupposes: it is assumed by someone that p

As the example below shows, response stance predicates induce weak islands as well:

- (104) \*How did Bill deny/admit/verify that John fixed the car?

Can the reasoning above as for why factive verbs create weak islands be extended to response stance verbs? It could, if their presupposition was anaphoric, relative to a contextually salient individual whose assumptions are being presupposed. Is this indeed the case? Cf. the following example:

- (105) *Context: Peter, Fred and Mark and their wives. Each of Peter, Fred and Mark believe that John slept with their wives (and only their wives).*

Which of these 3 women did Bill deny/admit that John slept with?

Is this sentence felicitous? If yes, the assumption that the existential quantifier in the presupposition is anaphoric to a single salient individual is too strong. Unfortunately, it seems to me that the sentence can be uttered in the above context. However, if this is indeed the case, a contradiction is not predicted by the present account. This is because similarly to the cases of existential modals discussed in Section 3.3., the existential quantifier should obviate the island effect, or more precisely it should not lead to an island effect in the first place. The reason why the example above should be acceptable is that now the presuppositions of the various alternatives could be all true in different possible worlds, and therefore a contradiction would not arise. At the moment I do not understand why the existential in the presupposition of response-stance predicates fails to obviate the weak-island effect. I suspect that the problem has to do with the notoriously complex and often problematic interaction of presupposition projection with existential quantification. Yet, a detailed analysis of this issue will have to wait for another occasion.

### 3.3.4 Islands created by *only*

Questions that contain an *only* NP also create weak island contexts. In this section I argue that this is also due to such questions standing with contradictory presuppositions. Before we can get to the argument however, it is necessary to briefly review some key assumptions about the semantics and pragmatics of *only*. It is well known that that a sentence of form *only*  $\phi$  conveys that  $\phi$  is true. E.g. the sentence in (106)a conveys that Muriel voted for Hubert ((106)b):

- (106) a. Only Muriel voted for Hubert  
b. Muriel voted for Hubert

It is equally well known that deciding what is the correct characterization of the relationship between (106)a and (106)b above has proven to be rather difficult. There are at least three different types of approaches to this question: Atlas (1993,1996) has proposed that the relationship is that of entailment; McCawley (1993) and van Rooij and Schulz (2005) have argued that the relationship is that of implicature; while a number of different proposals have been put forth arguing that this relationship is that of a presupposition (e.g. Horn 1969, Horn 1996, Rooth 1985, Geurts and van der Sandt 2004, Beaver 2004, Roberts 2006, Ippolito 2006, among others). The presuppositional analyses come at least in three variants: the strong presuppositional analysis (e.g. Horn 1969, Rooth 1985), the weak presuppositional analysis (Horn 1996, Geurts and van der Sandt 2004, Beaver 2004) and the conditional presupposition analysis in Ippolito (2006). In this paper I restrict my attention to the presuppositional approaches to *only*, which seems to be the most promising approach. (cf. Ippolito 2006 for a detailed review of all types of approaches).

According to the strong presuppositional approach to *only*, (cf. Horn 1969, Rooth 1985) *only*  $\phi$  presupposes the truth of  $\phi$  (a.k.a the prejacent). Given such a strong presupposition, the reasoning based on contradictory presuppositions can be easily extended to the intervention created by *only*: manner and degree questions that contain *only* are predicted to presuppose a contradiction. This is because if, as was argued earlier in this paper, presupposition projection from the alternative answers is universal, then any manner or degree question would be predicted to stand with a set of contradictory presuppositions. Take e.g. a question such as (107). In this case the manner alternatives might be restricted, yet any set will contain contraries. For example if our context is restricted to the dimension of politeness, the set of propositions in the H/K denotation of the question might look as in (108):

(107) \*How did only John behave?

(108)  $\llbracket$ \*How did only John behave? $\rrbracket^w$

= {that only John behaved politely,  
that only John behaved impolitely,  
that only John behaved neither politely nor impolitely},

If all of these alternatives presupposed the prejacent that *only* combines with (in our case that John behaved politely, that John behaved impolitely, that John behaved neither politely nor impolitely), then by universal projection we would derive that such a question should trigger contradictory presuppositions. As it is easy to see, a similar reasoning could also be extended to questions about degrees, as in this case the alternative would be based on the various intervals that do not necessarily have to overlap.

One potential objection for the above outlined explanation as to why *only* creates intervention might come from the arguments that seem to show that the above proposed presupposition for *only* might be too strong. In the Appendix to this paper I discuss what the predictions of some other versions of the presuppositional analyses are for the questions that we are interested in. It is shown that in fact under all the three presuppositional approaches to *only*, manner and degree questions are predicted to be unacceptable.

Contrast now the behavior of *only* with that of *exactly one*:

(109) How did exactly one girl think that you behaved?

Because *exactly one* is not presuppositional, for an answer such as *Exactly one girl thought you behaved politely* to be assertable as a complete answer, nothing else need to be taken into account than its assertive component. In this case this will be that exactly one girl thinks that you behaved politely, and for every manner in the domain other than politely, it is not true

that exactly one girl thinks that you behaved that way. But this requirement is easily satisfied, even in a context where no one thinks anything except for the one girl who thought you behaved politely. Hence, quantifiers such as *exactly one* are not predicted to cause any intervention effects. As the acceptability of (109) shows, this is in fact a welcome prediction.

### 3.4 Interim Summary

In this section I have argued that the presuppositions of propositional alternatives in the H/K denotation project in a universal manner. This has derived the basic facts of manner and degree weak islands created by factive verbs. The main idea was that in these cases a universal presupposition pattern gives rise to a contradictory set of presuppositions. This clearly cannot be a felicitous situation for asking a question. Given this, there is no context in which the question can be felicitously asked, and hence it will be ungrammatical. I have also argued that a question that has a variable in the scope of a factive verb might in fact stand with a singleton presupposition if it is understood as an identity question. I have shown that precisely in these cases (which coincide with the cases of so called D-linking) the island effect in manner questions disappears, which is in accordance with the prediction made in this paper. Similarly, in the case of *how-many* questions, the analysis predicts that the wide scope reading should be acceptable, but not the narrow scope one, as only the latter comes with a set of contradictory presuppositions. I have also shown that an existential modal in the scope of a factive verb might obviate the island effect. In the second half of the section I have extended the analysis to islands created by extraposition and certain less stable triggers such as adverbs, where it was shown that the strength of the presupposition triggering correlates with the island creating potential of the item. Finally, I have argued that intervention caused by *only* belongs to the group of presuppositional interveners as well.

## 4. Negative Islands

This section proposes an explanation for the oddness of negative islands, such as (110) and (111). These examples stand in contrast with the one in (112), which shows that a *wh*-word ranging over individuals can escape negation without any problems.

- (110) \*How didn't John behave at the party?
- (111) \*How many children doesn't John have?
- (112) Who didn't John invite to the party?

I propose that the reason for the unacceptability of (110) and (111) is that they cannot have a maximally informative true answer. Dayal (1996) has argued that a question presupposes that there is a single most informative true proposition in the Karttunen denotation of the question, i.e. a proposition that entails all the other true answers to the question. In this paper I show that in the case of negative manner and degree questions, Dayal's (1996) presupposition can never be met. As a consequence, any complete answer to these questions will amount to the statement of a contradiction. The reason is that for any proposition *p* in the question domain, there will be at least two alternatives to *p* that cannot be denied at the same time.

In the case of manner questions the intuitive idea as for why these questions are bad is very simple: the domain of manners contains contrary predicates, such as *fast*, *slow*, *medium speed*, etc. However, as the domain of manners is structured in such a way that the predicates themselves are in opposition with each other, in the case of negative questions it will turn out to be impossible to select any proposition in the denotation of negative manner questions as the most informative true proposition. In the case of negative degree questions I argue that the maximization failure is predicted if we assume an interval-based semantics of degree constructions.

An account for negative islands however not only has to apply for the odd examples above: it is also necessary to explain why in some cases the above examples can be rescued. There are two main such cases<sup>23</sup>. The first case is the important empirical observation made in Fox and Hackl (2007) (partly building on work by Kuno and Takami 1997) according to which universal modals above negation, or equivalently, existential modals under negation save negative degree questions:

- (113) How much radiation are we not allowed to expose our workers to?
- (114) How much are you sure that this vessel won't weigh?

This pattern was noted for negative degree questions, but in fact it seems to be a general property of negative islands: (115) provides an example of a negative question about manners.

- (115) How is John not allowed to behave at the party?

We might also add that attitude verbs above negation such as (116) seem to obviate negative islands as well:

- (116) How do you hope that John did not behave?

The second way to improve negative islands was discussed by Kroch (1989) who showed that examples like (110) become acceptable if the context specifies a list of options as exemplified in (117). However, notice that an answer "50" to be felicitous seems to require a context such that there be separate events of scoring 20, 30 and 40 respectively.

- (117) Among the following, how many points did Iverson not score?  
A. 20 B.30 C.40 D.50

In this section I show that both of these cases receive a simple and intuitive account under the present proposal. The section is organized as follows: Section 4.1 introduces the proposal for negative manner questions while Section 4.2 addresses negative degree questions. In Section 4.3 I discuss some other instances of unacceptable negative questions such as questions with adjectives, as well as temporal and spacial modifiers in certain environments cf. (118)-(120).

- (118) \*What isn't John like?
- (119) \*When didn't Jesus resurrect?
- (120) \*Where aren't you at the moment?

I argue that these sentences can receive an explanation in a similar spirit as the examples with the manner and degree question.

## 4.1 Negative islands created by manner adverbials

### 4.1.1 About manner predicates

This section introduces three points of refinement in connection with the interpretation of manner predicates introduced in Section 3. First, recall that in Section 3 it was observed that the domain of manners always contains contraries, i.e. every manner predicate has at least one

<sup>23</sup> The third case is the fact that stressing *not* also seems to ameliorate negative islands, as Szabolcsi and Zwarts (1993) point out (crediting Edwin Williams for the observation):

(12) How did John NOT fix the car?

I am not aware of any proposal in the literature that can account of this fact, including my own.

contrary in the domain of manners. As I have argued, although 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. For example any domain of manners that includes *properly* will always include its contrary *improperly*. That these items are contraries means that they cannot be simultaneously true, but they can be simultaneously false. The fact that they can be simultaneously false means that for any pair of contraries, there will always be a set of events that do not belong to either. We might now further propose then that this set of events is itself a manner predicate. In other words for any pair of a predicate  $P$  and a contrary of it,  $P'$ , there is a middle-predicate  $P^M$  such that at least some of the events that are neither in  $P$  or  $P'$  are in  $P^M$ . (121) summarizes the full conditions on the domain of manners:

- (121) Manners denote functions from events to truth values. The set of manners ( $D_M$ ) in a context  $C$  is a subset of  $\{f \mid E \rightarrow \{1,0\}\} = \wp(E)$  that satisfies the following conditions:
- i. 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:  $P \cap P' = \emptyset$ .
  - ii. for each pair  $(P, P')$ , where  $P$  is a manner predicate and  $P'$  is a contrary of  $P$ , and  $P \in D_M$  and  $P' \in D_M$ , there is a set of events  $P^M \in D_M$ , such that for every event  $e$  in  $P^M \in D_M$  [ $e \notin P \in D_M$  &  $e \notin P' \in D_M$ ].

Given this, now we will say that the context might implicitly restrict the domain of manners, just as the domain of individuals, but for any member in the set  $\{P, P', P^M\}$ , the other two members are alternatives to it in any context. Some examples of such triplets are shown below:

- (122) a.  $P$ : wisely; fast; by bus  
 b.  $P'$ : unwisely; slowly; by car  
 c.  $P^M$ : neither wisely nor unwisely; medium speed; neither by car or by bus

Second, observe that talking about plural manners gives rise to all-or-nothing effects in the unmarked case.<sup>24</sup> However the formula in (123)c only means that there is no event of running by John that was both fast and careless.

- (123) a. John didn't run fast and carelessly  
 b. 'John run neither fast nor carelessly'  
 c.  $\lambda w. \neg \exists e [\text{run}(w)(e)(\text{John}) \wedge \text{fast+carelessly}(w)(e)]$

A similar effect has been observed in the case of predication over plural individuals (cf. e.g. Löbner 1985, Schwarzschild 1994, Beck 2001, Gajewski 2005). This fact is often treated by postulating a homogeneity presupposition on the distributive operator. Similarly, we will postulate a homogeneity presupposition on the D-operator introduced in Section 3:

- (124)  $D(P_{PL}) = \lambda e: [\forall p \in P_{PL} p(e)]$  or  $[\forall p \in P_{PL} \neg p(e)]$ .  $\forall p \in P_{PL} p(e)$ .

<sup>24</sup> However, in some contexts it might be possible to understand such examples as if *and* was Boolean. To account for these cases we might say that *and* is in fact ambiguous between a Boolean *and* and a plural-forming *and*. However, this will not change the reasoning because in the case of negative sentences the alternative that employs a Boolean *and* will not have a chance to be a maximally informative answer in any case. [thanks to Danny Fox (pc) for pointing this out to me.]



Thirdly, observe the following surprising fact: the sentences in (125) below are odd: However, if the conjunction of two predicates is interpreted as forming a plural manner, and homogeneity applies, (125)a should mean that John ran neither fast nor slowly. Similarly, (125)b should simply mean that John's reply was neither wise nor unwise. We have just argued above that it is a property of contrary predicates that they might be simultaneously false. So why should the sentences in (125) be odd?

- (125) a. #John did not run fast and slowly  
 b. #John did not reply wisely and unwisely

I propose that it is the presupposition on forming plural manner predicates  $\{p_1, p_2\}$  that  $p_1 \cap p_2 \neq 0$ . It is then for this reason that the sentences in (125) are unacceptable: e.g. the plural manner  $\{\text{fast}, \text{slow}\}$  is a presupposition failure since it is not possible for a running event to be both fast and slow at the same time, and therefore the plural manner cannot be formed. I would like to suggest that this condition might be connected to a more general requirement that a plurality should be possible<sup>25</sup>. Spector (2007), who defends the view according to which the extension of plural common nouns contains both singularities and pluralities notes that the oddness of sentences like (126) is unexpected under this view: (126) should simply mean that John doesn't have a father, and hence should be acceptable. Spector (2007) claims that plural indefinites induce a modal presupposition according to which the 'at least two' reading of a plural noun should at least be possible. In the case at hand, the presupposition required that it should be at least possible to have more than one father.

- (126) #Jack doesn't have fathers.

Somewhat similarly, Szabolcsi and Haddican (2004) conclude that conjunctions, especially negated ones with homogeneity, have an "expected both" presupposition. It seems then that our presupposition that gives the restriction on forming incoherent plural manners might be part of a more general requirement on forming pluralities.

To sum up, in this section we have introduced a couple of natural assumptions about manner predicates that all seem to be motivated independently. Manner predicates have contraries, and for every pair of contraries, there is a third predicate that denotes a set of events that belong to neither  $p$  nor its contrary. These three predicates are alternatives to each other in any context. It was also shown that the distributive operator that applied to manners has a homogeneity presupposition on it, similarly to the distributive operator that applies to individuals. The final assumption was that it is impossible to form incoherent plural predicates, which seemed to be again a general property of forming pluralities.

#### 4.1.2 The proposal: Negative islands with manner questions

We finally have everything in place to spell out the account of negative manner questions. We will say that the reason for the ungrammaticality of questions like (110), in contrast to (112) (repeated below as (127) and (128)) is that there cannot be a maximally informative true answer to a negative question about manners.

- (127) \*How didn't John behave at the party?  
 (128) Who didn't John invite to the party?

Why? The reason is rooted in the fact that the domain of manners contains contraries. Let's see how.

<sup>25</sup> The connection with Spector's work was brought to my attention by Giorgio Magri (pc).

Let's look first at positive questions about manners. As I have suggested above, in any given context, the domain of manners might be restricted, but for any predicate of events  $p$ , its contrary  $p'$  and the middle-predicate  $p^M$  will be among the alternatives in the H/K set. Suppose that the context restricts the domain of manners to the dimension of wisdom. Now the H/K-denotation of (129) will contain at least the propositions in (129)b:

- (129) a: How did John behave?  
 b. {that John behaved wisely, that John behaved unwisely,  
       that John behaved neither wisely nor unwisely}

Suppose now that John indeed behaved wisely. Given that the three alternatives are exclusive (as contraries cannot be simultaneously true), if the H/K set contains only these three propositions, no other proposition will be true. In other words, the event in question ( $e^*$ ) is an element of the set of events denoted by *wisely*, and not an element of any other set. This is graphically represented below:

- (130)       $\frac{e^*}{\text{wise}} \quad \frac{\quad}{\text{med-wise}} \quad \frac{\quad}{\text{unwise}}$

Since in this case this is the only true proposition, this will at the same time be the most informative true answer as well. Note that if we had more propositions in the Hamblin set, e.g. *wisely*, *politely*, and their contraries respectively, as well as the plural manners that can be formed from these, the situation would be similar to questions that range over both singular and plural individuals. Suppose that John in fact behaved *wisely* and *politely*: given the distributive interpretation of plural predicates introduced above, this will entail that he behaved wisely and that he behaved politely, and imply that he did not behave in any other way.

Let's look now at a negative question. First imagine that our context restricts the domain to the dimension of wisdom.

- (131) a: \*How didn't John behave?  
 b.  $\lambda p. \exists q_{\text{manner}} [p = \lambda w'. \text{behave}(w')(e^*)(\text{John}) \wedge \neg q_{\text{manner}}(w')(e^*)]$   
 c. {that John did not behave wisely, that John did not behave unwisely,  
       that John did not behave neither wisely nor unwisely}

Suppose that *John did not behave wisely* was the most informative true answer. This would mean that the only set of events among our alternatives which does not contain the event in question ( $e^*$ ) is the set of wise events. But this means that the event in question is both a member of the set of events denoted by *unwisely*, and the set of events denoted by *neither wisely not unwisely* (in short: *med-wisely*). This situation is graphically represented below:

- (132) a. John did not behave wisely  
 b.  $\frac{\quad}{\text{wisely}} \quad \frac{e^*}{\text{med-wisely}} \quad \frac{e^*}{\text{unwisely}}$   
 →this cannot be true because of (121) ii.

Yet, this cannot be true, because these two sets are exclusive by definition, and no event can be a member of both of them. Therefore (132) cannot be the most informative true answer to (131). What about an answer such as (133) below?

- (133) a. #John did not behave wisely and unwisely  
 b. 

_____	e* _____	_____
wise	med-wise	unwise

This answer is ruled out by the presupposition that excludes the formation of incoherent plural manners. The predicates *wisely* and *unwisely* are contraries, and therefore they cannot form a plural manner. (As mentioned above, this is also the reason why the sentence itself in (133) is odd.) Therefore the proposition that John did not behave wisely and unwisely is not in the set of alternatives. For this reason, (133) cannot be the most informative true answer. But now we have run out of options, if neither (132) nor (133) can be a maximal answer, there is no maximal answer. It is easy to see that if we had more alternatives, e.g. the alternatives based on wisdom and politeness, (i.e. *wisely*, *med-wisely*, *unwisely*, *politely*, *impolitely*, *med-politely* and the acceptable pluralities that can be formed based on these) the situation would be similar: Any answer that contains only one member of each triplet leads to contradiction, and any answer that contains more than one member of each triplet is a presupposition failure. There is no way out, no maximal answer can be given. Notice also that in the case of questions about individuals a similar problem does not arise and therefore there is no obstacle for there being a maximal answer to these questions. For this reason, we predict the question in (112) to be acceptable.

It should be noted that given the similarity of selecting a complete answer to definite descriptions, the above account predicts that definite descriptions such as (134) should be also unacceptable:

- (134) #the way in which John didn't behave.

This prediction is indeed borne out. The reason is of course that there is no maximum among the various manners in which John did not behave.

#### 4.1.3 Blindness

One might wonder why it is that the examples below do not make the negative manner questions grammatical<sup>26</sup>:

- (135) A: \*How didn't John behave?  
 B: Politely, e.g.  
 B' Not politely.

In other words, there are contexts by which a non-complete or mention-some answer can be forced, suggested or at least made possible. The marker *e.g.* explicitly signals that the answer is non-complete, and as such the answer in (135)B should be contradiction-free. If so, we might expect that the existence of this answer should make the question itself grammatical. Negative term answers as (135)B' are usually also not interpreted as complete answers, as can be seen in exchanges such as *Who came? Not John.*<sup>27</sup> Why is it that these instances of partial answers do not make negative manner questions good? In other words, since grammar also

<sup>26</sup> (135)B was pointed out to me by Irene Heim and David Pesetsky (pc.), while (135)B' was brought to my attention by Emmanuel Chemla (pc.)

<sup>27</sup> Although von Stechow and Zimmermann (1984) report somewhat different judgements from mine and Spector (2003). On the other hand, if a negative term answer were to be interpreted exhaustively, then if we only have three alternatives: {*politely*, *impolitely*, *mid-politely*} we should infer from the answer in (135)B' that John behaved politely, and in no other way, which is not a contradiction in itself.

allows for weaker than strongly exhaustive answers, why can the hearer not recalibrate the condition on complete answers into a weaker requirement, that of giving a partial answer?

I would like to argue that this apparent problem is in fact part of a larger issue of the impenetrability of the linguistic system for non-linguistic reasoning, or reasoning based on common knowledge. As the requirement of the linguistic system is that there be a most informative true answer to the question, in the rare cases where this leads to a contradiction, we cannot access and recalibrate the rules for the felicity conditions on a question. Similar conclusions about the modularity of the various aspects of the linguistic systems were reached by Fox (2000) and Fox and Hackl (2007) about the nature of the Deductive System (DS) that he proposes, as well as in the above discussed Gajewski (2002). Similarly, Magri (2006) and subsequent work argues based on various examples that implicature computation should be blind to common knowledge. I contend then that the above observed impossibility of scaling down on our requirements based on contextual knowledge is part of a larger pattern of phenomena, where such adjustments to the core principles seem to be unavailable.

#### 4.1.4 Ways to rescue Negative Islands

It was already mentioned briefly that explicit context restriction can rescue negative manner questions, as first observed by Kroch (1989). A second way to save negative island violations has been discovered by Fox and Hackl (2007) (partly based on Kuno and Takami 1997): negative islands become perfectly acceptable if an existential modal appears under negation. This section shows that both of these facts are predicted by the present account in a straightforward manner.

##### ◆ Modals

Recall the observation of Fox and Hackl (2007), who have noted that certain modals can save negative island violations: more precisely negative islands can be saved by inserting existential modals below negation or by inserting universal modals above negation:

- (136) How is John not allowed to behave?  
 (137) How did John certainly not behave?

The reason why these are predicted to be good in our system is that the contrary alternatives that are required to be true by exhaustive interpretation of the complete answer can be distributed over different possible worlds, hence the contradiction can be avoided: Notice that unlike before, we are not talking about a specific event any more, but the event is existentially quantified over. The existential quantification is presumably provided by the existential modal.

- (138)  $[[\text{How is John not allowed to behave?}]^w]$   
 $= \lambda p. \exists q_{\text{manner}} [p = \lambda w'. \neg \exists w''_{\text{Acc}(w', w'')}. \exists e [\text{behave}(w'')(e)(\text{John}) \wedge q_{\text{manner}}(w'')(e)]]$

Imagine again a scenario, in which we have restricted the domain to the dimension of politeness. As before, the set of alternatives will at least include three contrary predicates: *politely*, *impolitely* and *neither politely nor impolitely* (represented below as *med-politely*):

- (139) a. John is not allowed to behave impolitely.  
 b.  $\underline{\quad} \Diamond \exists e \underline{\quad}$      $\underline{\quad} \Diamond \exists e \underline{\quad}$      $\underline{\quad} \neg \Diamond \exists e \underline{\quad}$   
     politely                      med-politely                      impolitely

There is no obstacle in this case for choosing a most informative answer, e.g. (139) above. This is because it might be the case that *impolitely* is indeed the only manner in which John is not allowed to behave, and in every other manner he is allowed to behave. In other words, it is allowed that there be an event of John behaving in a polite manner, and that there be another event of John behaving in a med-polite manner. The contradiction is resolved by distributing predicates over different worlds and events. Since universal modals above negation are equivalent to existential modals below negation, the same reasoning holds for (137) as well<sup>28</sup>. The same reasoning can be extended to the fact that attitude verbs above negation also obviate negative islands since attitude verbs are standardly analyzed as involving universal quantification over possible worlds.

On the other hand we predict manner questions where universal modals or attitude verbs can be found under negation to be unacceptable. This is because in this case, instead of distributing the mutually exclusive propositions over different worlds, we require them to be true in every possible world, which of course is impossible. I illustrate this with the case of modals. (Notice that assuming as before that the universal modal quantifies over worlds and events, the event variable is now universally quantified over.)

(140) \*How is John not required to behave?

(141) [[How is John not required to behave?]]<sup>w</sup>

$$= \lambda p. \exists q_{\text{manner}} [p = \lambda w'. \neg \forall w'' \text{Acc}(w', w'') \forall e [\text{behave}(w'')(e)(\text{John}) \wedge q_{\text{manner}}(w'')(e)]]$$

Why is the sentence in (142) below unacceptable as a maximal answer?

- (142) a. #John is not required to behave impolitely.  
 b.  $\_\square\forall e\_\$   $\_\square\forall e\_\$   $\_\neg\square\forall e\_\$   
     politely      med-politely      impolitely

The problem is that if *impolitely* is the unique manner such that John is not required to behave that way, then for the other two alternatives it must be the case that John is required to behave in that manner: However, this is again a contradiction as these manner predicates are exclusive. Furthermore, just as we have seen before in the case of non-modal negative manners, it is not possible to form incoherent plural manners, therefore an answer such as *#John is not required to behave politely and impolitely* will not be possible either.

#### ◆ Explicit domains

As it was observed by Kroch (1989), negative islands improve if we list potential answers, as shown in the example below:

(143) ?How did you not play chess: A-blindfolded, B-drunk, C-in a bathing suit?

In this case the set of possible answers is provided by the non-plural manners A, B, C, (and potentially the sets that can be formed of these, depending on the rules of the multiple choice

<sup>28</sup> However, notice that ability modals seem to be more complicated than the existential modals above:

(1) \*How can't you photograph the house? (cf. Kuno and Takami 1997)

(2) \*How are you not able to eat a mango?

But interestingly, in these cases even the corresponding positive questions don't seem to be good:

(3) ??How can you photograph the house?

(4) ??How are you able to eat a mango?

At present I have no explanation of these facts. I suspect however that the problem in these examples arises from the actuality entailment of ability modals in some contexts (cf. Hacquard 2006).

test). Why does this ameliorate the negative island? It seems that what happens in such cases is that the listed answers in fact facilitate a reading of the question where it ranges over multiple events. This is also argued for by the fact that the question further improves if instead of simple past, the tense of the question is the present perfect, and by inserting a particle such as *yet*.

(144) How have you not played chess yet: A-blindfolded, B-drunk, C-in a bathing suit?

Why does evoking multiple events ameliorate negative islands? The reason is very similar to that described in connection with modal obviation. What happens in these examples is that the contrary predicates can be distributed into different events, and therefore the contradiction can be avoided. Further support that this reasoning might be on the right track comes from cases where the multiple-event reading is not easily available. In such cases the listing of answers in fact does not seem to lead to improvement, as shown below:

(145) \*How do you not speak French? A: very well B: so-so C: badly

Thus the explanation of the Kroch-examples for which I argue is not connected to there being a contextual restriction, or a specific or D-linked reading of the manner question. Rather what happens is that providing explicit alternatives helps to promote a reading that is otherwise not prominent with questions whose tense is in the simple past: a reading where they might be understood as ranging over multiple events.

#### 4.2 Negative islands with degree questions

This section looks at negative degree questions. The basic contrast to be explained is the one exemplified below: while the positive degree questions are perfectly acceptable (146), their negative counterparts in (147) are not:

- (146) a. How tall is John?  
b. How much milk did John spill on his shirt?
- (147) a. \*How tall isn't John?  
b. \*How much milk didn't John spill on his shirt?

In fact a similar contrast can be observed in the case of grammatical *How many* questions, albeit with a twist. As it was discussed in Section 3, certain questions that contain the existential noun phrase *how many NP* have two different readings (cf. Longobardi 1987, Kroch 1989, Cinque 1990, Cresti 1995, Rullmann 1995, among others). It has been also long observed that the two readings behave differently in the context of weak-island inducers: the narrow scope reading is sensitive to weak islands, but the wide scope reading is not. The examples below show that this is indeed the case with negative islands as well: the question below is only felicitous if it asks about a particular set of books, i.e on the wide scope reading:

- (148) How many books didn't you buy?
- a. Wide scope reading: 'For what number  $n$ ,  $n$  is the cardinality of the set of books that you did not buy?'  
 $\lambda p. \exists n \in N^+ [p = \lambda w'. \exists X [\text{book}(X)(w') \wedge |X| = n \wedge \neg \text{you bought}(X)(w')]]$
- b. #Narrow scope reading: 'For what number  $n$ , you did not buy  $n$ -many books?'  
 $\# \lambda p. \exists n \in N^+ [p = \lambda w'. \neg \exists X [\text{book}(X)(w') \wedge |X| = n \wedge \text{you bought}(X)(w')]]$

In the case of certain *how many* questions, the wide scope reading is not possible, and the question becomes unacceptable altogether, as can be seen below:

- (149) \*How many children don't you have?

In the degree questions such as in (147) there is no existential quantifier over individuals and hence they only have the reading analogous to the narrow scope reading. Similarly to the above example then, these questions are also unacceptable, as shown below:

- (150)  $\llbracket \text{*How tall isn't John?} \rrbracket^w =$   
 $= \lambda p. \exists d [d \in D_d \wedge p = \lambda w'. \neg \text{John is } d\text{-tall in } w']$   
 'For what degree  $d$ , John is not  $d$ -tall?'

The question that arises then in the context of negative islands is what rules out degree questions and the narrow scope reading of *how many* questions. It seems that the disappearance of the narrow scope reading in negative island contexts should be due to exactly the same reasons that render the questions in (147) unacceptable. I will present an account of negative degree and numeral questions along these lines: it predicts that degree questions and narrow scope existential readings of *How many* questions should be unavailable because they lead to contradiction. In the case of the wide scope reading of *how many* questions a contradiction is not generated in negative island contexts, hence the questions that can have a wide scope reading are acceptable, but only on this reading.

An observation that should be mentioned at this point is the following. When negative degree questions are acceptable, for example because they contain an existential quantifier under negation, three different types of answers can be given to them:

- (151) a. How much are you sure that this vessel won't weigh?  
 b. 5 tons  
     i. 'I am sure that this vessel will not weigh exactly 5 tons'  
     ii. 'I am sure that this vessel will not weigh 5 tons or more'  
 b'. Between 5 and 7 tons.  
     iii. 'I am sure that this vessel will not weigh between 5 and 7 tons, (but I believe it might weigh less or more than that)'

The only existing account that is capable of addressing the problem of modal obviation, that of Fox and Hackl (2007), however cannot account for all the range of possible answers that are available for acceptable degree questions. While the availability of reading (i) and the questions it poses for Fox and Hackl's (2007) analysis was already pointed out in Spector (2004), and discussed in Fox and Hackl (2007), the availability of the interval reading has not yet been discussed in the literature. It seems however that an account such as Fox and Hackl (2007) cannot easily handle such interval readings. Thus the desideratum for a successful account is not only that it should be able to explain the negative island and the modal obviation facts, but also that it should predict the proper range of available readings, including the interval reading<sup>29</sup>.

<sup>29</sup> We need to be careful not to confuse this point with the potential conjunctive answers such as *5 to 7 and 9 to 11*, or answers such as *Any prime number*, i.e. conjunctions or quantifications over answers that are in the H/K set. These answers are not themselves part of the H/K set of the question, however, they can be related to it in a straightforward way: e.g. we might say that they are part of the Boolean closure of the H/K set. However the same point cannot be made with respect to the interval answer in (151)b': this could not even arise as a

### 4.2.1. The Solution Proposed

The solution in this section is based on a suggestion made by Benjamin Spector (pc.) to use a degree semantics based on intervals. (cf. also Abrusán and Spector 2008) Such an account of degree constructions was originally proposed in Schwarzschild and Wilkinson (2002), and was also adopted (with some modifications) by Heim (2006).

#### ◆ Positive degree questions

First let's look at a positive degree question, such as (152) below. Recall the assumption that we are looking for the most informative true proposition among the question alternatives. The alternative propositions in this case range over different intervals that could be the argument of the adjective:

- (152)  $\llbracket \text{How tall is John?} \rrbracket^w$   
 $= \lambda p. \exists I [I \in D_I \wedge p = \lambda w'. \text{John's height} \in I \text{ in } w']$   
 'For what interval I, John's height is in I?'

Naturally, there are many intervals for which it is true that John's height (a point) is contained in them. These intervals overlap. I will say that an interval K covers interval I, if for every degree d that is an element of I, K contains that element. (In other words, I is a subset of K.) It is easy to see then that the truth of *John's height*  $\in I$ , will entail the truth of *John's height*  $\in K$ , for every K that covers I.

- (153) an interval I is covered by interval K iff for all d:  $d \in I$  then  $d \in K$

- (154)  $\text{-----} \langle \text{--} ( \text{----} \{ \text{----} [ d_j ]_{I1} \text{-----} \} _{I2} \text{-----} \} _{I3} \text{-----} )_{I4} \text{-----} \text{-----}$

Therefore the most informative answer will be the interval  $\{\text{John's height}\}$ . This is illustrated in the picture above where John's height is represented by  $d_j$ . The truth of *John's height*  $\in I_1$ , entails the truth of *John's height*  $\in I_2$  and so on. Now, when we are looking for the most informative answer among the true answers, this will be the smallest interval such that John's height is contained in it. I take it to be a fact of the world that John has some height, therefore there will always be a most informative proposition among the true propositions: that John's height  $\in \{d_j\}$ .

#### ◆ Negative degree questions

In the case of a negative degree question the situation is different: we are now looking for the maximal interval among the intervals in which John's height is not contained. Given that the entailment pattern is reversed because of negation, if K covers I, the truth of *John's height*  $\notin K$  will entail the truth of *John's height*  $\notin I$ . We are then looking for the biggest interval such that John's height is not contained in it. The problem is that there is no such interval.

- (155)  $\llbracket * \text{How tall isn't John?} \rrbracket^w =$   
 $= \lambda p. \exists I [I \in D_I \wedge p = \lambda w'. \neg \text{John's height} \in I \text{ in } w']$   
 'For what interval I, John's height is not in I?'

---

conjunction of elementary answers, if degree adjectives were monotonic in the way Fox and Hackl (2007) assume.



The reason why there cannot be such an interval is because intervals are always convex<sup>30</sup>. The intuitive idea can be illustrated as follows: In the picture below for example the interval  $I_2$  is wholly below  $d_j$ , while the interval  $I_3$  is wholly above  $d_j$ . There is no maximal interval that covers both of these intervals, but does not cover  $d_j$ .

(156) an interval  $I$  is wholly below  $d$  iff for all  $d'$ :  $d' \in I \rightarrow d' \leq d$

(157) ---[-----]  $I_2$  -- $d_j$  --{-----}  $I_3$ ---

More precisely, we reason as follows: Let John's height be any non-zero degree  $d$ . The set of all intervals that do not include John's height ( $=N$ ) contains exactly two exclusive sets of intervals: all the intervals wholly below  $d$ , contained in  $[0, d)$  ( $=A$ ) and all the intervals wholly above  $d$ , contained in  $(d, \infty)$  ( $=B$ ). It is easy to see that for any interval  $I$  included in  $A$ , the (true) proposition that John's height is not in  $I$ , does not entail that John's height is not in  $B$ , and vice versa. Hence, there is no interval  $I$  in  $N$  such that the true proposition that John's height is not in  $I$  entails all the true propositions of the same form in  $N$ . Dayal's (1996) condition cannot be met, and we predict a presupposition failure.

As long as John has any height in the actual world this situation is in fact unavoidable. Indeed it seems to be a presupposition of degree questions that the answer is not-zero. In the case of asking about John's height this is a trivial fact about the world. In the case of a question such as *How many apples did you eat?* if no apples were eaten, then a natural answer is the refutation of the presupposition: "I did not eat any apples" instead of rather odd "#Zero".

Notice that for the reasoning outlined above contextually given levels of granularity do not make any difference: any level of granularity will lead to a contradiction, as long as the domain of degrees contains at least 3 degrees. In other words the scale might be dense (as in the case of heights, e.g.) or discreet (as in the case of children), the ungrammaticality of negative degree questions is equally predicted. This is in contrast with Fox and Hackl (2007)'s account, who need to assume that scales are universally dense.

#### 4.2.2. Modal obviation

##### ◆ Case one 1: $\neg \rightarrow \exists, \forall \rightarrow \neg$

As we have seen above, certain quantifiers can rescue negative degree questions. Why should this be? The reason is that now there can be scenarios in which it is possible to find a most informative true answer. Let's take a question such as the one below:

(158) How much radiation are we not allowed to expose our workers to?

The fact that this question should be grammatical is straightforwardly predicted by the present account: While with respect to (147) it was a fact about the world that John's height is a single degree, the degrees of radiation that we allow our workers to be exposed to might correspond to an interval, e.g.  $(0, d]$ . Then any interval  $I$  wholly above  $d$  is such that it is not allowed the the amount of radiation that we expose our workers be in  $I$ . The strongest true proposition of this form is obtained by taking  $I = (d, \infty)$ . Therefore Dayal's (1996) condition can be met. Another scenario in which the question might have a most informative answer is a scenario in which the degrees of radiation that we allow our workers to be exposed to corresponds to the intervals  $(0, d_1)$  and  $(d_2, \infty)$ , with  $d_1 < d_2$ . Then there will be a most

<sup>30</sup> This assumption, strictly speaking, is more restrictive than Heim (2006) or even Schwarzschild and Wilkinson (2002), for whom intervals could be simply sets of degrees, not necessarily convex ones.

informative true proposition in the H/K denotation: namely that we are not allowed to expose our workers to  $I=[d_1, d_2]$  radiation.

◆ **Case 2: Lack of modal obviation with  $\neg \rightarrow \forall, \exists \rightarrow \neg$**

- (159) a. # How fast are we allowed not to drive?  
 b. For what I, it is allowed that our speed be not in I?
- (160) a. # How fast are we not required to drive?  
 b. For what I, it is not required that our speed be in I?

Suppose we have *some* obligations as to what our speed should be. Call S the set of all the speeds such that our speed should be one of them. Then for any subset of S, it is allowed that our speed is not in it. Also, for any subset of the complement of S, it is allowed that our speed is not in it. The interval which covers all the intervals such that our speed is allowed not to be in it is therefore  $(0, \infty)$ . However this interval cannot be the most informative true answer, because it will also cover the interval (or sets of intervals<sup>31</sup>) for which it is required that our speed be in it.

Let's illustrate this reasoning intuitively with the following analogous example:

- (161)  $\llbracket \text{'*How tall are you not required to be (to be a basketball player)?'} \rrbracket^w$   
 $= \lambda p. \exists I [I \in D_I \wedge p = \lambda w'. \neg \forall w'' \text{'Acc}(w', w'') [\text{'your height } \in I \text{ in } w''] ] ]$   
 'For what interval I, your height is not required to be in that interval?'

Suppose that in the actual world you are required to be at least 180cm to be a basketball player, let's name this interval K. Let's take two intervals, for which it is true that it is not the case that your height is required to be in that interval:  $I_1$  and  $I_2$ , such that  $I_1$  is wholly below K, while  $I_2$  is covered by K:

- (162)  $--\langle \{ \text{-----} \}_{I_1} \text{-----} [\mathbf{d_{180cm}} \text{-----} ( \text{-----} \infty )_{I_2} ]_K \rangle_N$

An interval that covers both of these intervals (let's name it N) is not an interval for which it is not true that in every accessible world your height is contained in this interval. Quite the opposite, in fact in every accessible world, your height will be contained in N. Now again, similarly to the basic cases, we run into a situation such that among the set of true answers there is no maximally true one, one that would entail all and only the true answers<sup>32</sup>.

### 4.2.3 Kroch-examples

Let's return briefly to some of the properties of negative degree questions that were introduced in the introductory section. Recall the examples based on Kroch (1989) that showed that an explicit choice of answers seemed to make the question acceptable:

- (163) Among the following, how many points did Iverson not score?  
 A. 20      B. 30      C. 40      D. 50

<sup>31</sup> But notice that if the set S is not a convex interval, then the questions should be infelicitous independently, because it would entail that there is a degree d such that our speed is required to be both below and above it, which is impossible.

<sup>32</sup> As D. Fox (pc) observes, the account as it stands above makes too crude predictions for certain examples of universal modals in questions, e.g. *How fast must you drive?* This objection and certain further points are addressed in detail in Abrusán and Spector (2008) and in Abrusán and Spector (in prep).

Notice that if we selected “B” as our answer this would imply that there were many events of Iverson scoring. The Answer “B” suggests that among the alternatives given, B is the only one to which no scoring event corresponds. Thus what is happening in these examples is not so much that the quantificational domain gets restricted, but rather that the choice of alternatives invokes a number of different events. Once the scorings can be distributed over various events, the contradiction disappears, much in the same way as in the case of modals and other quantifiers. This example thus also points in the direction of the fact that was also observed with the examples where the presence of a quantifier seemed to obviate the weak island effect. A felicitous answer to these examples seemed to imply the truth of a range of alternatives. In fact if different alternative events are not easily available, even a restricted question of the sort shown above seems to be odd:

- (164) #Among the following, how many children don’t you have?  
A.2 B.3 C.4 D.5

This fact is straightforwardly predicted by the present account, but not by any other account.

### 4.3 Negative island-like phenomena based on the same logic

In this section, I return to the examples mentioned in the introduction of this section, the oddness of which can be explained by the same reasoning as we have seen for the manner questions.

#### 4.3.1 *When*

As the examples below show, we observe marked ungrammaticality with final punctual eventive verbs (e.g. *die*), but not with statives (e.g. *be happy*).

- (165) \*When did Mary not die?  
(166) When didn’t you feel happy?

It also seems that there is a scale of acceptability judgements in between these two extremes. These facts can be explained by the same logic as we have seen above: given that dying is a point-like event, there are infinite points in time (or intervals) such that it is true that Mary did not die at these times. However, these propositions are not ordered by entailment and therefore there is no maximally informative alternative among these true propositions. With statives on the other hand, it is possible to construct a scenario such that there is one maximal interval at which you did not feel happy.

#### 4.3.2. *Where*

A very similar pattern can be seen with questions formed by *where*. The first example below is deviant because it is not possible given the normal laws of our world to be at more than one place at the same time: yet this is exactly what a maximal answer to this (167) question would require.

- (167) \*Where aren’t you at the moment?  
(168) Where hasn’t Bill looked for the keys?

Assuming that spacial locations are point-like, there is no entailment relationship between being at various places at any given time, in fact all these options are mutually exclusive. Given this, and that there are always infinite points in space where one is not at any given

moment, there is no maximally informative answer to a question like (167). On the other hand, it is perfectly possible for someone to have searched for the keys at every salient place, except for one or two locations.

#### 4.4. Interim summary

In this section I have first argued that the felicity condition on asking a question according to which the speaker should be able to assume that the hearer might be able to know the most informative answer can never be met in the case of negative manner questions. This was because the domain of manners contained atoms that were not independent from each other: the domain of manners contained contraries. Therefore a truth of an (atomic) proposition in the H/K denotation of such questions had consequences for the truth of other atomic propositions. This state of affairs in the case of negative questions resulted in a situation in which it was not possible to select a maximal answer. In the second part of this section I have shown that an interval-based semantics for degrees predicts that negative degree questions will not have a maximal answer. This was because in these cases there was no single interval that covered all and only the degrees for which the negative predicate was true. Finally, I have also argued that certain examples of illicit extraction of *where* and *when* questions can be explained based on similar principles as manner and degree questions.

This explanation given for negative and degree manner islands relates in an interesting way to the proposal in Szabolcsi and Zwarts (1993). The fact that there is no unique most informative answer to such negative questions could also be expressed by saying that the complementation is not defined on these domains. In the case of degree questions, the assumption about intervals means that for an interval in a given domain of degrees, the complement set of degrees to that interval is not necessarily an interval itself. Let's take the interval  $[4,6]$  e.g. In the domain  $(0,\infty)$ , the complement of this interval is not an interval itself, but a conjunction of two intervals, the intervals  $(0,4)$ , and  $(6, \infty)$ . But notice an interesting difference with the proposal in Szabolcsi and Zwarts (1993). While for them negative islands arose because in some contexts the complement was not defined, in the present proposal negative degree questions are unacceptable because the complement can never be defined. E.g. in the case of a question such as *How tall isn't John?*, since heights are necessarily non-zero and point-like, i.e. denote a singular interval, the complement of such singular intervals will never be an interval itself, but a conjunction of two intervals. Observe now the domain of manners. The idea that the domain of manners always contains (at least) three mutually exclusive contrary predicates means that the domain of events is in a sense covered by these three predicates:

(169) [----wisely-----][-----neither wisely nor unwisely-----][---unwisely---]

The complement of any of these predicates however is not an element of the domain of manners itself. This was not because conjunction was not defined on the domain of manners, as we saw, conjunction itself does not lead out of the domain of manners. What caused a problem was that a conjunction of two mutually exclusive sets, i.e. sets that do not have an overlap leads to a presupposition violation. In other words, asserting that an event is a member of two mutually exclusive sets of events equals to stating that an event is a member of the empty set of events, which is a contradiction. Since conjunction on the domain of manners is restricted by the presupposition that the plural manner should not denote the empty set, the complement of any predicate of manners will not be a member of the domain of manners, given the assumption about the contraries. In this sense, we might say that the present proposal shares with that of Szabolcsi and Zwarts (1993) that negative islands arise when the domain of the *wh*-word is such that complementation is not defined on it. There are

two important differences however with the present proposal: first, as noted above, in our case complementation is never defined, while for Szabolcsi and Zwarts (1993) it was just a logical fact about the domain that complementation was sometimes not defined, e.g. in the case of amounts, it was only the maximal element whose complement, the minimal element, was not a member of the domain of manners. Second, the assumption about the domain of manners and degrees given in this proposal is radically different from Szabolcsi and Zwarts's (1993)'s, and independently motivated.

The proposal in this section on the other hand also has it in common with that of Fox and Hackl (2007) that negative islands arise because a most informative answer cannot be given to them. Further observing the two types of negative islands, and the types of explanations given above, we might make the following generalization, which I will call the Symmetry generalization:

(170) *Symmetry*

Let  $p$  be a proposition and  $A$  a set of propositions. For any  $p$ , there are at least 2 alternatives in  $A$  such that each of them can be denied consistently with  $p$ , but the denial of both of these alternatives is inconsistent with  $p$ .

Let's see informally how symmetry is manifested in the proposal of negative manner questions. Recall the basic case of a negative manner question. I will assume for the sake of simplicity that the context restricts the domain to the dimension of politeness:

- (171) a. \*How didn't John behave?  
 b.  $\lambda p. \exists q_{\text{manner}} [p = \lambda w'. \text{behave}(w')(e^*)(\text{John}) \wedge \neg q_{\text{manner}}(w')(e^*)]$   
 c. {that John did not behave wisely,  
     that John did not behave unwisely,  
     that John did not behave neither wisely nor unwisely}

Each alternative to any proposition  $p$  in the H/K denotation of the question above can be denied consistently with  $p$ . Let  $p$  be the proposition that John did not behave wisely. Then it is possible that John did not behave wisely, but behaved unwisely. It is also possible that John did not behave wisely, but behaved neither wisely or unwisely. However, the denial of these two alternatives to  $p$  at the same time leads to a contradiction because it is not possible that John's behavior be both unwise and neither wise nor unwise.

Observe now how symmetry is manifested in the case of the interval-based analysis of negative degree questions such as (172):

- (172) \*How many apples didn't John eat?

Suppose there was an answer to (172), the proposition that the number of apples John ate is not in interval  $[3, \infty)$ , call it  $K$ . Exhaustifying this answer would imply that for all the intervals that are not subintervals of  $K$ , the (exact) number of apples John ate is contained in those intervals. The intervals  $[0, 1]$  and the intervals  $[2, \infty)$  are for example such intervals. However, they do not overlap, therefore it is impossible that the exact number of apples that John has eaten be contained in both of these. In other words, the simultaneous denial of the two alternatives that *the number of apples John ate is  $\notin [0, 1]$*  and that *The number of apples that John ate is  $\notin [2, \infty)$*  is inconsistent. A similar situation will always arise as long as John ate any apples, which in turn seems to be a presupposition of the question, as it was discussed above.

How does Symmetry relate to other instances of exhaustification failure? Fox (2007) proposes the following generalization about the cases where exhaustification is not possible:

(173) *Fox (2007)'s generalization*

Let  $p$  be a proposition and  $A$  a set of propositions.  $p$  is *non-exhaustifiable* given  $A$ :  $[\text{NE}(p)(A)]$  if the denial of all alternatives in  $A$  that are not entailed by  $p$  is inconsistent with  $p$ .

The generalization about the non-exhaustifiable sets of propositions subsumes both the cases of symmetry and the cases of density<sup>33</sup>. However, one question one might ask, whether we really need anything else than symmetry? If the analysis of *degree/manner* questions proposed in this section is on the right track then at least for the cases of negative islands we might be able to retain a more restrictive generalization than that of Fox (2007), namely the symmetry generalization proposed above.

## 5 On contradiction and grammaticality

I have argued in the previous sections that presuppositional and negative islands are unacceptable because they lead to a presupposition failure in any context. In the case of presuppositional islands the question is predicted to stand with a set of contradictory presuppositions, however a set of contradictory presuppositions cannot be satisfied in any context. Negative islands were shown to lead to a violation of Dayal's (1996) presupposition no matter what the context was chosen to be. This was equivalent to the statement that the complete answer, i.e. the most informative true answer conjoined with the negation of the false answers expresses a contradiction. But why does the fact that a question is a presupposition failure in any context, or the fact that the complete answer expresses a contradiction in any context lead to ungrammaticality? We are, after all, perfectly capable of expressing contradictions that are not ungrammatical, cf. the example below:

## (174) The table is red and not red.

What is the difference between the two types of contradiction and why does one, but not the other lead to ungrammaticality? This section addresses this concern.

The earliest examples of analyses that resort to analyticity were proposed by Dowty (1979) and Barwise and Cooper (1981). Dowty (1979) argued that combining accomplishment verbs with durative adverbials leads to a contradiction and that this contradiction is the source of unacceptability, while Barwise and Cooper (1981) proposed that an explanation of the ungrammaticality of strong quantifiers in existential *there*-constructions follows from the fact that these would express a tautology. Later examples of such reasoning

<sup>33</sup> Fox (2007) proves that obviation by a universal, but not by existential quantification is a trivial logical property of such sets:

(13) A universal modal eliminates Non-exhaustifiability:  
If  $p$  is consistent,  $\text{NE}(\Box p, (\Box A))$  does not hold (even if  $\text{NE}(p, A)$  holds)  
(where  $\Box A = \{\Box p: p \in A\}$ )

*Proof:* Let the modal base for  $\Box$  in  $w^0$  be  $\{w: p(w)=1\}$ . It is easy to see that for every  $q \in A$ , s.t.,  $q$  is not entailed by  $p$ , there is a world in the modal base that falsifies  $q$ .

(14) An existential modal does not eliminate Non-Exhaustifiability:  
if  $\text{NE}(p, A)$  holds, so does  $\text{NE}(\Diamond p, \Diamond A)$  (where  $\Diamond A = \{\Diamond p: p \in A\}$ )

*Proof:* Assume otherwise, and let MB be the modal base that satisfies  $\Diamond p$  but does not satisfy any of the propositions in  $\Diamond A$  not entailed by  $\Diamond p$  (i.e. any of the proposition  $\Diamond q$  in  $\Diamond A$  such that  $q$  is not entailed by  $p$ ). Since  $\Diamond p$  is true,  $\exists w \in \text{MB}$ , s.t.  $p(w)=1$ ,  $w_p$ . For each  $q \in A$ , such that  $p$  does not entail  $q$ ,  $q(w_p)=0$  since  $[\neg \Diamond q](w)=1$ . But this means that all non-entailed members of  $A$  could be denied consistently, contrary to assumption. As the generalization about the NE sets of propositions subsumes both the cases of symmetry and the cases of density. Thus the observed pattern of modal obviation has a principled explanation in our system based on Fox (2007).

include Chierchia (1984), von Stechow (1993)'s analysis of the ungrammaticality of exceptives with non-universal quantifiers and Fox and Hackl (2007). (cf. also Ladusaw 1986 and Gajewski 2002 for an overview). How can these proposals be reconciled with the fact that natural language is capable to express tautologies and contradictions, otherwise?

Gajewski (2002) argues that we need to distinguish between analyticity that results from the logical constants alone, from analyticity that is the result of the non-logical vocabulary. He argues that it is the former that plays an important role for natural language: he argues that sentences that express a contradiction or tautology by virtue of their logical constants are ungrammatical. He follows van Benthem (1989) and others in defining logical constants as those notions that are permutation invariant.<sup>34</sup> Thus linguistic representations that have the same semantic value under any permutation of the domain are ungrammatical. More precisely Gajewski (2002) proposes to distinguish two types of analytic sentences: (ordinary) analytic sentences and L(ogical)-analytic sentences. While (ordinary) analytic sentences are true in every model, L-analytic sentences are true in every model with every possible combination of non-logical arguments. In other words, L-analytic sentences are not only true in every model, but remain true under rewriting of their non-logical parts. Gajewski (2002) further proposes that the kind of analyticity that induces ungrammaticality in natural language is L-analyticity.

(175) DEFINITION. An LF constituent  $\alpha$  of type  $t$  is *L-analytic* iff  $\alpha$ 's logical skeleton receives the denotation 1 (or 0) under every variable assignment.

(176) A sentence is ungrammatical if its Logical Form contains an L-analytic constituent

Gajewski (2002) shows that (176) can correctly distinguish sentences like (174) from well-known examples of ungrammatical analytic sentences, such as tautologies proposed in Barwise and Cooper (1981)'s explanation of the ungrammaticality of strong quantifiers in existential *there*-constructions and contradictions in von Stechow's (1993) analysis of the ungrammaticality of exceptives with non-universal quantifiers.

I will adopt Gajewski's (2002) proposal that it is L-analyticity that leads to ungrammaticality. What has to be shown then is that complete answers to weak islands are L-analytical. In other words, what we are looking for is to show that complete answers to weak islands remain ungrammatical under any variable assignment in any context. In the case of questions this condition should be understood as no matter what the value that we might give to the variable that the wh-word binds, a contradiction or a tautology arises. This is indeed the case. Recall that in the case of manner questions, for any predicate of manners  $p$ , the set of alternatives will always contain its contrary manner  $p'$  as well as a third manner predicate  $p^M$  that expresses that the event was neither  $p$  nor  $p'$ . This will have the consequence that the set of propositions that a complete answer to a negative manner question requires to be true is always incoherent. Thus complete answers to a negative manner question are L-analytic, and hence, predicted to be ungrammatical by Gajewski's (2002) condition<sup>35</sup>. A similar reasoning can be run for the case of negative degree questions: In a scale  $(0,d)$ , if the answer to the positive counterpart of the question corresponds to any non-zero singleton set of degrees,

<sup>34</sup> This way of defining what counts as a logical constant and what is part of the non-logical vocabulary might turn out to be too ambitious: e.g. predicates such as (*self*)-*identical* might turn out to be part of the non-logical vocabulary, while being permutation invariant at the same time. It is possible therefore that we should be content with a less ambitious proposal, in which logical constants are simply stipulated as being such, as in any logical system. (thanks to D. Fox for pointing this issue out to me)

<sup>35</sup> Nathan Klinedinst (pc.) has pointed out to me that the presupposition on manners that no incoherent pluralities can be formed seems to violate L-analyticity. Notice however, that this condition itself exists to prevent a contradiction from arising.

there can be no unique most informative answer to the negative question. In contexts where the question presupposes that the answer to its positive counterpart is the singleton set of degrees that contains the zero element, the question is a tautology, and therefore equally ruled out by Gajewski's condition. With respect to presuppositional islands similar facts can be observed as these are also predicted to stand with a contradictory presupposition independently of the choice of the value for the variable that the *wh*-word binds. As for the cases of modal obviation, these were acceptable however because there were some contexts and choices for the value of the variable that the *wh*-word bound that rendered them non-contradictory.

## 6. Conclusion

This paper has argued for a new semantic approach for certain weak islands that can explain the modal obviation phenomena which arise with negative and presuppositional islands, as well as the gradability phenomena that we can observe with adverbial interveners. It was shown that all these effects can be explained by two independently motivated assumptions: namely, that the domain of manners contains contraries, and that degree expressions range over intervals. These properties of the domain of manner and degree questions lead to the fact that unlike questions about individuals, manner and degree questions inevitably lead to a contradiction at some level: presuppositional islands were shown to arise because such questions stood with a contradictory presupposition, while in the case of negative degree questions Dayal's (1996) condition could never be met and therefore an exhaustive answer necessarily expressed a contradiction. It was also argued that unlike what is typically assumed in the syntactic literature, there is no single phenomenon of "D-linking" that can ameliorate island effects, instead, D-linking can only be understood as cover term for a number of unrelated phenomena: (a) the facilitation of multiple events (cf. Kroch examples of a salient checklist), (b) scope phenomena (cf. the two readings of *how many* questions) and (c) identity questions (cf. Section 3.2). Finally, it was shown that the nature of the contradiction that leads to unacceptability falls under Gajewski's (2002) generalization, according to which contradictions that arise in virtue of their logical form are ungrammatical.

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## Appendix: Islands created by *only* and the weak presuppositional analysis for *only*

One potential objection for the explanation as to why *only* creates intervention might come from the arguments that seem to show that the strong presupposition for *only* on which it relies might be too strong. The first problem, observed by Horn (1996), Geurts and van der Sandt (2004) is that the putative presupposition does not project in modalized sentences:



- (177) It is possible that only the Red Sox can beat the Yankees, and maybe not even they can.

The second problem, also observed by Horn (1996) is manifested by the fact that question-answer exchanges such as the one below are felicitous. This is a problem because if the truth of the prejacent was indeed that presupposition in the context of the conversation, the question should have been infelicitous in the first place. However, it is perfectly acceptable.

- (178) A: Who can beat the Yankees?  
B: Only the Red Sox.

The above authors therefore have suggested a weak presuppositional analysis. The sentence such as *only Muriel voted for Hubert* triggers the inference that *Muriel voted for Hubert* is true. However, according to the above authors this inference comes about as a combination of the truth conditional meaning of *only* and an existential presupposition. Thus:

- (179) Only [Muriel]<sub>F</sub> voted for Hubert  
presupposes: Someone voted for Hubert  
Asserts: No one other than Muriel voted for Hubert  
→inference: Muriel voted for Hubert

Exactly what the source of the existential presupposition is, i.e. whether it is triggered by focus Geurts and van der Sandt (2004), or (also) by *only* itself Beaver (2004), or by the existential import of a universal quantification Horn (1996) is a matter of ongoing debate. Yet whatever the source of this presupposition might be, the problem we have now that this weaker presupposition is not strong enough to derive a contradiction. Take a look at (108) again: if each alternative in the Hamblin set only presupposes that *someone* behaved in  $\alpha$ , then in the case of (108) by universal presupposition we derive that a complete answer should stand with the set of presuppositions: {*that someone behaved politely, that someone behaved impolitely, that someone behaved neither politely nor impolitely*}. In other words the offending contraries in this case would be distributed over various individuals, and therefore the contradiction would be avoided.

However, as it is well known, the previous counterargument is not without counterarguments either. E.g. Ippolito (2006) argues convincingly that the weak-presuppositional analysis is also not without its problems: e.g. it does not predict the correct inference for a sentence such as the one below:

- (180) *Only John and Mary ate cookies.*

The problem is that in a context where it is known that only John ate cookies, the above sentence is predicted to be true by the weak-presuppositional analysis, contrary to fact.

Secondly, as it was pointed out by many, in negative sentences the presupposition seems to be stronger, as if *only AB* indeed presupposed the truth of *AB*, as was originally proposed in Horn (1969)<sup>36</sup>.

<sup>36</sup> Beaver (2004) argues that this stronger presupposition in the case of negative sentences can be derived if we assume that under negation the whole phrase *only Muriel* is focussed, and the focus alternatives of an *only NP* are itself and the NP without *only*. If focus stands with the presupposition that one of the focus-alternatives is true, the problematic example is correctly predicted to presuppose that *Muriel voted for Hubert*.



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