

# Intervention Effects

*“How many books did you not read?”*

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**1 Intervention effects and the issues for semantic theory**

## 1.1 Dependencies over a distance and their restrictions

Natural language allows for dependencies between linguistic expressions over a distance (see Chomsky 1957, among others). In the declarative sentence in (1a) all linguistic material occurs in its canonical position. In the *wh*-interrogative in (1b), however, the *wh*-word *whom* together with the preposition is fronted to the beginning of the clause. Now, the intuitive paraphrase of (1b) is something along the lines of ‘Which *x* is such that you got this letter from *x*?’ That is, at the level of logical form (LF; see “Levels of Analysis: LF vs Direct Compositionality”) there is a variable *x* in what corresponds to the canonical position of *whom*, indicated by the underscored blanks in (1). This variable is dependent on the *wh*-operator. Without a variable in the canonical position, it would not be clear at all how to capture our intuitions regarding the interpretation of (1b). In fact, we would get a nonsensical paraphrase like ‘Which *x* is such that you got this letter from?’

- (1) a. You got this letter from Mary.  
 b. From whom did you get this letter \_\_\_?  
 c. To whom did you show \_\_\_ this letter?

It is thus tempting to make the overt fronting of the *wh*-word crucial in establishing the dependency observed at logical form.<sup>1</sup> Indeed, this is the standard approach to *wh*-movement and its interpretation going at least back to (Karttunen 1977). Parallel considerations apply to (1c), which can be paraphrased as ‘Which *x* is such that you showed this letter to *x*?’

Such dependencies are often subject to locality restrictions (e.g., Ross 1967). The effects of locality restrictions can be described in the following way. Two expressions  $\alpha$  and  $\beta$  in sentence *S* need to enter into a relation  $R_i$ . The presence of an element  $\omega$  c-commanded by  $\alpha$  and itself c-commanding  $\beta$ , however, blocks the establishment of  $R_i$ , whereby *S* is perceived to be degraded.<sup>2,3</sup> Schematically, in (2a)  $\alpha$  and  $\beta$ , on the one hand, undergo a successful relation, depicted by co-indexation and the checkmarks. A similar relation is, on the other hand, prohibited in (2b) – depicted by the crosses – by the presence of the intervening element  $\omega$ . The result of this prohibited dependency is that the sentence is degraded.



Given the difference between (5a) and (5b), one might think that it is actually the predicate in the embedded clause that causes the intervention effect. The examples in (6), however, show that this conclusion is not correct. Non-factive predicates like *think* allow a dependency regardless of the makeup of the embedded clause. Rather it seems that the semantics of the factive predicate *regret* causes an intervention effect if certain preconditions are fulfilled, that is, if the semantics of the embedded clause is of a certain kind. It is hard to see how a purely syntactic account could explain the data.<sup>5</sup>

- (6) a. From whom do you *think* you got this letter \_\_\_?  
 b. To whom do you *think* you showed this letter \_\_\_?

Consider next so-called Beck effects (Beck 1996a; 1996b). Such effects are exhibited by languages that can leave at least one *wh*-phrase in situ, that is, languages where not all *wh*-phrases must undergo fronting to the beginning of the clause. German is one such case. As (7a) shows, in a multiple *wh*-interrogative one *wh*-phrase undergoes fronting and the other one stays in situ. However, the second *wh*-phrase cannot stay in situ if a negative quantifier intervenes, as (7b) shows.

- (7) a. Wen hat Hans \_\_\_ wo gesehen?  
 whom has Hans where seen  
 'Who did Hans see where?'  
 b. \*Wen hat *niemand* \_\_\_ wo gesehen?  
 whom has nobody where seen

(Beck 1996a, ex. 1b)

Now, the intuitive paraphrase of (7a) shows that even in situ *wh*-expressions undergo a dependency with a variable: 'Which *x* and which *y* are such that Hans saw *x* at *y*?'<sup>6</sup> Thus it is natural to conclude that the negative quantifier in (7b) prohibits this dependency. Why? Again, we are led to conclude that the answer is unlikely to be found solely in the syntax. After all, syntactically (7a) and (7b) are completely parallel as in both cases an NP or DP intervenes.<sup>7</sup>

Another variant of intervention effects comprises certain cases where negative polarity items (NPIs) become unlicensed (Linebarger 1981; 1987; Chierchia 2004; 2013; Homer 2009). NPIs like *any* are dependent on the presence of a c-commanding negative expression, as the contrast in (8) shows. NPIs can therefore be dependent on *doubt* but not on *believe*.

- (8) a. \*I believe that John ate any soup.  
 b. I doubt that John ate any soup.

As (9) shows, however, when a universal quantifier intervenes between *doubt* and the NPI, the necessary dependency cannot be established, and the example is degraded. In this chapter I only discuss intervention effects obtaining with

sem057 *wh*-dependencies. See “Negative Polarity” for discussion of intervention in NPI-licensing.

(9) \*I doubt that *everyone* ate any soup.

### 1.3 Why intervention effects are a nontrivial issue

As some of the citations above already indicate, the phenomena subsumed under the umbrella *intervention effect* are often taken to belong to the realm of syntax. That is, historically intervention effects were often assumed to be syntactic locality restrictions on grammatical dependencies. As such, what one would have to do is to formulate syntactic dependencies in such a way that they become sensitive to syntactic properties of intervening linguistic expressions and state the conditions under which these properties lead to a breakdown of the dependency under consideration. The problem such approaches face is that it is often not clear at all what the syntactic properties could be that cause one potentially harmful intervener to be actually harmful and another to be harmless. The reason for this is that the interveners are to be characterized semantically rather than syntactically.

Competing approaches to intervention effects take the crucial difference between strong islands and intervention effects at fact value: due to the unselective nature of the former, on the one hand, these approaches posit that they are real locality restrictions on grammatical dependencies. The latter, on the other hand, due to their selectivity are assumed to be non-syntactic and would therefore not really be classified as locality restrictions at all. Such approaches can come in a number of guises, but a widely shared intuition is that the causes of intervention effects are due to clashing semantic/pragmatic properties of the dependencies under consideration and the harmful interveners.

The issue for semantic accounts in a nutshell is as follows: run-of-the-mill compositional principles will deliver well-defined denotations for the examples above that are, moreover, potentially pragmatically useful. I want to make this clear by discussing one example in detail.

#### 1.3.1 Interpreting an interrogative with a factive island

Consider the case of the factive island example from (5a) repeated in (10):

(10) \*From whom do you *regret* having gotten this letter \_\_\_?

In the following, I assume the standard interpretive rules from Heim and Kratzer (1998). Any post-Montagovian compositional semantics will make reference to such rules in one form or another (see “Levels of Analysis: LF vs Direct Compositionality” and “Compositionality”):<sup>8</sup>

sem054

sem094

(11) *Function application*

If  $\alpha$  is a node with immediate daughters  $\beta$  and  $\gamma$ , then for any assignment  $g$   $\alpha$  is in the domain of  $\llbracket \cdot \rrbracket^{w,g}$  if  $\beta$  and  $\gamma$  are in the domain of  $\llbracket \cdot \rrbracket^{w,g}$  and  $\llbracket \beta \rrbracket^{w,g}$  is a function whose domain includes  $\llbracket \gamma \rrbracket^{w,g}$ . If so,  $\llbracket \alpha \rrbracket^{w,g} = \llbracket \beta \rrbracket^{w,g}(\llbracket \gamma \rrbracket^{w,g})$ .

(12) *Intensional function application*

If  $\alpha$  is a node with immediate daughters  $\beta$  and  $\gamma$ , then for any assignment  $g$   $\alpha$  is in the domain of  $\llbracket \cdot \rrbracket^{w,g}$  if  $\beta$  and  $\gamma$  are in the domain of  $\llbracket \cdot \rrbracket^{w,g}$  and  $\llbracket \beta \rrbracket^{w,g}$  is a function whose domain includes  $\lambda w'. \llbracket \gamma \rrbracket^{w',g}$ . If so,  $\llbracket \alpha \rrbracket^{w,g} = \llbracket \beta \rrbracket^{w,g}(\lambda w'. \llbracket \gamma \rrbracket^{w',g})$ .

(13) *Predicate abstraction*

If  $\alpha$  is a node with immediate daughters  $\beta$  and  $\gamma$ , where  $\beta$  is a numerical index  $i$ , then for any assignment  $g$ ,  $\llbracket \alpha \rrbracket^{w,g} = \lambda x. \llbracket \gamma \rrbracket^{w,g[i \rightarrow x]}$  (where  $g[i \rightarrow x]$  is like  $g$  except that it maps  $i$  to  $x$  if  $g$  does not do so already).

Now, assume the rather standard LF for *wh*-interrogatives in (14), which quite closely resembles the pre-theoretical representation used above. Here the preposition is in its canonical position. The *wh*-expression is in its moved position having left a trace. The index of the moved *wh*-expression is adjoined to its sister node (Heim and Kratzer 1998). The trace bears the same index. Moreover, there is an interrogative operator  $?$  present below the index. This operator can be thought of as corresponding to the interrogative complementizer in C in embedded interrogatives.

(14)  $[_{CP} \text{whom } [1 [_{C'} ? [_{IP} \text{you regret having gotten this letter from } t_1 ]]]]$ 

For simplicity's sake, I assume a semantics for *wh*-interrogatives following Karttunen (1977) in the following. In such a framework, an interrogative denotes a (characteristic function of a) set of propositions. Intuitively, these propositions correspond to their semantic answers.<sup>9</sup>

The crucial lexical entries are then as follows: the interrogative operator denotes a function from propositions to functions from propositions to truth values, as in (15a), establishing equivalence between the propositions. This creates what Karttunen terms a proto-question. The *wh*-expression is an existential quantifier as in (15b). It takes as argument a question denotation which was abstracted over and gives back such a denotation. The factive predicate is a function from propositions  $p$  into functions from individuals to truth values.<sup>10</sup> It presupposes that  $p$  is true in the world of evaluation (Karttunen 1971; Kiparsky and Kiparsky 1971).

- (15) a.  $\llbracket ? \rrbracket = \lambda p_{st}. \lambda q_{st}. p = q$   
 b.  $\llbracket \text{whom} \rrbracket^w = \lambda f_{\langle e, \langle st, t \rangle \rangle}. \lambda p_{st}. \exists x [x \text{ is human in } w \wedge f(x)(p) = 1]$   
 c.  $\llbracket \text{regret} \rrbracket^w = \lambda p_{st}. \lambda x_e : p(w) = 1. x \text{ regrets } p \text{ in } w$

The compositional steps for the interpretation of the LF in (14) are then as follows. Here I gloss over details regarding the compositional build-up of the embedded clause, assuming that it is more or less transparent how this has to be spelled out. Crucially, IP denotes a defined truth value only if the addressee got this letter from individual  $g(i)$  in the world of evaluation  $w$ :

- (16)  $\llbracket \mathbf{IP} \rrbracket^{w,g} = 1$  iff you regret in  $w$  having gotten this letter from  $g(i)$   
defined if you got this letter from  $g(i)$  in  $w$

At the  $C'$ -level the proto-question is built by applying the interrogative operator using intensional function application to (16), as in (17). The result characterizes a singleton set of propositions, namely the set that contains the proposition that the addressee got this letter from  $g(i)$  in  $w$ , where the proposition presupposes that the addressee did get the letter from  $g(i)$  in  $w$ .

- (17)  $\llbracket \mathbf{C}' \rrbracket^{w,g} = \llbracket ? \rrbracket^{w,g}(\llbracket \mathbf{IP} \rrbracket^{w,g})$   
 $= \lambda p.p = \lambda w : \text{you got this letter from } g(i) \text{ in } w. \text{ you regret in } w \text{ having}$   
 $\text{gotten this letter from } g(i)$

The index adjoined to  $C'$  has the consequence that the next higher constituent is interpreted by the predicate abstraction rule as in (18). In essence, we abstract over the variable in (17)  $g(i)$ , thereby creating a function from individuals to question denotations.

- (18)  $\llbracket \mathbf{1C}' \rrbracket^{w,g} = \lambda x. \llbracket \mathbf{C}' \rrbracket^{w,g[1 \rightarrow x]}$   
 $= \lambda x. \lambda p.p = \lambda w : \text{you got this letter from } x \text{ in } w. \text{ you regret in } w \text{ having}$   
 $\text{gotten this letter from } x$

At the CP-level, the  $wh$ -expression applies to (18) as in (19). We get back a set of propositions. These are propositions that are of the form *that the addressee regrets having gotten this letter from  $x$*  where  $x$  is an individual and it is presupposed that the addressee did get the letter from  $x$ .

- (19)  $\llbracket \mathbf{CP} \rrbracket^{w,g} = \llbracket \mathbf{whom} \rrbracket^w(\llbracket \mathbf{1C}' \rrbracket^{w,g})$   
 $= [\lambda f. \lambda p. \exists x[x \text{ is human in } w \wedge f(x)(p) = 1](\llbracket \mathbf{1C}' \rrbracket^{w,g})$   
 $= \lambda p. \exists x[x \text{ is human in } w \wedge \llbracket \mathbf{1C}' \rrbracket^{w,g}(x)(p) = 1]$   
 $= \lambda p. \exists x[x \text{ is human in } w \wedge [\lambda y. \lambda p.p = \lambda w : \text{you got this letter from } y \text{ in } w.$   
 $\text{you regret in } w \text{ having gotten this letter from } y](x)(p) = 1]$   
 $= \lambda p. \exists x[x \text{ is human in } w \wedge p = \lambda w : \text{you got this letter from } x \text{ in } w. \text{ you}$   
 $\text{regret in } w \text{ having gotten this letter from } x]$

So, clearly there is nothing wrong with the factive island interrogative in (10) from a compositional perspective. In principle, we *can* arrive at a defined denotation.

### 1.3.2 Using an interrogative with a factive island

Maybe there is something wrong with the pragmatics of (10)? Maybe the denotation we got is not really usable? We can express the denotation in (19) less formally as the set in (20), assuming that the domain of individuals is Ann, Bea, and Cleo.

- (20)  $\llbracket \text{CP} \rrbracket^{w,g} = \{ \lambda w : \text{you got this letter from Ann in } w. \text{ you regret in } w \text{ having gotten this letter from Ann,}$   
 $\lambda w : \text{you got this letter from Bea in } w. \text{ you regret in } w \text{ having gotten this letter from Bea,}$   
 $\lambda w : \text{you got this letter from Cleo in } w. \text{ you regret in } w \text{ having gotten this letter from Cleo} \}$

A speaker asking a direct interrogative is asking for information. We can therefore define a question speech act as in (21). In particular, what (21) requires is that the speaker at the least be told all the true propositions in the question denotation. Whether (21) captures all ingredients of a question speech act is somewhat tangential to the issue at hand. It is, however, the minimal requirement a question speech act must make it seems (Groenendijk and Stokhof 1984).

- (21) *Question speech act*  
 A speaker uttering in world  $w$   $\Phi$ , where  $\llbracket \Phi \rrbracket^{w,g} \in D_{\langle st,t \rangle}$ , requests to be told the minimal proposition entailing the conjunction of all propositions  $q \in \{ r : \llbracket \Phi \rrbracket^{w,g}(r) = 1 \}$  such that  $q$  is true in  $w$ .

According to (21), by uttering an interrogative with the denotation in (20), the speaker requests to be told the minimal true proposition entailing all the true propositions in (20). This seems like a fine request for information and accords with intuitions.

#### 1.4 The difficulty in accounting for intervention effects and its benefits

Considering the discussion in the preceding section, it appears that the standard interpretive component of natural language as it stands and as is often taught in introductions – admittedly, a very coarse picture of which was presented here – is too unconstrained in that it does not yield anything that one could safely assume to yield judgments of degradedness for the phenomena under discussion. As we will see it turns out that intervention effects require us to make nontrivial and sometimes controversial assumptions about the ontology, the compositional process, the pragmatics, or the interaction of the interpretive components involved. In particular, we will see that at the heart of the issue lies the question of how the interpretive component as a whole should be constrained so as to yield the correct empirical results. Such considerations can shed light on important architectural questions in the theory of natural language semantics and pragmatics.

In the following sections I will discuss the phenomena reviewed above along these general lines. Section 2 discusses weak island phenomena. Section 3 is devoted to Beck effects. In each case, I will attempt to give a comprehensive empirical overview and point to specific semantic/pragmatic accounts of the phenomenon under consideration. In section 4 I will conclude by tying together the findings from the various sections.

## 2 Weak islands

In the following, I discuss the empirical landscape of the various weak islands and summarize the reasons for thinking that a semantic or pragmatic explanation is called for. After that I give an overview of existing proposals meeting that challenge. For other discussions of approaches to weak islands see Szabolcsi (2006) and Abrusán (2014).<sup>11</sup>

### 2.1 Types of weak islands

We saw that in English *wh*-interrogatives one *wh*-phrase is fronted to the beginning of the clause in order to form an operator–variable dependency at LF. This is true for all kinds of *wh*-expressions including *wh*-adverbials like *how*, *why*, and *when*, and *wh*-phrases asking for degrees such as *how many cars* and *how fast*.

- (22) a. What did John fix \_\_\_?  
 b. Which car did John fix \_\_\_?  
 c. How did John fix the car \_\_\_?  
 d. How many cars did John fix \_\_\_?  
 e. How fast did John fix the car \_\_\_?  
 f. Why did John fix the car \_\_\_?  
 g. When did John fix the car \_\_\_?

#### 2.1.1 Negative islands

With the exception of *why* (see below), all *wh*-expressions from (22) that do not ask for individuals are subject to intervention by negation. That is, an operator–variable dependency cannot be established across an intervening negation. This constraint is called the *negative island* constraint (Ross 1984; Rizzi 1990).

- (23) a. What didn't John fix \_\_\_?  
 b. Which car didn't John fix \_\_\_?  
 c. \*How didn't John fix the car \_\_\_?  
 d. \*How many cars didn't John fix \_\_\_?  
 e. \*How fast didn't John fix the car \_\_\_?  
 f. Why didn't John fix the car \_\_\_?  
 g. \*When didn't John fix the car \_\_\_?

In fact, other negative expressions like *no one*, *few boys*, and *only John* cause similar problems for operator–variable dependencies (Rizzi 1990). Note that *only John* is negative in the sense that it states that no one other than John makes the predicate true. The following pairs illustrate this for *how*-interrogatives:

- (24) a. How did John fix the car \_\_\_?  
 b. \*How did *no one* fix the car \_\_\_?
- (25) a. How did a few boys fix the car \_\_\_?  
 b. \*How did *few boys* fix the car \_\_\_?

- (26) a. How did John fix the car \_\_\_?  
 b. \*How did *only John* fix the car \_\_\_?

While these facts are more or less accepted, it is sometimes stated that the degree to which fronting across intervening factive predicates is possible varies with the fronted *wh*-expression (see, e.g., Cinque 1990; Rizzi 1990; Rooryck 1992). I do not engage in this discussion here as the facts are not entirely settled. To be on the safe side, the examples are marked as equally unacceptable. Similar comments are applicable to the weak islands discussed in the following sections. Clearly, obtaining more controlled judgments would be useful here and thus constitutes an avenue for future research. It might well be that different *wh*-expressions ultimately call for different treatments.

### 2.1.2 Factive islands

The situation is similar with respect to intervening factive predicates. All types of *wh*-phrases can undergo an operator-variable dependency across non-factive predicates like *believe*, as (27) shows, substantiating what we have already seen above.

- (27) a. What does Mary *believe* John fixed \_\_\_?  
 b. Which car does Mary *believe* John fixed \_\_\_?  
 c. How does Mary *believe* John fixed the car \_\_\_?  
 d. How many cars does Mary *believe* John fixed \_\_\_?  
 e. How fast does Mary *believe* John fixed the car \_\_\_?  
 f. Why does Mary *believe* John fixed the car \_\_\_?  
 g. When does Mary *believe* John fixed the car \_\_\_?

If the predicate in question is factive, however, the result is degraded, unless the *wh*-expression asks for an individual as the examples in (28) show. In contrast to negative islands, however, even *why* seems to be subject to factive islands. This led Rizzi (1990) to conclude that *why* in cases like (22f) above is actually not fronted to but rather inserted in the clause-initial position (see also Ko 2005). Note that this option is not available in the case of (28f) where *why* must be fronted given that it is intended to be related to the predicate of the embedded clause.

- (28) a. What does Mary *know* John fixed \_\_\_?  
 b. Which car does Mary *know* John fixed \_\_\_?  
 c. \*How does Mary *know* John fixed the car \_\_\_?  
 d. \*How many cars does Mary *know* John fixed \_\_\_?  
 e. \*How fast does Mary *know* John fixed the car \_\_\_?  
 f. \*Why does Mary *know* John fixed the car \_\_\_?  
 g. \*When does Mary *know* John fix the car \_\_\_?

The list of predicates causing intervention might actually not only include factive ones such as *know*, *regret*, *realize*, and *be surprised* but also others such as so-called response-stance predicates including *accept*, *deny*, and *verify* (Hegarty 1992). Response-stance predicates do not presuppose their complement to be

true strictly speaking, but rather imply that its truth is under discussion. The ultimate list of predicates causing intervention in the sense of factive ones is still somewhat open for debate. In the following, I will nevertheless often refer to factive predicates when I should actually also include reference to response-stance predicates.

### 2.1.3 Wh-islands with whether

Finally, extraction of *wh*-expressions from embedded interrogatives is also restricted. Embedded *wh*-interrogatives are usually seen as strong islands, at least in English (Huang 1982).<sup>12</sup> Embedded polar interrogatives that are either infinitival, subjunctive, or modal in nature, however, appear to be weak islands. As the following examples show, only *wh*-expressions asking for individuals can be easily fronted across an intervening *wh*-complementizer *whether*.

- (29) a. What does Mary know *whether* John should fix \_\_\_?  
 b. Which car does Mary know *whether* John should fix \_\_\_?  
 c. \*How does Mary know *whether* John should fix the car \_\_\_?  
 d. \*How many cars does Mary know *whether* whether John should fix \_\_\_?  
 e. \*How fast does Mary know *whether* John should fix the car \_\_\_?  
 f. \*Why does Mary know *whether* John should fix the car \_\_\_?  
 g. \*When does Mary know *whether* John should fix the car \_\_\_?
- (30) a. What is Mary wondering *whether* to fix \_\_\_?  
 b. Which car is Mary wondering *whether* to fix \_\_\_?  
 c. \*How is Mary wondering *whether* to fix the car \_\_\_?  
 d. \*How many cars is Mary wondering *whether* to fix \_\_\_?  
 e. \*How fast is Mary wondering *whether* to fix the car \_\_\_?  
 f. \*Why is Mary wondering *whether* to fix the car \_\_\_?  
 g. \*When is Mary wondering *whether* to fix the car \_\_\_?

Note that the responsive predicate *know* – that is, a predicate embedding both declarative and interrogative clauses (Lahiri 2002) – causes intervention when embedding a declarative, as discussed in section 2.1.2, but not when embedding a polar interrogative. With respect to the latter property, they thus pattern with rogative predicates like *wonder* (Asher 1987; Lahiri 2002) – predicates that only embed interrogative clauses. From this one should conclude that it is not the factivity of *know* that causes the degraded status of the examples in (29). Note also that it is not immediately clear that factivity is even present with *know* embedding interrogative clauses (see Groenendijk and Stokhof 1982; 1984; but cf. Spector and Egré 2015; Mayr 2017).

## 2.2 Why weak islands are semantic in nature

Historically, weak islands were taken to require a syntactic account. There are, however, at least three types of empirical arguments suggesting that a semantic account is preferable.

### 2.2.1 The influence of the semantics of the predicate

First, Szabolcsi and Zwarts (1992) show that dependencies formed with *wh*-expressions asking for individuals can be subject to weak islands. In particular, they are subject to intervention if there is a uniqueness implication present, as is necessary with the predicate *to get this letter from x* but not with the predicate *to show this letter to x*. A particular letter can only be from one individual, but it can be shown to multiple individuals. We have already seen the relevant difference for factive islands in section 1.2. I repeat the data here:

- (31) a. \*From whom do you *regret* having gotten this letter \_\_\_?  
 b. To whom do you *regret* having shown this letter \_\_\_?  
 (Szabolcsi and Zwarts 1992, ex. 98)

Recall that with non-factive predicates such as *think*, both examples are acceptable.

Negative islands show a similar picture. *Whom* can be fronted across negation in (33b) without the uniqueness property, while it cannot be so in (32b) with the uniqueness property present.<sup>13</sup>

- (32) a. From whom did you get this letter \_\_\_?  
 b. \*From whom didn't you get this letter \_\_\_?  
 (Szabolcsi and Zwarts 1992, ex. 96b)
- (33) a. To whom did you show this letter \_\_\_?  
 b. To whom didn't you show this letter \_\_\_?  
 (Szabolcsi and Zwarts 1992, ex. 96a)

Now, syntactic approaches to weak islands draw a strong distinction between *wh*-expressions asking for individuals and those asking for degrees, manners, time points, and the like. The reason for this are, of course, the data reviewed in section 2.1. The data just discussed where *wh*-expressions asking for individuals also seem to be subject to weak islands call such approaches into question then. Moreover, it is not clear how a syntactic account could differentiate between the *wh*-expressions in, say, (32b) and (33b).

### 2.2.2 Contextual alleviation of weak islands

The second reason for assuming that weak islands are semantic in nature is due to the fact that they can be alleviated by context. The observation of this fact goes back to Kroch (1998), the original version of which was written in 1989. Kroch argues that the degree questions in (34) and (35) are acceptable in the kinds of contexts given. Note that *whether* would be expected to instantiate a *wh*-island as seen above. Note also that the examples in (34) and (35) are not infinitival or modal in nature. That is, one might even expect the embedded clause to constitute a strong *wh*-island, if anything.

- (34) *Context: There was a set of books for which Bill asked whether the company was interested in publishing them.*  
How many books did Bill ask whether the company was interested in publishing \_\_\_?  
(Kroch 1998, ex. 19a)
- (35) *Context: There are violations A, B, C, and D for the sport under discussion. For each violation the athlete gets a particular number of points deducted. I have not watched the whole event, but my friend has. So I ask him:*  
How many points are the judges arguing about *whether* to deduct \_\_\_?  
(Kroch 1998, ex. 21a)

What these examples all have in common, intuitively speaking, is that the context restricts the domain of quantification for the *wh*-expression. Abrusán (2014) makes this explicit by giving examples listing salient answers as in (36), thereby showing that the observation extends to negative islands.

- (36) a. ?How didn't John behave \_\_\_: quickly or responsibly?  
(Abrusán 2014, 12, ex. 21)
- b. Among the following, how many points did Iverson *not* score \_\_\_?  
A: 20 B: 30  
(Abrusán 2014, 110, ex. 47)

These data taken together are problematic for syntactic accounts of weak island effects. It is not clear at all how contextual alleviation of the kind discussed could be incorporated in such an account in an explanatory way. After all islands are all-or-nothing phenomena on such a view.<sup>14</sup>

### 2.2.3 Modal obviation phenomena

A third argument for a semantic treatment of weak island effects comes from so-called modal obviation phenomena. For instance, Fox and Hackl (2006) show following Kuno and Takami (1997) that the addition of an existential or a universal modal can affect the availability of negative island effects in degree questions. In particular, having an existential modal under negation, (37a), or a universal one above negation, (37b), obviates the weak island effect otherwise obtained with negation.

- (37) a. How much radiation is the company *not allowed* to expose its workers to \_\_\_?  
(Fox and Hackl 2006, ex. 28a)
- b. How much radiation is the company *required not* to expose its workers to \_\_\_?  
(Fox and Hackl 2006, ex. 29a)

Crucially, in each case the reversal of the order of the modals and negation does not lead to an obviation effect:

- (38) a. \*How much food is the company **allowed** *not* to give its workers \_\_\_?  
(Fox and Hackl 2006, ex. 29b)  
b. \*How much food is the company *not* **required** to give its workers \_\_\_?  
(Fox and Hackl 2006, ex. 28b)

Abrusán (2014) shows that factive islands can also be obviated by adding an existential modal below the factive predicate, at least for many speakers:

- (39) 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 \_\_\_?  
(Abrusán 2011, ex. 5)

Finally, Abrusán (2014) adds to this picture that even *wh*-islands can be obviated by the addition of a universal modal in specific contexts, as the example in (40) shows:

- (40) *Context: Cough syrup contains some steroids. For this reason, Olympic athletes need to inform the World Anti-Doping Agency (WADA) if they have to take more than a certain amount of it. But I forgot what this amount was, so I ask my friend, Michael Phelps:*  
?How much cough syrup does the WADA **need** to know *whether* you took \_\_\_?  
(Abrusán 2014, 162, ex. 62)

Again, a syntactic account simply has nothing to say about why the addition of a modal should obviate a weak island effect.

### 2.3 Semantic accounts of negative islands

I now give a brief overview of existing semantic accounts of weak islands. In order to bring out parallels and differences between the different accounts, the discussion proceeds by island type rather than by account type. It might well be that one type of account works best for a particular type of weak island but not for another one. I will not do full justice to the individual accounts by presenting them in a literal fashion. Rather I will take the freedom to adopt them to the standard semantics and pragmatics discussed in section 1.3 above. This, I hope, will facilitate comparison.

#### 2.3.1 Assumptions about denotation domains and maximality

Szabolcsi and Zwarts's (1992) core idea is that at some point in the semantic composition of a *wh*-interrogative, a characteristic function of entities is generated and that this function is not necessarily defined for all possible appropriate arguments. If it is not defined for all possible argument types, unacceptability results. The authors do not give a precise semantics for their account (but cf. Honcoop's 1998 dynamic implementation). I will therefore focus on two paradigmatic cases,

in an attempt to bring out their intuition. The compositional interpretation may, however, not reflect what the authors had in mind. I hope that the implementation will make it possible to relate the account to the ones discussed in the following section.

As the reader can verify, the standard Karttunen semantics discussed in section 1.3.1 when adopted for manner questions like (41) would not derive a characteristic function of manners at any point in the composition.

(41) \*How didn't John fix the car \_\_\_?

Let us therefore assume for a moment, in contrast to the standard picture reviewed in section 1.3.1, that a *how*-interrogative like (41) denotes a function from manners to truth values directly. That is, to give an answer to (41) is to apply the function denoted by (41) to the maximal manner making the function true. For this assume the LF in (42). Notice that the predicate derived by fronting of *how* is separated from it by a maximality operator *max*. The derived predicate is interpreted by predicate abstraction and has the denotation in (43).<sup>15</sup>

(42)  $[_{CP} \text{ how } [_X \text{ max } [1 [_{IP} \text{ not John fixed the car } t_{1_m} ]]]]$

(43)  $[[1 \text{ IP}]]^{w,g} = \lambda m. \text{John did not fix the car in manner } m \text{ in } w$

The maximality operator has the denotation in (44). The operator applied to a function from entities of any basic type  $\tau$  to truth values gives back the maximal entity making the function true, notated by  $\iota x$ . Applying (44) to (43) yields the maximal manner in (45) as denotation, if such a manner exists.

(44)  $[[\text{max}]]^{w,g} = \lambda f_{\langle \tau, t \rangle}. \iota x [f(x) = 1]$

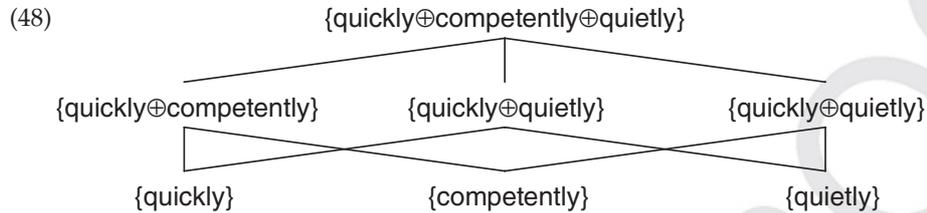
(45)  $[[X]]^{w,g} = \iota m. \text{John did not fix the car in manner in } m \text{ in } w$

The lexical entry of *how* denotes a relation between manners. The denotation of the interrogative then is the characteristic function of manners in (47). This function yields true for the manner corresponding to the maximal manner in which John did not fix the car.<sup>16</sup>

(46)  $[[\text{how}]] = \lambda y_m. \lambda x_m. x = y$

(47)  $[[CP]]^{w,g} = \lambda m. m = \iota m' [\text{John did not fix the car in manner } m' \text{ in } w]$

Now, Szabolcsi and Zwarts assume that the domain of manners  $D_m$  is ordered. In particular, assuming that there are three manners, the characteristic function in (47) can be represented as the free join semi-lattice in (48). Note that there is no bottom element in (48). This means that in a situation in which John fixed the car in a quick, competent, and quiet manner, the function in (47) does not characterize any manner.



As a consequence, there are situations in which the *how*-interrogative under discussion might not have an answer. This is the reason, the authors assume, why the interrogative is degraded.

The authors go on to suggest that such considerations lie at the heart of weak islands. For instance, degrees might have even poorer denotation domains than manners. Thus they will also be subject to intervention by negation. Individuals, on the other hand, are claimed to have richer, so-called Boolean denotation domains. In particular, they would have a bottom element where (48) does not have one corresponding to the empty set of individuals. As a consequence, (49) would be answerable even if John did not fix anything. Therefore it is not degraded.

(49) What didn't John fix \_\_\_?

At this point we might ask whether there is any independent reason for why denotation domains differ in precisely the ways necessary for the account to work. As far as I am aware, a positive answer to this question does not exist. There are also other open issues. First, it is not clear what the account has to say about contextual alleviation and modal obviation of islands. Would these affect the denotation domains in a positive way? Second, the fact that no real compositional semantics is provided by the authors raises the question of whether their intuition can be implemented in a satisfying way. In particular, it is not immediately clear whether the approach can be combined with a more standard semantics for questions.

### 2.3.2 Absence of maximal answer

While some of the details of Szabolcsi and Zwarts's (1992) approach are debatable, it is also clear that their idea of making maximality the culprit in negative islands has been very influential, in particular when it comes to degree questions. In the following, I briefly outline the history of various such implementations. As we will see, these are compatible with the compositional semantics from section 1.3.1.

#### 2.3.2.1 Rullmann (1995)

Since von Stechow (1984) it has been standard to assume that natural language semantics makes use of degrees and that *how*-interrogatives such as (50) are questions for degrees. Rullmann suggests that (50a) asks for the maximal degree such that the addressee is tall to that degree. If the addressee is exactly 185 cm tall, then

this is the relevant maximal degree the question is asking for. Similarly (50b) asks for the maximal degree to which the addressee is not tall. In the situation just mentioned, the addressee is not tall to 185.01 cm, and also not to 185.02 cm, and so on. In fact, there is no maximal degree to which the addressee is not tall. But if there is no maximal degree to which the addressee is not tall, then asking the interrogative does not make much sense. This would be the reason for the degradedness of (50b).

- (50) a. How tall are you \_\_\_?  
b. \*How tall aren't you \_\_\_?

Beck and Rullmann (1999) notice that interrogatives like (51) constitute a problem for this reasoning. If, say, three eggs are sufficient for baking the cake, then four eggs will also be sufficient, and similarly for any larger quantity. That is, there is no maximal number of eggs that is sufficient to bake the cake, in parallel to the situation in (50b). Why then is (51) acceptable?

- (51) How many eggs are sufficient (to bake this cake)?  
(Beck and Rullmann 1999, ex. 13)

### 2.3.2.2 Fox and Hackl (2006)

As a response to this puzzle, Fox and Hackl suggest that measurement scales used in natural language are universally dense. That is, for any two degrees  $d$  and  $d'$ , where  $d < d'$ , there is another degree  $d''$ , such that  $d < d'' < d'$ . Moreover, they shift the problem from nonexistent maximal degrees to nonexistent maximal answers.

They assume following Dayal (1996) that there is an answer operator definable as in (52). This operator when applied to a question denotation gives the maximal true answer to the question, but with a twist. Specifically, it yields the unique true proposition in the question denotation entailing all other true propositions in the denotation. Moreover, it presupposes that there is such a maximal true proposition in the question denotation ( $\Rightarrow$  stands for entailment).

- (52)  $[[\mathbf{Ans}]]^w = \lambda Q_{\langle st,t \rangle} : \exists! p [Q(p) = 1 \wedge p(w) = 1 \wedge \forall q [Q(q) = 1 \wedge q(w) = 1 \rightarrow p \Rightarrow q]]$ .  
 $\iota p [Q(p) = 1 \wedge p(w) = 1 \wedge \forall q [Q(q) = 1 \wedge q(w) = 1 \rightarrow p \Rightarrow q]]$

For concreteness, assume as in (53a) that *tall* is a predicate of degrees  $d$  yielding true for an individual  $x$  if and only if  $x$  is  $d$ -tall (see, e.g., Heim 2000; but cf. Kennedy 1997 for a compatible alternative). Assume then that *how* has the denotation in (53b). That is, it is just like the *wh*-expression *whom* seen in (15b) except that it quantifies over degrees, where  $D_d$  is the domain of degrees.

- (53) a.  $[[\mathbf{tall}]]^w = \lambda d_d . \lambda x_e . x$  is  $d$ -tall in  $w$   
b.  $[[\mathbf{how}]] = \lambda f_{\langle d, \langle st,t \rangle \rangle} . \lambda p_{st} . \exists d [d \in D_d \wedge f(d)(p) = 1]$

With the LFs in (54) for the examples in (50), all of this together means that the abstraction process must be over degrees as indicated by  $t_{1_d}$ . The denotations of the interrogatives in (50) are then as in (55).

- (54) a. [how [1 [? [you are  $t_{1_d}$ -tall]]]]  
 b. [how [1 [? [not you are  $t_{1_d}$ -tall]]]]
- (55) a.  $\llbracket(54a)\rrbracket^{w,g} = \lambda p.\exists d[d \in D_d \wedge p = \lambda w.\text{the addressee is } d\text{-tall in } w]$   
 b.  $\llbracket(54b)\rrbracket^{w,g} = \lambda p.\exists d[d \in D_d \wedge p = \lambda w.\text{the addressee is not } d\text{-tall in } w]$

Moreover assume now that we modify the notion of a question speech act from (21) as in (56) by incorporating the answer operator into it. The speaker still asks for the minimal proposition entailing the conjunction of all true propositions in the denotation. In contrast to before, however, (56) has the effect that the speaker comes to presuppose that there is a unique true proposition in the question denotation entailing all other true propositions in it (Stalnaker 1974). This is, of course, the consequence of the presupposition contributed by the answer operator.

- (56) *Question speech act (modified)*  
 A speaker uttering in world  $w$   $\Phi$ , where  $\llbracket\Phi\rrbracket^{w,g} \in D_{(st,t)}$ , requests to be told  $\llbracket\text{Ans}\rrbracket^w(\llbracket\Phi\rrbracket^{w,g})$ .

What are the consequences of this for degree questions? By (56), a speaker asking (50a) wants to know the unique true proposition of the form *that the addressee is tall to degree  $d$*  entailing all other such true propositions. If the addressee is exactly 185 cm tall, then that proposition is *that the addressee is tall to degree 185 cm*. For (50b), however, the situation is different. In the same situation, the addressee is not tall to degree 185.01 cm, and the same for any larger degree, as seen above. Is 185.01 cm the relevant degree then? No, because under the assumption that measurement scales are dense, there is always a smaller degree between 185 cm and 185.01 cm, call it  $d$ , such that the addressee is not tall to that degree. Moreover, there is another such degree between 185 cm and  $d$ . And so on. Thus  $\llbracket\text{Ans}\rrbracket^w(\llbracket(50b)\rrbracket^{w,g})$  is necessarily undefined. Clearly, this affects the question speech act negatively.

This approach can also deal with modal obviation phenomena. Consider (57) from (37b) again. Its denotation would be (58). Assume the law requires that the workers are not exposed to  $d'$ -amount of radiation. Then the proposition *that the company is required not to expose its workers to  $d'$ -amount of radiation* is the unique proposition entailing all other true propositions in the question denotation. For any  $d'' > d'$ , this proposition entails *that the company is required not to expose its workers to  $d''$ -amount of radiation*. This accounts for the acceptability of (57). Parallel reasoning extends to (37a) above as negation scoping over an existential modal is equivalent to negation scoping below a universal modal.

- (57) How much radiation is the company **required not** to expose its workers to \_\_\_?  
 (Fox and Hackl 2006, ex. 29a)
- (58)  $\llbracket(57)\rrbracket^{w,g} = \lambda p.\exists d[d \in D_d \wedge p = \lambda w.\text{in all worlds } w' \text{ accessible from } w \text{ the company does not expose its workers to } d\text{-amount of radiation}]$

So Fox and Hackl's (2006) approach deals both with negative island effects found with degree questions and modal obviation effects thereof without running into the problems discussed for Rullmann's (1995) account.<sup>17</sup> In order to deal with other cases of negative islands, however, the authors have to extend their use of dense scales to cases where such scales are normally not assumed. For instance, we saw that negative islands arise with interrogatives such as (59). It is, however, not clear what, say, 3.01 cars would amount to.

(59) \*How many cars didn't John fix \_\_\_?

As a consequence, my pragmatic rendition making use of (56) would probably not work for (59). Fox and Hackl, aware of this, suggest that the answer operator is directly attached to interrogatives in the representation and that there is a level of interpretation which is blind to contextual information and common knowledge and works with dense scales for all kinds of counting. This necessitates a strong version of modularity (see also Fox 2000; Gajewski 2002 for the related notion of a deductive system). The authors attempt to motivate their assumptions with other phenomena such as the implicatures of modified numerals (see also Nouwen 2008; but cf. Mayr 2013 for contrary arguments; see also "Modified Numerals"). Moreover, it is not immediately clear how to extend the density-based account to negative islands in non-degree questions such as (60) (but see Fox 2007).

(60) \*How didn't John fix the car \_\_\_?

### 2.3.2.3 Abrusán (2014)

Giving up universally dense scales, Abrusan retains Fox and Hackl's suggestion that the answer operator in (52) is central to accounting for negative islands, but combines it with certain assumptions about denotation domains.

For degree questions such as those in (50), Abrusan suggests that they actually ask for an interval of degrees, that is, a set of degrees (Schwarzschild and Wilkinson 2002; Abrusán and Spector 2011). Accordingly, *tall* is a function from intervals  $I$  to functions from individuals  $x$  to truth values yielding true for  $x$  if and only if  $x$ 's height is a degree in  $I$ , as in (61a). *How* must also be adjusted, namely to a quantifier over intervals as in (61b).

- (61) a.  $\llbracket \text{tall} \rrbracket^w = \lambda I_{dt} \cdot \lambda x_e \cdot x$ 's height is in  $I$  in  $w$   
 b.  $\llbracket \text{how} \rrbracket = \lambda f_{\langle (dt), (st,t) \rangle} \cdot \lambda p_{st} \cdot \exists I [I \in D_{dt} \wedge f(I)(p) = 1]$

The LFs for the degree examples in (50) correspond to the ones in (54) with abstraction over interval denoting traces. The denotations are then as in (62).

- (62) a.  $\llbracket (50a) \rrbracket^{w,g} = \lambda p \cdot \exists I [I \in D_{dt} \wedge p = \lambda w \cdot \text{the addressee's height is in } I \text{ in } w]$   
 b.  $\llbracket (50b) \rrbracket^{w,g} = \lambda p \cdot \exists I [I \in D_{dt} \wedge p = \lambda w \cdot \text{the addressee's height is not in } I \text{ in } w]$

Given the definition of question speech act in (56), a speaker of (62a) asks for the unique true proposition of the form *that the addressee's height is in interval I* entailing

all other such true propositions. If the addressee is exactly 185 cm, that proposition is *that the addressee's height is in interval [185 cm, 185 cm]*, which is equivalent to saying that the addressee is exactly 185 cm tall. With (62b), however, a problem arises again. There are at least two nonoverlapping intervals such that the addressee's height is not in them:  $[0, 184.9998 \text{ cm}]$  and  $[185.0001 \text{ cm}, \infty]$ . Now, the proposition *that the addressee's height is in  $[0, 184.9998 \text{ cm}]$*  does not entail *that the addressee's height is not in  $[185.0001 \text{ cm}, \infty]$*  and vice versa. Completely parallel considerations apply to smaller intervals based on the two mentioned. Thus there is no unique answer in the case of (50b) in the sense required by the answer operator. Thus again, the question speech act cannot be carried out.

Abrusán assumes that manner predicates like *quickly* are modifiers of eventualities. Therefore *how* in (60) quantifies over such modifiers in parallel to the quantification over intervals just seen. That is, the denotation of (60) is as in (63).

$$(63) \quad \llbracket (60) \rrbracket^{w,g} = \lambda p. \exists m [m \in D_m \wedge p = \lambda w. \text{John did not fix the car in manner } m \text{ in } w]$$

Crucially, Abrusán suggests that every set of manners must contain for each manner both its contrary and the middle between the two contraries, where two contraries contradict each other by definition. Assume that  $D_m$  in (63) is restricted contextually to manners of speed, then it contains *quickly* together with *slowly* and *with regular speed*. Assume now that John did not fix the car slowly. Would *that John did not fix the car slowly* be the unique true answer entailing all other true answers in (63)? No, if John actually fixed the car quickly, *that John did not fix the car with regular speed* would also be true. But the latter proposition is not entailed by the former one. And vice versa if John fixed the car with regular speed. Then *that John did not fix the car quickly* would be true, which is also not entailed. Therefore no unique true answer can be found and (60) is degraded. Of course, it remains to be seen how the assumption that sets of manners always contain contraries and middles can be substantiated. For now it must remain a stipulation.

Abrusán's proposal can also deal with modal obviation facts and contextual alleviation. The logic of the argument is similar to that seen with Fox and Hackl's (2006) proposal. I refer the reader to Abrusán (2014) for details.

I want to briefly return to discussion of the influence of the verbal predicate on negative islands. Abrusán suggests that given the punctual predicate *die*, (64a) is degraded because there are infinitely many time points where Mary did not die. Moreover, the time points and the resulting propositions are not ordered by entailment. Thus no unique answer can be found in parallel to what we saw above. With the stative predicate in (64b), on the other hand, maximal intervals where the addressee did not feel happy can be found, accounting for its acceptability.

- (64) a. \*When did Mary *not* die?  
b. When didn't you feel happy?

(Abrusán 2014, 118, ex. 64)

But recall the data in (65) from above, which seem related to those in (64). Given the logic of the argument, then (65a) should be degraded because there are infinitely



many individuals from whom the addressee did not get this letter. This is, however, not true given real world knowledge. There is a finite set of individuals, though maybe not listable. This suggests that even on Abrusán's account one might need to resort to additional mechanisms. For instance, one might see (65) as evidence for dense scales for entities other than degrees, in particular for individuals. But this would bring the account closer to Fox and Hackl's (2006) one, and in the end Abrusán's criticism of universal dense scales might not hold up.

- (65) a. \*From whom didn't you get this letter \_\_\_?  
b. To whom didn't you show this letter \_\_\_?  
(Szabolcsi and Zwarts 1992, ex. 96b)

#### 2.4 Semantic accounts of factive and *wh*-islands

As far as I know only Abrusán (2014) attempts to account for *wh*-islands. Since the account is very close to her account of negative islands – the difference being that one needs to make reference to the strong exhaustive rather than the weak exhaustive answer (Heim 1994) – I do not discuss it in the interest of space.

I therefore directly turn to factive islands. In general, they have been the focus of semantic research to a lesser degree than negative islands. I will keep the discussion to a minimum focusing on the differences to accounts of negative islands.<sup>18</sup>

##### 2.4.1 *Universal presupposition projection*

As we have seen, *wh*-expressions are quantificational. Now, it is well known that a presupposition triggered by an expression embedded in the scope of a quantifier projects in the sense that it becomes a presupposition of at least one of the entities quantified over (Karttunen 1971). What is less clear is in what way the presupposition projects. Does it become a presupposition of all the entities under consideration or only of some?

On the basis of data such as (66), Abrusán (2011; 2014) concludes that presuppositions in the scope of *wh*-expressions project universally (Heim 1983; Schlenker 2009). The reason is that (66) suggests that Bill invited all of these 10 people. That is, the presupposition of *Mary regrets that Bill invited x* with a free variable *x* appears to become a presupposition of each of the 10 people.<sup>19</sup>

- (66) Who among these 10 people does Mary regret that Bill invited \_\_\_?  
(Abrusán 2014, 61, ex. 9)

The assumption of universal projection immediately derives the difference between (67a) and (67b). The universal presupposition attributed to (67a) that the addressee got this letter from every individual quantified over by the *wh*-expression is contradictory, as the letter can only be from one person (but cf. the remarks in footnote 13 above). Such a universal presupposition is, however, not contradictory for (67b), as it says that the addressee showed the letter to every individual, which is indeed a possibility.<sup>20</sup>



- (67) a. \*From whom do you *regret* having gotten this letter \_\_\_?  
 b. To whom do you *regret* having shown this letter \_\_\_?  
 (Szabolcsi and Zwarts 1992, ex. 98)

Factive islands in manner interrogatives such as (68) are also accounted for where *how* quantifies over a set of manners. Recall from section 2.3.2.3 that Abrusán assumes that every set of such manners must contain its contrary. If the set contains, say, *politely* it must also contain *impolitely*. Universal projection will thus derive the contradictory presupposition that John behaved politely and impolitely. No context can satisfy this presupposition.

- (68) \*How do you *regret* that John behaved \_\_\_?

This account can deal with modal obviation phenomena such as in (69). This interrogative, in contrast to the one in (68), will presuppose that for every manner John is allowed to behave in that manner. This, even though unlikely, can be satisfied by a context.

- (69) \*How do you *regret* that John was **allowed** to behave \_\_\_?

This approach also carries over to degree questions such as (70). Recall Abrusán's assumption that *how* quantifies over intervals of height. If so, (70) presupposes that for every interval  $I$  Mary's height is in  $I$ . Assume there are just two degrees,  $d$  and  $d'$ . Then there are two nonoverlapping intervals  $[d, d]$  and  $[d', d']$ , and similarly for any more realistic set of degrees. But clearly Mary's height cannot be in nonoverlapping intervals. Therefore the universal presupposition is contradictory.

- (70) \*How tall does Mary *know* that she is \_\_\_?

There is, however, a rather pressing issue for an account relying on universal projection: why is universal projection obligatory? It is well known that projection does not happen if an unsatisfiable presupposition would obtain (Heim 1983). For instance, in (71) the presupposition that John used to smoke triggered by *stop* does not project as it would contradict the *because*-clause. Rather the presupposition is locally accommodated under negation deriving the reading *It is not the case that John used to smoke and stopped*, which is compatible with the *because*-clause.

- (71) John didn't stop smoking, because he never did.

Moreover, it is not even necessary in the factive island cases for the presupposition to not project at all. Presuppositions in the scope of indefinites, for instance, seem to project existentially (see Beaver 2001; Fox 2013; Mayr and Sauerland 2016; among others). Clearly, (72) does not require that every fat man have a bicycle. It suffices if there is one and he pushes it. If indefinites and *wh*-expressions both

denote existential quantifiers, as standardly assumed, then both should at the least have the option of projecting presuppositions existentially.

(72) A fat man was pushing his bicycle.

(Heim 1983, ex. 25)

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#### 2.4.2 Trivially answerable questions

Oshima (2007) suggests that the difference between (73a) and (73b), similar to the examples in (67), follows from independent pragmatic reasons.

- (73) a. Who does Max *know* that Alice sent a Christmas card to \_\_\_?  
 b. \*Who does Max *know* that Alice got married to \_\_\_ on June 1st?

(Oshima 2007, ex. 5)

Oshima notes that for any context  $c$  some of the propositions in the denotation of (73a) and (73b) will be incompatible with  $c$ , namely the propositions about individuals for whom the factivity presupposition of *know* is known to not hold. In other words, the questions in (73) are effectively only about those individuals about whom it is a mutually shared belief that they make the factivity presupposition true. As a consequence the question denotations essentially reduce to those in (74) where the *wh*-expression is restricted to those individuals for which the context does entail that they satisfy the presupposition.

- (74) a.  $\llbracket(73a)\rrbracket^{w,g} = \lambda p. \exists x[x \text{ is human in } w \wedge c \Rightarrow [\lambda w. \text{Alice sent a Christmas card to } x \text{ in } w] \wedge p = \lambda w : \text{Alice sent a Christmas card to } x \text{ in } w. \text{Max knows in } w \text{ that Alice sent a Christmas card to } x \text{ in } w]$   
 b.  $\llbracket(73b)\rrbracket^{w,g} = \lambda p. \exists x[x \text{ is human in } w \wedge c \Rightarrow [\lambda w. \text{Alice got married to } x \text{ on June 1st in } w] \wedge p = \lambda w : \text{Alice got married to } x \text{ on June 1st in } w. \text{Max knows in } w \text{ that Alice got married to } x \text{ on June 1st in } w]$

Now, notice that there is at most one proposition in the denotation in (74b) in any context where common knowledge holds that Alice cannot get married to more than one person on one day. Oshima assumes an existence requirement as in (75) requiring that in every world in the context at least one proposition in the question denotation be true. Here and in (74) I assume the context to be a set of worlds in Stalnaker’s (1978) sense. That is, I equate the context with the context set defined over it (see “Context and Conversation”).

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(75) *Existence requirement*

An interrogative  $\Phi \in D_{(st,t)}$  is askable in context  $c$  only if for all worlds in  $c$  there is a proposition  $p \in \{q : \llbracket\Phi\rrbracket^{w,g}(q) = 1\}$  such that  $p(w) = 1$ .

(75) together with the uniqueness property requires that in any context there is exactly one proposition in (74b). Now, if there is exactly one proposition in (74b),

then there is exactly one individual  $x$  such that it is a mutually shared belief that Alice got married to  $x$  on June 1st. But then, the speaker of (73b) cannot fail to know the answer to (73b), as it must be  $x$  who Max knows that Alice got married to on June 1st. Oshima thus holds that it is this pragmatic anomaly that sets (73b) apart from (73a). Clearly, the question denotation in (74a) is not similarly restricted as the verbal predicate does not have the uniqueness property.

Oshima also holds that this can be extended to *why*- and manner interrogatives. In particular, he argues that each proposition can have at most one reason, and each eventuality can be carried out in at most one manner. Together with the existence requirement negative interrogatives about reasons and manners therefore observe a uniqueness property similar to (74b). Note, however, that it is not at all intuitive that a proposition can have only one reason. At any rate, one might even extend Oshima's approach to degree questions: the property of having a unique maximal degree together with the existence requirement would also yield the problematic uniqueness property. See also Simonenko (2016) for an application of Oshima's analysis to so-called DP-islands.

### 3 Beck effects

I now turn to discussion of Beck effects. I first discuss what the source of their unacceptability is and why they are substantively different from the weak island effects seen in the preceding section. Unlike with the weak island effects, I will not summarize reasons for thinking why Beck effects might be semantic in nature. As will be seen, which empirical generalizations are seen to be the crucial ones varies with the nature of the semantic account proposed.

#### 3.1 The nature of Beck effects

##### 3.1.1 The unacceptability in Beck effects

Recall the data in (76) from (7) above. Following Beck (1996a) and others in the literature, I noted that a negative quantifier like *niemand* in German creates an intervention effect in (76b) in contrast to the minimally different (76a).

- (76) a. Wen hat Hans \_\_\_ wo gesehen?  
 whom has Hans where seen  
 'Who did Hans see where?'  
 b. \*Wen hat *niemand* \_\_\_ wo gesehen?  
 whom has nobody where seen

(Beck 1996a, ex. 1b)

What actually goes wrong in (76b)? To see this one must notice that a multiple *wh*-interrogative such as (76a) can either be answered by a single-pair answer – that is, an answer specifying the unique pair making the relation denoted by the verb true – or by a multiple-pair answer – that is, an answer specifying all pairs

making that relation true. In other words, both A and A' are possible answers to Q in (77).

(77) German

Q: Wen hat Hans \_\_\_ wo gesehen?  
whom has Hans where seen

A: Den Anton hat der Hans im Büro gesehen.  
the Anton has the Hans in.the office seen  
'Hans saw Anton in the office.'

A': Den Anton hat der Hans im Büro gesehen, die Maria hat er  
the Anton has the Hans in.the office seen, the Maria has he  
im Kino gesehen, und ...  
in.the cinema seen, and ...

One might think, of course, that the single-pair answer is a special case of the multiple-pair answer. Beck effects, however, suggest otherwise (see also Dayal 2002 for independent reasons). It is sometimes noted in the literature that an interrogative such as (76b) is actually acceptable under a single-pair interpretation but not on a multiple-pair interpretation (e.g., Pesetsky 2000; Beck 2006; Kotek 2014). That is, it can be answered by A in (78) but not by A'. This state of affairs would be unexpected if single- and multiple-pair answers were due to the same interpretation of the multiple *wh*-interrogative.

(78) German

Q: Wen hat *niemand* \_\_\_ wo gesehen?  
whom has nobody where seen

A: Den Anton hat niemand im Büro gesehen.  
the Anton has nobody in.the office seen  
'No one saw Anton in the office.'

A': #Den Anton hat niemand im Büro gesehen, die Maria hat niemand  
the Anton has nobody in.the office seen, the Maria has nobody  
im Kino gesehen, und ...  
in.the cinema seen, and ...

That is then, (76b) is judged degraded on its multiple- but not on its single-pair interpretation. Presumably, the former is more salient somehow. Otherwise, we should not judge (76b) degraded when presented on its own at all. Beck (2006) moreover notes that embedding a multiple *wh*-interrogative with an intervener under predicates like *enumerate* blocks the single-pair interpretation (see also Schwarz 1995). The degradedness then comes out clearly, as the contrast in (79), inspired by Beck's (26), shows.

(79) German

a. \*Luise zählt auf, welchen Professor *niemand* \_\_\_ wohin eingeladen hat.  
Luise enumerates which professor nobody where.to invited has

- b. Luise zählt auf, welchen Professor wohin *niemand* \_\_\_ eingeladen hat.  
 Luise enumerates which professor where.to nobody invited has  
 'Luise enumerates which professor  $x$  and which place  $y$  are such that no one invited  $x$  to  $y$ .'

### 3.1.2 Beck effects are about *wh-in situ* expressions and not weak islands

This raises the question whether (76b) is simply an instance of a negative island as discussed in section 2.1.1 above. Fronting of a *wh*-expression such as *wen* across a negative quantifier, however, is in principle possible, as (80) shows. This is as expected given the data discussed above.

- (80) German  
 Wen hat *niemand* \_\_\_ gesehen?  
 who has nobody seen  
 'Who did no one see?'

But maybe negative islands for questions over individuals only become visible once we look at multiple *wh*-interrogatives? That is, maybe negative islands for questions over individuals manifest themselves by blocking the multiple-pair interpretation thereby disambiguating the questions. The fact that (76b) significantly improves if the non-fronted *wh*-expression is placed before the intervening negative quantifier, as in (81), strongly suggests otherwise. That is, (81) can have the multiple-pair interpretation and is thus answerable by  $A'$  in (78).

- (81) German  
 Wen hat wo *niemand* \_\_\_ gesehen?  
 who has where nobody seen  
 'For which individual  $x$  and place  $y$ , no one saw  $x$  at  $y$ ?'

That we are not dealing with an instance of a negative island is also suggested by the fact that, unlike with the latter, modal obviation does not seem to exist. Recall from section 2.2.3 that existential modals below negation obviate weak islands. This is not the case with Beck effects as the paradigm in (82) shows.

- (82) German
- a. Wen ist dem Hans **erlaubt** worden \_\_\_ wo zu treffen?  
 who is the Hans allowed become where to meet  
 'Who was Hans allowed to meet where?'
  - b. \*Wen ist *niemandem* **erlaubt** worden \_\_\_ wo zu treffen?  
 who is nobody allowed become where to meet
  - c. Wen ist wo *niemandem* **erlaubt** worden \_\_\_ zu treffen?  
 who is where nobody allowed become to meet  
 'Which person  $x$  and place  $y$  are such that no one was allowed to meet  $x$  at  $y$ ?'

Returning to (81), its acceptability suggests that it is a relationship between the non-fronted *wh*-expression and some higher element that is prohibited. This is unlike what we know from negative islands. The generalization that Beck effects are about *wh*-in situ expressions – or *wh*-expressions undergoing LF-movement – is also supported by cross-linguistic considerations. For instance, *wh*-in-situ interrogatives in Japanese and Korean such as in (83) and (84) show behavior comparable to that of German multiple *wh*-interrogatives (Hoji 1985; Beck and Kim 1997; Hagstrom 1998; Kim 2002; Tomioka 2007). A NPI like *anyone* causes intervention when c-commanding a *wh*-in-situ expression but not when the latter c-commands the former. Note that here issues about single- vs multiple-pair interpretations do not even arise.

(83) Japanese

- a. ?\**Daremo* nani-o yom-ana-katta-no  
 anyone what-ACC read-NEG-PAST-Q
- b. Nani-o *daremo* \_\_\_ yom-ana-katta-no  
 what-ACC anyone read-NEG-PAST-Q  
 ‘What did no one read?’

(Tomioka 2007, ex. 1a)

(84) Korean

- a. ?\**amuto* muôs-ûl sa-chi anh-ass-ni?  
 anyone what-ACC buy-CHI not do-PAST-Q
- b. muôs-ûl *amuto* \_\_\_ sa-chi anh-ass-ni?  
 what-ACC anyone buy-CHI not do-PAST-Q  
 ‘What did no one buy?’

(Kim 2002, ex. 10)

A prevalent intuition in the literature is that languages like German, Japanese, and Korean show Beck effects because they are so-called scrambling languages. In such languages the mutual scope between two expressions is largely determined by surface order (see in particular Mayr 2014). The degraded interrogatives seen above are degraded then because the scope of the *wh*-in-situ expression is restricted to its surface position, while for semantic reasons it should take scope above the intervener.

Kotek (2014) shows that this intuition is also supported by facts from English. At first sight, it seems as if English does not show Beck effects given that Q in (85) is acceptable in contrast to the German example above. That is, the English multiple *wh*-interrogative is acceptable both on a single- and a multiple-pair interpretation.

(85) Q: Who did *no one* see where?

A: No one saw Tony in the office.

A': No one saw Tony in the office, no one saw Mary in the cinema, ...

Pesetsky (2000) shows that intervention effects exist in English as well. In particular, in multiple *which*-interrogatives the so-called superiority condition can

be violated. That is, here it is not always the structurally highest *wh*-phrase that must be fronted, as (86a) shows. Now, in such violations of superiority Beck effects emerge, as the degradedness of (86c) relative to (86b) shows. Kotek argues that this difference is due to the fact that in (86c) but not in (86b) the scope of the *wh*-in-situ expression is restricted to its surface position.

- (86) a. Which student did Mary give which book to \_\_\_?  
 b. Which book did *no one* give \_\_\_ to which student?  
 c. ?\*Which student did *no one* give which book to \_\_\_?  
 (Pesetsky 2000, ex. 100)

In general, with regards to which languages show the kind of intervention effect under discussion, (Beck 2006, 6) lists the following: Dutch, English, German, French, Hindi/Urdu, Japanese, Korean, Malayalam, Mandarin, Passamaquoddy, Persian, Thai, and Turkish.<sup>21</sup>

### 3.1.3 Problematic interveners and affected *wh*-expressions

Apart from negative quantifiers, what is the class of problematic interveners with regards to Beck effects? I cannot give an exhaustive list, both for reasons of space and because of the lack of an accepted crosslinguistic picture. But I want to give a few examples at least. See also the following sections.

Negation in general causes intervention. The same holds for other languages. In fact, all kinds of negative expressions such as *few*, *at most n*, and *fewer than n* are interveners (Beck 1996a; Honcoop 1998; Mayr 2014).

Focus operators like *only* and *even* are also interveners, as (87) and (88) show:

- (87) a. Which girl did *only Mary* introduce \_\_\_ to which boy?  
 b. ?\*Which boy did *only Mary* introduce which girl to \_\_\_?  
 (Pesetsky 2000, ex. 103)

- (88) German  
 a. \*Wen hat *sogar der Hans* \_\_\_ wann angerufen?  
     who has even the Hans when called  
 b. Wen hat wann *sogar der Hans* \_\_\_ angerufen?  
     who has when even the Hans called  
     'Who did even Hans call when?'  
 (Mayr 2014, ex. 11)

Universal quantifiers are also problematic interveners. A superiority obeying multiple *wh*-interrogative such as Q in (89) can be answered by both A and A'. Crucially, A corresponds to an interpretation of Q where the universal quantifier is scoped out of the interrogative (Groenendijk and Stokhof 1984; Engdahl 1986; Chierchia 1992b). On that interpretation it can be paraphrased as 'For every *x*, tell me which newspaper *x* wrote to about which book?'. With A', however, the universal quantifier is interpreted in its surface scope position, as is also apparent from the fact that it figures in the multiple-pair answer repeatedly. Now, the

superiority violating  $Q'$  can only be answered by A. That is, it only seems to have an interpretation where the universal quantifier is scoped out. The reason for this would be that on the other interpretation the universal would cause an intervention effect. This is also true for German (Beck 1996a).

- (89) Q: Which newspaper did *everyone* write to \_\_\_ about which book?  
 Q': Which book did *everyone* write to which newspaper about \_\_\_?  
 A: Bill wrote to the *New York Times* about book X, Mary wrote to the *Boston Globe* about book Y, and Tom wrote to the *Maquoketa Sentinel* about book Z.  
 A': Everyone wrote to the *New York Times* about book X, everyone wrote to the *Boston Globe* about book Y, and everyone wrote to the *Maquoketa Sentinel* about book Z.

(Pesetsky 2000, 62–63)

From this cursory look it seems that it is quantificational expressions that cause Beck effects. But this generalization has been called into question, as we will see once we turn to existing accounts.

Which dependencies with in-situ *wh*-expressions are affected negatively by interveners? The examples so far have shown that *wh*-expressions asking for individuals, places, and times are affected. In addition, expressions asking for degrees and manners are also affected as (90) and (91) show:

- (90) German  
 a. Wen hat wie *niemand* \_\_\_ getroffen?  
 who has how nobody seen  
 'Which  $x$  and which manner  $y$  are such that no one met  $x$  in  $y$ ?'  
 b. \*Wen hat *niemand* \_\_\_ wie getroffen?  
 who has nobody how seen
- (91) German  
 a. Wen hat wie oft *niemand* \_\_\_ getroffen?  
 who has how often nobody seen  
 'Which  $x$  and which degree  $d$  are such that no one met  $x$  to  $d$ ?'  
 b. \*Wen hat *niemand* \_\_\_ wie oft getroffen?  
 who has nobody how often seen

This differentiates Beck effects strongly from weak islands. They are unselective with regards to the kinds of *wh*-dependencies that are affected. This suggests that the explanation of the former does not lie in the differing natures of the bound variables as we have seen for the latter.

Finally, so-called *wh*-scope marking interrogative are also affected. As the acceptable (92a) shows, *was* marks the scope of *wer* which is itself in situ. Intervening negation blocks this dependency.

(92) German

- a. Was glaubt Hans, wer da war?  
 what believes Hans who there was  
 'Who does Hans believe was there?'
- b. \*Was glaubt Hans *nicht*, wer da war?  
 what believes Hans not who there was

(Beck 1996a, ex. 1a)

### 3.2 Existing accounts of Beck effects

#### 3.2.1 Intervention by focus

Beck (2006) argues that crosslinguistically it is focus operators that cause degradedness more reliably than simple quantifiers such as *no one*, *everyone*, and so on. In this she follows Kim (2002). She thus draws the conclusion that it is not the quantificational nature of the interveners seen so far that cause degradedness, but rather the fact that they associate with focus. In particular, Beck argues that *wh*-expressions contribute alternatives to the interpretation in a manner similar to focus (Rooth 1985; 1992). Now, if there is a focus operator intervening between the *wh*-expression and the question operator, the alternatives contributed by the *wh*-expression are evaluated by the focus operator. Therefore the question operator will not have access to the alternatives as it should in order to create a question denotation (see also Beck and Kim 2006; Cable 2010; Kotek 2014).

Consider the Korean case of intervention by *only* in (93b) and the acceptable (93a) without intervention. Assume the LFs in (94) using English words for simplicity. Note that the use of Korean avoids having to deal with multiple *wh*-interrogatives.

- (93) a. Suna-ka muôs-ûl sa-ss-ni?  
 Suna-Nom what-ACC buy-PAST-Q  
 'What did Suna buy?'

(Kim 2002, ex. 9a)

- b. \*Minsu-man nuku-lûl manna-ss-ni?  
 Minsu-only who-ACC meet-PAST-Q

(Kim 2002, ex. 11a)

- (94) a. [<sub>CP</sub> Q [<sub>IP</sub> Suna bought what]]  
 b. [<sub>CP</sub> Q [<sub>IP'</sub> only<sub>Alt</sub> [<sub>IP</sub> Minsu meet who]]]

I will implement Beck's ideas in a greatly simplified way in the following for reasons of space. Following Rooth (1985), any expression has both an ordinary and a focus value,  $\llbracket \cdot \rrbracket^o$  and  $\llbracket \cdot \rrbracket^f$  respectively. The former is what we are used to and is composed along the principles laid out in section 1.3.1. The latter, however, corresponds to a set of meanings. The focus value of a lexical item (without a focus on it) is just the singleton set containing its ordinary value. The focus value of a complex expression with daughters  $\alpha$  and  $\beta$  is composed by point-wise function application – that is, by applying each function in  $\alpha$  to each argument in  $\beta$ .<sup>22</sup>

As noted above, Beck assumes that *wh*-expressions do not have defined ordinary values, but contribute to the focus value as given in (95). The focus value in the cases at hand is a set of individuals. We can think of *wh*-expressions as being inherently focused, that is, F-marked.

- (95) a. (i)  $\llbracket \mathbf{who} \rrbracket^{o,w} = \text{undefined}$   
 (ii)  $\llbracket \mathbf{who} \rrbracket^{f,w} = \{x : x \in D_e \wedge x \text{ is human in } w\}$   
 b. (i)  $\llbracket \mathbf{what} \rrbracket^{o,w} = \text{undefined}$   
 (ii)  $\llbracket \mathbf{what} \rrbracket^{f,w} = \{x : x \in D_e \wedge x \text{ is nonhuman in } w\}$

Beck also assumes that there is a question operator at the top of the clause, which can be seen as the Q-marker in the Korean examples above. It takes the focus value of its sister constituent and makes it the ordinary value of the whole clause and says its own focus value is equivalent to that:

- (96) a.  $\llbracket \mathbf{QS} \rrbracket^o = \llbracket \mathbf{S} \rrbracket^f$   
 b.  $\llbracket \mathbf{QS} \rrbracket^f = \llbracket \mathbf{QS} \rrbracket^o$

Consider first the interpretation of (94a). Given that the *wh*-expression does not have a defined ordinary value, the IP constituent does not either, as in (97ai). The focus value is composed by point-wise function application. This gives (97aii). The question operator takes the latter value and makes it the ordinary value of the clause as in (97bi). Note that this value corresponds to the set of propositions characterized by the function that the interpretation procedure from section 1.3.1 would derive with syntactic scoping of the *wh*-expression. We thus arrive at an adequate meaning (see also Hamblin 1973). But the present system does so by interpreting the *wh*-expression in situ.

- (97) a. (i)  $\llbracket \mathbf{IP} \rrbracket^{o,w} = \text{undefined}$   
 (ii)  $\llbracket \mathbf{IP} \rrbracket^{f,w} = \{p : \exists x[x \in D_e \wedge x \text{ is nonhuman in } w \wedge p = \lambda w. \text{Suna bought } x \text{ in } w]\}$   
 b. (i)  $\llbracket \mathbf{CP} \rrbracket^{o,w} = \{p : \exists x[x \in D_e \wedge x \text{ is nonhuman in } w \wedge p = \lambda w. \text{Suna bought } x \text{ in } w]\}$   
 (ii)  $\llbracket \mathbf{CP} \rrbracket^{f,w} = \llbracket \mathbf{CP} \rrbracket^{o,w}$

As for *only*, assume the interpretation in (98). For its ordinary value it takes a set of alternatives and states that all propositions that are not entailed by the ordinary value of its sister constituent are false. That is the exclusive component of *only*. Moreover this ordinary value is only defined if that of the sister constituent is true. This is the familiar presupposition of *only* saying that the prejacent is true (Horn 1969; Rooth 1992; Coppock and Beaver 2014). It is also presupposed that the set of alternatives be a subset of the focus value of the sister constituent (Rooth 1992). The focus value corresponds to the singleton containing the ordinary value.

- (98) a.  $\llbracket \mathbf{only}_{Alt} \mathbf{S} \rrbracket^{o,w} = 1 \text{ iff } \forall p \in Alt[\llbracket \mathbf{S} \rrbracket^{o,w} \neq p \rightarrow p(w) = 0]$   
 defined only if  $\llbracket \mathbf{S} \rrbracket^{o,w} = 1 \wedge Alt \subseteq \llbracket \mathbf{S} \rrbracket^f$   
 b.  $\llbracket \mathbf{only}_{Alt} \mathbf{S} \rrbracket^{f,w} = \{ \llbracket \mathbf{only}_{Alt} \mathbf{S} \rrbracket^{o,w} \}$

Consider now LF (94b). As before, the ordinary value of IP is undefined because of the undefined ordinary value of the *wh*-expression. Its focus value is again a set of propositions as in (99a<sub>ii</sub>). Assuming with Heim and Kratzer (1998) that a constituent only has a defined value if its constituting constituents do, it follows that the ordinary value of IP' is undefined, as stated in (99b<sub>i</sub>). This is so because the IP value is undefined. Since the focus value of IP' depends on its ordinary value, given (98b), it is undefined as well, as given in (99b<sub>ii</sub>). As a consequence, the ordinary value of the whole clause is also undefined. Recall that the question operator takes the focus value of its sister, that is IP', and makes it the ordinary value. But the latter is undefined.

- (99) a. (i)  $\llbracket \text{IP} \rrbracket^{o,w} = \text{undefined}$   
 (ii)  $\llbracket \text{IP} \rrbracket^{f,w} = \{p : \exists x[x \in D_e \wedge x \text{ is human in } w \wedge p = \lambda w. \text{Minsu met } x \text{ in } w]\}$   
 b. (i)  $\llbracket \text{IP}' \rrbracket^{o,w} = \text{undefined}$   
 (ii)  $\llbracket \text{IP}' \rrbracket^{f,w} = \{ \llbracket \text{IP}' \rrbracket^{o,w} \}$   
       = undefined  
 c. (i)  $\llbracket \text{CP} \rrbracket^{o,w} = \llbracket \text{IP}' \rrbracket^{f,w}$   
       = undefined  
 (ii)  $\llbracket \text{CP} \rrbracket^{f,w} = \llbracket \text{CP} \rrbracket^{o,w}$   
       = undefined

Assuming that a question speech act requires that the interrogative used has a defined ordinary value, it follows that only (93a) can be used to perform one. An interrogative that cannot be used for a question speech act, such as (93b), will therefore be unacceptable. If the *wh*-expression in (93b) were to be fronted before the intervener, a defined question denotation could be derived. This is so because the undefinedness of the ordinary value of the *wh*-expression would now be contributed after the application of *only*. Therefore the focus value would remain intact. This account can be straightforwardly extended to multiple *wh*-interrogatives.

### 3.2.2 Intervention by quantification

So how then would *no one* cause intervention? It is well known that the truth conditions of sentences containing quantifiers can be altered by focus (Rooth 1992). However, it is also known that quantifiers need not associate with focus (see Beaver and Clark 2003; 2008; among others). Now, Beck actually assumes that it is a silent operator  $\sim$  that evaluates focus (Rooth 1992), contrary to the simplifying exposition above. Operators like *only* must make use of  $\sim$  – that is, they obligatorily associate with focus – whereas quantifiers like *no one* merely can do so – that is, they optionally associate with focus. Crucially, however, in German and English  $\sim$  is always present and thereby causes intervention along the lines discussed above. In languages like Korean  $\sim$  need not always be present with quantifiers such as *most* (Kim 2002). Therefore they do not reliably cause intervention. At this point it becomes crucial to understand why  $\sim$  seems to be crosslinguistically necessarily present with *only*.<sup>23</sup>

Such considerations highlight a problematic feature of Beck's account. While it is technically elegant, its predictive power as to what counts as a problematic intervener and what does not is limited. At the end of the day, this property must be lexically stipulated. It has been noted in the literature, however, that potentially a different empirical generalization can be drawn, whereby problematic interveners share a feature other than association with focus with each other (Honcoop 1998; Haida 2007; Mayr 2014).

### 3.2.2.1 Mayr (2014)

It is argued that at least in German the class of problematic interveners is fully predictable. Mayr suggests that only those expressions that do not commute scopally with existential quantifiers cause a Beck effect. An expression  $\alpha$  commutes scopally with an existential quantifier if and only if  $\exists x.\alpha.\phi = \alpha.\exists x.\phi$ , that is, if the mutual scope of  $\alpha$  and the existential quantifier does not matter for the truth conditions.

Mayr argues that this is the reason why upward monotonic expressions never cause intervention unlike downward monotonic ones.<sup>24</sup> The following pairs illustrate:

#### (100) German

- a. Wen haben *mehr als drei Studenten* \_\_\_ wann eingeladen?  
 who have more than three students when invited  
 'Who did more than three students invite when?'
- b. \*Wen haben *weniger als drei Studenten* \_\_\_ wann eingeladen?  
 who have fewer than three students when invited

(Mayr 2014, ex. 21)

#### (101) German

- a. Wen haben *einige Regisseure* \_\_\_ in welchem Film gesehen?  
 who have a few directors in which film seen  
 'Who did a few directors see in which film?'
- b. \*Wen haben *wenige Regisseure* \_\_\_ in welchem Film gesehen?  
 who have few directors in which film seen

(Mayr 2014, ex. 22)

It is also easy to see why this should be so. Simplifying considerably, assume that upward monotonic indefinites denote existential quantifiers themselves and downward monotonic ones negative quantifiers. Then it is plain to see why by the monotonicity view discussed here the former are not expected to cause intervention but the latter are:  $\exists x.\exists y.\phi = \exists y.\exists x.\phi$ , but  $\neg\exists x.\exists y.\phi = \exists y.\neg\exists x.\phi$ . Now, Mayr shows that all of the problematic interveners seen so far do not scopally commute with existential quantifiers. That is, the focus operators *only* and *even* are also predicted to cause intervention.

As discussed by Haida and Repp (2013) additive focus operators like *also* would be crucial to distinguish between Beck's proposal and Mayr's. The reason is that they contribute a simple existential presupposition and thus would be classified as

scopally commutative. Their experimental data actually go in this direction. That is, the German version of *also*, unlike the other focus operators, does not seem to cause intervention effects, which would not be predicted by Beck.

But why would scopal commutativity even be relevant? I again give a very simplistic implementation in the following. Following Beck, Mayr assumes that *wh*-expressions are interpreted in their surface scope position and contribute alternatives. Contrary to Beck's approach, however, *wh*-expressions contribute existential quantification as their ordinary meaning here, that is, they have a defined ordinary value:

- (102) a.  $\llbracket \text{what} \rrbracket^{o,w} = \lambda f_{et}. \exists x[x \text{ is nonhuman in } w \wedge f(x) = 1]$   
 b.  $\llbracket \text{what} \rrbracket^{f,w} = \{x : x \in D_e \wedge x \text{ is nonhuman in } w\}$

Consider now the Korean examples in (103) repeated from above with intervention by a NPI. Assume the LFs in (103), where for simplicity the NPI is represented as a negative quantifier.

- (103) a. \**amuto* muôs-ûl sa-chi anh-ass-ni?  
 anyone what-ACC buy-CHI not do-PAST-Q  
 b. muôs-ûl *amuto* — sa-chi anh-ass-ni?  
 what-ACC anyone — buy-CHI not do-PAST-Q  
 'What did no one buy?'

(Kim 2002, ex. 10)

- (104) a.  $[_{CP} Q [_{IP_a} \text{no one bought what}]]$   
 b.  $[_{CP} Q [_{IP_b} \text{what } 1[ \text{no one bought } t_1 ]]]$

By the composition principles from section 3.2.1 we arrive at equivalent denotations for (104a) and (104b) as in (105). Note, however, that the ordinary values for the IP-constituents in (104) differ as (105b) and (105c) show.

- (105) a.  $\llbracket (104a)/(104b) \rrbracket^{o,w,g} = \{p : \exists x[x \in D_e \wedge x \text{ is nonhuman in } w \wedge p = \lambda w. \neg \exists y[y \text{ is human in } w \wedge y \text{ bought } x \text{ in } w]]\}$   
 b.  $\llbracket IP_a \rrbracket^{o,w,g} = 1 \text{ iff } \neg \exists y[y \text{ is human in } w \wedge \exists x[x \text{ is nonhuman in } w \wedge y \text{ bought } x \text{ in } w]]$   
 c.  $\llbracket IP_b \rrbracket^{o,w,g} = 1 \text{ iff } \exists x[x \text{ is nonhuman in } w \wedge \neg \exists y[y \text{ is nonhuman in } w \wedge y \text{ bought } x \text{ in } w]]$

Mayr now claims that the difference between (105b) and (105c) is at the heart of Beck effects. A *wh*-interrogative has an existential presupposition. This presupposition can in principle be derived in two ways: either by disjoining the question denotation in (105a), as suggested by (Abusch 2010), or by simply taking the ordinary value of the IP-constituent – that is, by considering the meaning of the clause before the meaning of the question operator is factored in. Mayr suggests that both ways are actually necessary in that the two ways of deriving the presupposition need to match. As can be easily verified, the disjunction of the propositions in (105a) matches (105c) making (103a) acceptable, but not (105b) making (103a)

unacceptable. Essentially, a speaker of the latter would make two different presuppositions. This is to be avoided.

### 3.2.2.2 Honcoop (1998), Haida (2007)

The authors draw attention to the fact that intervention in anaphoric dependencies empirically looks somewhat similar to Beck effects. In particular, it is well known that indefinites can be anaphorically related to pronouns they do not c-command – so-called donkey anaphora – as shown in (106a) and indicated by co-indexing. Crucially, replacing the higher indefinite with a universal or negative quantifier as in (106b) and (106c) leads to unacceptability (see Heim 1982, among others). The quantifiers make the indefinite inaccessible for entering into an anaphoric relation with the non-c-commanded pronoun. See “Donkey Anaphora” and “Pronouns: Binding and Anaphora” for more details.

sem017  
sem016

- (106) a. If a farmer<sub>j</sub> owns a donkey<sub>i</sub>, he<sub>j</sub> beats it<sub>i</sub>.  
 b. \*If every farmer owns a donkey<sub>i</sub>, he beats it<sub>i</sub>.  
 c. \*If no farmer owns a donkey<sub>i</sub>, he beats it<sub>i</sub>.

Honcoop and Haida now suggest that the problematic interveners causing Beck effects should be seen as establishing inaccessible domains for anaphora similar to what is happening in (106).<sup>25</sup> This makes sense under the assumption that the *wh*-in-situ expression in (107), repeated from above, must undergo an anaphoric relationship with an operator at the top of the clause. That is, assume an LF like (108) and assume that the question operator must bind the variable introduced by the index 2 on *which book*.

- (107) ?\*Which student did *no one* give which book to \_\_\_?

(Pesetsky 2000, ex. 100)

- (108) [? [which student<sub>1</sub> [no one gave which book<sub>2</sub> to t<sub>1</sub>]]]

If the quantifier binds the variable contributed by *which book* unselectively, however, the question operator cannot bind it anymore. Thus no question denotation obtains, or at least not the intended one. Note that for this to work, the quantifier must not bind the variable corresponding to the trace of the fronted *wh*-expression. Otherwise, simple *wh*-interrogatives with negative quantifiers would be equally unacceptable. That is, binding by *no one* must be somewhat selective.

What was just described essentially replicates the Discourse Representation Theory (DRT) approach to donkey anaphora as laid out in chapter 2 of Heim (1982), making use of unselective binding.<sup>26</sup> Note that this brings out a similarity to Beck’s (2006) account. She essentially applies the DRT strategy making use of unselective binding to the focus domain rather than the ordinary denotation.

Of course, this approach can be supplemented by a dynamic interpretation procedure as in Heim’s chapter 3 and as done by Honcoop (1998) and Haida (2007). The nature of Beck effects makes it, however, difficult to see how a purely dynamic approach as advanced by Groenendijk and Stokhof (1990; 1991) and Chierchia

(1992a) for (106) could be applied to (107). Such an approach is designed to bring expressions that are outside of the *c*-command domain of an indefinite into its semantic scope nevertheless, so that binding becomes possible whenever there is no intervening quantifier. A quantifier like *no one* in particular has the effect that an indefinite *c*-commanded by it can at the most bring the nuclear scope of the quantifier into its own scope, that is, the latter's scope is restricted. The situation in (108), however, is quite different. The question operator *c*-commands the *wh*-in-situ expression and can bind it by the usual non-dynamic mechanism. Consequently, the scope-restricting property of *no one* simply does not matter.

The class of problematic interveners predicted by Honcoop and Haida is close to what we have seen in the discussion of Mayr (2014). It should, however, be noted that focus operators like *only* do not seem to cause intervention in donkey anaphora, as in (109), unlike what we have seen for Beck effects. This is somewhat unexpected on Honcoop's and Haida's accounts.

(109) If *only John* has a donkey<sub>*i*</sub>, he beats it<sub>*i*</sub>.

### 3.2.3 Intervention by anti-topics

Recall finally Tomioka's (2007) Japanese data in (110) from above.

- (110) a. *?\*Daremo nani-o yom-ana-katta-no*  
 anyone what-ACC read-NEG-PAST-Q  
 b. *Nani-o daremo \_\_\_ yom-ana-katta-no*  
 what-ACC anyone read-NEG-PAST-Q  
 'What did no one read?'

(Tomioka 2007, ex. 1a)

He notes that in a *wh*-interrogative without problematic intervener, the expression that occurs in the position where the problematic intervener occurs in (110a) is typically marked as a topic, as in (111). The same is shown to be true for Korean.

- (111) Japanese  
*John-wa / ?-ga nani-o yon-da-no?*  
 J-top / -NOM what-ACC read-PAST-Q  
 'What did John read?'

(Tomioka 2007, ex. 11a)

Now, Tomioka notices that the class of problematic interveners such as *daremo* in (110a) cannot be marked with *wa*. That is, they cannot function as topics. They are anti-topics. Tomioka consequently draws on the observation that the material in a *wh*-interrogative that is not *wh*-marked must be old information (Prince 1981; Schwarzschild 1999). In particular, *daremo* in (110a) should be old information. However, it cannot be so because it is an anti-topic. On Tomioka's account Beck effects are thus the consequence of two incompatible pragmatic constraints; one a constraint on non-*wh*-marked expressions occurring in a *wh*-interrogative and one a constraint on certain lexical expressions such as *daremo*. For (110b) it is

shown that the fronting of the *wh*-expression leads to deaccenting of the remaining material including *daremo*. Via this deaccenting, material that can otherwise not become a topic does so, whereby (110b) becomes acceptable.

While an intriguing idea, it is less clear whether the approach carries over to other languages. In particular, Mayr (2014) argues that the correlation noted by Tomioka for Japanese and Korean does not hold up for German (but see Grohmann 2006 for a different view). See also “Information Structure” and “Topics” for discussion.

sem050  
sem125

## 4 Conclusion

In this chapter we discussed two ways in which *wh*-dependencies are blocked by intervening material: weak islands and Beck effects. In both cases we have reasons to believe that the resulting intervention effect is semantic in nature. The main reasons for this are that weak islands, on the one hand, can be alleviated in various ways and that Beck effects, on the other hand, seem to be about a dependency that is closer to anaphora than syntactic movement. Syntactic accounts are hard pressed to account for such behavior, as we have seen. We also saw that the two kinds of intervention effects must be held apart, mainly for these two very same reasons. We discussed a number of semantic accounts attempting to deal with weak islands and Beck effects. What they have in common is that they restrict the pre-theoretically plausible meanings grammar can generate. That is, they either restrict the kinds of denotations a *wh*-interrogative can have or they directly limit the kinds of speech acts one can make by various assumptions.

Throughout I have tried to make clear that there are still numerous open issues in both empirical domains. One such question is what the crosslinguistic picture regarding intervention effects looks like. I have pointed to differences between languages, but much work remains to be done in this area. Moreover, it is not clear that semantics and pragmatics are the only factors contributing to intervention effects. It is conceivable that factors such as intonation and general processing restrictions (see, e.g., Kluender 1998 and later) play a role as well. Finally, the field would also benefit from more controlled experimental work. In particular, the question of what kind(s) of deviance intervention effects correspond to could be addressed in this way.

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**SEE ALSO:** Donkey Anaphora; Negative Polarity; Matrix and Embedded Presuppositions: Projection, Accommodation, Cancellation, and Ambiguities; Projective Meanings; Pronouns: Binding and Anaphora; Quantifiers, Scope, and Pseudo-Scope; Questions and Interrogatives: Exhaustivity vs. Quantificational Variability

## Notes

1. The paraphrase makes it plain that the preposition is pied-piped by the *wh*-expression (see Ross 1967, among others). That is, the preposition is strictly speaking not part of the dependency established. Rather it is carried along – i.e., pied-piped – for independent syntactic reasons. For recent discussion see Cable (2010).
2.  $\alpha$  *c*-commands  $\beta$  iff  $\alpha \neq \beta$  and the first node that irreflexively dominates  $\alpha$  also irreflexively dominates  $\beta$  (Reinhart 1976).

3. At this point the question arises whether the syntactic notion of c-command is the one relevant for the definition of intervention or whether it is the semantic notion of scope that is crucial. These two notions often coincide and it is thus not always easy to discriminate (e.g., Barker 2012). The phenomena to be dealt with are generally taken to be sensitive to c-command and thus derivatively to scope.
4. This is an oversimplification. While the restrictions placed on dependencies by complex noun phrases indeed seem to be considered to be syntactic in nature by most researchers, there are strong island constraints whose formulations have been, at least, partly framed in semantic terms. The coordinate structure constraint is one such example (Ruys 1992; Fox 2000).
5. A reviewer reminds me that even with strong islands a certain kind of selectivity is sometimes found. Would it follow that even strong islands should be considered instances of intervention? Why not? Ultimately, however and foreshadowing the discussion to follow somewhat, the question is whether one can devise coherent semantic/pragmatic theories of strong islands. Only then could one, potentially, group them with weak islands, as we will see. See also note 4.
6. This paraphrase suggests a single pair reading, which is only one possible interpretation. See section 3.3.1 for discussion.
7. Note that the discussion of Beck effects is deliberately framed in such a way as to not require that in situ *wh*-expressions undergo covert fronting (Huang 1982; Dayal 1996). They might, but there are other proposals to be found in the literature as to how operator–variable relations can be established for in situ *wh*-phrases (see, e.g., Pesetsky 1987; Winter 1997; Reinhart 1998). The definition of intervention effect in (4) also applies if the latter option turned out to be correct. Here  $\alpha$  would be some abstract operator that undergoes a dependency with the in situ *wh*-expression. See section 3.2.
8. A few words on the formal conventions adopted here. For the abbreviation of types I use  $e$  for individuals,  $t$  for truth values,  $s$  for worlds,  $d$  for degrees, and  $m$  for manners. Propositions are assumed to be of type  $\langle s, t \rangle$ , i.e., they denote functions from worlds to truth values. I leave out the angled brackets from types when there is no threat of confusion. I adopt Heim and Kratzer's 1998 convention for presuppositions by notating them as definedness conditions.  $[\lambda p_{st}. \lambda x_e : p(w) = 1. x \text{ regrets } p \text{ in } w]$  is a function that is only defined for propositions  $p$  that are true in  $w$ . I will say that it presupposes that  $p$  is true in  $w$ . Moreover, I assume that world variables are introduced by a world parameter on the interpretation function  $\llbracket \cdot \rrbracket^w$ . Finally, an assignment  $g$  is a function from the set of natural numbers to entities, for now to individuals. That is, the denotation of a pronoun or trace with index  $i$ ,  $g(i)$ , is an individual. Therefore, the interpretation function is ultimately relativized to both worlds and assignments,  $\llbracket \cdot \rrbracket^{w,g}$ . I leave off  $g$  from the interpretation function whenever there is no expression which is dependent on it for interpretation.
9. This semantics for interrogatives is particularly useful for present purposes because many of the theories discussed below are framed in terms of it. Also it is more expressive than, say, a question semantics such as the one advocated by Groenendijk and Stokhof (1982; 1984). In the latter approach, an interrogative denotes its strong exhaustive answer. As Heim (1994) and Beck and Rullmann (1999) show, this is expressible in a Karttunen semantics as well. One would apply an answer operator to the question denotation discussed in the text to get at this type of answer. Moreover, a Karttunen semantics is closely related to an alternative semantics for interrogatives such as Hamblin's (1973) one or the one argued for by inquisitive semantics (Ciardelli,

Groenendijk, and Roelofsen 2013). The hope is therefore that by using a Karttunen semantics for the discussion of intervention effects, one is on the safe side. For further discussion see “Questions and Interrogatives: Exhaustivity vs. Quantificational Variability”.

sem044

10. The precise semantics for attitude predicates would be spelled out by universal quantification over worlds. This could be done by assuming that  $x$  regrets  $p$  roughly means either that in all of the worlds bouletically accessible to  $x$   $p$  is false (Hintikka 1969) or that in all the worlds  $w$  doxastically accessible to  $x$  the most similar worlds to  $w$  where  $p$  is true are better than the ones most similar to  $w$  where  $p$  is false (Heim 1992; Villalta 2008). See “Attitude Verbs”.

sem008

11. I will not discuss extraposition islands here. As noted by Honcoop (1998), the class of predicates where extraposition leads to an intervention effect are the factive ones. That is, extraposition islands can be seen to be a special case of factive islands (see also Abrusán 2014).
12. Islands caused by *wh*-interrogatives seem to be subject to crosslinguistic variation. That is, there are languages where it has been claimed that they should be seen as instances of weak islands too (Szabolcsi and Zwarts 1992). Why there is variation is an interesting topic for future research.
13. To be sure, (32b) is unacceptable under the reading where it is implied that this letter is from a unique person, a reading that is perfectly accessible in the unnegated version in (32a). There might be a reading under which (32b) is acceptable as well, namely one where *this letter* is understood as referring to a type of letter rather than a particular token (Szabolcsi and Zwarts 1992). There can of course be multiple instances of a type.
14. Syntactic accounts often rely on a distinction between referentiality and non-referentiality (Pesetsky 1987; Cinque 1990; Rizzi 1990). Note, however, that this would entail that *wh*-phrases like *which NP* are referential in a way that those such as *how* – without specific context – are not; only referential *wh*-phrases are hypothesized to be able to undergo a dependency across a weak island intervener. Unfortunately, it is not clear at all what syntactic “referentiality” of *wh*-phrases could mean on the semantic side (Cresti 1995; Rullmann 1995).
15. This also means that the assignment function must be able to map indices to manners, and degrees as we will see below. Moreover, the predicate abstraction rule must also be able to generate functions from all those denotation types to denotations. We can generalize the rule as in (i). This rule essentially assumes that indices come with information as to what their denotation type must be, a kind of definedness condition. It might be best to make the predicate abstraction rule completely unconstrained and have the definedness condition be contributed by a presupposition on the trace position that projects in the standard way. I indicate the intended type for the variable as a subscript on the traces in the LFs.
- (i) *Predicate abstraction (generalized)*  
 If  $\alpha$  is a node with immediate daughters  $\beta$  and  $\gamma$ , where  $\beta$  is a numerical index  $i_\chi$  where  $\chi \in \{e, d, m\}$  then for any assignment  $g$ ,  $\llbracket \alpha \rrbracket^{w,g} = \lambda x_\chi. \llbracket \gamma \rrbracket^{w,g[i \rightarrow x]}$  (where  $g[i \rightarrow x]$  is like  $g$  except that it maps  $i$  to  $x$  if  $g$  does not do so already).
16. Note that something must be said about how manners are compositionally factored in. We could assume that they are functions from eventualities to functions from individuals to truth values, which would make it necessary to introduce eventualities into the picture, of course. I do not wish to speculate on this either. Similar questions arise below. See “Manner Adverbs”.

sem097



17. The situation for (51) is parallel to the one just seen for modal obviation effects. Assume that exactly three eggs are sufficient for baking the cake. This entails that 3.01 eggs are sufficient, but also that 3.001 eggs are sufficient and so on. Thus the unique true proposition entailing all other true propositions in the question denotation is *that 3 eggs are sufficient to bake the cake*.
18. Szabolcsi and Zwarts (1992) also intend their account discussed in section 2.3.1 to deal with factive islands. They suggest that what we normally take to be a factive presupposition is a conjunct in the assertive component. Again, it is not quite clear how to implement this for the case of factive islands. Their comments in the paper suggest that they take the conjunction to take place at the level where I implemented the maximality operator. As a consequence, there would have to be two maximality operators involved. I do not see how to do this other than with rather ad hoc syntactic assumptions.
19. Note that explicit domain restriction by partitives has been claimed to block the possibility of presupposition accommodation (Beaver 2001), thereby revealing the nature of the quantificational force derived from the projection algorithm. See the “Matrix and Embedded Presuppositions: Projection, Accommodation, Cancellation, and Ambiguities”.
20. The predicted presupposition is actually a weaker one, namely that for every individual the addressee believes that they got the latter from that individual (Heim 1992). This would only attribute a contradictory belief to the addressee and could in principle be the case. Presumably we do not make such presuppositions in the general case. Moreover, it is also known that such weak presuppositions somehow get strengthened to stronger ones, as assumed in the text.
21. There are also languages with the option to leave *wh*-phrases in situ for which Beck effects are reported to be absent, such as Amharic (Eilam 2009) and Egyptian Arabic (Branan 2016).
22. Somewhat more precisely, the relevant interpretation rules can be given as in (i) and (ii).  $F$  is an F-mark, i.e., indicates focus. Note also that for reasons of simplicity and unlike what (i) and (ii) imply, the composition in the text proceeds syncategorematically. That is, the question operator and *only* are given meaning only in context (see Rooth 1985 for discussion).
- (i) *Focus values for lexical expressions*  
 If  $\alpha$  is a lexical expression and  $\llbracket \alpha \rrbracket^{a,w,g} \in D_\tau$ ,
- $\llbracket \alpha \rrbracket^{f,w,g} = \{ \llbracket \alpha \rrbracket^{a,w,g} \}$ ,
  - $\llbracket \alpha_F \rrbracket^{f,w,g} = \{ x : x \in D_\tau \}$ .
- (ii) *Focus values for complex constituents*  
 If  $\alpha$  is a node with immediate daughters  $\beta$  and  $\gamma$ , then for any assignment  $g$   $\alpha$  is in the domain of  $\llbracket \rrbracket^{f,w,g}$  if  $\beta$  and  $\gamma$  are in the domain of  $\llbracket \rrbracket^{f,w,g}$ . If so  $\llbracket \alpha \rrbracket^{f,w,g} = \{ x : \exists y \in \llbracket \beta \rrbracket^{f,w,g}. \exists h \in \llbracket \gamma \rrbracket^{f,w,g}. x = h(y) \}$ .
23. See, however, Kitagawa, Tamaoka, and Tomioka (2013) for experimental data suggesting that focus operator *only* is, not an intervener in Japanese, whereas NPI *any* is, thereby challenging Beck’s approach.
24. Upward and downward monotonicity are defined as follows:
- $f \in D_{(\sigma,\tau)}$  is upward monotonic iff for all  $a, b \in D_\sigma$ , where  $a \Rightarrow b, f(a) \Rightarrow f(b)$ .
  - $f \in D_{(\sigma,\tau)}$  is downward monotonic iff for all  $a, b \in D_\sigma$ , where  $a \Rightarrow b, f(b) \Rightarrow f(a)$ .
25. Honcoop (1998) actually intends his account for weak islands. As we have seen above, it is, however, unlikely that weak islands are directly related to Beck effects given their differences. Moreover, his account makes better predictions for Beck effects than weak islands.

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26. In fact, Honcoop and Haida indirectly argue for such an approach to cases like (106). If (106) were to be accounted for by, say, the E-type strategy making use of a situation semantics (Heim 1990; Elbourne 2005), it would be quite hard to see how the parallel with Beck effects could be held up.

## References

- Abrusán, Márta. 2011. "Presuppositional and Negative Islands: A Semantic Account." *Natural Language Semantics*, 19: 257–321.
- Abrusán, Márta. 2014. *Weak Island Semantics*. Oxford: Oxford University Press.
- Abrusán, Márta, and Benjamin Spector. 2011. "A Semantics for Degree Questions Based on Intervals: Negative Islands and Their Obviation." *Journal of Semantics*, 28: 107–147.
- Abusch, Dorit. 2010. "Presupposition Triggering from Alternatives." *Journal of Semantics*, 27: 37–80.
- Asher, Nicholas. 1987. "A Typology for Attitude Verbs and Their Anaphoric Properties." *Linguistics and Philosophy*, 10: 125–197.
- Barker, Chris. 2012. "Quantificational Binding Does Not Require C-Command." *Linguistic Inquiry*, 43: 614–633.
- Beaver, David. 2001. *Presupposition and Assertion in Dynamic Semantics*. Stanford, CA: CSLI.
- Beaver, David, and Brady Clark. 2003. "Always and Only: Why Not All Focus-Sensitive Operators are Alike." *Natural Language Semantics*, 11: 323–362.
- Beaver, David, and Brady Clark. 2008. *Sense and Sensitivity: How Focus Determines Meaning*. Oxford: Wiley-Blackwell.
- Beck, Sigrid. 1996a. "Quantified Structures as Barriers for LF Movement." *Natural Language Semantics*, 4: 1–56.
- Beck, Sigrid. 1996b. "Wh-Constructions and Transparent Logical Form." PhD diss., University of Tübingen.
- Beck, Sigrid. 2006. "Intervention Effects Follow from Focus Interpretation." *Natural Language Semantics*, 14: 1–56.
- Beck, Sigrid, and Shin-Sook Kim. 1997. "On Wh- and Operator Scope in Korean." *Journal of East Asian Linguistics*, 6: 339–384.
- Beck, Sigrid, and Shin-Sook Kim. 2006. "Intervention Effects in Alternative Questions." *Journal of Comparative Germanic Linguistics*, 9: 165–208.
- Beck, Sigrid, and Hotze Rullmann. 1999. "A Flexible Approach to Exhaustivity in Questions." *Natural Language Semantics*, 7: 249–298.
- Branan, Kenyon. 2016. "Prosodic Intervention." MS, MIT.
- Cable, Seth. 2010. *The Grammar of Q: Q-Particles, Wh-Movement and Pied-Piping*. Oxford: Oxford University Press.
- Chierchia, Gennaro. 1992a. "Anaphora and Dynamic Binding." *Linguistics and Philosophy*, 15: 111–183.
- Chierchia, Gennaro. 1992b. "Questions with Quantifiers." *Natural Language Semantics*, 1: 181–234.
- Chierchia, Gennaro. 2004. "Scalar Implicatures, Polarity Phenomena, and the Syntax/Pragmatics Interface." In *Structures and Beyond: The Cartography of Syntactic Structures*, edited by Adriana Belletti, 39–103. Oxford: Oxford University Press.
- Chierchia, Gennaro. 2013. *Logic in Grammar: Polarity, Free Choice, and Intervention*. Oxford: Oxford University Press.
- Chomsky, Noam. 1957. *Syntactic Structures*. The Hague: Mouton.
- Ciardelli, Ivano, Jeroen Groenendijk, and Floris Roelofs. 2013. "Inquisitive Semantics: A New Notion of Meaning." *Language and Linguistics Compass*, 7: 459–476.

- Cinque, Guglielmo. 1990. *Types of A'-dependencies*. Cambridge, MA: MIT Press.
- Coppock, Elizabeth, and David Beaver. 2014. "Principles of the Exclusive Muddle." *Journal of Semantics*, 31: 371–432.
- Cresti, Diana. 1995. "Extraction and Reconstruction." *Natural Language Semantics*, 3: 79–122.
- Dayal, Veneeta. 1996. *Locality in Wh-Quantification: Questions and Relative Clauses in Hindi*. Dordrecht: Kluwer.
- Dayal, Veneeta. 2002. "Single-Pair Versus Multiple-Pair Answers: Wh-in-Situ and Scope." *Linguistic Inquiry*, 33: 512–520.
- Eilam, Avid. 2009. "The Absence of Intervention Effects in Amharic: Evidence for a Non-structural Approach." *Brill's Annual of Afroasiatic Languages and Linguistics*, 1: 204–254.
- Elbourne, Paul D. 2005. *Situations and Individuals*. Cambridge, MA: MIT Press.
- Engdahl, Elisabet. 1986. *Constituent Questions*. Dordrecht: Reidel.
- Fox, Danny. 2000. *Economy and Semantic Interpretation*. Cambridge, MA: MIT Press.
- Fox, Danny. 2002. "Antecedent-Contained Deletion and the Copy Theory of Movement." *Linguistic Inquiry*, 33: 63–96.
- Fox, Danny. 2007. "Too Many Alternatives: Density, Symmetry and Other Predicaments." In *Proceedings of SALT 17*, edited by Tova Friedman and Masayuki Gibson, 89–111.
- Fox, Danny. 2013. "Presupposition Projection from Quantificational Sentences: Trivalence, Local Accommodation, and Presupposition Strengthening." In *From Grammar to Meaning: The Spontaneous Logicality of Language*, edited by Ivano Caponigro and Carlo Cecchetto, 201–232. Cambridge: Cambridge University Press.
- Fox, Danny, and Martin Hackl. 2006. "The Universal Density of Measurement." *Linguistics and Philosophy*, 29: 537–586.
- Gajewski, Jon. 2002. "L-Analyticity in Natural Language." MS, MIT.
- Groenendijk, Jeroen, and Martin Stokhof. 1982. "Semantic Analysis of Wh-Complements." *Linguistics and Philosophy*, 5: 173–233.
- Groenendijk, Jeroen, and Martin Stokhof. 1984. "Studies on the Semantics of Questions and the Pragmatics of Answers." PhD diss., University of Amsterdam.
- Groenendijk, Jeroen, and Martin Stokhof. 1990. "Dynamic Montague Grammar." In *Papers from the Second Symposium on Logic and Language*, edited by L. Kalman and L. Polos, 3–48.
- Groenendijk, Jeroen, and Martin Stokhof. 1991. "Dynamic Predicate Logic." *Linguistics and Philosophy*, 14: 38–100.
- Grohmann, Kleanthes K. 2006. "Top Issues in Questions: Topics–Topicalization–Topicalizability." In *Wh-Movement: Moving On*, edited by Lisa Lai-Shen Cheng and Norbert Corver, 249–288. Cambridge, MA: MIT Press.
- Hagstrom, Paul. 1998. "Decomposing Questions." PhD diss., MIT.
- Haida, Andreas. 2007. "The Indefiniteness and Focusing of Wh-Words." PhD diss., Humboldt University Berlin.
- Haida, Andreas, and Sophie Repp. 2013. "The Intervention Effect: Focus Alternatives or Indefinite Alternatives? Experimental Evidence." In *Proceedings of the 19th Amsterdam Colloquium*, edited by Maria Aloni, Michael Franke, and Floris Roelofsen, 131–138.
- Hamblin, Charles. 1973. "Questions in Montague Grammar." *Foundations of Language*, 10: 41–53.
- Hegarty, Michael. 1992. "Adjunct Extraction Without Traces." In *The Proceedings of the WCCFL 10*, edited by Dawn Bates, 209–222.
- Heim, Irene. 1982. "The Semantics of Definite and Indefinite Noun Phrases." PhD diss. University of Massachusetts, Amherst.
- Heim, Irene. 1983. "On the Projection Problem for Presuppositions." In *Proceedings of WCCFL 2*, edited by Daniel P. Flickinger, 114–125.

- Heim, Irene. 1990. "E-Type Pronouns and Donkey Anaphora." *Linguistics and Philosophy*, 13: 137–178.
- Heim, Irene. 1992. "Presupposition Projection and the Semantics of Attitude Verbs." *Journal of Semantics*, 9: 183–221.
- Heim, Irene. 1994. "Interrogative Semantics and Karttunen's Semantics for *Know*." In *The Israeli Association of Theoretical Linguistics 1*, edited by Rhoanna Buchalle and Anita Mittwoch, 128–144.
- Heim, Irene. 2000. "Degree Operators and Scope." In *Proceedings of SALT 10*, edited by Brendan Jackson and Tanya Matthews, 40–64.
- Heim, Irene, and Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Oxford: Blackwell.
- Hintikka, Jaako. 1969. "Semantics for Propositional Attitudes." In *Philosophical Logic*, edited by J. W. Davis, D. J. Hockney, and W. K. Wilson, 21–45. Dordrecht: Reidel.
- Hoji, Hajime. 1985. "Logical Form Constraints and Configurational Structures in Japanese." PhD diss., University of Washington.
- Homer, Vincent. 2009. "Disruption of NPI Licensing: The Case of Presuppositions." In *Proceedings of SALT 18*, edited by Tova Friedman and Satoshi Ito, 429–446.
- Honcoop, Martin. 1998. "Dynamic Excursions on Weak Islands." PhD diss., University of Leiden.
- Horn, Laurence R. 1969. "A Presuppositional Analysis of *Only* and *Even*." In *Papers from the 5th Annual Meeting of the Chicago Linguistics Society*, edited by Robert I. Binnick, Alice Davison, Georgia M. Green, and Jerry L. Morgan, 98–107.
- Huang, C.-T. James. 1982. "Logical Relations in Chinese and the Theory of Grammar." PhD diss., MIT.
- Karttunen, Lauri. 1971. "Some Observations on Factivity." *Papers in Linguistics*, 4: 55–69.
- Karttunen, Lauri. 1977. "Syntax and Semantics of Questions." *Linguistics and Philosophy*, 1: 3–44.
- Kennedy, Christopher. 1997. "Projecting the Adjective: The Syntax and Semantics of Gradability and Comparison." PhD diss., University of California, Santa Cruz.
- Kim, Shin-Sook. 2002. "Intervention Effects are Focus Effects." In *Japanese/Korean Linguistics*, edited by Noriko Akatsuka and Susan Strauss, 10: 615–628. Stanford, CA: CSLI.
- Kiparsky, Paul, and Carol Kiparsky. 1971. "Fact." In *Semantics*, edited by Danny D. Steinberg and Leon A. Jacobovits, 345–369. Cambridge: Cambridge University Press.
- Kitagawa, Yoshihisa, Katsuo Tamaoka, and Satoshi Tomioka. 2013. "Prosodic Matters in Intervention Effects in Japanese: An Experimental Study." *Lingua*, 124: 41–63.
- Kluender, Robert. 1998. "On the Distinction Between Strong and Weak Islands: A Processing Perspective." *Syntax and Semantics*, 29: 241–279.
- Ko, Heejeong. 2005. "Syntax of *Why-in-Situ*: Merge into [Spec,CP] in the Overt Syntax." *Natural Language and Linguistic Theory*, 23: 867–916.
- Kotek, Hadas. 2014. "Composing Questions." PhD diss., Cambridge, MA: MIT.
- Kroch, Anthony. 1998. "Amount Quantification, Referentiality, and Long *Wh*-Movement." *University of Pennsylvania Working Papers in Linguistics*, 5: 22–36.
- Kuno, Susumu, and Ken-ichi Takami. 1997. "Remarks on Negative Islands." *Linguistic Inquiry*, 28: 553–576.
- Lahiri, Utpal. 2002. *Questions and Answers in Embedded Contexts*. Oxford: Oxford University Press.
- Linebarger, Marcia. 1981. "The Grammar of Negative Polarity." PhD diss., MIT.
- Linebarger, Marcia. 1987. "Negative Polarity and Grammatical Representation." *Linguistics and Philosophy*, 10: 325–387.

- Mayr, Clemens. 2013. "Implicatures of Modified Numerals." In *From Grammar to Meaning: The Spontaneous Logicality of Language*, edited by Ivano Caponigro and Carlo Cecchetto, 139–171. Cambridge: Cambridge University Press.
- Mayr, Clemens. 2014. "Intervention Effects and Additivity." *Journal of Semantics*, 31: 513–554.
- Mayr, Clemens. 2017. "Predicting Polar Question Embedding." In *Proceedings of Sinn und Bedeutung 21*, edited by Robert Truswell, Chris Cummins, Caroline Heycock, et al., 863–880.
- Mayr, Clemens, and Uli Sauerland. 2016. "Accommodation and the Strongest Meaning Hypothesis." In *Proceedings of the 20th Amsterdam Colloquium*, edited by Thomas Brochhagen, Floris Roelofsen, and Nadine Theiler, 276–285.
- Nouwen, Rick. 2008. "Upper-Bound No More: The Exhaustive Interpretation of Non-Strict Comparison." *Natural Language Semantics*, 16: 271–295.
- Oshima, David Y. 2007. "On Factive Islands: Pragmatic Anomaly vs. Pragmatic Infelicity." In *Proceedings of JSAI 2006: New Frontiers of Artificial Intelligence*, edited by Takashi Washio, Ken Satoh, Hideaki Takeda, and Akihiro Inokuchi, 147–161.
- Pesetsky, David. 1987. "Wh-in-Situ: Movement and Unselective Binding." In *The Representation of (In)definiteness*, edited by Eric J. Reuland and Alice G. B. ter Meulen, 98–129. Cambridge, MA: MIT Press.
- Pesetsky, David. 2000. *Phrasal Movement and Its Kin*. Cambridge, MA: MIT Press.
- Prince, Ellen F. 1981. "Toward a Taxonomy of Given/New Information." In *Radical Pragmatics*, edited by Peter Cole, 223–255. New York, NY: Academic Press.
- Reinhart, Tanya. 1976. "The Syntactic Domain of Anaphora." PhD diss., MIT.
- Reinhart, Tanya. 1998. "Wh-in-Situ in the Framework of the Minimalist Program." *Natural Language Semantics*, 6: 29–56.
- Rizzi, Luigi. 1990. *Relativized Minimality*. Cambridge, MA: MIT Press.
- Rooryck, Johan. 1992. "Negative and Factive Islands Revisited." *Journal of Linguistics*, 28: 343–373.
- Rooth, Mats. 1985. "Association with Focus." PhD diss., University of Massachusetts, Amherst.
- Rooth, Mats. 1992. "A Theory of Focus Interpretation." *Natural Language Semantics*, 1: 117–121.
- Ross, John R. 1967. "Constraints on Variables in Syntax." PhD diss., MIT.
- Ross, John R. 1984. "Inner Islands." In *Proceedings of BLS 10*, edited by Claudia Brugman and Monica Macaulay, 258–265.
- Rullmann, Hotze. 1995. "Maximality in the Semantics of Wh-Constructions." PhD diss. University of Massachusetts, Amherst.
- Ruys, Eduard G. 1992. "The Scope of Indefinites." PhD diss., Utrecht University.
- Sauerland, Uli. 2004. "The Interpretation of Traces." *Natural Language Semantics*, 12: 63–127.
- Schlenker, Philippe. 2009. "Local Contexts." *Semantics and Pragmatics*, 2: 1–78.
- Schwarz, Bernhard. 1995. "Rattling off Questions." MS, University of Massachusetts, Amherst.
- Schwarzschild, Roger. 1999. "Givenness, Avoid F and Other Constraints on the Placement of Accent." *Natural Language Semantics*, 7: 141–177.
- Schwarzschild, Roger, and Karina Wilkinson. 2002. "Quantifiers in Comparatives: A Semantics of Degree Based on Intervals." *Natural Language Semantics*, 10: 1–41.
- Simonenko, Alexandra. 2016. "Semantics of DP islands: The Case of Questions." *Journal of Semantics*, 33: 661–702.
- Spector, Benjamin, and Paul Egré. 2015. "A Uniform Semantics for Embedded Interrogatives: An Answer, not Necessarily the Answer." *Synthese*, 192: 1729–1784.

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- Stalnaker, Robert C. 1974. "Pragmatic Presuppositions." In *Semantics and Philosophy*, edited by Milton K. Munitz and Peter K. Unger, 197–213. New York, NY: New York University Press.
- Stalnaker, Robert C. 1978. "Assertion." *Syntax and Semantics*, 9, 315–332.
- Stechow, Arnim von. 1984. "Comparing Semantic Theories of Comparison." *Journal of Semantics*, 3: 1–77.
- Szabolcsi, Anna. 2006. "Strong vs. Weak Islands." In *The Blackwell Companion to Syntax*, edited by Martin Everaert and Henk van Riemsdijk, 4: 479–531. Oxford: Blackwell.
- Szabolcsi, Anna, and Frans Zwarts. 1992. "Weak Islands and an Algebraic Semantics for Scope Taking." *Natural Language Semantics*, 1: 235–284.
- Tomioka, Satoshi. 2007. "Pragmatics of LF Intervention Effects: Japanese and Korean *Wh*-Interrogatives." *Journal of Pragmatics*, 39: 1570–1590.
- Villalta, Elisabeth. 2008. "Mood and Gradability: An Investigation of the Subjunctive Mood in Spanish." *Linguistics and Philosophy*, 31: 467–522.
- Winter, Yoad. 1997. "Choice Functions and the Scopal Semantics of Indefinites." *Linguistics and Philosophy*, 20: 399–467.

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**Abstract:** This chapter provides an overview of both weak island phenomena and Beck effects. In both cases, reasons suggesting that accounts of such effects should at the least involve a semantic or pragmatic component are found. The chapter then gives a survey of currently existing proposals along that general vein. It does so by comparing them with each other and identifying some open issues.

**Keywords:** Beck effects; binding; degrees; focus; negation; presuppositions; quantifiers; weak islands; wh-questions