

# Factive islands and meaning-driven unacceptability\*

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## Abstract

It is often proposed that the unacceptability of a semantically interpretable sentence can be rooted in its meaning. Elaborating on Oshima (2007), we argue that the meaning-driven unacceptability of factive islands must make reference to felicity conditions, and cannot be reduced to the triviality of propositional content. We also observe, again elaborating on Oshima (2007), that the triviality of factive islands need not be logical, but can be relative to a listener's background assumptions. These findings call for a revision of a prevalent view about meaning-driven unacceptability (Gajewski 2002, Fox and Hackl 2006, Chierchia 2013, Abrusán 2014, Del Pinal 2017), according to which unacceptability results from triviality that is both propositional and logical.

**Keywords:** factive islands, questions, unacceptability, triviality and grammar, felicity conditions, presuppositions

## 1 Introduction

Under a widely adopted view, the unacceptability of a semantically interpretable sentence can be rooted in its meaning. The phenomena that have been referred to in motivating this view include, for example, the definiteness effect in existential *there*-sentences (Barwise and Cooper 1981), aspectual modification (Dowty 1979), exceptive

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\*For comments and discussion, we thank the members of the McGill Semantics Reading Group and those who stopped by our poster at NELS 46 at Concordia University. Special thanks to Brian Buccola, Dan Goodhue, and Aron Hirsch. The first author acknowledges support from the Social Sciences and Humanities Research Council of Canada (SSHRC), grants #435-2013-0103 and #435-2016-1448; and from Fonds de Recherche du Québec - Société et Culture (FRQSC), grant #2012-SE-144646. The second author acknowledges support from Labex EFL and the Research Foundation Flanders.

phrases (von Stechow 1993), polarity sensitivity (Krifka 1995, Lahiri 1998, Chierchia 2013), and comparative clauses (Gajewski 2009). The precise characterization of the *meaning-driven unacceptability* that these phenomena are taken to instantiate is a matter of current debate. But extant proposals seem to assume that meaning-driven unacceptability arises, under certain conditions, in virtue of a sentence having tautologous or contradictory truth conditions or in virtue of it carrying a contradictory presupposition (Gajewski 2002, Chierchia 2013, Abrusán 2014, Del Pinal 2017). In the following, we will refer to this proposal by saying that meaning-driven unacceptability is assumed to arise, under certain conditions, when a sentence carries *logically trivial propositional content*.

To illustrate, consider an instance of the familiar definiteness effect, viz. the fact that existential *there*-sentences do not permit a universal quantifier in post-verbal position. Barwise and Cooper (1981) derive the unacceptability of such cases from the assumption that they have tautologous truth conditions. On this view, sentence (1) is unacceptable in virtue of asserting nothing more than the tautologous proposition that every student in the domain is a member of the domain.

(1) \*There is every student.

It can be argued that sentences that carry logically trivial propositional content in the sense introduced above are guaranteed to violate certain felicity conditions. Stalnaker (1978) proposed the principle that a sentence must be true in some but not all possible worlds in the context set, the set of possible worlds that encodes the information entailed by the common ground, and also that a sentence must have a truth value in each world in the context set. Tautologies and contradictions necessarily violate the first of these conditions; and under the Frege/Strawson notion of semantic presupposition, where presupposition failure amounts to a lack of truth value, sentences that carry contradictory presuppositions necessarily violate the second.

Necessary infelicity can therefore serve as a natural underlying pragmatic rationale for the proposal that logically trivial propositional content leads to unacceptability. However, this rationale leads one to expect that meaning-driven unacceptability need not be tied to logically trivial propositional content. This is so because necessary infelicity might arise in a broader range of circumstances. We can illustrate this point by considering an alternative analysis of the definiteness effect, due to Zucchi (1995). (Note that here we appeal to the definiteness effect merely to illustrate analytical options, without taking a stand on its proper analysis.) Under Zucchi's analysis, the unacceptability of (1) springs from the conspiracy of a pair of felicity conditions. On the one hand, a felicity condition on the use of existential *there*-sentences is taken to require for (1) that the context set be compatible with the set of students being empty; on the other hand, felicitous use of *every student* is taken to require that the context set entail the set of students to be non-empty. Hence the two felicity conditions make conflicting demands. This conflict, which does not invoke contradictory propositional

content, ensures that (1) is necessary infelicitous, and it is this necessary infelicity that Zucchi holds responsible for the unacceptability of cases like (1).

In this paper, we will offer an argument that meaning-driven unacceptability cannot be reduced to the logical triviality of propositional content. We will argue that, as implied by Zucchi’s (1995) analysis of the definiteness effect, the triviality that causes unacceptability need not be propositional. We will motivate these claims as consequences of the proper analysis of *factive islands*. In factive islands, question-forming wh-extraction from the complement of a factive predicate yields unacceptability (Rooryck 1992, Szabolcsi and Zwarts 1997, Oshima 2007, Abrusán 2011, 2014, Del Pinal 2017). The effect is illustrated by the unacceptability of Oshima’s (2007) example (2), in a reading where *how* is understood as associating with the embedded clause.

(2) \*?How does Max know that Alice went to San Francisco?

We will argue for an analysis of factive islands originating in Oshima (2007), on which the content of such questions ensures, in the absence of trivial propositional content, that two felicity conditions make conflicting demands, much as in Zucchi’s (1995) analysis of the definiteness effect. We moreover argue that this conflict need not be a matter of logical contradiction, but can be dependent on a listener’s background assumptions. On this analysis, then, factive islands teach us that the triviality underlying meaning-driven unacceptability does not have to be either propositional or logical.

We will conclude that, while factive islands lend support to the view that it is a certain triviality of meaning that underlies meaning-driven unacceptability, they are incompatible with existing attempts of fleshing out the idea (Gajewski 2002, Chierchia 2013, Abrusán 2014, Del Pinal 2017). We therefore intend our contribution as an invitation to reexamine the arguments that have motivated these attempts, an invitation that we hope will be taken up in future work.

Section 2 provides a more detailed introduction to the phenomenon of factive islands. Focusing on *who*-questions, section 3 then introduces a preliminary version of the proposed account of factive islands, a rendition of Oshima’s (2007) analysis, which credits factive islandhood to necessary, non-propositional, infelicity due to conspiring felicity conditions. Section 4 presents independent motivation for this analysis, emerging from Simonenko’s (2016) treatment of a similar island effect. Section 5 critiques an alternative approach, due to Abrusán (2011, 2014) and adopted in Del Pinal (2017), on which factive islandhood arises from a contradictory universally projected presupposition. Section 6 points out that the triviality that causes unacceptability in factive islands need not be logical triviality, and it speculates on the possible consequences of this finding. Section 7 argues that the proposed analysis applies correctly, or is at least compatible with, data from degree questions as well as *how*- and *why*-questions.

## 2 Factive islands

The factivity of a clause-embedding predicate in certain cases prevents question-forming *wh*-movement from the predicate’s clausal complement (Rooryck 1992, Szabolcsi and Zwarts 1997, Oshima 2007, Abrusán 2011, 2014). In particular, *how* and *why* typically cannot extract from the complement of a factive predicate. For factive *know*, this *factive island* effect is illustrated by the unacceptability of Oshima’s (2007) examples (3a) (which repeats (2)) and (4b), in readings where *how* or *why* is understood as originating in the embedded clause. Replacing *know* with non-factive *think*, as in (4), renders these cases acceptable (in the relevant readings), confirming the role of factivity as an ingredient of the island effect.

- (3) a. \*?How does Max know that Alice went to San Francisco?  
b. \*Why does Max know that Alice insulted Pat?
- (4) a. How does Max think that Alice went to San Francisco?  
b. Why does Max think that Alice insulted Pat?

In contrast to *how*- and *why*-questions, *wh*-extraction in *who*-questions is not typically affected by factivity. This is illustrated by (5), from Szabolcsi and Zwarts (1997), where *who* successfully extracts from the complement of factive *regret*.<sup>1</sup>

- (5) To whom do you regret having shown this letter?

What is the nature of the factive island effect? Is it due to the violation of syntactic constraints or is it rooted in the meaning? Critical evidence comes from Szabolcsi and Zwarts’ (1997) discovery of unacceptable examples like (6a), which modifies (5) by substituting *gotten this letter (from)* for *shown this letter (to)*. The contrast between (6a) and (6b), where non-factive *suspect* replaces the factive predicate, shows that *wh*-extraction in *who*-questions, too, can be precluded by factivity.

- (6) a. \*From whom do you regret having gotten this letter?  
b. From whom do you suspect having gotten this letter?

The acceptability contrast between (5) and (6a) suggests that factive islandhood is sensitive to the semantic content of the embedded clause, and that appeal to syntactic constraints is at least insufficient. Specifically, Szabolcsi and Zwarts (1997) propose that factive islandhood materializes with *who* when the embedded clause describes a non-iterable event. That is, they suggest that the contrast between (5) and (6a)

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<sup>1</sup>We use “*who*-question” as a cover term for all questions that ask for individuals, which all behave alike with regard to factive islands. Apart from question with *who*, these also include questions with *which*, *what*, and *where*.

reflects the fact that, while an event of showing someone this letter is iterable, the event of getting this letter is not.

The data pattern illustrated above, as interpreted by Szabolcsi and Zwarts, raises obvious questions. Why would non-iterability conspire with factivity to preempt extraction of *who*-phrases? And what is the general notion of ill-formedness that links superficially dissimilar instances of the factive island effect like those in (3) and (6a)?

Szabolcsi and Zwarts (1997) themselves proposed that the underlying cause of factive islandhood is a failure of semantic composition, and that the above contrasts are rooted in a semantic type distinction. Their contribution is ground-breaking in virtue of establishing that factive islandhood is (at least in part) a matter of meaning and proposing a coherent rationale for linking superficially diverse instances of the phenomenon. However, the account has a number of shortcomings, catalogued in Oshima (2007) and Abrusán (2011, 2014), most prominently, in our view, a shortage of independent support for the proposed type distinction and its assumed effect on semantic composition.

Oshima (2007) sketched an alternative account of factive islandhood, as what we call *meaning-driven unacceptability*, that we consider more promising. According to Oshima’s analysis, rather than in a failure of semantic composition, factive islandhood is rooted in necessary infelicity. On this account, or rather the rendition that we will spell out below, factive islandhood is due to a conspiracy of two felicity conditions. Due to their semantic makeup, factive island questions cannot satisfy either of these conditions without violating the other. This analysis, which we dub the *conspiracy analysis* is introduced in section 3.

### 3 Factive islands from non-propositional triviality

Before introducing the theoretical ingredients of the conspiracy analysis in section 3.2, we first identify in section 3.1 an assumption underlying that analysis, regarding a characteristic semantic property, or *logical signature*, of factive islands.

#### 3.1 The logical signature of factive islands

As reported above, Szabolcsi and Zwarts (1997) discovered that factive islandhood can materialize with *who*-questions, viz. when the embedded clause describes a non-iterable event, as in (6a), repeated here as (7).

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

Oshima (2007) interprets data like (7) as showing that factive islands arise when the property given by the factive predicate’s complement clause applies uniquely, that is, cannot hold of more than one entity. On this view, the unacceptability of (7) depends

on the uniqueness of the letter's sender, that is, the fact that the property of having sent the letter cannot hold of more than one individual. As further support for this generalization, we present the example in (8).

(8) \*Which of the girls does Fred know is the tallest member of our team?

Since only one individual can be the tallest member of our team, in this case the property described by the gapped complement clause again applies uniquely. As expected under Oshima's interpretation, (8) is judged unacceptable in much the way as (7) is.

Oshima further proposes that in factive island questions with *how* and *why*, the property described by the gapped complement applies uniquely as well. For the factive island examples in (3), repeated here in (9), the claim is that there can be only one manner that provides a true answer to the question how Alice went to San Francisco, and that there can be only one reason that provides a true answer to the question why Alice insulted Pat.

(9) a. \*?How does Max know that Alice went to San Francisco?  
b. \*Why does Max know that Alice insulted Pat?

We will scrutinize these assumptions about *how*- and *why*-questions (and also degree questions) in section 7 (see also footnote 6). For the moment, we will simply accept Oshima's characterization of the *logical signature* of factive islands. That is, we will assume that factive islandhood is dependent on the factive predicate's gapped complement describing a property that applies uniquely. It is this assumption that underlies the Oshima's conspiracy analysis to be presented in section 3.2.

## 3.2 Factive islands and necessary infelicity

To facilitate the introduction of the conspiracy analysis in section 3.2.2, we first outline in section 3.2.1 the semantics of questions that it builds on.

### 3.2.1 Question semantics

The conspiracy analysis of factive islandhood assumes the so-called Hamblin/Karttunen semantics for wh-questions (Hamblin 1973, Karttunen 1977). Under this semantics, a question extension is a set of propositions. This set can be thought of as a family of possible answers to the question, the so-called Hamblin answers. For example, the extension of (10) contains, for any member *x*, the proposition that *x* resigned.

(10) Which member resigned?

We will be exclusively concerned with wh-questions of the form instantiated by this example, that is, examples of the form  $[wh R] S$ , where  $wh$  is the lone wh-word, the predicate  $R$  is the wh-word's property-denoting *restrictor*,  $[wh R]$  is the wh-phrase, and the predicate  $S$  is the wh-phrase's property-denoting *scope*. We construe propositions as functions from possible worlds to truth values, and properties as functions from individuals to propositions. We take the denotation of a question to be its intension, a function that maps any possible world to the extension of the question in that world. So the question  $[wh R] S$  denotes the function in (11), where  $\mathbf{R}$  and  $\mathbf{S}$  are the denotations of  $R$  and  $S$ , respectively. The values of  $\mathbf{R}$  and  $\mathbf{S}$  in the example in (10) are given in (12).

$$(11) \quad \text{Hamblin/Karttunen semantics} \\ \lambda w. \{ \mathbf{S}(x) \mid \mathbf{R}(x)(w) \}$$

$$(12) \quad \mathbf{R} = \lambda x. \lambda w. x \text{ is a member in } w \\ \mathbf{S} = \lambda x. \lambda w. x \text{ resigned in } w$$

We take propositions to be partial functions, functions whose domain may comprise only those possible worlds that meet certain conditions. Under the Frege/Strawson notion of semantic presupposition, adopted here for concreteness, this provides a way of encoding the presuppositional content contributed by a presupposition trigger in the scope of the wh-phrase. To illustrate, taking gender marking to trigger a presupposition (Cooper 1983), the property denoted by *nominated herself* will map any individual to a proposition whose domain is limited to worlds where that individual is female. To simplify reference to presuppositional content, let  $\mathbf{P}$  be a property such that for any individual  $x$ ,  $\mathbf{P}(x)$  characterizes the domain of  $\mathbf{S}(x)$ . So, if  $\mathbf{S}$  is the property denoted by *nominated herself*, then  $\mathbf{P}$  is the property of being female. For the question in (13), the values for  $\mathbf{R}$ ,  $\mathbf{P}$ ,  $\mathbf{S}$  are then as catalogued in (14). (To make partiality explicit, we employ the colon notation introduced in Heim and Kratzer 1998). With reference to  $\mathbf{R}$ ,  $\mathbf{P}$ , and  $\mathbf{S}$ , we can rewrite the Hamblin/Karttunen denotation (11) as in (15).

$$(13) \quad \text{Which member nominated herself?}$$

$$(14) \quad \mathbf{R} = \lambda x. \lambda w. x \text{ is a member in } w \\ \mathbf{P} = \lambda x. \lambda w. x \text{ is female in } w \\ \mathbf{S} = \lambda x. \lambda w. x \text{ is female in } w. x \text{ nominated herself in } w$$

$$(15) \quad \text{Hamblin/Karttunen semantics} \\ \lambda w. \{ \lambda v. \mathbf{P}(x)(v). \mathbf{S}(x)(v) \mid \mathbf{R}(x)(w) \}$$

We note that in the absence of a presupposition trigger in the wh-phrase’s scope, **P** is the trivial property, the property that applies to every individual in every possible world. The garden variety question in (10) is a case in point. In (16), the list of values given in (12) above is updated accordingly.

- (16)    **R** =  $\lambda x.\lambda w.$  x is a member in w  
           **P** =  $\lambda x.\lambda w.$  w = w  
           **S** =  $\lambda x.\lambda w.$  x resigned in w

We now turn to introducing the conspiracy analysis. While we attribute it to Oshima (2007), we should note that Oshima’s exposition is very brief. Our presentation of the conspiracy analysis is considerably more detailed and superficially very different from Oshima’s.

### 3.2.2 Answerability and existence

As announced earlier, the conspiracy analysis attributes factive islandhood to necessary infelicity. Necessary infelicity is taken to arise from a conspiracy of felicity conditions on question use, which factive island questions cannot satisfy simultaneously.

We construe felicity conditions as restricting the permissible relations between context sets and possible sentence denotations. We assume Stalnaker’s (1978) notion of context set as a set of possible worlds that encodes the information entailed by the common ground. Felicity conditions on questions, then, relate context sets to possible Hamblin/Karttunen question denotations.

The first felicity conditions on question that we introduce here is what we will refer to as *answerability condition*. (We read Oshima 2007 as assuming such a condition even though his exposition does not state it explicitly.) The answerability condition defines the felicity of a Hamblin/Karttunen denotation in terms of felicity conditions on the Hamblin answers that this denotation determines. For any possible sentence denotation X and context set c, we write  $c \succ X$  to indicate that X is felicitous relative to c. Employing this notation, we state the answerability condition as in (17) (which generalizes a condition also stated informally in Guerzoni 2003).

- (17)    Answerability condition  
            $c \succ Q$  only if  $\exists p[ \exists w[w \in c \ \& \ p \in Q(w)] \ \& \ c \succ p]$

The answerability condition states that a question denotation is felicitous relative to a context set only if there is a context set world where the question extension contains a proposition that is felicitous relative to the context set. In a nutshell, the condition requires that the context set be consistent with the question having a felicitous answer. The answerability condition, then, amounts to a test for the existence of a possible



felicitous answer in an idealized question-answer dialogue where the possible answers are those enshrined in the Hamblin/Karttunen denotation.

Note that the question extension may in principle vary from one context set world to another. The answerability condition must therefore specify in what, or how many, context set worlds a felicitous answer is required to be a member of the question extension. According to (17), there must be a felicitous answer that is in the question extension in at least one context set world.<sup>2</sup>

In order to actually apply the answerability condition, it is necessary to first give content to the conjunct  $c \succ p$ , so as to establish the felicity conditions that Hamblin answers are subject to. Here we will assume two relevant constraints on the  $\succ$  relation. These constraints are adaptations of two conditions on assertions proposed in Stalnaker (1978). Linking semantic and pragmatic notions of presupposition, Stalnaker proposed that in felicitous discourse, a semantic presupposition encoded as a partial proposition's domain must be entailed by the context set. This condition, which von Stechow (2008) dubbed *Stalnaker's Bridge*, is stated in (18). As well, Stalnaker posited that the proposition expressed by a felicitous assertion must be informative in the context set, that is, there must be a context set world where the assertion is false. Our version of this condition, we call it *informativity condition*, is stated in (19).

(18) Stalnaker's Bridge  
 $c \succ p$  only if  $c \subseteq \text{dom}(p)$

(19) Informativity condition  
 $c \succ p$  only if  $c \not\subseteq p$

Putting everything together, the answerability condition then reads as in (20). In a nutshell, the condition states that for a question to be felicitous, the context set must be consistent with the question having an informative answer whose presupposition is met.

(20) Answerability condition  
 $c \succ Q$  only if  $\exists p[ \exists w[w \in c \ \& \ p \in Q(w)] \ \& \ c \subseteq \text{dom}(p) \ \& \ c \not\subseteq p]$

Returning now to factive islands, we attend to our example (8), repeated in (21). The values that the properties **R**, **P**, and **S** take on in this example are listed in (22). What sets factive island cases like (21) apart from acceptable examples like

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<sup>2</sup>Here we elaborate on both Guerzoni (2003) and Oshima (2007), who do not actually consider the possibility of the question extension varying from one context set world to another. Note that a conceivable alternative rendition of the condition would impose the stronger requirement that there must be a felicitous answer that is in the question extension in *all* context set worlds. However, here we will make do with the weaker version in (17), as it is sufficient for the specific purpose of analyzing factive islands.

(13) (*Which member nominated herself?*) is uniqueness. In the present format, the fact that the embedding predicate is factive plus the fact that its gapped complement denotes uniquely guarantees that  $\mathbf{P}$  relates to the context set as shown in (23).

(21) \*Which of the girls does Fred know is the tallest member of our team?

(22)  $\mathbf{R} = \lambda x.\lambda w. x$  is one of the girls in  $w$   
 $\mathbf{P} = \lambda x.\lambda w. x$  is the tallest member of our team in  $w$   
 $\mathbf{S} = \lambda x.\lambda w. x$  is the tallest member of our team in  $w$ . Fred knows in  $w$  that  
 $x$  is the tallest member of our team

(23) Factivity plus uniqueness  
 $c \subseteq \{w: |\{x: \mathbf{P}(x)(w)\}| \leq 1\}$

According to (23), the context set entails that  $\mathbf{P}$  holds of at most one individual. For the case of (21), this amounts to the context set having the entailment that there is at most one girl that is the tallest member of our team. Note that, under the Hamblin/Karttunen semantics in (15), factivity plus uniqueness ensures that in every context set world, there is at most one proposition in the question extension whose presupposition is true. That is, (23) has the consequence in (24).

(24) From factivity plus uniqueness  
 $c \subseteq \{w: |\{p: p \in Q(w) \ \& \ w \in \text{dom}(p)\}| \leq 1\}$

The observation at the heart of the conspiracy analysis is that given factivity plus uniqueness, the answerability condition is in conflict with another felicity condition on questions. According to a prevalent intuition, a *wh*-question carries the presupposition that there is an individual who has both the restrictor and scope properties (e.g., Dayal 1996, Fox and Hackl 2006, Abusch 2010). For example, the question in (10) (*Which member resigned?*) is taken to presuppose that some member resigned, and (13) (*Which member nominated herself?*) is taken to presuppose that some member is female and nominated herself. Under the Hamblin/Karttunen semantics, we can say that a question presupposes that at least one of the Hamblin answers is true. Without encoding this existence presupposition in the denotation of the question, we propose the felicity condition in (25) so as to directly describe its pragmatic effect (of requiring that in every context set world, the question extension contains a Hamblin answer that is true in that world).

(25) Existence presupposition  
 $c \succ Q$  only if  $c \subseteq \{w: \exists p[p \in Q(w) \ \& \ p(w)]\}$

It can be shown that under the Hamblin/Karttunen semantics, assuming factivity plus uniqueness, the answerability condition and the existence presupposition are inconsistent, that is, there are no logically possible context sets that meet both conditions.

Before establishing the general result, it might be useful to consider a pair of toy context sets that illustrate the conflict between the answerability condition and the existence presupposition, given factivity plus uniqueness. To aid this illustration, we introduce a bit of convenient notation. For any sets  $X$ ,  $Y$ ,  $Z$ , and given a question denotation defined by properties  $\mathbf{R}$ ,  $\mathbf{P}$ , and  $\mathbf{S}$ , let  $w_{\mathbf{R}:X, \mathbf{P}:Y, \mathbf{S}:Z}$  be some possible world  $w$  such that  $\{x: \mathbf{R}(x)(w)\} = X$ ,  $\{x: \mathbf{P}(x)(w)\} = Y$ , and  $\{x: \mathbf{S}(x)(w)\} = Z$ . Consider now the toy context sets in (26) and (27) (where  $a$  and  $b$  are individuals).

$$(26) \quad \text{a.} \quad c = \left\{ \begin{array}{l} w_{\mathbf{R}:\{a, b\}, \mathbf{P}:\{a\}, \mathbf{S}:\{a\}} \\ w_{\mathbf{R}:\{a, b\}, \mathbf{P}:\{b\}, \mathbf{S}:\{b\}} \end{array} \right\}$$

$$\text{b.} \quad c = \left\{ w_{\mathbf{R}:\{a, b\}, \mathbf{P}:\{a\}, \mathbf{S}:\{a\}} \right\}$$

$$(27) \quad c = \left\{ \begin{array}{l} w_{\mathbf{R}:\{a, b\}, \mathbf{P}:\{a\}, \mathbf{S}:\emptyset} \\ w_{\mathbf{R}:\{a, b\}, \mathbf{P}:\{a\}, \mathbf{S}:\{a\}} \end{array} \right\}$$

Both context sets in (26) respect uniqueness plus factivity, as both entail that only one individual ( $a$  or  $b$ ) has property  $\mathbf{P}$ . Also, both context sets meet the existence presupposition, since the three sets determined by  $\mathbf{R}$ ,  $\mathbf{P}$ , and  $\mathbf{S}$  overlap in every context set world (with  $a$  or  $b$  as a common member). However, neither context set in (26) meets the answerability condition. In (26a), this is because the context set does not entail any individual to have the property  $\mathbf{P}$ , hence it fails to entail the presupposition of any Hamblin answer. The context set in (26b) entails that  $\mathbf{P}(a)$ , so it meets the presupposition of the Hamblin answer  $\mathbf{S}(a)$ ; however the context set also entails  $\mathbf{S}(a)$  itself, so that this Hamblin answer is not informative relative to the context set.

In contrast, the context set in (27), which also respects uniqueness plus factivity, meets the answerability condition, since it entails  $\mathbf{P}(a)$  without also entailing the proposition  $\mathbf{S}(a)$ . However, this context set does not meet the existence presupposition, since in one of the context set worlds the set determined by  $\mathbf{S}$  is empty, which entails the sets determined by  $\mathbf{R}$ ,  $\mathbf{P}$ , and  $\mathbf{S}$  fail to overlap.

We now turn to establishing the general result that, assuming factivity plus uniqueness, the answerability condition and the existence presupposition are inconsistent. To show this, consider first the conjunction of factivity plus uniqueness in (24) and the existence presupposition in (25). If in every context set world the question extension contains at most one proposition with a true presupposition (factivity plus uniqueness) and contains at least one proposition that is true (existence presupposi-

tion), then in every context set world, *the* proposition in the question extension with a true presupposition is true.

- (28) from factivity plus uniqueness, existence presupposition  
 $c \subseteq \{w: [\iota p. p \in Q(w) \ \& \ w \in \text{dom}(p)](w)\}$

On the other hand, according to the answerability condition in (20), the question extension in some context set world contains a proposition whose presupposition is true in every context set world and that is informative in the context set. In terms of the Hamblin/Karttunen semantics in (15), that proposition is  $\mathbf{S}(x)$ , for some individual  $x$ , where the domain of  $\mathbf{S}(x)$  is characterized by  $\mathbf{P}(x)$ . Since every Hamblin answer equals  $\mathbf{S}(y)$  for some individual  $y$ , factivity plus uniqueness in (23) and the fact that  $\mathbf{P}(x)$  holds in every context set world ensure that  $\mathbf{S}(x)$  is the only proposition with a true presupposition that can be in the question extension in any context set world. Suppose now that it holds in every context set world that there is a unique proposition in the question extension with a true presupposition and that that proposition is true. This would require that the context set entails  $\mathbf{S}(x)$ , which would imply that  $\mathbf{S}(x)$  is not informative in the context set, hence that the answerability condition is violated. We conclude, therefore, that it cannot be that in every context set world, the unique proposition in the question extension with a true presupposition is true, a conclusion stated in (29).

- (29) from factivity plus uniqueness, answerability condition  
 $c \not\subseteq \{w: [\iota p. p \in Q(w) \ \& \ w \in \text{dom}(p)](w)\}$

The statements in (28) and (29) are, of course, contradictory. Under the conspiracy analysis, then, questions like (21) invoke the necessarily violation of one of two felicity conditions. If a context set satisfies such a question's existence presupposition and also satisfies the presupposition of one of its possible semantic answers, it is guaranteed to already entail a complete answer to the question, in violation of the answerability condition. The question in a sense answers itself. It is this property that the conspiracy analysis holds responsible for the unacceptability of factive island questions.

In section 4, we now turn to providing a piece of independent support for the conspiracy analysis of factive islands.

## 4 Independent motivation

The conspiracy analysis would receive compelling support from questions whose semantic makeup is different from that of factive islands, but where a similar conflict between felicity conditions can be argued to cause unacceptability. We will now report on a case of this sort.

It has been known since the work of Ross (1967) that certain determiner phrases (DPs) are islands for wh-subextraction in question formation. In particular, English DPs headed by demonstratives typically ban wh-subextraction. This island effect is illustrated by (30), whose unacceptability is due to wh-subextraction from a DP headed by the demonstrative determiner *that*.

(30) \*Which team did they arrest that violent fan of?

Simonenko (2016) proposes that the property of demonstrative DPs that prevents wh-phrases to subextract from them is that they are directly referential in the sense of Kaplan (1989). Accepting this generalization, we will therefore refer to this constraint on wh-question formation as the *referential island* effect.<sup>3</sup>

Simonenko (2016) offers an account of the referential island effect that effectively amounts to the conspiracy analysis of factive islands. Since this is not obvious from cursory inspection of Simonenko’s rendition, we will recast the analysis in the format introduced above. In addition, we will simplify Simonenko’s account slightly, sidestepping details that distract from the main point.

In virtue of a demonstrative DP being directly referential, it picks out a fixed, contextually determined, individual as its denotation. The denotation of a demonstrative DP therefore cannot vary with the interpretation of a variable that it might contain. For the question in (30), this implies that the denotation of the demonstrative DP *that violent fan of* is a fixed individual, which here we call  $r$ , and that its denotation is accordingly independent of the semantic value of the wh-trace in the complement position of *of*. With this in mind, consider now again the Hamblin/Karttunen semantics stated in (11), repeated in (31). Under the relevant semantics of the demonstrative,  $\mathbf{R}$  and  $\mathbf{S}$  in (30) take on the values in (32). The question itself then has the denotation in (33).

(31) Hamblin/Karttunen semantics  
 $\lambda w. \{ \mathbf{S}(x) \mid \mathbf{R}(x)(w) \}$

(32)  $\mathbf{R} = \lambda x. \lambda w. x$  is a team in  $w$   
 $\mathbf{S} = \lambda x. \lambda w. \text{they arrested } r$  in  $w$

(33)  $\lambda w. \{ \lambda v. \text{they arrested } r$  in  $v \mid x$  is a team in  $w \}$

Note now that the property  $\mathbf{S}$  in (32) is a constant function. It maps any input individual to the same proposition, viz. the proposition that they arrested  $r$ . That proposition, call it  $p$ , is therefore the only possible member of the question extension in

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<sup>3</sup>In those contexts where demonstratives have been argued to demonstrate quantificational behaviour (e.g., King 2001), Simonenko (2014) shows that they allow for wh-subextraction, confirming the role of direct referentiality in the phenomenon.

any possible world. In possible worlds where there is at least one team, the question extension will be  $\{p\}$ ; in worlds where no team exists, the question extension is the empty set  $\emptyset$ . This entails that relative to any context set, the extension of the question is *rigid* in the sense stated in (34): there is at most one proposition that serves a member of the questions extension in any context set world.

$$(34) \quad \text{Extension rigidity} \\ |\{p: \exists w[w \in c \ \& \ p \in Q(w)]\}| \leq 1$$

We can now show that, given extension rigidity, the answerability condition is inconsistent with the existence presupposition. This pair of felicity conditions, employed above in our rendition of the conspiracy analysis, is shown again in (35) and (36), repeated from (20) and (25) above.

$$(35) \quad \text{Answerability condition} \\ c \succ Q \text{ only if } \exists p[ \exists w[w \in c \ \& \ p \in Q(w)] \ \& \ c \subseteq \text{dom}(p) \ \& \ c \not\subseteq p]$$

$$(36) \quad \text{Existence presupposition} \\ c \succ Q \text{ only if } c \subseteq \{w: \exists p[p \in Q(w) \ \& \ p(w)]\}$$

On the one hand, if there is at most one proposition that is a member of any question extension in the context set (extension rigidity) and in every context set world there is a proposition in the question extension that is true (existence presupposition), then in every context world, *the* proposition that is a member of a question extension in the context set is true. This consequence is stated in (37).

$$(37) \quad \text{from extension rigidity, existence presupposition} \\ c \subseteq \iota p. \exists w[w \in c \ \& \ p \in Q(w)]$$

On the other hand, if there is at most one proposition that is a member of any question extension in the context set (extension rigidity) and in some context set world there is a proposition in the question extension that the context set does not entail (answerability condition), then in some context set world, *the* proposition that is a member of a question extension in the context set is false. This consequence is stated in (38).

$$(38) \quad \text{from extension rigidity, answerability condition} \\ c \not\subseteq \iota p. \exists w[w \in c \ \& \ p \in Q(w)]$$

What we have established is that, given the inconsistency of the consequences in (37) and (38), extension rigidity guarantees that referential island questions necessarily violate either the existence presupposition or the answerability condition.

As announced, this analysis of referential islands closely parallels the conspiracy analysis of factive islands. Both analyses derive the unacceptability of the relevant questions from a conflict between the existence presupposition and the answerability condition, given the question’s particular semantic makeup. In the case of factive islands, this makeup is assumed to guarantee factivity plus uniqueness, while in the case of referential islands it is assumed to guarantee question rigidity.

We are not aware of credible alternatives to the analysis of referential islands presented here. In the absence of such alternatives, referential islands provide what we consider compelling independent evidence for the conspiracy analysis of factive islands.

That said, we have of course not established that the conspiracy analysis is the only feasible approach to factive islands. In section 5, we discuss an alternative approach, due to Abrusán (2011, 2014).

## 5 Factive islands from propositional triviality?

On the conspiracy analysis, factive islandhood is due to conflicting felicity conditions, and is not tied to trivial propositional content. As regards propositional content, the analysis only commits to *wh*-questions carrying an existence presupposition, which in the relevant factive island cases is a contingent proposition.

However, we have not presented an argument that factive island questions do not carry trivial propositional content. In fact, Abrusán (2011, 2014) argued that they do, and proposed that this is what causes their unacceptability. Abrusán builds an analysis of factive islandhood on the observation (previously reported in Schlenker 2008, 2009), that in *wh*-questions, presuppositions triggered in the *wh*-phrase’s scope tend to project universally. Abrusán illustrates this observation with the example in (39), reporting that it presupposes that Bill invited each of these ten people.

(39) Who among these ten people does Mary regret that Bill invited?

This universal presupposition is contradictory in cases where the presupposition property applies uniquely, as it does in (21), repeated again in (40).

(40) \*Which of the girls does Fred know is the tallest member of our team?

Assuming universal projection, (40) presupposes that each girl is the tallest of our team. Abrusán proposes to attribute factive islandhood to the contradictoriness of such universal presuppositions. Abrusán extends this analysis to factive islands with degree questions and *how*-questions, by making suitable assumptions about their domains, designed to ensure that universal projection yields a contradictory presupposition. This analysis, call it the *projection analysis*, is also endorsed (and refined) in Del Pinal (2017).

A problem with this analysis that we would like to draw attention to is that, without further additions, it overgenerates factive island effects.<sup>4</sup> Specifically, it incorrectly leads one to expect that the effect carries over to declaratives. Starting with Heim (1983), presuppositions have been proposed to project universally from under certain quantifiers. Chemla (2009) reports, in particular, that presupposition reliably project universally from under quantifiers headed by the determiner *no*. For example, Chemla observes that (41), where *his* is to be read as bound by *none of these ten students*, presupposes that the father of each of these 10 students is going to receive a congratulation letter.

- (41) None of these 10 students knows that his father is going to receive a congratulation letter.

With this in mind, consider the declarative sentence in (42), where again the personal pronoun is to be read as bound by the subject quantifier. This example is predicted to carry the very same universal presupposition as the one that the projection analysis posits for the factive island in (40), viz. that each girl is the tallest member of our team.

- (42) None of the girls knows that she is the tallest member of our team.

Speaker intuitions in fact bear out this prediction. This presupposition being contradictory, the example is accordingly perceived as pragmatically deficient. But it is uncontroversial that this perceived deficiency does not amount to the sort of unacceptability that factive islands give rise to. This observation requires an explanation under any account that posits triviality, propositional or not, as a possible cause of unacceptability. The particular challenge under the projection analysis, however, is to find an explanation for the relevant contrast between questions and declaratives. Why would a universally projected contradictory presupposition cause unacceptability in questions when it fails to do so in declaratives?<sup>5</sup>

In the absence of a compelling answer to this question, we conclude that the expected presence of a contradictory universally projected presuppositions does not

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<sup>4</sup>There is also a potential problem of undergeneration, arising from the observation in Schwarz and Simonenko (2018a) that universal projection in *wh*-questions is fragile, in the sense that it can be suspended under certain contextual conditions. Here we focus on overgeneration.

<sup>5</sup>A reviewer suggests that the acceptability of (42) is not representative, in that it is tied to the particular properties of the superlative construction featured in the embedded clause, and the reviewer also proposes a different rationale for the contrast between (40) and (42). As far as we can see, however, the relevant judgments do not depend on the particulars of how uniqueness in the embedded clause is linguistically established. For example, the sentence *No woman regrets that you got this letter from her*, in a reading where *no woman* binds *her*, is as acceptable as (42), and again contrasts with corresponding factive island cases, such as Szabolcsi and Zwarts's (1997) example (6a) above (*\*From whom do you regret having gotten this letter?*).



provide a satisfactory rationale for factive islandhood. We maintain that the conspiracy analysis is needed, entailing that meaning-driven unacceptability can arise in the absence of trivial propositional content.<sup>6,7</sup>

In section 6, we return to the conspiracy analysis, showing that it is in need of refinement, in particular noting that the notion of triviality the analysis refers to cannot be logical triviality.

## 6 Not just logical triviality

We have so far equated necessary infelicity of a sentence with the absence of any logically possible context set relative to which the sentence is felicitous. However, this sense of necessary infelicity undergenerates factive islands. To illustrate, let us compare our running example (21), repeated again in (43), to Szabolcsi and Zwarts' (1997) example (7), repeated again in (44a), and Oshima's (2007) example (44b).

(43) \*Which of the girls does Fred know is the tallest member of our team?

(44) a. \*From whom do you regret having gotten this letter?  
b. \*Who does Max know that Alice got married to on June 1<sup>st</sup>?

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<sup>6</sup>The projection analysis also differs from the conspiracy analysis with regard to the predicted logical signature of factive islands. This is because it is logically possible for universal projection to yield a contradiction even if the presupposition property does not apply uniquely. The example in (i) is a possible test case.

(i) ?Which of these four girls does Fred know finished in the top three?

The sentence is expected to carry the contradictory presupposition that each of the four girls finished in the top three. Unlike the conspiracy analysis, therefore, the projection analysis predicts (i) to be a factive island. What we have found is that most speakers judge examples like (i) to be more easily interpretable than familiar factive island cases. Those speakers in particular do not judge (i) to be contradictory. Given this judgment, the projection analysis faces the challenge of allowing for the absence of contradiction in cases like (i) without making the unwanted prediction that factive islandhood is always obviated. The approach that may seem most promising hypothesizes that in (i) the absence of contradiction is due to tacit restriction of the wh-restrictor's domain to those girls who finished in the top three. In factive islands, the corresponding restriction would be blocked pragmatically, on the grounds of reducing the wh-restrictor to a singleton (Schwarz and Simonenko 2018b). This hypothesis, however, must be reconciled with the finding that tacit domain restriction is otherwise hard or impossible with restrictors of the particular form in (i), featuring a partitive with a numeral and a complex demonstrative (Chemla 2009, Geurts and van Tiel 2015).

<sup>7</sup>The conclusion that unacceptability can be driven by non-propositional triviality has consequences for the nature of the "deductive system" posited in Fox and Hackl (2006), a module of grammar assumed to calculate triviality for the purposes of meaning-driven unacceptability. The conspiracy analysis of factive islands entails that the deductive system must have access to felicity conditions and must calculate triviality with reference to those conditions.

When deriving the necessary infelicity of (44a) in section 3.2, we assumed that it is logically necessary for the presupposition property to apply uniquely. This assumption was justified, as it is not logically possible for two different individuals to be the tallest member of our team. However, the corresponding assumption is hard or impossible to defend for the examples in (44). It is unclear to us whether it is logically necessary for this letter to have at most one sender, and (as Oshima’s discussion makes clear) it is evidently not logically necessary for Alice to have married at most one person on June 1<sup>st</sup>.

That said, letters by default are taken to have a unique sender, and (as Oshima notes) by default no one is taken to marry more than once on the same day. Let us say that contexts that are compatible with letters having multiple senders and with multiple marriages by the same person on the same day are not *accessible*. To accommodate examples like those in (44), we can then suitably weaken the condition on unacceptability assumed under the conspiracy analysis. The requirement that a given sentence be infelicitous in all logically possible context set is now weakened to the requirement that it be infelicitous in all accessible context sets. So amended, the conspiracy analysis does not merely exclude cases like (43) that suffer from *logical triviality*, but also cases like those in (44) that suffer from mere *relative triviality*, triviality that holds relative to certain entrenched, though logically contingent, background assumptions.

The finding that unacceptability can arise from mere relative, non-logical, triviality is in conflict with established thinking about the general characteristics of meaning-driven unacceptability. For concreteness, let us return to the definiteness effect and Barwise and Cooper’s (1981) proposal that examples like (1), repeated in (45), are unacceptable in virtue of having tautological truth conditions.

(45) \*There is every student.

This proposal invited the objection that logically trivial truth conditions do not always lead to unacceptability, as illustrated by the unquestionable acceptability of tautologous statements like (46) (e.g., Keenan 1987, Heim 1991).

(46) Every student is either invited or not invited.

Aiming to preserve the idea that meaning-driven unacceptability has to do with meaning triviality, more recent literature therefore took on the task of pinpointing the precise conditions under which logical triviality results in unacceptability (Gajewski 2002, Chierchia 2013, Abrusán 2014, Del Pinal 2017). Gajewski (2002) introduced the influential idea that a logical triviality is unacceptable only if the triviality is guaranteed by the sentence’s so-called logical skeleton, that is, if it is preserved under arbitrary substitutions of the non-logical vocabulary it contains. This proposal discriminates between the examples in (45) and (46) because *There is every P* is

tautologous regardless of the content of  $P$ , whereas *Every student is either  $P$  or not  $Q$*  is a tautology under only some possible contents of  $P$  and  $Q$ . Abrusán (2014) and Del Pinal (2017) explore variants of this proposal, which applies to examples like (45) and (46) in much the same way.

By presupposing that only logical triviality can ever give rise to unacceptability, these proposals fail to exclude as unacceptable any statements that are not logical trivialities in the first place. For example, alongside logical trivialities like (46), they allow for the acceptability of logically contingent statements like *No cats are dogs* or *Some cats are dogs*, notwithstanding the fact that in any ordinary contexts, those are invariably judged true and false, respectively. By the same token, the unacceptability of factive island examples like those in (44), where uniqueness is given by non-logical content, is not within the reach of these proposals, and that would continue to be the case even if the proposals were extended to also recognize non-propositional triviality as a possible cause of unacceptability.<sup>8,9</sup>

In short, to the extent that factive islands are to be captured under a unified theory of meaning-driven unacceptability, such a theory must renounce the assumption that only logical triviality can give rise to unacceptability. We must leave to future work the task of devising a unified theory of meaning-driven unacceptability that abandons this premise. Here we content ourselves with identifying a possible starting point, provided by remarks in Chierchia (2013, 53). Chierchia speculates that trivial content results in unacceptability in cases where the compositional history of the triviality is “not readily accessible to conscious introspection”. Chierchia accordingly suggests that listeners can use introspection to detect triviality in examples like (46), but not in examples like (45). Building on Chierchia’s speculation, we suggest that a triviality might be inaccessible to introspection even if it is not a logical triviality, and that this possibility can be instantiated by factive islands.

We leave further development of this line of thought for another occasion. But we would like to point to a particular type of empirical issue that Chierchia’s speculation might help address. It is not hard to see that the conspiracy analysis as articulated

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<sup>8</sup>The finding is in particular incompatible with Fox and Hackl’s (2006) proposal that suggest that triviality is calculated by an encapsulated “deductive system” (see footnote 7). The deductive system is a hypothesized module of grammar that does not have access to grammar-external information, such as as listener’s background assumptions.

<sup>9</sup>Applying the projection analysis outlined in section 5, Abrusán (2014) and Del Pinal (2017), too, argue that factive islands resist Gajewski’s (2002) characterization of meaning-driven unacceptability. Their argument does not make reference to the content of the embedded clause, though, but instead focuses on the factive embedding predicate. They point out that, given that the factive embedder is presumably not part of a sentence’s logical skeleton, and given that triviality is dependent on factivity, the logical skeleton of a factive island question does not guarantee triviality. Both authors propose variants of Gajewski’s (2002) account that they argue circumvents this problem. However, these proposals do not address the issue that we have focused on here, viz. the problem that factive islandhood in *who*-questions can arise even if uniqueness is not established by a sentence’s logical content, so that triviality is not logical in the first place.

so far overgenerates unacceptability in the realm of *wh*-questions. The issue we have in mind is illustrated by the acceptability of the *wh*-question in (47).

(47) Who is invited or not invited?

The scope property of (47) maps every person *x* to the tautologous Hamblin answer that *x* is invited or is not invited. This entails that it is impossible for (47) to satisfy the answerability condition spelled out in section 3.2. Under the unembellished conspiracy analysis, therefore, (47) is excluded as unacceptable. This is, however, incorrect. While perhaps pragmatically deficient, (47) is clearly not unacceptable.

Examples like (47) differ from factive islands in how the necessary infelicity arises. While (47) necessarily violates a particular felicity condition, the necessary infelicity of questions with factive islands (or referential islands) depends on a conspiracy of two felicity conditions, viz. the answerability condition and the existence presupposition. That is, while it is not possible for such a question to satisfy both felicity conditions at the same time, there are possible worlds where it satisfies one or the other. A hypothesis that inspired the name that we have assigned to the conspiracy theory is that necessary infelicity yields unacceptability only if it is due to such a conspiracy of felicity conditions. We suggest that Chierchia's speculation offers a possible rationale for this generalization, as a triviality may be more easily detectable by conscious introspection when this triviality is due to a single felicity condition than when it arises from a conspiracy of felicity conditions. We leave further exploration of this speculation for future work.

In section 7, we return to the phenomenon of factive islands proper, to investigate whether the conspiracy analysis has adequate effects beyond the domain of *who*-questions.

## 7 Back to the logical signature

In this final section we further probe the empirical adequacy of the conspiracy analysis of factive islands. The conspiracy analysis derives necessary infelicity under the assumption that the gapped complement of the factive embedding predicate applies uniquely. While this assumption has the intended effect for *who*-questions, its adequacy for the analysis of other cases of factive islands remains to be examined. We saw that factive islands are attested with *how*- and *why*-questions, such as the Oshima's (2007) examples in (9), repeated in (48).

(48) a. \*?How does Max know that Alice went to San Francisco?  
b. \*Why does Max know that Alice insulted Pat?

Abrusán (2011) moreover reports that degree questions, too, can give rise to factive islands. Abrusán illustrates this with the example in (49), where the degree *wh*-

phrase *how* has extracted from the complement factive *regret* (accompanied by the pied-piped gradable predicate *tall*).

(49) \*How tall do you regret that you are?

We will assume that such questions have much the same structure as *who*-questions, but instead of properties of individuals, involve properties of manners, reasons, or degrees (e.g., Higginbotham 1993, Beck and Rullmann 1999). The question is then whether these instances of the factive island effect share the logical signature of *who*-question of the sort analyzed above, hence whether they also fall under the purview of the conspiracy analysis. This is the question to be addressed in the remainder of this section. We discuss degree questions (section 7.1), *how*-questions (section 7.2), and *why*-questions (section 7.3), in this order.

## 7.1 Degree questions

The conspiracy analysis will have the intended effect for the degree question in (49), repeated in (50), if it is assigned the semantics in (51). According to this semantics, the presupposition property only holds of a unique degree, viz. your actual height, instantiating the requisite logical signature.

(50) \*How tall do you regret that you are?

(51)  $\mathbf{R} = \lambda d.\lambda w.$  *d* is a height  
 $\mathbf{P} = \lambda d.\lambda w.$  your height in  $w = d$   
 $\mathbf{S} = \lambda d.\lambda w:$  your height in  $w = d.$  you regret in  $w$  that your height =  $d$

However, the “exactly” semantics in (51) is not the only option to be considered. Under a commonly held view (e.g., Beck and Rullmann 1999, Fox and Hackl 2006), degree questions have an “at least” semantics, and the meaning of (49) would be given by (52) instead of (51).

(52)  $\mathbf{R} = \lambda d.\lambda w.$  *d* is a height  
 $\mathbf{P} = \lambda d.\lambda w.$  your height in  $w \geq d$   
 $\mathbf{S} = \lambda d.\lambda w:$  your height in  $w \geq d.$  you regret in  $w$  that your height  $\geq d$

The presupposition property in (52) does not hold of a unique degree. In addition to your actual height, it also maps any degree below your actual height to a true proposition. Under the “at least” semantics, the degree question in (50) therefore lacks the uniqueness property, hence lacks the logical signature that the conspiracy analysis relies on to exclude questions as necessarily infelicitous.

Are there independent reasons for preferring the question semantics in (51) to the one in (52)? One piece of support for an “exactly” semantics for degree questions comes from an observation in Spector (2018) about the truth conditions of examples like (53), where a degree question is embedded under *know*.

(53) Ann knows how tall Ben is.

Spector’s observation, applied to the case at hand, is that (53) unambiguously has a *strongly exhaustive* reading in the sense of Groenendijk and Stokhof (1984), entailing that Ann knows Ben’s exact height. As Spector also notes, this observation can be interpreted as supporting an “exactly” semantics for the embedded degree question, stated in (54a), as opposed to the “at least” semantics stated in (54b).

- (54) a.  $\mathbf{R} = \lambda d. \lambda w. d$  is a height  
 $\mathbf{S} = \lambda d. \lambda w. \text{Ben’s height in } w = d$   
 b.  $\mathbf{R} = \lambda d. \lambda w. d$  is a height  
 $\mathbf{S} = \lambda d. \lambda w. \text{Ben’s height in } w \geq d$

The reason is that under independently motivated assumptions about question embedding (based on data from embedded *who*-questions) only (54a) can explain why (53) can only have a strongly exhaustive reading (Klinedinst and Rothschild 2011, Uegaki 2015, Spector and Egré 2015, Cremers and Chemla 2016, Cremers 2016, Theiler et al. 2016, Xiang 2016). Under the question meaning in (54b), (53) is incorrectly predicted to allow for a weaker reading, an *intermediate exhaustive* reading in the sense of Klinedinst and Rothschild (2011), which can be true even if Ann fails to know Ben’s exact height, viz. if she considers it possible that Ben is taller than he actually is.<sup>10</sup>

How can an “exactly” semantics like (54a) be made to arise compositionally? A straightforward answer would assume that degree predicates themselves have an “exactly” semantics. Assuming that degree predicates relate individuals to degrees (Cresswell 1976), the lexical entry for *tall* would then be as in (56).

(56)  $\llbracket \text{tall} \rrbracket = \lambda d. \lambda x. \lambda w. x\text{’s height in } w = d$

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<sup>10</sup> To confirm that (53) indeed does not allow for such a weaker, intermediate exhaustive, reading, we note that (53) cannot be judged true in scenario (55), which is modelled after a parallel scenario provided in Spector (2018).

(55) Ann has learned that Ben was selected to play for the team Beaconsfield Baskets. Ann is not sure about Ben’s exact height, but since she knows that the Beaconsfield Baskets strictly require players to be at least 180 cm tall, she comes to believe that Ben is no shorter than 180 cm. As it happens, Ben is exactly 180 cm tall.

However, presenting the example in (57), Abrusán (2007) shows such an analysis to be inadequate. If *tall* had the lexical entry in (56), any Hamblin answer to (57) would convey, for some height  $d$ , that you are required to be exactly  $d$  tall to be a basketball player. As a consequence, the question should carry the existence presupposition that there is some height  $d$  such that you are required to be exactly  $d$  tall.

(57) How tall are you required to be to be a basketball player?

This is, however, not how the question has to be understood. Instead, (57) is naturally interpreted as merely presupposing that there is a minimum height that you are required to have to be a basketball player, without imposing an upper bound on the range of permissible heights.

Fortunately, recent work on the semantics of degree and numerals points to a way of deriving “exactly” meanings for degree questions that accommodates examples like (57) (Heim 2006, Kennedy 2015, Buccola and Spector 2016, Gentile and Schwarz 2017). Gradable predicates are assigned an “at least” semantics like (58a) but are assumed to be accompanied in logical form by a maximality operator, here called  $\Pi$ , with the semantics in (58b) (where  $\max$  is taken to map a set of degrees to its greatest member).

(58) a.  $\llbracket \text{tall} \rrbracket = \lambda d. \lambda x. \lambda w. x\text{'s height in } w \geq d$   
 b.  $\llbracket \Pi \rrbracket = \lambda d. \lambda P. \lambda w. \max\{d': P(d')(w)\} = d$

Suppose  $\Pi$  combines with *how* to form a phrase that originates in the gradable predicate’s degree argument position, from where it moves covertly for interpretability. Suppose further that *how* subextracts from the  $\Pi$ -phrase by way of *wh*-movement. This leads to the logical form in (59a), which delivers the intended “exactly” meaning in (54a). Further, the intended meaning for example (57) can now be attributed to the logical form in (59b), where the  $\Pi$ -phrase is taking inverse scope over the modal *required*.

(59) a.  $\text{how } \lambda d [ \Pi d ] \lambda d' [ \text{Ben } d' \text{ tall} ]$   
 b.  $\text{how } \lambda d [ \Pi d ] \lambda d' [ \text{required } [ \text{you } d' \text{ tall} ] ]$

We conclude, therefore, that examples like (57), while providing evidence against an “exactly” semantics for gradable predicates, are compatible with an “exactly” semantics for degree questions like the embedded question in (53).

The proposed analysis furthermore delivers the intended “exactly” meaning (51) for the factive island question (49). This meaning is the interpretation of the logical form in (60), where the  $\Pi$ -phrase takes scope within the complement of *regret*.

(60)  $\text{how } \lambda d [ \text{you regret } [ \Pi d ] \lambda d' [ \text{you are } d' \text{ tall} ] ]$

Suppose now that the complement clause of a factive predicate is in fact a scope island for the  $\Pi$ -phrase, perhaps as an instance of the stringent constraints on the scope of degree operators described in Heim (2000). In that case, (60) is the only available logical form for (49), hence (51) is the only derivable interpretation of (49). Under the conspiracy analysis, (49) is then correctly excluded. We conclude, therefore, that factive islandhood in degree question is compatible with the conspiracy analysis.

## 7.2 *How-questions*

We have seen that the factive island effect is found with *how*-questions. This is illustrated again by the unacceptability of (61) in a reading where *how* is understood as originating in the embedded clause.

(61) \*How does she know that he opened that coconut?

Do such questions also have the logical signature required under the conspiracy analysis, that is, does the presupposition property in those cases necessarily apply to a unique member of the restrictor extension?

As Oshima (2007) and Abrusán (2011, 2014) note, this issue can be investigated by considering simple *how*-questions such as (62). Suppose it can be shown that (62) cannot have more than one true Hamblin answer. This would indicate that the scope property of (62) applies uniquely, and thereby show indirectly that the same must be true of the presupposition property in the factive island case (61).

(62) How did he open that coconut?

While Oshima (2007) suggested that simple *how*-questions like (62) indeed (tend to) allow for at most one true Hamblin answer, Abrusán (2011, 2014) argues that this claim is incompatible with the range of felicitous responses that such questions routinely permit. To illustrate, (63) can serve as a felicitous response to (62), seemingly spelling out two Hamblin answers to (62), viz. the proposition that he opened the coconut slowly and the proposition that he opened it carefully.

(63) Slowly and carefully.

However, we think that it is actually unclear whether (63) spells out two Hamblin answers, as opposed to just one, viz. the proposition that he opened the coconut slowly and carefully. Given that the set of ways that a *how*-question is about seems context dependent (cf. Oshima 2007, Sæbø 2016) we are not sure how the latter possibility can be excluded. More generally, it seems to us that the uncertainty about the mapping from linguistic responses to Hamblin answers makes it difficult to



draw reliable conclusions about a question’s semantics based on the possible linguistic responses it can receive.

To circumvent this source of uncertainty, we therefore propose a more direct diagnostic for the logical makeup of a question, viz. additive *else* as a modifier of the *wh*-phrase. Schwarz (in press) observes that the contribution of additive *else* in a question like *Who else called?* is twofold. First, *else* introduces the additive presupposition that the scope property holds of some salient entity, the *additive referent*. In the case at hand, the additive presupposition is the proposition that the additive referent called. Second, *else* subtracts the additive referent from the restrictor’s extension, thereby excluding Hamblin answers about the additive referent. As Schwarz also notes, this predicts correctly the oddness of *else* in cases where the scope property applies uniquely. For example, (64) is expectedly odd, since the additive presupposition, the proposition that the additive referent is the tallest member of our team, is in conflict with the question’s existence presupposition, viz. the proposition that someone other than the additive referent is the tallest member.<sup>11</sup>

(64) #Who else is the tallest member of our team?

We now observe that adding *else* to the acceptable question in (62), as in (65), renders the example odd in much the way (64) is. Based on this observation, we conclude that in the case of (62), the scope property indeed applies uniquely. Accordingly, we conclude the same holds true for the presupposition property in (61), hence that this particular example indeed has the logical signature required for the conspiracy analysis to correctly exclude it as necessarily infelicitous.<sup>12</sup>

(65) #How else did he open that coconut?

We do not wish to claim, however, that all *how*-questions have a scope property that applies uniquely. What the conspiracy analysis leads us to hypothesize is merely that there is a correlation between attested factive islandhood and the infelicity of *else* in the *wh*-phrase of the corresponding simple question. As far as we can see, the data are consistent with this hypothesis. For example, the infelicitous *else* example in

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<sup>11</sup>On this analysis, the oddness of *wh else*-questions like (64) is another instance of necessary infelicity. The triviality is propositional, due to a contradictory presupposition. The contradiction arises from conspiring felicity conditions (on the use of additive *else* and *wh*-questions), which in section 6 we speculated is a sufficient condition for unacceptability. We are not sure, however, about our intuitions regarding the nature of the oddness of examples like (64), hence whether such cases actually judged to instantiate meaning-driven unacceptability.

<sup>12</sup>In Schwarz and Simonenko (in press), we lay out the space of possibilities regarding the source of the uniqueness effect exemplified by *how else*-questions like (65), as well as certain *why else*-questions (to be discussed in section 7.3 below). There we also spell out in more detail the argument that evidence from linguistic responses is insufficient, and we begin to relate the evidence from *wh else* to proposals in previous literature regarding semantic typologies of *how*- and *why*-questions.

(65) can be rescued by adding the possibility modal *could* in the wh-phrase’s scope. The question in (66) is fully acceptable.

(66) How else could he have opened that coconut?

Apparently, the possibility modal obviates uniqueness. This is in fact expected, since even if there is a unique way in which he opened that coconut, there plausibly can be multiple ways in which he *could* have opened it. Under the conspiracy analysis, we therefore expect that the addition of *could*, as in (67), likewise ameliorates (61). As indicated, this prediction appears to be correct.<sup>13</sup>

(67) ?How does she know that he could have opened that coconut?

There are other types of *how*-questions where the scope property systematically fails to have the uniqueness property. These include question where *how* functions as an adjective. The felicity of the *how else*-question (68a), where the wh-phrase originates in the complement position of *feel*, serves to illustrate this. Once again, the judgment on factive islands tracks the judgment on *how else* questions, as (68b) is acceptable, at least more so than classic factive island cases like (61).

- (68) a. How else is this making you feel?  
b. ?How does she know this is making you feel?

We conclude that, as far as we can determine, data from *how*-questions, too, are consistent with the conspiracy analysis of factive islands.

### 7.3 *Why*-questions

Does factive islandhood in *why*-questions also coincide with the presupposition property applying uniquely, as expected under the conspiracy analysis? Oshima (2007) argues that that is the case. Here we will investigate the issue by employing the *else* diagnostic introduced in the last subsection, which will lead us to qualify Oshima’s assessment.

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<sup>13</sup>Abrusán (2011, 2014) presents example (i) below, noting that “for most speakers, factive islands [...] can be significantly ameliorated by placing an existential modal in the r of a factive verb”.

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

Aligned with Abrusán’s comment, we have also found that speakers vary in their judgments about such examples and that they are generally judged to be less than perfect. We must leave these qualifications as an open problem (for the conspiracy analysis and also Abrusán’s own analysis reviewed in section 5 below).

We begin with the pair of examples in (69). (69a) exhibits the factive island effect under the reading where *why* is taken to modify the embedded clause. The infelicity of (69b) indicates that there the scope property applies uniquely, and hence that the presupposition property in (69a) does, too. We conclude, then, that (69a) has the logical signature required under the conspiracy analysis, which excludes (69a) as necessarily infelicitous.<sup>14</sup>

- (69) a. \*Why does she know that your light went out at midnight?  
 b. #Why else did your light go out at midnight?

As in the case of *how*-questions, though, we do not wish to claim that all *why*-questions have the uniqueness property. Once again, the addition of a possibility modal systematically obviates uniqueness and expectedly renders *else* acceptable. This is illustrated by (70a). (70b) is another felicitous *why else*-question. We are not sure about what exactly accounts for the contrast between (70b) and (69b). It appears that, unlike reasons for physical events, the reasons for mental states need not be unique, but we will leave a closer investigation of this issue for future work.

- (70) a. Why else could your light have gone out at midnight?  
 b. Why else are you angry?

The point we wish to focus on here is that, surprisingly, in the case of *why*-questions, the *else* diagnostic and factive islandhood are not aligned. That is, despite the absence of uniqueness, the examples in (71) do not seem to be significantly more acceptable, in the relevant readings, than the factive island example in (69a).

- (71) a. \*Why does she know that your light could have gone out at midnight?  
 b. \*Why does she know that you are angry?

These examples not being excluded by the conspiracy analysis, we are led to conclude that they are unacceptable for independent reasons. While we cannot further identify these independent reasons, we note that *why*-questions have been said to

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<sup>14</sup>Our observation about (69b) is reminiscent of data presented in Unger (1977) to argue for the “uniqueness of causation”. Unger reported, for example, that *Bill’s sneezing caused Betty to catch a cold for the second time, and so did something else* is inconsistent, viz. on the grounds of portraying two different events as the cause of Betty’s catching a cold for the second time. Oshima (2007) presents a similar data point, one that also suggests that reasons are, in certain cases, understood to be unique. Oshima reports that *Alice insulted Max because she was on edge, among other reasons* cannot be interpreted as conveying that Alice insulted Max because she was on edge, and that Alice insulted Max because of some other reasons. That is, according to Oshima, the *because*-clause and *among other reasons* must be interpreted as jointly specifying a single reason for Alice’s insulting Max, apparently because the possibility of the insult having multiple reasons is excluded.

be exceptional in other respects. Investigating so-called negative islands, Fox (2007) observes that *why*-questions resist extraction past negation under a broader range of circumstances than degree questions and *how*-questions. More generally, Szabolcsi and Zwarts (1997, fn. 14) report that “[the] extraction [of *why*] is blocked by a wider range of interveners than that of any other wh-phrase”.<sup>15</sup>

While this issue requires further study, we will content ourselves in this paper with the conclusion that *why*-questions are compatible with the conspiracy analysis of factive islands.

## 8 Conclusions

Elaborating on a proposal in Oshima (2007), we have made a case that the unacceptability of factive islands is not propositional and does not need to be logical. This analysis requires a revision of the prevalent view about meaning-driven unacceptability, according to which the triviality that results in unacceptability is both propositional and logical. (Gajewski 2002, Fox and Hackl 2006, Chierchia 2013, Abrusán 2014, Del Pinal 2017). Our findings lead us to a four-way typology of possible meaning-driven unacceptability, as indicated in the table in (72).

|      |                          |                     |                 |
|------|--------------------------|---------------------|-----------------|
|      |                          | <i>logical</i>      | <i>relative</i> |
| (72) | <i>propositional</i>     | ...                 | ?               |
|      | <i>non-propositional</i> | referential islands | factive islands |

The dots in the top left cell indicate that the propositional and logical type is instantiated in language if the literature is correct about at least some of the relevant phenomena (e.g., Barwise and Cooper 1981, Dowty 1979, von Stechow 1993, Krifka 1995, Lahiri 1998, Chierchia 2013, Gajewski 2009). We have argued that the triviality of factive islands is neither propositional nor necessarily logical. We can add that the triviality of referential islands, according to the analysis reviewed in section 4, is non-propositional but logical. The question mark in the top right cell indicates that we are not aware of an instance of the propositional and relative type, that is, meaning-driven unacceptability that stems from propositional triviality that need not be logical. The absence of cases of this type, if confirmed, would present an important observation for a general theory of meaning-driven unacceptability to explain.

<sup>15</sup>Szabolcsi and Zwarts note, for example, that in *Why did you want me to quit?* cannot be interpreted as asking about the reason the addressee wanted the speaker to have for quitting. The contrast with our example (4b) (*Why does Max think that Alice insulted Pat?*), where the corresponding reading seems available, suggests that the possibility of extracting *why* from a clausal complement is restricted to complements of bridge verbs like *think*.

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