Trivial questions

Abstract

Oshima (2007) and Abrusán (2011, 2014) offer two competing analyses of so-called factive islands in wh-questions. Both analyses attribute the factive island effect to a pathology of meaning, but they take different views regarding the semantic and pragmatic ingredients of this pathology. On Oshima's analysis, the perceived ungrammaticality in factive islands is due to a conflict between two felicity conditions on wh-questions. In contrast, without postulating felicity conditions particular to questions, Abrusán credits factive islands to universally projected contradictory presuppositions. After reformulating and fleshing out the two analyses in order to facilitate comparison, we argue that Oshima's analysis is supported by independent evidence while Abrusán's is not. This result informs the ongoing debate regarding the proper notion of meaning triviality that induces judgments of ungrammaticality (Gajewski 2009, Abrusán 2014, Del Pinal 2017). It suggests that in order to properly apply to wh-questions, a comprehensive theory of this notion must make reference to felicity conditions on questions, and that meaning-based ungrammaticality cannot uniformly be attributed to the triviality of propositional content.

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

1 Introduction

An idea that linguistic theory owes to Barwise and Cooper (1981) is that under certain conditions, triviality of meaning can lead to judgments of uninterpretability, unacceptability judgments that are similar to judgments of ungrammaticality elicited by syntactic ill-formedness, and markedly different from judgments that are typical of mere pragmatic infelicity. A central question that arises in this school of thought is how to precisely characterize the relevant notion of meaning triviality or the conditions under which such triviality leads to uninterpretability (Gajewski 2002, Abrusán 2014, Del Pinal 2017). A particularly interesting instance of this question has emerged in the literature on questions. A consensus seems to have been reached that some notion of meaning triviality is the cause of so-called factive islands in wh-questions (Szabolcsi and Zwarts 1993; Oshima 2007; Abrusán 2011, 2014), but there is no agreement on the precise characterization of this triviality. We will compare (reformulated versions of) the two proposals put forward in Oshima (2007) and Abrusán (2011, 2014), which we call *answerability analysis* and *contradiction analysis*, respectively.

On Oshima's (2007) answerability analysis (or, rather, our reconstruction of it) uninterpretability in factive islands is due to a conflict between two felicity conditions on wh-questions. One of these is imposed by an existence presupposition that has often been posted for wh-questions (e.g., Dayal 1996). The other is an answerability condition of the sort proposed in Guerzoni (2003), which relates the felicity of a question to the felicity of the answers defined by the question's semantic content, requiring that at least one of these answers be felicitous. In contrast, Abrusán's (2011, 2014) contradiction analysis does not posit any felicity conditions particular to questions, instead crediting uninterpretability in factive islands to a contradictory presupposition. This analysis assumes that presuppositions in wh-questions project universally, as proposed in, e.g., Schlenker (2008, 2009).

Questions that we consider canonical instances of the factive island effect were first described in Szabolcsi and Zwarts (1993). Those questions feature overt wh-movement that leaves a gap within the complement of a factive predicate. The factive island effect is a judgment of uninterpretability elicited by cases where the gapped complement clause denotes uniquely, describing a property that cannot hold of more than one entity. The phenomenon is illustrated by Szabolcsi and Zwarts's example (1a) and Oshima's (2007) example (1b).

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

In (1a), the complement clause is embedded under factive *regret* and denotes uniquely because there can only be one individual that a given letter is from; in (1b), the complement clause is embedded under factive *know* and denotes uniquely in virtue of the assumption that Alice got married to at most one individual on any given day.

To demonstrate that the factive island effect is indeed dependent on uniqueness, Szabolcsi and Zwarts (1993) contrast (1a) with the acceptable question in (2a), where the gapped complement clause does not denote uniquely; likewise Oshima (2007) contrasts (1b) with the acceptable question in (2b), where again uniqueness is not guaranteed.

(2) a. To whom do you regret having shown this letter?
  b. Who does Max know that Alice sent a Christmas card to?

To complete the paradigm, (3) presents examples where the factive embedding verbs *regret* and *know* in (1) are replaced with non-factive verbs. These questions are fully acceptable as well, confirming that the factive island effect is dependent on the factivity of the embedding predicate.

(3) a. From whom do you suspect having gotten this letter?
b. Who does Max think that Alice got married to on June 1^{st}?

Both Oshima's (2007) answerability analysis and Abrusán's (2011, 2014) contradiction analysis capture the contrast between canonical factive island cases like those in (1) and the controls in (2) and (3). In this paper, we examine whether the particular assumptions underlying them can be motivated with data other than the canonical factive island data they were designed to capture. We will argue that the answerability analysis is supported by such independent considerations while the contradiction analysis is not.

In support of the answerability analysis, we demonstrate that the conflict between a wh-question's existence presupposition and the answerability condition can be observed independently of factivity and uniqueness, viz. in wh-questions that feature extraction from a referential DP (Simonenko 2016). With regard to the contradiction analysis, we examine the effects of two minimal manipulations that alter canonical factive island cases in ways that this analysis does not predict to affect judgments. We observe that in both cases, the manipulation in fact removes the factive island effect, a finding that presents a challenge to the contradiction analysis.

This result informs the ongoing debate regarding the proper notion of meaning triviality that induces judgments of ungrammaticality (Gajewski 2009, Abrusán 2014, Del Pinal 2017). It suggests that in order to properly apply to wh-questions, a comprehensive theory of this notion must make reference to felicity conditions on questions, and that meaning-based ungrammaticality cannot uniformly be attributed to the triviality of propositional content.

Sections 2 presents our renditions of the answerability analysis and the contradiction analysis; section 3 evaluates the two accounts, leading to the conclusion stated above; and section 4 offers concluding remarks.

2 Two accounts

Both Oshima (2007) and Abrusán (2011, 2014) assume (implicitly or explicitly) the so-called Hamblin/Karttunen semantics for wh-questions. This analysis of wh-question meaning is therefore introduced in section 2.1. In sections 2.2 and 2.3 we then present our renditions of the answerability and contradiction analysis, respectively.

2.1 Question semantics

The so-called Hamblin/ Karttunen semantics for wh-questions combines elements of the approaches in Hamblin (1973) and Karttunen (1977). Under the Hamblin/Karttunen 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/Karttunen answers. For example, the extension of (4) contains, for any member x, the proposition that x resigned.

(4) Which member resigned?

We will be exclusively concerned with wh-question of the form illustrated 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 (5), where **R** and **S** are the denotations of *R* and *S*, respectively. The values of **R** and **S** in the example in (4) are given in (6).

(5) Hamblin/Kartunnen semantics
λw.{**S**(x)| **R**(x)(w)}

(6) **R** = λx.λw. x is a member in w
S = λx.λw. x 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. For example, 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 **P** be a property such that for any individual x, **P**(x) characterizes the domain of **S**(x). So, if **S** is the property denoted by *nominated herself*, then **P** is the property of being female. For the question in (7) (which in the relevant respects is just like the cases in (2)), the values for **R**, **P**, **S** are then as catalogued in (8). (To make partiality explicit, we employ the colon notation introduced in Heim and Kratzer 1998). With reference to **R**, **P**, and **S**, we can rewrite the Hamblin/Karttunen denotation (5) as in (9).

(7) Which member nominated herself?

(8) **R** = λx.λw. x is a member in w
P = λx.λw. x is female in w
S = λx.λw: x is female in w. x nominated herself in w

(9) Hamblin/Kartunnen semantics
λw.{λv: **P**(x)(v). **S**(x)(v)| **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 (4) is a case in point (as are the examples in (3)). In (10), the list of values given in (6) above is updated accordingly.

(10) **R** = λx.λw. x is a member in w
P = λx.λw. w = w
S = λx.λw. x resigned in w

2.2 The answerability analysis

This section introduces the answerability analysis, which we attribute to Oshima (2007). We note at the outset, however, that Oshima's exposition is very brief. Our presentation of the answerability analysis is considerably more detailed and superficially very different than Oshima's.

2.2.1 The answerablity condition

We are now prepared to introduce the key ingredient of the answerability analysis, a felicity condition on question use that we refer to as *answerability condition.* We read Oshima (2007) as assuming such a condition even though his exposition does not state it explicitly.

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 represents the interlocutors prior common beliefs. The answerability condition on questions, then, relates context sets to possible Hamblin/Karttunen question denotations. The answerability condition defines the felicity of a Hamblin/Karttunen denotation in terms of felicity conditions on the Hamblin/Karttunen 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 (11), which formalizes and generalizes a condition stated informally in Guerzoni (2003).[1]

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

[1]Guerzoni's (2003) (p.41) posits a *Question Bridge Principle*, which states that "A question question is felicitous in c ONLY IF it can be felicitously answered in c (I.e. if at least one of its answers is defined in c)." The considerations that lead Guerzoni to posit this condition are not directly related to our present concerns.

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 (11), there must be a felicitous answer that is in the question extension in at least one context set world.[2]

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/Karttunen 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 Fintel (2008) dubbed *Stalnaker's Bridge*, is stated in (12). 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, and there must be one where the assertion is true. Our version of this condition, we call it *informativity condition*, is stated in (13).

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

(13) Informativity condition
$c \succ p$ only if $c \nsubseteq p$ & $c \cap p \neq \emptyset$

Putting everything together, the answerability condition then reads as in (14). 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.

[2]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 (11), as it is sufficient for the specific purpose of analyzing factive islands.

(14) Answerability condition
$c \succ Q$ only if $\exists p[\ \exists w[w \in c\ \&\ p \in Q(w)]\ \&\ c \subseteq dom(p)\ \&\ c \not\subseteq p\ \&\ c \cap p \neq \emptyset]$

2.2.2 Factive islands and answerability

Returning now to factive islands, we introduce (15) as our running example to be used for illustration below. (15) is a factive island case parallel to those in (1), featuring wh-movement from the complement of a factive predicate, here *know*, as well as uniqueness, as it is impossible for two different girls to be the tallest member of our team.

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

The values that the properties **R**, **P**, and **S** take on in this example are listed in (16). What sets factive island cases like (15) apart from acceptable examples like those in (3) or (7) is, of course, uniqueness. In the present format, the fact that the embedding predicate is factive plus the fact that its gapped complement denotes uniquely guarantees that **P** relates to the context set as shown in (17).

(16) $\mathbf{R} = \lambda x.\lambda w.$ 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

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

According to (17), the context set entails that **P** holds of at most one individual. For the case of (15), 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 (9), 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, (17) has the consequence in (18).

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

The observation at the heart of the answerability analysis is that given factivity plus uniqueness, the answerability condition is in conflict with another felicity condition on questions. According to a prevalent intuition, which Oshima (2007) takes at face value, a wh-question carries the presupposition that there is an individual who has both the restrictor and scope properties (e.g. Karttunen 1977; Dayal 1996; Fox and Hackl 2006; Abusch 2010). For example, the question in (4) (*Which member resigned?*) is taken to presuppose that some member resigned, and (7) (*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/Karttunen answers is true. Without encoding this existence presupposition in the denotation of the question, we propose the felicity condition in (19) so as to directly describe its pragmatic effect.[3]

(19) 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 will 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 **R**, **P**, and **S**, let $w_{X,Y,Z}$ be some possible world w such that {x: **R**(x)(w)} = X, {x: **P**(x)(w)} = Y, and {x: **S**(x)(w)} = Z. Consider now the toy context sets in (20) and (21), where a and b are individuals.

(20) a. $c = \left\{ \begin{array}{l} w_{\{a,\ b\},\ \{a\},\ \{a\}} \\ w_{\{a,\ b\},\ \{b\},\ \{b\}} \end{array} \right\}$

b. $c = \left\{ w_{\{a,\ b\},\ \{a\},\ \{a\}} \right\}$

(21) $c = \left\{ \begin{array}{l} w_{\{a,\ b\},\ \{a\},\ \emptyset} \\ w_{\{a,\ b\},\ \{a\},\ \{a\}} \end{array} \right\}$

Both context sets in (20) respect uniqueness plus factivity, as both entail that only one individual (a or b) has property **P**. Also, both context sets meet the existence presupposition, since the three sets determined by **R**, **P**, and **S** overlap in every context set world (with a or b as a common member). However, neither context set in (20) meets the answerability condition. In (20a), this is because the context set does not entail any individual to have the property **P**, hence it fails to entail

[3] Oshima (2007, 152) writes: "It is generally believed that a wh-interrogative presupposes that it has at least one true resolution; I too take this view, although it can be a matter of debate." See Dayal (2016) for a recent review of this debate. Dayal also discusses some puzzles arising from the assumptions that wh-questions invariably carry an existence presupposition. It is not entirely clear to us how to reconcile Dayal's observations with the answerability account, an issue we leave to future work.

the presupposition of any Hamblin/Karttunen answer. The context set in (20b) entails that **P**(a), so it meets the presupposition of the Hamblin/Karttunen answer **S**(a); however the context set also entails **S**(a) itself, so that this Hamblin/Karttunen answer is not informative relative to the context set.

In contrast, the context set in (21), which also respects uniqueness plus factivity, meets the answerability condition, since it entails **P**(a) without also entailing the proposition **S**(a) or its negation. However, this context set does not meet the existence presupposition, since in one of the context set worlds the set determined by **S** is empty, which entails the sets determined by **R**, **P**, and **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.[4] To show this, consider first the conjunction of factivity plus uniqueness in (18) and the existence presupposition in (19). 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 presupposition), then in every context set world, *the* proposition in the question extension with a true presupposition is true.

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

On the other hand, according to the answerability condition in (14), 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 (9), that proposition is **S**(x), for some individual x, where the domain of **S**(x) is characterized by **P**(x). Since every Hamblin/Karttunen answer equals **S**(y) for some individual y, factivity plus uniqueness in (17) and the fact that **P**(x) holds in every context set world ensure that **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.

[4]Since, as noted above, Oshima (2007) does not make the answerability condition explicit in the first place, the demonstration below is not found in Oshima's exposition. However, with reference to example (1b) above (**Who does Max know that Alice got married to on June 1st?*), Oshima notes: "[...] what [(1b)] asks can be paraphrased as: 'Of the x's such that it is in the common ground that Alice got married to x on June 1st, who is such that Max knows that Alice got married to him on June 1st?'. This results in pragmatic oddity for an obvious reason. In a quotidian context, it is natural to assume that a single person would not get married twice (to different persons) on the same day. If there is only one x such that it is known to the speaker that Alice got married to x on June 1st, the speaker should know the answer to his question before asking it. [...] This means that the speaker should expect the answer to be already known to him, and at the same time expect this expectation not to be fulfilled, which is possible only with an irrational mind." We take this passage to be pointing to the conflict between felicity conditions explicated in our rendition of the account.

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 (23).

(23) from factivity plus uniqueness, answerability condition
$c \nsubseteq \{w\text{: } [\iota p.\ p{\in}Q(w)\ \&\ w{\in}dom(p)](w)\}$

The statements in (22) and (23) are, of course, contradictory. Under the proposed analysis, then, the factive island questions are questions that, given factivity plus uniqueness, necessarily violate one of the two felicity conditions. It is this necessary violation that the answerability analysis holds responsible for the uninterpretability of factive island questions.

The answerability analysis moreover successfully discriminates between factive island cases like (15) and acceptable cases that lack uniqueness or factivity. As the reader is invited to confirm, removing either of these two ingredients results in question meanings that can consistently satisfy the existence presupposition and the answerability condition at the same time.

2.3 The contradiction analysis

Abrusán (2011, 2014) proposes an alternative analysis of factive islands that we call *contradiction analysis*. The key ingredient of this analysis is the proposal that presuppositions in wh-questions project universally, as was suggested independently in Schlenker (2008, 2009). According to this proposal, a presupposition triggered in the scope of the wh-phrase must hold for every entity described by the wh-phrase's restrictor. Employing again our notation from above, for a wh-question of the form *[wh R] S* the content of such a universally projected presupposition can be stated as the proposition in (24).

(24) Universal projection
$\{w\text{: } \forall x[\mathbf{R}(x)(w) \rightarrow \mathbf{P}(x)(w)]\}$

As evidence for universal projection, Abrusán reports that the question in (25), which features the factive verb *regret*, presupposes that Bill invited each of these ten people. The question in **??** repeated below as (26), makes the same point if it presupposes that each of the girls scored a goal.

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

(26) Which of these girls does Fred know scored a goal?

For the factive island case in (15), repeated below as (27), the hypothesized universal projection yields a contradiction, viz. the proposition that each of these girls is the tallest member of our team. It is this contradictory presupposition that Abrusán (2011, 2014) proposes to hold responsible for the factive island effect.

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

Apart from universal presupposition projection in wh-questions, the sources of the contradiction that Abrusán identifies are the factivity of the embedding predicate and the uniqueness guaranteed by the semantics of the gapped embedded clause, whose combined effect is encoded by the proposition in (28).

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

We saw that factivity and uniqueness are indeed necessary ingredients of the canonical factive island effect. However, expanding on Abrusán's exposition, for the universal projected presupposition in (24) to be contradictory, factivity plus uniqueness is obviously insufficient, as the propositions (24) and (28) are consistent. It is also necessary for restrictor plurality to hold, that is, for **R** to apply to more than one entity. This requirement is encoded by the proposition in (29), which is inconsistent with the conjunction of (24) and (28).

(29) Restrictor plurality
$\{w: |\{x: \mathbf{R}(x)(w)\}| > 1\}$

Assuming universal presupposition projection, then, the contradiction analysis isolates factivity plus uniqueness and restrictor plurality as the key features of factive islands.

In example (27), restrictor plurality is guaranteed by the wh-phrase's restrictor *of the girls*, which necessary holds of more than one individual. However, we have already seen examples of factive islands that do not share this feature. In the cases in (1), repeated in (30), the wh-phrase is bare *who(m)*, which does not encode plurality.

(30) a. *From whom do you regret having gotten this letter?
b. *Who does Max know that Alice got married to on June 1^{st}?

In those cases, one might want to attribute restrictor plurality to world knowledge, which plausibly guarantees the existence of more than one person. However, the factive island effect persists even when neither semantic meaning nor world knowledge ensures restrictor plurality. The variant of example (15) shown in (31) illustrates this.

(31) #Which girl in Group A does Fred know is the tallest member of our team?

In the absence of independently established information about Group A referred to (31), it is surely conceivable for that group to include no more than one girl. Even so, this question is perceived to suffer from the same uninterpretability as our running example (27). Without further assumptions, this judgment remains unexplained.

There is independent evidence, however, that wh-questions quite generally tend to imply restrictor plurality. For example, (32) is intuited to convey that there is more than one girl in Group A.

(32) Which girl in Group A scored a goal?

Restrictor plurality, then, is an independently attested inference in wh-questions at large, which the contradiction account can therefore rely on at no theoretical cost.[5]

In sum, elaborating on Abrusán's (2011, 2014) rendition of the contradiction analysis, then, the account credits the uninterpretability of canonical factive islands to a contradictory implication that arises from universal presupposition projection, given factivity plus uniqueness and restrictor plurality.

3 Evaluating the accounts

We begin our evaluation by delimiting the hypotheses that are to be evaluated. We note that both the answerability analysis and the contradiction analysis as presented above should ultimately be embedded in a more general theory regarding the relation between meaning and uninterpretability. In fact, both Oshima (2007) and Abrusán (2011, 2014) point to such a theory. Assuming that semantic presuppositions must be entailed by the context set (Stalnaker 1978), Abrusán points out that a contradictory presupposition carried by a sentence will result in that sentence being infelicitous relative to any (consistent) context set. Abrusán suggests that it is this necessary infelicity that leads to uninterpretability. As already reported above, Oshima (2007), too, proposes to reduce uninterpretability to necessary infelicity. So the difference between the two accounts merely resides in the hypothesized source of the necessary infelicity.

[5]The question remains how restrictor plurality inferences arise. We suggest (without demonstrating this here) that the effect is most naturally made to follow from assumptions that include the ingredients of the answerability analysis, viz. the wh-question's existence presupposition and (a version of) the answerability condition. If so, restrictor plurality inferences provide independent support for the assumptions underlying the answerability analysis, adding to the evidence adduced in section 3.1 below. If accepted, the assumptions underlying the contradiction analysis must then be taken to hold *in addition* to those underlying the answerability analysis. This is a coherent position, since the union of the two sets of assumptions is a consistent set.

Unfortunately, without further qualification, the general theory that both Oshima and Abrusán point to is descriptively inadequate. In particular, it is all too easy to construct interpretable wh-questions that have properties similar to those of canonical factive island cases and that this theory incorrectly predicts to be uninterpretable. The questions in (33) serve to illustrate this point.

(33) a. Which of these girls is as tall as herself?
b. Which of these girls knows that she is taller than herself?

Under the relevant question semantics, the extension of (33a) contains for any girl x, the proposition that x is as tall as x. Any such proposition being tautologous, (33a) necessarily violates the answerability condition, predicting uninterpretability under the answerability analysis. Similarly, the extension of (33a) contains for any girl x, a proposition presupposing that x is taller than x. Any such presupposition itself being contradictory, universal projection yields a contradiction too, predicting uninterpretability under the contradiction analysis. In both cases, this prediction is incorrect. The questions in (33) are intuited to be trivial in meaning, but surely neither of them is uninterpretable.

Even within the limited domain of wh-questions, then, it is at present unclear under both accounts how to properly generalize the specific assumptions designed to capture factive islands. In the following, we will therefore focus on more narrowly circumscribed commitments of the two analyses, viz. commitments that exclude canonical factive island cases while being consistent with the interpretability of the questions in (33).[6]

For the answerability analysis, we will focus on the assumption (consistent with the interpretability of (33a)) that uninterpretability can arise from necessary conflict between the – individually satisfiable – answerability condition and existence presupposition. With regard to the contradiction analysis, we scrutinize the assumption (consistent with the interpretability of (33b)) that uninterpretability arises from universal projection where the individual presuppositions in the set that universal quantification ranges over are contingent.

For the remainder of this paper, we will use the labels *answerability analysis* and *contradiction analysis* to refer to those specific respective assumptions. The question we will address is whether there is independent support for the analyses so construed.

[6]In the same vein as our point about (33), we note that the factive island effect is also observable in embedded position. This is illustrated by the unacceptability of **Ann wonders which of the girls Fred knows is the tallest member of our team*, where our running example question (15) appears embedded under *wonder*. As stated, the general pragmatic rationale suggested by Oshima (2007) and Abrusán (2011, 2014) does not apply to embedded factive island questions. However, since both the answerability analysis and the contradiction analysis home in on particular semantic features of factive island questions that hold irrespectively of their syntactic context, we submit that both accounts can in principle be generalized to apply to embedded questions. We will, however, not attempt such a generalization in this paper.

We will argue that the answerability analysis indeed has independent support (section 3.1). In contrast, we will report that, rather than providing evidence for contradiction analysis, the most obvious test cases turn out to undermine it (section 3.2).

3.1 Support for the answerability analysis

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 (34), whose unacceptability is due to wh-subextraction from a DP headed by the demonstrative determiner *that*.

(34) *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.[7]

Simonenko (2016) offers an account of the referential island effect that has much the same theoretical ingredients as Oshima's (2007) analysis of factive islands. Since this is not obvious from cursory inspection of the two works we will reformulate the analysis as presented in Simonenko's (2016) in a format that matches our above rendition of Oshima's (2007) answerability analysis of factive islands. 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 (34), this implies that the denotation of the demonstrative DP *that violent fan of* is a fixed individual, call it 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 (5), repeated in (35). Under the relevant semantics of the demonstrative, **R** and **S** in (34) take on the values in (36). The question itself then has the denotation in (37).

(35) Hamblin/Kartunnen semantics
$\lambda \text{w}.\{\mathbf{S}(\text{x})|\ \mathbf{R}(\text{x})(\text{w})\}$

[7] 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, which confirms that the immediate culprit of the DP-island effect is direct referentiality.

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

(37) $\lambda w.\{\lambda v.$ they arrested r in v | x is a team in w$\}$

Note now that the property **S** in (36) 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 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 (38): there is at most one proposition that serves a member of the questions extension in any context set world.

(38) 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 answerability analysis, is shown again in (39) and (40), repeated from (14) and (19) above.

(39) Answerability condition
$c \succ Q$ only if $\exists p[\ \exists w[w \in c \ \&\ p \in Q(w)] \ \&\ c \subseteq dom(p) \ \&\ c \not\subseteq p \ \&\ c \cap p \neq \emptyset]$

(40) Existence presupposition
$c \succ Q$ 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 (41).

(41) 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 (42).

(42) from extension rigidity, answerability condition
$c \nsubseteq \iota p[\exists w[w \in c \ \& \ p \in Q(w)]]$

What we have established is that given the inconsistency of the consequences in (41) and (42), extension rigidity guarantees that referential island questions necessarily violate either the existence presupposition or the answerability condition. As announced above, this analysis of referential islands closely parallels the answerability analysis. Both analyses derive the uninterpretability of the relevant questions from a conflict between the existence presupposition and the answerability condition, given the question's particular semantic signature. In the case of factive islands, this signature consists in factivity plus uniqueness, while in the case of referential islands it consists in 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 answerability analysis.

3.2 No support for the contradiction analysis

The contradiction analysis makes predictions about uninterpretability that go beyond canonical factive island cases. We will investigate relevant predictions with regard to two types of minimal modifications of such examples. In section 3.2.1, we examine cases which, under the contradiction analysis, constitute the declarative counterpart of canonical factive island cases. These are declarative sentences where contradictory presuppositions are predicted to project universally from under a quantificational expression. In section 3.2.2, we consider wh-questions that lack uniqueness but generalize the conflict between restrictor plurality and uniqueness held responsible for factive islands under the contradiction analysis.

3.2.1 No factive islands in declaratives

The contradiction analysis does not posit any assumptions that are specific to questions. In particular, universal projection of presuppositions is of course familiar from declaratives. Starting with Heim (1983), presuppositions have been proposed to project universally from under certain quantificational determiner phrases in declaratives. Chemla (2009) reports, in particular, that presupposition reliably project universally from under determiner phrases headed by the determiner *no*. For example, Chemla observes that (43), 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.

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

This suggests that our characterization of universal projection in wh-questions in (24), repeated below in (44), carries over unchanged to quantified statements of the form *[no R] S*. The intended presupposition for (43) falls out from this characterization, given that in (43) that the restrictor property **R** is the property of being one of these ten students and **P** is the property of having a father who will receive a congratulation letter.

(44) Universal projection
$\{w: \forall x[\mathbf{R}(x)(w) \rightarrow \mathbf{P}(x)(w)]\}$

Under the contradiction analysis, the obvious prediction is accordingly that the uninterpretability of canonical factive islands can be reproduced in declaratives with quantificational determiners like *no*. Abrusán (2011, 2014) does not discuss this prediction. Consider, then, the example in (45).

(45) None of these girls knows that she is the tallest member of our team.

Example (45) is to be compared to canonical factive island cases such as our running example (15), repeated again in (46). Just like (46), (45) instantiates factivity plus uniqueness and restrictor plurality shown in (47), which repeats (28) and (29).

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

(47) a. Factivity plus uniqueness
$\{w: |\{x: \mathbf{P}(x)(w)\}| \leq 1\}$
b. Restrictor plurality
$\{w: |\{x: \mathbf{R}(x)(w)\}| > 1\}$

For (45), universal projection is therefore predicted to result in a contradictory presupposition, viz. the presupposition that each of these girls is the tallest member of our team.

Speaker intuitions in fact bear out this prediction. That is, sentence (45) is indeed judged to carry this contradictory presupposition. Unsurprisingly, this judgment might cause (45) to be perceived as pragmatically deficient. But it is uncontroversial that this perceived deficiency is of a rather different nature than the uninterpretability attested in canonical factive island cases, such as our running example (46). While the uninterpretability of factive island questions has been likened to cases of ungrammaticality, (45) surely cannot be so characterized. In sharp contrast to (46), (45) is judged as contradictory, but not as ungrammatical or uninterpretable.

In sum, declaratives with a presupposition trigger under a quantificational expression provide an obvious test bench for the assumptions underlying the contradiction analysis of canonical factive islands. Judgments on the relevant cases, however, call those assumptions into question. To reconcile the contradiction analysis with the data presented above, it would need to be amended with a rationale for the observation that universally projected contradictory presuppositions yield ungrammaticality in wh-questions but not in parallel declaratives. In the absence of such a rationale, the declarative data furnish an argument against the contradiction analysis.

3.2.2 No factive islands without uniqueness

Let us focus one more time on the two features of factive island questions that under the contradiction analysis result in a contradictory presupposition, viz. factivity plus uniqueness and restrictor plurality, as catalogued in (47) above. Note now that we can generalize this pair of properties by replacing the cardinality 1 with an arbitrary cardinality n, n>1. This amounts to the substitution of *n-boundedness* and *n-plurality* in (48) for uniqueness and plurality.

(48) a. Factivity plus n-boundedness
$\{w: |\{x: \mathbf{P}(x)(w)\}| \leq n\}$
b. Restrictor n-plurality
$\{w: |\{x: \mathbf{R}(x)(w)\}| > n\}$

Suppose now that a given wh-question of the form *[wh R] S* has the semantic profile in (48), call it *numerical conflict*. That is, suppose that the question's semantic content guarantees the truth of the propositions in (48) for some n>1. Universal projection as described in (44) will then yield the presupposition that **P** applies to each of the more than n individuals that **R** applies to. Given that **P** applies to no more than n individuals, this presupposition is contradictory. Without further assumptions, therefore, the contradiction analysis places numerical conflict cases in a natural class with canonical factive island cases, excluding the former as uninterpretable in exactly the same way as the latter.

Numerical conflict cases therefore represent another straightforward test case for the contradiction analysis. Such test cases are not considered in Abrusán (2011, 2014), either. Consider, therefore, the question in (49).

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

This example is designed to instantiate the numerical conflict profile described above. Specifically, given that in (49) the values for **R** and **P** are as listed in (50), this example instantiates restrictor 3-plurality and 3-boundedness.

(50) $\mathbf{R} = \lambda x.\lambda w.$ x is one of these 4 girls
$\mathbf{P} = \lambda x.\lambda w.$ x finished in the top 3 in w
$\mathbf{S} = \lambda x.\lambda w$: x finished in the top 3 in w. Fred knows in w that x finished in the top 3

The question is accordingly expected to carry a contradictory presupposition, viz. the presupposition that each of these four girls finished in the top three. Without further assumptions, the contradiction analysis therefore leads us to expect that examples like (50) are no less uninterpretable than canonical factive island cases.

This is, however, not what we found. What we found is that speakers detect a contrast in acceptability between canonical factive island cases and numerical conflict cases, judging the latter to be interpretable. Just like declarative clauses of the sort discussed in the previous subsection, then, judgments about numerical conflict cases fail to furnish independent evidence for the assumption that universally projected contradictory presuppositions can be the source of uninterpretability.

That said, there is an important difference between numerical conflict cases and the declarative data. Recall that example (45), repeated below as (51), while interpretable, is judged to carry a contradictory presupposition, conveying that each of these girls is the tallest member of our team. In contrast, no such contradiction is attested in numerical conflict cases like (49).[8]

(51) None of these girls knows that she is the tallest member of our team.

Therefore, even though numerical conflict cases fail to lend support to the assumption that universally projected contradictory presuppositions lead to uninterpretability, their interpretability is potentially consistent with that assumption, as in those cases there is no sign of the expected universally projected presupposition in the first place.

So far, then, there is no argument against the contradiction analysis. However, the question remains why it is that the expected universally projected presupposition is absent in numerical conflict cases like (49). Below we consider three types of potential additions to the contradiction analysis that could in principle be posited to obviate the unattested presupposition: tacit domain restriction, local accommodation, and

[8] Six of the seven English native speakers we consulted reported perceiving a contrast between canonical factive islands and numerical conflict cases, while one speaker judged both types of cases equally unacceptable. The six speakers in the first group varied in terms of how easily they found it to interpret the numerical conflict cases. Some reported having no difficulties, and hence found the contrast between canonical island cases and numerical conflict cases to be crisp. Others required careful reflection before judging the latter cases to be acceptable, and accordingly found the relevant contrast to be more subtle. We speculate that the judgments of the speakers of the second type reflect a processing cost incurred by the suspension of the pragmatically deviant universally projected presupposition. We speculate moreover that a greater degree of the same difficulty is reflected in the judgment of the one speaker who reported perceiving no contrast between canonical factive island cases and numerical conflict cases.

weakening to existential projection. We argue that each of these additions is either excluded by considerations that are independent of factive islands or incompatible with the contradiction analysis' explanation for the uninterpretability of canonical factive islands. We will therefore conclude, that in the absence of a viable analysis of numerical conflict cases that is consistent with the contradiction analysis, such cases do present argument against the contradiction analysis.

Tacit domain restriction. One conceivable answer to the question why (49) is non-contradictory assumes that the content of a universally projected presupposition can sometimes be weakened as a consequence of tacit restriction of the domain of the wh-phrase. In parallel to what has been argued for quantificational phrases in declaratives (e.g. van der Sandt 1992; Geurts 1999; Geurts and van der Sandt 1999; Beaver 2001), wh-phrases might in particular be subject to tacit domain restriction by presupposed content. If so, then rather than denoting the property of being one of these four girls, the wh-restrictor in (49) might denote the stronger property of being one of these four girls and having placed in the top three. That is, the value of **R** in (50) would be replaced with the value in (52).[9]

(52) $\mathbf{R} = \lambda x.\lambda w.$ x one of these 4 girls in w & $\mathbf{P}(x)(w)$
$\mathbf{P} = \lambda x.\lambda w.$ x placed in the top 3 in w

Under this revision, universal projection no longer derives a contradictory presupposition. The projected presupposition is now that each individual who is one of these four girls and placed in the top three placed in the top three. Since this presupposition is not merely non-contradictory, but tautologous, it is predicted to not have any detectable effect.

In the present context, the crucial question is whether tacit domain restriction correctly discriminates between interpretable numerical conflict cases like (49) and uninterpretable canonical factive island cases like our running example (46). Why would domain restriction not obviate contradiction, and hence the factive island effect, in the case of (46) as well? The potential values for **R** and **P** shown in (53) have the very same effect in relation to (46) that the values in (52) have in relation to (49), rendering the universal presupposition tautologous.

(53) $\mathbf{R} = \lambda x.\lambda w.$ x is one of the girls in w & $\mathbf{P}(x)(w)$
$\mathbf{P} = \lambda x.\lambda w.$ x is the tallest member of our team in w

So the domain restriction in (53), if available, would preempt the very contradictory presupposition that the contradiction analysis holds responsible for the factive

[9]The domain restriction posited here is provided by a property, rather than a set (i.e., it is intensional rather than extensional). The possibility of wh-phrases being subject to tacit restriction by a property is also considered in George (2011).

island effect. Under the contradiction analysis, (53) must therefore be assumed to be unavailable. Given this, the question is how to exclude the undesirable domain restriction in (53) while allowing for the desired domain restriction in (52).

At first sight, this question might appear to have a straightforward answer. Note that under the domain restriction in (53), uniqueness ensures that **R** cannot truthfully apply to more than one individual. However, as we noted when first introducing the contradiction analysis, restrictors are generally interpreted as describing sets of at least two individuals, an inference whose content we encoded in the proposition in (29) above, repeated below as (54).

(54) Restrictor plurality
$\{w: |\{x: \mathbf{R}(x)(w)\}| > 1\}$

This restrictor plurality inference provides a natural way of discriminating between the intended (52) and the undesirable (53), as it is incompatible with the latter but compatible with the former.

However, despite this initially promising rationale, there are good arguments that, actually, (52) is not available any more than (53) is. Consider first the sentence in (55), in a reading where *she* is interpreted as anaphoric to the quantificational subject. In such a reading, the sentence seems contradictory, conveying that each of the four girls placed in the top three.

(55) None of these four girls knew that she placed in the top three.

This data point suggests that that the partitive phrase *of these four girls* resists tacit domain restriction even when such domain restriction would be required for non-contradictory interpretation. If resistance to tacit domain restriction is due to the syntax and semantics of such partitive phrases (Chemla 2009, Geurts and van Tiel 2015), then neither (46) or (49) should allow for domain restriction, excluding both (52) and (53) alike.

There is in fact even more direct evidence against the hypothesis that the acceptability of (49) depends on the domain restriction posited in (53). We note that in uncontroversial cases of tacit domain restriction, the tacitly restricted content of a wh-phrase can be taken up anaphorically. For example, B's answer in (56) can quantify over whoever A's question might be about.

(56) A: Which students speak English?
B: All of them. / All but Alex.

That is, if A is interpreted as asking which students in, say, this class speak English, then B's answer can likewise be understood as conveying that all of the students in this class, or all of them except Alex, speak English.

This observation suggests a natural experiment to investigate the presence of tacit domain restriction in the interpretation of numerical conflict cases. Under the hypothesis presently entertained, the wh-restrictor in A's question in (57) must be interpreted as describing a set containing only those among these four girls who placed in the top three, that is a subset of the four that has at most three members.

(57) A: Which of these four girls does Fred know placed in the top three?
B: All of them. / All but Alex.

Accordingly, in analogy to (57), it should be possible for the B's answers to make reference to that same set, yielding the contingent meaning that all of its members, or all but Alex, are such that Fred knows that they placed in the top three. However, such an interpretation of B's answer is clearly unavailable. Instead, the answer only has a contradictory interpretation, implying that all of the four girls, or all but Alex, placed in the top three. We conclude from these observations that the wh-phrase domain in A's question cannot actually be restricted in the way posited in (53). More generally, we conclude that tacit domain restriction cannot be held responsible for the absence of a contradictory presupposition in numerical conflict cases.

Local accommodation. Another conceivable answer to the question why numerical conflict cases like (49), repeated below in (58), are not judged contradictory relies on Heim's (1983) notion of local accommodation.

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

Local accommodation is a process assumed to convert non-projected presuppositional content into asserted content. In the case at hand, this means that the values for **P** and **S** in (50) above are replaced with those in (59), where the presupposition property is now trivial and the relevant content is added to the asserted meaning of the scope.

(59) $\mathbf{R} = \lambda$x.λw. x is one of these 4 girls
$\mathbf{P} = \lambda$x.λw. w = w
$\mathbf{S} = \lambda$x.λw. x finished in the top 3 in w & Fred knows in w that x finished in the top 3

This conceivable interpretation of (58) has the effect intended here, since local accommodation, by removing presupposition content altogether, preempts the projection of the contradictory presupposition. We note that is moreover in keeping with Heim's (1983) assumption that local accommodation applies under threat of inconsistency, precisely because the universal presupposition that local accommodation preempts would be contradictory.

However, it is clear that this analysis is not in fact compatible with the contradiction analysis of factive islands. The reason is that under the assumption that (59) is an available interpretation for (58), the parallel interpretation is predicted to be available for canonical factive island cases as well. That is, our running example in (46), repeated once more in (60), should allow for (16) above to be replaced with the interpretation in (61).

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

(61) **R** = λx.λw. x is one of the girls in w
P = λx.λw. w = w
S = λx.λw. x is the tallest member of our team in w & Fred knows in w that x is the tallest member of our team

Hence the contradiction analysis would no longer account for the canonical factive island effect, as it would also cease to derive contradictory presuppositions for those cases. Local accommodation, therefore, must be assumed to be unavailable across the board, and hence is not viable as an explanation for why the expected universal presupposition is absent in numerical conflict cases.

Weakening to existential projection. A third conceivable answer to the question why the expected universal presupposition is not attested in numerical conflict cases holds that the quantificational force of the projected presupposition is weakened from universal to existential. To make this concrete, suppose that under threat of inconsistency, the content of the projected presupposition described by (24) above, repeated below as (62), is weakened to (63).

(62) Universal projection
$\{w: \forall x[\mathbf{R}(x)(w) \rightarrow \mathbf{P}(x)(w)]\}$

(63) Existential projection
$\{w: \exists x[\mathbf{R}(x)(w) \ \& \ \mathbf{P}(x)(w)]\}$

On this analysis, instead of presupposing that each of these four girls finished in the top three, (49) merely presupposes, consistently, that some girl did.[10] More generally, this analysis correctly captures the absence of a contradictory presuppo-

[10] Under the assumption that wh-questions carry an existence presupposition (of the sort assumed under the answerability analysis), the existentially projected presupposition would not have any effect on overall meaning, as it is already entailed by the existence presupposition (here the proposition that for one of the five girls, Fred knows that she placed in the top three). Weakening to existential projection is then indistinguishable empirically from an alternative hypothesis according to which presuppositions do not project at all beyond the level of Hamblin/Karttunen answers.

sition in numerical conflict cases. However, the proposal suffers from the very same shortcoming as the local accommodation hypothesis discussed above. The present proposal, too, keeps the contradiction analysis from capturing the canonical island effect. In those cases, too, the weakening from universal to existential projection should be available to preempt a contradiction. Example (46) would no longer be predicted to presuppose that each of these girls is the tallest member of our team, but instead should allow for the weaker, consistent, presupposition that some girl is. So weakening to existential projection, too, fails to provide a viable explanation for the absence of a universally projected presupposition in numerical conflict cases.

We have now examined three different conceivable accounts of the absence of a contradictory universal projection in numerical conflict cases. On the one hand, an account in terms of tacit domain restriction turned out to not be feasible for reasons that are independent of the analysis of factive islands. On the other hand, we argued that analyses in terms of local accommodation or weakening to existential projection are incompatible with the contradiction analysis, as they fail to discriminate between canonical factive islands and numerical conflict cases. We are not aware of any other credible explanations for the absence of the expected projected presupposition in numerical conflict cases. In the end, then, numerical conflict cases furnish an argument against the assumption that the factive island effect is due to a universally projected contradictory presupposition.

3.3 Outcome of the evaluation

Our evaluation of the answerability analysis and the contradiction analysis has produced three results. First, the answerability analysis is motivated independently by data other than the factive island effect itself, viz. the referential island effect discussed in Simonenko (2016). Second, what we consider to be the most obvious manipulations for putting the contradiction analysis to the test, viz. the declarative counterparts of factive islands and numerical conflict cases, do not reveal any evidence for this analysis. Third, those manipulations in fact present challenges for the contradiction analysis. The contradiction analysis requires an explanation for why a contradictory universally projected presupposition does not render the declarative cases uninterpretable; and the absence of contradiction in numerical conflict cases seems to lack a credible account that would be compatible with the contradiction analysis.

We now add that the answerability analysis avoids those challenges. Given that the answerability analysis by design makes no predictions about declaratives, it is obviously compatible with the declarative data. The answerability analysis is likewise compatible with the interpretability of numerical conflict cases, given that the conflict between the answerability condition and the existence presupposition depends on uniqueness. Finally, the answerability analysis allows for the absence of contradiction in numerical conflict examples. Specifically, the answerability analysis can credit this absence to weakening of universal projection to existential projection. This is so because the answerability account depends on the factive presupposition being carried by the propositions in the extension of a wh-question, but it does not rely on any assumptions about how these presuppositions might further project at the question level.

To complete our evaluation, we note that Abrusán (2011, 2014) actually provides remarks intended to establish the insufficiency of the answerability analysis, and the need for the contradiction analysis. The argument makes reference to unacceptable *how*- and *why*-questions like those in (64), from Oshima (2007).

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

Like Oshima, Abrusán takes such *how*- and *why*-questions to form a natural class with the canonical factive island cases discussed in this paper. In fact, it is such cases that first gave rise to the observation that factive predicates can induce island effects (e.g., Rizzi 1990, Cinque 1990, Rooryck 1992). Yet Abrusán suggests that such examples are not captured by the answerability analysis. Specifically, Abrusán suggests that these cases lack the uniqueness ingredient that the answerability account requires. Aligned with Oshima (2007), we disagree with Abrusán's assessment. In support of our view, we suggest that *how*- and *why*-questions with additive *else* bolster the view that *how*- and *why*-questions in fact do instantiate uniqueness.[11]

To illustrate, we submit that the questions in (65) are felicitous only to the extent that they can be read as implicitly modalized.

(65) a. ?Why else did Alice insult Pat?
b. ?How else did Alice go to San Francisco?

That is, to the extent that these questions are acceptable, they are interpreted much like *Why else could Alice have insulted Pat?* and *How else could Alice have gone to San Francisco?*. Under the assumption that the wh-phrase's scope in (65) instantiates uniqueness, these judgments receive a natural explanation. As Harris (2014) observes, *wh else* trigger an additive presupposition. With scope properties instantiating uniqueness, this additive presupposition is expected to create incoherence, just

[11]Abrusán's own argument focuses on *how*-questions. It appeals to intuitions about possible linguistic answers to *How did Alice teach Max French?* (from Oshima 2007). Abrusán observes that this question could well be answered with *By private lessons and with emphasis on pronunciation and spelling.* Abrusán assumes that this answer expresses two different propositions in the question extension, concluding that uniqueness cannot hold. However, Abrusán does not motivate the assumption that the relevant answer indeed expresses two different propositions in the question extension, nor do we see any compelling reasons for accepting this premise of Abrusán's argument.

as in cases like *Who else is the tallest member of our team?*.[12] The observation that implicit modality can obviate the inconsistency then follows as well, since modalization can preempt uniqueness. Even if there can only be one cause of Alice's insulting Pat, one way of Alice going to San Francisco, and one tallest member of our team, the possible causes, possible ways, or possible tallest members may well be numerous. *How*- and *why*-questions, then, do not furnish an argument for the contradiction analysis.[13]

We accordingly take our results to support the answerability and to challenge the contradiction analysis. We take them to place the burden of proof on those wishing to argue that the contradiction analysis of factive islands is needed, viable, or superior to the answerability analysis, and this is what we consider to be the central outcome of our paper.

4 Conclusion

Both Oshima's (2007) answerability analysis and Abrusán's (2011, 2014) contradiction analysis capture the uninterpretability of canonical factive island questions. We have argued, however, while the answerability analysis is supported by independent considerations, the contradiction analysis is not. This result informs the ongoing debate regarding the proper notion of meaning triviality that induces judgments of ungrammaticality (Gajewski 2009, Abrusán 2014, Del Pinal 2017). It suggests that in

[12] The intuited incoherence created by the additive presupposition is expected under the assumptions of the answerability analysis. Given uniqueness, the additive presupposition is in conflict with the question's existence presupposition, and it also makes it impossible for the question to have an informative answer, in violation of the answerability condition. (Note that under the answerability analysis as construed above, this does not predict uninterpretability, since the additive presupposition is incompatible with both the existence presupposition and the answerability condition individually, not just with their conjunction.)

[13] Abrusán (2011) suggests in passing that the the factive island effect is also attested in degree questions, and moreover suggests that this fact remains unexplained under Oshima's (2007) analysis. Indeed, much like canonical factive islands, the question in (i), for example, seems uninterpretable. Assuming that the extension of (i) is comprised of propositions of the form λw: LENGTH(the rope)$\geq$d in w. Fred knows in w that LENGTH(the rope)$\geq$d, such cases are not captured under the answerability analysis, as they lack the uniqueness ingredient. However, it is not in fact clear that the latter assumption is correct. The infelicity of A's reply in (ii) (inspired by Spector and Sudo 2017) indicates that there the measure phrase only allows for an "exactly" semantics. If so, one might expect the propositions in the extension of (i) to be of the form λw: LENGTH(the rope)=d in w. Fred knows in w that LENGTH(the rope)=d, in which case (i) does instantiate uniqueness after all.

(i) *How long does Fred know that the rope is?

(ii) A: I've now measured the rope: it's exactly 3 meters long.
B: Do Fred and Bethany know?
A: #Well, Fred knows that it is 2 meters long.

order to properly apply to wh-questions, a comprehensive theory of this notion must make reference to felicity conditions on questions, and that meaning-based ungrammaticality cannot uniformly be attributed to the triviality of propositional content – a position that notably does not even receive mention in recent discussion of semantic island effects in questions (Dayal 2016, Del Pinal 2017).

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