

# Question Bias from Polarity Focus

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## Abstract

We argue that original bias in a subset of non-canonical polar questions is triggered by focus marking on some polar operator, such as low or high negation, VERUM, or conversational *really*. The proposed mechanism of bias generation rests on the assumption that, if a question partition cell is made salient by a contrasting focus antecedent, the speaker must be biased for that cell. While this mechanism generates a default bias that is weak, obligatory and of the opposite polarity to that of the focus domain, pragmatic factors may independently raise the degree of commitment and strengthen the bias.

**Keywords:** polar questions, original bias, polarity focus, degrees of commitment, salience

## 1 Introduction

Canonical polar questions, like (1), contain conventional interrogative features and are typically interpreted as neutral requests for information. In contrast, non-canonical polar questions contain some extra feature and are often not neutral. For example, (2) contains high ('preposed', 'light') negation and moreover, in addition to requesting information, it conveys some bias on the part of the speaker regarding the question prejacent.

- (1) Is it raining?
- (2) Isn't it raining?

In general, we take biases in polar questions to be derived from a variety of sources (for representative accounts, see Abels, 2003; van Rooy and Šafářová, 2003; Guerzoni, 2004; Romero and Han, 2004; Reese, 2007; Krifka, 2015; Malamud and Stephenson, 2015; AnderBois, 2019; a.o.). One obvious obstacle to theoretical uniformity is the fact that these biases may have different flavors. The kind of bias that we will be concerned with in this paper is what is usually called 'original' bias, or bias that reflects the prior belief of the speaker regarding the truth of the possible answers (Ladd, 1981; Romero and Han, 2004). This flavor of bias needs to be distinguished from intuitions about which possible answer is supported by the evidence available in the utterance context (Büring and Gunlogson, 2000; Romero and Han, 2004) or which possible answer is projected to enter the Common Ground

(Krifka, 2015; Malamud and Stephenson, 2015). From now on, when we talk about question bias, we will be referring to original bias.

We argue that a certain group of non-canonical polar questions form a natural class, on account of their (original) biases being derived from ‘polarity focus’, defined as narrow focus on some polar operator. These include questions with accented low negation, like (3), questions with a verum accent (an accent on the finite auxiliary), like (4), questions with conversational *really* (which we assume is accented by default; see Romero and Han, 2004), like (5), and high negation questions, like (6).<sup>1</sup> We will use capitalization in linguistic examples to mark the nuclear pitch accent and take it that all other material is prosodically neutral (i.e., follows the default polar question prosodic contour).

- (3) Is there NOT a vegetarian restaurant in this town?
- (4) IS there a vegetarian restaurant in this town?
- (5) Is there REALLY a vegetarian restaurant in this town?
- (6) Isn’t there a vegetarian restaurant in this town?

We will claim that the biases conveyed by all these question forms are fundamentally derived from polarity focus, although the specific characteristics of these biases also vary along (at least) three dimensions, i.e., direction (positive vs. negative), strength (weak vs. strong), and optionality (optional vs. obligatory). We will now take a moment to present these different dimensions in more detail, including the diagnostic tests we will be using to identify the specific settings.

We will determine the direction of the bias using a novel diagnostic called the Evidential Follow-up Test. This diagnostic involves a follow-up utterance which explicitly presents the evidential basis for the speaker’s prior belief. Note that we intentionally use reportative evidence (conveyed by a verb of saying), as such evidence is compatible with any degree of certainty and so does not intervene with the bias strength feature. Applying this diagnostic, a speaker can be biased either positively, as in (7), or negatively, as in (8).

- (7) Is Zelda NOT coming to the party? I mean, she said she would / #wouldn’t.
- (8) Is Zelda REALLY coming to the party? I mean, she said she #would / wouldn’t.

As for strength, we will diagnose the settings of this bias dimension using another novel diagnostic, or what we call the Epistemic Follow-up Test. This diagnostic involves the pairing of the targeted question form with two follow-up clauses that ostensibly spell out the bias conveyed by the question. Crucially, the two follow-up clauses vary with regard to the epistemic strength they bestow on this bias and may result in a match or a mismatch. For example, the high negation question in (9) can be felicitously combined with the weak epistemic modal *think* but is felt to be degraded when combined with the strong epistemic modal *be sure*. This indicates that

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<sup>1</sup>In Section 5.2, we will distinguish between two uses of *really*. In its ‘regular’ use *really* occurs low and composes with a lexically gradable predicate, while in its ‘conversational’ use it occurs high and signals a raised degree of commitment to the prejacent proposition.

the bias conveyed by such questions is weak. The *really*-question in (10) presents the opposite pattern, indicating that the bias it conveys is strong.

(9) Doesn't Boris play tennis? Because I thought / ?I was sure he did.

(10) Does Boris REALLY play tennis? Because I was sure / ?I thought he didn't.

Notice how the follow-up clauses are shifted to the past, which was done in order to align with the temporal properties of original bias. That is, the past tense entails that the speaker's respective certainty holds prior to uttering the question and so it may clash with the bias direction suggested by the current contextual evidence or intuitions regarding a projected answer.

Moving on to optionality, it is important to emphasize that while any polar question can convey bias in the right context, there are some polar question forms that always do. Therefore, in order to determine the settings for optionality, we need to probe for the possibility of a neutral reading, and only when such a reading is missing should we classify the relevant bias as being obligatory. We will employ two empirical strategies to this goal. Our first strategy is to explore whether we can identify a context where such a neutral reading is possible. As Gutzmann et al. (2020) and Goodhue (2022) have already pointed out, certain contexts elicit a neutral interpretation for verum-accented questions, thus suggesting that the latter are only optionally biased. This is illustrated in (11).

(11) DID Mary join the team? Because some say she did, others say she didn't.

Our second strategy for determining the optionality settings is to employ the neutrality marker *by any chance*, previously discussed in Sadock (1971), Reese (2007), and Reese and Asher (2010). This diagnostic is based on the observation that *by any chance* may only appear in utterances that can be interpreted as unbiased with regard to the truth of the prejacent. For example, pairing this marker with the declarative sentence in (12) results in infelicity whereas pairing it with the positive polar question in (13) is perfectly fine.<sup>2</sup>

(12) #By any chance, it is sunny.

(13) By any chance, is it sunny?

We thus take an infelicitous combination with *by any chance* as evidence that the targeted question form lacks a neutral interpretation, or—in other words—that it obligatorily conveys bias. For example, the infelicity of the question with *really* in (14) indicates that such questions are obligatorily biased.

(14) #By any chance, do you REALLY smoke?

Bringing all of this together, we are proposing that the bias conveyed by our targeted polar questions can vary in direction, strength, and optionality. Our main claim is that—despite this rich pattern of bias profiles—in all cases the fundamental

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<sup>2</sup>More generally, *by any chance* seems able to occur in positive polar questions and conditional antecedents only. A minimal semantics for it would then state that the speaker is ignorant as to which of the two polar alternatives is true.

trigger of bias is polarity focus. The formal mechanism itself is based on the idea that polarity focus points to a contrasting focus alternative that entails one of the question partition cells, thus making that cell semantically salient and conveying an (original) bias for it. This idea is codified as the principle in (15).

(15) *Salient Cell Principle*

Do not make semantically salient one of the question partition cells unless your prior belief state supports that cell.

More specifically, our claim is that polarity focus generates a bias that is weak, obligatory, and of the opposite polarity to that of the focus domain. The generated bias is weak by default, as the Salient Cell Principle requires a mere preference on the part of the speaker, although this weak bias may be further strengthened by pragmatic factors. Moreover, the bias is optional only if it is derived by a mechanism other than polarity focus (e.g., the question has a parse that does not include polarity focus at all). Finally, the direction of the bias is always opposite to the polarity of the focus domain because of the contrastive interpretation of focus.

We close this introductory section by clarifying our general strategy for deriving the different bias profiles. As already stated, our central claim is that all four targeted question forms are united by their bias being triggered from polarity focus and governed by the Salient Cell Principle. At the same time, the focus marking is carried by various polar operators (conversational *really*, high negation, VERUM), whose own interpretational effects should be established outside their use in biased polar questions. We thus aim at a modular approach, where the various bias profiles are derived in a uniform way as focus-based, but the independently motivated contribution of the different polar operators that carry the focus is also taken into account.

The rest of this paper will proceed as follows. Section 2 kicks off the discussion by diagnosing the bias profiles associated with our targeted polar questions. In Section 3, we introduce polarity focus and show how it derives the bias profile of accented low negation questions. Section 4 motivates our own version of a VERUM operator, which provides the machinery required to account for the bias profile of verum-accented questions. Next, in Section 5, we provide some background on degrees of commitment and use it to propose novel definitions of *really* and high negation, which then allows us to capture the bias profiles of questions with conversational *really* and high negation. In Section 6, we review two competing approaches, and Section 7 concludes.

## 2 Bias profiles in polar questions

This section will employ the diagnostic tests outlined in the previous section to determine the bias profiles of the four polar questions we are targeting in this paper.

To start with, we will identify the direction of the relevant biases. Applying the Evidential Follow-up Test, (16)–(19) show that questions with accented low

negation or high negation are associated with a positive bias, whereas questions with a verum accent or conversational *really* are associated with a negative bias.

- (16) Is Zelda NOT coming to the party? I mean, she said she would / #wouldn't.
- (17) IS Zelda coming to the party? I mean, she said she wouldn't / #would.
- (18) Is Zelda REALLY coming to the party? I mean, she said she wouldn't / #would.
- (19) Isn't Zelda coming to the party? I mean, she said she would / #wouldn't.

Before moving on, we make two remarks about the claimed negative bias in questions with conversational *really*, as in (18). A reviewer suggests that this question would convey a positive bias if, for example, the speaker is very excited that Zelda is coming to the party and just seeks confirmation from the addressee. While we agree that questions like these can be asked in a context where it is clear that the speaker's expectation is for a positive answer, we would argue that the question still conveys a negative original bias, or else the presented negative evidence for the speaker's prior belief would make no sense. In short, our claims only extend to the original bias profiles associated with the above question forms.

In a similar vein, another reviewer suggests that (18) conveys not a negative bias, but rather a lack of a positive bias regarding the prejacent. As evidence, the reviewer points out that such a question could be used in a situation in which the speaker had not even considered the possibility that Zelda was coming to the party. However, we argue that in such a situation the speaker's belief state is not unbiased. The situation that the reviewer seems to have in mind is one where the speaker held some general kind of belief that was incompatible with Zelda's coming to the party. For example, the speaker might have known that five people are coming to the party, where Zelda is not one of them, and might have concluded that no one else is coming. Upon hearing that Zelda is coming, the speaker realizes the conflict with her belief state and asks the question in (18) to resolve it. Differently put, if the speaker's prior belief state was truly indifferent as to whether Zelda is coming to the party, then the question in (18) would not have been felicitous.

We will now consider the strength features of the respective biases using the Epistemic Follow-up Test. The data in (20)–(23) indicate that questions with accented low negation, questions with high negation, and questions with a verum accent convey a weak bias, whereas questions with a conversational *really* convey a strong bias.

- (20) Does Paul NOT own a bike? Because I thought / ?I was sure he did.
- (21) DOES Paul own a bike? Because I thought / ?I was sure he didn't.
- (22) Does Paul REALLY own a bike? Because I was sure / ?I thought he didn't.
- (23) Doesn't Paul own a bike? Because I thought / ?I was sure he did.

It is important to stress that these judgments express defaults, in the sense that they capture the minimal degree of bias strength systematically associated with a given question form. Since a natively weak bias can be strengthened by external

factors, a strong bias should not always be taken to stem from the question form alone.<sup>3</sup> Overall, we will say that a given question form conveys a strong bias only if it does so systematically, or across different contexts. If it does not, i.e., if it varies in strength across different contexts, we will say that the question form conveys a weak bias.

As noted by several reviewers, the judgments related to bias strength are very subtle and call for a systematic collection of judgments. To this end, we recruited 48 participants from the Prolific crowdsourcing platform and presented them with the Epistemic Follow-up Test in (20)–(23). Specifically, participants saw screens like that shown in Figure 1 and were asked to choose whether the WEAK or the STRONG follow-up was most natural. After a short training phase, each participant was presented with each QUESTION TYPE twice, in a random order, for a total of eight trials. The content of the questions was counterbalanced across four lists, such that they were paired with each question type the same number of times. Finally, participants were told that words printed in bold font and capitalized should be read as though they were pronounced with strong emphasis or stress.

The results are pictured in Figure 2. Specifically, we found participants chose the WEAK follow-up when judging questions with high negation 78% of the time. Similarly, when judging questions with accented low negation or a verum accent, participants chose the WEAK follow-up 59% and 60% of the time, respectively. In contrast, for questions with conversational *really*, participants chose the STRONG follow-up 58% of the time.<sup>4</sup>

These results broadly align with our judgments from (20)–(23) and, together, provide a firm empirical foundation for an analysis explaining this variation. Most importantly, questions with conversational *really* were found to be the only type

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<sup>3</sup>A self-identified reviewer (Daniel Goodhue) provides an example that can be analyzed along these lines. That is, while high negation questions were found to convey a weak bias by default, in the context below this bias is strengthened by S's initial utterance, which implies certainty that Boris plays tennis.

- (i) *S is Boris's coworker. S knows Boris well professionally, but hasn't spent much time with him outside of work. S has talked with Boris about professional tennis around the water cooler, S has seen Boris carrying a tennis racket bag once or twice on his way out of work, and S believes she heard Boris making plans to play tennis with a mutual colleague once. From all of this, S has concluded that Boris plays tennis, and if someone were to ask her about her certainty level, she would say she is sure. A is married to Boris, and S is talking to A at the beginning of a company retreat:*

S: I'm going to ask Boris if he wants to be my doubles partner in the tennis round robin tomorrow.

A: Ha! That's rich! Boris doesn't own tennis SHOES let alone a tennis RACKET.

S: What? Doesn't Boris play tennis? (Because) I was sure he did/does.

<sup>4</sup>Following Barr et al. (2013), we further analyzed the data by constructing a logistic mixed-effect model with a random intercept for participant and a fixed effect for QUESTION TYPE. We determined the statistical significance of the fixed effect via model comparison, using a likelihood-ratio test, which revealed a significant effect for QUESTION TYPE ( $\chi^2(3) = 28.45, p < 0.001$ ). Follow-up tests revealed that all the contrasts were significant ( $p < 0.05$ ), except for the contrast between questions with accented low negation and those with verum accent.

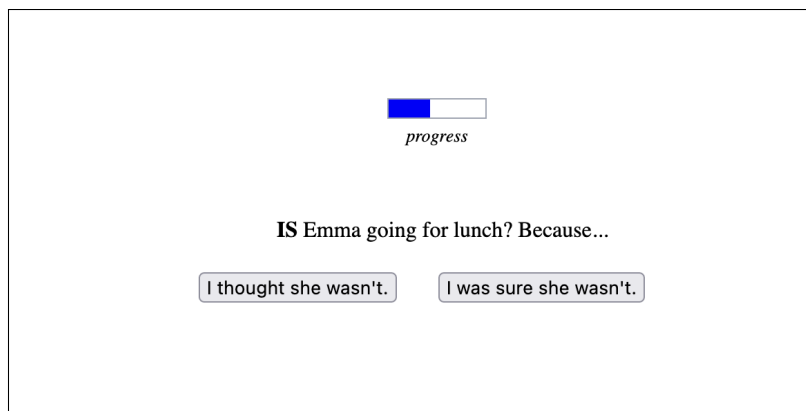


Figure 1: Method through which judgments were collected.

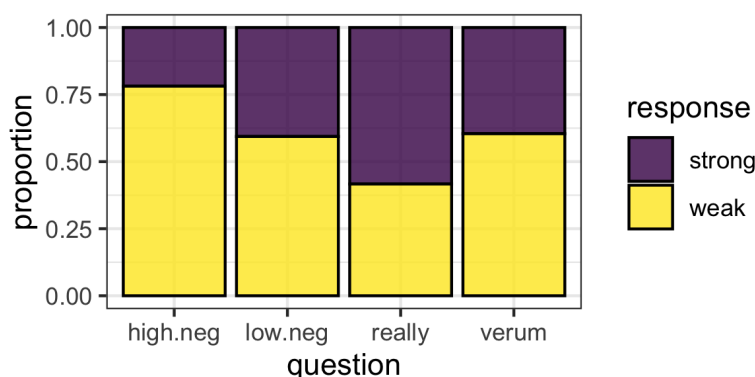


Figure 2: Proportion of WEAK vs. STRONG follow-up phrases preferred for each question.

that were predominantly judged as being strongly biased. Interestingly, the results also reveal an apparent contrast within the group of weakly biased questions itself, i.e., between questions with high negation and those with accented low negation or a verum accent. While we did not detect this contrast in our own judgments, in Section 5.4 we will make a tentative suggestion for why high negation questions seem to convey a bias that is extremely weak.

Finally, we will consider the optionality settings of the biases. As already mentioned in the Introduction, we have two avenues for determining these settings: trying to find a context where a neutral interpretation is possible and combination with *by any chance*. We start off by presenting several contexts, including some from previous literature, which show that questions with a verum accent can receive a neutral interpretation. That is, as shown in (24)–(26), when placed in a context containing evidence in favor of and against the question prejaent, a verum-accented question is acceptable and no longer biased.

- (24) DID Mary join the team? Because some say she did, others say she didn't.  
 (25) A: Did Karl kick the dog? (Gutzmann et al., 2020: 41)

- B: No, Karl didn't kick the dog.  
 C: No, he DID kick the dog.  
 A: Which is it? DID he kick the dog?

(26) *B wants to know whether Jill will be at a meeting for members of a club. But B lacks an opinion about whether Jill is a member.*

(Goodhue, 2022: 150)

- B: Will Jill be at the meeting?  
 A: If she's a member, she will.  
 B: IS she a member?

We now explore these questions further using our second strategy. As shown in (27), the combination of *by any chance* with all these questions seems to result in some form of infelicity, at least out of context.

- (27) a. #By any chance, do you NOT eat gluten?  
 b. #By any chance, DO you eat gluten?  
 c. #By any chance, do you REALLY eat gluten?  
 d. #By any chance, don't you eat gluten?

This is particularly surprising in the case of questions with a verum accent, like (27b), which we have just identified as being capable of receiving a neutral interpretation. As we outline in more detail in Section 4.3, this is because such questions carry a conflicting evidence presupposition that needs to be explicitly satisfied in a certain manner in order for this neutral interpretation to be accessible. So this apparent contrast in our tests is not a problem for us because optionality is not defined by the ability for a question to convey a bias, but rather from its possibility to receive a neutral interpretation. In sum then, when it comes to optionality, we have evidence that the bias conveyed by verum-accented questions is optional and we will assume that the biases conveyed by questions with accented low negation, questions with conversational *really* and high negation questions are obligatory.<sup>5</sup>

Table 1 brings together the empirical results. While these results exhibit only certain combinations of bias features, our account will view the three features (direction, strength, optionality) as logically independent and will impose no restrictions on specific combinations.<sup>6</sup> That is, we do not predict any sort of interaction or implication relations between the three bias features and so expect future research to uncover other combinations.

<sup>5</sup>Of course, this leaves open the possibility that we simply have not come across the right context to reveal similar readings for polar questions that we claim are obligatorily biased. While we cannot rule this out, the focus-based account we present below rules out such readings for the latter three polar question forms.

<sup>6</sup>As detailed in the following three sections, this is because the direction of bias depends on the polarity of the focused operator while the strength and optionality features depend on the lexical semantics of the focused operator and the presence or absence of focus, where these factors are generally unrelated.



question form	example	direction	strength	optionality
LNQ	<i>Is it NOT raining?</i>	positive	weak	obligatory
VrmQ	<i>IS it raining?</i>	negative	weak	optional
RlyQ	<i>Is it REALLY raining?</i>	negative	strong	obligatory
HNQ	<i>Isn't it raining?</i>	positive	weak	obligatory

Table 1: Summary of bias profiles. (Abbreviations: LNQ = accented low negation question, VrmQ = question with a verum accent, RlyQ = question with conversational *really*, HNQ = high negation question.)

### 3 Polarity focus and question cell salience

The cornerstone of our analysis is polarity focus, as it is the process that fundamentally generates the original bias. Therefore, we will start by providing a short background on focus as a general phenomenon, followed by a discussion of its bias effect when applied to negation in low negation questions.

#### 3.1 Background on focus interpretation

We will adopt ‘alternative semantics’, a prominent theory of focus which involves a feature  $F$  that marks syntactic constituents and generates alternatives relevant to interpretation (Rooth, 1985, 1992, 1997). According to this theory, each linguistic expression has two semantic values: ‘ordinary’ and ‘focus’. The ordinary semantic value of an expression  $\alpha$  is rendered as  $\llbracket \alpha \rrbracket$  and corresponds to its usual denotation. The focus semantic value of  $\alpha$  is rendered as  $\llbracket \alpha \rrbracket^f$  and is always a set of alternatives, although the shape of this set depends on the complexity of  $\alpha$  and on whether or not  $\alpha$  is  $F$ -marked. When  $\alpha$  is a lexical item that is not  $F$ -marked, its focus value is the singleton set comprised of the ordinary value of  $\alpha$ . In contrast, when  $\alpha$  is a lexical item that is  $F$ -marked, its focus value is some subset of all objects that are of the same semantic type as the ordinary value of  $\alpha$ . As for complex expressions, if  $\alpha$  is  $F$ -marked, its focus value is again some subset of all denotations of the same semantic type as its ordinary value. If  $\alpha$  is not  $F$ -marked, however, the focus value of a complex expression is derived by pointwise composition of the focus values of its immediate constituents, and so focus alternatives project up the tree. Formally, focus semantic values are generated via the recursive procedure shown in (28)–(29).

- (28) a. *Non-focused lexical items*:  $\llbracket a \rrbracket^f = \{\llbracket a \rrbracket\}$   
b. *Focused expressions (lexical or complex)*:  $\llbracket [\alpha]_F \rrbracket^f \subseteq D_\tau$ , if  $\llbracket \alpha \rrbracket \in D_\tau$
- (29) *Pointwise Function Application*  
a. If  $\llbracket \beta \rrbracket \in D_{\sigma \rightarrow \tau}$  and  $\llbracket \gamma \rrbracket \in D_\sigma$ , then  $\llbracket [\beta \ \gamma] \rrbracket^f = \llbracket [\gamma \beta] \rrbracket^f = \llbracket \beta \rrbracket^f(\llbracket \gamma \rrbracket^f)$ .  
b.  $X(Y) = \{x(y) \mid x \in X \text{ and } y \in Y\}$

Consider the sentence in (30) as an example. (28a) tells us that the focus values of *drink* and *beer* are the singleton sets of their ordinary values, and (29) further

derives that the focus value of the predicate *drink beer* is the singleton set comprised of its ordinary denotation. In turn, (28b) tells us that the focus value of  $[Mary]_F$  is some appropriately restricted set of individuals, e.g., the set comprised of Mary and Jane.<sup>7</sup> Combining the two focus values via (29), we obtain the range of alternatives, corresponding to Mary drinking beer and Jane drinking beer.

(30) MARY drinks beer.

- a.  $[_{TP} [Mary]_F [_{VP} \text{drink beer}]]$   
 b.  $[[\text{beer}]]^f = \{\text{beer}\}$ ,  $[[\text{drink}]]^f = \{\lambda y \lambda x \lambda w. \text{drink}_w(x, y)\}$   
 $[[[_{VP} \text{drink beer}]]^f = \{\lambda x \lambda w. \text{drink}_w(x, \text{beer})\}$   
 $[[[Mary]_F]]^f = \{\text{mary}, \text{jane}\}$   
 $[[[_{TP} [Mary]_F [_{VP} \text{drink beer}]]]^f = \left\{ \begin{array}{l} \lambda w. \text{drink}_w(\text{mary}, \text{beer}), \\ \lambda w. \text{drink}_w(\text{jane}, \text{beer}) \end{array} \right\}$

The *F*-feature was traditionally thought to lump together two distinct pragmatic functions, i.e., contrast and new information (Jackendoff, 1972; Rooth, 1992; Schwarzschild, 1999). However, there is mounting evidence that focus proper is always contrastive and that the new/given information marking is due to an independent discourse strategy (Halliday, 1967; Chafe, 1976; Kiss, 1998; Kratzer, 2004; Féry and Samek-Lodovici, 2006; Selkirk, 2008; Beaver and Velleman, 2011; Katz and Selkirk, 2011; Rochemont, 2013; Büring, 2019; Kratzer and Selkirk, 2020; Goodhue, 2022). We will adopt this latter view without discussion and view focus as always signaling a contrast. That is, we will assume that focus marks a phrase whose referent stands in a certain ‘contrastive’ relation to an antecedent that is present in the discourse or else can be accommodated. More specifically, a contrast is felicitously established only if the antecedent is among the focus alternatives of the focus domain but is different from the ordinary meaning of that domain. This relationship is outlined in (31), where the ‘squiggle’ operator  $\sim$  links the focus domain  $\phi$  and the contrasting antecedent *C*.

(31) *Contrasting Elements* (cf. Rooth, 1992: 90)

$$\phi \sim C \text{ is felicitous only if } C \in [[\phi]]^f \text{ and } C \neq [[\phi]].$$

To appreciate the impact of (31), consider the divergence in judgment in (32). Intuitively, in (32a) *Mary* can be contrasted with *Jane* (the remaining parts of the two clauses being equivalent) and the sentence is felicitous, while in (32b) *beer* finds no contrasting phrase and so the sentence is odd.

- (32) a. Jane drinks beer and MARY drinks beer (too).  
 b. #Jane drinks beer and Mary drinks BEER (too).

Here is how this follows. In (32a), the second conjunct finds as an appropriate antecedent the first conjunct, whose ordinary semantics is presented in (33). This antecedent is a member of the focus value of the second conjunct and also differs from its ordinary value, as shown in (34). The constraint in (31) then correctly predicts

<sup>7</sup>Specifically, we want to exclude ‘beer’ and other non-human objects from this set, thus barring implausible focus alternatives like ‘beer drinks beer’.

that (32a) is felicitous. However, the second conjunct in (32b) is expected to be out, as can be seen in (35). In this latter case, the first condition in (31) is violated because (33), the only potential antecedent, is not a member of the focus value of (35).

$$(33) \quad C = \llbracket \text{Jane drinks beer} \rrbracket = \lambda w. \text{drink}_w(\text{jane}, \text{beer})$$

(34) MARY drinks beer.

- a.  $[\text{TP} [\text{Mary}]_F [\text{VP drink beer}]]_\phi \sim C$
- b.  $\llbracket \phi \rrbracket = \lambda w. \text{drink}_w(\text{mary}, \text{beer})$   
 $\llbracket \phi \rrbracket^f = \left\{ \begin{array}{l} \lambda w. \text{drink}_w(\text{mary}, \text{beer}), \\ \lambda w. \text{drink}_w(\text{jane}, \text{beer}) \end{array} \right\}$
- c.  $C \in \llbracket \phi \rrbracket^f \checkmark, C \neq \llbracket \phi \rrbracket \checkmark$

(35) Mary drinks BEER.

- a.  $[\text{TP} \text{Mary} [\text{VP drinks} [\text{beer}]_F]]_\phi \sim C$
- b.  $\llbracket \phi \rrbracket = \lambda w. \text{drink}_w(\text{mary}, \text{beer})$   
 $\llbracket \phi \rrbracket^f = \left\{ \begin{array}{l} \lambda w. \text{drink}_w(\text{mary}, \text{beer}), \\ \lambda w. \text{drink}_w(\text{mary}, \text{wine}) \end{array} \right\}$
- c.  $C \in \llbracket \phi \rrbracket^f \times, C \neq \llbracket \phi \rrbracket \checkmark$

Now that we have introduced focus as a general phenomenon, we will consider its effects on polar elements. Just like any other phrase, focus can mark an operator that determines the polarity of a clause, a phenomenon that is called ‘polarity focus’. In this paper, we discuss the role of focus in generating bias when targeting four polarity operators: *not* (regular sentential negation), VERUM (a conversational operator manifested as a verum accent), conversational *really* (a special use of the degree adverb *really*), and *not<sup>high</sup>* (high negation). We will argue that, roughly, these operators fall into two pairs of positive/negative polar opposites: VERUM / *not* and conversational *really* / *not<sup>high</sup>*. In the current section, we discuss the effects of focus on *not*. The effects of focus on VERUM are discussed in Section 4, and those on conversational *really* and *not<sup>high</sup>* are discussed in Section 5.

We take the ordinary semantics of regular negation to be that of set-theoretic complementation, as expected. Its focus semantics has a bit more going on. When not *F*-marked, *not* denotes the singleton set comprised of its ordinary value. More importantly, when *F*-marked, we assume that *not* denotes a very restricted set of functions from propositions to propositions, i.e., the set comprised of its ordinary value and its positive counterpart.<sup>8</sup> The formal definitions are provided in (36) and follow similar proposals outlined in Wilder (2013), Samko (2016), Gutzmann et al. (2020), and Goodhue (2022).<sup>9</sup>

$$(36) \quad \text{a. } \llbracket \text{not} \rrbracket^f = \{ \llbracket \text{not} \rrbracket \} = \{ \lambda p. \neg p \}$$

<sup>8</sup>This positive counterpart corresponds to the at-issue component of the ordinary semantics of VERUM (see Section 4.2).

<sup>9</sup>For convenience, in the metalanguage we use the symbol  $\neg$  for both truth-conditional negation (of type  $t \rightarrow t$ ) and propositional negation (of type  $(s \rightarrow t) \rightarrow (s \rightarrow t)$ ).

$$\text{b. } \llbracket [\text{not}]_F \rrbracket^f = \{\lambda p.p, \lambda p.\neg p\}$$

Given this semantics, it follows that the focusing of propositional negation contrasts the host clause with an antecedent clause that is equivalent in every respect, except for the fact that it is of the opposite polarity. This can be seen in (37), where B's negative utterance is responding to the positive utterance produced by A.<sup>10</sup>

- (37) A: Susan likes ballet.  
B: Susan does NOT like ballet.

Formally, the polar contrast in (37) is established because both conditions imposed by the squiggle operator in (31) are met. This is outlined in (38)–(39).<sup>11</sup>

$$(38) \ C = \llbracket \text{Susan likes ballet} \rrbracket = \lambda w. \text{like}_w(\text{susan}, \text{ballet})$$

$$(39) \ \text{Susan does NOT like ballet.}$$

$$\text{a. } [\text{PolP } [\text{not}]_F [\text{TP Susan like ballet}]]_\phi \sim C$$

$$\text{b. } \llbracket \phi \rrbracket = \lambda w. \neg \text{like}_w(\text{susan}, \text{ballet})$$

$$\llbracket \phi \rrbracket^f = \left\{ \begin{array}{l} \lambda w. \text{like}_w(\text{susan}, \text{ballet}), \\ \lambda w. \neg \text{like}_w(\text{susan}, \text{ballet}) \end{array} \right\}$$

$$\text{c. } C \in \llbracket \phi \rrbracket^f \checkmark, \ C \neq \llbracket \phi \rrbracket \checkmark$$

Before discussing further how focus plays out in polar questions with sentential negation, we will present a salience principle that we propose generates original bias in polar questions across-the-board.

### 3.2 Bias through question cell salience

According to Hamblin (1973) and much subsequent work, the (ordinary) semantics of a polar question amounts to a partition with two cells which correspond to the question prejacent and its negation. An example of a positive polar question and its semantic composition is shown in (40). Importantly for our analysis, neither of the partition cells is predicted to be more salient than the other.

- (40) Does George cheat?
- a.  $[\text{CP Q } [\text{TP George cheat}]]$
- b.  $\llbracket [\text{TP George cheat}] \rrbracket = \lambda w. \text{cheat}_w(\text{george})$   
 $\llbracket \text{Q} \rrbracket = \lambda p. \{p, \neg p\}$   
 $\llbracket [\text{CP Q } [\text{TP George cheat}]] \rrbracket = \left\{ \begin{array}{l} \lambda w. \text{cheat}_w(\text{george}), \\ \lambda w. \neg \text{cheat}_w(\text{george}) \end{array} \right\}$

<sup>10</sup>Of course, focus on sentential negation need not involve disagreement between discourse participants. If the antecedent and the host clause do not lead to a contradictory contribution, they may be part of the same utterance, as in *Susan likes ballet or she does NOT like ballet, it really doesn't matter*.

<sup>11</sup>Since we are dealing with polarity phenomena, we will make the simplifying assumption that in all the relevant data the squiggle operator applies to the minimal clause that contains the focus-marked operator. This assumption is already present in prior literature (Wilder, 2013; Samko, 2016; Goodhue, 2022), albeit in an implicit form.

The Hamblin semantics is a fine analysis of neutral questions. However, in many cases one of the cells is presented as more salient, thus directing the addressee's attention to it and communicating a certain kind of bias. Since there may be different notions of salience, it is important to be clear about which particular notion we believe is at the heart of original bias.

For one, an overtly stated question prejacent is salient in that it reflects the discourse goals of the speaker (van Rooy and Šafářová, 2003). Relatedly, prior research has shown that the overt question prejacent must be compatible with the evidence supplied by the context—i.e., it must be supported or at least not contradicted by it (Büring and Gunlogson, 2000; Romero and Han, 2004; Roelofsen et al., 2012; Sudo, 2013; Domaneschi et al., 2017). However, this surface notion of salience is semantically invariant. That is, it is about the choice between pronouncing the positive cell  $p$  or the negative cell  $\neg p$ , which makes no difference in interpretation as it results in the same overall meaning, i.e.  $\{p, \neg p\}$ .

The notion that we have in mind is that of ‘semantic’ salience, where the choice of prejacent has interpretational effects above and beyond just delineating a question partition. For example, a focused low negation question like *Is it NOT raining?* and its unfocused variant *Is it not raining?* both delineate the same question partition. However, due to the contrastive focus interpretation, the former question also makes semantically salient the positive cell corresponding to ‘It is raining’. We propose that the bias effect of polarity focus in polar questions is underlied by this kind of salience mechanism. That is, we view polarity focus as a linguistic pointing device that makes one of the question cells semantically salient and conveys an original bias towards it.<sup>12</sup> We capture this general effect of question cell salience on bias by proposing the principle in (41).

(41) *Salient Cell Principle*

Do not make semantically salient one of the question partition cells unless your prior belief state supports that cell.

We now make several remarks on the scope, status and need of this principle. To start with, notice that all the Salient Cell Principle states is that making semantically salient a given partition cell should match the original bias of the speaker. Beyond that, this principle says nothing about how such salience is achieved, e.g., it is not specific to polarity focus or some other concrete mechanism. That is, polarity focus is just one way, among possibly many, of raising the salience of a given partition cell and generating a bias.<sup>13</sup>

As for its status, we view the Salient Cell Principle as a basic pragmatic principle that derives the attested biases in various question forms. That being said, one could still wonder why semantic salience and original bias should be so tightly

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<sup>12</sup>See also Goodhue (2022), where a similar strategy is employed to derive the emphatic effect of polarity focus.

<sup>13</sup>A potential alternative way is presented by questions in which *even* associates with a minimal element (e.g., *Did Jill even solve [the easiest problem]<sub>F</sub>?*). Abels (2003) and Guerzoni (2004) argue that such questions only make available the negative answer because a positive answer would clash with the presuppositions introduced by *even*.

linked in language. One idea is that this is because semantic salience plays a supportive role to the interrogative force of a question. That is, since the primary role of a question is to delineate a partition and raise an issue that needs to be resolved, by making one of the partition cells semantically salient the speaker is signaling that their prior belief state supports a particular way of resolving said issue.

A related question is whether the Salient Cell Principle is actually a required part of the analysis. That is, do we really need this principle, or is the resolution of polarity focus sufficient for deriving the attested biases? We do not see how polarity focus alone would suffice. All the focus semantics does is signal that the focus domain contrasts with a salient polar alternative. But this leaves open the issue of what effect, if any, this has on the interpretation of the interrogative utterance.<sup>14</sup> This is exactly where the Salient Cell Principle comes in: it links the presence of a contrasting focus alternative with the expression of bias.

We will now show how the combination of polarity focus and the Salient Cell Principle derives the bias profile of accented low negation questions.

### 3.3 Accented low negation questions

Accented low negation questions are polar questions with a pitch accent on a structurally low negation, like (42). As outlined in Section 2, such questions convey a positive, weak, and obligatory bias. In (42), this bias amounts to the speaker's prior belief that Susan does weightlifting.

(42) Does Susan NOT do weightlifting?

The basic process through which this bias (and the biases of all our other questions) is generated involves a combination of polarity focus and the Salient Cell Principle. That is, the antecedent of polarity focus is necessarily resolved to a focus alternative that is of the opposite polarity to that of the focus domain. Since this focus alternative entails the opposite polarity question cell and thus makes it semantically salient, we get the intuition that the speaker is biased for that question cell.

Here is how this reasoning applies to accented low negation questions. Consider (43), the semantic analysis of (42).

- (43) a.  $[[CP\ Q\ [PolP\ [not]_F\ [TP\ Susan\ do\ weightlifting]]]_{\phi} \sim C]$   
 b.  $[[PolP]] = \lambda w. \neg do_w(susan, weightlifting) = [[\phi]]$   
 $[[Q]] = \lambda p. \{p, \neg p\}$   
 $[[CP]] = \left\{ \begin{array}{l} \lambda w. do_w(susan, weightlifting), \\ \lambda w. \neg do_w(susan, weightlifting) \end{array} \right\}$   
 c.  $[[TP]]^f = \{\lambda w. do_w(susan, weightlifting)\}$   
 $[[not]_F]^f = \{\lambda p. p, \lambda p. \neg p\}$   
 $[[PolP]]^f = \left\{ \begin{array}{l} \lambda w. \neg do_w(susan, weightlifting), \\ \lambda w. do_w(susan, weightlifting) \end{array} \right\} = [[\phi]]^f$

<sup>14</sup>The contrast in (44)–(45) in the next section demonstrates that, in general, narrow focus in a polar question need not result in bias.

- d.  $C = \lambda_w \cdot do_w(susan, weightlifting)$
- e.  $C \in [\phi]^f \checkmark, C \neq [\phi] \checkmark$

We will begin by accounting for the polarity of the bias. Given the nature of polarity focus as generating just two focus alternatives, the only possible antecedent that contrasts with the negative focus domain is the positive alternative in (43d), i.e., the proposition that Susan does weightlifting. Since this alternative matches exactly one of the members of the question partition in (43b), i.e., the positive answer, the salience of that cell is raised. Now, according to the Salient Cell Principle raising the salience of a cell in this manner results in the conveying of original bias for that cell, so we end up with the intuition of a positive bias.

Moreover, note that the Salient Cell Principle does not specify the strength of the bias. It calls for a mere preference for the salient cell, not a strong belief or similar. This explains why in (43) the bias is weak. While this is generally true about our other polar questions, we will see that in certain cases the semantics of the focused operator and the resulting partition may strengthen the bias.

Finally, the bias in (43) is correctly predicted to be obligatory. The reason is that, once triggered by the presence of polarity focus, the process described above applies and a bias will be generated. Or, stated in reverse, in the absence of a prior preference there would be no reason for the speaker to raise the salience of the relevant cell in the first place.

One might wonder whether this kind of obligatory bias effect is also present when other, non-polar elements are narrowly focused. The short answer is that this need not be the case, since a bias will be generated only when a question partition cell is being made salient by the focus antecedent. The examples below provide a useful contrast.

- (44) Is JOHN the boss? I thought it was Mary. (negative bias)
- (45) I have no idea who the boss is. Is JOHN the boss? (no bias)

The question in (44) conveys a negative bias. This is because the speaker has a specific focus alternative in mind, i.e., the proposition that Mary is the boss. Since this proposition entails the question partition cell that expresses the negative answer (i.e., ‘John is not the boss’), the speaker is perceived as being negatively biased. In contrast, the question in (45) need not convey a bias, the reason being that the speaker likely has some non-specific focus alternative in mind. That is, the only plausible focus antecedent here seems to be the existential proposition that someone is the boss, which is implied by the interrogative complement of the previous sentence (i.e., *who the boss is*). Since no specific question partition cell is being made salient, no bias needs to be generated.

In sum, accented low negation questions are associated with a positive, weak, and obligatory bias. Their bias is positive, because the focus antecedent is identical and thus makes semantically salient the positive cell of the question partition. It is weak, because—as a default—the Salient Cell Principle requires a mere preference for the salient cell. And it is obligatory, because there would be no reason for raising the salience of the positive cell unless the speaker is biased for it.

## 4 The VERUM operator

The phenomenon of ‘verum accent’ involves a pitch accent on the finite auxiliary and, in the case of a declarative sentence, has the effect of emphasizing the truth of the expressed proposition (Höhle, 1992). For example, by uttering *Oliver IS from Australia*, the speaker stresses their belief that it is indeed true that Oliver is from Australia. This section presents our account of verum accent in terms of a VERUM operator and then goes on to show how this operator plays into the bias properties of verum-accented polar questions.

### 4.1 Core data on verum accent

Gutzmann et al. (2020) point out that verum accent is felicitous in two kinds of contexts: ‘contradictory’ and ‘affirmative’. Contradictory contexts are more common and arise when there is some dispute about whether the prejacent is true or false, as in (46).

- (46) A: Oliver is not from Australia.  
B: He IS from Australia.

In turn, affirmative contexts come about when the speaker and the addressee agree on the prejacent. We note that this use typically involves extreme adjectives like *amazing* or *horrible* (Cruse, 1986; Paradis, 2001; Morzycki, 2012). An example of such a context is presented in (47).<sup>15</sup>

- (47) *After a colloquium talk:*  
A: Paula is an amazing linguist.  
B: She IS an amazing linguist.

Crucially, a verum accent is not possible in neutral contexts—e.g., when a new issue has been raised by a neutral polar question (Wilder, 2013; Samko, 2016; Gutzmann et al., 2020). This is illustrated in (48).<sup>16</sup>

- (48) *Out of the blue...*  
A: Is it raining outside?  
B: #It IS raining.

That is, in order for a verum-marked declarative to be felicitous, the issue must have already been prejudged in prior discourse, as in (46)–(47).

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<sup>15</sup>In an affirmative context, verum accent is also possible with regular predicates, although the result is once again an ‘extreme’ interpretation. For example, if *It IS raining* has been uttered as a reaction to *It’s raining*, it would suggest a heavy rain and not just a light drizzle (cf. Umbach, 2011 on extreme verbs).

<sup>16</sup>Context neutrality is crucial here. That is, B’s utterance can be made felicitous if a conflicted context is somehow accommodated—e.g., if the question is not asked truly ‘out of the blue’ or if the positing of the question itself is interpreted as some kind of conflicting evidence.



## 4.2 Verum accent as a VERUM operator

There are two main approaches to analyzing verum accent. The ‘focus approach’ posits that verum accent involves focus marking on a positively specified polarity head that manifests itself as a pitch accent on some element in the left periphery (Laka, 1990; Wilder, 2013; Samko, 2016; Goodhue, 2022). This approach analyzes verum accent in essentially the same manner as we have analyzed polarity focus on negation in Section 3, modulo the difference in polarity. In turn, the ‘operator approach’ contends that a verum accent signals the presence of an operator with certain conversational properties (Romero and Han, 2004; Repp, 2012; Goodhue, 2019; Gutzmann et al., 2020). For reasons that we explore in detail in Author and Author (2021), we favor an explanation that is more in line with the latter approach. Here we simply present our account and demonstrate how it captures the core data presented in Section 4.1.

We propose that verum accent manifests the presence of a purely presuppositional VERUM operator that requires an epistemic conflict regarding the prejacent proposition in the given context. This is stated in (49).<sup>17</sup>

$$(49) \quad \llbracket \text{VERUM} \rrbracket_c(p) = p, \text{ provided that there is conflicting evidence about } p \text{ in } c$$

Conflicting evidence about  $p$  involves two mutually exclusive propositions: one providing evidence for  $p$  and the other providing evidence against  $p$  (cf. Büring and Gunlogson, 2000). Notice that contrasting evidence alone does not suffice, as such evidence need not produce an epistemic conflict and VERUM may not be licensed. Thus, if the positive and the negative pieces of evidence are presented as mere possibilities, a verum-marked sentence is degraded, as shown in (50).<sup>18</sup>

- (50) A: It’s possible that Oliver is from Australia.  
B: It’s also possible that he is from New Zealand (though).  
C: ?No, he IS from Australia.

Moreover, note that the strength of the two pieces of evidence does not need to be equal. As shown in (51), it is possible for one side of the evidence to be strong and the other side of the evidence to be weak, provided the outcome is that they conflict.<sup>19</sup>

- (51) A: Oliver is from Australia.  
B: Actually, he might be from New Zealand.  
C: No, he IS from Australia.

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<sup>17</sup>We will add a context variable to denotation brackets when the context makes a difference in meaning.

<sup>18</sup>C’s utterance in (50) is not entirely out. The reason, we suggest, is that strong positive evidence can be accommodated from C’s (verum-marked) assertion itself, thus deriving the required conflict with B’s utterance.

<sup>19</sup>An anonymous reviewer points out that a verum accent in (51) is not obligatory. However, our claim is not that a verum accent is obligatory in the presence of an epistemic conflict. Rather, our claim amounts to the reverse implication, i.e., that the presence of a verum accent (an overt reflex of VERUM) actively calls for an epistemic conflict.

We will now show how this simple semantics captures the distribution of VERUM in declaratives. Starting with contradiction contexts, recall from example (46) that the prototypical use of verum accent is as a denial that targets a negative utterance. In this case, the conflicting evidence presupposition of VERUM is satisfied as follows: the negative evidence comes from the previous utterance, while the positive evidence has two possible sources. One option is that this evidence is due to a prior positive utterance that the negative utterance is itself responding to. After all, one would generally not utter a negative sentence if the positive alternative had not been uttered or raised in some way. Even in the absence of such prior utterance, the conflicting evidence presupposition can be accommodated from the fact that the verum-marked sentence is being asserted, and thus provides strong positive evidence. However, in this latter case, we expect the sentence to be somewhat degraded, as shown in (50), due to the accommodation process. In any case, once the conflicting evidence presupposition is satisfied, VERUM is licensed.

As for affirmation contexts, we noted earlier that such uses typically involve extreme adjectives (or extreme readings of regular predicates), as demonstrated in (47). Morzycki (2012) proposes that extreme adjectives make use of the far end of the scale associated with the respective regular adjective. Following up on this idea, we can say that in (47) the extreme adjective *amazing* is parasitic on the regular adjective *good*, as it refers to extreme degrees of goodness. This derives the required epistemic conflict as follows. Let us assume that  $\langle \textit{good}, \textit{amazing} \rangle$  forms some sort of a pragmatic scale, such that a sentence with *amazing* naturally invokes the regular alternative with *good*. In (47), A's initial utterance of *Paula is an amazing linguist* will invoke the weaker alternative *Paula is a good linguist*. Now, if we allow that this latter alternative be strengthened to *Paula is a good but not an amazing linguist* by some standard scalar mechanism, we get an alternative that contradicts B's verum-marked utterance *She IS an amazing linguist*. In other words, the use of an extreme adjective creates an implicit contraction within the positive portion of the scale by splitting it into two non-overlapping regions. As a result, the conflicting evidence presupposition is met and VERUM is licensed once again.

Finally, our semantics for VERUM straightforwardly derives the observation that verum accent is out in neutral contexts, as in (48). That is, since such contexts lack conflicting evidence about the prejacent, the presupposition of VERUM is not satisfied and so a verum-marked sentence is out.

We should emphasize that there are several oblique ways to convey an epistemic conflict and license VERUM. Thus, an anonymous reviewer points out that a verum accent is possible in certain seemingly neutral contexts, citing the example in (52).

(52) *The speaker has got an errand to run and has been sitting around inside all day, worried that it is going to rain. She steps outside, sees that it is raining, and says (to no one in particular):*

Fuck! It IS raining.

However, it seems natural to assume that in such self-addressed utterances the linguistic context includes the internal dialogue of the speaker. If this step is taken, the use of verum accent in the above example will be in line with our account of

VERUM since the conflicting evidence requirement will be met. That is, the speaker is conflicted about the possibility of rain—e.g., because the weather forecast she heard earlier that day did not settle the issue, she has two contradicting pieces of evidence about the weather outside, or similar. Importantly, it would not be possible for (52) to be addressed to an unsuspecting pedestrian who is unaware of the conflicted mental state of the speaker.

In a similar vein, another reviewer contends that example (26), repeated below as (53), does not provide conflicting evidence about the prejacent, and so, the felicity of the verum-accented question at the end of the exchange seems to count against our account.

- (53) *B wants to know whether Jill will be at a meeting for members of a club. But B lacks an opinion about whether Jill is a member.*

(Goodhue, 2022: 150)

B: Will Jill be at the meeting?

A: If she's a member, she will.

B: IS she a member?

However, an epistemic conflict here is implicit in the conversational behavior of A and B. That is, on the one hand B must think that A has an opinion as to whether Jill is a member, or else B's second question would make no sense. On the other hand, A is unwilling to answer B's first question as to whether Jill will be at the meeting, suggesting that A is conflicted about whether Jill is a member.

We end this section with a discussion of how VERUM interacts with focus. Quapolar operator, VERUM is expected to be able to be *F*-marked.<sup>20</sup> We thus propose the focus semantics for VERUM in (54), where  $CE_c(p)$  stands for there being conflicting evidence about  $p$  in  $c$ . These lexical entries are very similar to those for regular negation in (36), but differ in the presence of the conflicting evidence presupposition and in polarity.

- (54) a.  $\llbracket \text{VERUM} \rrbracket_c^f = \{ \llbracket \text{VERUM} \rrbracket_c \} = \{ \lambda p : CE_c(p) \cdot p \}$   
 b.  $\llbracket [\text{VERUM}]_F \rrbracket_c^f = \{ \lambda p : CE_c(p) \cdot p, \lambda p : CE_c(p) \cdot \neg p \}$

What is the interpretational effect of focus marking on VERUM? In declaratives, this type of polarity focus is not expected to have a noticeable interpretational effect because, as just discussed, the contrasting negative alternative will typically be salient in the context (whether contradictory or affirmative). In polar interrogatives, however, this type of polarity focus will decide between the presence or absence of bias, as argued in the following section.

In sum, we have proposed an independently motivated analysis of verum accent in terms of a VERUM operator that carries a conflicting evidence presupposition. We now show how this operator plays into deriving the bias profile of questions with a verum accent.

<sup>20</sup>We do not take a stand on whether there is an intonational difference between *F*-marked and non-*F*-marked VERUM. Since VERUM is already manifested by a pitch accent, it stands to reason that focus marking on this operator has no noticeable prosodic effect.

### 4.3 Verum-accented questions

Just like in declaratives, when a verum accent features in polar interrogatives, we get the intuition of some kind of bias. For example, the question in (55) seems to convey a negative bias, i.e., that Mary did not join the team.

(55) DID Mary join the team?

Importantly though, in Section 2 we have established that the bias associated with verum-accented questions is optional, as it can disappear in certain contexts. One such context is (56), where evidence for and against the prejacent has been provided by other parties and the speaker herself does not take a stand. Note also that, in such a context, the question is compatible with the neutrality marker *by any chance*.

(56) DID Mary join the team(, by any chance)? Because some say she did, others say she didn't.

On top of being optional, we have also established that the bias triggered by verum accent is weak. We will now demonstrate that these bias characteristics (negative, weak, optional) follow from the semantics of VERUM and the Salient Cell Principle.

In order to derive the optionality of the bias, we propose that verum-marked polar questions may be associated with two (potentially homophonous) Logical Forms, one with and another without focus marking. While both forms contain VERUM and thus require conflicting evidence about the prejacent, only the variant in which VERUM is *F*-marked conventionally conveys a bias. That is, we propose that (55) is ambiguous between (57a) and (57b).

(57) a.  $[_{CP} Q [_{VERUM} [_{TP} \text{Mary join the team}]]]$  (unbiased)  
 b.  $[_{CP} Q [[_{VERUM}]_F [_{TP} \text{Mary join the team}]]_\phi \sim C]$  (biased)

The ordinary meaning of (57a) is the usual question partition that is comprised of the prejacent proposition and its complement. Since this structure also contains VERUM, it generates the presupposition of conflicting evidence about the prejacent. This is illustrated in (58).

(58) a.  $[_{CP} Q [_{VERUM} [_{TP} \text{Mary join the team}]]]$   
 b.  $[[_{CP}]_c = \left\{ \begin{array}{l} \lambda w . \text{join}_w(\text{mary}, \text{team}), \\ \lambda w . \neg \text{join}_w(\text{mary}, \text{team}) \end{array} \right\}$ ,  
 provided that there is conflicting evidence about  $\lambda w . \text{join}_w(\text{mary}, \text{team})$   
 in  $c$

Notably, no part of the evidence needs to originate from the speaker and it can stem from other contextual sources entirely, including reported sources, as in (56). This accounts for the possibility of an unbiased interpretation of verum-marked polar questions.

In turn, (57b) gives rise to the same question denotation and conflicting evidence presupposition. However, in this case VERUM is *F*-marked and thus requires a contrasting antecedent. The only such antecedent that meets the two conditions in (31) is the negative focus/question alternative, as shown in (59).

- (59) a.  $[\text{CP Q } [[\text{VERUM}]_F \text{ [TP Mary join the team]]}]_\phi \sim C]$   
 b.  $[[\phi]]_c = \lambda w. \text{join}_w(\text{mary}, \text{team})$ ,  
 provided that there is conflicting evidence about  $\lambda w. \text{join}_w(\text{mary}, \text{team})$   
 in  $c$   
 c.  $[[\phi]]_c^f = \left\{ \begin{array}{l} \lambda w. \text{join}_w(\text{mary}, \text{team}), \\ \lambda w. \neg \text{join}_w(\text{mary}, \text{team}) \end{array} \right\}$ ,  
 provided that there is conflicting evidence about  $\lambda w. \text{join}_w(\text{mary}, \text{team})$   
 in  $c$   
 d.  $C = \lambda w. \neg \text{join}_w(\text{mary}, \text{team})$   
 e.  $C \in [[\phi]]_c^f \checkmark, C \neq [[\phi]]_c \checkmark$

This semantics derives the negative direction of the bias in a straightforward manner. That is, in (59) the focus antecedent is necessarily resolved to the negative alternative of the focus domain. Since this alternative is logically equivalent to the negative cell of the question partition, this latter cell is being made semantically salient by the speaker and so, by the Salient Cell Principle, the speaker must be biased for that cell. Moreover, in the absence of contextual strengthening, the preference for the negative partition cell will convey a weak bias.

We close this section with a comment on the theoretical link between VERUM and accented low negation. Notice that, according to our proposal, an accent on low negation marks focus while verum accent signals the presence of VERUM, which may but need not be focused. This makes the asymmetric prediction that, where verum-accented questions are only optionally biased, accented low negation questions are obligatorily biased. The example in (60), raised by a self-identified reviewer (Daniel Goodhue), casts some doubt on the latter prediction. That is, since this question is uttered in a neutral context and contains the marker *by any chance*, it must be unbiased.

- (60) *S is looking for gluten intolerant people to participate in a study. She is asking random people on the campus green.*

S: By any chance, do you NOT eat GLUTEN?

One way to account for this is to argue that here the entire negative VP is focus marked, where the accents on *gluten* and *not* mark the size of the focused constituent. While non-standard accenting mechanisms may help explain away cases like these, we would also like to point out that if examples of unbiased polar questions with accented low negation are found to occur systematically, there is a fairly straightforward analytical option open to us. Specifically, we could analyze such questions as containing a FALSUM operator (cf. Repp, 2012; Romero, 2015; Frana and Rawlins, 2019)—a polar counterpart of VERUM, which presupposes conflicting evidence about the prejacent and is manifested as accented low negation. Most importantly, since FALSUM may or may not be focus marked, polar questions with accented low negation would not always convey a bias. We believe that pursuing this analytical option would be premature at this point.<sup>21</sup> Our point is simply that

<sup>21</sup>For example, accented low negation questions seem to be ruled out in the contexts that otherwise rule in an unbiased interpretation of verum-accented questions, like (24)–(26).

such an option exists and adopting it would constitute a straightforward revision of our current account of accented low negation.

Taking stock, we have derived the optionality, the negative direction, and the weak nature of the original bias in polar questions with VERUM. The optionality follows from the assumption that VERUM, qua polar operator, may (though need not) carry focus marking. The negative direction is due to the fact that when such marking is present, the contrasting antecedent will be resolved to the negative question alternative. And finally, the weak nature of the bias is a default that stems from the preference for the negative partition cell.

## 5 Modifying degrees of commitment

This section explores the effect of focus on conversational *really* and high negation in polar questions. We will argue that these two operators are closely related, in the sense that they are polar opposites that modify degrees of commitment. Since *really* is a regular degree modifier of gradable predicates, we begin by introducing degree modification, and then go on to show how the ‘regular’ and the ‘conversational’ uses of *really* can be derived from the same basic semantic content. Against this background, we argue that polar questions with conversational *really* and high negation have exactly the bias profiles that we expect them to have.

### 5.1 Background on degree modification

A standard assumption in the literature is that gradable adjectives denote relations between degrees and individuals (Cresswell, 1976; a.m.o.). More specifically, gradable adjectives encode functions that measure an individual along a given dimension and compare the resulting value to some degree. This is illustrated for *tall* in (61), whose denotation takes a degree  $d$  and an individual  $x$  and states that the degree of tallness of  $x$  meets or exceeds  $d$ .

$$(61) \quad \llbracket \text{tall} \rrbracket = \lambda d \lambda x \lambda w . d \preceq \mathbf{tall}_w(x)$$

The individual argument of gradable adjective meanings is provided by the subject of the host clause. The degree argument is filled and constrained by degree morphology (comparatives, superlatives, etc.) or degree modifiers. In this section, we will look at two degree modifiers that are directly relevant to our purposes, i.e., *very* and POS. In the following section, we will show how *really* is similar but also differs from these modifiers in one important way.

Intuitively, *very* requires that the degree to which the modified property applies exceeds the standard of comparison by a significant amount. This is illustrated in (62).

$$(62) \quad \text{Zelda is very tall.}$$

$\rightsquigarrow$  *Zelda’s height exceeds the average degree of tallness by a significant amount.*

What does it mean for a degree to exceed a standard by a ‘significant’ amount? One idea is that *very* enforces a simple comparison to a raised standard, where the raised standard is produced by restricting the comparison class to objects that meet the modified property (Wheeler, 1972; Klein, 1980; Stechow, 1984; Kennedy and McNally, 2005; Heim, 2006). For example, a very expensive laptop would be one that counts as expensive not just relative to the class of laptops but also relative to the class of expensive laptops. Another idea is that *very* involves a comparison to a regular or non-raised standard, although the degree to which the modified property applies has to exceed this standard by some large amount (Kennedy and McNally, 1999: 3.2.2; Barker, 2002; Katz, 2005; Morzycki, 2016: 3.5.6). How large this ‘large’ amount must be is context dependent. For example, given that the range of watch prices is greater than the range of laptop prices, the price of a very expensive watch will typically exceed the average watch price by a larger amount than the price of a very expensive laptop will exceed the average laptop price. For concreteness, we adopt the latter, boosted-comparison mechanism, because it emphasizes the parallel between *very* and *really*.

Specifically, we adopt the entry for *very* in (63), where **std** is a standard function that maps the gradable property  $P$  relative to some basic comparison class (of laptops, watches, etc.) to some norm and  $\prec\prec_c$  stands for the relation of being significantly greater in  $c$ .

$$(63) \quad \llbracket \text{very} \rrbracket_c = \lambda P \lambda x \lambda w . \exists d [ P(d)(x)(w) \wedge \mathbf{std}_{c,w}(P) \prec\prec_c d ]$$

For *very tall*, for example, this semantics produces a property according to which the individual in question exceeds the standard for tallness by some large amount, as determined by contextual information. This is shown in (64).

$$(64) \quad \begin{aligned} & \llbracket \llbracket \text{DegP very tall} \rrbracket \rrbracket_c \\ &= \lambda x \lambda w . \exists d [ d \preceq \mathbf{tall}_w(x) \wedge \mathbf{std}_{c,w}(\llbracket \text{tall} \rrbracket) \prec\prec_c d ] \\ &= \lambda x \lambda w . \mathbf{std}_{c,w}(\llbracket \text{tall} \rrbracket) \prec\prec_c \mathbf{tall}_w(x) \end{aligned}$$

We now discuss the positive form of degree constructions, which lacks overt degree morphology. As shown in (65), the intuition about this form is simply that the argument exceeds the relevant standard along the specified dimension. There is no requirement that there be a significant difference.

$$(65) \quad \begin{aligned} & \text{Zelda is tall.} \\ & \rightsquigarrow \text{Zelda's height exceeds the average degree of tallness.} \end{aligned}$$

How is this meaning derived? A common assumption is that the comparison in the positive form is facilitated by a null morpheme called POS (Cresswell, 1976; a.m.o.). What POS does is take a gradable property and state that this property applies to a greater degree than the relevant standard.<sup>22</sup> An entry for POS is given in (66).

<sup>22</sup>This is only true for the case of ‘relative’ gradable predicates, like *tall*, which have vague or contextually-dependent standards. When composing with ‘absolute’ gradable predicates, like *bent* or *straight*, the comparison makes reference to an endpoint (i.e., the minimum or the maximum of the scale).

$$(66) \quad \llbracket \text{POS} \rrbracket_c = \lambda P \lambda x \lambda w . \exists d [P(d)(x)(w) \wedge \mathbf{std}_{c,w}(P) \prec d]$$

When applied to *tall*, POS derives the property of being taller than whatever the contextual standard for *tall* is. This is shown in (67).

$$(67) \quad \begin{aligned} & \llbracket [\text{DegP POS tall}] \rrbracket_c \\ &= \lambda x \lambda w . \exists d [d \preceq \mathbf{tall}_w(x) \wedge \mathbf{std}_{c,w}(\llbracket \text{tall} \rrbracket) \prec d] \\ &= \lambda x \lambda w . \mathbf{std}_{c,w}(\llbracket \text{tall} \rrbracket) \prec \mathbf{tall}_w(x) \end{aligned}$$

Against this background, in the following section we argue that *really* achieves a similar interpretational effect to that of *very*, but arrives there through a different route, i.e., by virtue of being a quantificational counterpart to POS.

## 5.2 *Really*

It has been noticed that *really* has two major uses, which we call ‘regular’ and ‘conversational’ (Partee, 2004; Romero and Han, 2004; a.o.). In its regular use, *really* modifies a gradable adjective and implies that the property denoted by such an adjective applies to a greater degree than required by the relevant standard. In contrast, in its conversational use, *really* expresses definite certainty about the pre-jacent proposition.<sup>23</sup> As illustrated in (68), these two uses of *really* are distinguished both structurally (low vs. high attachment) and prosodically (non-default vs. default accenting).<sup>24</sup>

- (68) a. Zelda is really tall. (regular use)  
 $\approx$  *Zelda is very tall.*
- b. Zelda REALLY is tall. (conversational use)  
 $\approx$  *The speaker is definitely certain that Zelda is tall.*

We note that this apparent ambiguity is not restricted to English *really* and is in fact mirrored by similar operators in other languages, including Hebrew *mamaš* (McNabb, 2012), German *wirklich*, Bulgarian *naistina*, and Farsi *vâqean*. The fact that the same kind of meaning overlap is attested crosslinguistically suggests that we are in need of a unified semantics for *really*, one that brings the two uses (regular and conversational) under the same analysis.

In spite of these two uses, we claim that there is no real ambiguity involved and that we are dealing with a single lexical item. We thus view *really* as a degree modifier akin to *very* and POS. More specifically, we propose that *really* achieves a similar effect to *very* by virtue of being a quantificational counterpart to POS. While

<sup>23</sup>Romero and Han (2004: 624–625), citing personal communication with Anthony Kroch, argue that *really* has a third, ‘in-actuality’ use. They illustrate this use on the following example:

- (i) Gore really won the election though Bush is president.

However, in the absence of more examples, it is difficult to know whether this is in fact another use of *really* or just a version of the conversational use. We leave the issue to further research.

<sup>24</sup>Note that a sentence containing conversational *really* is often most naturally pronounced with a pitch accent on the auxiliary (e.g., *Zelda REALLY IS tall*). We take this pitch accent to signal the presence of VERUM and to be motivated by the pressure to maximize discourse coherence.



*very* requires a significant distance from the contextual standard, *really* signals negotiation about standards (Partee, 2004). That is, *really* quantifies over contexts ‘similar’ to the current one and states that in each such context the degree to which the gradable property applies lies above the standard (cf. Barker, 2002; McNabb, 2012; Beltrama and Bochnak, 2015). We formalize this idea in (69), where  $\approx$  is a similarity relation over contexts.

$$(69) \quad \llbracket \text{really} \rrbracket_c = \lambda P \lambda x \lambda w. \exists d [P(d)(x)(w) \wedge \forall c' \approx c [\mathbf{std}_{c',w}(P) \prec d]]$$

In essence, by universally quantifying over contexts, *really* eliminates potential imprecision about standards. As there may be several relevant standards beyond the default one associated with the current context, *really* states that all such standards are exceeded.

The regular use of *really* now comes for free. For example, the modification *really tall* amounts to saying that all relevant standards for tallness are exceeded, as shown in (70).

$$(70) \quad \begin{aligned} \llbracket [\text{DegP really tall}] \rrbracket_c & \\ &= \lambda x \lambda w. \exists d [d \preceq \mathbf{tall}_w(x) \wedge \forall c' \approx c [\mathbf{std}_{c',w}(\llbracket \text{tall} \rrbracket) \prec d]] \\ &= \lambda x \lambda w. \forall c' \approx c [\mathbf{std}_{c',w}(\llbracket \text{tall} \rrbracket) \prec \mathbf{tall}_w(x)] \end{aligned}$$

This meaning correctly predicts that, in its regular use, *really* is nearly synonymous to *very*. That is, *really* invokes several standards for tallness. This could be for various reasons: the exact current standard is unknown, it is vague, it is contested, etc. The speaker thus considers not just the current context but a number of similar contexts, each with its own standard for tallness, some of them looser and some of them stricter. Since all such standards are exceeded, including stricter ones, we derive the boosting *very*-like effect of *really*.

Capturing the conversational use of *really* is more challenging, as it is not immediately clear how to get from the degree adverb meaning in (69) to an inference about the certainty of the prejacent proposition. At the practical level, the problem is that the meaning of *really* expects a gradable property and cannot directly compose with a proposition. We thus propose that conversational *really* composes with a property of degrees of commitment. Following Krifka (2015) and Geurts (2019) (see also Hamblin, 1971; Gunlogson, 2003; Farkas and Bruce, 2010; a.o.), this property is created by the covert operator COM defined in (71).

$$(71) \quad \llbracket [\text{ComP COM } \phi] \rrbracket = \lambda d \lambda x \lambda w. d \preceq \mathbf{com}_w(x, \llbracket \phi \rrbracket)$$

Given this meaning, conversational *really* states that the degree of commitment to the prejacent proposition exceeds all relevant standards of commitment. The semantic composition is given in (72), where the individual argument is to be filled by a relevant conversational agent (the speaker, the addressee, or both of them).

$$(72) \quad \begin{aligned} \llbracket [\text{PolP [really]}_F [\text{ComP COM } \phi]] \rrbracket_c & \\ &= \lambda x \lambda w. \exists d [d \preceq \mathbf{com}_w(x, \llbracket \phi \rrbracket) \wedge \forall c' \approx c [\mathbf{std}_{c',w}(\llbracket [\text{ComP COM } \phi] \rrbracket) \prec d]] \\ &= \lambda x \lambda w. \forall c' \approx c [\mathbf{std}_{c',w}(\llbracket [\text{ComP COM } \phi] \rrbracket) \prec \mathbf{com}_w(x, \llbracket \phi \rrbracket)] \end{aligned}$$

Since contexts with stricter standards will require a higher-than-usual degree of commitment to the prejacent proposition, we get the intuition that conversational *really* brings in definite certainty.

We close this section with three important points about our commitment operator. The first point concerns the content of this operator. Why propose a commitment operator instead of some purely epistemic operator, say a covert equivalent to English *sure* or *certain*? Here we take a cue from Romero and Han's (2004: 626) observation that conversational *really*, despite its 'epistemic' flavor, has proper conversational implications. For example, conversational *really* is not always interchangeable with *sure/certain* (cf. *I REALLY am tired* vs. *?I am sure/certain I am tired*), a fact that would remain unexplained if we blur the distinction between expressions of commitment and expressions of purely epistemic certainty. In addition, notice that COM encodes a measure of commitment, which entails that commitment comes in degrees. While different sentiments about the issue have been expressed in the literature (Geurts, 2019), we see nothing wrong with the idea that commitment is a graded notion.

The second point has to do with the meaning dimension that COM contributes to. Notice that our COM, albeit a conversational operator, makes a purely at-issue contribution and takes scope under *really*. The worry then is that we are introducing a conversational operator that only carries regular entailments with it. However, the idea that covert operators are more likely to contribute to a single meaning dimension than their overt counterparts is not new. A well-known example from the literature on scalar implicature is the exhaustivity operator EXH, a covert counterpart to English *only* (Chierchia et al., 2013; a.m.o.). Importantly, while overt *only* presupposes its prejacent and entails that all stronger alternatives are false, covert EXH carries both of these inferences as regular entailments.

Our final point concerns the empirical observation, made in (68), that conversational *really* appears high in the structure and is typically accented. First, since conversational *really* takes scope over the propositional operator COM, the former needs to occupy a high structural position. As for the default accenting, we suggest that this is a reflex of the presence of COM. That is, since conversational *really* modifies a property (of degrees of commitment) which is covertly introduced, this property is manifested in the form of focus marking, which results in default accenting. As discussed in Section 5.4, this obligatory focus marking is the trigger of original bias in polar questions with conversational *really*.<sup>25</sup>

### 5.3 High negation

Given that conversational *really* raises the degree of commitment to the prejacent proposition, we may ask what other elements may occupy this same position, and more specifically what element may serve as a polar opposite to conversational

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<sup>25</sup>Notice that we only require theoretical focus marking of conversational *really* and not necessarily overt accenting. That is, our proposal is open to the possibility that this focus marking is expressed in some other way, or that an overt accent is present but less perceivable due to additional prosodic pressures.

*really*. We will assume that this role is played by high negation. High negation not only negates the prejacent but has additional interpretational effects (Baker, 1970; Ladusaw, 1979: ch.7; Schwarz and Bhatt, 2006; Ippolito and Su, 2014; Romero, 2015). Here we list three such effects, as established in prior literature, and show how our proposed semantics for high negation naturally captures them.

Ladusaw (1979) argued for two types of negation in English. Regular truth-conditional negation, here called ‘low’ negation, merely negates the prejacent, as in (73). In contrast, a different kind of negation is used in denial contexts. This latter kind, here called ‘high’ negation, not only negates its prejacent but additionally suggests that the prejacent has been raised in prior discourse. This is illustrated in (74).<sup>26</sup>

- (73) There aren’t any unicorns in the garden. (low negation)  
 $\rightsquigarrow$  *The speaker is convinced of the truth of the proposition ‘there are no unicorns in the garden’.*
- (74) There aren’t some unicorns in the garden. (high negation)  
 $\rightsquigarrow$  *The speaker is convinced of the falsity of the proposition ‘there are some unicorns in the garden’, which has been put forward by another speaker.*

Beyond its use in denials, subsequent work has attributed more properties to high negation. One such property is that high negation takes widest scope within its host clause. For example, Schwarz and Bhatt (2006) show that high negation in German always takes wide scope with respect to propositional operators, like conjunction or intensional operators. In addition, high negation has been shown to not license negative polarity items nor anti-license positive polarity items (Schwarz and Bhatt, 2006). This property is already visible in (73)–(74), where the negative polarity item *any* is only possible with low negation and the positive polarity item *some* is only possible with high negation.<sup>27</sup>

We view high negation as roughly achieving the opposite semantic effect to that of conversational *really*. That is, while conversational *really* raises the degree of commitment to the prejacent proposition, high negation denies any degree of commitment to it. This suggests that high negation is the same kind of expression as *really*, i.e., it is a degree modifier with certain negative characteristics. Formally, we propose that high negation takes a gradable property and an individual as arguments and states that the degree to which the property applies to the individual is the scale minimum—i.e., the individual entirely lacks the given property. This is shown in (75).

$$(75) \quad [\text{not}^{\text{high}}] = \lambda P \lambda x \lambda w . \forall d [P(d)(x)(w) \rightarrow d = \mathbf{min}(S_P)]$$

<sup>26</sup>These examples are slightly simplified versions of Ladusaw’s own examples.

<sup>27</sup>The literature lists yet another property of high negation, i.e., its ability to force a counterfactual reading when occurring in subjunctive conditional antecedents. Due to space limitations, we will not discuss this property here. However, notice that this property has been directly linked to factivity (Ippolito and Su, 2014) or bias (Romero, 2015), which resonates with what we are proposing below.

When composed with a property of commitments, high negation entails that the relevant agent lacks any degree of commitment to the prejacent proposition, see (76).

$$\begin{aligned}
 (76) \quad & \text{a. } \llbracket [\text{Comp COM } \phi] \rrbracket = \lambda d \lambda x \lambda w . d \preceq \mathbf{com}_w(x, \llbracket \phi \rrbracket) \\
 & \text{b. } \llbracket [\text{PolP not}^{high} [\text{Comp COM } \phi]] \rrbracket \\
 & \quad = \lambda x \lambda w . \forall d [d \preceq \mathbf{com}_w(x, \llbracket \phi \rrbracket) \rightarrow d = \mathbf{min}(S_{\llbracket [\text{Comp COM } \phi] \rrbracket})] \\
 & \quad = \lambda x \lambda w . \mathbf{com}_w(x, \llbracket \phi \rrbracket) = \mathbf{min}(S_{\llbracket [\text{Comp COM } \phi] \rrbracket})
 \end{aligned}$$

Notice how this semantics derives the three independently established properties of high negation mentioned at the beginning of this section. First, the fact that high negation fits denial contexts makes sense, since its role is to negotiate commitments. Second, high negation is expected to take widest scope within its host clause, since it occupies a high structural position. Finally, recall that high negation does not license negative polarity items nor does it anti-license positive polarity items. This behavior falls out from the fact that high negation scopes over COM, which creates an upward-entailing environment with respect to its propositional argument. This is because, if an agent is committed to some degree to a given proposition, she will be committed to anything entailed by that proposition to at least that same degree. If so, we correctly predict that high negation does not affect the distribution of polarity items in its scope.

Despite its name, according to our analysis high negation is a kind of degree modifier that refers to the bottom of the relevant scale. If so, it must be able to occur low as well, provided that the scale of the modified predicate is lower closed. Is such low occurrence of high negation possible and what do we predict about it? The important point here is that the resulting interpretation would be no different from that of regular truth-conditional negation, so this use either goes unnoticed or it is blocked by some economy constraint. To illustrate, let us assume that the minimal-degree adjective *bent* has the meaning  $\lambda d \lambda x \lambda w . d \preceq \mathbf{bent}_w(x)$ . Composing this meaning with the lexical entry for high negation in (75), we get for  $[not^{high} bent]$  the interpretation ‘being bent to a zero degree’. This is equivalent to ‘not being bent’, which is just the interpretation that would be produced by low (or regular) negation.

We now come to the most important part of this section, which concerns the formal link between *really* and high negation. *Really* and high negation are polar opposites, in the sense that the portions of the scale they cover do not overlap and include the relevant endpoints.<sup>28</sup> We then expect that their focus semantics is linked in a particular way. That is, we expect that these two operators form a natural class and thus contrast with each other when focused. More formally, we propose that, when *F*-marked, the focus semantic values for *really* and high negation are equivalent and amount to the set comprised of their ordinary values. This is stated in (77).

<sup>28</sup>In spite of that, notice that *really* and high negation are not ‘duals’ of each other, i.e., they are not placed symmetrically around the midpoint of the scale the way gradable adjectives like *tall/short* are. The reason is that, due to its quantificational nature, *really* covers a portion (i.e., the top portion) of the scale, while high negation refers to a fixed degree (i.e., the low endpoint).

$$(77) \quad \llbracket [\text{really}]_F \rrbracket^f = \llbracket [\text{not}^{\text{high}}]_F \rrbracket^f = \{ \llbracket [\text{really}] \rrbracket, \llbracket [\text{not}^{\text{high}}] \rrbracket \}$$

We have now put enough formalism in place to derive the bias profiles of polar questions with conversational *really* and high negation.

## 5.4 Questions with conversational *really* and high negation

In Section 2, we established that polar questions with conversational *really* are associated with a negative, strong, and obligatory bias. For example, (78) conveys the speaker’s prior certainty that this is not an Apple Watch.

(78) Is this REALLY an Apple Watch?

Since being an Apple Watch is not a gradable property, the use of *really* here cannot be a regular one and must be a conversational one.<sup>29</sup> Notice also that the bias inference is not a matter of context since it is not cancelable. For example, the question above is incompatible with the marker *by any chance*, which excludes the possibility of bias.

The general semantics for focus laid out in Section 3.1 and the specific focus semantics for *really* proposed in the previous section determine that the question prejacents in (78) contrasts with the respective high negation alternative. The formal details are spelled out in (79), where  $p$  stands for the proposition that this is an Apple Watch and  $\alpha$  is a free variable resolved to an appropriate discourse agent.

- (79) a.  $[\text{CP Q } [\alpha [\text{PoIP } [\text{really}]_F [\text{ComP COM } [\text{TP this an Apple Watch}]]]]]_{\phi} \sim C]$   
 b.  $\llbracket \phi \rrbracket = \llbracket [\text{really}] \rrbracket(\llbracket [\text{COM}] \rrbracket(p))(\alpha)$   
 $\llbracket [\text{CP}] \rrbracket = \left\{ \begin{array}{l} \llbracket [\text{really}] \rrbracket(\llbracket [\text{COM}] \rrbracket(p))(\alpha), \\ \neg \llbracket [\text{really}] \rrbracket(\llbracket [\text{COM}] \rrbracket(p))(\alpha) \end{array} \right\}$   
 c.  $\llbracket \phi \rrbracket^f = \left\{ \begin{array}{l} \llbracket [\text{really}] \rrbracket(\llbracket [\text{COM}] \rrbracket(p))(\alpha), \\ \llbracket [\text{not}^{\text{high}}] \rrbracket(\llbracket [\text{COM}] \rrbracket(p))(\alpha) \end{array} \right\}$   
 d.  $C = \llbracket [\text{not}^{\text{high}}] \rrbracket(\llbracket [\text{COM}] \rrbracket(p))(\alpha)$   
 e.  $C \in \llbracket \phi \rrbracket^f \checkmark, C \neq \llbracket \phi \rrbracket \checkmark$

We will start by outlining how the negative direction of the bias is derived. As just mentioned, the contrasting antecedent to the overtly expressed *really*-alternative must be the high negation alternative. The important thing to notice is that this latter alternative entails the negative cell of the question partition. That is, the lack of any commitment to  $p$  entails the lack of a strong commitment to  $p$ , i.e., the negative question partition cell. In this way, the negative question partition cell is being made semantically salient, and so the Salient Cell Principle mandates that the speaker must be biased for said cell.

This does not quite capture the negative direction of the bias conveyed by (78), though. The reason is that the bias predicted in (79) is towards the negative question

<sup>29</sup>This is in contrast with polar questions with regular *really*, like *Are you really hungry?*, which contain a gradable adjective and need not be biased.

partition cell, which merely denies a strong commitment to  $p$  and would be compatible with any lower degree of commitment. In order to do justice to the intuition of proper negative bias, we must make one additional assumption. It is that questions involving a heightened degree of commitment are part of a discourse strategy to answer a larger Question Under Discussion, which is about strongly committing to  $p$  or  $\neg p$ .<sup>30</sup> Specifically, we will assume that if a salient partition cell is linked in this way to another partition cell that is logically stronger, then the bias is in fact aligned with that stronger cell. Therefore, since the negative partition cell of the larger Question Under Discussion signals strong commitment to  $\neg p$ , the bias in (78)–(79) will be not just towards the lack of strong commitment to  $p$  but also towards a strong commitment to  $\neg p$ . This is in line with the intuition that questions with conversational *really* are negatively biased.

Moreover, in Section 5.2 we have assumed that conversational *really* is obligatorily focus marked, as an overt reflex of the presence of the commitment operator. This means that the above mechanism will always apply, and so the bias is correctly predicted to be obligatory.<sup>31</sup>

Finally, the above mechanism derives a mere preference, or a weak bias. However, owing to the semantics of *really*, this bias will typically be strengthened. That is, the issue raised by the question in (78) is whether or not we should strongly commit to  $p$ , as evidenced by the question partition in (79), which is of the form  $\{Rly(Com(p)), \neg Rly(Com(p))\}$ . We suggest that in such a context the only meaningful bias is a strong one. This is because the speaker is asking whether their interlocutor is willing to commit to a high degree to the relevant proposition, which is something one would conventionally do only if one had a strong prior belief in the opposite direction. A weak such belief would be of no use since it would ignore the

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<sup>30</sup>This is already suggested by the set of focal alternatives  $\{Rly(Com(p)), Not^{high}(Com(p))\}$  ( $\approx$  ‘Should we strongly commit to  $p$  or not commit to  $p$  at all?’), which seems to serve as an intermediary between the assumed Question Under Discussion  $\{Rly(Com(p)), Rly(Com(\neg p))\}$  ( $\approx$  ‘Should we strongly commit to  $p$  or  $\neg p$ ?’) and the *really*-question  $\{Rly(Com(p)), \neg Rly(Com(p))\}$  ( $\approx$  ‘Should we strongly commit to  $p$  or not?’). That is, the Question Under Discussion entails the set of focal alternatives, which in turn entails the *really*-question—in the sense that a complete answer to a former question would entail a complete answer to a latter question (e.g., Roberts, 2012).

<sup>31</sup>A self-identified reviewer (Daniel Goodhue) objects that conversational *really* is not always accented. One of the reviewer’s examples is shown below, where the claim is that *really* may, but need not be, accented.

(i) *Two friends are gossiping about the marriage of a mutual friend.*

A: And so then she told him he could just pack up his things and leave.

S: Did she really SAY that?

We agree that there is a pronunciation of the above question where the accenting on *really* is at least less prominent than it could be. However, we would note that, in order to capture the obligatory bias effect of conversational *really*, we only require theoretical focus marking and not necessarily overt accenting. That is, our proposal is in principle compatible with such focus marking being signaled in some other way (e.g., by a high structural proposition or by the absence of a grammatically gradable predicate). That being said, for the purposes of this paper we will assume that an overt accent on conversational *really* is present by default, but may be less perceivable or even absent altogether in certain contexts due to additional prosodic pressures.

conversational importance of the issue raised by the question partition.

We now turn to polar questions with high negation. Recall from Section 2 that such questions are associated with a positive, weak, and obligatory bias. In (80), for example, the speaker conveys their prior suspicion that this is an Apple Watch. This inference cannot be canceled, e.g., the question does not accept modification by *any chance* and cannot be used in a neutral context.

(80) Isn't this an Apple Watch?

The formal analysis of (80) is presented in (81) and closely resembles that in (79), with the roles of the positive and the negative focus alternatives being reversed. Because of this, we now get as a contrasting antecedent the corresponding alternative with conversational *really*. Notice also our assumption that high negation is obligatorily focus marked. We make this assumption for the same reason as in the case of conversational *really*, i.e., as a way to manifest the presence of COM.<sup>32</sup>

- (81) a.  $[\text{CP Q } [\alpha [\text{PoIP } [\text{not}^{\text{high}}]_F [\text{ComP COM } [\text{TP this an Apple Watch}]]]]]_{\phi} \sim C]$   
 b.  $[\phi] = [\text{not}^{\text{high}}]([\text{COM}](p))(\alpha)$   
 $[\text{CP}] = \left\{ \begin{array}{l} [\text{not}^{\text{high}}]([\text{COM}](p))(\alpha), \\ \neg[\text{not}^{\text{high}}]([\text{COM}](p))(\alpha) \end{array} \right\}$   
 c.  $[\phi]^f = \left\{ \begin{array}{l} [\text{not}^{\text{high}}]([\text{COM}](p))(\alpha), \\ [\text{really}]([\text{COM}](p))(\alpha) \end{array} \right\}$   
 d.  $C = [\text{really}]([\text{COM}](p))(\alpha)$   
 e.  $C \in [\phi]^f \checkmark, C \neq [\phi] \checkmark$

In view of this parallelism, the polarity and optionality features of the bias in (80) are derived in a similar manner as in the counterpart sentence with *really* in (78). That is, the focus antecedent in (81) entails the positive question partition cell (the one with both propositional and high negation in it, of the form  $\neg \text{Not}^{\text{high}} \text{Com}(p)$ ), since being strongly committed to  $p$  entails the presence of some positive degree of commitment to  $p$ . This fact raises the salience of the positive cell and directs, through application of the Salient Cell Principle, the bias towards that cell.

Once again, this does not yet derive the positive direction of the bias, since being committed to  $p$  to some degree (e.g., considering  $p$  to be a mere possibility) need not amount to full commitment to  $p$ . As above, we can sharpen our prediction if we assume that the bias is in fact directed at the positive cell of the larger Question Under Discussion, which conveys a strong commitment to  $p$  and correctly predicts the intuition of a positive bias. Moreover, since the focus marking on high negation must be interpreted, this bias is obligatory.

As for strength, high negation questions like (80) convey a weak bias, in contrast with the strong bias conveyed by counterpart questions with conversational

<sup>32</sup>Han and Romero (2004) provide tentative phonetic evidence that preposed negated auxiliaries are associated with a higher pitch than auxiliaries in affirmative questions. In spite of that, an accent in high negation questions is not clearly perceivable. One possible explanation is that, since it contracts with the auxiliary, high negation cannot be prosodically prominent at all, because accenting the auxiliary would manifest the presence of VERUM (recall Section 4.2).

really like (78). The reason for this contrast becomes clear when we ask what the question partition in (81) actually says. Being of the form  $\{Not^{high}(Com(p)), \neg Not^{high}(Com(p))\}$ , this partition raises the issue of whether or not we should commit to  $p$  to any degree. Since this issue does not call for any raised degree of commitment, no strengthening has to apply and the bias can remain weak.

Finally, recall from Section 2 that the bias strength in high negation questions is not just weak, but appears to be even weaker than the bias found in polar questions with accented low negation or verum accent. We will not attempt an explanation here, our goal being simply to establish the basic contrast between weak vs. strong bias. However, given that the issue raised by high negation questions is about assigning a minimal degree of commitment, one idea is that we actually get additional weakening of an already weak bias. At this point, this is just a speculation and we leave the possibility of multiple degrees of bias strength to future work.

## 6 Previous work

This section critically evaluates two previous approaches to original bias in polar questions of the kind discussed here: the epistemic approach of Romero and Han (2004) and the decision-theoretic approach of van Rooy and Šafářová (2003). As we will see, none of these approaches are able to capture the full range of the data.<sup>33</sup>

### 6.1 Epistemic approach

Epistemic accounts to original bias are based on the idea that a question partition may reveal a certain attitude towards the question prejacent (Romero and Han, 2004; Repp, 2012; Frana and Rawlins, 2019; Goodhue, 2019; Silk, 2019). While we focus here on the account in Romero and Han (2004), who ushered in the epistemic approach, we take the main limitations of this account to be shared by the approach as a whole. This account assumes that what polar questions with a verum accent, high or accented low negation, or conversational *really* have in common is that they all contain a meta-conversational operator VERUM, which states that the relevant agent is certain that the prejacent proposition should be added to the Common Ground. In addition to its lexical meaning, the use of VERUM is subject to a pragmatic economy principle which requires the presence of an epistemic conflict. An entry for VERUM and a (slightly simplified) formulation of the Principle of Economy are stated in (82)–(83).

$$(82) \quad \llbracket \text{VERUM}_x \rrbracket = \lambda p \lambda w. \forall w' \in \text{Epi}_{x,w} \forall w'' \in \text{Conv}_{x,w'} [p \in \text{CG}_{x,w''}] \\ =: \text{ForSureCG}_x$$

$$(83) \quad \textit{Principle of Economy}$$

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<sup>33</sup>We will put aside the approach to question bias based on projected discourse developments (see Krifka, 2015; Malamud and Stephenson, 2015; AnderBois, 2019). This is because we think that this approach models a notion that is very different from original bias, which is our focus here.



Do not use a meta-conversational move unless necessary to resolve an epistemic conflict.

Here is an illustration of how this accounts is put to use. The analyses of polar questions with a verum accent and high negation are presented in (84) and (85), respectively.<sup>34</sup> The pronounced cell of the question partition is placed in a box.

(84) IS Jane coming?

- a.  $[\text{CP Q VERUM}_x [\text{TP Jane coming}]]$   
 b.  $\left\{ \begin{array}{l} \boxed{\text{ForSureCG}_x(\lambda w. \text{coming}_w(\text{jane}))}, \\ \neg\text{ForSureCG}_x(\lambda w. \text{coming}_w(\text{jane})) \end{array} \right\}$

(85) Isn't Jane coming?

- a.  $[\text{CP Q not VERUM}_x [\text{TP Jane coming}]]$   
 b.  $\left\{ \begin{array}{l} \text{ForSureCG}_x(\lambda w. \text{coming}_w(\text{jane})), \\ \boxed{\neg\text{ForSureCG}_x(\lambda w. \text{coming}_w(\text{jane}))} \end{array} \right\}$

Notice that both denotations amount to essentially the same epistemic or ‘unbalanced’ partition, which presents a choice between being certain and not being certain that the prejacent proposition should be added to the Common Ground. The only difference lies in which cell of the question partition is the pronounced one, i.e., the positive cell (as in (84)) or the negative cell (as in (85)). This correctly predicts that VERUM-based forms like these are typically used when the speaker’s prior expectation is in conflict with the available evidence, as per the Principle of Economy.

This account does well with predicting the direction of the bias in such VERUM-based forms, due to the assumption that the speaker always requires evidence for the pronounced cell, a concept that Romero and Han call the ‘intent’ of the question. This assumption derives the observation that the bias in the targeted forms is always of the opposite polarity to the prejacent in the following way. Starting with (84), the pronounced cell is the positive one, corresponding to our being certain that ‘Jane is coming’ should be added to the Common Ground. Since the speaker is requiring evidence for that cell, given the epistemic conflict mandated by the Principle of Economy, the contextual evidence must be in favor of the prejacent and the speaker must be doubting it, hence the negative bias. In contrast, in (85) the pronounced cell is the negative one, corresponding to our not being certain that ‘Jane is coming’ should be added to the Common Ground. In this case, the speaker is requiring evidence for that negative cell, i.e., she is requiring evidence against the positive cell. Given an epistemic conflict, the contextual evidence then must point

<sup>34</sup>Notice that (85) models the so-called ‘outer’ negation reading of high negation questions, in which the speaker tries to confirm the positive alternative. By flipping the scope between *not* and VERUM, Romero and Han (2004) also capture the ‘inner’ negation reading, in which the speaker tries to confirm the negative alternative. While the existence of this latter reading has been disputed (Sailor, 2013; Goodhue, 2019), there is also evidence supporting it (Romero et al., 2017; Jeong, 2021).

against the prejacent and the speaker must be believing it, hence the positive bias. All this accords well with intuition.

The account does not do so well with deriving the strength of the bias, though. As just discussed, in (84) the speaker is asking for evidence for the pronounced positive cell, so she must be doubting the truth of the prejacent to some degree. This is compatible with the speaker having either a weak or a strong bias against the prejacent, although it is unclear how to make the correct choice in specific cases. For example, in Section 2 we found that verum-marked questions (if biased at all) convey a weak bias, which is not explicitly captured. Moving on to high negation questions like (85), things get a bit more troublesome. Since in this case the speaker is requiring evidence for the pronounced negative cell, i.e., requiring evidence against adding the prejacent proposition to the Common Ground, she must be strongly biased for said prejacent. This, however, is in direct contradiction with our finding in Section 2 that high negation questions are weakly biased.

As for optionality, the initial expectation is that bias should be optional in all targeted question forms. This is because the different biases are derived by pragmatic reasoning about evidence, and as such they are expected to be cancelable. However, in Section 2 we found that most question forms are in fact obligatorily biased. Romero and Han (2004: ft.1) thus stipulate that the conversational principles involved in deriving these biases are non-violable. Although this makes the right predictions in most cases, it still misses the fact that verum-marked questions are only optionally biased.

In sum, the epistemic approach, exemplified here by Romero and Han (2004), makes systematically good predictions about bias polarity. However, its predictions about the strength or the optionality of the bias are either not specific enough or appear to be wrong.

## 6.2 Decision-theoretic approach

Another approach to question bias employs notions from ‘decision theory’ (Savage, 1954; Jeffrey, 1965; a.o.). This approach is most clearly articulated in van Rooy and Šafářová (2003), so we focus on this account (see also AnderBois, 2019 and Goodhue, 2019). The main idea behind the account is that, in asking a question, the speaker has to choose between different question forms and thus faces a decision problem. Which particular question form is selected will depend on the speaker’s beliefs and desires, which determine the ‘utility value’ (or usefulness) of each answer. For polar questions, this means that the speaker selects the specific form for which the utility values of the positive and the negative answer compare in the right way. The gist of van Rooy and Šafářová (2003)’s proposal is captured by the following felicity constraint.

### (86) *Utility Values of Polar Questions*

A polar question is felicitous if the utility value of the pronounced cell exceeds the utility value of the unpronounced cell. If both cells are pronounced, the utility values of the positive and the negative cells are the

same.

The account discusses three types of question forms: positive polar questions, negative polar questions (with low or high negation), and alternative questions. Although these forms produce the same regular question partition, the felicity constraint in (86) imposes different restrictions on the utility values of pronounced cells. That is, in positive polar questions the positive cell is ranked higher, in negative polar questions the negative cell is ranked higher, and in alternative questions the two cells are on a par. This is summarized in (87), where  $UV$  stands for the utility value function.

- (87) a. Positive polar questions:  $\{p, \neg p\}$ , where  $UV(p) > UV(\neg p)$   
b. Negative polar questions:  $\{p, \neg p\}$ , where  $UV(p) < UV(\neg p)$   
c. Alternative questions:  $\{p, \neg p\}$ , where  $UV(p) = UV(\neg p)$

The utility value of a proposition is a formal construct that amounts to different things, depending on the given discourse strategy that the speaker is pursuing. This means that the conditions in (87) can be satisfied in many different ways. Here we focus on one common strategy that is directly linked to original bias, i.e., the speaker wanting to know what the world is like. In this case, the utility value of a proposition reduces to its informativity (or ‘surprisal’) resulting from having learned that proposition. Formally, the utility value of  $p$  here amounts to  $UV(p) = \inf(p)$ , where the latter value stands for  $-\log P(p)$ , i.e., the negative (binary) logarithm of the probability of  $p$ . Since the logarithmic function is an increasing function,  $UV(p)$  will decrease as  $P(p)$  increases, and  $UV(p)$  will increase as  $P(p)$  decreases. In other words, the utility value and the probability of a proposition are inversely proportional: less likely information is more informative and more likely information is less informative. The felicity conditions in (87) then boil down to the general requirement that the pronounced cell be less likely, or—if both cells are pronounced—that they be equally likely. This is stated in (88).

- (88) a. Positive polar questions:  $\{p, \neg p\}$ , where  $P(p) < P(\neg p)$   
b. Negative polar questions:  $\{p, \neg p\}$ , where  $P(p) > P(\neg p)$   
c. Alternative questions:  $\{p, \neg p\}$ , where  $P(p) = P(\neg p)$

We now discuss the predictions about the different features of original bias in the targeted question forms. First, notice that the account correctly predicts the general direction of the bias, i.e., the observation that the polarity of the bias is opposite to that of the question prejacent. That is, according to (88), positive questions convey a negative bias because the negative alternative is more likely, whereas negative questions convey a positive bias because the positive alternative is more likely. While this is on the right track for high negation and accented low negation questions, it also predicts that (on the current fact-finding strategy) positive polar questions are negatively biased, which is incorrect as such forms need not convey a bias at all. In turn, the prediction that alternative questions are unbiased is in line with prior literature (Bolinger, 1978; Biezma and Rawlins, 2012).

As for bias strength, if taken at face value, the account only ever requires a mild preference for one over the other alternative. In order to distinguish between weak and strong bias, we would need to explicitly state that in the latter case the probabilities of the two alternatives are further apart than in the former case. One problem is that fine-tuning bias strength would amount to a long list of stipulations for individual question forms. On the flip side though, such an account could capture any degrees of bias strength, no matter how fine-grained. That is, should more degrees of bias strength emerge (cf. the experimental results in Section 2), the decision-theoretic account is well-equipped to deal with it.

Where the decision-theoretic account starts to face serious problems is with the optionality feature. Despite our finding that almost all of the targeted question forms convey an obligatory bias, this account predicts that the relevant biases are always cancelable. This is due to the open-ended nature of the explanation, which allows that in asking a question the speaker may be pursuing different strategies. That is, even if the utility constraint in (86) is assumed to be non-violable, there are still many ways to satisfy that constraint, and presumably only some of them will generate a bias. This incorrectly predicts that in all other uses the targeted question forms do not give rise to bias.

Overall, it seems unlikely to us that a purely pragmatic account like this one can capture all the intricacies of the bias data. While we do agree that decision-theoretic reasoning draws important distinctions, we do not believe that taking into consideration the polarity of the pronounced alternatives alone—while ignoring further linguistic cues—can derive the rich bias pattern we have uncovered.

## 7 Conclusion

We have developed a focus-based approach to original bias in a subset of non-canonical polar questions in terms of direction, strength, and optionality. Our approach is modular: although the trigger of bias is the combination of polarity focus and the Salient Cell Principle in all of the discussed cases, we have argued that the independently motivated semantics of the relevant polar operator may have effects on a given bias profile. Finally, we have argued that existing approaches to original bias are unable to capture the richness of the data.

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