How to Ask the Obvious

A presuppositional account of evidential bias in English yes/no questions[*]

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Abstract

English can express the basic meaning of a yes/no question in several ways, for example with or without sentential negation, and with or without subject auxiliary inversion. In this paper, we discuss how the presence of contextual clue with respect to one or the other answer to a yes/no question determines which formal variants of the question are felicitous. We then derive these syntax-pragmatics interactions from Heim's principle of Maximize Presupposition, Stalnaker's Bridge Principle and Grice's Maxim of Manner, each formulated in a particular way, together with the assumption that the lexicon of English contains a silent evidential marker which exhibits familiar syntactic and semantic properties.

1 Introduction

1.1 Establishing two generalizations

Standard analyses of questions have been based on some version of Hamblin's postulate which states that knowing the meaning of a question is knowing what counts as an answer (Hamblin 1958, 1973). Consequently, the meaning of a question is identified with the set of propositions which are possible answers to it. The meaning of *who walked?*, for example, is the set of propositions of the form 'x walked' where x ranges over the relevant domain of individuals.

(1) $[\![\text{who walked?}]\!] = \{\{w \mid x \text{ walked in } w\} \mid x \ \varepsilon \ E\}$
          $= \{\text{that John walked, that Mary walked, that Bill walked, ... }\}$

Similarly, the meaning of the yes/no question $?p$ 'whether p' which has p and $W\backslash p$ as possible answers is the set $\{p, W\backslash p\}$.[1] For concreteness, take *Does John smoke?* as an example.

(2) $[\![\text{does John smoke?}]\!] = \{\{w \mid \text{John smokes in } w\}, W\backslash\{w \mid \text{John smokes in } w\}\}$
  $= \{\text{that John smokes, that John doesn't smoke}\}$

It has been pointed out that this approach to yes/no questions fails to capture certain pragmatic differences between various "wordings" of $?p$ (cf. Ladd 1981, Büring and Gunlogson 2000, Gunlogson 2001, 2002, Han and Romero 2002, Romero and Han 2004, Van Rooy and Safarova 2003, Safarova 2005, 2007, Truckenbrodt 2006, Trinh and Crnic 2011, Krifka 2012a,c,b, Sudo 2013). As we know, there are several ways in English to "ask the same question." For example, both (3-a) and (3-b) are answered by confirming the truth of either $\{w \mid \text{John is left-handed } w\}$ or $W\backslash\{w \mid \text{John is left-handed in } w\}$, which means both of them express the question $\{\{w \mid \text{John is left-handed in } w\}, W\backslash\{w \mid \text{John is left-handed in } w\}\}$, according to the Hamblinian view.[2]

(3) a. Is John left-handed?
  b. Is John right-handed?

The two sentences in (3) differ with respect to the lexical content of the main predicate. But even if we keep the main predicate lexically constant, there are still many ways to ask the question which is expressed by (3-a) and (3-b). Consider the sentences in (4), all of which contain *left-handed* as the main predicate.

(4)

	positive	*negative*
inverted	is John left-handed?	is John not left-handed? / isn't John left-handed?
non-inverted	John is left-handed?	John is not left-handed? / John isn't left-handed?

Intuitively, all the forms in (4), just as those in (3), are used to elicit a response which confirms either the proposition $\{w \mid \text{John is left-handed in w}\}$ or its negation. In other word, we have the intuition that all of these sentences express the question $\{\{w \mid \text{John is left-handed in w}\}, W\backslash\{w \mid \text{John is left-handed in w}\}\}$, and hence that they are mere syntactic variants. The variation, observably, can be described in terms of three parameters: (i) whether subject auxiliary inversion takes place,[3] (ii) whether sentential negation is present, and (iii) whether sentential negation is affixed onto the auxiliary. We will ignore the last distinction and call questions with negation

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[1]Or some semantic object constructed from this set. Thus, Karttunen (1977) takes $[\![?p]\!]^w$ to be the set $\{p, W\backslash p\} \cap \{q : q(w) = 1\}$, while Groenendijk and Stokhof (1982, 1984) identify $[\![?p]\!]^w$ with the proposition $\bigcap(\{p, W\backslash p\} \cap \{q : q(w) = 1\})$. We abstract away from these differences since they do not matter for the discussion to follow. We will also leave aside issues concerning the response particles *yes* and *no* (cf. Krifka 2013 and references therein).

[2]Assuming that a person is either left- or right-handed. Note that the same response particle would tend to confirm different propositions depending on whether the question is (3-a) or (3-b). But again, we have to leave aside this interesting topic (cf. Krifka 2013 and references therein).

[3]The surface word order of a yes/no question without subject aux inversion is identical to that of a declarative sentence and contextual clues would be needed to interpret the expression in one way or the other. In many cases, rising intonation would disambiguate the sentence towards being construed as a question. Note, however, that rising intonation is neither a necessary nor a sufficient condition for such disambiguation (cf. Safarova and Swerts 2004, Safarova 2005, 2007).

"negative," those without negation "positive," those with subject aux inversion "inverted" and those without subject aux inversion "non-inverted questions." This nomenclature is displayed in (4).[4]

The intuition, then, is that all of the sentences in (3) and (4) express the question $\{\{w \mid \text{John is left-handed in } w\}, W \backslash \{w \mid \text{John is left-handed in } w\}\}$, or more generally that there are different formulations of the same yes/no question. Let us now turn to a possibly conflicting intuition, namely that what we call "different formulations of the same yes/no question" are in fact different questions. To illustrate, suppose the speaker sees John writing with his left hand. She can then ask (5-a), say to "double check" or express surprise at what she sees, but it would be strange for her to ask (5-b), for whatever purpose.[5] Note that the contrast persists in a situation where the speaker does not see John writing with his left hand but only infers that John is left-handed from some piece of information available in the context, for example from hearing someone say that John will not be able to take the written test because he injured his left hand. Thus, we conclude that (5-a) is felicitous, while (5-b) is not, in contexts where there is evidence, direct or indirect, that John is left-handed.

(5)   Contextual evidence: John is left-handed

      a.   Is John left-handed?

      b. #Is John right-handed?

If we add negation to the sentences in (5), keeping to the same discourse context, we will see that the judgements are reversed: it is now the question containing the predicate *left-handed* which is infelicitous.

(6)   Contextual evidence: John is left-handed

      a. #Is John not left-handed? / #Isn't John left-handed?

      b.   Is John not right-handed? / Isn't John right-handed?

The pattern seems clear enough. In the felicitous (5-a) and (6-b), the "prejacent" of the question, i.e. the proposition denoted by the declarative sentence underlying the question, is $\{w \mid \text{John is left-handed in } w\}$, while the prejacent in the infelicitous (5-b) and (6-a) is $W \backslash \{w \mid \text{John is left-handed in } w\}$, the negation thereof.[6] The generalization, then, is the following.

(7)   Prejacent Compatibility (PC)
      A yes/no question is felicitous only if its prejacent does not contradict the answer implied by contextual evidence

The examples we have considered sofar all exhibit subject aux inversion. However, as already noted above, yes/no questions in English can also be expressed without subject aux inversion (cf.

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[4]As the reader may have noticed, we use the word "question" in our meta-language with systematic ambiguity: it can denote a set of propositions, a model theoretic object, or the (logical) form whose interpretation is this set, a syntactic object. This ambiguous usage is familiar, and we hope it causes no confusion.

[5]Why people ask questions about what may already be clear from the context is not an issue this paper is concerned with. As the title says, it discusses how people ask the obvious, not why they do.

[6]In more formal terms, the "prejacent" of the question is the proposition denoted by the largest TP constituent in the relevant logical form, assuming that sentential negation is dominated by TP (cf. Pollock 1989, Laka 1989, 1990, Chomsky 1991), and that head-movement, in this case T-to-C movement, has no interpretive effects (cf. Chomsky 1995, 2001, Boeckx and Stjepanovic 2001, Trinh 2009, Schoorlemmer and Temmerman 2011).

Gunlogson 2002, 2001), and it can be seen that PC is confirmed by these cases as well. Again, suppose the speaker sees John writing with his left hand and wants to double check or express surprise at what she sees using a yes/no question. The following contrasts can be observed.

(8)   Contextual evidence: John is left-handed
    a.   John is left-handed? / John is not right-handed? / John isn't right-handed?
    b.   #John is right-handed? / #John is not left-handed? / #John isn't left-handed?

Again, we see that the infelicitous questions are those whose prejacent contradicts the answer implied by contextual evidence. Now what about "neutral" contexts in which there is no evidence for any of the answers? For concreteness, assume a speaker who wants to inquire about John's handedness and who has no prejudice, and receives no clue from the context, about whether John is left-handed or right-handed.[7] All the speaker sees is John sleeping on the couch, say.[8] It seems that among all formulations of the question $\{\{w \mid \text{John is left-handed in w}\}, W \backslash \{w \mid \text{John is left-handed in w}\}\}$, only those in (9-a) are felicitous. Those in (9-b) are infelicitous in this scenario.[9]

(9)   Contextual evidence: none
    a.   Is John left-handed? / Is John right-handed?
    b.   #Is John not left-handed? / #Is John not right-handed? / #Isn't John left-handed? / #Isn't John right-handed? / #John is left-handed? / #John is right-handed? / #John is not left-handed? / #John is not right-handed? / #John isn't left-handed? / #John isn't right-handed?

Thus, we see that a yes/no question which contains negation or does not show subject aux inversion is infelicitous in a "neutral" context, i.e. one in which there is no evidence for any of the answers to the question. Apparently, such contexts admit only inverted positive questions.[10] Let us formulate the relevant generalization.

(10)   Neutral Question (NQ)
        In contexts where there is neither evidence for p nor evidence for $W \backslash p$, the question $\{p, W \backslash p\}$ is felicitous only if it is an inverted positive question.

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[7]We want the speaker to have no prejudice about any answer to the question in our gedankenexperiment because we want to prevent the possibility of interpreting this prejudice as resulting from some sort of contextual evidence.

[8]It was pointed out to us by a member in the audience at GLOW 37 that since the majority of people are right-handed, the said context should by default be seen as containing evidence that John is right-handed too. This point is valid and highlights the fact that we do not, and at this point cannot, provide an explicit intensional definition of the term "contextual evidence." While this just means we are engaging in the usual task of developing a theory without having made every notion involved antecedently clear, it does make us better aware of another issue that must be left for future research.

[9]Obviously, there are factors which influence the speaker in her choice between the two forms in (9-a). For example, she would probably tend to choose the *left-handed* alternative if she is conducting research on left-handedness. We bracket out such factors in this discussion, for the same reason we bracket out the speaker's prejudice towards one of the answers: they do not touch on the felicity condition of interest. The crucial point here is that the alternatives in (9-a) can, and those in (9-b) cannot, be felicitous in the said neutral context.

[10]The observation that the most "neutral" way to ask a yes/no question in English is to have subject aux inversion and no negation is not new. For example, in their informal discussion of English yes/no questions, Quirk and Greenbaum (1973) call negative questions "questions with negative orientation" and non-inverted ones "declarative questions," ascribing them several kinds of bias, while inverted positive questions are just called "questions" and given no special description.

The goal of this paper is to derive PC and NQ.

1.2 More on the two generalizations

Do PC and NQ hold for cases beyond those we have discussed? Let us consider another example to convince ourselves that they do. Imagine a speaker who sees John wearing a gold ring on his fourth finger.[11] The speaker will then be able to infer from this piece of contextual evidence that John is married. Suppose she wants to double check or express surprise at this information by asking the question $\{\{w \mid$ John is married in $w\}, W \backslash \{w \mid$ John is married in $w\}\}$. The acceptability judgements concerning the forms of this question will then be those in (11).

(11)   Contextual evidence: John is married

      a.   Is John married? / John is married? / Is John not single? / Isn't John single? / John is not single? / John isn't single?

      b. #Is John single? / #John is single? / #Is John not married? / #Isn't John married? / #John is not married? / #John isn't married?

We can observe that none of the questions whose prejacent is $W \backslash \{w \mid$ John is married in $w\}$ is felicitous in this context, just as PC predicts. Now imagine a scenario where the speaker has absolutely no idea and no evidence about John's marital status.[12] It seems that if she wants to ask the yes/no question $\{\{w \mid$ John is married in $w\}, W \backslash \{w \mid$ John is married in $w\}\}$ in this neutral context, the only expressions she can use are those in (12). The other formulations of this question in (11), all of which either contain negation or exhibit declarative word order, are infelicitous. This is exactly what NQ predicts.

(12)   a.   Is John married?

      b.   Is John single?

We tentatively conclude that PC and NQ are valid generalizations about yes/no questions in English. At this point, we can ask whether they are related, "two sides of the same coin" so to speak. A positive answer is suggested by the fact that both generalizations correlate grammatical properties of yes/no questions with their pragmatics. However, a negative answer is suggested by the fact that PC and NQ differ fundamentally with respect to the kind of grammatical properties that are of relevance. What PC says, basically, is that if there is contextual evidence in favor of one of the two possible answers to a yes/no question, the question must be formulated in such a way that its prejacent matches this answer in semantic content. Thus, PC imposes a felicity condition on yes/no questions in terms of their semantics, not their syntax: what is at stake is whether the prejacent coincides with a certain proposition, not whether the sentence contains a certain morpheme or involves a certain sort of movement operation. For example, if there is contextual evidence that John is left-handed, both *John is left-handed?* and *Isn't John right-handed?* can be felicitous, since the prejacent in both cases is the proposition $\{w \mid$ John is left-handed in $w\}$. Crucially, it does not matter that the first sentence involves neither negation nor subject aux inversion while the second involves both. NQ, on the other hand, imposes a felicity condition on yes/no questions solely in terms of their syntax: it says that in case there is no contextual evidence

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[11]Alternatively, imagine that she hears someone say "John has to pick up his wife from the airport."

[12]See note 7.

in favor of any answer to a yes/no question, the question must be expressed by a sentence which exhibits subject aux inversion and contains no negation. NQ does not care which of the possible answers matches the prejacent. Thus, both *Is John left-handed?* and *Is John right-handed?* can be felicitous in a neutral context,[13] even though the two questions differ with respect to their prejacent. Thus, there are reasons to doubt that PC and NQ are two sides of the same coin. Nevertheless, that is exactly what we are going to say, and argue for, below.

1.3   Previous observations

Most works to date on bias in yes/no questions either (i) contrast inverted positive and inverted negative questions, staying within the shaded cells of table (13) (cf. Büring and Gunlogson 2000, Van Rooy and Safarova 2003, Romero and Han 2004, Reese 2006, Venhuizen 2011), or (ii) contrast inverted positive and non-inverted positive questions, staying within the shaded cells of table (14) (cf. Gunlogson 2001, 2002, Safarova 2005, 2007).

(13)

	positive	*negative*
inverted	is John left-handed?	isn't John left-handed?
non-inverted	John is left-handed?	John isn't left-handed?

(14)

	positive	*negative*
inverted	is John left-handed?	isn't John left-handed?
non-inverted	John is left-handed?	John isn't left-handed?

Empirical claims made in the above cited works pertain to various kinds of bias. Here we are interested in those claims which concern evidential bias, or more precisely, which can be made out to relate to PC or NQ. And as far as we can see, such claims largely support these two generalizations. Let us start with works of the first category, i.e. those that deal exclusively with the two shaded cells in (13). Büring and Gunlogson (2000) observe that $?p$, the positive question whose prejacent is p, is felicitous only if "there is no compelling contextual evidence against p" (Büring and Gunlogson 2000, 7), and that $?\neg p$, the negative question whose prejacent is $W \backslash p$, is felicitous only if "there is compelling contextual evidence against p" (Büring and Gunlogson 2000, 10).[14] In other word, the prejacent may not contradict contextual evidence, as predicted by PC, and negative question cannot be used in neutral contexts, as predicted by NQ. Van Rooy and Safarova (2003) make the same observation but describe it in slightly different terms, saying that $?p$ triggers "no weak presupposition or weak presupposition for p" while $?\neg p$ triggers a "weak presupposition for $\neg p$," with "weak presupposition" being understood as "a kind of minimal evidence in the common ground" (Van Rooy and Safarova 2003, 5–6). Romero and Han (2004) focus on the "epistemic implicature," i.e. inference about the speaker's belief, of negative questions, and do not really discuss their evidentiality. However, their argument is based on examples which can clearly be interpreted as facts covered by PC/NQ. As illustration, we reproduce examples (6) and (10) of Romero and Han (2004) in (15) and (16), respectively.

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[13]Modulo such conditions as discussed in note 9.

[14]Büring and Gunlogson (2000) also claim that there is another kind of $?\neg p$, called "outer negation question," which can be felicitous in contexts where there is neither evidence for p nor evidence against p. This claim is not compatible with NQ which says that such contexts admit only positive questions. We believe the claim is empirically wrong and will discuss it in subsection 2.2.6.

(15)   A: Ok, now that Stephan has come, we are all here. Let's go!
        S: Isn't Jane coming too?

(16)   Scenario: S likes Jane and simply wants to find out whether she is coming.

        A: Pat is coming.
        S: What about Jane? Is she coming?

The negative question in (15) is asked after the speaker has received contextual information which implies that Jane is not coming, and in the neutral context of (16), it is an (inverted) positive question which is used. This conforms to PC/NQ.

Reese (2006) used similar examples in his argument, one of which (his example (38)) is reproduced below, in (17).

(17)   A: No syntacticians are coming to the meeting.
        B: Isn't Jane coming?

According to Reese, negative questions are not used to request information but are used to ask for "confirmation" of the prejacent – "confirmation" because the prejacent is supposed to be already implied by the context (Reese 2006, 346–347). Positive questions, on the other hand, can be used for simple information request, but can also "just as easily be used as confirmation questions when there is contextual evidence for a particular proposition" (Reese 2006, 347). Reese gives the following example (his example (40)) to illustrate the latter case.

(18)   a.   [A enters B's windowless office wearing a dripping wet rain coat.]
        b.   B: Is it raining outside?

Reese's observations, then, amount to the claim that negative questions must be used in contexts where there is evidence supporting the prejacent, while positive questions can either be used in such contexts or be used in neutral contexts. This is exactly what is predicted by the PC/NQ. Lastly, Venhuizen (2011) notes that "positive polar questions can occur in all contexts except those with compelling contextual evidence against the radical [i.e. prejacent] of the question [...] and [...] negation questions can occur only in these contexts" (Venhuizen 2011, 20). This description is also a prediction of PC/NQ.

We turn now to works which contrast inverted positive and non-inverted positive questions, i.e. those that restrict attention to the two shaded cells in table (14). Gunlogson (2001, 2002) proposes a theory of non-inverted questions which could be seen as the flip side of PC/NQ. Recall what these generalizations entail for non-inverted questions: they are felicitous only if their prejacent is supported by contextual evidence. Gunlogson's proposal essentially says that a declarative can "count as a question" only if it is "uninformative to the addressee" (Gunlogson, 2001:78, Gunlogson, 2002:38). "Declaratives that count as polar questions" are what we call "non-inverted questions," and examples provided by Gunlogson show that "uninformative to the addressee" can be understood as 'inferable from contextual evidence.' Gunlogson's proposal, then, can be reformulated thus: the prejacent of a non-inverted question must be inferable from contextual evidence. This is exactly the prediction of PC/NQ. As for inverted questions, Gunlogson notes that their distribution is a (proper) superset of the distribution of non-inverted questions, more specifically that an inverted question can be used in every context that admits the corresponding non-inverted question and also in some contexts that do not, namely those which contain no

evidence for or against the prejacent (Gunlogson, 2001:103). Again, this is a prediction of PC/NQ. The following two examples – (63) and (64) from Gunlogson (2002) – serve as illustrations.

(19)   Robin is sitting in a windowless computer room with no information about current weather conditions when another person enters. Robin says to the newcomer:
        a.   Is it raining?
        b.   #It's raining?

(20)   Robin is sitting in a windowless room when another person enters. The newcomer is wearing a wet raincoat and boots. Robin says:
        a.   Is it raining?
        b.   It's raining?

Finally, Safarova (2005, 2007) note that "rising declaratives [non-inverted questions] are not interchangeable with interrogative polar questions [inverted questions] because they often convey a certain bias of the speaker." And relevant examples used by Safarova suggest that "bias of the speaker" is the result of contextual evidence supporting the prejacent of the question.[15] We reproduce examples (6) and (2) from Safarova (2007) in (21) and (22), respectively.

(21)   [As an exam question]
        a.   Is the empty set a member of itself?
        b.   #The empty set is a member of itself?

(22)   a.   Speaker A: John has to leave early.
        b.   Speaker B: He'll miss the party then?

Example (21) shows that neutral contexts admit inverted but not non-inverted questions, and (22) shows that contexts which admit a non-inverted question contain evidence supporting its prejacent. This is exactly what PC/NQ lead us to expect.

2   Deriving the generalizations

2.1   On "salience" as a nonstarter

Are PC and NQ surprising, or are they obvious? Consider NQ first. Recall what it says: if the context is neutral with respect to the prejacent, the question must be positive and inverted. That neutral contexts require the absence of negation seems intuitive, suggesting the effect of some "economy condition" which appeals to structural simplicity: the less structure the better, everything else being equal.[16] However, the fact that neutral contexts require the *presence* of subject aux inversion remains hopelessly bizzare, and to say that subject aux inversion is the "unmarked" way to formulate yes/no questions in English is, of course, just to reformulate the problem.

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[15] Safarova provides some examples in which the rising declarative is not a question. Such examples are not relevant for this discussion because we are only interested in sentences that are construed as questions.

[16] Meaning there is no difference between the forms with respect to their semantic content and with respect to whether there is contextual evidence for or against their prejacent.

What about PC? This generalization says that in case contextual evidence biases one of the two answers to a yes/no question, the question must be formulated in such a way that its prejacent matches this answer. Compared to NQ, PC has more of a "self-evident" feel to it. Thus, suppose we say that among the two answers to a yes/no question, it is the one matching the prejacent that is made "salient" by the question. It then seems natural to say that using a yes/no question to express some attitude – surprise, doubt, disappointment etc. – towards the contextual evidence that p involves making p, not its negation, salient. We would then have an explanation for PC, i.e. for the fact that the prejacent of a question has to match the contextual evidence that prompts the question. But what is "salience"? Specifically, is there a principled reason for saying that it is the answer matching the prejacent, not the other answer, which is made salient by the question? If there is none, the explanation of PC in terms of salience, as proposed above, is just a fancy reformulation. Let us, then, turn to a brief discussion of "salience."

To the best of our knowledge, salience has been explicated in terms of two other notions. The first is relevance: salient propositions are relevant propositions; the second is utterance: salient propositions are those that have been uttered (cf. Fox and Katzir 2011).[17] Let us start with the "relevance approach" to salience. Intuitively, p is relevant if we want to know whether p is true. From this it follows that relevance is "closed under negation": p is relevant if $W \backslash p$ is relevant, as knowing whether p is true is equivalent to knowing whether $W \backslash p$ is true.[18] This squares well with another robust intuition we have about "relevance," namely that "relevant" propositions are those that answer the "question under discussion."[19] Witness the pragmatic contrast between (23-a-b) on one hand and (23-c) on the other, as answers to (23).

(23)   Is John right-handed?

     a.   (Yes.) He is right-handed.

     b.   (No.) He is left-handed.

     c.   #The empty set is a subset of every set.

The clear intuition is that (23-a) and (23-b) answer the question while (23-c) does not. Since (23-a) is the negation of (23-b), the example supports the claim that the relevance is closed under negation, insofar as relevance is identified with answerhood. Coming back now to the issue at hand: what if we say salient propositions are relevant propositions? Obviously, we will then have to say that a proposition p cannot be salient without $W \backslash p$ being salient too, and consequently that a yes/no question cannot make one answer salient without making the other salient as well. But this means that an explanation of PC in terms of "salience," in this sense, is doomed to fail, since its premise is that a yes/no question makes only one of its answers salient, namely the one matching its prejacent.

What about the "utterance approach" to salience, i.e. one that says salient propositions are those that have been uttered, or more explicitly, those denoted by a consituent of the logical form of an expression which has been uttered in the discourse context? Under this view, (24-a) and (24-b),

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[17]It is sometimes assumed that what has been uttered is relevant by default (cf. Magri 2009, Romoli 2012), but this is of course not a logical truth, and there is evidence that it is not an empirical truth either (cf. Trinh and Haida 2014).

[18] For more articulated notions of relevance see Groenendijk and Stokhof (1984), Lewis (1988), Fintel and Heim (1997), Fox and Katzir (2011), all of which include the property of closure under negation.

[19]In fact, it is this second intuition, made explicit, which implies that relevance is closed under negation (cf. the works referenced in note 18).

under standard syntactic assumptions, would make different propositions salient, even though they both express the question $\{\{w \mid \text{John is left-handed in w}\}, W \backslash \{w \mid \text{John is left-handed in w}\}\}$.[20]

(24)   a.   Is John left-handed?
              Analysis: [$_{CP}$ is+C [$_{TP}$ John ~~is~~ [$_{XP}$ ~~John~~ left-handed]]]
        b.   Is John right-handed?
              Analysis: [$_{CP}$ is+C [$_{TP}$ John ~~is~~ [$_{XP}$ ~~John~~ right-handed]]]

The proposition-denoting constituent in both structures is XP/TP, and the proposition denoted by XP/TP in (24-a) is $\{w \mid \text{John is left-handed in w}\}$, while in (24-b) it is $W \backslash \{w \mid \text{John is left-handed in w}\}$, the negation thereof.[21] The "utterance approach" to salience, as formulated above, would then say (23-a) makes only the former and (23-b) only the latter proposition salient, a good result.

But what about other cases? Consider the negative questions in (25).

(25)   Is John not left-handed?
        Analysis: [$_{CP}$ is+C [$_{TP}$ John ~~is~~ [$_{NegP}$ not [$_{XP}$ ~~John~~ left-handed]]]]

As we can see, (25) contains at least two proposition-denoting constituents, XP and NegP, with XP denoting the proposition $\{w \mid \text{John is left-handed in w}\}$ and NegP its negation, i.e. $W \backslash \{w \mid \text{John is left-handed in w}\}$. This means that both propositions are made salient by the question, and we are back to the problem faced by the "relevance approach."

We will make another attempt to relate salience to utterance, this time giving more weight to phonology. In this "phonological approach" to salience, we say that a salient proposition must be "heard." More concretely, we say that a salient proposition must be computed from the (logical form of) the uttered sentence as if all traces are identity functions: they must be computed from the meanings of pronounced copies only. This assumption implies that (25) does not make $\{w \mid \text{John is left-handed in w}\}$, the proposition denoted by XP, salient, because the computation of this proposition involves composing the meaning of the unpronounced copy of *John* with the meaning of *left-handed*. However, (25) is predicted to make $W \backslash \{w \mid \text{John is left-handed in w}\}$, the proposition denoted by TP, salient, because this proposition is computed from the meanings of pronounced copies only: *John*, *not*, and *left-handed*.[22] This is a good result, and the reader can verify that the proposal works in the case of (24) also.

It turns out, however, that even this explication of salience fails to be helpful in understanding PC. Consider (26).

(26)   Isn't John left-handed?
        Analysis: [$_{CP}$ is+n't+C [$_{TP}$ John ~~is+n't~~ [$_{NegP}$ ~~n't~~ [$_{XP}$ ~~John~~ left-handed]]]]

The result we want is for this question to make only the proposition $W \backslash \{w \mid \text{John is left-handed in w}\}$, which is the prejacent, salient. However, if we compute the meaning of the TP constituent with traces being identity functions, we get the proposition $\{w \mid \text{John is left-handed in w}\}$.

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[20]We indicate unpronounced copies, i.e. "traces," of moved materials are by ~~strikethrough~~, and write "XP" to remain neutral about the category of the "small clause" complement of *be*, which is not essential to the present discussion.

[21]We assume that the copula is semantically empty (cf. Heim and Kratzer 1998), and that the lower copy of the chain created by A-movement of the subject can be interpreted in such a way that XP is a proposition (cf. Fox 2003).

[22]Assuming that negation is systematically ambiguous between complementation on sets of possible worlds and complementation on sets of individuals.

Independently of whether the question also makes the other proposition salient, this result alone suffices to discredit the "phonological approach" to salience.

The explanation of PC in terms of salience depends on the claim that a yes/no question makes only the answer matching its prejacent salient. We have attempted to be explicit about what "salience" is, and have failed to find a formulation that does not contradict the above claim. We tentatively conclude that this line of explanation is to be abandoned.

2.2   A presuppositional account

2.2.1   The Bridge Principle and Maximize Presupposition

The phenomena described in section 1 bear the hallmark of presuppositionality: syntactic objects expressing the same "meaning" are felicitous in different discourse contexts. Consider the contrast between the (27-a) and (27-b), in a context where there are more than two stars on the sky.

(27)   Context: there are more than two stars on the sky

     a.   John sees two stars
     b.   #John sees both stars

It is assumed to be part of the lexical content of the word *both* that $[\![both]\!](P)(Q) = [\![two]\!](P)(Q)$ in contexts where $|P| = 2$, undefined in other contexts. We say that *John sees both stars* asserts that John sees two stars and presupposes that there are exactly two stars. Adopting a notation used in Sauerland (2008), we represent the complete meaning of a expression as fraction, with the "logical content" as numerator and the "presupposition" as denominator.[23]

(28) $[\![John\ saw\ both\ stars]\!] = \dfrac{\exists x(star'(x) \wedge saw'(j,x) \wedge |x| = 2)}{|star'| = 2}$

Sentence (27-b) is infelicitous because it is a "presupposition failure": its presupposition is not true in the relevant context. This result is guaranteed by Stalnaker's "Bridge Principle" (cf. Stalnaker 1973, 1978), given a simplified formulation in (29).[24]

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[23]To clarify the terminology: by "logical content" we mean the non-presuppositional part of the meaning. In what follows, we say two expressions are "logically equivalent" if they have the same logical content. Note that non-presuppositional expressions can be represented as those whose presupposition is the tautology.

[24]Stalnaker states this principle as follows: "Any assertive utterance should express a proposition, relative to each possible world in the context set, and that proposition should have a truth-value in each possible world in the context set" (Stalnaker 1978, 325), where the "context set" is the conjunction of all mutual beliefs of the discourse participants (cf. Stalnaker 1998, 2002), and the set of worlds in which the proposition expressed by the sentence has a truth-value is the presupposition of the sentence. Thus, what the principle says is that the presupposition of a felicitous sentence has to be entailed by the mutual beliefs of the discourse participants, and a sentence is a presupposition failure if its presupposition fails to be entailed by such beliefs. For example, (27-b) would already be infelicitous in a discourse context where the mutual beliefs of the participants do not determine how many stars are on the sky. We speak of presuppositions being "true" or "false" in a context instead of them being entailed or not entailed by the mutual beliefs of the discourse participants in that context, and choose such examples as to make this way of talking possible, just to keep the discussion simple.

Note, also, that Stalnaker's principle, in his own formulation, applies to "assertive utterances" only. However, the underlying idea that an expression may fail to have an interpretation under certain circumstances, causing infelicity, can be generalized to non-assertive utterances, as is done in this paper, albeit informally.

(29)   Bridge Principle
        A sentence is felicitous in context c only if its presupposition is true in c

Now consider a context where there are exactly two stars on the sky. It can be observed that the acceptability judgement concerning (27-a) and (27-b) is reversed.

(30)   Context: there are exactly two stars on the sky
        a. #John sees two stars
        b. John sees both stars

Since the complete interpretation of (30-b) consists in the meaning of (30-a) plus the presupposition triggered by *both*, it could be argued that the contrast between the two sentences should be explained in terms of Grice's Maxim of Quantity, which tells us to "be informative," i.e. to convey as much information as we can (cf. Grice 1975, Hawkins 1991).[25] In her famous 1991 paper, Irene Heim points out a hole in this argument: if it is already known that there were exactly two stars on the sky, there would be no sense in which (30-b) is "more informative" than (30-a). Thus, "[m]angelnde Informativität kann hier also nicht der Grund für die Unangemessenheit sein [...]," and "[v]ielleicht sollten wir eine neue Maxime postulieren." This "neue Maxime," Heim suggests, is something like "[p]räsupponiere in deinem Beitrag so viel wie möglich!" (Heim 1991, 515). Heim did not give the principle a name in her paper, but it has since been known as "Maximize Presupposition."

(31)   Maximize Presupposition (informal version)
        Make your contribution presuppose as much as possible!

We can see how Maximize Presupposition (MP) works for (30): because (30-b) presupposes "more" than (30-a) and it is possible to use (30-b), MP dictates (30-b) should be used instead of (30-a).[26] However, the vague formulation of MP in (31) falls prey to overgeneration, as more contrasts are predicted than should be.[27] To see this, imagine a context where there are exactly two stars on the sky and both were red. We predict, taking (31) at face value, that (32-a) is infelicitous in this context, since (32-b) has a stronger presupposition and is not a presupposition failure.[28] This prediction is wrong: the two sentences seem equally felicitous in this context.

(32)   a. John saw both stars
        b. John saw both red stars

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[25]That is, without lying (i.e. violating the Maxim of Quality) and giving unnecessary information (i.e. violating the Maxim of Relation) (cf. Grice 1975).

[26]By "it is possible to use (30-b)" we mean this sentence is not a presupposition failure, the implicit assumption here being that MP does not have presupposition failures in its "candidate set." Note that this means "presupposing more" has to be understood as "having a logically stronger presupposition," not as "having a more informative presupposition," since presuppositions of non-failures are by definition all uninformative.

[27]Heim herself is aware of the provisional nature of her formulation: after noting that it would account for the relevant example if it is "passend präzisiert," she goes on to say "[d]amit befinden wir uns aber ganz auf Neuland und wollen weitere Spekulationen in dieser Richtung erst einmal der zukünftigen Forschung überlassen" (Heim 1991, 515).

[28]The same point is made in Sauerland (2008), using different examples.

The challenge, then, is to find a formulation of MP which predicts a contrast in (30) but does not predict a contrast in (32).[29] We propose the following definition.

(33)   Maximize Presupposition (final version)
      A sentence S is infelicitous in context c if there is another sentence S' such that
      a. $[\![S]\!] = \frac{m}{p}$ and $[\![S']\!] = \frac{m}{q}$
      b. $q \subset p$
      c. q is true in c

Our hypothesis, then, is that Maximize Presupposition adjudicates between any two logically equivalent sentences whose presuppositions are true in the context but differ in logical strength, and rules in favor of the presuppositionally stronger one. The reader can verify that this formulation of MP works for all the cases we have considered.

   The discussion we just had on presupposition opens a new perspective from which to view the facts about yes/no questions presented in section 1. Suppose we say that among the logically equivalent formulations of a question, some have the "evidential presupposition" that there is contextual evidence for one of the two answers and some do not. By virtue of the Bridge Principle, the presuppositional formulations would be those that are infelicitous in neutral contexts, and by virtue of Maximize Presupposition, the non-presuppositional formulations would be those that are infelicitous in biased contexts. The formulations that are felicitous in both kinds of contexts would have to be cases of structural ambiguity: same pronunciation, different interpretations. Finally, the requirement that questions in biased contexts must have prejacents matching the relevant evidence will follow if it is the prejacent from which the evidential presupposition is computed. The challenge now is to construct a theory which gives us all of the above.

2.2.2   The evidential marker E

Presuppositions are triggered by specific lexical items. We propose that the English lexicon contains a (null) morpheme **E** which triggers the "evidential presupposition" of yes/no questions. Thus, a yes/no question which presupposes that there is evidence for the prejacent-matching answer will have the structure in (34-a), where **E** maps a proposition p to itself only in contexts where there is evidence for p, as specified in (34-b), and **Q** is the "question morpheme" which maps a proposition p to the set $\{p, W \backslash p\}$, as specified in (34-c).[30]

(34)   a. $[_{CP}$ Q $[_{CP}$ E $[_{TP}$ ... $]]]$
      b. $[\![E]\!](p) = p$ in contexts where there is evidence for p, undefined in other contexts
      c. $[\![Q]\!](p) = \{p, W \backslash p\}$

The semantics of **E**, then, is akin to that of epistemic *must* in the proposal made by Fintel and Gillies (2010). According to these authors, $[\![must]\!](p)$ asserts that there is evidence for p and

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[29]For various explications of MP, see Percus (2006), Sauerland (2008), Singh (2011), among others.

[30]A non-presuppositional question, of course, would not contain **E**. Note that **E** is of type $< st, st >$ and **Q** is of type $< st, < st, t >>$, which means switching the position of **E** and **Q** will result in an uninterpretable structure. For the idea that questions are headed by a null question morpheme cf. Katz and Postal (1964), Jacobs and Rosenbaum (1968), Baker (1970), Karttunen (1977), and for the idea that the CP layer may contain several heads cf. Rizzi (1997).

presupposes that this evidence is "indirect." Thus, the logical content of epistemic *must* is basically the presuppositional content of **E**.

What about the morphology of **E**? To address this question, let us briefly discuss the typology of heads which has been assumed, explicitly or implicitly, in many syntactic accounts. First, heads are divided into those that trigger head-movement and those that do not.[31] Let us call the former "affixal" and the latter "non-affixal," indicating them with the features $[+af]$ and $[-af]$, respectively. Among the C heads, the question morpheme **Q** is $[+af]$, forcing T-to-C movement, while the declarative morpheme is $[-af]$, forcing no head-movement, for example.[32] The idea is that affixes cause the derivation to crash at PF, unless they are attached to a non-affix (cf. Lasnik 1981). Thus, T-to-C movement averts the threat of PF crash posed by affixal C only if T itself is $[-af]$; if T is $[+af]$, the movement has to be followed by PF insertion of the light verb *do*, which is $[-af]$ and thus able to "host" the affixes (cf. Chomsky 1957).

(35)   a.   Will John talk to Mary?
               Analysis: $[_{CP}$ will$_{[-af]}$+C$_{[+af]}$ $[_{TP}$ John ~~will~~$_{[-af]}$ talk to Mary]]
         b.   Does John talk to Mary?
               Analysis: $[_{CP}$ do$_{[-af]}$+es$_{[+af]}$+C$_{[+af]}$ $[_{TP}$ John ~~es~~$_{[+af]}$ talk to Mary]]

What we will say for **E** is this: it can be either $[+af]$ or $[-af]$. In other words, it may enter the derivation either as an affix or as a non-affix.[33] We then have the following three options for yes/no questions in English.

(36)   a. $[_{CP}$ Q$_{[+af]}$ $[_{TP}$ ...]]
         b. $[_{CP}$ Q$_{[+af]}$ $[_{CP}$ E$_{[-af]}$ $[_{TP}$ ...]]]
         c. $[_{CP}$ Q$_{[+af]}$ $[_{CP}$ E$_{[+af]}$ $[_{TP}$ ...]]]

The first option, (36-a), will have to involve head-movement of T to Q, the second head-movement of E to Q, and the third head-movement of T to E to Q.[34] If we let TP be *John will talk to Mary*, these abstract scenarios translate to the more concrete (37-a), (37-b) and (37-c), respectively.

(37)   a. $[_{CP}$ will$_{[-af]}$+Q$_{[+af]}$ $[_{TP}$ John ~~will~~ talk to Mary]]
               Pronunciation: "will John talk to Mary?"
         b. $[_{CP}$ E$_{[-af]}$+Q$_{[+af]}$ $[_{CP}$ ~~E~~ $[_{TP}$ John will talk to Mary]]]
               Pronunciation: "John will talk to Mary?"
         c. $[_{CP}$ will$_{[-af]}$+E$_{[+af]}$+Q$_{[+af]}$ $[_{CP}$ ~~will+E~~ $[_{TP}$ John ~~will~~ talk to Mary]]]
               Pronunciation: "will John talk to Mary?"

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[31]Given the Head Movement Constraint (Travis 1984) and other conditions on movement in general, a head H "triggers head-movement" iff H forces the head of its complement to adjoin to H.

[32]We assume that declarative sentences are also CPs, headed by a null C head which indicates the declarative force of the sentence (cf. Ross 1970, Lakoff 1970, Sadock 1974, Gazdar 1979, Chomsky 1995, Krifka 1995, 2001).

[33]Morphological "amphibians" of this sort include the sentential negation which is either affixal *n't* or non-affixal *not*. Among null heads, Lasnik (2000) proposes that T in English may come in two varieties, one triggering V-to-T movement and the other not. (Lasnik calls them "featural" and "affixal," incidentally.) Thus, the idea is not as exotic as it may seem.

[34]Which means movement of T to E followed by movement of the complex T head T+E to Q, given Baker's ban against excorporation (Baker 1988).

2.2.3 Deriving PC

PC says that a yes/no question is felicitous only if its prejacent does not contradict the answer implied by contextual evidence. We are now ready to prove this claim.

    Proof. Let c be a context where there is evidence for p and S be a sentence expressing the question $\{p, W\backslash p\}$ whose prejacent is $W\backslash p$. This means S has to be either (38-a) or (38-b), where TP is subscripted with its denotation.

(38)   a.   [Q TP$_{W\backslash p}$]
           b.   [Q [E TP$_{W\backslash p}$]]

Suppose S = (38-a). Then $[\![S]\!]$ = (39-a), which means S is infelicitous in c by virtue of MP as there exists S' = [Q [E TP$_p$]], which means $[\![S']\!]$ = (39-b), which means S' is logically equivalent to S, presuppositionally stronger than S, and not a presupposition failure in c. Now suppose S = (38-b). Then $[\![S]\!]$ = (39-c), which means S is infelicitous in c by virtue of the Bridge Principle since its presupposition, namely that there is evidence for $W\backslash p$, is by assumption false in c.[35]

(39)   a. $\dfrac{\{p, W\backslash p\}}{\top}$

           b. $\dfrac{\{p, W\backslash p\}}{\text{there is evidence for } p}$

           c. $\dfrac{\{p, W\backslash p\}}{\text{there is evidence for } W\backslash p}$ QED.

As a concrete example, take the question *Is John right-handed?* in a context where there is evidence that John is left-handed. The question can only be parsed as either (40-a) or (40-b).

(40)   a.   [$_{CP}$ is+Q [$_{TP}$ John ~~is~~ right-handed]]
           b.   [$_{CP}$ is+E+Q [$_{CP}$ ~~is+E~~ [$_{TP}$ John ~~is~~ right-handed]]]

Given MP, (40-a) is ruled out by the existence of the sentences in (41), both of which are logically equivalent to (40-a) but presuppositionally stronger, and given the Bridge Principle, (40-b) is ruled out because it has a false presupposition, namely that there is evidence that John is right-handed.

(41)   a.   [$_{CP}$ is+E+Q [$_{CP}$ ~~is+E~~ [$_{TP}$ John ~~is~~ left-handed]]]
           b.   [$_{CP}$ is+E+Q [$_{CP}$ ~~is+E~~ [$_{TP}$ John ~~is~~ not right-handed]]]

We see why a question whose prejacent contradicts the answer implied by contextual evidence is infelicitous: it has no parse which does not violate MP or the Bridge Principle.

2.2.4 The Maxim of Manner

It remains to derive NQ. The derivation will require another premise, which we now discuss. Grice (1975) proposes a preference principle, the Maxim of Manner, which favors simpler expressions over more complex ones. Let us take it to mean the following.

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[35]We assume that (people speak as if) contextual evidence is logically consistent: if there is contextual evidence for p, there is no contextual evidence for $W\backslash p$.

(42)   Maxim of Manner
        Do not use S if there is an equally good S' which is simpler than S

For the purpose of this discussion, we will say S and S' are equally good iff they are "semantically equivalent," meaning they are identical with respect to both logical and presuppositional content. But what does it mean to call one expression "simpler" than another? For this question, we will adopt a characterization of simplicity which is based on the one proposed in Katzir (2007), Fox and Katzir (2011).[36]

(43)   Simplicity
        a. S' is simpler than S iff $S' \in \text{ALT}(S)$ and $S \notin \text{ALT}(S')$
        b. $S' \in \text{ALT}(S)$ iff S' is derivable from S by successive replacement of a constituent γ of S with (i) a lexical item, (ii) a subconstituent of γ, or (iii) a constituent of another sentence S'' uttered in the context

The definition of $\text{ALT}(S)$ is a ternary disjunction, but it turns out that only the last two disjuncts are relevant to our concerns. Let us briefly discuss these. First, replacing a constituent with its subconstituent amounts to deletion. For example, replacing NegP with VP in (44-a) amounts to deleting the negation, deriving (44-b).

(44)   a.   [$_{TP}$ John will [$_{NegP}$ not [$_{VP}$ talk to Mary]]]
        b.   [$_{TP}$ John will [$_{VP}$ talk to Mary]]

The third disjunct in (43-b) allows using materials from the discourse context to derive S' from S. However, it imposes the condition that these materials must not be part of S or S' themselves. This is a virtual necessity: the point is to compare sentences which have been uttered with those which could have been uttered, and if this condition is not imposed, a non-uttered sentence $S_{[-u]}$ can never be simpler than an uttered sentence $S_{[+u]}$, as we could always derive $S_{[+u]}$ from $S_{[-u]}$ by replacing $S_{[-u]}$ with $S_{[+u]}$, each sentence being a constituent of itself.

2.2.5   Deriving NQ

NQ says that in contexts where there is neither evidence for p nor evidence for $W \backslash p$, the question $\{p, W \backslash p\}$ is felicitous only if it is an inverted positive question. In other words, neutral contexts admit only questions which (i) show subject aux inversion and (ii) contain no negation. We are now ready to prove this claim.

    Proof. Let c be a context where there is evidence for neither p nor $W \backslash p$ and S a sentence expressing the question $\{p, W \backslash p\}$ which does not exhibit subject aux inversion. Given that **Q** is $[+af]$, the absence of subject aux inversion must be caused by the presence of non-affixal **E** which intervenes between T and **Q** and which itself moves to **Q**, as in (45).

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[36]Fox and Katzir's idea is that the set of formal alternatives of S, $\text{ALT}(S)$, should contain only expressions that are no more complex than S, where "more complex than" is the inverse of "simpler than." In Fox and Katzir's system, "simpler than" would be defined exactly as it is defined here, except that the third disjunct of (43-b) would say "a sentence uttered in the context" instead of "another sentence S'' uttered in the context." As far as we know, this is a distinction without a difference for Fox and Katzir: both definitions work equally well for the facts they describe. However, the distinction is crucial for us, as will be seen below.

(45) $[_{CP} E_{[-af]} + Q_{[+af]} [_{CP} \cancel{E} [_{TP} \text{Subject T ...}]]]$

But this means S presupposes that there is contextual evidence for the prejacent. By hypothesis, c contains neither evidence for the prejacent nor its negation. Thus, S is infelicitous in c by virtue of the Bridge Principle: it has a false presupposition.

Keeping now to the same neutral context c, and suppose that S is a sentence expressing the question $\{p, W \backslash p\}$ which contains negation. To rule out the possibility that S is a presupposition failure, assume S does not contain **E**. Then, S must be analyzed as (46-a), which means S violates the Maxim of Manner, since there exists a semantically equivalent but simpler alternative, (46-b), derivable from (46-a) by replacing NegP with VP.[37]

(46) a. $[_{CP} Q [_{TP} \text{Subject T} [_{NegP} \text{not} [_{VP} ...]]]]$
      b. $[_{CP} Q [_{TP} \text{Subject T} [_{VP} ...]]]$ QED.

As a concrete example, consider the questions in (47) in a context where there is no evidence about John's handedness.

(47) a. John is left-handed?
      b. Is John not left-handed?

For the auxiliary to stay in situ in (47-a), there must be non-affixal **E** intervening between it and **Q**, as in (48). But this means (47-a) presupposes there is evidence that John is left-handed, hence is a presupposition failure.

(48) $[_{CP} E_{[-af]} + Q_{[+af]} [_{CP} \cancel{E} [_{TP} \text{John is left-handed}]]]$

The infelicity of (48-b) in this context has a straightforward explanation: there is a simpler way to ask the question, namely without the negation.[38]

2.2.6 Some apparent counterexamples

As mentioned in note 14, Büring and Gunlogson (2000) – henceforth B&G – claim that there are instances of negative questions being used felicitously in contexts with neither evidence for the prejacent nor evidence for its negation.[39]

(49) B&G's claim
      A negative question can be felicitous in a neutral context

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[37]Note that if there is **E** in the structure, removing NegP would result in a semantically different alternative: the evidential presupposition would change polarity.

[38]Andreas Haida (personal communication) points out to us that the alternative question *Is John left-handed or right-handed?* is felicitous in a neutral context, even though it is structurally more complicated than the yes/no question. We acknowledge the intuitive appeal of this point, noting at the same time that the observation may turn out to be evidence that the yes/no question cannot be derived from the alternative question in the manner stated in (43). We hope to address alternative questions in the future.

[39]Büring and Gunlogson (2000) divide negative questions into two syntactic classes which they call "outer negation polar questions" (ONPQ) and "inner negation polar questions" (INPQ). What they actually claim is that only ONPQ's can be felicitous in neutral contexts. In this paper, we do not distinguish between different kinds of negative questions, so Büring and Gunlogson's claim becomes a simple negation of the statement that no negative question can be felicitous in a neutral context, which itself is a consequence of NQ.

The claim contradicts NQ which says that neutral contexts admit no negative or non-inverted questions. It is motivated in Büring and Gunlogson (2000) by a single example, reproduced below.

(50)   A and S want to go out for dinner. S has been to Moosewood a couple of years back.
        A: Where do you want to go for dinner?
        S: Isn't there some vegetarian restaurant around here?

This example is supposed to show that the negative question coming from S is felicitous even though the context contains no evidence as to whether there is a vegetarian restaurant nearby. However, we do not believe the example shows what it is supposed to show. We believe that insofar as the question is felicitous, it invokes a context where S is reacting to the absence of evidence *for* there being a vegetarian restaurant nearby. Specifically, the negative question seems to highlight the fact that A did not mention any vegetarian restaurant, suggesting this fact is somehow at odd with S's belief that there is one. It seems to be mutually assumed in this context that (i) A knows whether there is a vegetarian restaurant nearby and (ii) if there is then both A and B would have dinner at that restaurant. These two premises make it possible to interpret A's failure to mention a vegetarian restaurant as a kind of "minimal evidence" that there is none, and S seems to be speaking under this interpretation.

Roelofsen et al. (2013) conduct an experiment which tests the felicity of yes/no question variants in different discourse contexts and allege to have substantiated B&G's claim. In the relevant condition, participants were shown three pictures displaying (i) Kate speaking to Jennifer (51-a), (ii) Rose speaking to Jennifer (51-b), and (iii) Jennifer responding to Rose's statement with a negative question (51-c).[40]

(51)   a.   Kate to Jennifer: "I'm going to get a cat. I've always wanted one."
        b.   Rose to Jennifer: "Did you hear? Kate got a pet. I heard it's so cute!"
        c.   Jennifer to Rose: "Didn't she get a cat?"

Participants are then asked to rate the "naturalness" of Jennifer's question on the scale of 0 (totally unnatural) to 7 (totally natural). The result cited as supporting B&G's claim is that Jennifer's question receives the score of 4.03, suggesting the negative question is judged as relatively natural in this supposedly "neutral" context.[41]

Again, we do not believe this result shows what the authors claim it shows. There are several confounds in the experiment. First, Jennifer's question presupposes Rose knows whether Kate got a cat. Second, the mention of *cat* in (51-a) might have prompted participants to consider *cat* as an alternative of *pet* (see section 2.2.4). Thus, they could interpret Rose's statement in (51-b) as having the implicature that Kate did not get a cat: Rose could say "Kate got a cat" but chooses the less informative "Kate got a pet" instead; this means Rose does not believe Kate got a cat, and given that she knows whether Kate got a cat, she believes Kate did not get a cat. In fact, Jennifer's question does feel like a reaction to Rose's choice of the word *pet* instead of the more specific *cat*, or more precisely to the implication of this choice. We believe that the negative question is

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[40]The latter two pictures represent parts of the same discourse between Rose and Jennifer, while the first represents a separate, previous discourse between Kate and Jennifer.

[41]The idea is that the context is "neutral" because a "pet" can be true of a cat or a non-cat.

felicitous only to the extent that this construal of the experimental condition is possible. This may explain why the score is only 4.03, not higher.

B&G's claim is also defended by Romero and Han (2004) who provide such data as (52) as argument that negative questions can be felicitous in neutral contexts.

(52)   Context: preparing for a party
        A: Mary does not smoke.
        B: What about John? Does he not smoke?

It is undeniable that this context contains no evidence as to whether John smokes, but B's negative question seems perfectly fine. Therefore, it seems we must accept (52) as a genuine counterexample to NQ. Interestingly, it turns out that (52) actually supports the *explanation* of NQ that we have proposed. According to this explanation, the infelicity of negative questions in neutral contexts is due to the fact that the corresponding positive questions are simpler, with S' said to be "simpler" than S iff $S' \in \text{ALT}(S)$ but $S \notin \text{ALT}(S')$. Now consider the negative question in (52-B), reproduced with analysis in (53-b). The competing positive question would be (53-a).

(53)   a.   [$_{CP}$ does+Q [$_{TP}$ he ~~does~~ [$_\alpha$ smoke]]]?
         b.   [$_{CP}$ does+Q [$_{TP}$ he ~~does~~ [$_\beta$ not [$_\gamma$ smoke]]]]?

It is clear that (53-a) $\in$ ALT((53-b)), as (53-a) is derivable from (53-b) by replacing a constituent of the latter with its subconstituent, specifically by replacing $\beta = not\ smoke$ with $\gamma = smoke$. But is (53-a) simpler than (53-b)? The answer is no, since it is also the case that (53-b) $\in$ ALT((53-a))), as (53-b) is derivable from (53-a) by replacing a constituent of (53-a) with a constituent of another sentence uttered in the context, specifically by replacing $\alpha = smoke$ with NegP of (54), which is the sentence uttered by A.

(54)   [$_{TP}$ Mary does [$_{NegP}$ not smoke]]

In short, it is A's utterance that makes B's negative question just as simple as its positive counterpart in this context. Consequently, there is no violation of Manner, and the question is felicitous.[42] Thus, our explanation of NQ not only accounts for the cases it covers, but also makes correct predictions for cases it does not cover.

3   Conclusion and remaining issues

The felicity condition relating formal characteristics of a yes/no question and evidential properties of the context in which it is put to use manifests itself in complicated distributional patterns. We have shown that these patterns can be described systematically in terms of established principles of linguistic pragmatics, formulated in certain ways. To the extent that our account is successful, it is an argument for some, and against other, formulations of these principles.

There are at least three remaining issues. The first concerns speaker's bias. It has been claimed that whether a certain formulation of a yes/no question is felicitous also depends on whether the speaker's belief state favors an answer to that question, and if it does, which one. To what extent

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[42]A prediction we make is that if A had said "Mary smokes" instead of "Mary does not smoke," B's question would have been infelicitous. We believe this prediction is correct.

this claim is true, and if it is, to what extent we can reformulate it as a claim about evidential bias, are questions that we leave open. The second issue concerns the evidential marker **E**. We have stipulated that it can enter the derivation affixal or non-affixal. A structure that we do not rule out is $[E_{[+af]}$ TP], which would result in a declarative sentence that exhibits subject aux inversion (T-to-C movement). However, declaratives with subject aux inversion are not attested in English, which means we would have to say that affixal **E** does not appear in sentences without **Q**, which would be the case if declaratives are not felicitous when there is contextual evidence for the propositions they denote. Again, we choose to remain temporarily agnostic on this point. The third issue concerns typological variation. Even if we assume that every language has **E**, there is no reason to assume for every language that **E** is free to enter the derivation as $[-af]$ or $[+af]$. One peculiar consequence **E** has for English is that there are forms of yes/no questions which are felicitous in both neutral and biased contexts, because deleting $E_{[+af]}$ from $[Q_{[+af]} E_{[+af]}$ TP] results in a string-identical sentence. This means if we can find a language in which **E** is never affixal, say because it is an independent word, we would expect, for this language, that no question which is felicitous in biased contexts is felicitous in neutral contexts and none which is felicitous in neutral contexts is felicitous in biased contexts.[43] We will have to leave this typological study, as well the other two issues, to future research.

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[43]There are reasons to believe Vietnamese is such a language (cf. Trinh 2010).

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