

Rising intonation and uncertainty

Erin Zaroukian

zaroukian@cogsci.jhu.edu

1 Introduction

Gunlogson (2008) describes the effect of rising intonation on declarative sentences like (1) as marking the speaker's commitment to the expressed proposition (here, the proposition that it is raining) as contingent.

(1) It's raining? (Gunlogson 2008:104)

However, we will see that surprising readings of rising declaratives arise when they are used in a non-questioning capacity in combination with certain modal elements, as in (2).

(2) α : What is John's favorite color?
 β : a. Blue? / b. Maybe blue? / c. #Maybe blue.

Here I provide a concord analysis, where a modal adverb in combination with rising intonation gives rise to modal concord.

1.1 Rising declarative questions

As proposed in Gunlogson (2008), rising intonation in a declarative question like (1) marks the speaker's commitment to a proposition as contingent such that no context update will occur unless someone verifies the proposition. For Gunlogson, context is defined relative to each discourse agent and contains a commitment set (*cs*) and a source set (*ss*). An agent's *cs* represents his discourse commitments, and an agent's *ss* represents the discourse commitments for which he acts as a source. A discourse commitment is considered contingent if the speaker is not a source of it and it is understood that it will be withdrawn unless a source is found. Gunlogson focuses on rising declaratives that function as questions, and she describes their capacity to act as questions as their being understood as contingent on ratification by the addressee.

We can see how these definitions predict the meaning of the rising declarative question in (1). Imagine that (1) is uttered in a situation where the speaker is sitting in a windowless room when another person enters wearing a wet raincoat and boots. In this context, the speaker's commitment to the proposition *it's raining* is seen as contingent on newcomer's ratification, since the newcomer is presumably better informed with respect to the weather, so (1) functions as a question.

1.2 Rising declarative answers

As mentioned at the outset, this paper focuses on rising intonation in declarative answers, as in (2), not questions, as in (1). In considering rising declarative answers, two problems arise.

The first concerns how to fit them into Gunlogson's framework, described above. Rising declarative answers are not particularly questioning. Instead, they seem to convey a lack of speaker commitment without being contingent on ratification by the addressee. The solution I adopt here is to consider rising declarative answers as appealing to an unspecified (perhaps hypothetical) source. If someone can corroborate the answer, so much the better, but this is not necessarily expected.

The second problem, which constitutes the focus of this paper, is that the responses in (2) do not have their expected meanings. Following Gunlogson, the expected meanings are given below.

Blue? (2a): (blue) [-commitment] *It's blue, but don't believe that unless someone can verify.*

Maybe blue? (2b): (\diamond blue) [-commitment] *It's possible that it's blue, but don't believe that it's possible that it's blue unless someone can verify.*

Maybe blue. (2c): (\diamond blue) [+commitment] *It's possible that it's blue.*

(2a) should express that blue is John's favorite color, but only contingently, due to the rising intonation. (2b) should make the rather weak claim that blue might be John's favorite color, but only contingently, due to the rising intonation. (2c) should express that blue might be John's favorite color, non-contingently.

In reality, however, (2a) and (2b) seem equivalent in meaning, and (2c) seems infelicitous. I propose that the solution to the equivalence between (2a) and (2b) is a consequence of modal concord, and the infelicity of (2c) is due to the uncooperative use of *maybe* without rising intonation.

2 Concord

Modal concord occurs when multiple modal items give rise to concord readings, as in (3).

- (3) Examples cited in Geurts and Huitink (2006)
- a. You may possibly have read my little monograph upon the subject.
 - b. Power carts must mandatorily be used on cart paths were provided.

Here, the modal elements (*may* and *possibly* or *must* and *mandatorily*) can unite in meaning, such that (3a), for example, has the paraphrase *It's possible that you have read my little monograph upon the subject* (cf. literal paraphrase *It's possible that it's possible that you have read my little monograph upon the subject*, Zeijlstra 2008). This occurs where a modal adverb and a modal auxiliary have the same (or similar) flavor (i.e. modal base) and quantificational force. In (3a), we can note that the adverb and auxiliary share epistemic flavor and existential force, and in (3b) they share deontic flavor and universal force.

Returning to rising declarative answers, we must determine why (2a) and (2b) are equivalent. Here I propose adopting a modal concord analysis such that [*maybe* + ?] is equivalent to [?] (where ? indicates rising intonation). To accomplish this, I propose that *maybe* involves

existential quantification over epistemically accessible worlds (\exists_{epist}) and rising intonation involves universal quantification over worlds epistemically accessible from the speaker's *cs* and existential quantification over worlds epistemically accessible from the speaker's *ss* ($cs : \forall_{epist}, ss : \exists_{epist}$), such that when *maybe* and rising intonation combine, modal concord yields universal quantification over worlds epistemically accessible from the speaker's *cs* and existential quantification over worlds epistemically accessible from the speaker's *ss* ($cs : \forall_{epist}, ss : \exists_{epist}$).

- (4) a. *Maybe* – \exists_{epist}
 ? – $cs : \forall_{epist}, ss : \exists_{epist}$
 b. *Maybe+?* $\rightarrow cs : \forall_{epist}, ss : \exists_{epist}$

To provide a concrete example, I draw on Anand and Brasoveanu (2010), who suggest that modal concord occurs when a modal adverb takes modal argument and causes both to share same modal base. In the case of *maybe+?*, *maybe* is shifted (i-ii) to take such an argument, namely ? (iii).

- (i) $\llbracket \mathbf{maybe} \rrbracket = \lambda w \lambda f_{\langle s \langle \langle st \rangle t \rangle \rangle} \lambda p_{\langle st \rangle} \cdot \bigcap f(w) \cap p \neq \emptyset$
 \downarrow
 (ii) $\llbracket \mathbf{maybe} \rrbracket = \lambda M_{\langle s \langle \langle st \rangle t \rangle \langle \langle st \rangle t \rangle \rangle} \lambda w \lambda f_{\langle s \langle \langle st \rangle t \rangle \rangle} \lambda p_{\langle st \rangle} : f \text{ is epistemic.}$
 $M(w)(f)(p) \wedge \bigcap f(w) \cap p \neq \emptyset$
 (iii) $\llbracket ? \rrbracket = \lambda w \lambda f_{\langle s \langle \langle st \rangle t \rangle \rangle} \lambda p_{\langle st \rangle} : f \text{ is epistemic.}$
 $\bigcap f(w) \subseteq \{w' | p \in cs_s \text{ in } w'\} \wedge \bigcap f(w) \cap \{w' | p \in ss_s \text{ in } w'\} \neq \emptyset$

Using rising intonation as the argument of *maybe*, composition progresses as follows.

- $\llbracket \mathbf{maybe ?} \rrbracket$
 (iv) $= \llbracket \mathbf{maybe} \rrbracket (\llbracket ? \rrbracket)$
 (v) $= \left[\lambda M \lambda w \lambda f \lambda p. f \text{ is epist. } M(w)(f)(p) \wedge \bigcap f(w) \cap p \neq \emptyset \right]$
 $\left(\left[\lambda w \lambda f \lambda p : f \text{ is epist. } \bigcap f(w) \subseteq \{w' | p \in cs_s \text{ in } w'\} \wedge \bigcap f(w) \cap \{w' | p \in ss_s \text{ in } w'\} \neq \emptyset \right] \right)$
 (vi) $= \lambda w \lambda f \lambda p : f \text{ is epist.}$
 $\left[\bigcap f(w) \subseteq \{w' | p \in cs_s \text{ in } w'\} \wedge \underbrace{\bigcap f(w) \cap \{w' | p \in ss_s \text{ in } w'\} \neq \emptyset}_1 \right] \wedge \underbrace{\bigcap f(w) \cap p \neq \emptyset}_2$

Here we expect concord between \exists_{epist} and \exists_{ss} (1 and 2 underlined above), which match in flavor and force, but they quantify over different sets. However, if someone is a possible source for *p*, we can assume that they consider *p* epistemically possible, which I codify in the Epistemic Source Principle.

(5) **Epistemic Source Principle:** $\diamond_{ss}p \models \diamond_{epist}p$

Following the Epistemic Source Principle, the contribution of *maybe* is subsumed by *?*, and we can see why (2a) and (2b) are equivalent.

$$(vii) \quad = \left[\lambda w \lambda f \lambda p : f \text{ is epist. } \bigcap f(w) \subseteq \{w' | p \in cs_s \text{ in } w'\} \wedge \bigcap f(w) \cap \{w' | p \in ss_s \text{ in } w'\} \neq \emptyset \right]$$

$$(viii) \quad = \llbracket ? \rrbracket$$

3 What about (2c)?

To address the infelicity of (2c), it seems that in this answer β is neither committing to a color nor opening the door for anyone else to do so. In other words, β 's *cs* and *ss* contain the proposition that John's favorite color might be blue, but β does not provide an opening for anyone to step in as a source for this actually being John's favorite color. And this uncooperativity seems to be exactly the kind of infelicity this utterance suffers from.

4 Conclusion

Here we have seen the surprising pattern of rising declarative answers explained. The surprising reading in (2b) results from the modal status of rising intonation and its participation in modal concord with an epistemic adverb, and the uncooperativity of uncertainty with falling intonation explains the infelicity of (2c). A variety of supporting evidence for this analysis, as well as its ramifications, have been omitted due to space constraints, but to provide just two items for consideration, quantifying relative to *cs* and *ss* as was done here provides a way to represent graded commitment (\exists /very unsure \longleftrightarrow \forall /very sure), and this analysis suggests that the illocutionary operator *?* has additional semantic content (see, e.g., Green 2000 for support).

Acknowledgments

Many thanks to Kyle Rawlins, Christine Gunlogson, Charley Beller, Kristen Johannes, Mike Oliver, and Lilia Rissman for their input and support.

References

- Anand, P. and A. Brasoveanu (2010). Modal concord as modal modification. In M. Prinzhorn, V. Schmitt, and S. Zobel (Eds.), *Proceedings of Sinn und Bedeutung 14*.
- Geurts, B. and J. Huitink (2006). Modal concord. In P. Dekker and H. Zeijlstra (Eds.), *Concord and the syntax-semantics interface*, pp. 15–20. Malaga: ESSLLI 06.
- Green, M. S. (2000). Illocutionary force and semantic content. *Linguistics and Philosophy* 23, 435–473.
- Gunlogson, C. (2008). A question of commitment. *Belgian Journal of Linguistics*, 101–136.
- Zeijlstra, H. (2008). Modal concord is syntactic agreement. In *SALT 17*. Ithaca: CLS Publications.