

# Rising intonation and uncertainty

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## 1 Introduction

- Gunlogson (2008): Effect of rising intonation on declarative sentences – mark commitment as contingent

(1) It's raining?

- Surprising readings of rising declaratives with certain modal elements

(2)  $\alpha$ : What is John's favorite color?  
 $\beta$ : a. Blue? / b. Maybe blue? / c. #Maybe blue.

- Concord analysis provided

### 1.1 Rising declarative questions (Gunlogson 2008)

- Rising intonation in declarative question like (1) marks speaker's commitment to a proposition as contingent

(3)  $C_d = \langle \sigma_\alpha, \sigma_\beta, \dots \rangle$ , where each  $\sigma_\chi$  is a triple  $\langle cs, ss, \chi \rangle$ , with  $\chi$  and agent in d, and:

- $cs = \{w \in W: \text{all discourse commitments of agent } \chi \text{ in discourse } d \text{ are true in } w\}$
- $ss = \{w \in W: \text{all commitments of agent } \chi \text{ in discourse } d \text{ for which agent } \chi \text{ is a source are true in } w\}$

(4) A discourse move  $\mu$  committing an agent  $\alpha$  to  $\phi$  is *contingent* upon ratification by an agent  $\beta$ ,  $\alpha \neq \beta$ , if:

- $\beta$  is implicitly authoritative with respect to  $\phi$  at the time of  $\mu$
- It is inferable in the discourse context that  $\alpha$ 's commitment to  $\phi$  will be withdrawn unless the discourse move immediately succeeding  $\mu$  has the effect of committing  $\beta$  to  $\phi$  as a source

(5) An utterance of a declarative with content  $\phi$  is *questioning* to the extent that the speaker's commitment is understood as contingent on the addressee's ratification of  $\phi$ .

- For (1)
  - Uttered in following situation: Speaker is sitting in a windowless room when another person enters. The newcomer is wearing a wet raincoat and boots.

–  $\phi = \textit{it's raining}$

– Speaker's commitment to  $\phi$  seen as contingent on newcomer's ratification, (1) functions as a question

- Not discussing some other popular readings of rising intonation, e.g.  $? = \text{I'm not sure this is an appropriate answer}$

### 1.2 Rising declarative answers

Rising intonation in declarative answer, as in (2)

**First problem:** How to deal with rising declarative answers in the first place

- They're not particularly questioning, not contingent on addressee's ratification (They asked the question, after all)
- Instead, they seem to convey a lack of commitment where the addressee need not be the source

**Solution:** Rising declarative answers can be seen as appealing to an unspecified source. If someone can corroborate the answer, so much the better, but this is not necessarily expected.

**Second problem:** These responses do not have their expected meanings

- Expected meanings

*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.*

- Actual meanings

– (2a)  $\approx$  (2b)

– #(2c)

**Solution:** Modal concord

## 2 Concord

- Multiple modal items can give rise to concord readings

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

- Can unite in meaning

- $\Diamond_{epist}\Diamond_{epist}$  vs.  $\Diamond_{epist}$
- $\Box_{deon}\Box_{deon}$  vs.  $\Box_{deon}$

- Occurs where modal adverb and modal auxiliary have same/similar flavor (modal base) and quantificational force

- (6a) –  $\exists$ , epistemic
- (6b) –  $\forall$ , deontic

Returning to rising declarative answers...

- Why (2a)  $\approx$  (2b)  $\not\approx$  (2c)
- Modal concord analysis s.t.  $[maybe + ?] \approx [?]$
- Requires that  $?$  be modal
- The plan

- Maybe* –  $\exists_{epist}$
- $?$  –  $cs : \forall_{epist}, ss : \exists_{epist}$

$Maybe + ? \rightarrow cs : \forall_{epist}, ss : \exists_{epist}$

Drawing on Anand and Brasoveanu (2010) – adverb takes modal, share same modal base

- (i)  $\llbracket \text{maybe} \rrbracket = \lambda w \lambda f_{(s \langle \langle st \rangle t \rangle t))} \lambda p_{(st)} \cdot \bigcap f(w) \cap p \neq \emptyset$   
 $\downarrow$
  - (ii)  $\llbracket \text{maybe} \rrbracket = \lambda M_{(s \langle \langle s \langle st \rangle t \rangle \rangle \langle st \rangle t))} \lambda w \lambda f_{(s \langle \langle st \rangle t \rangle)} \lambda p_{(st)} : f \text{ is epistemic.}$   
 $M(w)(f)(p) \wedge \bigcap f(w) \cap p \neq \emptyset$
  - (iii)  $\llbracket ? \rrbracket = \lambda w \lambda f_{(s \langle \langle st \rangle t \rangle)} \lambda p_{(st)} : f \text{ is epistemic.}$   
 $\bigcap f(w) \subseteq \{w' | p \in cs_s \text{ in } w'\} \wedge \bigcap f(w) \cap \{w' | p \in ss_s \text{ in } w'\} \neq \emptyset$
- $\llbracket \text{maybe } ? \rrbracket$
- (iv)  $= \llbracket \text{maybe} \rrbracket (\llbracket ? \rrbracket)$
  - (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 want 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 ( $\Diamond_{ss} p \models \Diamond_{epist} p$ ), so the contribution of *maybe* is subsumed by  $?$ , and we can see why (2a)  $\approx$  (2b).
- (7) **Epistemic Source Principle:**  $\Diamond_{ss} p \models \Diamond_{epist} p$
- (vii)  $= \left[ \lambda w \lambda f \lambda p : f \text{ is epist. } \bigcap f(w) \subseteq \{w' | p \in cs_s \text{ in } w'\} \wedge \bigcap f(w) \cap \{w' | p \in ss_s \text{ in } w'\} \neq \emptyset \right]$
  - (viii)  $= \llbracket ? \rrbracket$

- Using the Epistemic Source Principle and treating  $?$  as modal as above, modal concord can explain why (2a)  $\approx$  (2b)

## 2.1 ? + other modal adverbs

- *Definitely* + ?
  - Predicted to NOT yield modal concord –  $\diamond_{ss}P \not\models \Box_{epist}P$
  - $[cs : \forall_{epist}, ss : \exists_{epist}] + [\forall_{epist}]^1$
  - And concord reading is NOT attested
- *Probably* + ?
  - Predicted to NOT yield modal concord –  $\diamond_{ss}P \not\models \text{MOST}_{epist}P$
  - $[cs : \forall_{epist}, ss : \exists_{epist}] + [\text{MOST}_{epist}]$
  - And concord reading is NOT attested
- Instead, ? seems to convey *is this the kind of answer you're looking for?*, not level of certainty about blue.
- So, with other epistemic modal adverbs, this analysis makes the correct predictions

## 2.2 Support for concord analysis

- Concord appears not just in rising declarative answers, but **also in questions**, (8)  $\approx$  (9)
  - *will*-answer - concord
  - *might*-answer - no concord
- (8)  $\alpha$ : Is John *maybe* gonna come visit?  
 $\beta$ : a. Yes, he will. / b. #Yes, he might. / (c. Yeah, he might.)
- (9)  $\alpha$ : Is John gonna come visit?  
 $\beta$ : a. Yes, he will. / b. #Yes, he might. / (c. Yeah, he might.)
- (10) When is John (maybe) gonna come visit?
- cf. (c), *might* is fine, agreeing with something weaker than the proposition (agreeing with polarity)

<sup>1</sup>Or, similarly, according to Anand and Brasoveanu, *definitely*, *absolutely*, etc. are flavor- and force-neutral and act to strengthen the force of the auxiliary.

## 2.3 Another approach to modal concord

Syntactic analysis of modal concord (Zeijlstra 2008)

- Concord as feature checking
    - Modal auxiliaries – uninterpretable flavor/force features
    - Modal adverbs – interpretable flavor/force features
    - e.g.  $[\text{mandatorily}_{i\forall,iDeon} \text{ must}_{u\forall,uDeon} [\dots]]$
    - OP checks any remaining uninterpretable features
    - e.g.  $[\text{OP}_{i\forall,iDeon} \text{ must}_{u\forall,uDeon} [\dots]]$
  - For ?
    - Since adverbs have interpretable flavor/force features, to result in concord ? should have uninterpretable features
    - e.g.  $[\text{?}_{u\exists ss,uEpist} \text{ maybe}_{i\exists,iEpist} [\dots]]$
    - But ? and *maybe* don't quite match in w.r.t. force ( $\exists_{ss}$  vs.  $\exists$ )  $\rightarrow$  no concord
    - If they could be treated as matching, concord should occur in (11),  $[\text{?}_{u\exists ss,uEpist} \text{ might}_{u\exists,uEpist} [\dots]]$
- (11)  $\alpha$ : {John might/might John} come visit?  
 $\beta$ : a. #Yes, he will. / b. Yes, he might.

- Rising intonation in modal concord is difficult to account for under a syntactic analysis

## 3 What about (2c)?

Problem:

- Why should (2c) be infelicitous?
 

(2)  $\alpha$ : What is John's favorite color?  
 $\beta$ : a. Blue? / b. Maybe blue? / c. #Maybe blue.

**Solution:** Uncooperativity

- $\beta$  is neither committing to a color nor opening the door for anyone else to do so.
- I.e.,  $\beta$ 's *cs* and *ss* contain the proposition that it might be blue, but he does not provide an opening for anyone to step in as a source for this actually being John's favorite color.
- And this seems to be exactly the kind of infelicity this utterance suffers from.

Note that such falling declaratives are not always infelicitous

- When question is speculative

- (12)  $\alpha$ : Roughly how many books are on your desk?  
 $\beta$ :  
a. Maybe 5.  
b. Maybe 5?  
c. Maybe 5...

- Singleton answer to list question

- (13)  $\alpha$ : What books does John have?  
 $\beta$ :  
a. Maybe Anna Karenina.  
b. Maybe Anna Karenina?  
c. Maybe Anna Karenina...

#### 4 Concord in rising declarative questions

**Problem:** Why is felicity different in questions vs. answers?

- In questions, often  $[\text{?}] \not\approx [\text{?} + \text{maybe}]$  (cf. (2a)  $\approx$  (2b))

- (14) #It's maybe raining?

**Solution:** Modal concord as strengthening force

- For  $\exists$  this leads to weaker claim (smaller likelihood)
- Weaker claims are typically more appropriate in answer contexts than in information-seeking contexts
- In certain questioning contexts, as for (1), weak propositions (via modal concord) are infelicitous, though they can suffice as answers, as in (15).

- (15)  $\alpha$ : Why is John so wet?  
 $\beta$ : It's maybe raining outside?

#### 5 Conclusion

- Rising declarative answers explained
- Surprising readings result from

- Modal status of  $\text{?}$  and its participation in modal concord with epistemic adverb ((2a)  $\approx$  (2b))
- Uncooperativity of uncertainty with falling intonation ( $\not\approx$  (2c))

- Data may be difficult for a syntactic approach

- Quantifying relative to *cs* and *ss* as representing graded commitment

- $\exists$ /very unsure  $\longleftrightarrow$   $\forall$ /very sure

- This analysis suggests that the illocutionary operator  $\text{?}$  also has semantic content (see, e.g., Green (2000) for support)

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