

# Incomplete Answers and the Rise-Fall-Rise Contour

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## Abstract

The English rise-fall-rise contour has played an important role in the development of theories of intonational meaning, but there have been only few experimental studies testing their predictions. This paper reports on production and perception experiments which investigate the idea that the RFR is an intonational tune that conveys that the current assertion is not a complete answer to the question under discussion.

## 1 Introduction

Consider the following sentence, uttered with main prominence on *all*. Jackendoff (1972) describes an intonational realization which involves a rising accent on *all*, followed by a fall, and then a final rise at the end of the utterance (in the following indicated by ‘.../’):

- (1) ALL of the men didn't go.../  
L H\*                                  L- H%

We will refer to this intonation as the rise-fall-rise intonation, or the RFR, following much work in the literature on the topic (Hirschberg and Ward, 1992). It is important to distinguish between the RFR and other rising intonations such as the yes/no question rise, the continuation rise, the incredulity contour, and the contradiction contour (Goodhue et al., 2013). There are two types of analysis of the nature of this intonation. One view takes the RFR contour to be the reflex of a special pitch accent on the word in focus (in this case *all*); the other takes the RFR contour as a sentence-level intonational tune, similar to the declarative contour or the rise typically used in yes/no-questions.<sup>1</sup>

<sup>1</sup>In this paper we intend the label RFR to be theory neutral, even though the term is from the literature that treats the RFR as a sentence-tune.

In the following, we first review two past analyses of the RFR (as a pitch accent, and as an intonational tune), and attempt to clearly disambiguate them, and then propose a new analysis based on the idea that the RFR signals that an assertion is only an incomplete answer to the question under discussion. A production experiment was conducted and shows that indeed the RFR is preferred when a speaker intends to convey a partial answer, and only rarely used when a complete answer is conveyed. This is to our knowledge the first time that it was shown in a production task that there are contexts in which the RFR is the preferred contour. Two perception experiments try to further elucidate the precise pragmatic import of the contour. The final section, §6 discusses the effectiveness of these experiments and their ultimate conclusion.

### 1.1 RFR as Pitch Accent

The pitch accent analysis presented in Jackendoff (1972) is that both the rise and following fall-rise are due to a special kind of contrastive pitch accent on the word *all*.<sup>2</sup> Jackendoff (1972) calls this accent *background accent* or B-accent, assuming that it is usually placed on discourse-old information. Because it is the last word carrying the accent in the case of (1), the second rise associated with the accent is realized at the sentence end.

An updated analysis of this kind was proposed

<sup>2</sup>Bolinger (1958) also proposes an analysis using accents, positing a B-accent which marks ‘connectedness’ and ‘incompleteness.’ However, the proposed accent classification in Bolinger’s paper cannot straightforwardly map to Jackendoff’s. Jackendoff’s B-accent corresponds to a version of Bolinger’s ‘Accent A’ when there is no further accent following, but in the Jackendoff examples in which an A-accent follows the B-accent (not discussed here), Bolinger would categorize the first as an instance of his ‘Accent B’. Wagner (2012) argues that Jackendoff’s analysis conflates two distinct types of accent: 1) a non-terminal B-accent as a continuation rise which is unrelated to the RFR (similar to Bolinger), and 2) a terminal instance like in (1) of a sentence level RFR-contour (different from both Jackendoff and Bolinger).

in more recent work on contrastive topics (Büring, 1997; Büring, 2003), although under very different assumptions with respect to the semantic meaning and the pragmatic import of the B-accent. Büring's theory is formalized using alternative-semantics (Rooth, 1992), which assumes that each proposition comes with a set of alternative propositions which can play into the overall meaning of the sentence through their interaction with focus and topic operators. Büring's proposal extends this analysis to allow for more complex alternatives, and argues that an utterance can also evoke a set of alternative questions, that is, a set of alternative sets propositions. The idea for the analysis of contrastive topics is then that an utterance that includes a B-accent triggers the conventional implicature that one of these alternative questions still remains open or 'disputable' after the context has been updated with the contribution of the assertion of the current utterance. We can summarize Büring's insight about the meaning of the RFR as follows:

- (2) **Disputability Claim**  
An utterance involving an RFR must leave an answer to a salient alternative question disputable.

## 1.2 RFR as Intonational Tune

The second type of approach views the RFR as a sentence-level intonational tune, and is more in line with early descriptions of the contour (Pike, 1945; O'Connor and Arnold, 1961). The idea is that, in principle, the RFR can be 'draped' over any utterance independent of the presence or location of a contrast, in contrast to Büring's and Jackendoff's analysis, which both view their B-accent as necessarily evoking contrastive alternatives to the constituent it is placed on. Of course, even in the tune-analysis one might expect that the meaning of RFR could interact with the contribution that a contrastive emphasis makes, if there is one.

Under this view, the RFR-tune has the effect that the last pitch accent of the utterance is realized with a rising accent, which is immediately followed by a fall, and then a final rise is realized at the end of the utterance. In other words, this analysis also makes claims about the presence of a special pitch accent, but views this to be part of the sentence-level contour. This is parallel to other sentence-level tunes, such as the rising in-

tonation observed in questions, which usually is paired with low pitch accents earlier in the utterance, in contrast to the declarative tune which comes with high pitch accents.<sup>3</sup>

Liberman and Sag (1974) argues in favor of this view of RFR as a sentence-tune and against Jackendoff's account in terms of a special contrastive accent.<sup>4</sup> Ward and Hirschberg (1985) come to a similar conclusion, and were the first to make a precise proposal of how to characterize the pragmatic import of RFR. According to their analysis, the RFR conveys speaker uncertainty:

- (3) **The Uncertainty Claim**  
The RFR conveys uncertainty with respect to a scale: A speaker conveys uncertainty about whether to evoke the scale, about which scale to choose, or whether the choice of value from the scale is correct.

This analysis is similar to Büring's in that if there remains uncertainty, this plausibly means that there is still an unresolved and hence disputable issue that remains open. It differs from Büring's analysis in that there could be uncertainty with respect to the present assertion that carries the RFR, by virtue of the last clause in (3). Büring's analysis does not predict any uncertainty about the present assertion.

It is important to point out, however, that this difference in the pragmatic/semantic analysis between the two views is only loosely linked to the difference in whether or not RFR is treated as a pitch accent or a tune. In other words, one could imagine a Büringian tune-analysis and a Ward & Hirschbergian pitch accent analysis. Constant (2012) and Wagner (2012), for example, posit a tune-analysis couched in alternative semantics, and proposes a meaning for the tune that is very similar to Büring's disputability implicature. For the remainder of this paper we focus on the *semantic/pragmatic differences* between accounts and leave a discussion of the tune-vs.-accent issue for another occasion.

<sup>3</sup>Pierrehumbert and Hirschberg (1990), however, argue that pitch accent type and boundary tone (declarative vs. question rise) are freely combinable—we have some reservations about this claim but will not elaborate on this here.

<sup>4</sup>Arguably Liberman and Sag (1974) conflate the RFR with a different contour, the Contradiction Contour (not discussed here). A running theme in the literature on tunes is that different authors assume different taxonomies of intonational tunes, which makes a direct comparison between proposals difficult.

### 1.3 Disambiguation?

An important difference between the analysis in Ward and Hirschberg (1985) on the one hand and the analyses of Büring, Constant and Jackendoff on the other is that in the latter, the use of the special intonation is predicted to have the effect that the universal quantifier takes scope below negation. The sentence in (1) should then be paraphrasable as follows:

(4) Not ALL of the men went.../

Büring's analysis offers an elegant account of this (purported) disambiguation. Suppose that (1) didn't involve inverse scope, and instead could be paraphrased as follows:

(5) NONE of the men went.../

Under this reading, the set of alternative questions would look as follows in this analysis:

- (6) a. Did all of them go?  
b. Did some of them go?

Clearly, the assertive content of (5) already provides an answer to all of these questions, and hence the disputability implicature should be infelicitous. Under the inverse scope reading, the alternatives are the following:

- (7) a. Didn't all of them go?  
b. Didn't some of them go?

Here, the assertion of (4) leaves open the possibility that none of them went, and only resolves the first question; hence this reading is compatible with the RFR.

Constant (2012) incorporates Büring's insight into a tune-analysis of the RFR. Under this analysis, the RFR obligatorily associates with focus and requires that all propositional alternatives remain unresolved. Asserting (5), with focus on *all*, would then be incompatible with the implicature of the RFR since it resolves all propositional alternatives:

- (8) a. None of them went.  
b. Some of them went.

Both Büring (1997) and Constant (2012) predict that the RFR should be infelicitous on utterances which resolve all alternatives, even if the technical explanations slightly differ. In other words, an ut-

terance like (5) in which the assertion entails the falseness of all alternatives should be infelicitous with the RFR contour, and this, under these analyses, is the source of disambiguation in (1).

The disambiguation claim has not, however, gone unchallenged. For example, Ward and Hirschberg (1985) argue that context can disambiguate the sentence one way or another, orthogonal to which intonation is used. For more recent evidence bearing on this question see Syrett et al. (2013). While this paper will not directly test Jackendoff's original disambiguation claim, we will see evidence bearing on the predictions of Büring's and Constant's view that alternative-excluding contexts should be incompatible with the RFR.

## 2 RFR and Incomplete Answers

While we conducted this study to establish some of the basic data points relevant for these prior studies and test some of their diverging predictions, the design of the experiment was motivated further by an analysis that unifies insights from prior analyses but is slightly different in the precise content it attributes to RFR.

Each prior analysis of the contour has been based on one particular use of the contour, which was then argued to generalize to other uses, and ours is no exception to this pattern. The use of RFR we take as a starting point is this:

- (9) **Q:** Who solved the problem?  
a. **A:** JOHN did.  
b. **A:** JOHN did.../

When A wants to provide a partial answer to the question Q raised, then she might use the RFR to signal this. The analysis of the RFR we propose is the following:

- (10) **RFR** (*p*): The speaker asserts *p* but considers it to be only an incomplete answer to the question under discussion.

An answer with a declarative fall as in (9a) comes with the implicature that no one else but John solved the problem. This is the reading of the sentence that ensues when we treat the answer to be an exhaustive question under the discussion. The use of the RFR in (9b) preempts this implicature.

The analysis is essentially that embodied in Büring's disputability claim, which also requires

a question to remain unresolved, but differs in one aspect: The remaining disputable question is always the one the speaker takes to be the question under discussion (QUD). We already know from Büring (2003) that what a speaker takes to be the current question under discussion does not always have to be the question immediately asked before, so some apparent counterexamples are compatible with this view, if we allow the speaker to perform discourse moves that don't just obey the QUD made salient by prior discourse. For example, a speaker might use the RFR to signal that she considers another question related to the present one by forming part of a super-question (in our analysis the unresolved QUD) to be salient:

- (11) In a context where it matters how well several people did on a specific problem...  
**Q:** Did John solve the problem?  
**A:** JOHN did.../ (But SALLY didn't!)

The immediate question under discussion asks about one particular individual, but the intonation in the answer reflects the fact that speaker A considers a broader question, namely *Who solved the problem*, or maybe *Did John and Sally solve the problem?*

Our analysis of RFR as a contour signalling a partial contour simplifies Büring's in that it does not require the complex topic-semantic value for utterances that Büring's analysis relies on, and uses a 'flatter' representation that only involves the meaning of utterances and alternatives to that utterance. An argument against topic-semantic values and in favor of 'flatter' meanings is given Wagner (2012). This fits with the observation in Wolter (2003) and Constant (2012) that partial answer are one typical environment for the RFR.

Our analysis differs from the analysis in (Ward and Hirschberg, 1985) in that it does not attribute uncertainty to the meaning of the contour itself. Rather the assumption is that that uncertainty inferences are a conversational implicature that result from choosing the RFR over a declarative contour. Not providing a complete answer is felicitous if the speaker does not know the complete answer, but would often be uncooperative otherwise. There may be uses of partial answers though that are not uncooperative even when the speaker does know the complete answer, and we would predict in those cases no inference about uncertainty to ensue. One such use of the RFR is arguably when

it is used to insinuate something and there is either a taboo or some other reason why the speaker does not want to state something explicitly. We will return to this point below.

This paper reports on a series of experiments in which we first test whether speakers indeed use the RFR to convey an incomplete answer. First, a production experiment tests whether speakers actually use the RFR when providing incomplete answers, and whether they avoid it when they provide a complete answer. Second, two perception experiments are used to test the claims about the meaning of the contour further.

### 3 Experiment 1: Production

What are the odds that a speaker uses the RFR in a situation where, based on a particular analysis of what the RFR contributes pragmatically, the RFR would seem like a good option? To our knowledge, no previous account of the RFR has tried to establish this empirically, maybe because of a sense that the intonation is elusive and even rare when the conditions of its use are optimally met.

What are the odds that the RFR is not used in a context that a particular account predicts to be incompatible with its use? Even for this question there has been very little experimentation, since most of the semantic work is based on impressionistic intuitions alone.

A production experiment was conducted to test whether the RFR is used in partial answers and not in complete answers. A second goal of this study was to collect a mini-corpus of utterances in which the RFR and other tunes were used by speakers without prior training on intonational tunes or priming that certain tunes were even a possible choice. These utterances will then be used in perception studies to elucidate what the contours were taken to mean when heard in or out of context.

#### 3.1 Methodology

Participants were asked to respond to a pre-recorded question played to them over headphones. They were unaware that the experiment was about sentence intonation. Prior to recording the dialogue, participants read the script of the dialogue, which included a set of 'stage directions' with respect what their intentions were supposed to be with their assertion. The crucial manipulation was that they were effectively told whether their answer is intended as a complete answer or

not. An example dialogue with a complete answer, predicted to disfavor use of the RFR:

- (12) **Q:** Is Bill coming to the party?  
[You wish to convey that you know Bill will be coming to the party.]  
**A:** Bill is coming.

The answer completely resolves the QUD. An partial-answer tune would only be motivated here if A actually considers a broader question, maybe *Who is coming to the party* or *Are Bill and some others coming to the party?*. But expanding the discourse to a broader question is not motivated by the context, hence we expect a lower rating for appropriateness.

An example with a context that is predicted to favor the use of the RFR:

- (13) **Q:** Is either Bill or Susan coming to the party?  
[You know for sure Bill is coming, but you wish to convey that you are not sure whether Susan is coming as well.]  
Is Bill coming to the party?  
**A:** Bill is coming.

Here, the question leaves one part of the QUD unresolved, and this is also made explicit in our stage directions. Participants were asked to read the question, context, and answer silently until comfortable with the material, and then read out only the reply as if in a normal conversation once prompted with the pre-recorded question. Twenty native speakers of North American English were tested. The experiment had a latin square design, such that each participant took part in 8 dialogues, 4 from each condition, in pseudo-random order such that repetitions of condition and item were minimized; this yielded a total of 160 utterances. The experiments were run using a set of Matlab scripts. The data was then acoustically analyzed (reported briefly here), as well as annotated by a trained Research Assistant (RA) for which contour was used:

- (14) a. RFR  
b. Question Rise  
c. Falling Contour  
d. Unclear/Other

### 3.2 Results

The annotation summarized in Figure 1 shows that the contextual manipulation was successful in creating both situations in which participants were likely to use the RFR contour, and ones in which they were unlikely to use it (the data reported on here only includes utterances from the first three categories in (14), which comprised more than 90% of all trials). In the dialogues that involved answers that were necessarily complete answers to the QUD, a falling declarative contour was used more than 83% of the time and an RFR contour less than 12% of the time. In the dialogues that involved answers that were compatible with being partial answers, and in which stage directions had made it clear that only a partial answer was intended, the RFR contour was used more than 65% of the time, and the declarative contour only 24% of the time.

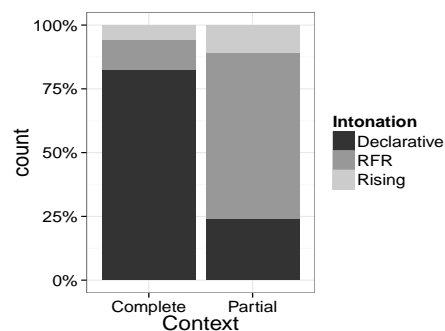


Figure 1: Experiment 1. Percent of Declarative, RFR, and Rising Intonation in Annotation

We tested that the difference was indeed statistically significant by looking at the subset of data that only involved Declarative or RFR contours, and fitting a mixed effects logistic regression model with RFR (presence or absence) as the dependent variable, Context as a fixed factor, and mixed effects for Item and Participant that included a random slope for Context. The contribution of Context was highly significant at  $p < 0.001$ .

As way to check that there were indeed systematic acoustic differences between the different contours, we report here about a single measure, the maximum pitch in the final quadrant of the final word of the utterance. We fit a linear mixed model with this dependent measure and Intonation (levels: Declarative, RFR, Rising) as fixed factor and random effects for participant and item, in-

cluding random slopes for Intonation. We found highly significant differences between Declarative vs. RFR ( $t > 2.8$ ), such that there was a higher final pitch in the cases where the annotator labeled a contour as RFR. We will not explore the acoustics in more detail in this paper.

### 3.3 Discussion

Experiment 1 is, to our knowledge, the first production experiment in which it was shown that in certain contexts and while trying to convey a certain meaning, speakers are likely to use the RFR contour. In fact, in these contexts the RFR contour is more likely than any other contour, and it is rare in other contexts.

Why was the RFR ever used in complete-answer contexts? One possibility is that our annotations conflated different prosodies (e.g., the incredulity or contradiction contours also involve a fall rise). Another possibility is that our manipulation wasn't successful in requiring a complete answer all the time. A disproportionate fraction of the RFR used in the complete contexts were due to two particular items, making this option seem likely. Finally, over the course of the experiment, participants might just have paid less attention and repeated the contour they used on the last trial. In order to establish whether the contour has indeed the pragmatic import we assume, and also to get at the diverging predictions of different theories, we ran two perception experiments.

## 4 Experiment 2: Appropriateness Rating

Is the RFR contour really dispreferred in complete-answer contexts? Our assumption about what the RFR conveys suggests that it should be. In order to answer this question, we ran a perception study in which listeners had to rate how natural a response sounds given the dialogue context. We used utterances from six speakers from experiment 1—these utterances were sampled from 4 of the original 8 items, and played either in the original context or in opposite one. The items we sampled the productions from were those in which the context itself, even without the stage directions, makes a partial answer interpretation of the response unlikely.

### 4.1 Methodology

Participants were presented with the audio recordings as described, either matching utterances from

Experiment 1 to their appropriate context, or playing audio that mismatched the condition of the context and response. Participants were then asked to rate the response on a scale from 1-7, where *higher numbers* indicated the utterance was *more appropriate* as a response to the given question. Here is an example with predictions:

- (15) Complete-Answer Context:
- a. Q: Is Bill coming to the party?  
A: Bill is coming. (Declarative)
  - b. Q: Is Bill coming to the party?  
? A: Bill is coming.../ (RFR)
- (16) Partial-Answer Context:
- a. Q: Is either Bill or Susan coming to the party?  
A: Bill is coming. (Declarative)
  - b. Q: Is either Bill or Susan coming to the party?  
A: Bill is coming.../ (RFR)

It is of course also possible to use the RFR in a complete-answer context. This could mean that speaker A wants to convey that she is considering a broader question than the one asked, or that she wants to move the discourse to such a broader QUD. But, since this is not motivated by the context, we expect the rating for an RFR contour answer to be lower in response to a complete-answer context.

### 4.2 Results

Figure 2 summarizes the results. The top panel shows the appropriateness rating by context, depending on which original context the utterance was recorded in.

As predicted, the only case in which the appropriateness seems lower is the one where an utterance was recorded in a partial context (those in which the RFR was most commonly used) and was then played in the complete context (the context in which the RFR is not expected to occur). If an utterance was recorded in the *complete* context and is then played back in the *partial* context, there is a much smaller difference, or none at all.

We analyzed the data using a mixed model regression with the original context and the new context, and their interaction as random effects, and random effects for participant and item, that included slopes for the interaction. The main effects of original and new context were not significant,

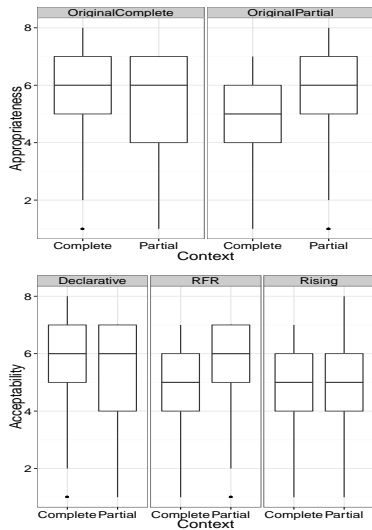


Figure 2: Experiment 2: Acceptability by original context (top) and intonation (bottom). Question: ‘How appropriate do you find the answer is pronounced given the question? (From 1=completely inappropriate to 7=completely appropriate)’

although the effect of original context approaches significance ( $t > 1.0$ ). The interaction between original and new context was highly significant ( $t > 3.1$ ), as predicted.

These results show that the answer’s original context mattered in determining which context listeners deemed the utterance more appropriate. But they don’t show yet *why* they were more or less appropriate. Our hypothesis was that the observed differences were due to the RFR contour. The bottom panel in Figure 2 shows the results by intonation. We see, as expected, that the RFR is less suitable for the complete context, but the declarative contour is suitable for both contexts, while rising (question) intonation is rated as less suitable overall in both types of context.

Again, we fitted a mixed model, this time with intonation and context, and their interaction as fixed effects, and random effects with slopes for participant and items. There was a main effect of context such that utterances played in Complete contexts were deemed more appropriate ( $t > 2.1$ ), and crucially there was a highly significant interaction between context and intonation: The difference between Declarative and RFR was different in Complete vs. Partial contexts ( $t > 2.8$ ).

### 4.3 Discussion

The results show that using the RFR contour is more compatible with contexts in which the current assertion can be taken to be an incomplete answer. In contexts in which the assertion seems to be a complete answer to the question under discussion, the RFR contour does not appear to be completely infelicitous, in contrast to the claim in Constant (2012) that the RFR is incompatible with uses in utterances for which all alternatives are resolved (i.e., in complete answers). Since Constant (2012) assumes obligatory association with focus, alternatives that are not structurally related (such as broader question that are not part of the formal set of alternatives) are not available in the interpretation of RFR.

We do not assume association with focus with the RFR to be obligatory or even necessary. Therefore is expected that a speaker might use the RFR to convey that she considers a super-question other than the question in the immediate context to be the QUD, in which case the provided response is indeed a partial answer. For example, in the following dialogue, A answers the immediate question under discussion, but the RFR indicates that A assumes the relevance of a larger question. The RFR then conveys that A is not in a position to answer that, as indicated by the continuation after the first sentence:

- (17) Q: Is Bill coming to the party?  
A: Bill is coming.../ But I’m not sure whether anyone else...

In order to get more specific information about the meaning of the contour, we ran a second experiment, in which we asked listeners more directly about what they think an utterance communicates.

### 5 Experiment 3: Guessing Intentions

Suppose we play utterances out of context: What do listeners infer about the intended meaning? We ran an experiment in which we directly asked participants what they think a speaker wanted to convey, addressing three separate qualities. If the RFR really conveys uncertainty, what does it convey uncertainty about? Is it 1) about the confidence that the proposition that is asserted itself is true, or 2) about the fit of the assertion into the current discourse? We also examined a third option, 3) that the RFR is being used to insinuate something above and beyond the asserted content (re-

ardless of certainty).

## 5.1 Methodology

We used the same materials as in Exp. 2. This time, listeners only heard the “answer” recordings of the question-answer pairs, thus removing the influence of the context on the interpretation of the contour. Rather than simply ranking how appropriate the sentence was out-of-context, this time participants rated the utterances on three separate Likert-scales that directly addressed what the listeners thought were the intentions of the speaker.

## 5.2 Results

Figure 3 summarizes how confident listeners thought speakers were in the asserted content. There was a non-significant trend that utterances originally produced in *Partial* contexts were rated as less confident about the asserted content (Mixed model analysis,  $t = 1.81$ ). When looking at Intonation, however, the Declarative contour differed significantly from the RFR contour ( $t = 2.59$ ). The rising contour did not differ from the RFR in this respect. Only the approach in Ward and Hirschberg (1985) expects the fact that the RFR contour was taken by the listeners to convey that speakers were less confident about the asserted content—it comes as a surprise for the approaches in (Jackendoff, 1972; Büring, 1997; Constant, 2012; Wagner, 2012).

Figure 4 shows how confident listeners thought speakers were that their utterance fit the discourse context. Uncertainty about whether an assertion is relevant to the context is another dimension about uncertainty which was attributed to the RFR by previous approaches, particularly the one in Ward and Hirschberg (1985). There was a non-significant trend that utterances originally produced in *Partial* contexts were rated as conveying speaker uncertainty that the assertion is context-appropriate (Mixed model analysis,  $t = 1.92$ ).

Again, when looking at Intonation, the Declarative contour differed significantly from the RFR contour ( $t = 2.8$ ), such that listeners thought speakers were less confident about fit, which the Rising intonation did not ( $t = 0.89$ ).

Figure 5 shows how likely listeners thought it was that speakers were insinuating something with their answer above and beyond the literal meaning they were conveying. Utterances originally produced in *Partial* contexts were rated as much

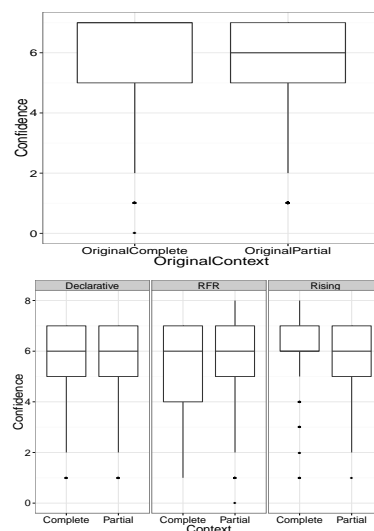


Figure 3: Experiment 3, Question 1: Confidence in Asserted Content. Question: ‘How confident do you think the speaker is about the literal statement she/he is making? (Between 1=not confident at all, and 7=completely confident)’

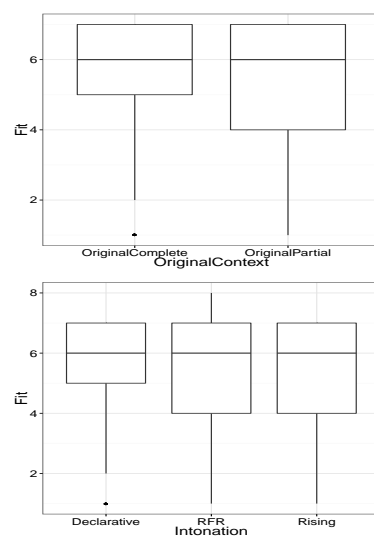


Figure 4: Experiment 3, Question 2: Confidence of Fit into Context. Question: ‘How confident do you think is the speaker about whether or not the answer is relevant for the present discussion? (Between 1=not confident at all and 7=completely confident)’

more likely to insinuate something. The RFR contours differed from both Declarative ( $t = -2.4$ ) and Rising contour ( $t = 2.6$ ) in this regard. This is what is predicted under the present analysis in the absence of a context question, since the RFR indicates that some issue still remains open.



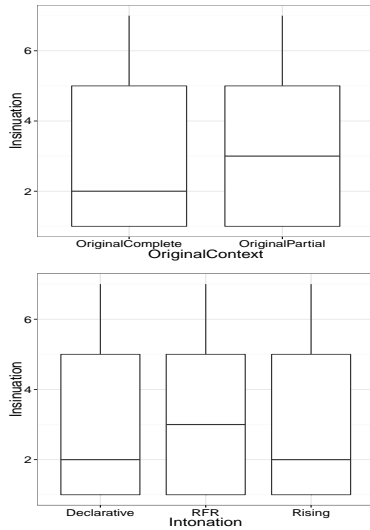


Figure 5: Experiment 3, Question 3: Likelihood of Insinuation. Question: ‘How likely do think is it that the speaker tries to insinuate something apart from what she/he is actually saying? (Between 1=not likely at all and 7=very likely)’

### 5.3 Discussion

The results are compatible with the present analysis, and raise some questions for the alternative accounts. The least accounted-for effect is that we did not expect the RFR to convey uncertainty about the present assertion, and neither do most analyses of the RFR contour. One striking result is that the RFR is overwhelmingly taken by listeners to indicate that the utterance is meant to insinuate something above and beyond what is literally asserted by the speaker. That the RFR can be used to insinuate non-asserted content is compatible with all analyses considered here.

## 6 Conclusion

We proposed that using the RFR contour allows speakers to encode that they consider their assertion to be an *incomplete answer* to the question under discussion. We showed that based on this hypothesis, we can create contexts in which speakers are highly likely or unlikely to use the RFR contour, namely by asking them to convey partial or complete answers respectively. This is, as far as we know, the first time that it was shown that the RFR is the preferred (i.e., most frequent) intonational contour used in some contexts. Showing that a contour is actually used in a production task in which no reference is made to the participants

that the experiment is about intonation is important since it provides real evidence that the contour is systematically used at least under certain circumstances. Perception experiments that try to get at this question have the problem that by providing examples of a contour they invite the listeners to consider they make the existence of the contour salient, and this might bias results when listeners compare their felicity to other contours.

Two perception experiments complemented the production evidence and provided further insights into the pragmatic import of the contour. The RFR was rated less felicitous in a context which favors a complete answer, but it is far from being infelicitous. In our analysis, in these cases a broader question has to be accommodated to make sense of the fact that the contour signals that the speaker considers the response to be a partial answer. Infelicity would be expected based on the claim in Constant (2012) that the RFR obligatorily associates with focus, and can only express uncertainty about alternatives structurally related to the asserted one. This precludes the possibility that a broader issue outside of the alternative set evoked by the assertion can be raised by the speaker using the RFR.

The contour is compatible with cases with in which it is not obvious that a scale really plays a role, which raises some questions with respect to the proposal in Ward and Hirschberg (1985). On the other hand, the contour also seems compatible with conveying uncertainty about the present assertion—this is compatible with Ward and Hirschberg (1985)’s account, but unexpected the other approaches discussed in this paper, including our own proposal. More experimental work is necessary to better understand this contour and the conditions on its use.

A very clear result of our perceptual studies is that out of context, the RFR is taken by listeners to indicate that the utterance is meant to insinuate something above and beyond what is literally asserted by the speaker. Our analysis makes the following prediction about the sense of insinuation that the RFR conveys: When used in a context where it is obvious why the provided answer might be incomplete, the only insinuation conveyed should be that the speaker is not ready to provide a complete answer; however, when the asserted content appears to answer the question under discussion completely, then indicating that the answer is incomplete should signal that *the*

speaker in fact considers something else to be the real issue, something that is still open and unresolved.<sup>5</sup>

A direct test of this prediction would be to ask the question about insinuation from Experiment 3 in a perception experiment that plays both context and answers to listeners, a prediction that we haven't tested yet. The sense of insinuation should be greater in complete contexts. If true, it would mean that the lower appropriateness rating of the RFR in complete contexts in Experiment 2 may not result from an inherent incompatibility between the RFR and such contexts, but rather from listeners not being able to guess what was being insinuated, and hence judging the utterances as less appropriate.

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<sup>5</sup>Another possible use of the RFR is in answers that insinuate an answer to the question under discussion, but their literal content appears to not address it. Here's an example from Wagner (2012):

- (i.) A: Did Mary rob the candy store?  
B: She likes chocolate.../

The speaker can use this response to convey that she thinks Mary did rob the candy store or at least thinks it's plausible. It is not clear that our proposal is sufficient to explain such uses of the RFR. In some sense, even if the speaker wants to insinuate that she thinks that Mary did rob it (and hence provide a complete answer), the answer in itself does not provide a complete answer. Our proposal needs to be made more explicit by defining what counts as an incomplete answer. Wagner (2012) argues that the RFR conveys that a salient alternative to the asserted proposition is possibly true. This account seems better suited for this type of example—we defer further discussion to a future occasion.

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