

A pitch accent beyond contrastive Focus marking: experimental evidence from auditory rating¹

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Abstract. This paper presents two auditory rating experiments investigating the meaning contribution of the L*H pitch accent. Adapting previous work, we hypothesize the L*H to contribute an evaluative scale. The first experiment tests this hypothesis by drawing a connection to the ambiguity of epistemic and concessive *at least*, based on the intuition that the concessive interpretation correlates with a L*H accent. The data corroborate this intuition by showing that an L*H accent receives lower ratings than an H* accent in contexts that are more compatible with an epistemic interpretation of *at least*. The second experiment extends this pattern to the contribution of the L*H accent in the same contexts but without *at least*, with the L*H accent receiving higher ratings than the H* accent in concessive contexts. The results thus provide evidence for an independent contribution of the L*H accent, which resembles that of concessive *at least*. We consider two analyses. One situates the effect at the level of focus, and distinguishes two squiggle operators: one without a scale presupposition with H* accents on the Foci it associates with, and one with a scale presupposition with L*H accents on the Foci it associates with. The second analysis situates the scale presupposition at the level of the utterance contour, in an operator that always takes utterance-wide scope. The two analyses make different locality predictions, which remain to be tested.

Keywords: alternatives, focus-particles, intonation.

1. Introduction

The semantic effect of sentence stress in English is commonly taken to indicate Focus, which on the widely adopted Alternative Semantics account (Rooth 1985, 1992) is treated as evoking alternatives, illustrated in (1).²

- (1) a. A: Who will succeed Logan Roy?
B: [KENDALL]_F will succeed Logan Roy.
b. [[[Kendall]_F will succeed Logan Roy.]]^f =
{Kendall will succeed Logan Roy,
Roman will succeed Logan Roy,
Shiv will succeed Logan Roy}

However, English intonational phonology offers multiple ways to mark stress given its repertoire of available pitch accents. For instance, the commonly adopted ToBI system (Beckman et al. 2005) distinguishes between at least four different types: H*, L*, L*+H, and L+H*. The resulting question then is whether all pitch accents simply indicate Focus. We take this to be

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²Complicating factors such as the question how to derive the underlying Focus structure of a sentence from its stress pattern, i.e. Focus projection, will be put aside here, but see Féry and Samek-Lodovici (2006) for more on this issue.

an empirical question: are there instances where a difference between two pitch accents results in a difference in acceptability or interpretation, or even aspects of language processing? Prior research argues in favor for such differences, for instance in the case of contrastive topics (Büring 1997) or psycholinguistic research on contrastive accents (Watson et al. 2008). The present work extends this research by focusing on the less studied L*+H pitch accent. Two auditory rating studies provide evidence for the hypothesis that the L*+H accent evokes an evaluative scale (cf. Pierrehumbert and Hirschberg 1990), looking first at its interaction with the epistemic/concessive ambiguity of *at least* (Nakanishi and Rullmann 2009), which will serve as an entry point, and second at its effect in the absence of *at least*.

2. Background

This section briefly reviews relevant prior research on meaning differences of pitch accents in English (2.1) and then sets up the background directly pertaining to the first experiment (2.2).

2.1. Prior research on pitch accent differences

As noted above, the question about how pitch accents in English may have different semantic and pragmatic effects is not novel, going back at least to the distinction between A-accents and B-accents by Bolinger (1965) and Jackendoff (1972) and their correspondence with Contrastive Topics (CTs, Büring 1997). Prosodically, CTs have been argued to be marked by a fall-rise accent — L+H* in ToBI terms — rather than the simple falling accent used for Focus. Although formal details vary across accounts (e.g. Büring 2003; Wagner 2012; Constant 2014), one shared analysis component concerns how the interaction of CT and Focus results in a hierarchically structured discourse: CTs are taken to indicate strategies of approaching an issue by dividing things into super- and subquestions, as made explicit in (2).³ As a result, dialogues lacking the need or possibility for such a strategy are restricted to Focus-accents, see (3).

- (2) A: What about Fred? What did he eat?
 B: [Fred]_{CT} ate [the beans]_F. [AUDIO]
- (3) A: Did Knut break up with Alleessa? (Büring 2003: (32))
 a. B: No, ALLESSA_F broke up with KNUT_F. [AUDIO]
 b. B: #No, ALLESSA_{CT} broke up with KNUT_F. [AUDIO]

However, recent research by Martens (2022) raises doubt about the validity of some of the prior characterizations of CTs as a concept distinct from Focus. For instance, production data show qualitatively indistinguishable results for classic CT cases like (2) compared to multiple Focus questions (e.g. *Who ate what?*). While other sources of evidence such as the contrast in (3) may require further investigation, the experiments presented in Section 3 crucially make a clearer case for pitch accent differences correlating with a difference in meaning.

³Here, we provide audio recordings of relevant sentences and indicate semantic labels, rather than give prosodic labels. The issue with prosodic labels such as ToBI is that there may still be some underspecification of relevant properties and more crucially that they require additional background, whereas we hope that audio recordings can make relevant intuitions more accessible to naive readers. However, given the frequent prior practice of only providing prosodic labels without audio recordings means that recordings are our rendition of what we think how examples from prior papers were intended, which may be inaccurate. We hope that providing audio recordings where relevant becomes a more common practice to avoid such issues of interpretation in the future.

A different source of data that supports the necessity to distinguish different pitch accents comes from psycholinguistic research on the activation of alternatives by so-called contrastive accents (see also Sedivy et al. 1999 for the influence of contrastive accents on implicature calculation). For example, Watson et al. (2008) provide evidence from a visual world experiment that a contrastive L+H* accent facilitates the recognition of relevant alternatives in online processing relative to a non-contrastive H* accent. They conceptualize a contrastive accent as one involved in corrective exchanges like (4a), whereas a non-contrastive accent occurs in replies to questions (4b).⁴ A sample item with used audio recordings to illustrate how contrast was employed is given in (5).⁵

- (4) a. A: Did Carmen cook risotto? B: No, he cooked SPAGHETTI. [AUDIO]
 b. A: What did Carmen cook? B: He cooked SPAGHETTI. [AUDIO]
- (5) Click on the camel and the dog.
 Move the dog to the right of the square.
 Now, move the CAMEL/CANDLE to the left of the diamond.
 [CONTRASTIVE], [NON-CONTRASTIVE]

Additional evidence for the influence of contrastive accents on aspects of language comprehension come from a cross-modal priming study from Husband and Ferreira (2016) and recognition studies by Fraundorf et al. (2010). Similar effects have also been found for Dutch and German by Braun and Tagliapietra (2010); Braun et al. (2018); Braun and Biezma (2019), in addition to effects on exhaustivity by Gotzner (2019). Although the majority of the findings of these studies primarily pertain to processing, they nonetheless point to the relevance of distinguishing pitch accents and their semantic and pragmatic contributions, and hence constitute relevant evidence against the idea that all pitch accents equally indicate Focus.

2.2. Setup for experiments

As the review above shows, previous research has mostly focused on effects of the L+H* accent, at least in terms of prosodic labels. The present study will instead investigate the L*+H accent, which differs from the H* and L+H* in the accented syllable being at a low pitch level rather than a high one and then rise in pitch afterwards, often such that the pitch peak falls on the following syllable. An illustration of the difference between H* and L*+H from Ladd (2008) is given in (6), with pitch tracks in Figure 1.

- (6) Wonderful. [H*], [L*+H] (Ladd 2008: 95)

Although the L*+H accent has been less studied in a minimal contrast to H* or L+H*, it is featured in the so-called rise-fall-rise contour (RFR, Ward and Hirschberg 1985) and its contribution hence studied indirectly as part of this contour. Prior research has characterized the RFR as conveying uncertainty (Ward and Hirschberg 1985) or incompleteness (Constant 2012; Wagner 2012). In contrast, recent work by Göbel and Wagner (2023) has highlighted limitations of these accounts for dialogues like (7) where the RFR is used to provide a counterpoint to a previous (evaluative) statement, but is only felicitous when the counterpoint is positive in

⁴Note that both instances would count as Focus in Alternative Semantics. The authors discuss that this difference hence would not have to be about a binary distinction between evoking alternatives or not but potentially in the restrictions on the contrast set (see also Repp 2016).

⁵Thanks for Duane Watson for sharing the audio files.

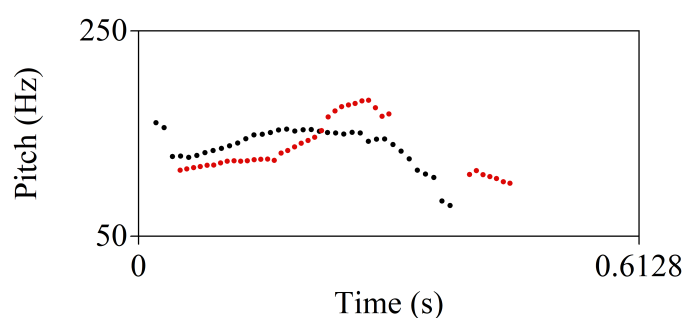


Figure 1: Pitch tracks for (6): H* in black, L*+H in red.

reply to a negative statement (7a) and not vice versa (7b). Göbel and Wagner, following Göbel (2019), hence argue that the RFR requires a higher alternative on a scale.

- (7) a. A: The new iPhone is really terrible.
 B: It has a lot of storage... [AUDIO]
 b. A: The new iPhone is really great.
 B: #It has little storage... [AUDIO]

By virtue of its occurrence in the RFR, Pierrehumbert and Hirschberg (1990) in their account of assigning meanings to individual subcomponents of contours propose that the L*+H evokes a scale. Building on this proposal, we adopt the more specific hypothesis that the L*+H evokes an evaluative scale.

The way in which this hypothesis will be tested here is in relation to an intuition about the interaction of pitch accents with the interpretation of the English Focus-particle *at least*. *At least* is in principle ambiguous between an epistemic interpretation, which can be paraphrased as “this much and maybe more”, and a concessive interpretation, paraphrasable as “it could’ve been worse”.

- (8) a. Grover ate **at least** [the chicken]_F (maybe even the tuna).
 b. **At least** Grover ate [the chicken]_F (he could’ve eaten nothing at all).

The intuition we aim to test in Experiment 1 is that concessive *at least* correlates with the use of the L*+H accent. Such a correlation would be in line with the hypothesis, and it crucially allows us to render the subtlety of any pitch accent difference more concrete. While the meaning difference between L*+H and other pitch accents is hard to pin down intuitively, the difference between epistemic and concessive *at least* seems quite clear. As a result, if the L*+H correlates with *at least* being used concessively, we can use the interpretation of *at least* as way to tap into the effect of the pitch accent. Experiment 1 aims to do so by employing an auditory rating task.

3. Experiments

3.1. Experiment 1: accent comparison with *at least*

3.1.1. Materials & design

The goal of this experiment was to assess the hypothesis that the L*+H accent evokes an evaluative scale by testing its effect on the interpretation of *at least*. To do so, we used dialogues as in (9) that varied in the assumed compatibility of a context sentence with the interpretation of *at least* in the target sentence: Context sentences were either *how many* questions taken to be more compatible with an epistemic interpretation of *at least* (9a), or assertions expressing some negative attitude toward the falsity of a higher alternative taken to be more compatible with a concessive interpretation (9b). To render *at least* principally ambiguous, the target sentence contained *at least* sentence-initially associating with the subject, to avoid the influence of syntactic cues for disambiguation as used in (8) above. As a second factor, the target sentence varied in intonation: The target word — here *some* — either carried an H* accent preceded by an accent on *at least*, or an L*+H accent with *at least* deaccented.⁶ Pitch tracks of the relevant parts of the target sentence for both conditions are shown in Figures 2 and 3. The remainder of the target sentence was deaccented and ended with a fall.

(9) Sample Item, Experiment 1

a. *Epistemic context*

A: How many of the children do you think ate their broccoli?

B: At least SOME of the children ate their broccoli. [(LH*+)H*], [(0+)L*H]

b. *Concessive context*

A: I'm surprised that not all of the children ate their broccoli.

B: At least SOME of the children ate their broccoli. [(LH*+)H*], [(0+)L*H]

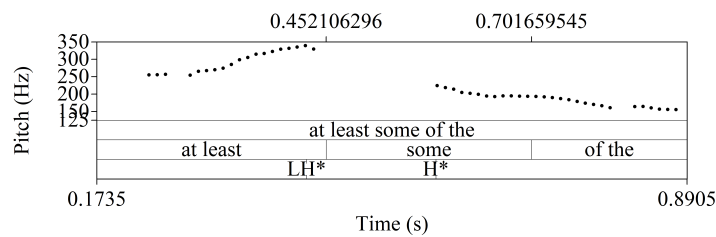


Figure 2: Pitch track for (LH*+)H* condition.

As an additional exploratory between-item factor, dialogues varied in whether the target sentence contained *some*, as above, or a numeral between *one* and *four*. While epistemic contexts remained unchanged with numerals, the evaluative contexts were adjusted to contain *not more* instead of *not all*. The comparison between *some* and numerals was used to see how any potential effect would generalize across different types of scalar items (see Alexandropoulou 2021 for relevant findings).

(10) Sample Item, Experiment 1: numerals

⁶The additional accent in the H* condition was used based on our impression from a previous natural production study. We will come back to this issue in the discussion.

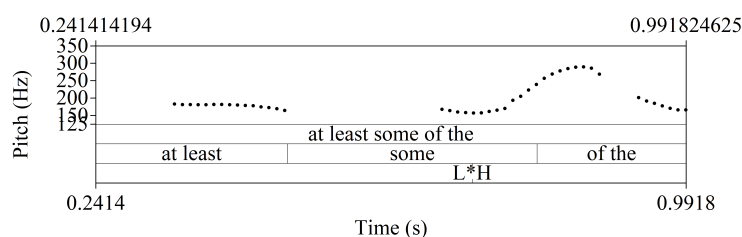


Figure 3: Pitch track for (0+)L*H condition.

a. *Epistemic context*

A: How many of the customers do you think gave a tip?

B: At least THREE of the customers gave a tip.

b. *Concessive context*

A: I'm shocked that not more of the customers gave a tip.

B: At least THREE of the customers gave a tip.

The design was thus a 2x2x2 with within-item factors CONTEXT (epistemic vs concessive) and INTONATION (H* vs L+H*) and between-item factor SCALE-ITEM (*some* vs *numeral*). The factors were Latin-squared such that participants only saw one combination of context and intonation per item. There were 24 items in combination with 24 fillers, which can be viewed at the associated OSF repository at <https://osf.io/m9tgn>.

3.1.2. Procedure

The experiment started with a headphone screener test to make sure participants were wearing headphones to appropriately listen to audio, followed by a consent form and a demographic survey. Participants were then told to rate items according to naturalness on a scale from 1 to 6. Dialogues were presented only auditorily without displaying any items in written form. There were three practice trials that varied in naturalness before the main part of the experiment began. At the end, participants had the option to provide feedback.

3.1.3. Participants

47 participants were recruited from Prolific.ac and compensated with \$2.00 each. 11 participants were excluded due to failing headphone check, leaving 36 for data analysis.

3.1.4. Predictions

On the hypothesis that the L*+H accent evokes an evaluative scale, its presence should bias toward a concessive interpretation of *at least*, whereas we assume the H* accent to be neutral. As a result, we predict an interaction between CONTEXT and INTONATION such that the difference between H* and L*+H (i.e. the rating resulting from L*+H from H*) should be smaller for concessive contexts than epistemic contexts. However, we remain agnostic about the exact shape this interaction may take given uncertainty about the independent baseline ratings for intonation and contexts.

3.1.5. Results

Data were analyzed in R using ordinal mixed effects model with random intercepts for subjects and items and sum-coded factors. The mean ratings by condition are shown in Figure 4. Looking first at *some*, we see higher ratings for H* than for L*+H in epistemic contexts, and a numerical trend toward the reverse in concessive contexts. Additionally, evaluative contexts were overall rated more natural. For numerals, there is a similar pattern of H* above L*+H for epistemic contexts, which decreases without reversing in concessive contexts. Moreover, epistemic contexts were overall higher rated than concessive ones, contrasting with *some*.

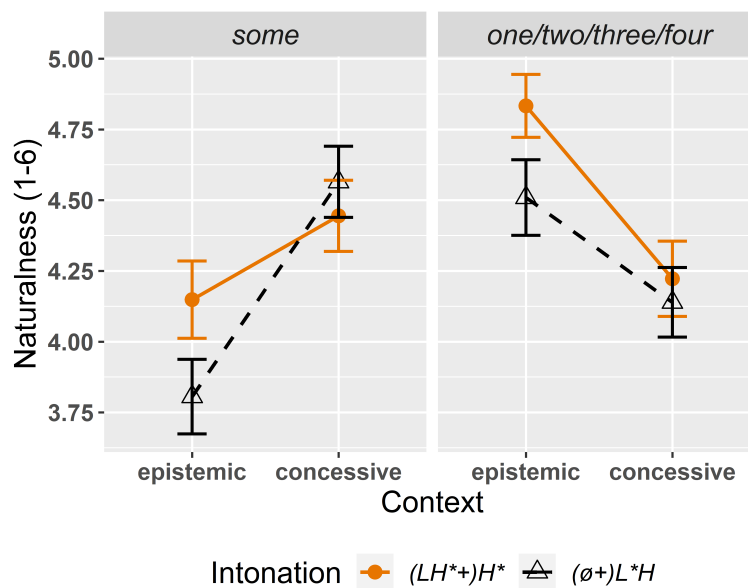


Figure 4: Mean ratings by condition, Experiment 1

Model outputs reveal significant main effects of INTONATION ($z = -2.29$, $p < .05^*$), with higher ratings for H*, and SCALE-ITEM ($z = 2.55$, $p < .05^*$), with numerals better than *some*, while CONTEXT was not significant ($z = 0.07$, $p = .95$). Additionally, we find a significant effect for the crucial interaction between CONTEXT and INTONATION ($z = 2.20$, $p < .05^*$), as well as an interaction between CONTEXT and SCALE-ITEM ($z = -7.23$, $p < .001^{***}$), both in line with the impression of the results pattern. The interaction between INTONATION and SCALE-ITEM as well as the three-way interaction was not significant ($z = -0.79$, $p = .43$; $z = -0.65$, $p = .52$).

3.1.6. Discussion

The results provided evidence for the hypothesis that L*+H evokes an evaluative scale: the particular pattern we found was that L*+H lead to lower ratings in epistemic contexts relative to H*, whereas there was a small numerical difference for intonation in concessive contexts. On the view advocated for here, these results are explained by L*+H biasing toward a concessive interpretation, which is deemed less natural in epistemic contexts, or takes cognitive effort to revise and hence leads to lower ratings.⁷ This pattern was present for both *some*

⁷Notably, a more definitive interpretation of the results is not possible given the lack of an assessment of the baseline naturalness for the two intonation conditions outside the experimental design. That is, it might also be

and numerals, although numerically more pronounced for *some*. However, *some* and numerals differed in another way: while concessive contexts were rated better than epistemic ones for *some*, the reverse was true for numerals, with concessive contexts rated worse than epistemic ones. A possible explanation for this could be that the reply with *some* in epistemic contexts is less informative than with a numeral. The *how many* question may be taken as the speaker pragmatically presupposing the underlying existential statement, which would render B's reply only minimally informative. In contrast, the numeral provides a more specific answer than an existential presupposition would entail. This difference could thus account for why *some* and numerals differ in which of the contexts is rated higher.

A potential confound of the experiment, on the other hand, is that the two intonation conditions varied not only in the pitch accent on the target word but also in the presence/absence of an accent on *at least*. The results may thus be solely driven by the prosody on *at least* or an interaction of it with pitch accent on target. Moreover, from a theoretical perspective, there is an open question whether the potential effect of L*+H is due to it serving as a cue for disambiguating *at least* and hence mediated by the presence of an applicable ambiguity, or whether the pitch accent itself makes an independent meaning contribution. The next experiment aims to address both of these issues.

3.2. Experiment 2: accent comparison without *at least*

3.2.1. Materials & design

In order to test whether the L*+H pitch accent makes its own contribution, the experiment used the same design and materials as Experiment 1, but removed *at least* from the target sentences. The modification was done by manually cutting off the portion of the audio recordings corresponding to *at least*.⁸ This change also removes the potential confound regarding the influence of the prosody on *at least*, given that there now is no *at least* anymore. A sample item is shown below for completion:

(11) Sample Item, Experiment 2

a. *Epistemic context*

A: How many of the children do you think ate their broccoli?

B: SOME of the children ate their broccoli. [H*], [L*H]

b. *Concessive context*

A: I'm surprised that not all of the children ate their broccoli.

B: SOME of the children ate their broccoli. [H*], [L*H]

We used the same 24 item sets with the same 24 fillers from Experiment 1 in the same Latin-square design.

the case that L*+H is generally deemed less natural than H*, and that the interaction is driven by L*+H leading to more concessive interpretations in concessive contexts and hence higher ratings. However, a significant interaction would crucially constitute evidence for our hypothesis in either case.

⁸Note that for the *some* items, all parts of the initial fricative identifiable in Praat were kept for consistency despite sometimes noticeable co-articulation with the preceding *at least*, which may have led to some recordings sounding slightly less natural.

3.2.2. Procedure

The procedure was the same as Experiment 1.

3.2.3. Participants

37 participants were recruited from Prolific.ac and compensated with \$2.00 each. 1 participant was excluded due to failing the headphone check, leaving 36 for data analysis.

3.2.4. Predictions

If the L*+H accent makes a contribution that is independent of its effect on an applicable ambiguity, we should again find an interaction between *context* and *intonation*, although the exact shape of the results pattern may differ given the removal of *at least*. If the L*+H accent does not have any independent effect, INTONATION should not interact with the other factors.

3.2.5. Results

The results, given in Figure 5, were again analyzed with a sum-coded ordinal mixed effects model with random intercept for participants and items. To again first descriptively characterize the results, for *some* we see numerically slightly higher ratings for H* compared to L*+H in epistemic contexts, and this difference being reversed and becoming larger for concessive contexts. This pattern is almost identical for numerals, except that epistemic contexts are overall much more natural than concessive ones.

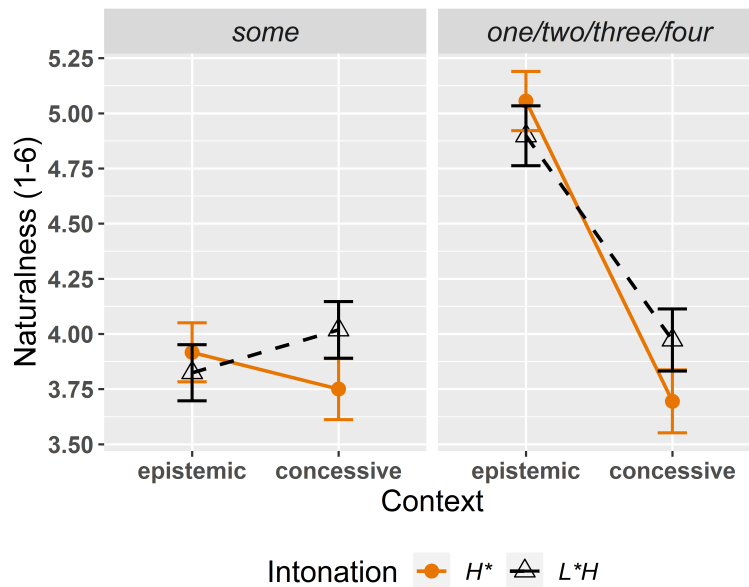


Figure 5: Mean ratings by condition, Experiment 1

In line with this characterization, the model revealed a significant effect of CONTEXT ($z = -8.05$, $p < .001^{***}$), with higher ratings for epistemic contexts than concessive ones, a significant effect of SCALE-ITEM ($z = 4.80$, $p < .001^{***}$), with numerals rated higher than *some*, as well as significant interactions of CONTEXT and INTONATION ($z = 2.56$, $p < .05^*$), and CONTEXT and SCALE-ITEM ($z = -7.78$, $p < .001^{***}$). All other effects were non-significant

(INTONATION: $z = 0.60$, $p = .55$; INTONATION*SCALE-ITEM: $z = -0.47$, $p = .64$; CONTEXT*INTONATION*SCALE-ITEM: $z = 0.32$, $p = .75$). The analysis thus shows almost exactly the same significant factors as Experiment 1, the only difference being that Experiment 1 showed a main effect of INTONATION where Experiment 2 shows a main effect of CONTEXT.

3.2.6. Discussion

The data provide evidence for a genuine contribution of the L*+H pitch accent. More specifically, the L*+H's contribution seems to resemble that of concessive *at least* given how similar the pattern of results is to that of Experiment 1: independent of scale-item, L*+H received numerically higher ratings than H* in concessive contexts, and — albeit with a smaller difference — numerically lower ratings in epistemic contexts. In relation to Experiment 1, that means that the larger difference is now in concessive contexts rather than epistemic ones, but is nonetheless consistent with the hypothesis of L*+H being evaluative. The change in results patterns may be due to a small overall decrease in ratings for H* in both contexts in the absence of *at least*. For epistemic contexts, the issue of the reply being uninformative may be exacerbated without (an epistemically interpreted) *at least*, as the reply is now fully equivalent to the existential presupposition of the question. For concessive contexts, on the other hand, H* may be more likely to be taken as corrective/exhaustive — also due to it now being the most prominent accent — which seems somewhat incoherent as a reply.

This issue, that the lack of informativity in epistemic contexts is worse for H* in this experiment, may also be reflected in the interaction of CONTEXT with SCALE-ITEM. In the absence of *at least*, the response with a bare numeral is now maximally informative, whereas *some* maximally uninformative on the view that the question triggers an existential presupposition.

To sum up, the results provide evidence that L*+H does not merely serve as a cue to resolve an appropriate ambiguity but has its own meaning contribution, which aligns with that of concessive *at least*, and resolved the potential confound of the influence of the prosody on *at least* given that target sentences here only differed in the pitch accent on the target word. The next section discusses the results of this experiment and Experiment 1 in more detail.

4. General discussion

The experimental results provide evidence for the L*+H pitch accent contributing an evaluative meaning not only in the context of an ambiguous *at least* but also in the absence of any mediation. The resulting question is how to capture this hypothesis in a formal semantic analysis. We discuss two paths forward here.

The first option is to adopt a proposal by Göbel (2019), treating the L*+H accent as a modified squiggle operator. While regular squiggle — formalized as in (12) — presupposes a set of propositional alternatives C that contains the prejacent and at least one other member varying along its focus dimension, alternatives are not ordered in any way and can hence be considered equal to each other, so to speak. The modified squiggle, \sim^* , then differs in exactly this way by ranking alternatives relative to each other, shown in (13).

$$(12) \quad \llbracket \sim \rrbracket = \lambda C : C \subseteq \llbracket \phi \rrbracket^f \ \& \ \llbracket \phi \rrbracket^o \subset C . C$$

$$(13) \quad \llbracket \sim^* \rrbracket = (12) \ \& \ \forall p \forall q [p, q \in C \ \& \ p \neq q \rightarrow p < q \vee p > q]$$

(= for all distinct propositions p, q in C , p is either ranked below or above q)

This modification is notably weak: it is left open how alternatives are ranked specifically, which would have to be determined by pragmatics.⁹ The main reason for keeping the meaning underspecified is to capture other occurrences of L^*+H , for instance in the context of *only* as in (14), intuitively marking an evaluative (or “scalar”) interpretation (i.e. to mean that the Focus-associate is not a lot). While the contribution of the pitch accent would still be evaluative, the utterance crucially serves a different discourse function from concessive *at least* in that it seems to be about higher (false) alternatives being better rather than lower (false) alternatives being worse. For cases as in Experiment 2, we would then assume that alternatives are ordered by logical strength but interpreted evaluatively, such that we would get *some children ate their broccoli* being considered better than *no children ate their broccoli*, in line with the intuitive meaning of concessive *at least*. This analysis would predict that the constraint scale can be placed individually for separate Foci within a sentence. For example, if one focused constituent carries an H^* accent and another an L^*H , it would only be the latter Focus that must operate over an ordered scale.

- (14) A: Did you get anything good at the farmer’s market?
 B: No, I **only** got [mandarines]_F. [AUDIO]

As a second option, the evaluation of the L^*+H accent could be contributed globally as a contour taking scope over the whole utterance, rather than having the ability to be localized in as modified squiggle approach. That is, the ranking component of (13) would come from a [L^*+H L- L%] contour.

One source of evidence to distinguish between these two options would be embedding environments: if L^*+H contributes its evaluation via a type of squiggle operator, it should be embeddable and able to do so locally, rather than having to range over the whole sentence. However, constructing appropriate examples is not straightforward, such that we will leave an answer to this question for future research.

A relevant connection in this regard is that of the present account to the rise-fall-rise (RFR). Wagner (2012) presents arguments that the RFR cannot be embedded, and the uncertainty it conveys is always attributed to the speaker. Related to the question of embeddability and locality is the more general issue of analyzing intonational meaning holistically, as assumed by recent approaches (e.g. Goodhue et al. 2016; Rudin 2018), or as decomposable into meaningful parts, see (Pierrehumbert and Hirschberg 1990; Bartels 1999). The RFR constitutes a perfect comparison case in this regard, since it represents a minimal pair with respect to the terminal part of the contour for the intonation investigated here, only differing in there being a final rise instead of a final fall. Looking at the acceptability of the RFR in the experimental items in (15), it seems to be acceptable in concessive contexts, maybe even more so than with the final fall, and the fall feels more confrontational. Interestingly, the RFR seems less unnatural in epistemic contexts, maybe by virtue of sounding more like an educated guess that resembles the effect epistemic *at least* might have here, which would counteract the un informativity issue. This pattern could be in line with the claim that the RFR is ambiguous between an epistemic-like and concessive-like meaning in Göbel and Wagner (2023) but requires further testing.

⁹An even weaker—but possibly cognitively more plausible—meaning would be to say that there is some alternative that is ranked above others. Thanks to Matt Husband for this suggestion.

- (15) a. *Epistemic context*
 A: How many of the children do you think ate their broccoli?
 B: SOME of the children ate their broccoli. [RFR]
- b. *Concessive context*
 A: I'm surprised that not all of the children ate their broccoli.
 B: SOME of the children ate their broccoli. [RFR]

One way to further investigate the question of locality and compositionality would be to look at cases of multiple accents, for instance to what extent the L*+H can be used in combination with a non-L*+H accent in the same utterance, and explore its interpretative effects if it can.

5. Conclusion

This paper started with a question about the relationship between the pitch accent repertoire in an intonational language like English and their corresponding meaning contribution. We presented two experiments to investigate this issue with respect to the L*+H accent. Experiment 1 used the epistemic-concessive ambiguity of *at least* to test the hypothesis that an L*+H accent should map onto a concessive interpretation, which was borne out. Experiment 2 elaborated on this finding by examining the L*+H in the same contexts but in the absence of *at least*. The results closely resembled that of Experiment 1, suggesting that the L*+H accent by itself contributes a meaning similar to that of concessive *at least*. We discussed two possible paths for formalizing this contribution, either in the shape of a modified squiggle-operator or as a global contour. While differentiating between these possibilities requires further research, the experimental results presented here provide evidence for a distinct contribution of the L*+H accent and hence the need for paying attention to pitch accent differences that go beyond their usage to convey contrast.

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