Relating Scalar Inference and Alternative Activation: A view from the Rise-Fall-Rise Tune in American English

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Overarching themes of rise-fall-rise

Has something to do with “higher alternatives”
Testing ground for higher alternatives

Scalar Inference (SI)

Jane ate some of the cookies → some, *but not all* of the cookies

• *<some, all>* comprise a lexical scale (Horn 1972)

Likelihood of SI-enriched interpretations varies → *scalar diversity*

(van Tiel et al. 2016, Gotzner et al. 2018, Ronai 2022, a.o.)
RFR in the context of SI

Has something to do with “higher alternatives”

"Jane ate some of the cookies".

Uncertainty ↔ Negation

?All
Not all

But what is rise-fall-rise?

What is rise-fall-rise?

AM theory gives us building blocks to make intonational tunes

Pierrehumbert (1980)
Ward and Hirschberg (1985)
Beckman and Pierrehumbert (1986)
What is rise-fall-rise?

AM theory gives us building blocks to make intonational tunes

Pitch
Accent

Edge Tones

RISE
FALL
RISE

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What is rise-fall-rise?

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Does the specific RFR matter?

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Is it just about the pitch accent?

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High level questions about RFR

What is the meaning contribution of RFR?
Does it have a processing correlate?

One RFR or any RFR?

Let’s exploit adjectival lexical scales in...

Cross-modal priming

Inference task

Are falls any different?
Inference Task & Material Considerations

Did someone leave a window open in the office overnight?

The office feels cool.

Would you conclude that the office does not feel cold?

Yes  No

Mentioning cold will affect priming task
(Gotzner et al. 2016)
(Yan and Calhoun 2019)

RFR can’t be used out of the blue

Contexts not biased towards or against SI

64 adjectival scales in indirect Q/A pairs
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64 adjectival scales in indirect Q/A pairs
Audio Materials
Audio Materials
Sketching some predictions

Average SI Rate

All RFRs > Falls
Sketching some predictions

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All RFRs > Falls

Bitonal RFRs > Falls
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**Average SI Rate**

- All RFRs > Falls
- Bitonal RFRs > Falls
- Largest RFR > Falls
Sketching some predictions

Average SI Rate

All RFRs > Falls
Bitonal RFRs > Falls
Largest RFR > Falls
Graded RFRs > Falls
RFRs encourage SI calculation
RFRs encourage SI calculation

All RFRs increase SI rates, but there seems to be graded distinctions

The pattern is reversed for the falls

We can’t attribute things solely to the pitch accent
Going back to accounts of RFR

Has something to do with “higher alternatives”

“Jane ate some of the [cookies] all

Uncertainty \(\rightarrow\) Negation

?All Not all

Next: Do we find a similar pattern in online processing?

Cross-Modal Lexical Decision

What factors affect the activation status of the target?

(1) The relation between the prime and the target
(2) The prosody used with the auditory prime

Braun and Tagliapietra (2010)
Husband and Ferreira (2016)
Yap et al. (2015) i.a.
Rastle et al. (2010)
Materials

64 adjectival scales in indirect question-answer pairs
  • Split between hear cool and see cold or hear cold and see cool

+ 60 filler dialogues with pseudoword targets (Rastle et al. 2010)
+ 60 filler dialogues testing focus alternatives (Husband and Ferreira 2016)
  • Targets: counterbalanced contrastive, non-contrastive, or unrelated

Q: Did the museum deliver any good news?
A: The museum thrilled the sculptor

PAINTER
STATUE
REGISTER
High-level view by condition

Scalemates behave like focus alternatives

Our critical items

Predicted RT

- **cool** Lower
- **cold** Higher
- **painter** Contrastive Noncontrastive
- **statue**
- **register** Unrelated

Items derived from Husband and Ferreira (2016)
Sketching Lexical Decision Predictions

Maybe: RFRs that encourage SI more → higher alternative more facilitated

If RFR targets the **higher** alternative, *cool* may not be as facilitated

<table>
<thead>
<tr>
<th>Hear cool, see cold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reaction Time</td>
</tr>
<tr>
<td>% Change</td>
</tr>
</tbody>
</table>

Cool+RFR = Faster RT for cold?

Cold+RFR = Slower RT for cool?
Sketching Lexical Decision Predictions

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Sketching Lexical Decision Predictions

Maybe: RFRs that encourage SI more $\rightarrow$ higher alternative more facilitated

If RFR targets the higher alternative, cool may not be as facilitated
Lexical Decision Results

Residual RT (as % change)
Lexical Decision Results

![Graph showing residual RT (as % change) for different tunes: Hear cold, see cool and Hear cool, see cold. The graph displays the percentage change in residual RT for each tune configuration.](image-url)
Lexical Decision Results

Residual RT (as % change)
Lexical Decision Results

Residual RT (as % change)

Hear cold, see cool

Hear cool, see cold
Comparing the two sets of results

The RFR with the highest rate of SI enrichment gives us less facilitation.

Similar pattern was found recently in text-based priming (Lacina & Gotzner 2024, CogSci).

Patterns don’t generalize within pitch accent, analysis needs to be at the tune level.
Relationship to pitch range

Competing inferences may be interfering with and masking additional facilitation effects, c.f. what we found for H*LH

“Vanilla”

“Incredulous”

“Contradictory”

Pitch Range

Arousal
Effort
Affect
Incredulity
Engagement
Cooperativeness

Ladd et al. (1985)
Gussenhoven (2004)
Hirschberg and Ward (1995)
Conclusions

RFRs encourage SI relative to Falls, with small graded distinctions
  • Incompatible with uncertainty accounts

Increased likelihood of SI associated with less facilitation, not more
  • Generally, priming for scalemates is similar to that for contrastive associates

RFRs with larger pitch ranges may be inviting competing inferences

Patterns can’t be attributed to the pitch accent or edge tones alone, variation at the level of the tune needs to be accounted for

Ongoing: Can we relate SI rates and priming in a simultaneous dual task?
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