

Pitch Accent Variation and the Interpretation of Rising and Falling Intonation in American English

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Roadmap

Background & Task

Stimuli

Predictions

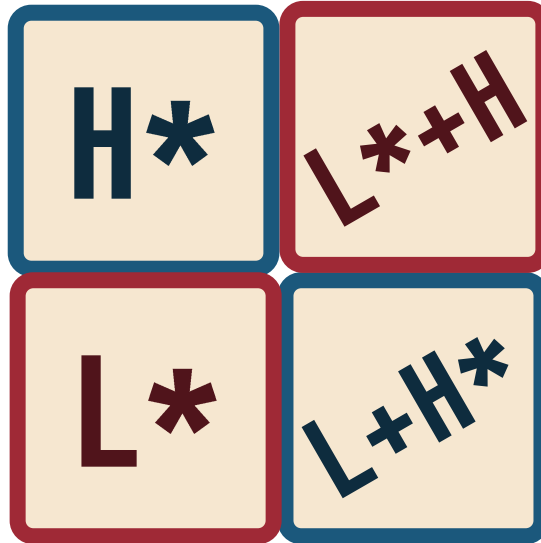
Experimental Results

Wrapping up & Conclusions

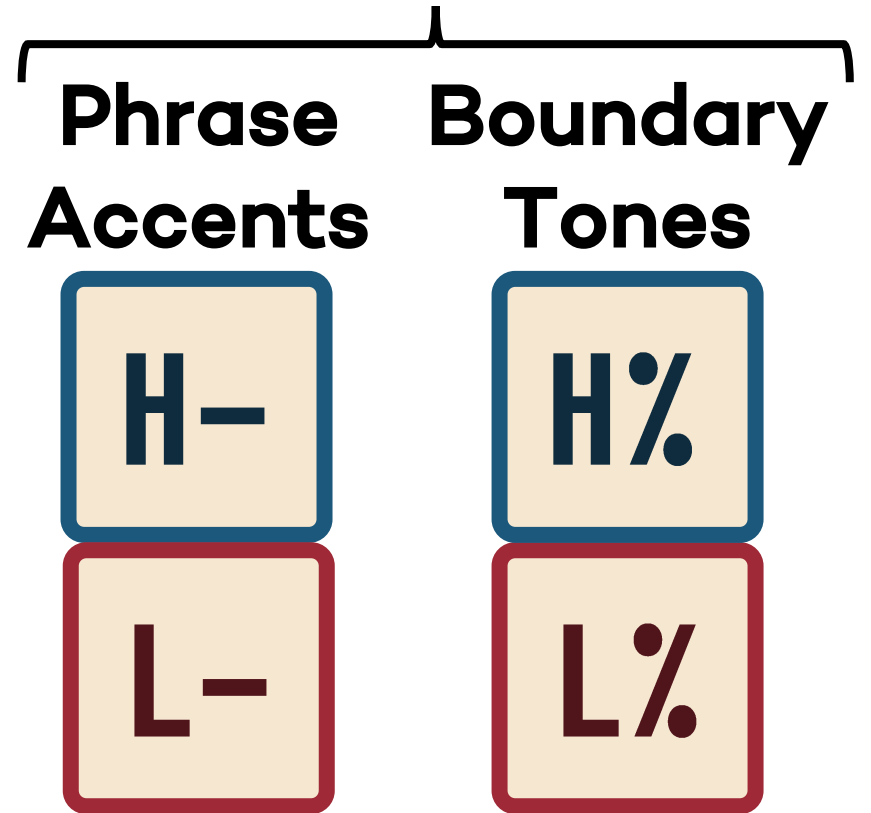
Phonological Units



Pitch Accents

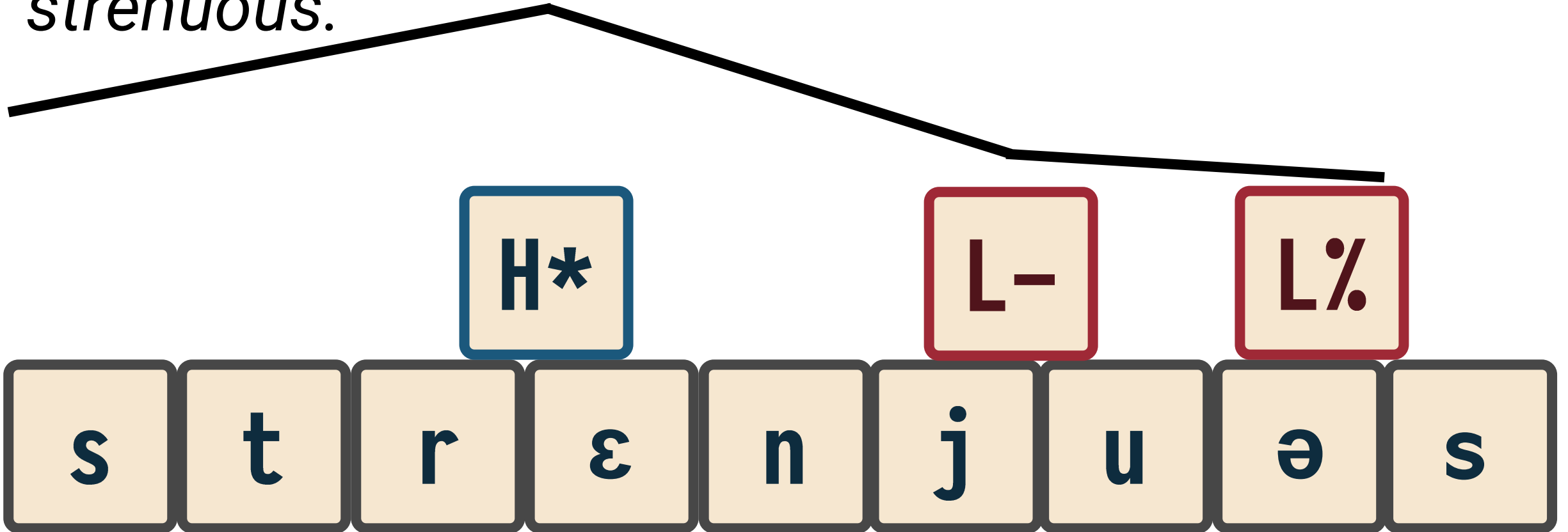


Edge Tones



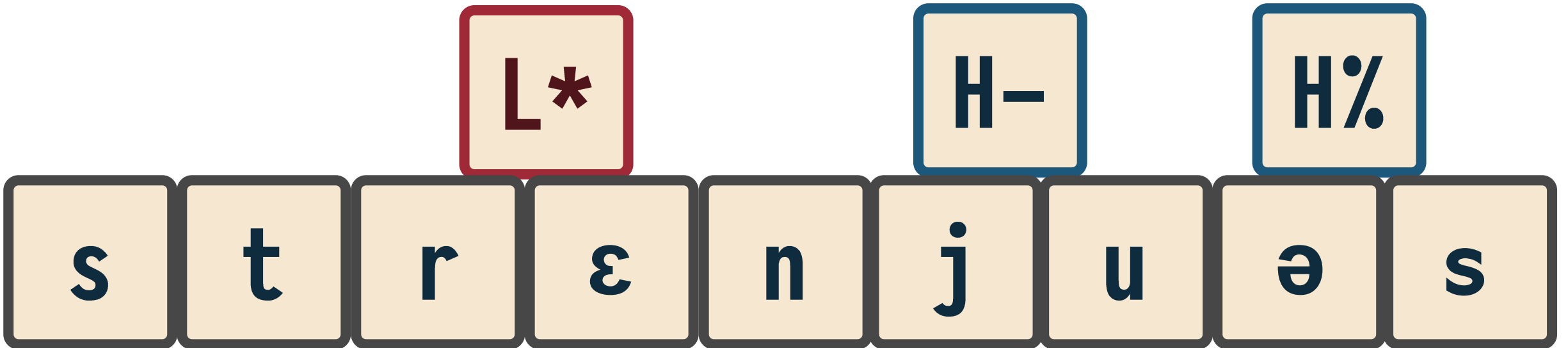
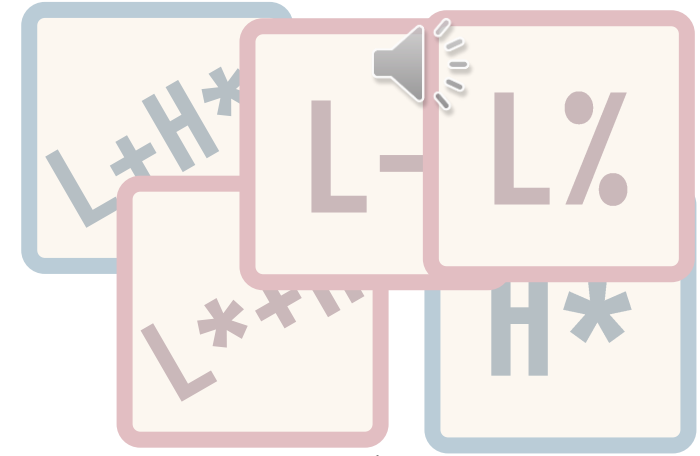
Phonological Units

The hike was strenuous.



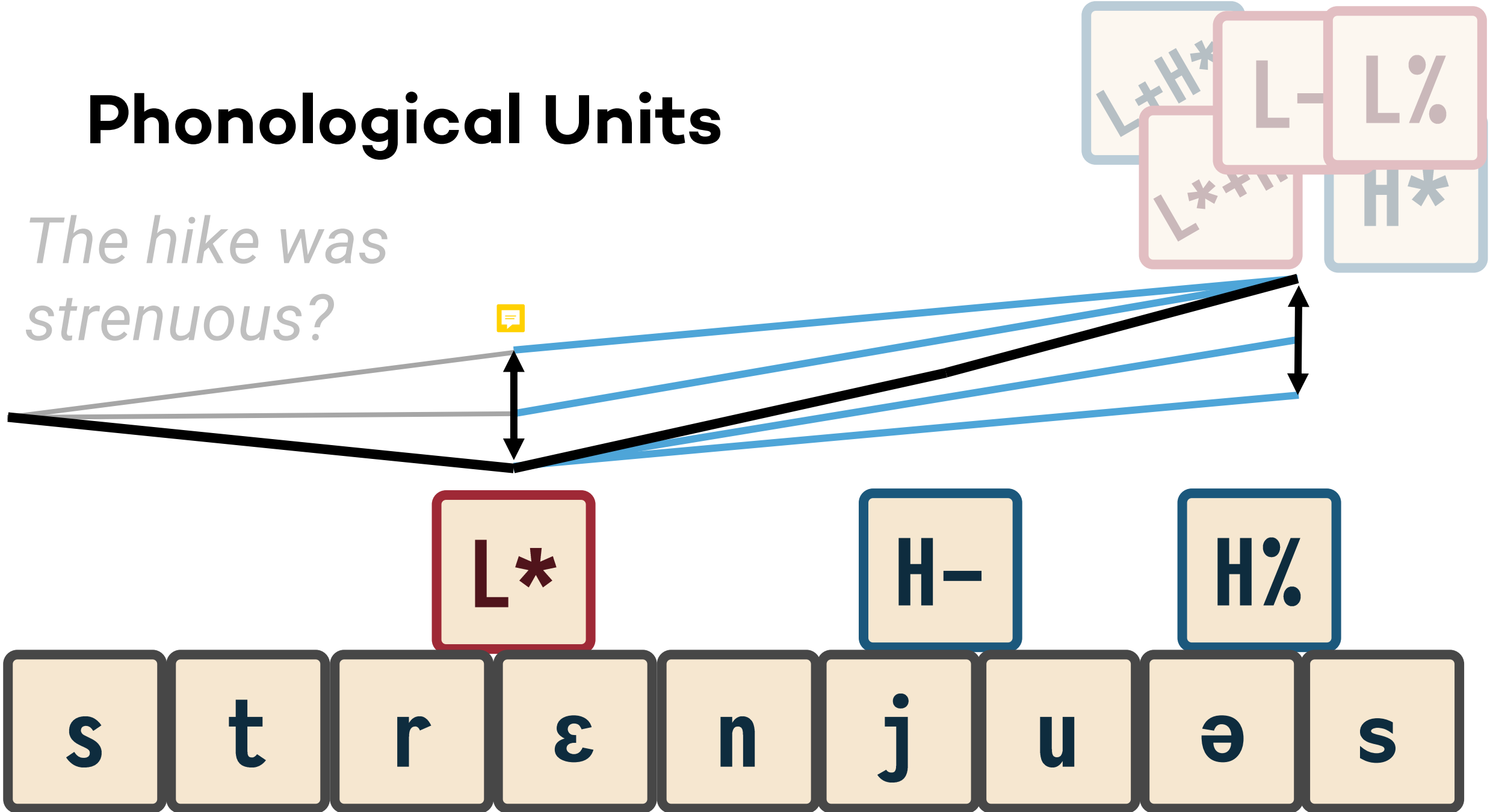
Phonological Units

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Phonological Units

The hike was strenuous?



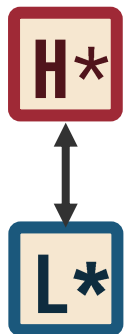
Research Questions

Is it about where pitch rises/falls from, or towards?

How does variation in the accentual and ending pitch regions affect interpretation along the Question/Assertion dimension?

Exp 1

Varying the scaling between monotonal accents



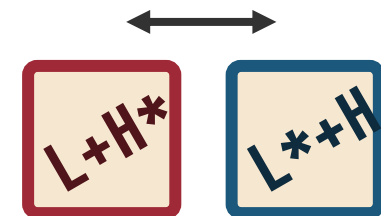
Exp 2

Varying the scaling of a “contrastive” accent

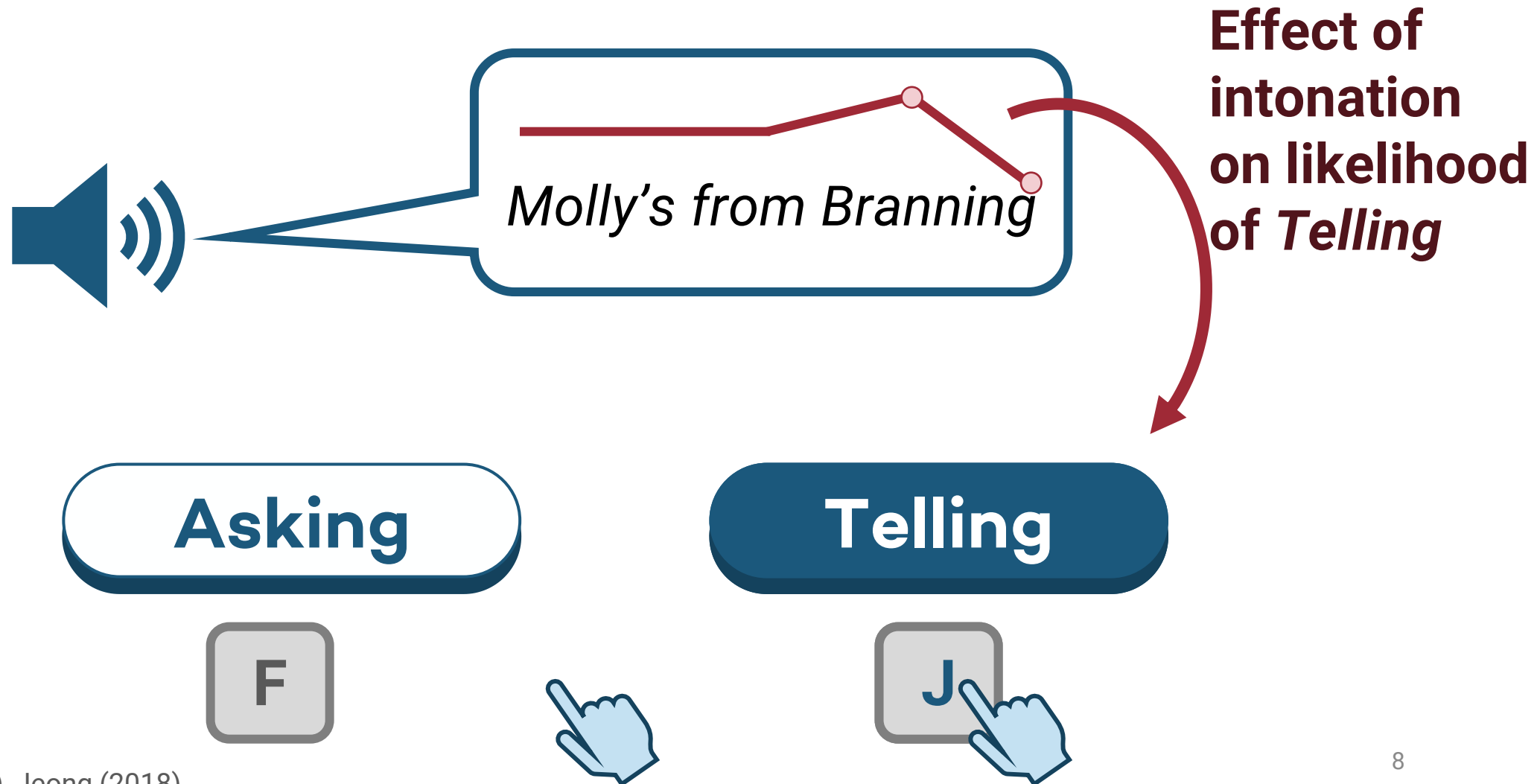


Exp 3

Varying the alignment between bitonal accents

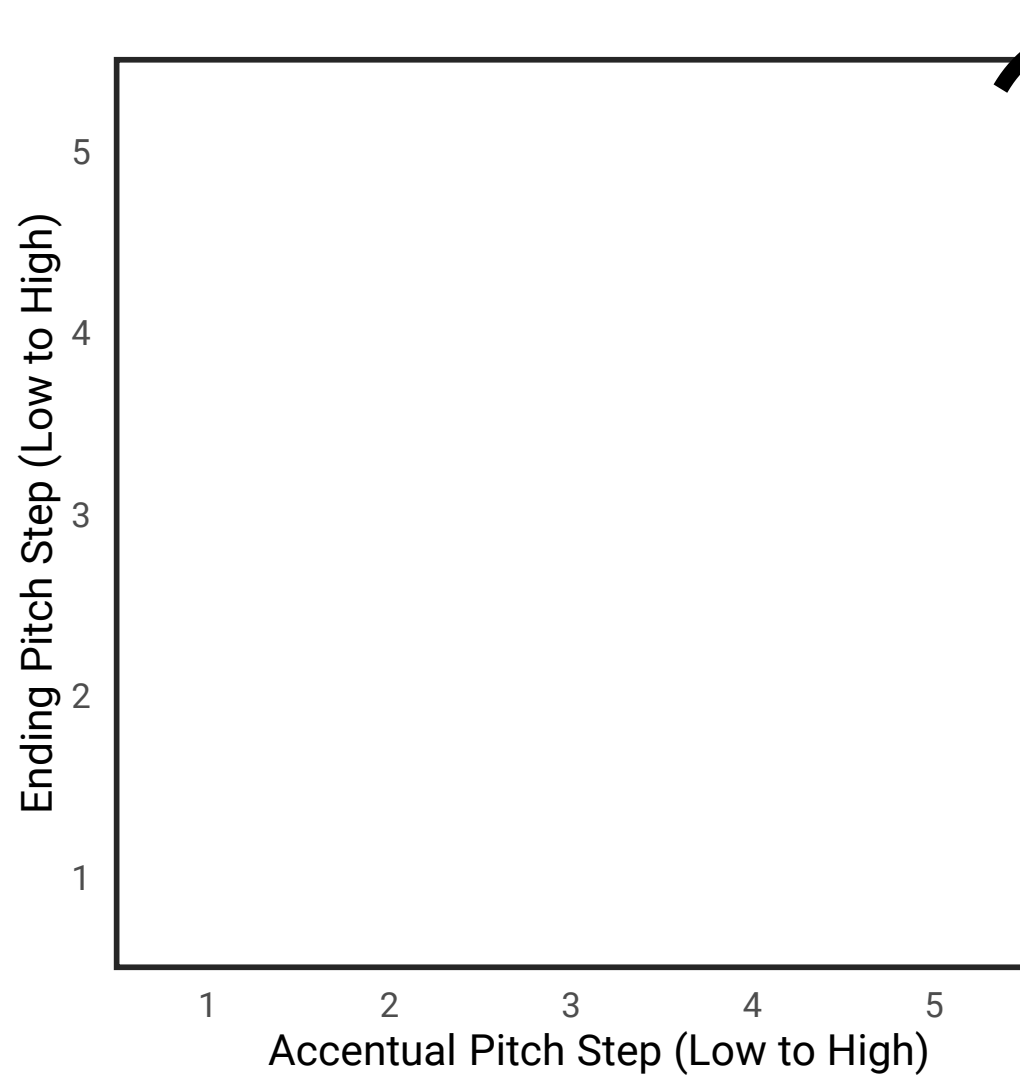


2-Alternative Forced Choice Task



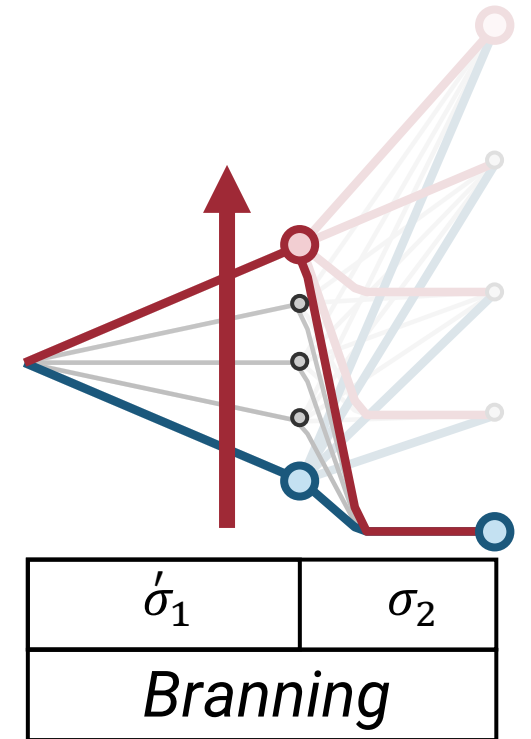
Mapping our stimuli

Cue to edge tones

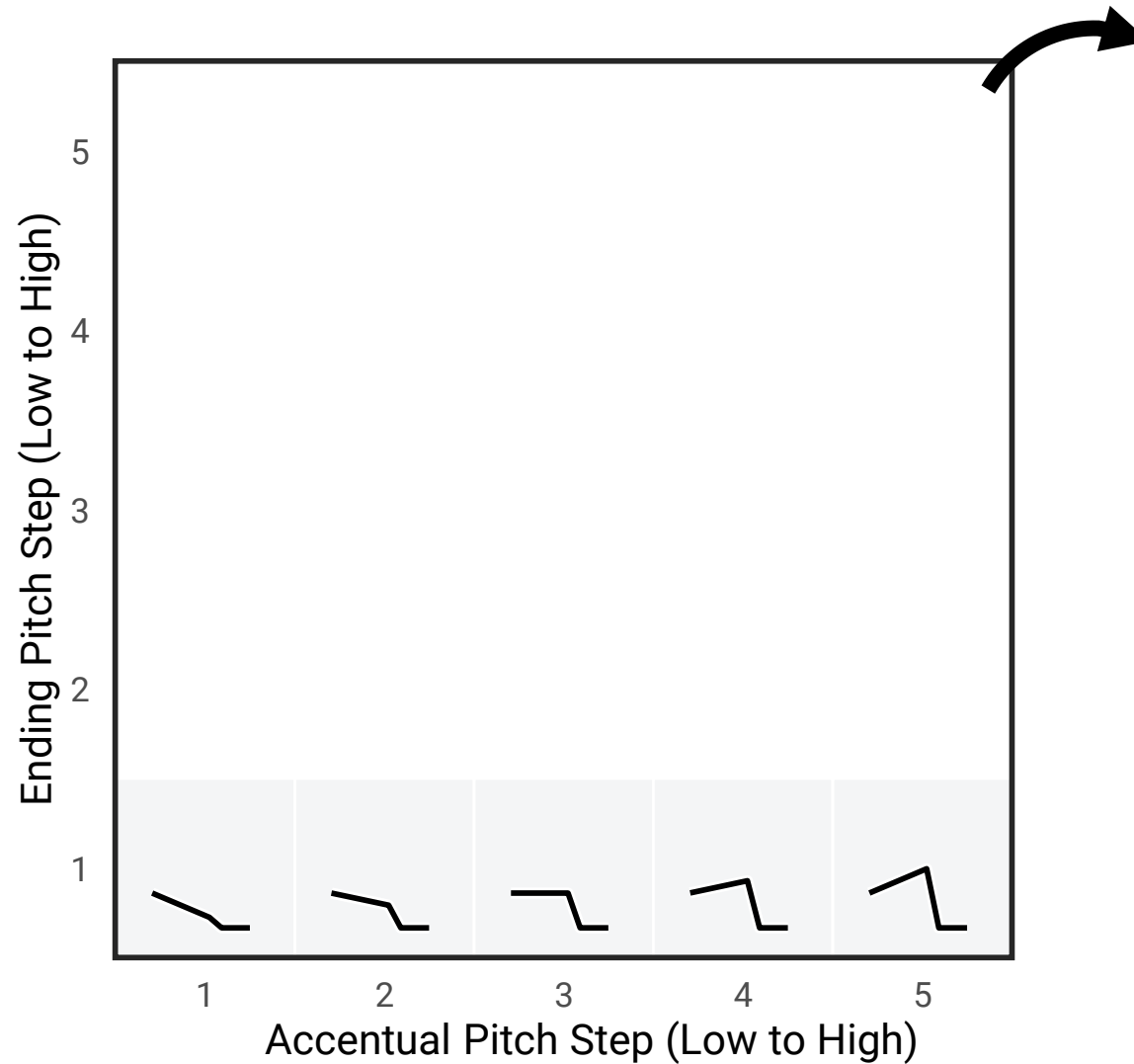


Cue to Pitch Accent

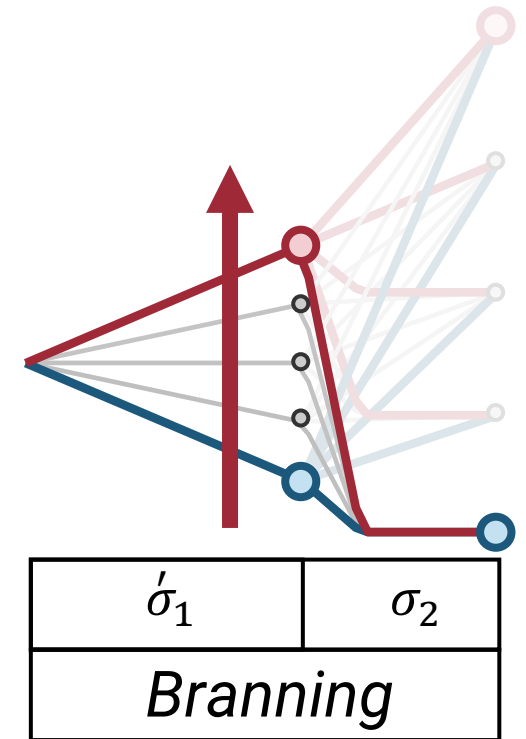
Only the contour
over the nuclear word:
“Molly’s from **Branning**”



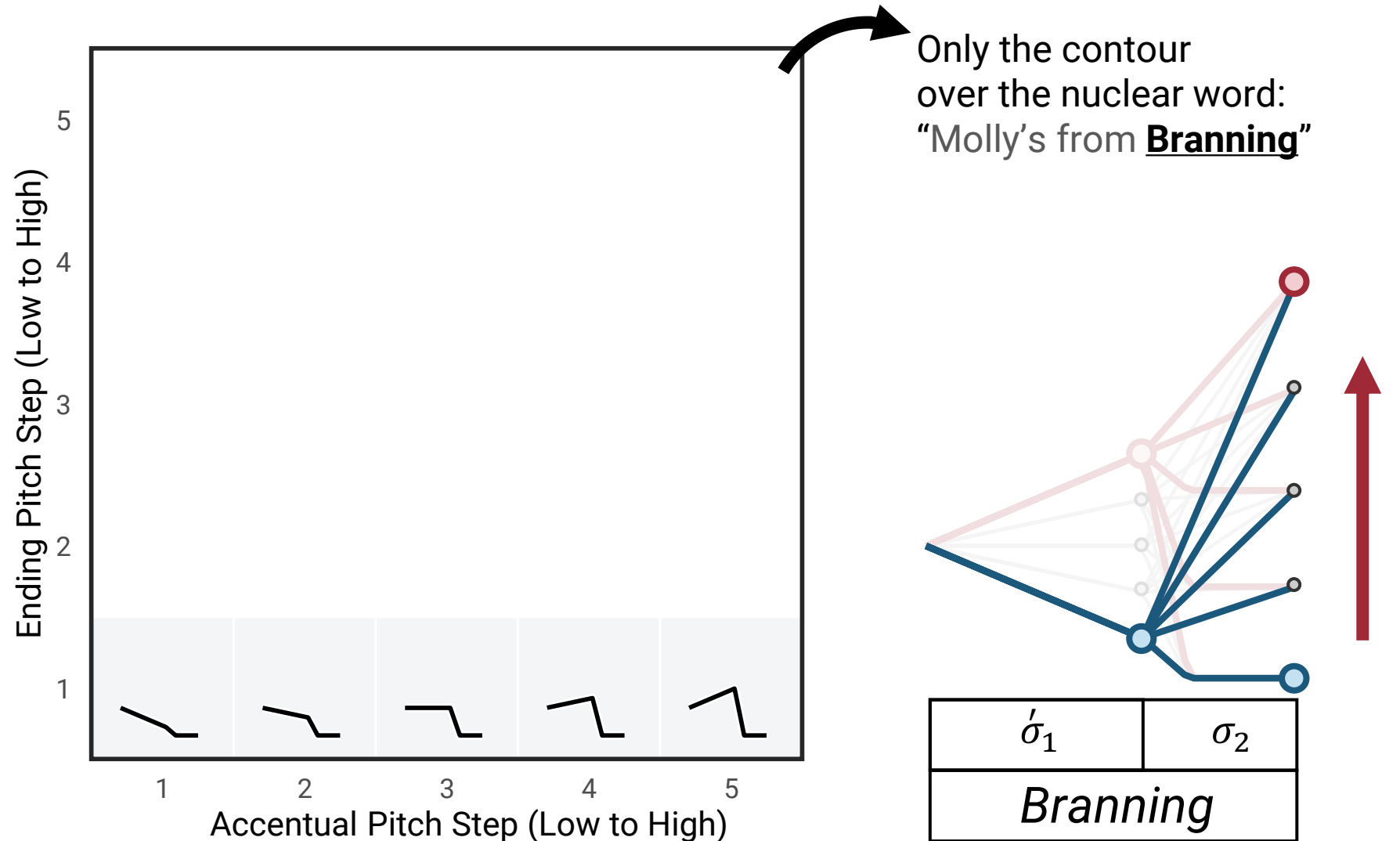
Mapping our stimuli



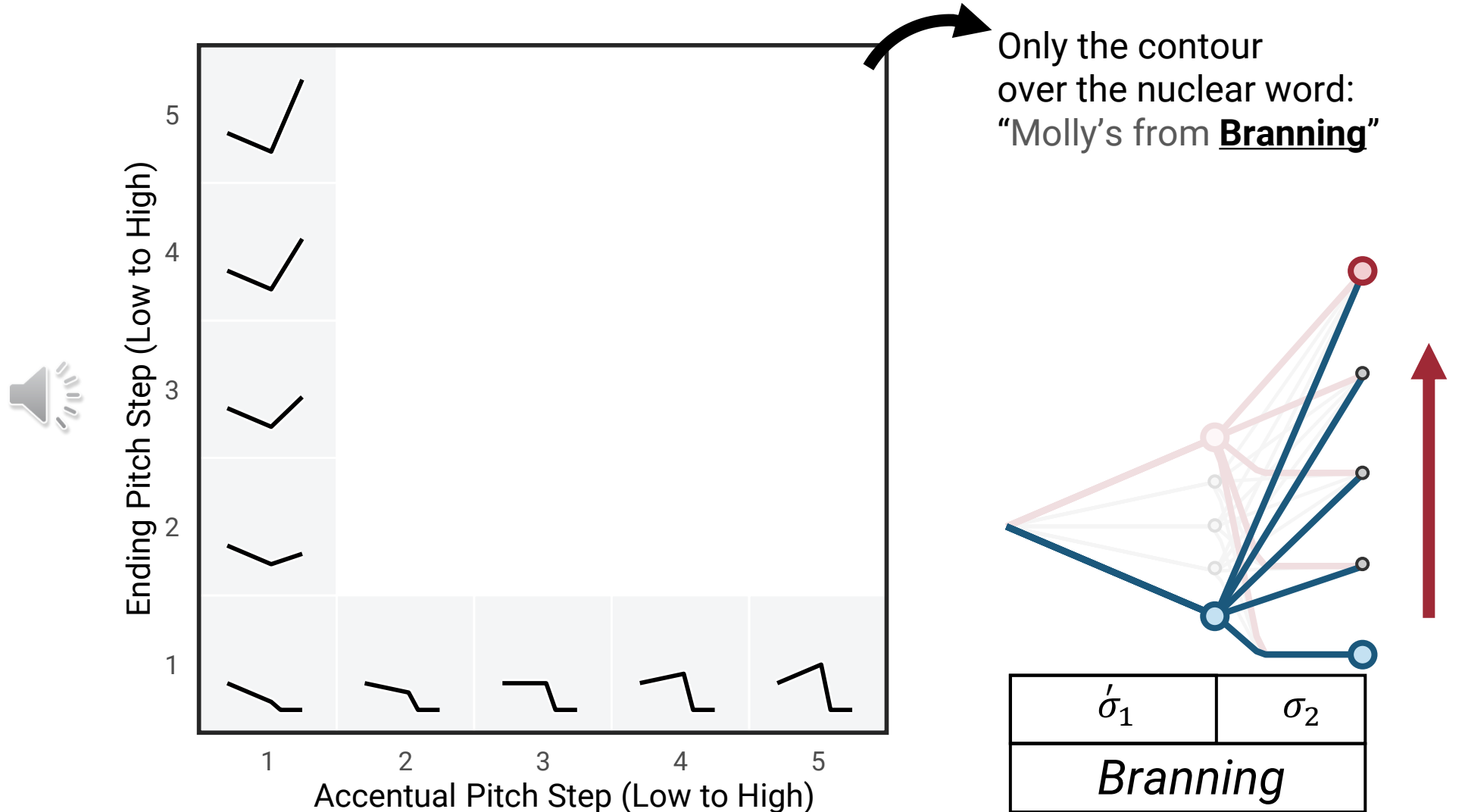
Only the contour over the nuclear word: "Molly's from **Branning**"



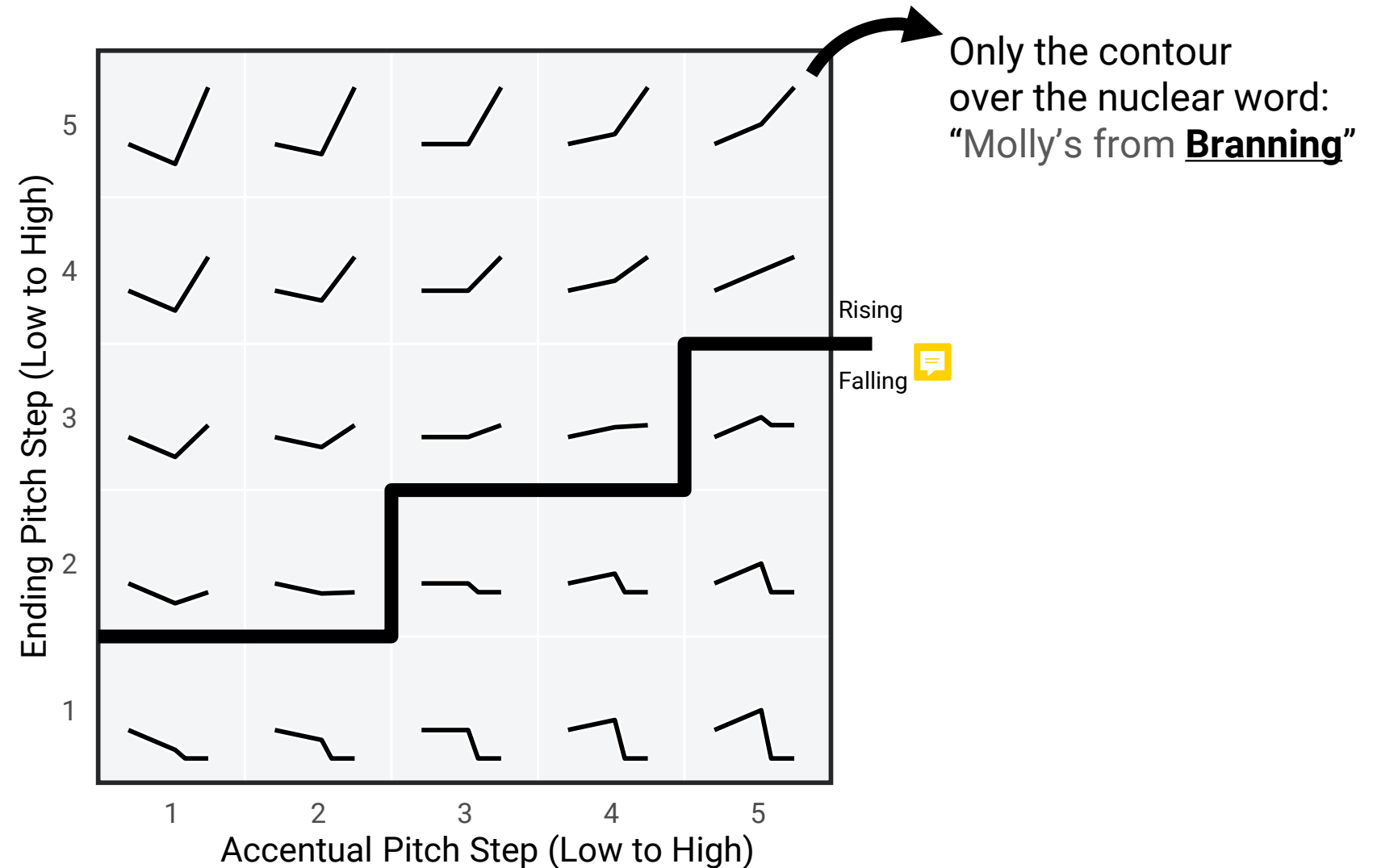
Mapping our stimuli



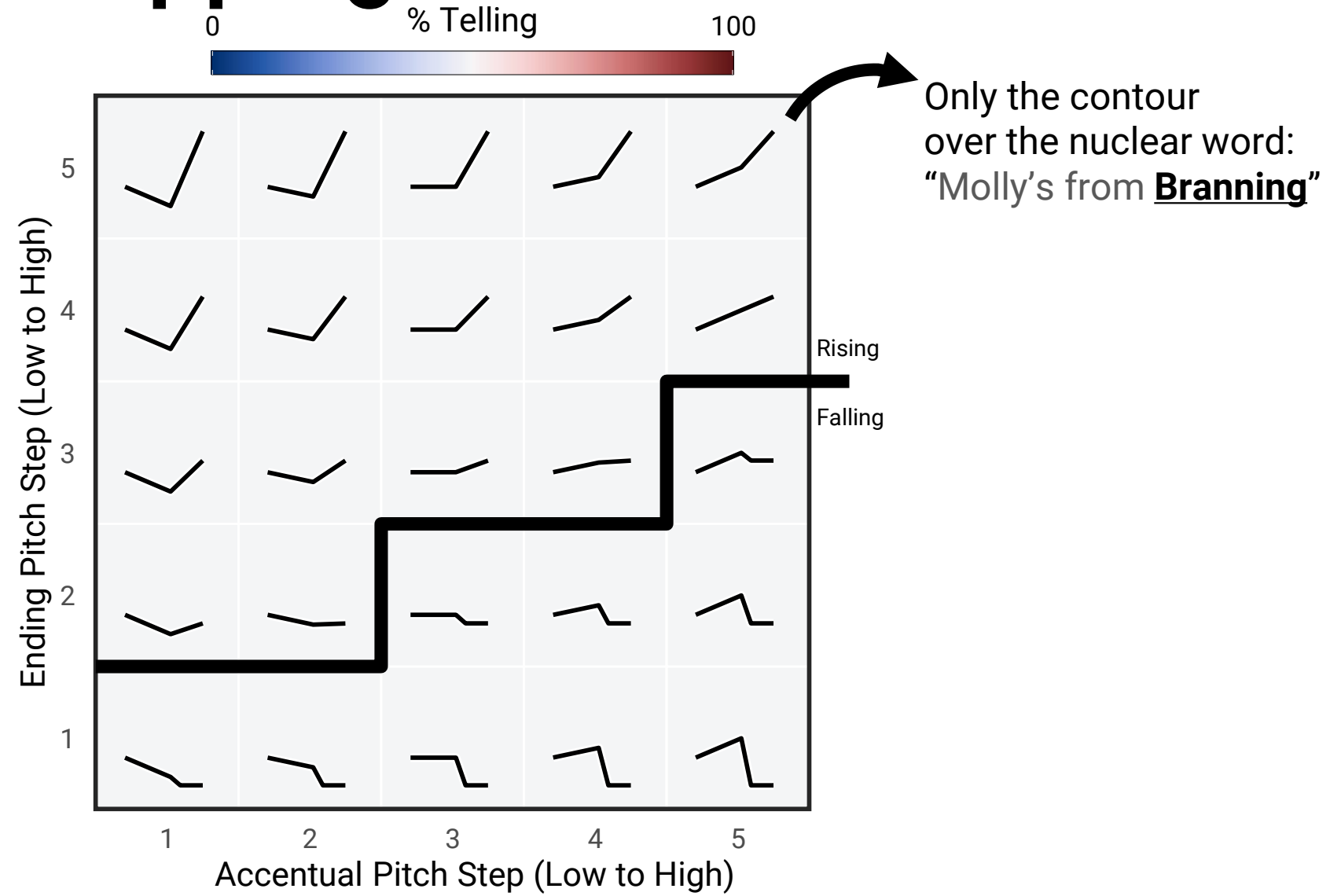
Mapping our stimuli



Mapping our stimuli

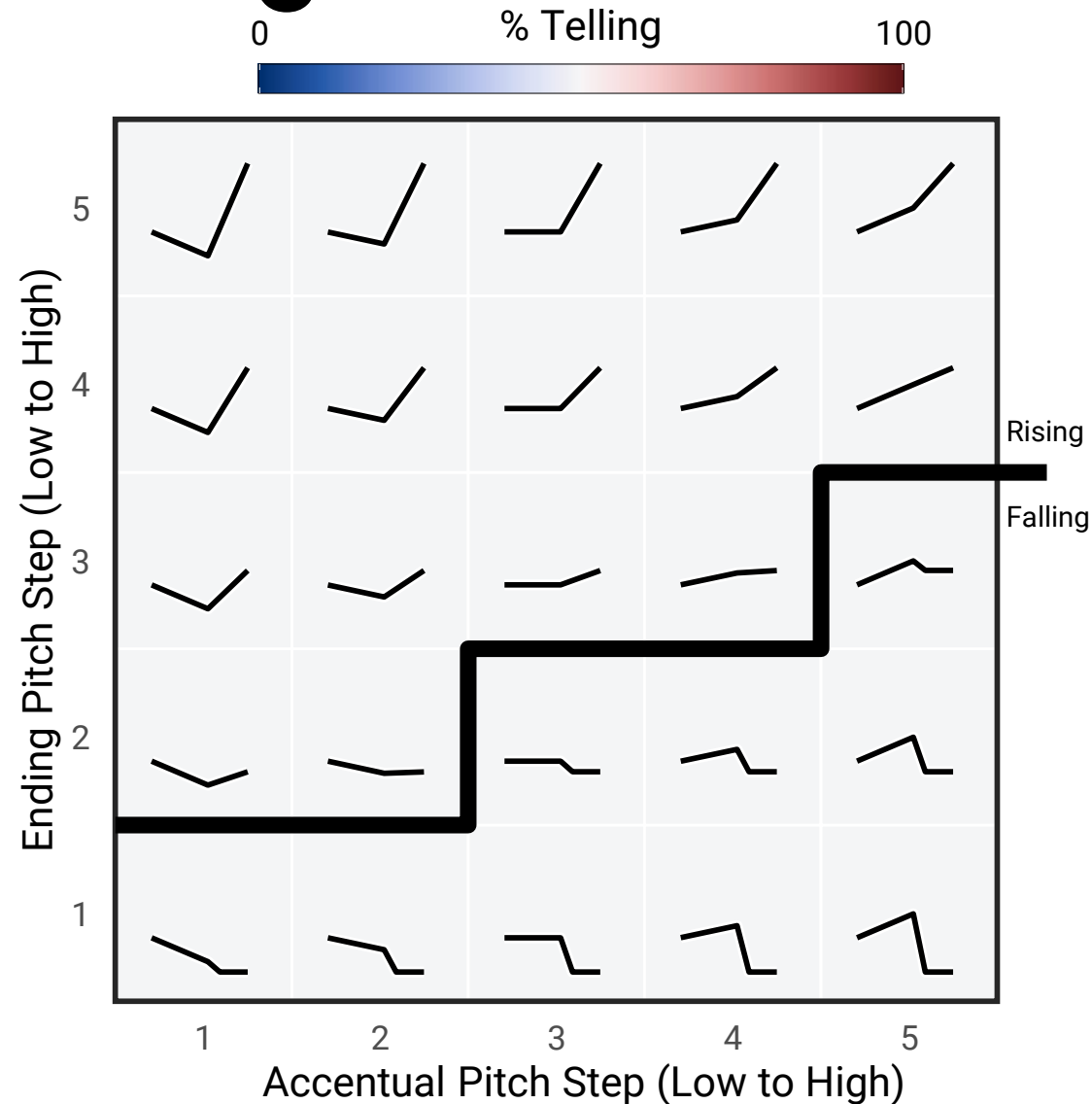


Mapping our stimuli



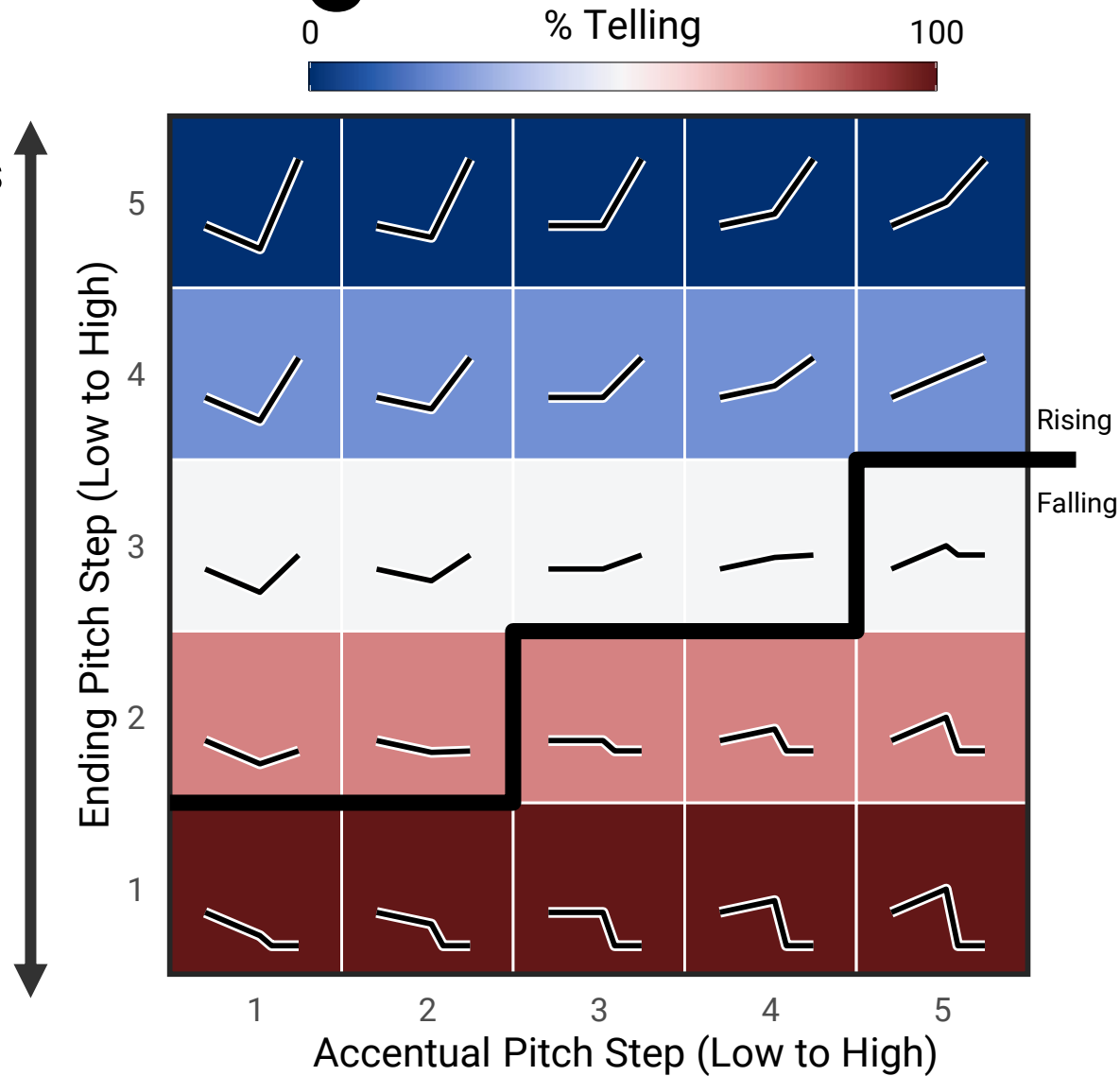
How might the data look?

H1: Q/A contrast resides solely in the edge tones



How might the data look?

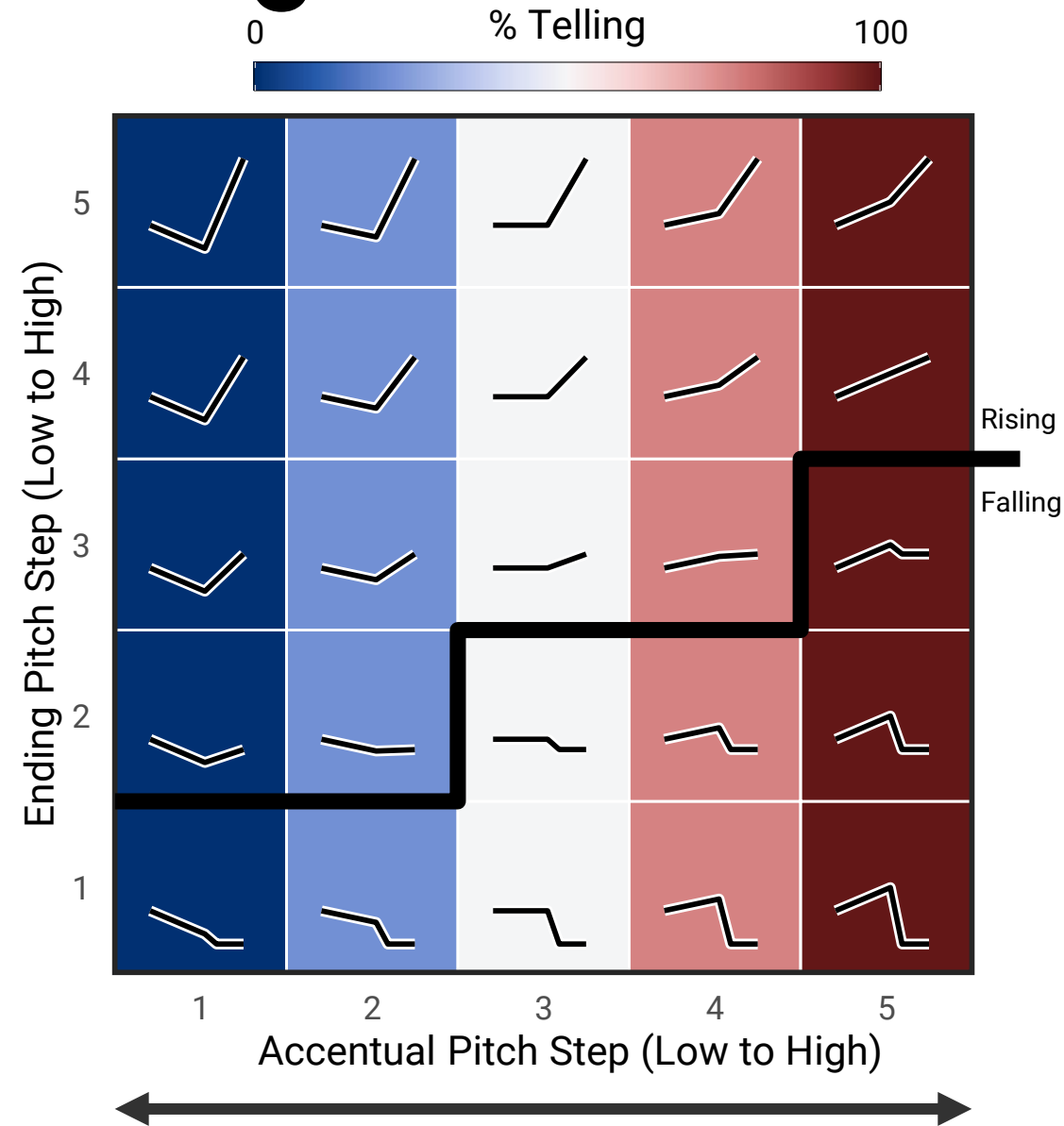
H1: Q/A contrast resides solely in the edge tones



How might the data look?

H1: Q/A contrast resides solely in the edge tones

H2: Q/A contrast resides solely in the pitch accent

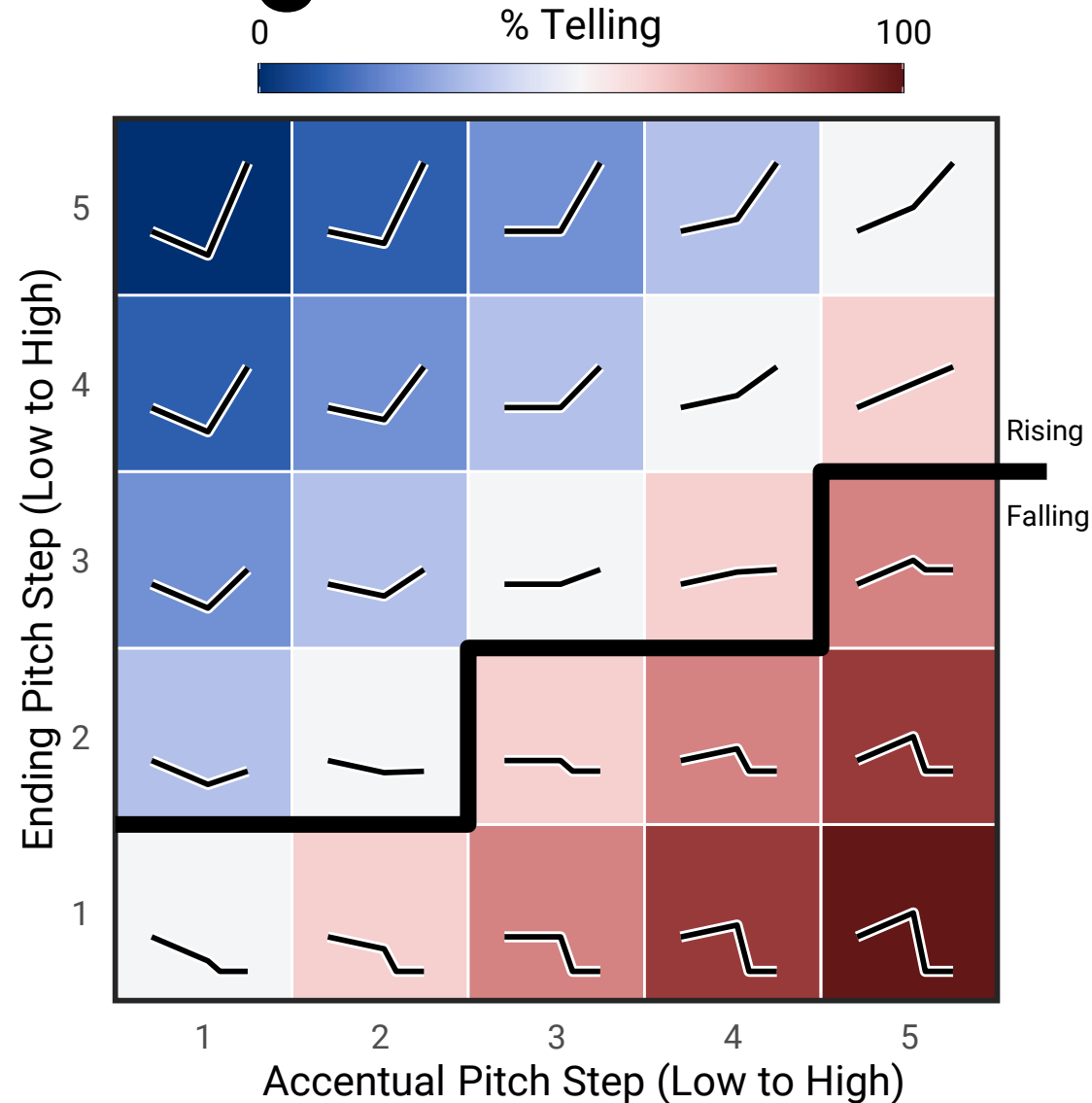


How might the data look?

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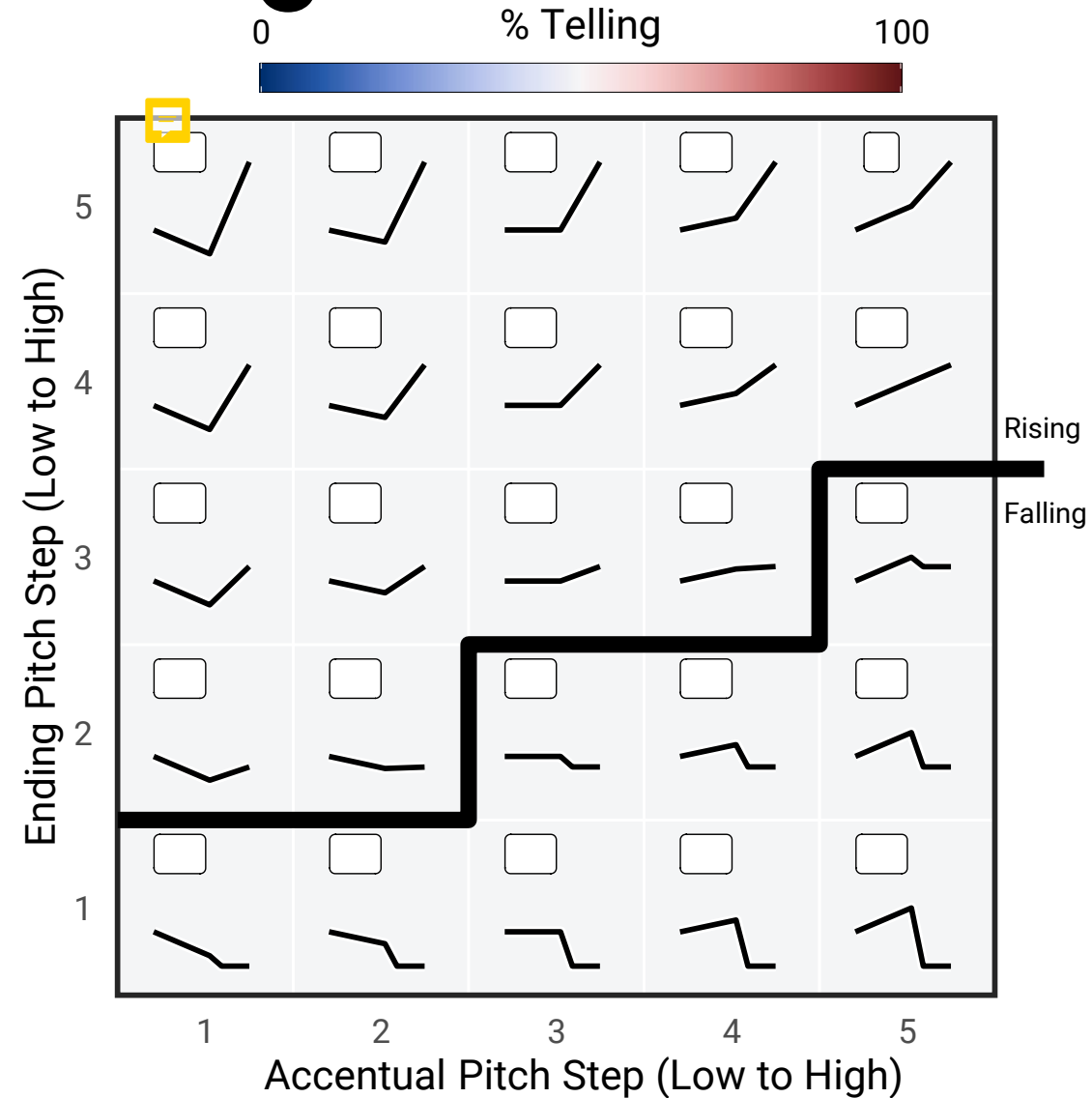
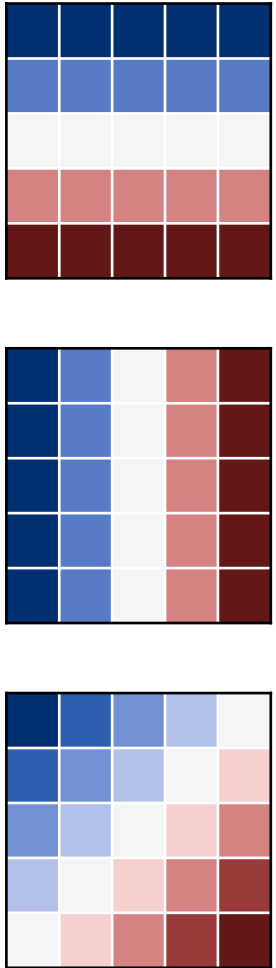
H2: Q/A contrast resides solely in the pitch accent

H3: Both pitch accent and edge tones contribute to Q/A contrast



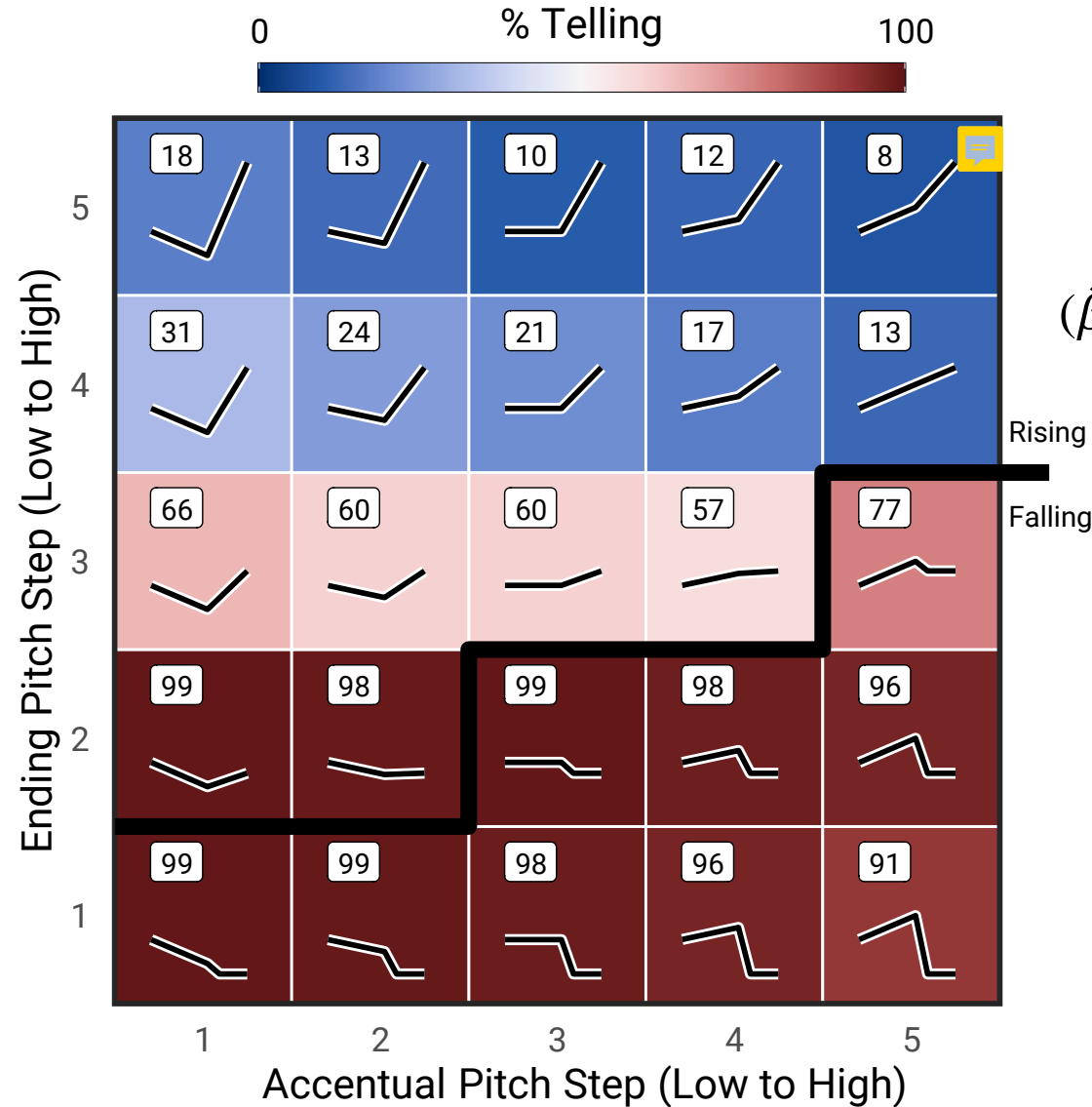
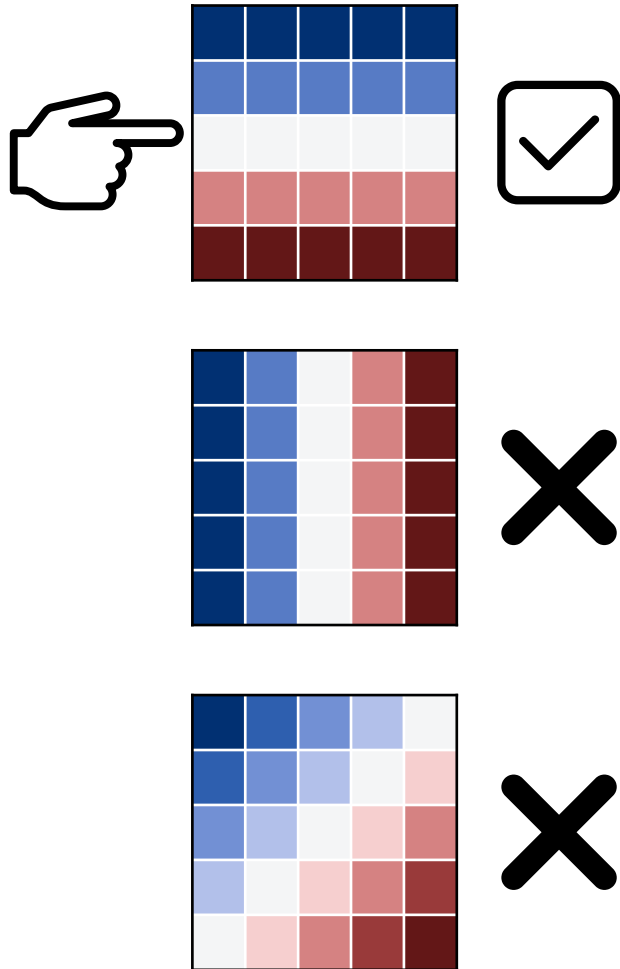
How might the data look?

Schematic Predictions



Results

Schematic Predictions



Bayesian Logistic Mixed Effect Model

Ending Pitch
 $(\hat{\beta} = -0.76, 95\% \text{ CI } [-0.87, -0.65])$

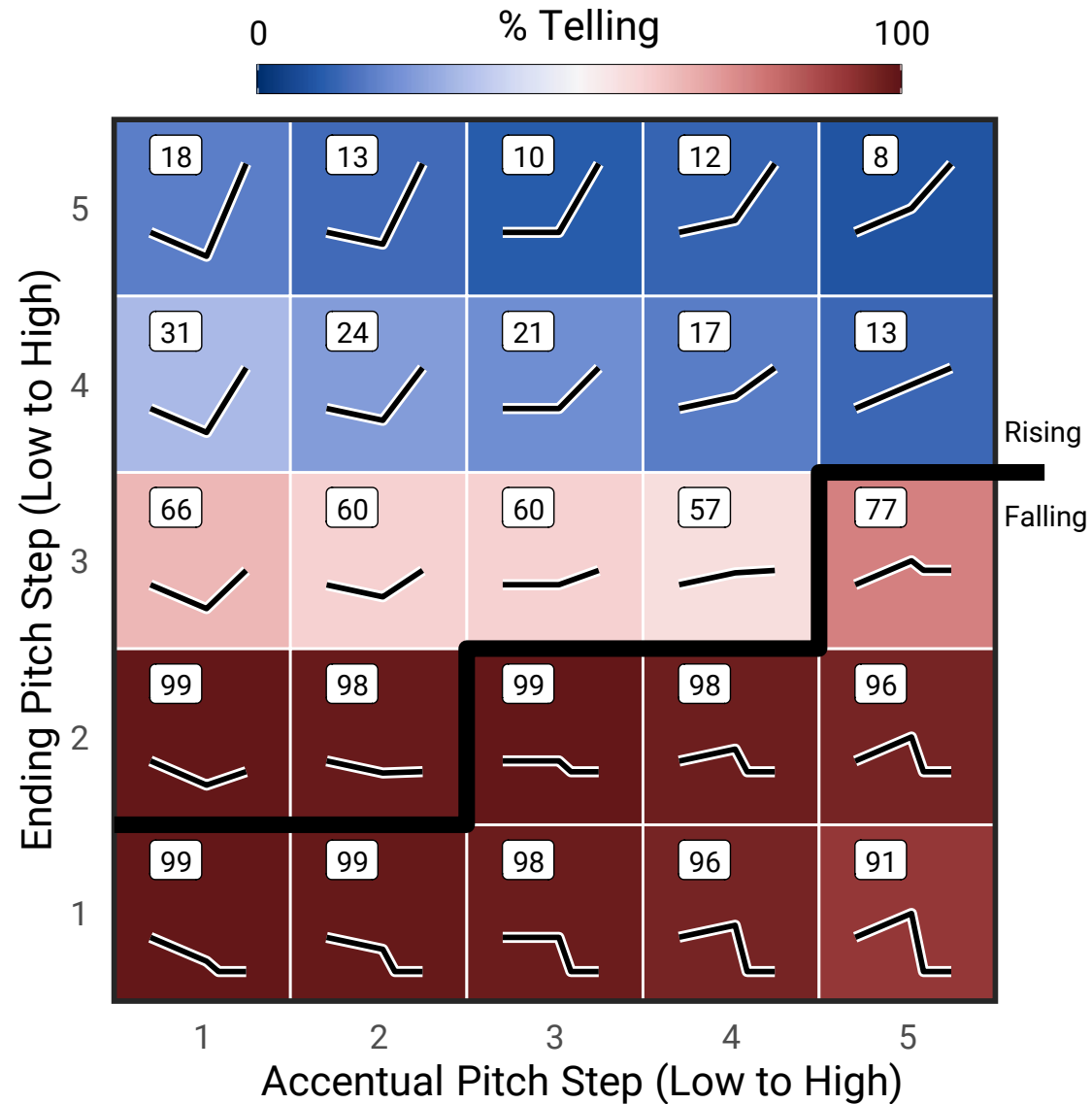
Accentual Pitch
 $(\hat{\beta} = -0.05, \text{ CI } [-0.13, 0.03])$

Ending:Accentual
 $(\hat{\beta} = 0, \text{ CI } [-0.02, 0.03])$

N=52 from Prolific

Takeaways:

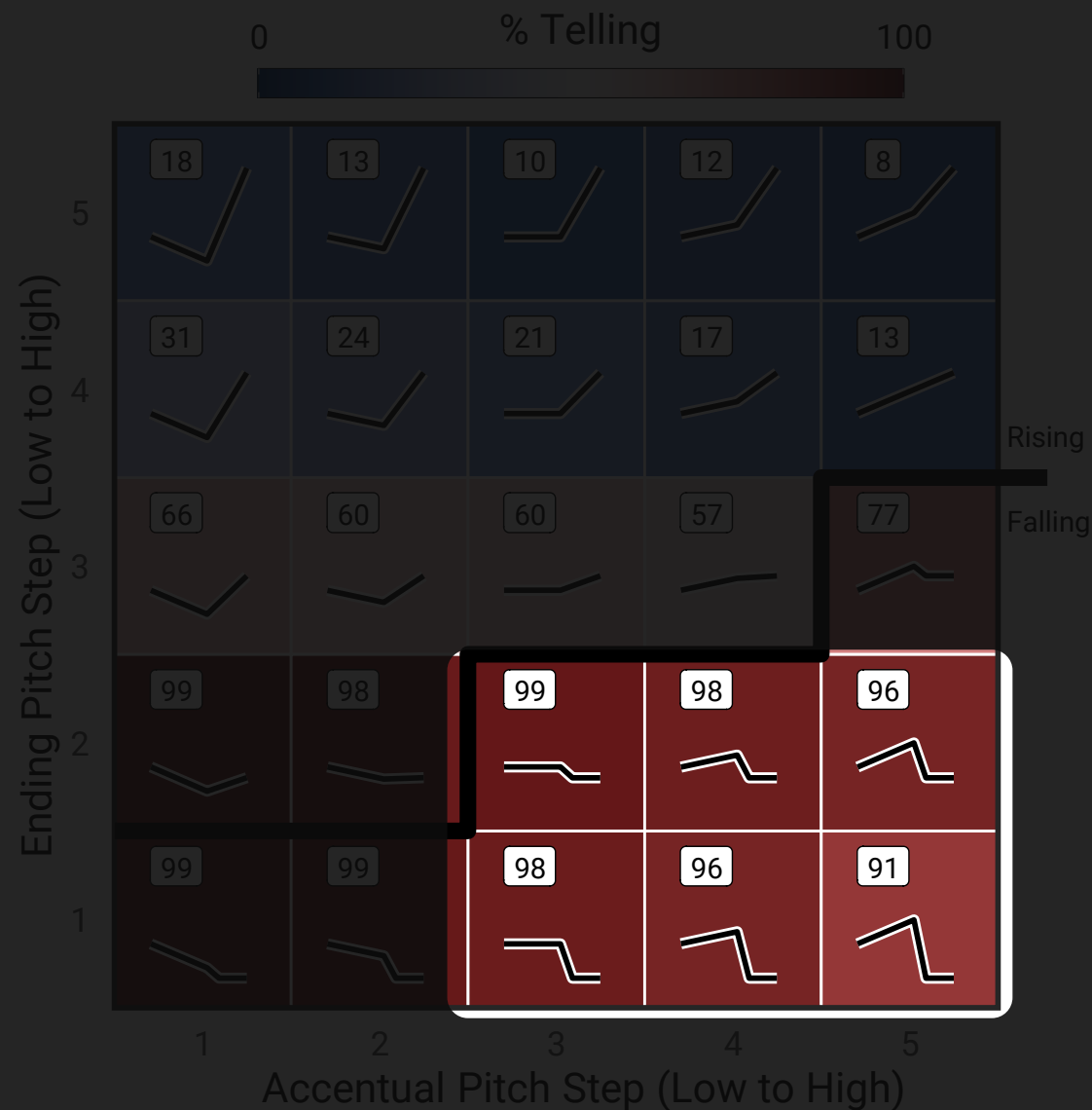
L*/H* doesn't seem to matter: ending pitch variation captures most of the results



Takeaways:

L*/H* doesn't seem to matter: ending pitch variation captures most of the results

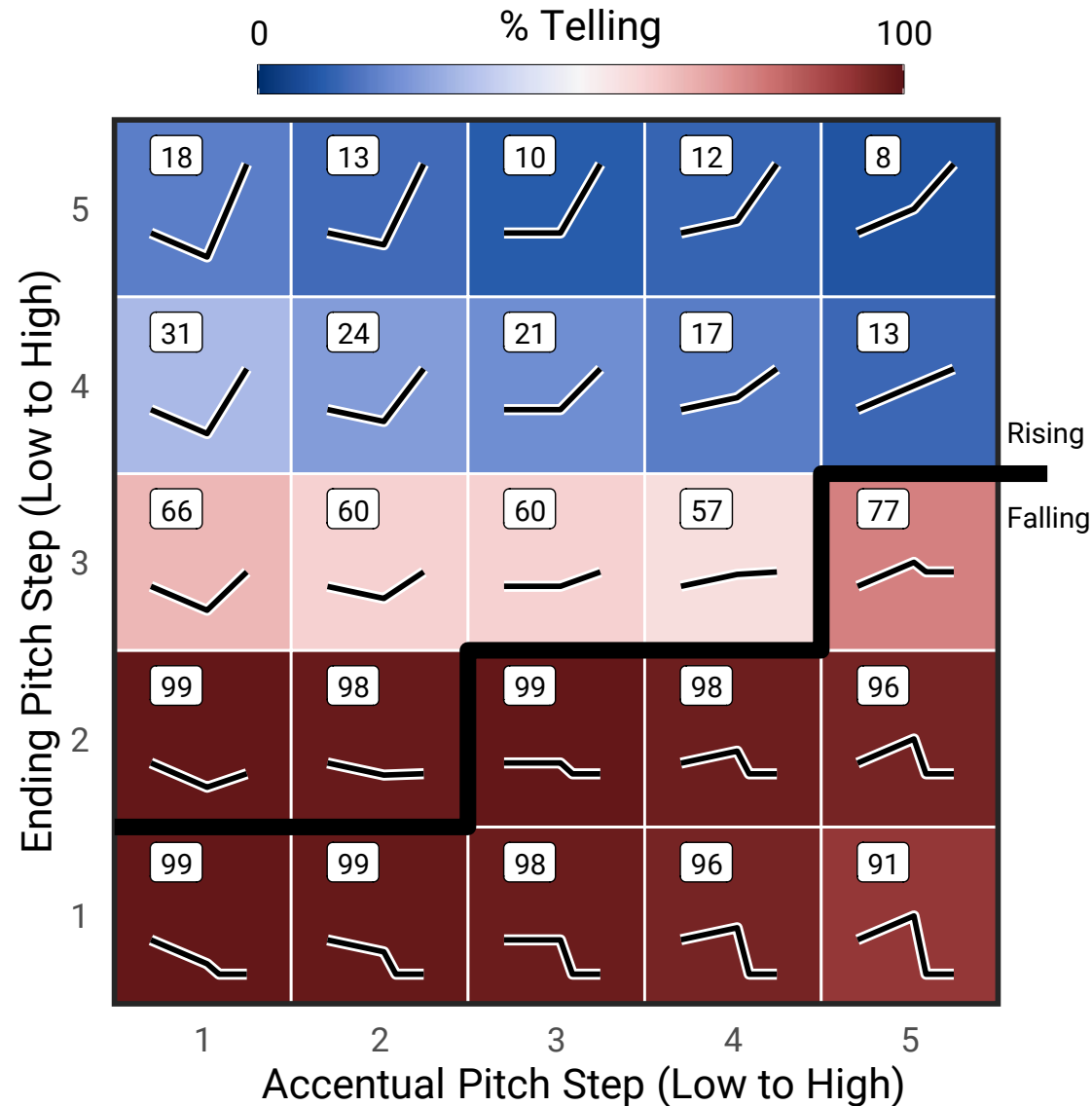
H*L-L% fall curiously not at ceiling



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H*L-L% fall curiously not at ceiling



Next:

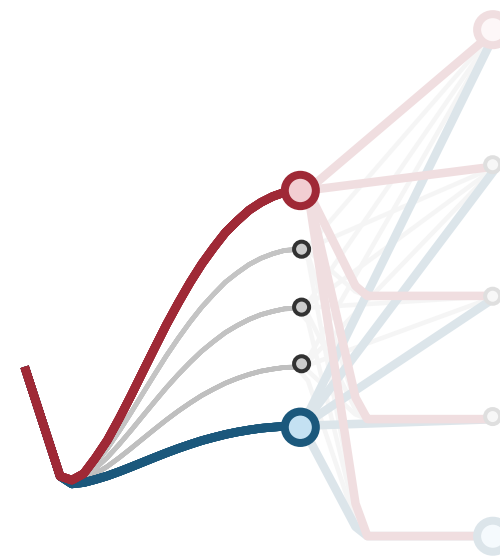
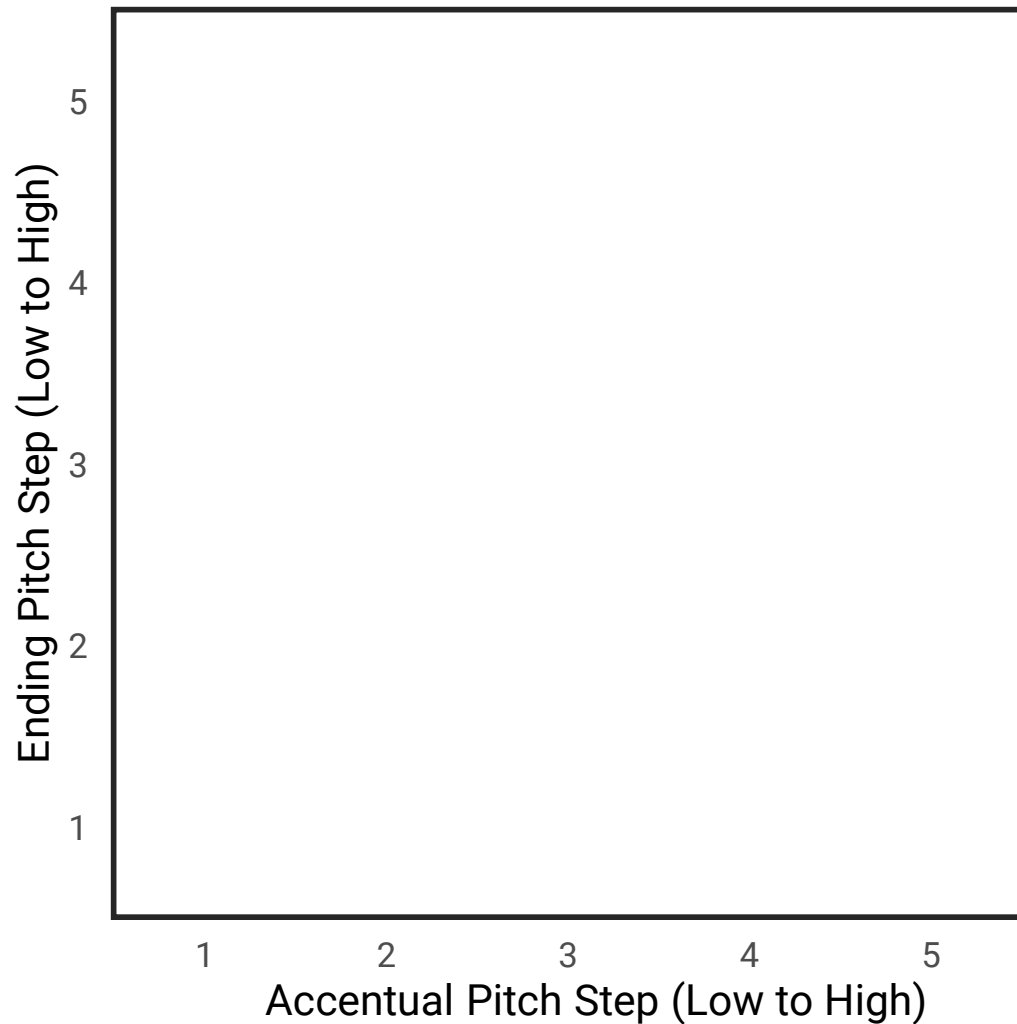
How might a bitonal pitch accent affect interpretation?

Exp 2

Varying the scaling of a “contrastive” pitch accent



Maybe: invoking contrastive focus alternatives would enhance or reduce the contrast

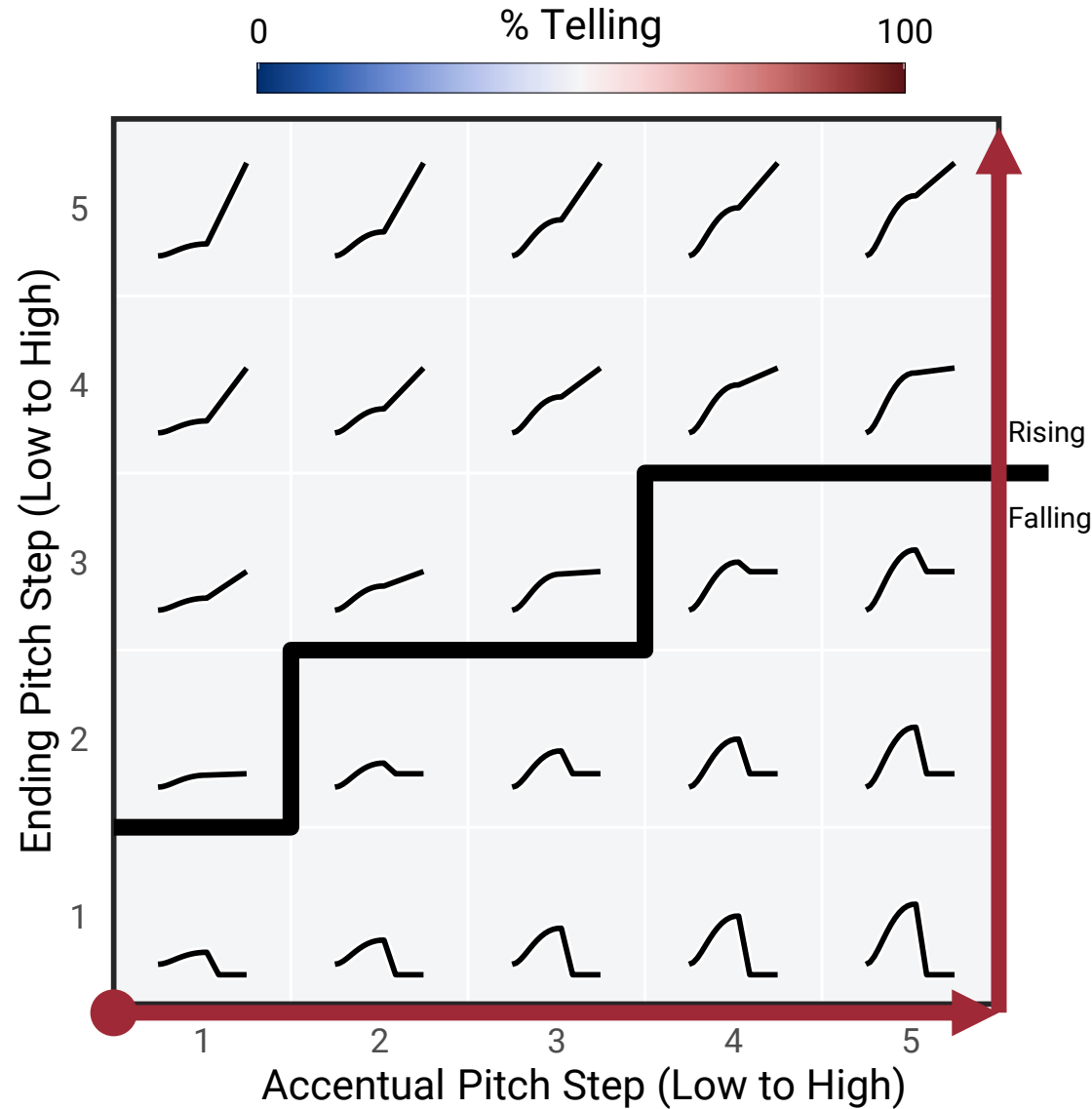


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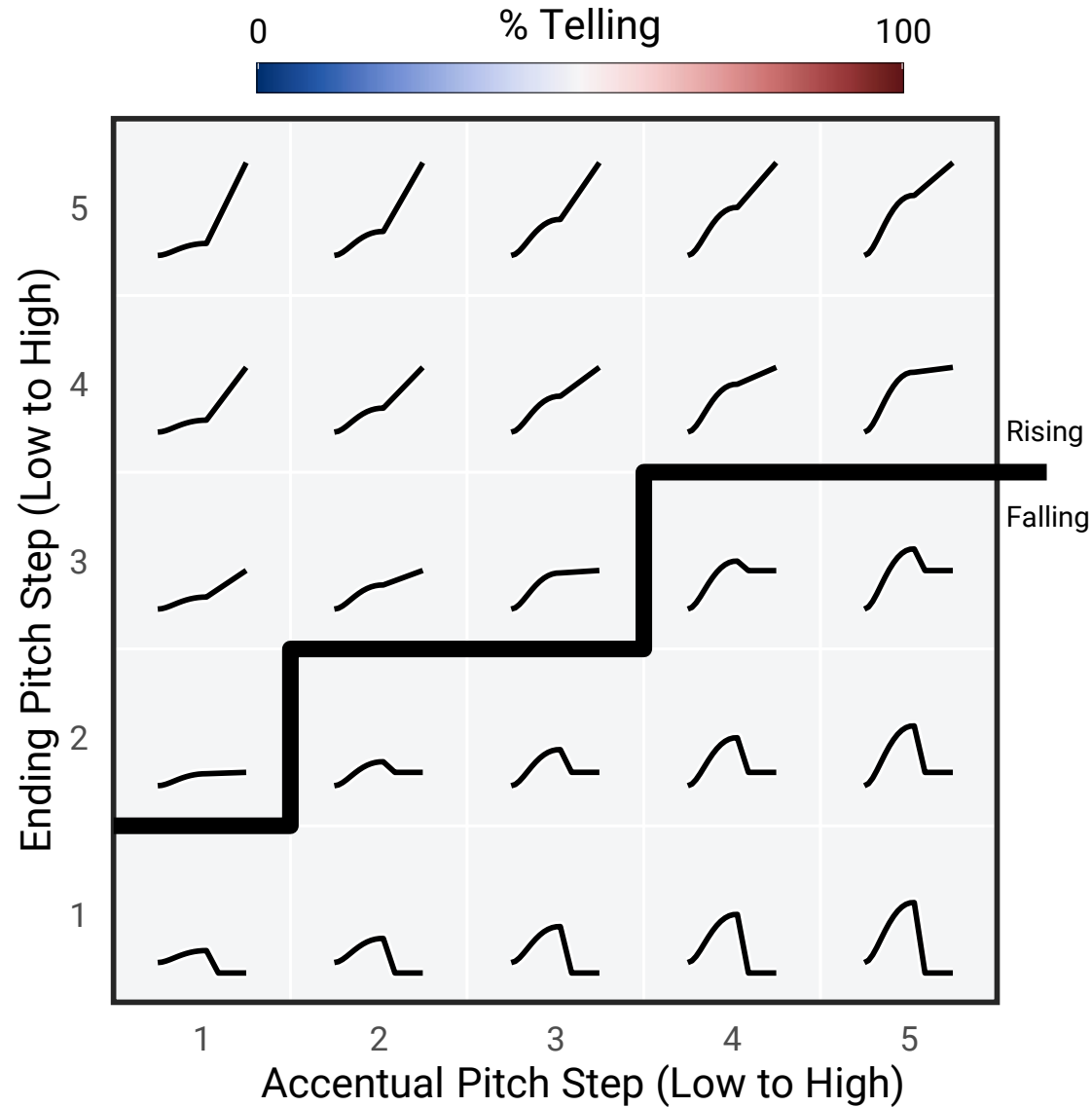


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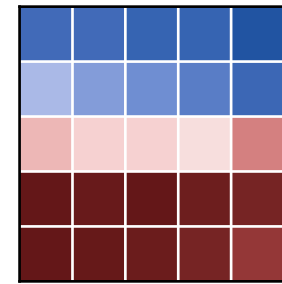


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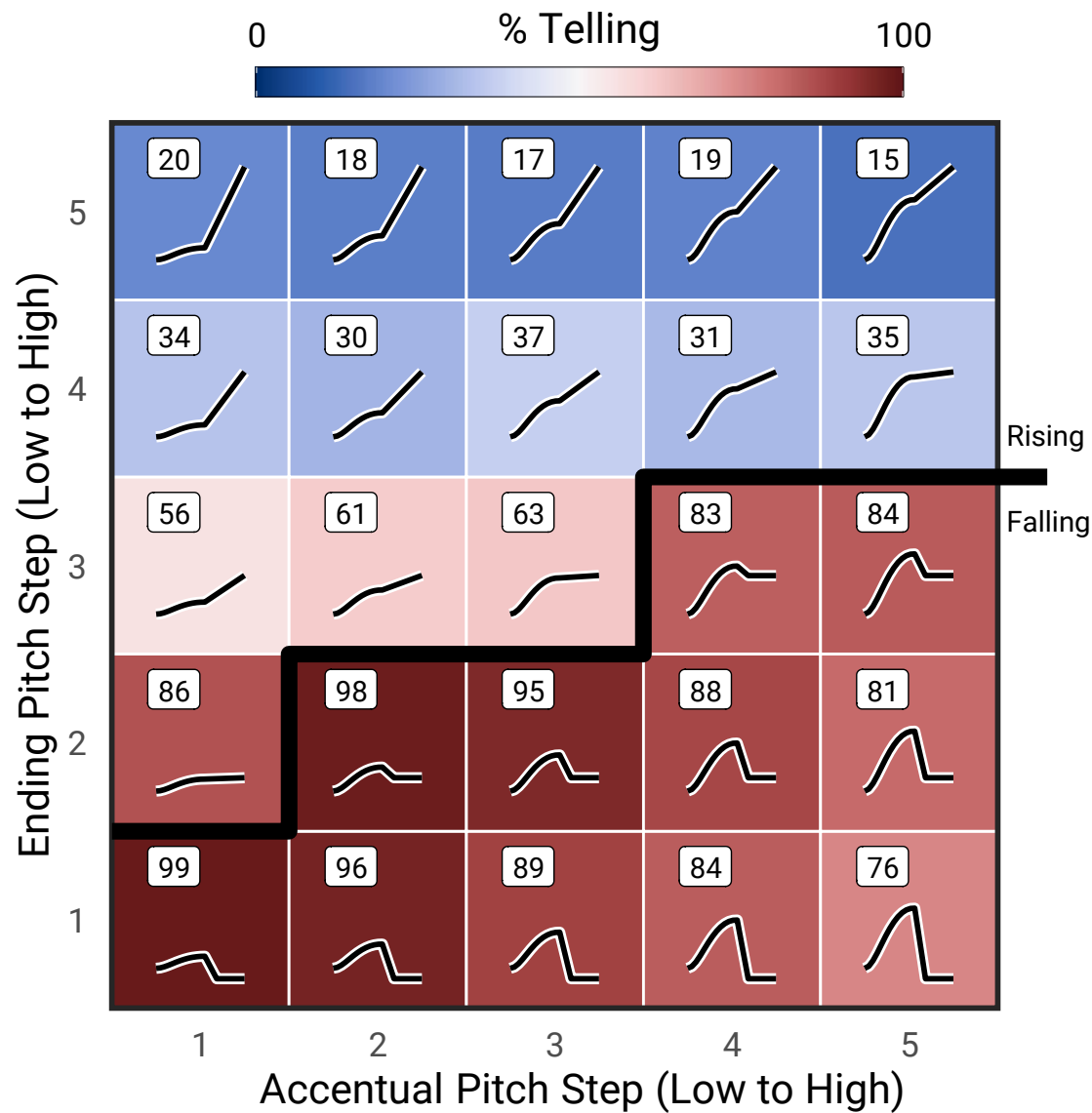


Do our results change with a **more prominent** pitch accent?

Exp 1 Results



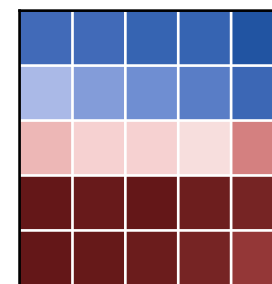
Takeaways:



N=55 from Prolific

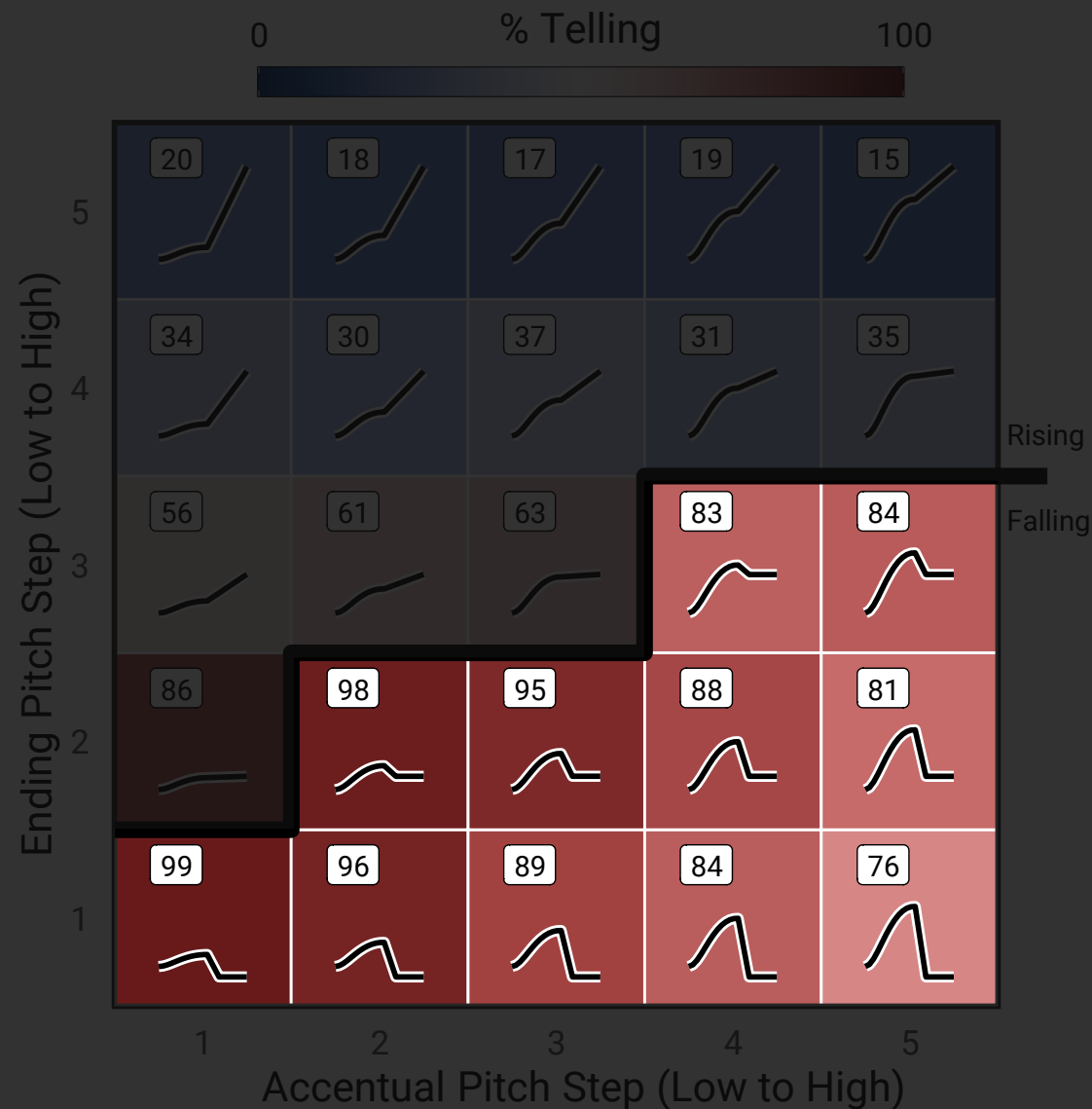
Do our results change with a **more prominent** pitch accent?

Exp 1 Results



Takeaways:

Increased scaling in falls may make a focus interpretation more salient



Do our results change with a **more prominent** pitch accent?

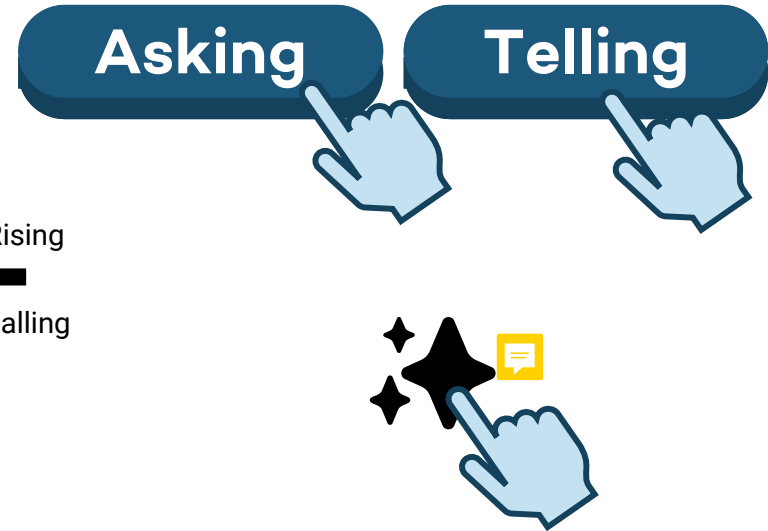
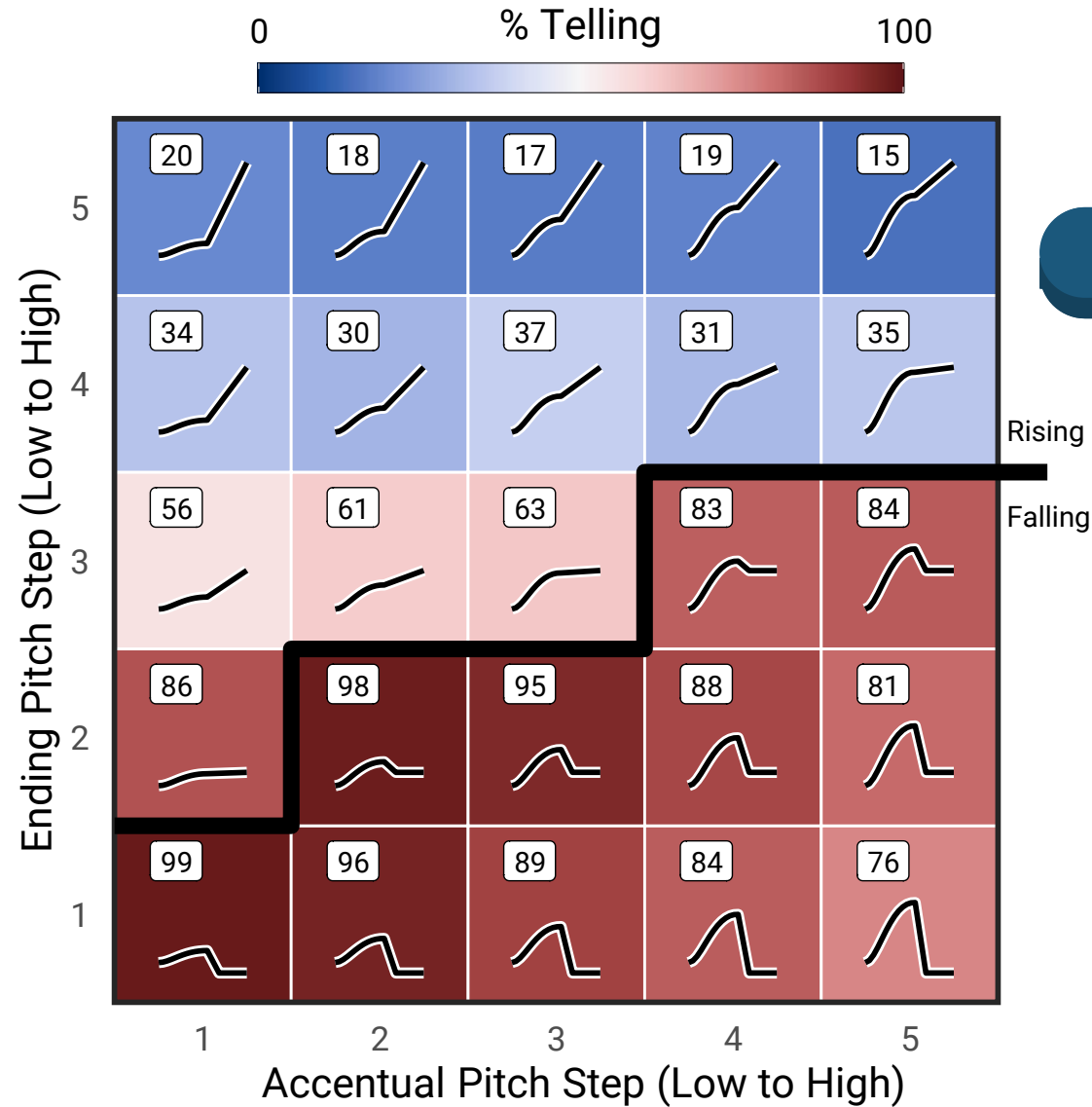
Exp 1 Results



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Increased scaling in falls may make a focus interpretation more salient

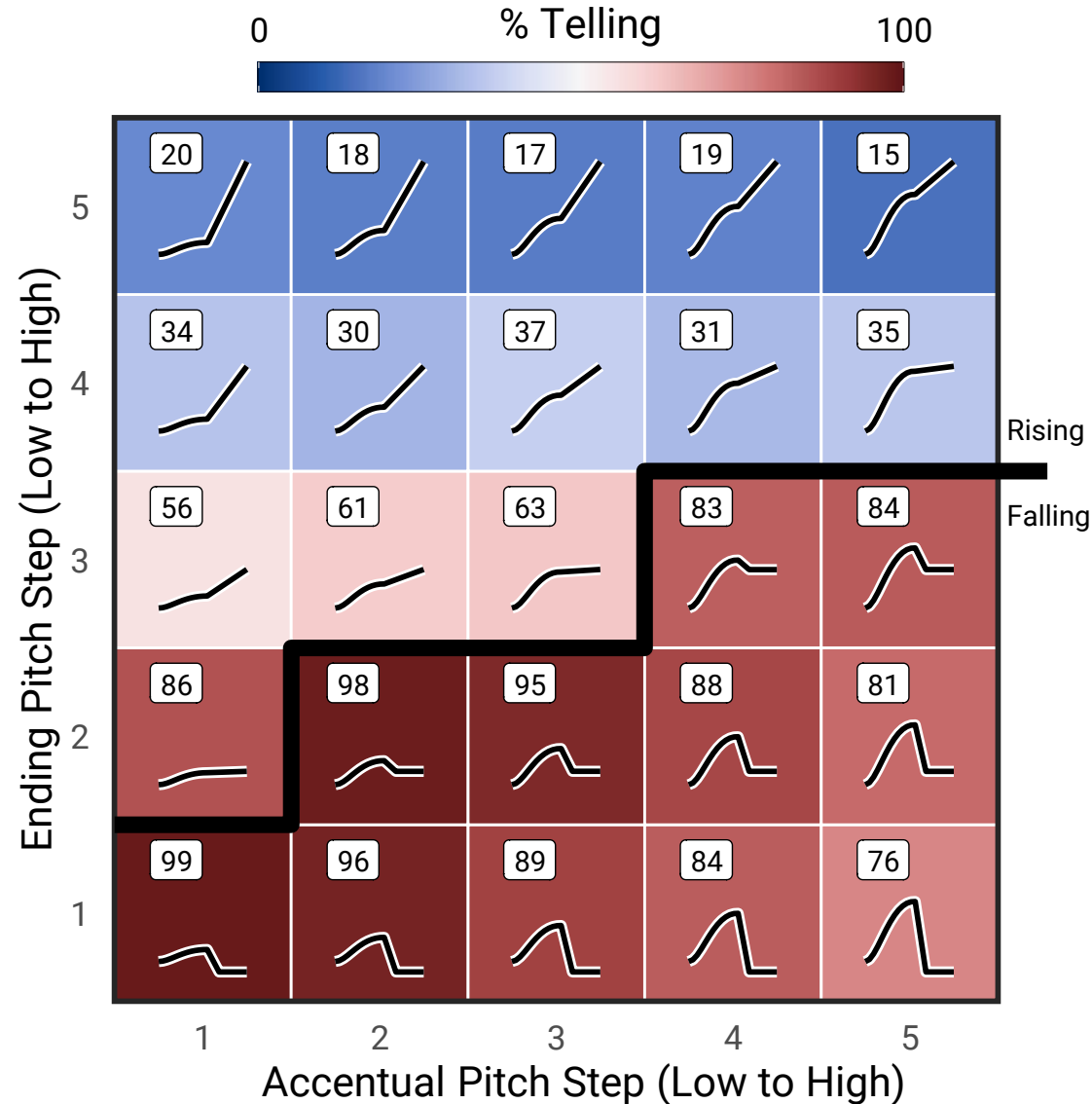
Perhaps this salient focus interpretation is interfering with Q/A interpretation



Takeaways:

Increased scaling in falls may make a focus interpretation more salient

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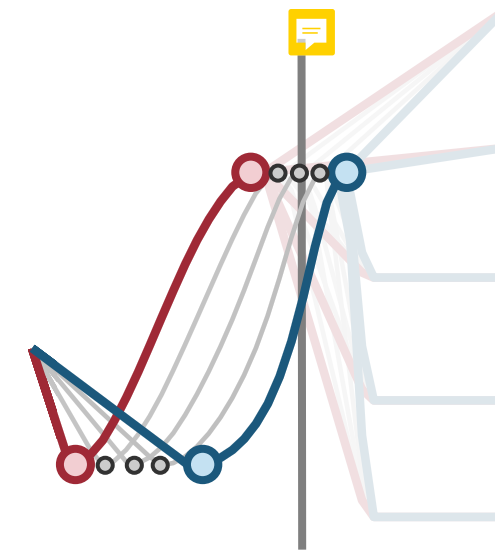
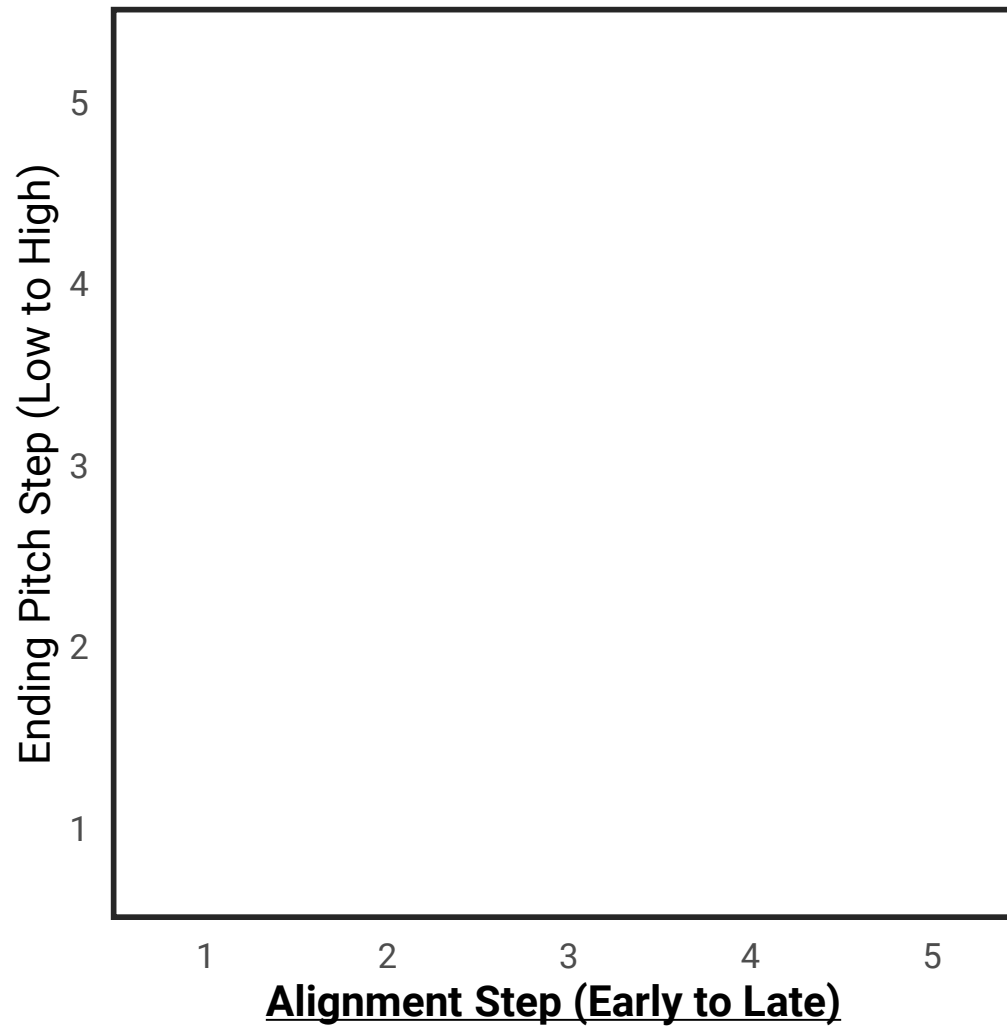
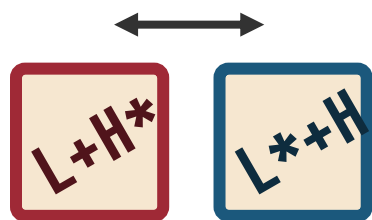
Next:

How might the *choice of bitonal pitch accent* affect interpretation?

What is the role of variation in peak alignment in interpretation?

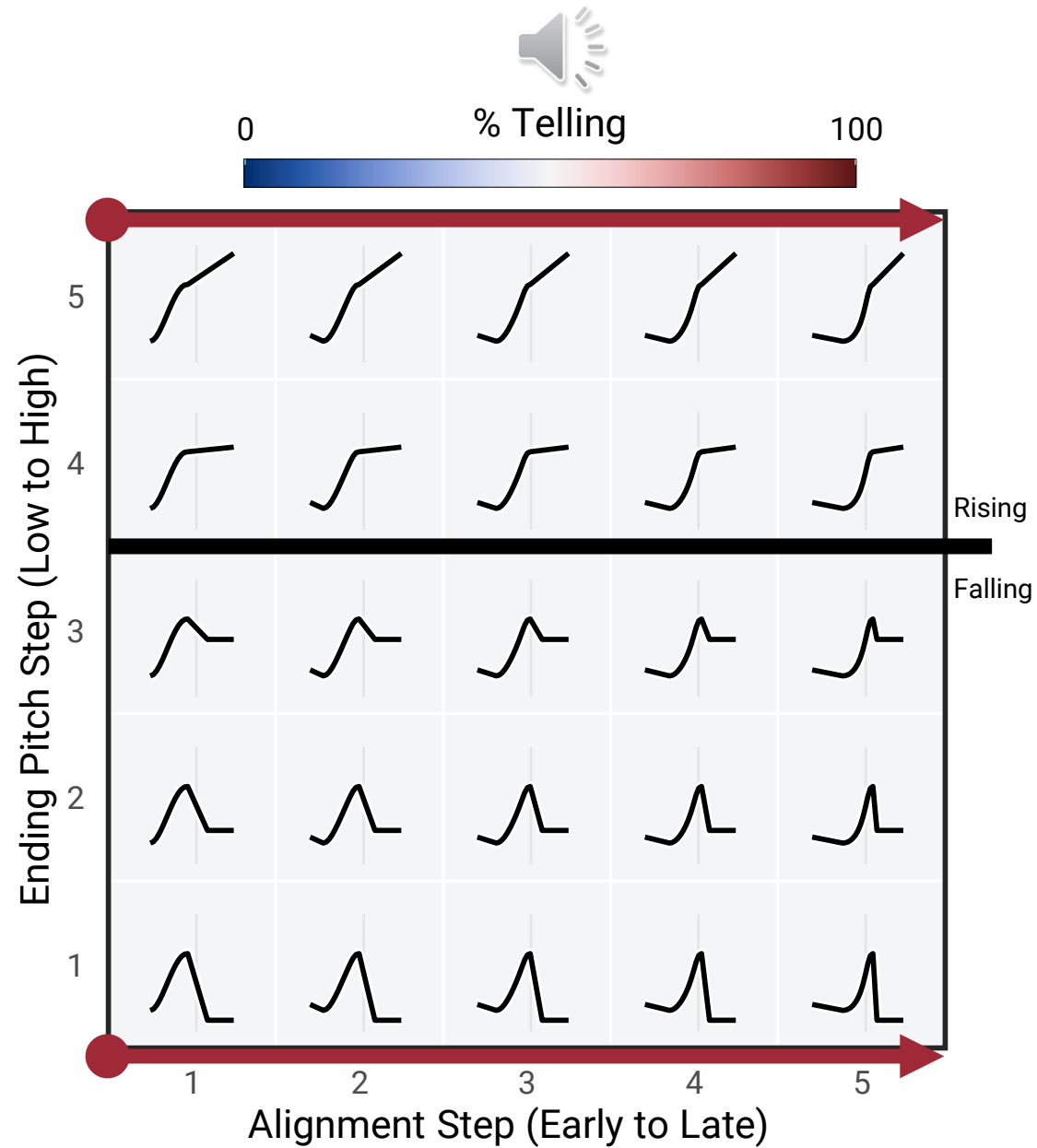
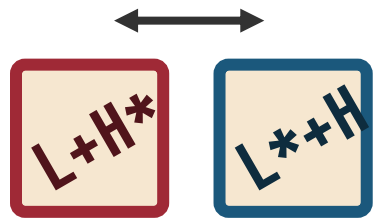
Exp 3

Varying the alignment between bitonal pitch accents



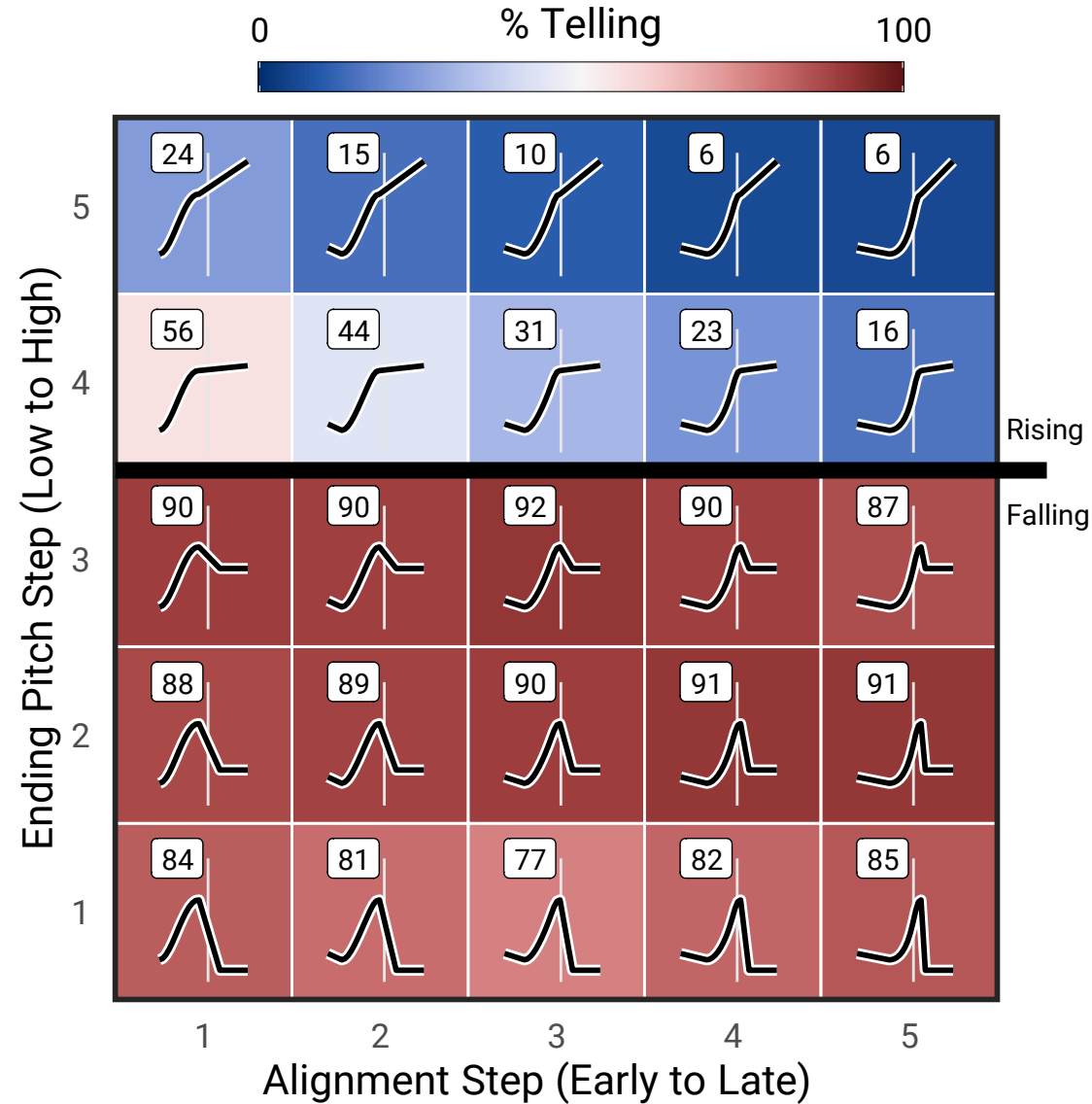
Exp 3

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Takeaways:

Bitonal accent peak *alignment* does not strongly affect Q/A interpretation

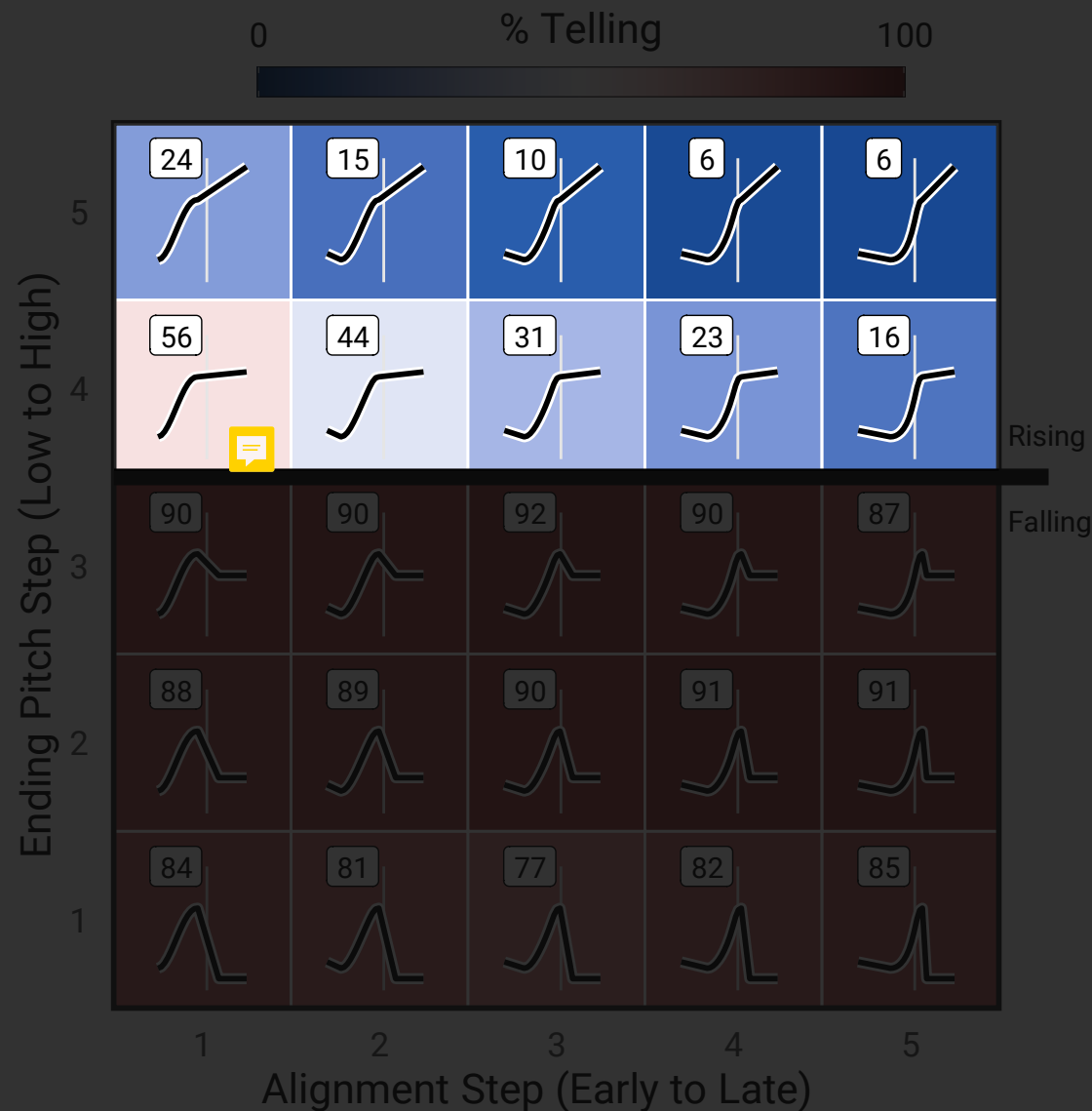


N=58 from Prolific

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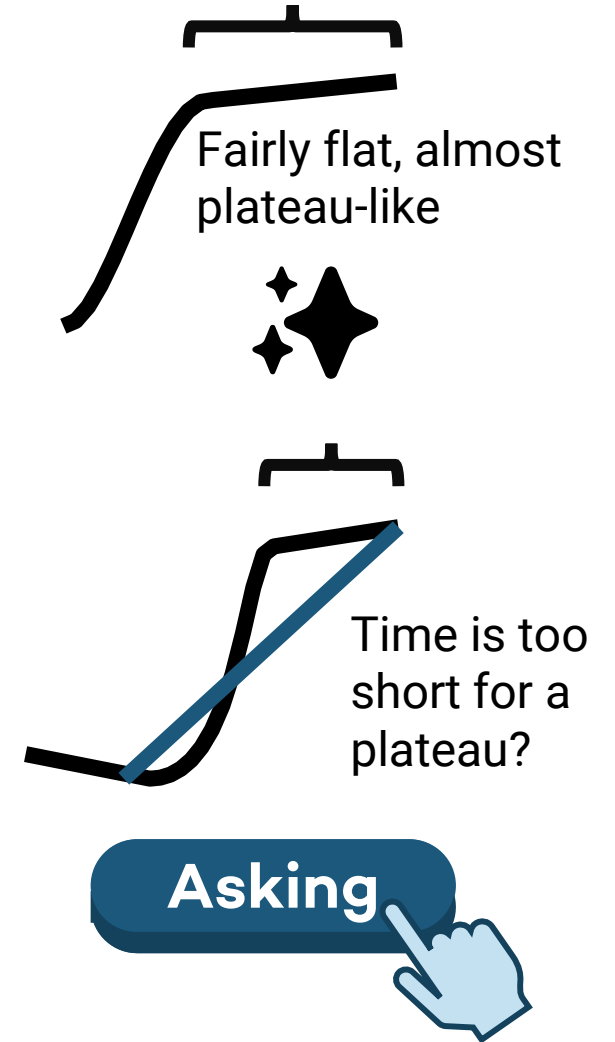
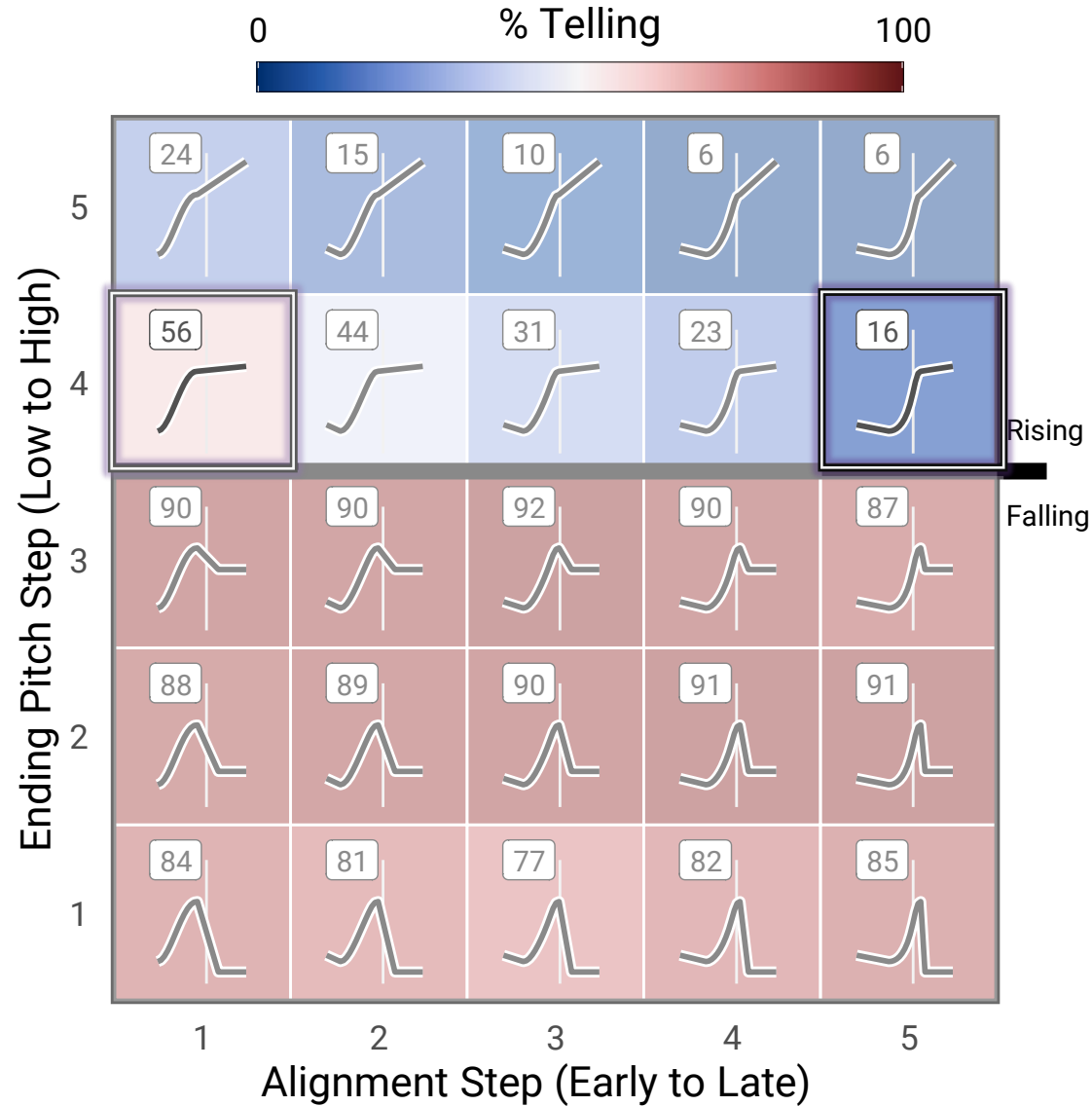
Manipulation of alignment reveals interactions in the implementation of plateaus and rises



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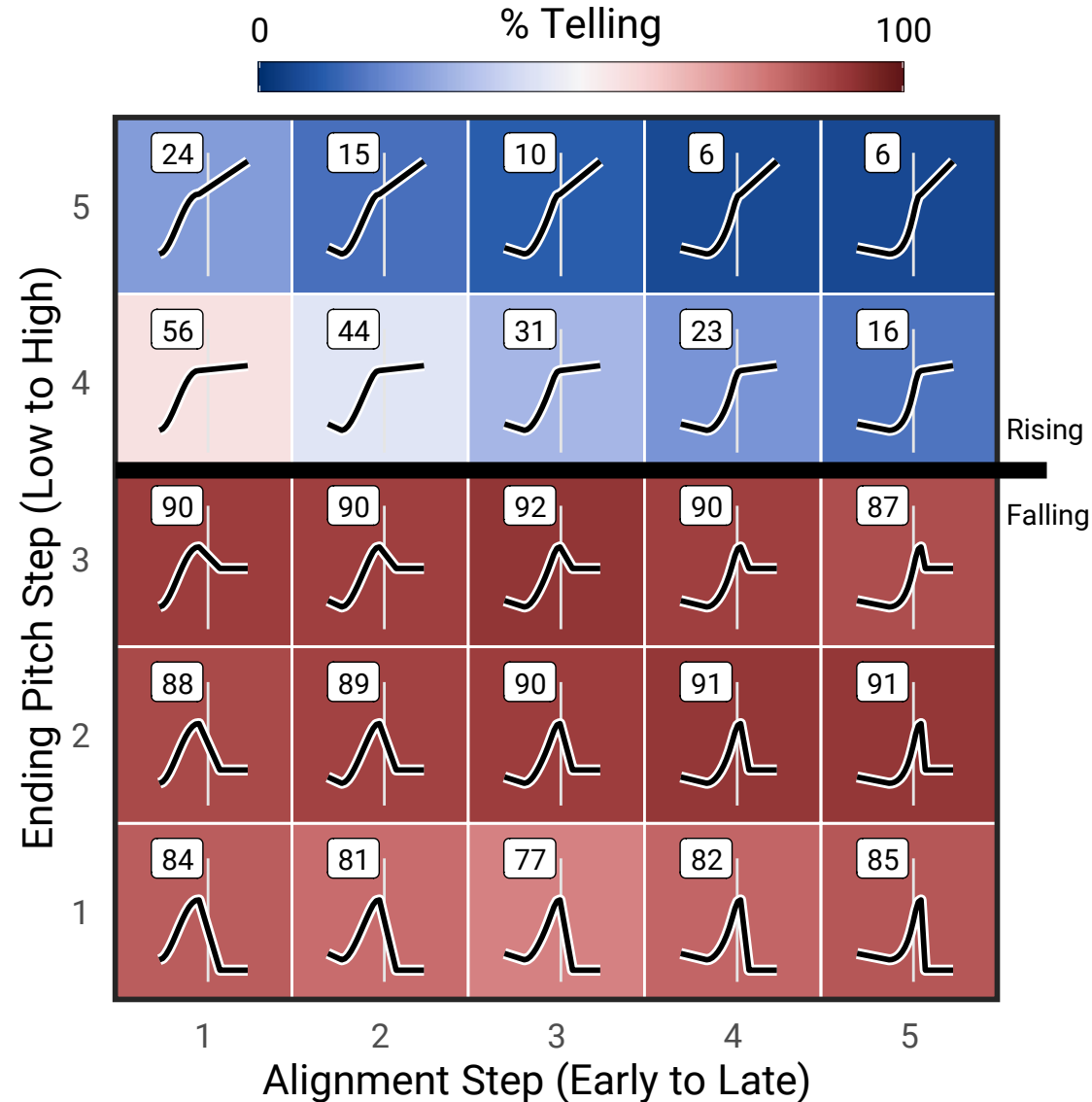
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Takeaways:

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Manipulation of alignment reveals interactions in the implementation of plateaus and rises



Next:

What have we learned from all this variation?

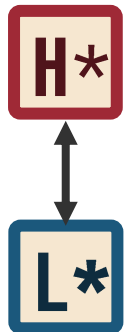
Conclusions

Is it about where pitch rises/falls from, or towards?

How does variation in the accentual and ending pitch regions affect interpretation along this Q/A dimension?

We tested **75** pitch contours across three experiments

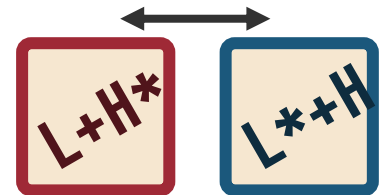
Exp 1



Exp 2



Exp 3



Conclusions

Across all experiments, we found a robust effect of ending pitch with a primary distinction between rising vs falling shapes

(Cole and Steffman 2021; Cole et al. 2023)

Pitch accent doesn't play a role in this meaning distinction but..

Higher prominence may license a focus interpretation that's salient to some listeners

Alignment of bitonal accent doesn't affect interpretation much for falls, but impacts how plateau-like shallow rises are

Acknowledgments

- ProSD Lab and Phonatics group at Northwestern
- Northwestern Graduate School for funding
- Chun Chan for experiment implementation

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