

Assessing Contrasts in Intonation Through Contrasts in Speaker Commitment

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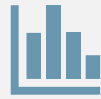
Outline



Background and Motivation



Current Experiment



Results



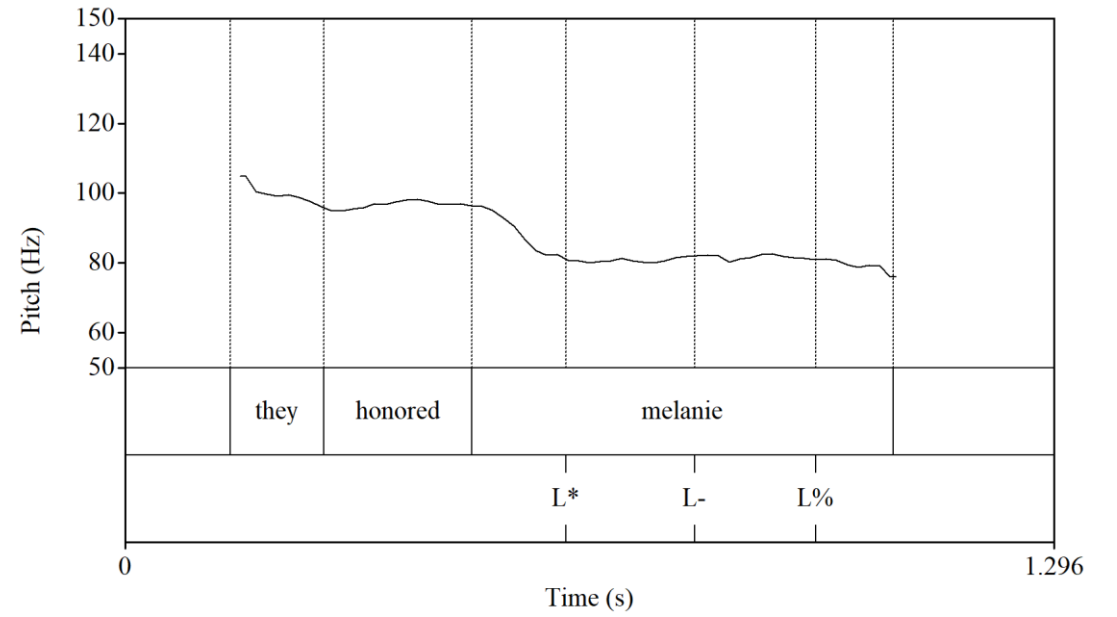
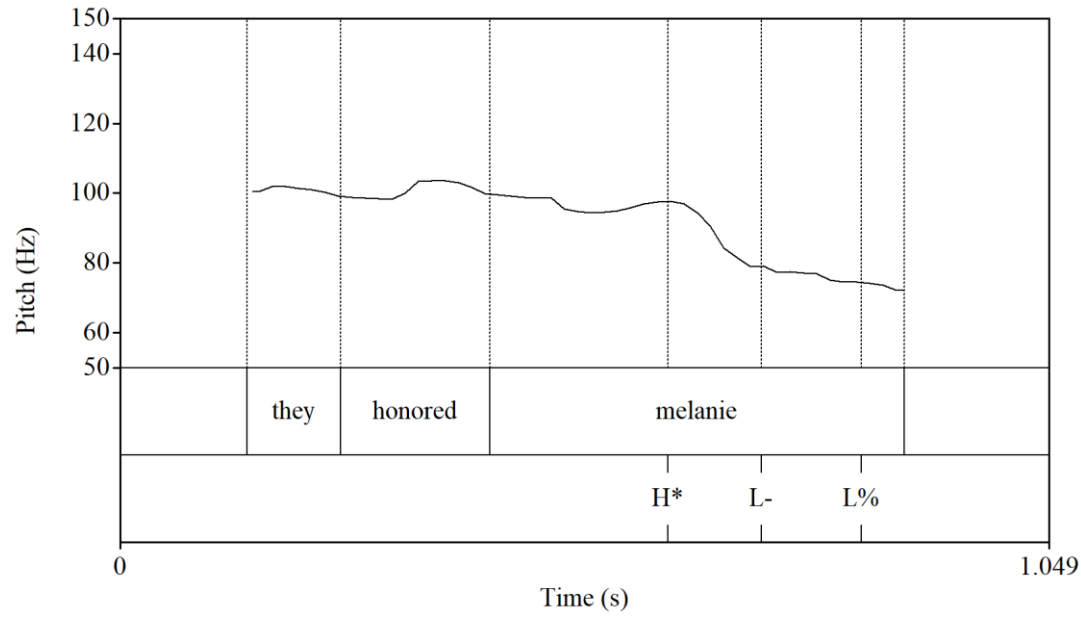
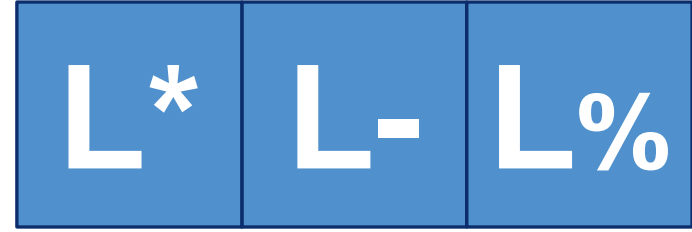
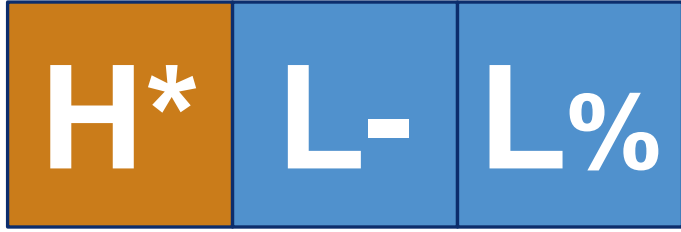
Conclusions

Background & Motivation

		Phrase and boundary tone combination			
		L-L%	L-H%	H-L%	H-H%
Pitch accent type	H*	 fall	 fall-rise	 stylised high rise	 high rise
	L*	 low fall	 low rise (narrow pitch range)	 stylised low rise	 low rise
	L+H*	 rise-fall	 rise-fall-rise	 stylised high rise (with low head)	 high rise (with low head)
	L*+H	 rise-fall (scooped)	 rise-fall-rise (scooped)	 stylised low rise	 low rise
	H+L*	 low fall (with high head)	 low rise (with high head)	 stylised low rise (with high head)	 low rise (high range)
H*+L	(same as H*)		 stylised fall (‘calling contour’)	 fall-rise (high range)	

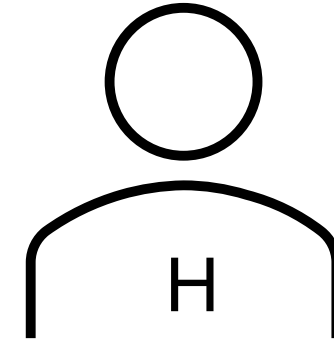
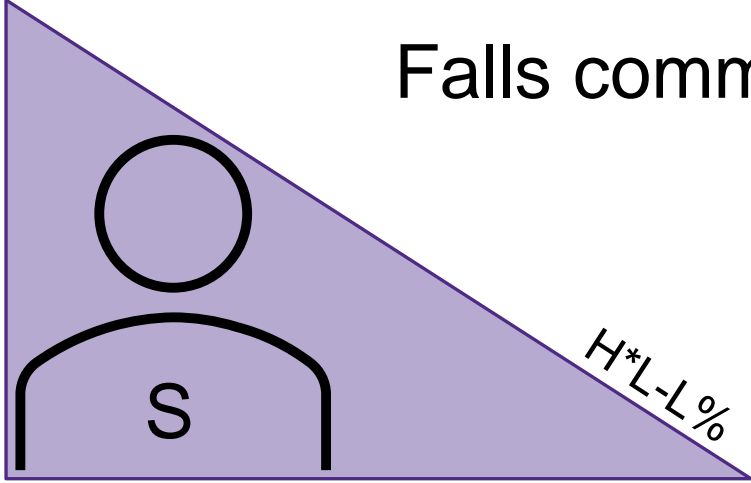
— Accented syllable
 Baseline

(Pierrehumbert 1980)
 (Pierrehumbert and Beckman 1986)
 (Pierrehumbert and Hirschberg 1990)
 (Warren 2016)



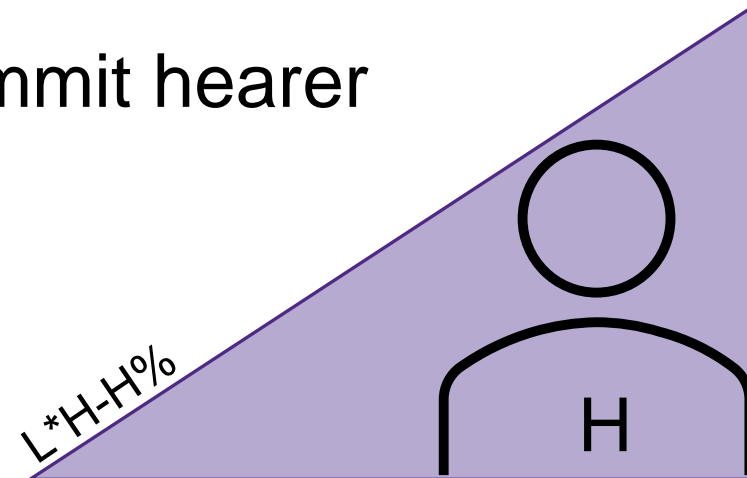
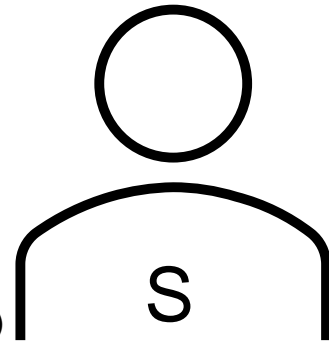
Falls commit speaker

(Krifka 2015)
(Farkas and Bruce 2010)

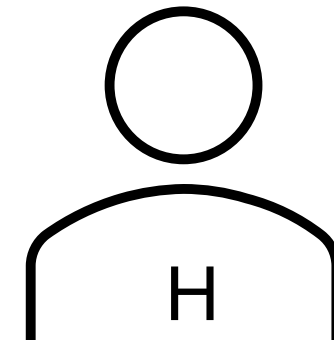
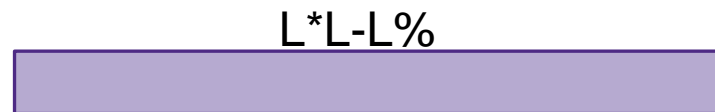
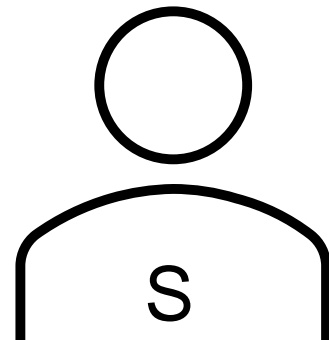


Rises commit hearer

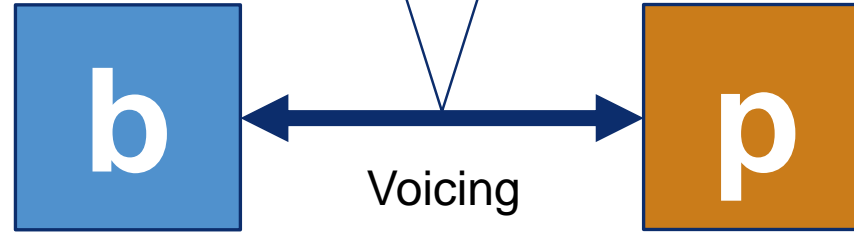
(Rudin 2018)



Low & Flat withholds speaker commitment



Phoneme/Syllable/Word



Difference in pragmatic meaning

Why withhold commitment to p ?

Knows p will disappoint

Embarrassed about p

Believes p is abundantly obvious

Resigned to or reluctant about p

Unwilling to admit/commit to p



Does pitch co-vary with commitment?

What does that relationship look like?



Current Experiment

A volunteering context

Boss: I need one volunteer for this task, who will do it?

Alex: I will (LLL)

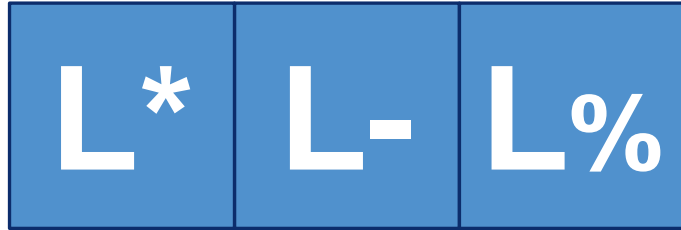
- \leadsto I'll do it if I have to
 - \leadsto I'll do it but I don't want to
 - \leadsto I'll do it but I'm not happy about it
- } *unwilling*

B: Thanks, glad I can count on you

A: #Whoa, I never meant that I was committed to doing it!

A's withholding licenses an unwilling inference, but *does not absolve them*

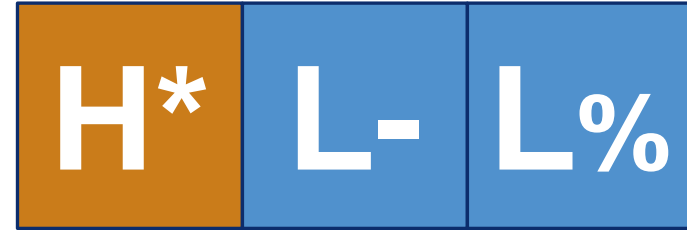
- B may still hold A accountable for p



Withholding of commitment



Unwilling



Full (default) commitment



Willing



Experimental design

Task 1: Given an utterance, select if the speaker actually sounds **willing** or **unwilling**

Task 2: Give a rating of how confident you were in your selection

3 utterances that vary in terms of speaker commitment (Mazzarella et al. 2018)

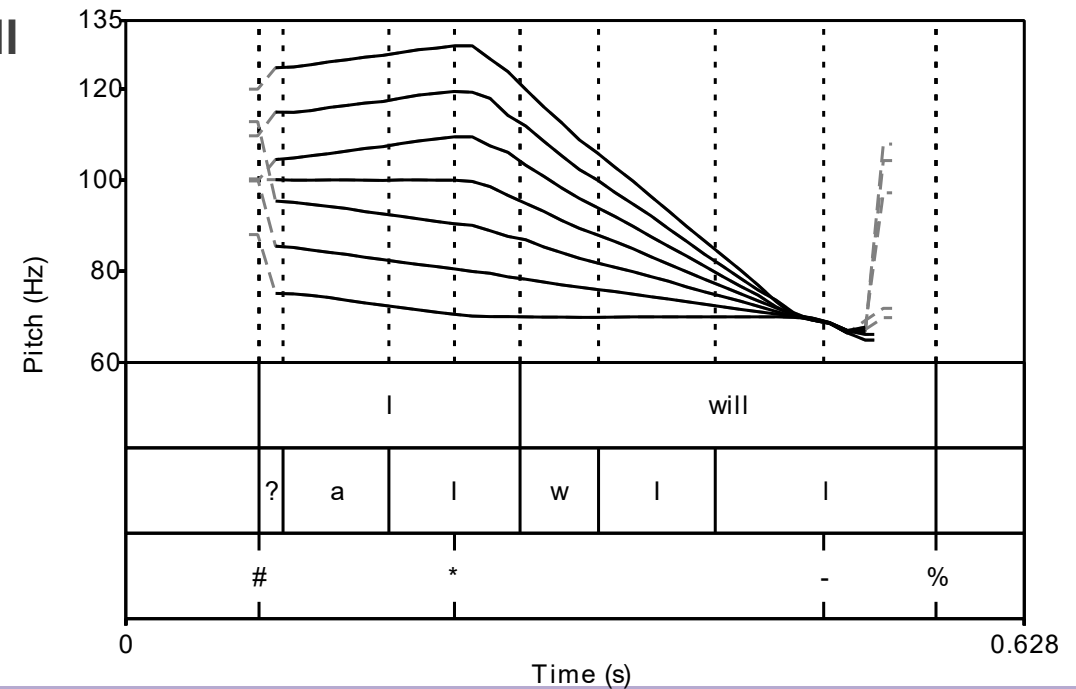
- **I will** > **I'm available** > **If no one else can do it, I will**
- Commissive > Implicature > Conditional

2 baseline recordings for each tune

7-step continuum between L*L-L% and H*L-L%

3 repetitions of each item

126 total trials



Stimuli Examples

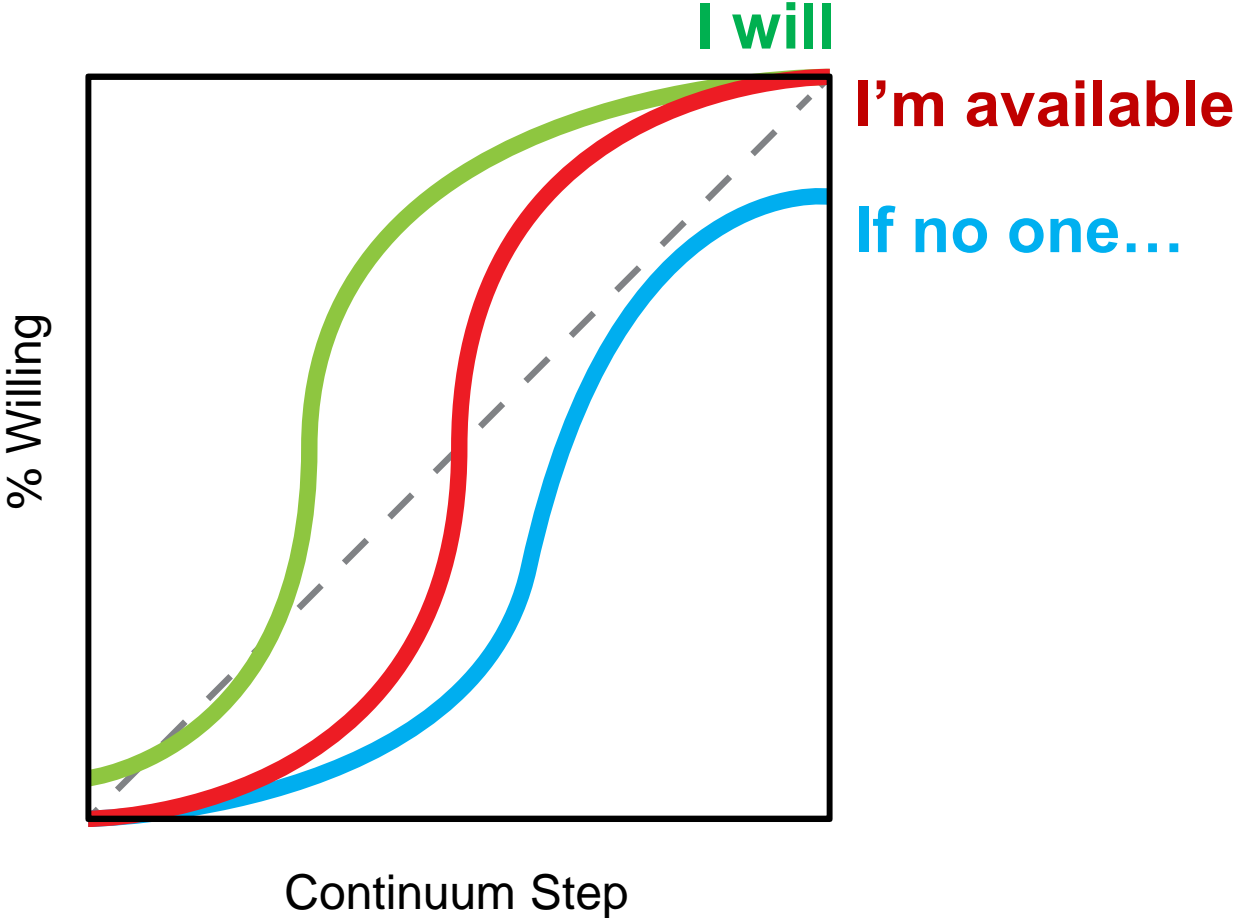
L* L- L%



H* L- L%



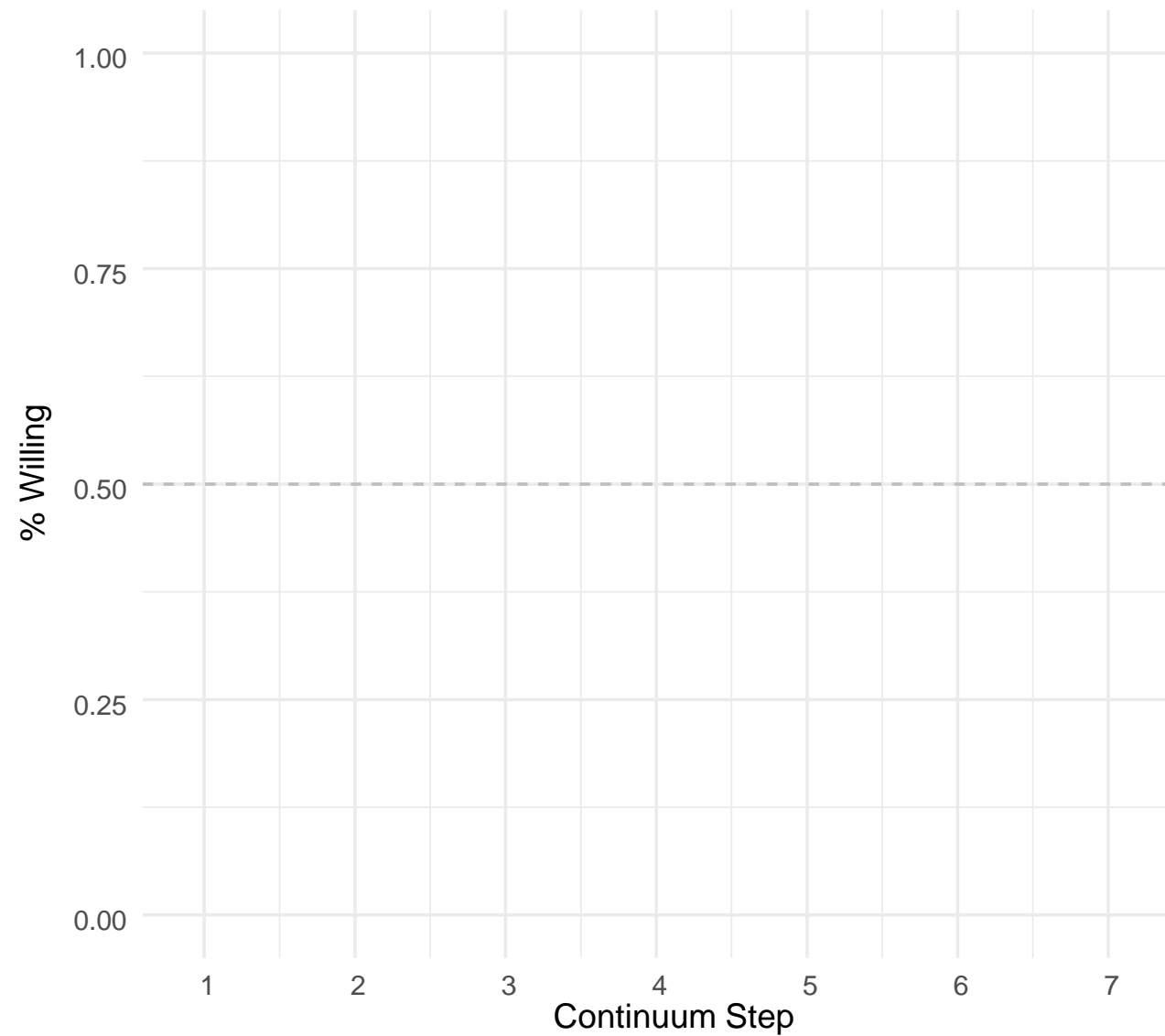
Predictions



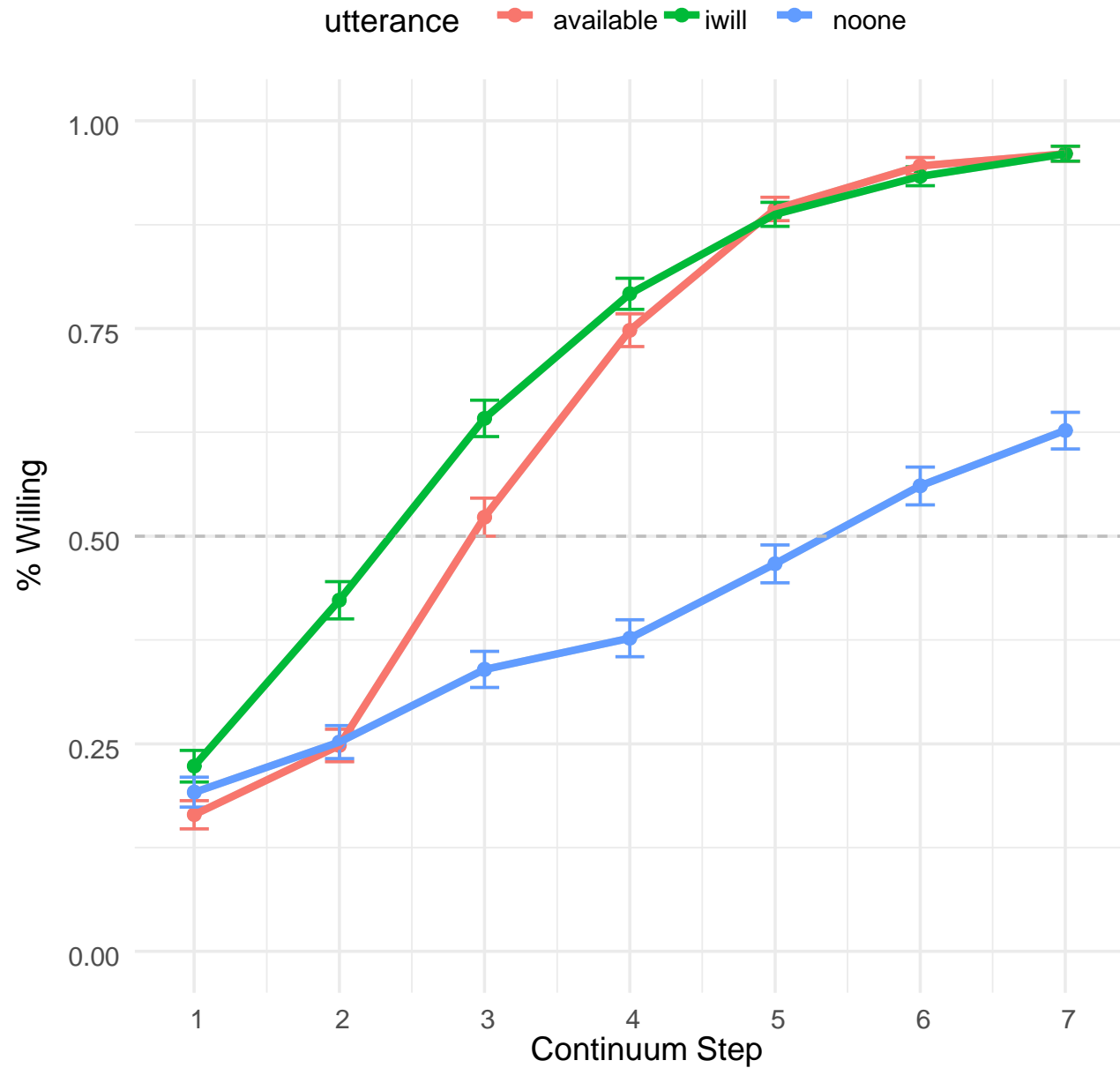
Forced Choice Results

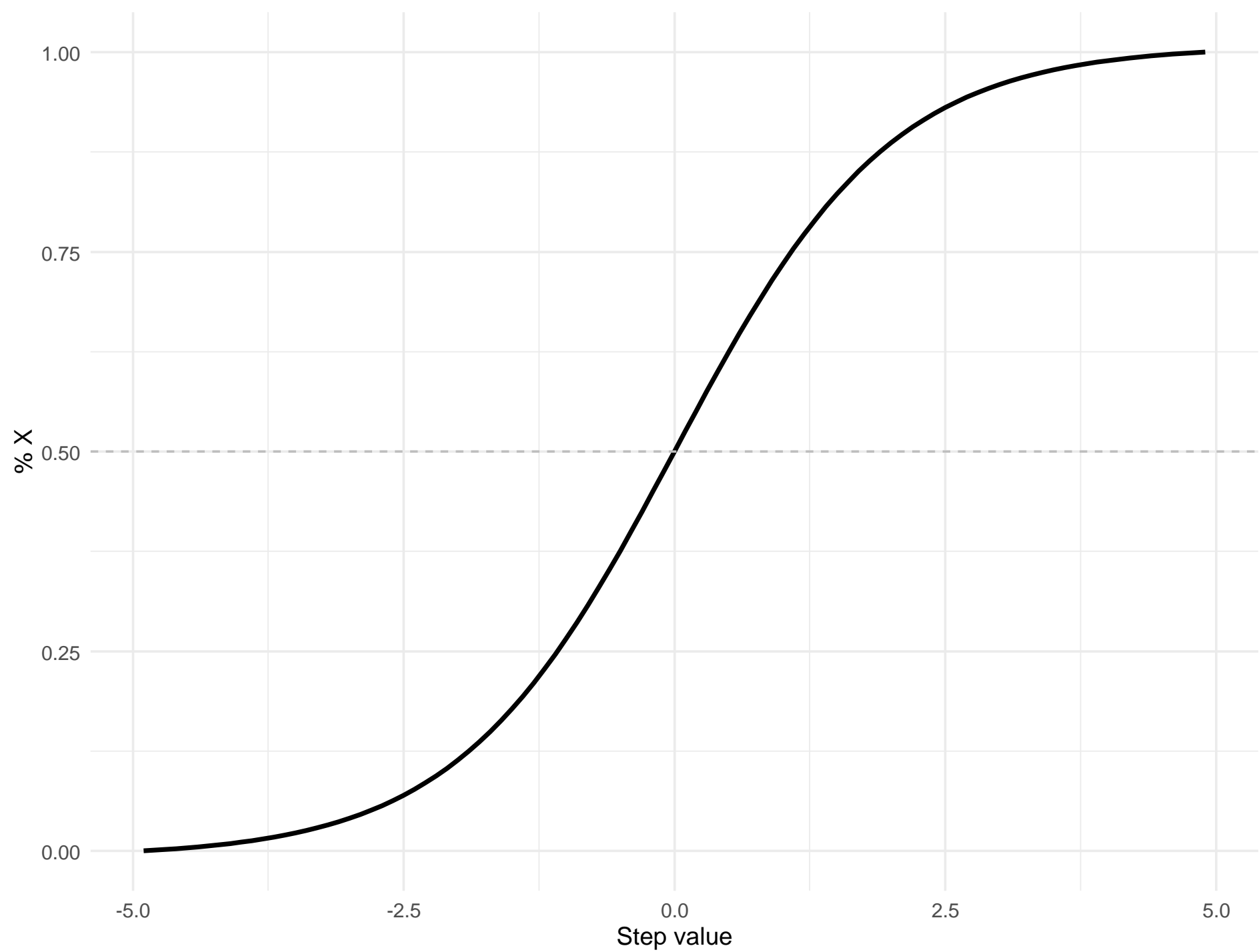
Aggregate Empirical Data (n=80)

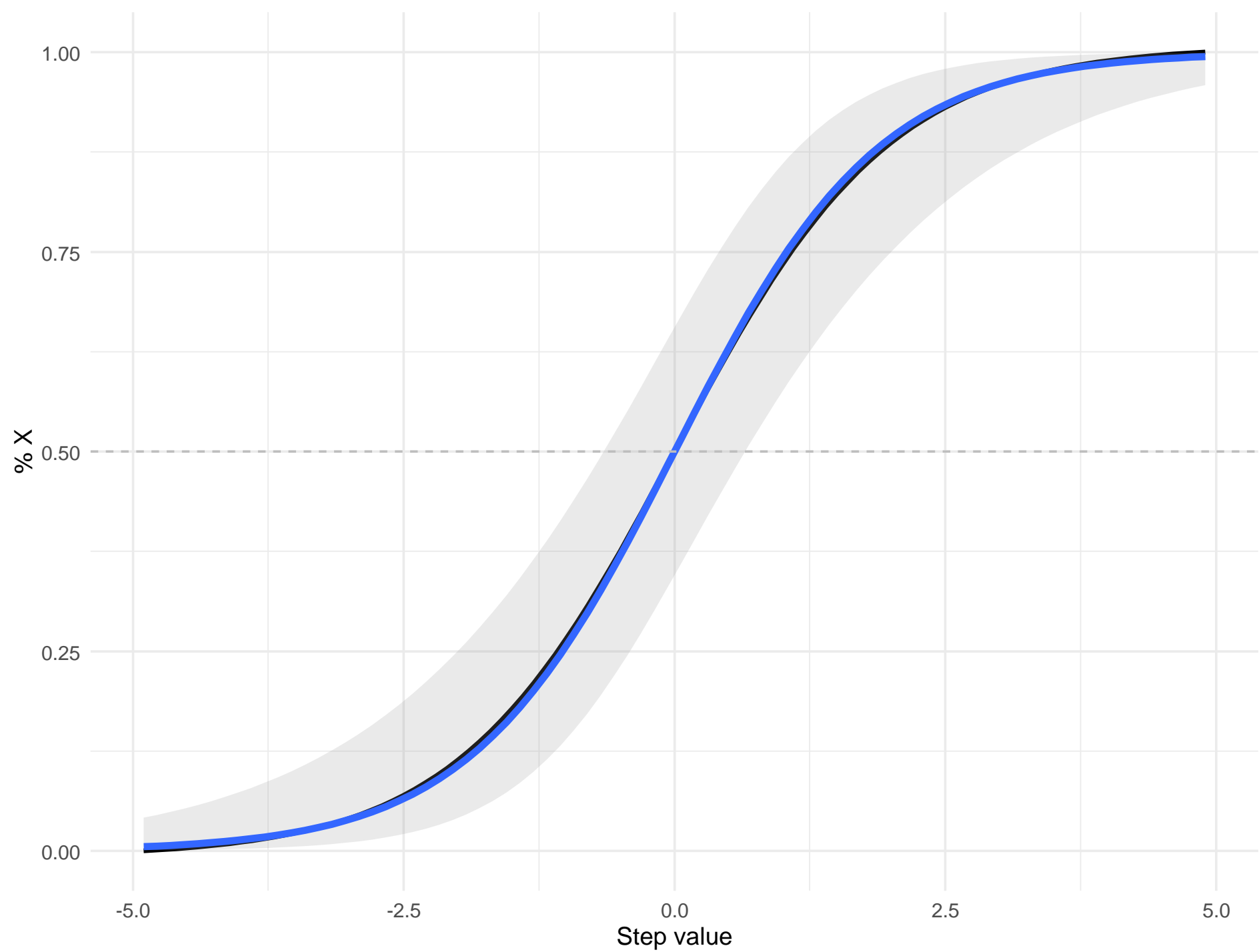
utterance available iwill noone

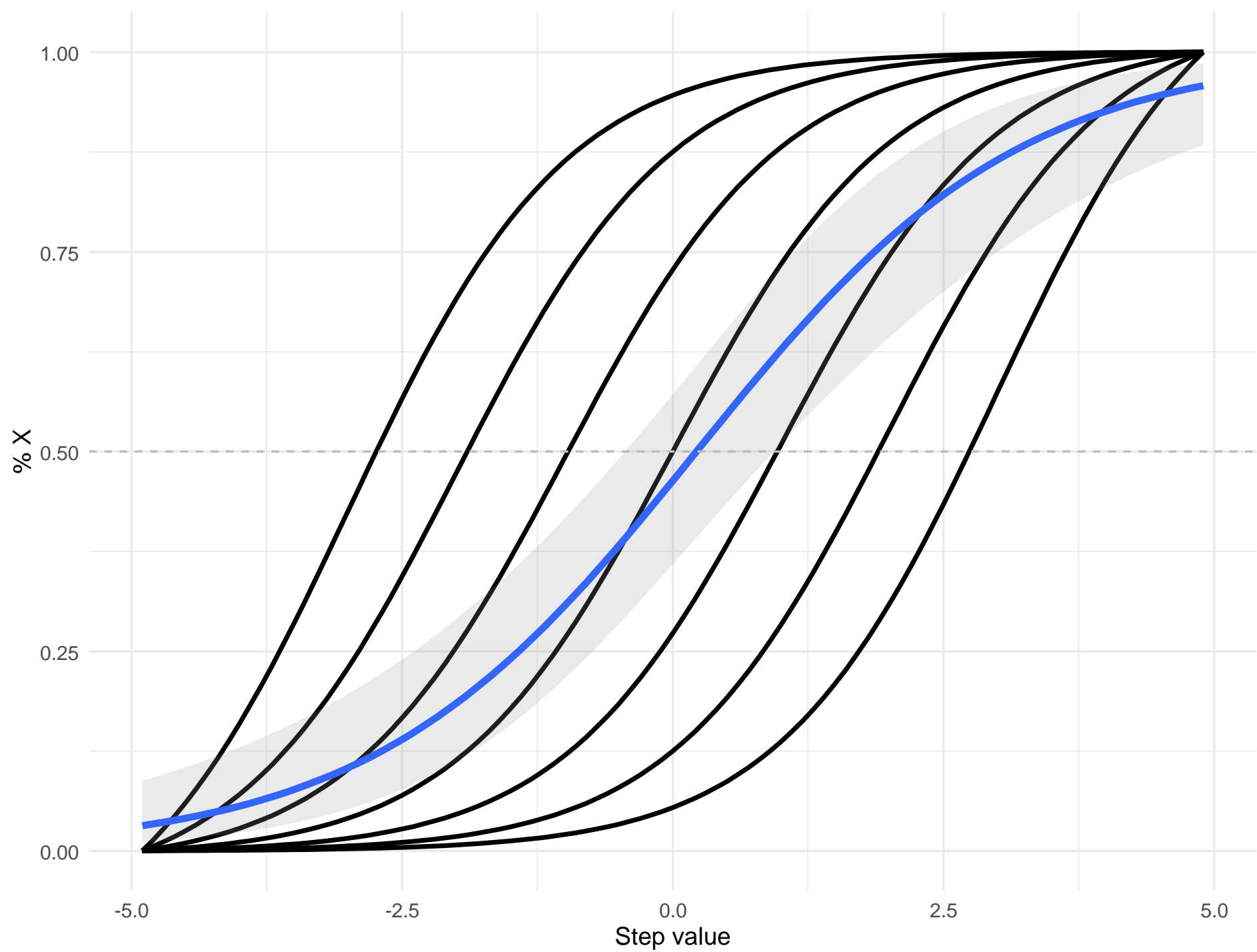


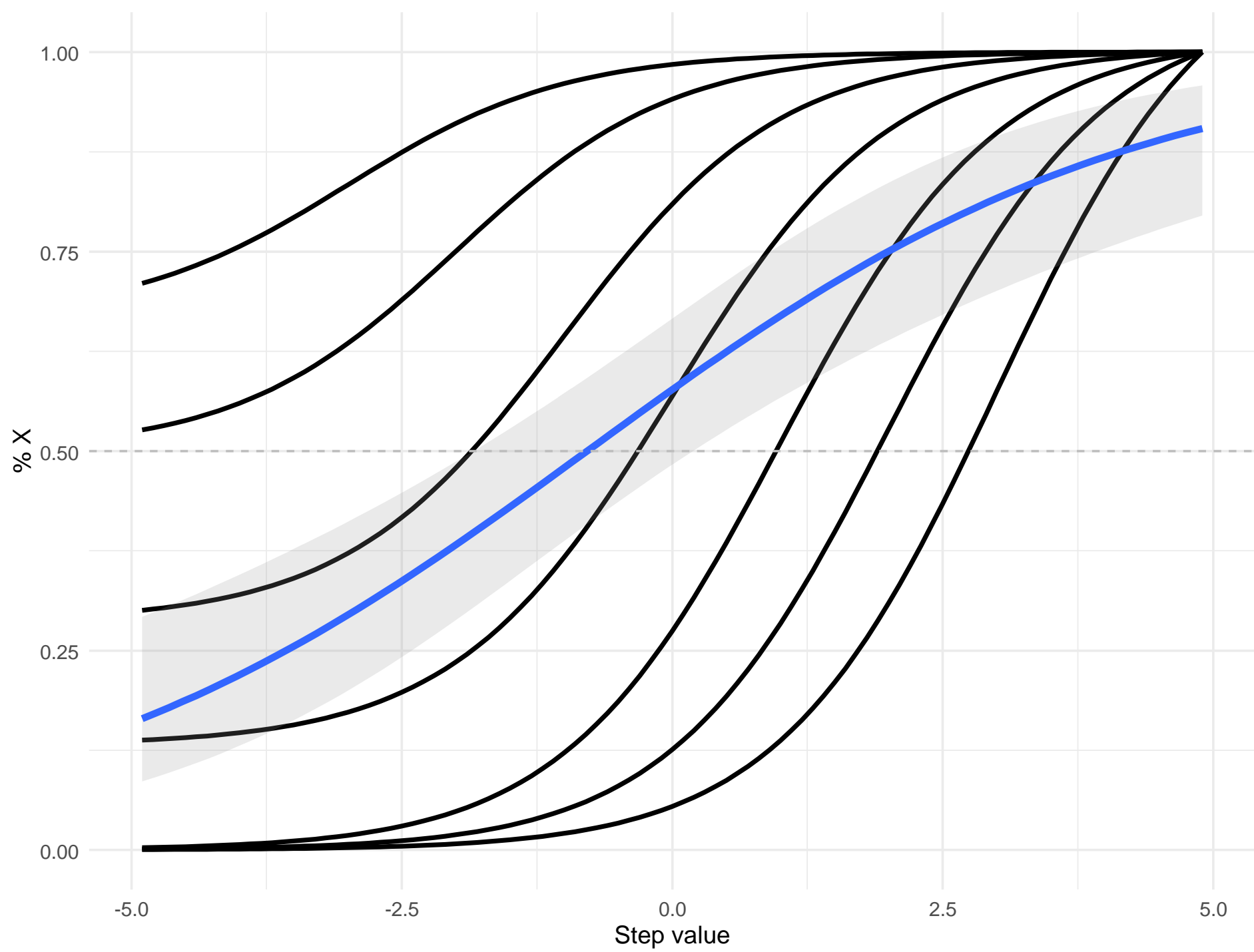
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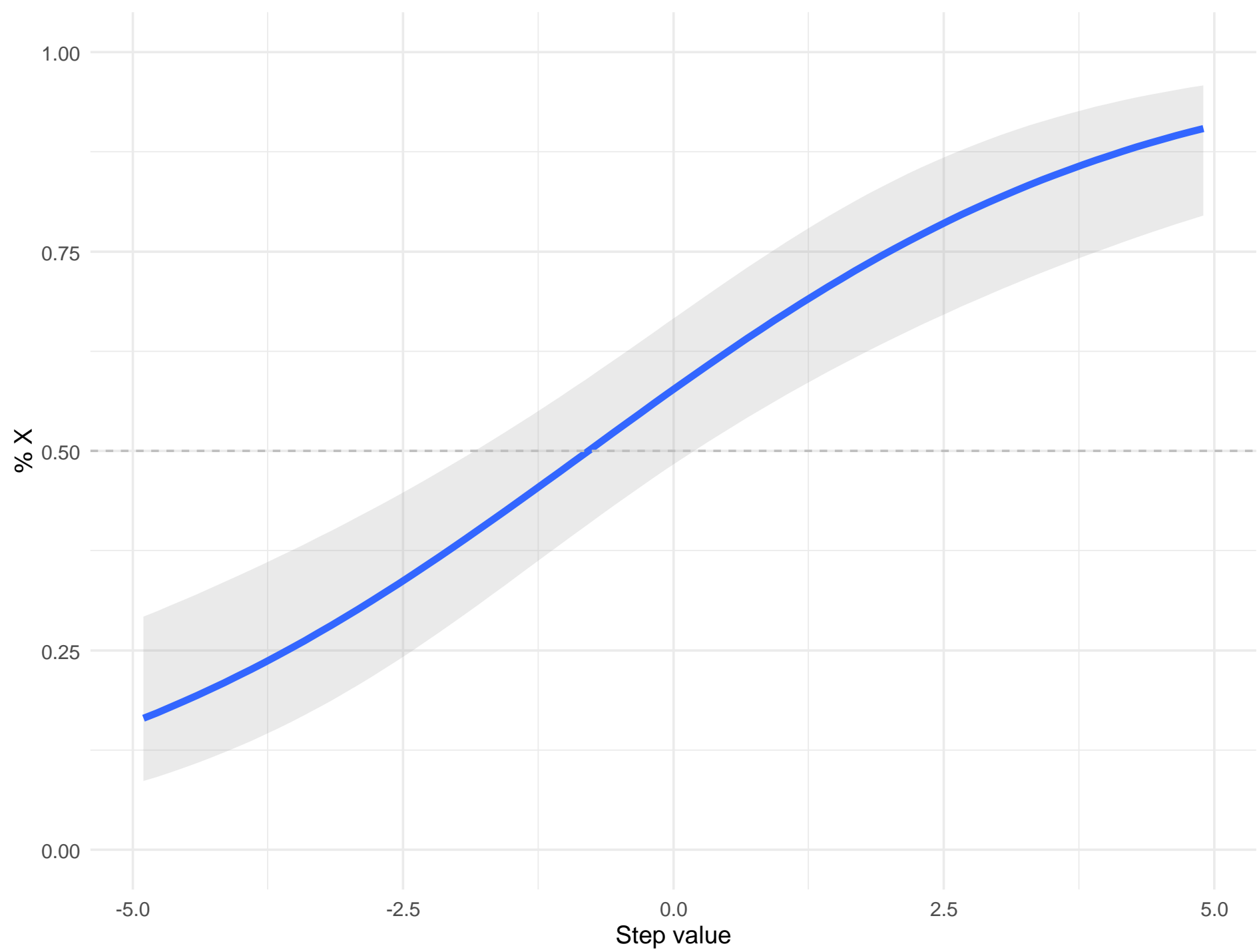




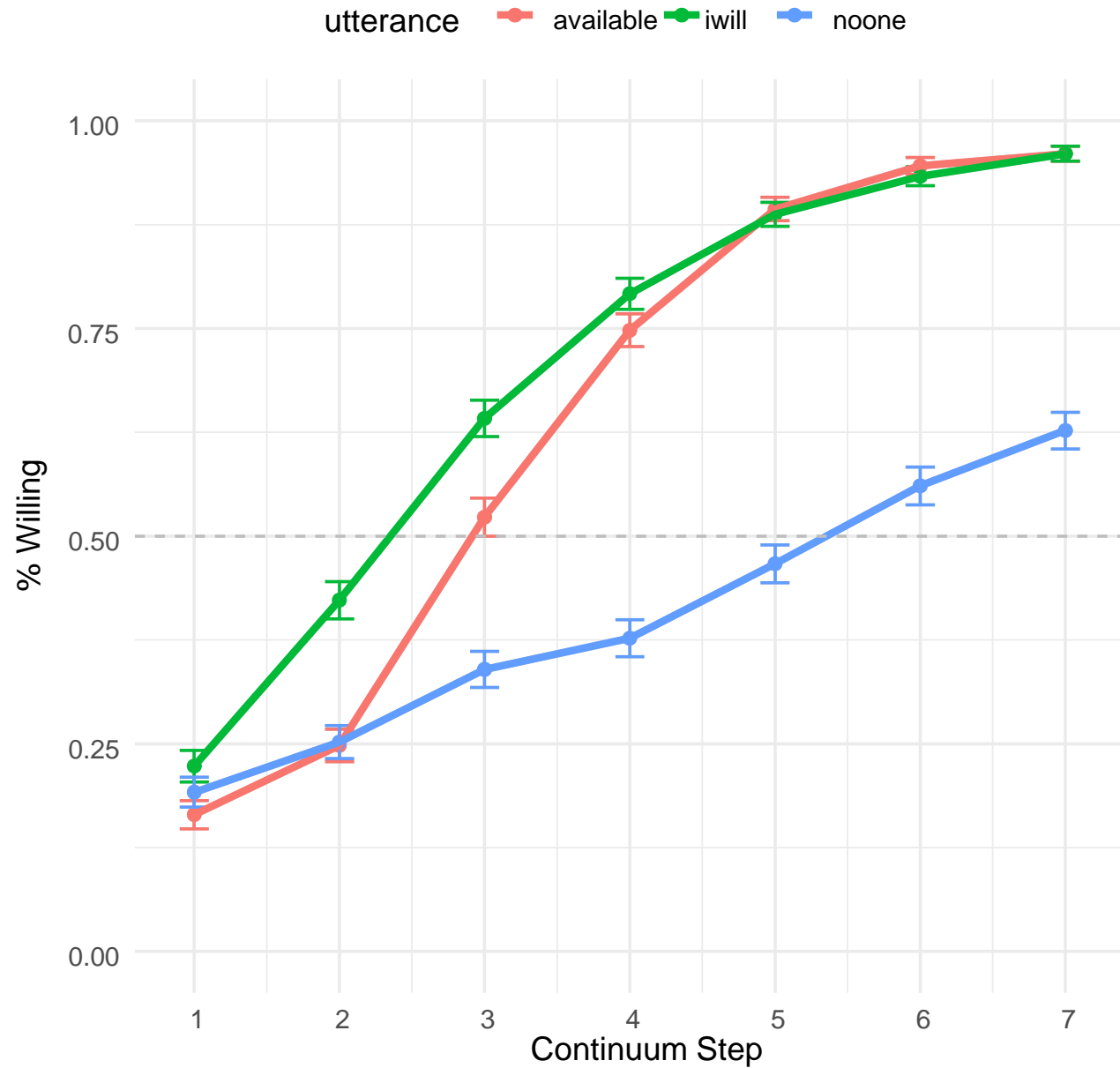




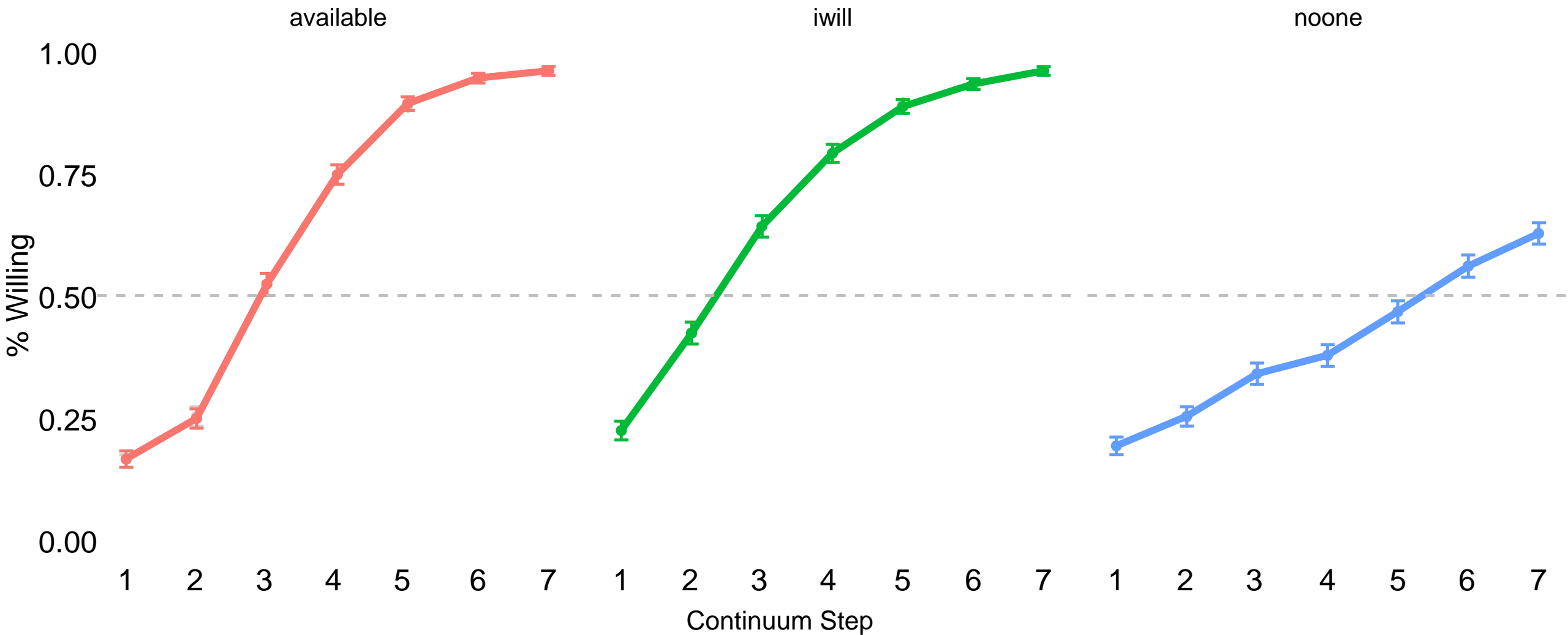




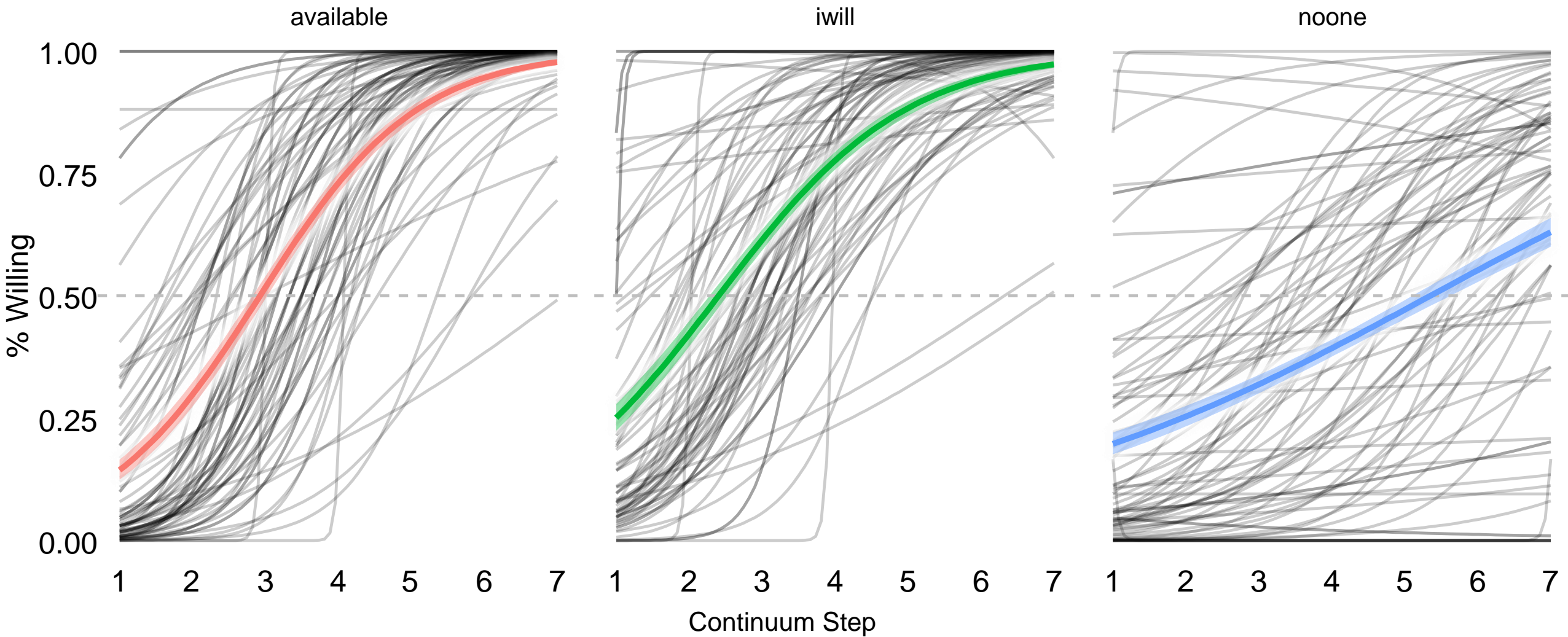
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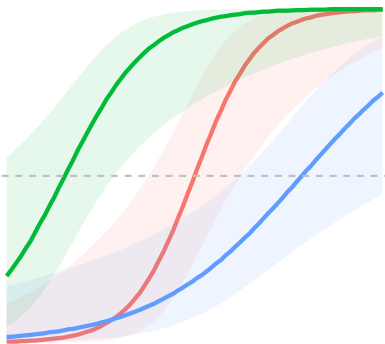
Aggregate Empirical Data



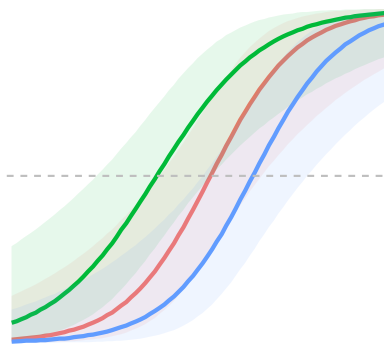
Individual Variation (Smoothed)



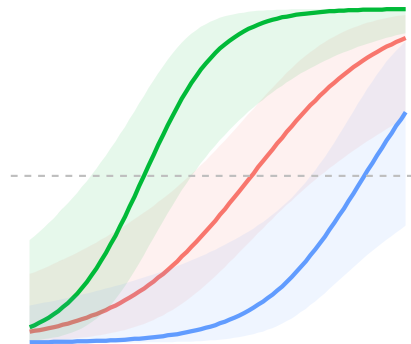
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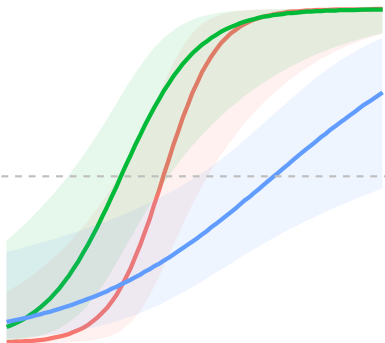
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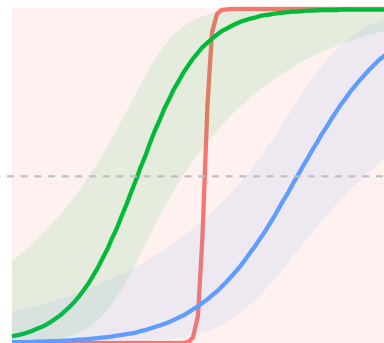
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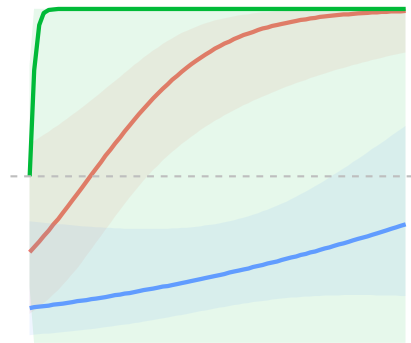
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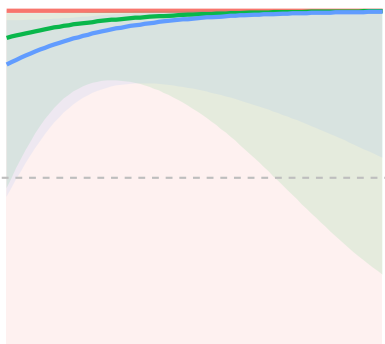
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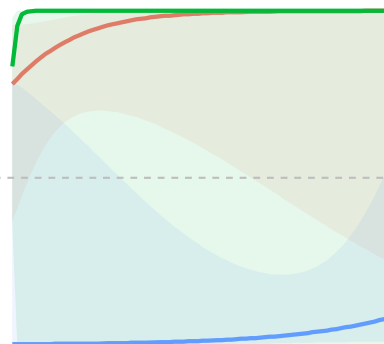
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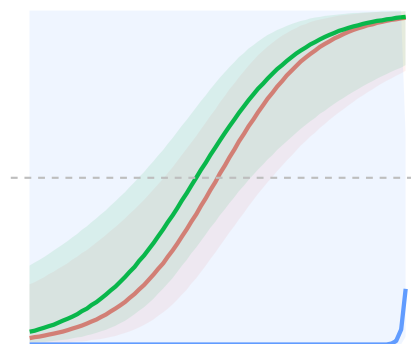
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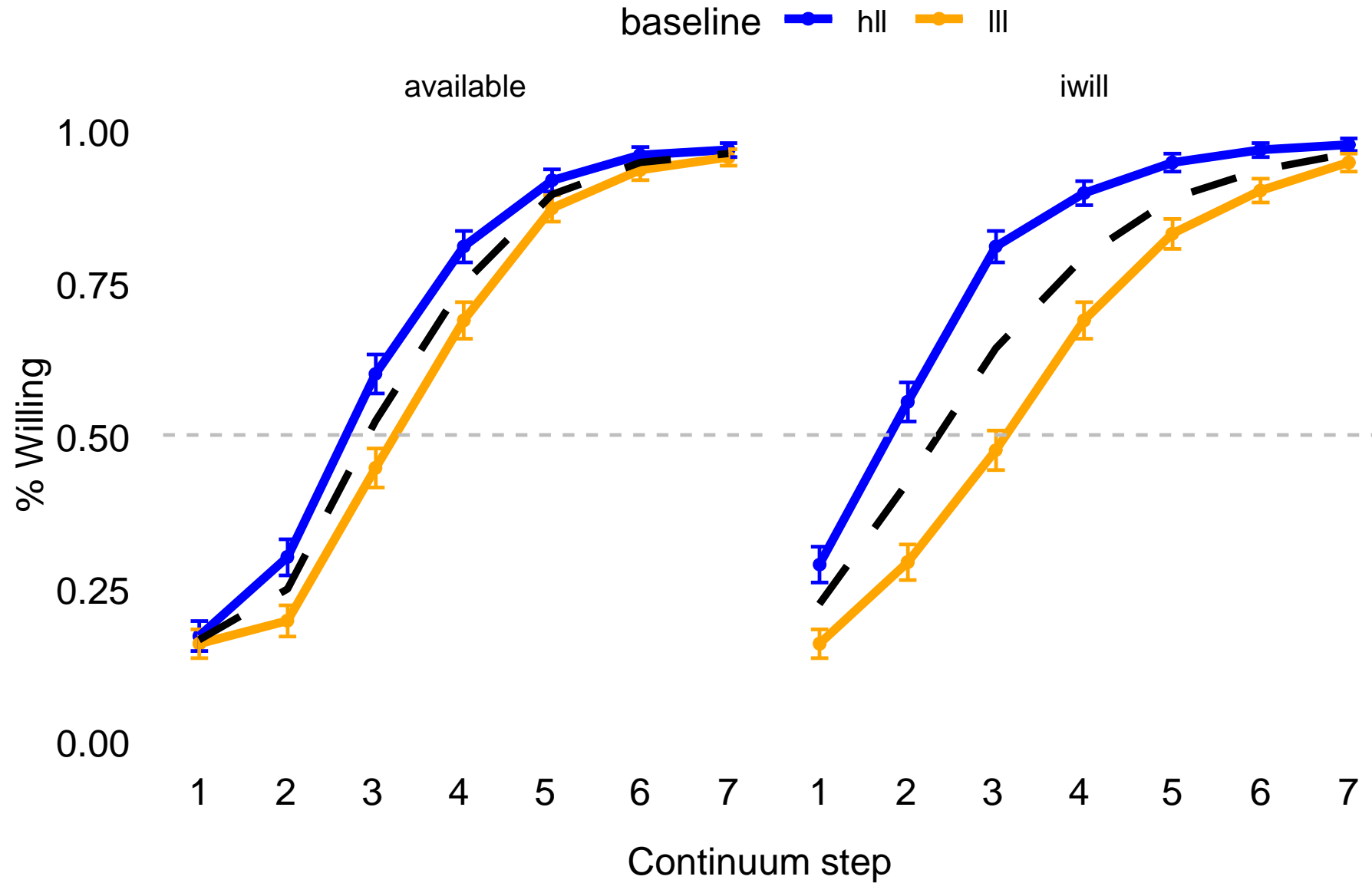
18



80



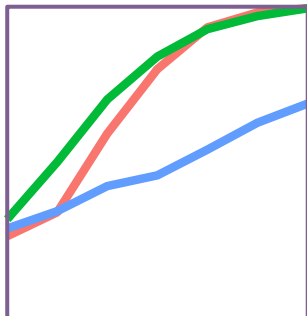
Aggregate Empirical Data by Baseline Recording



Interim Summary of Forced Choice Task

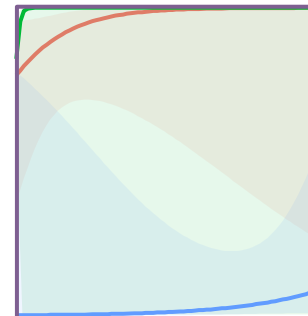
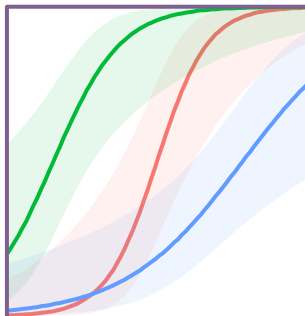
Aggregate

Predicted effect of pitch and utterance, but within-category behavior obfuscated



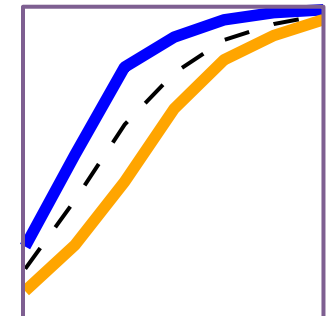
Individual

Better picture of potential within-category behavior
Exposes biases and participant strategies



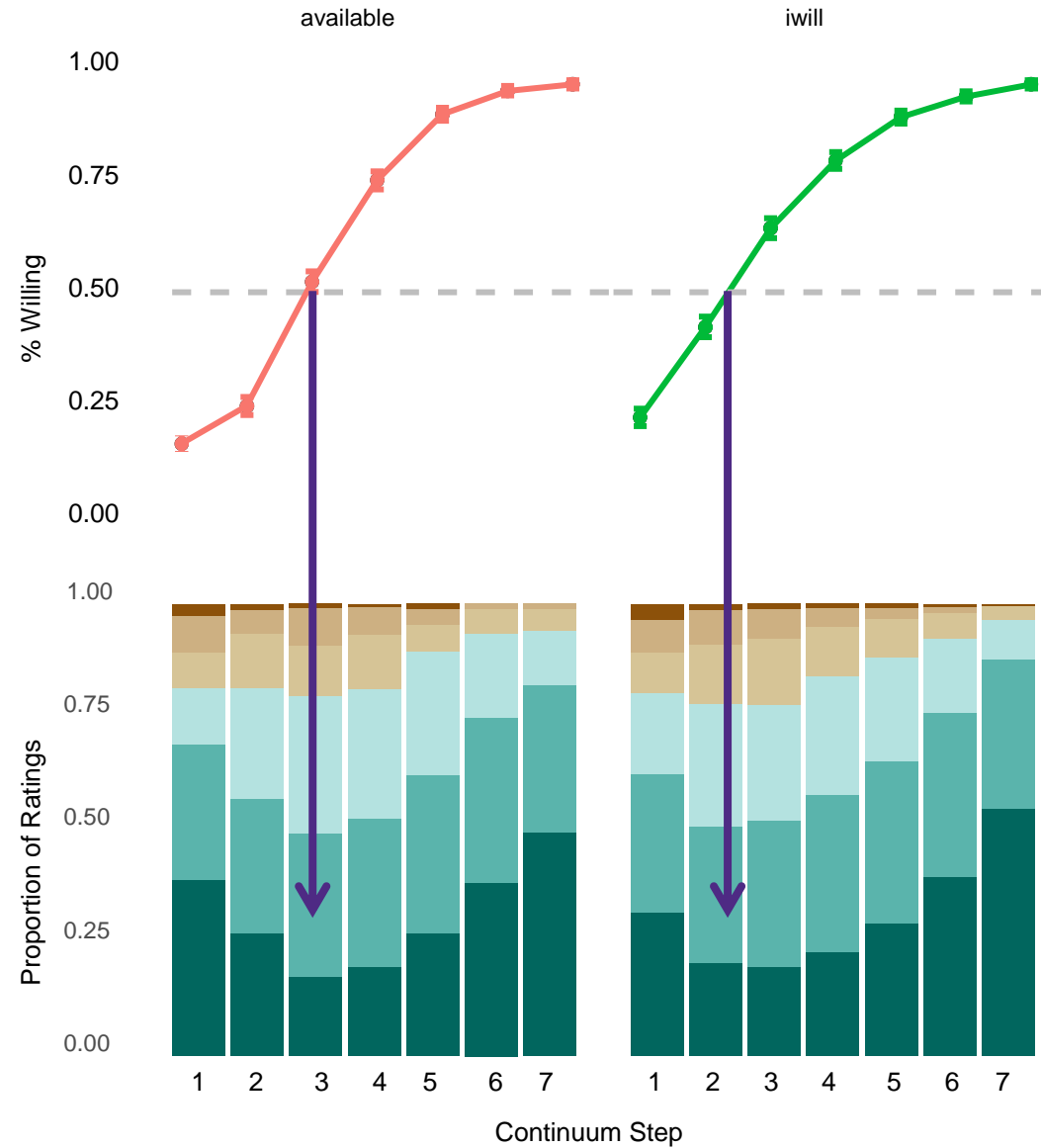
Signal

Other cues at play in perception of LLL & HLL



Confidence Rating Results

Aggregate Empirical Data



Confidence Rating
<Low High>



Does pitch co-vary with commitment?

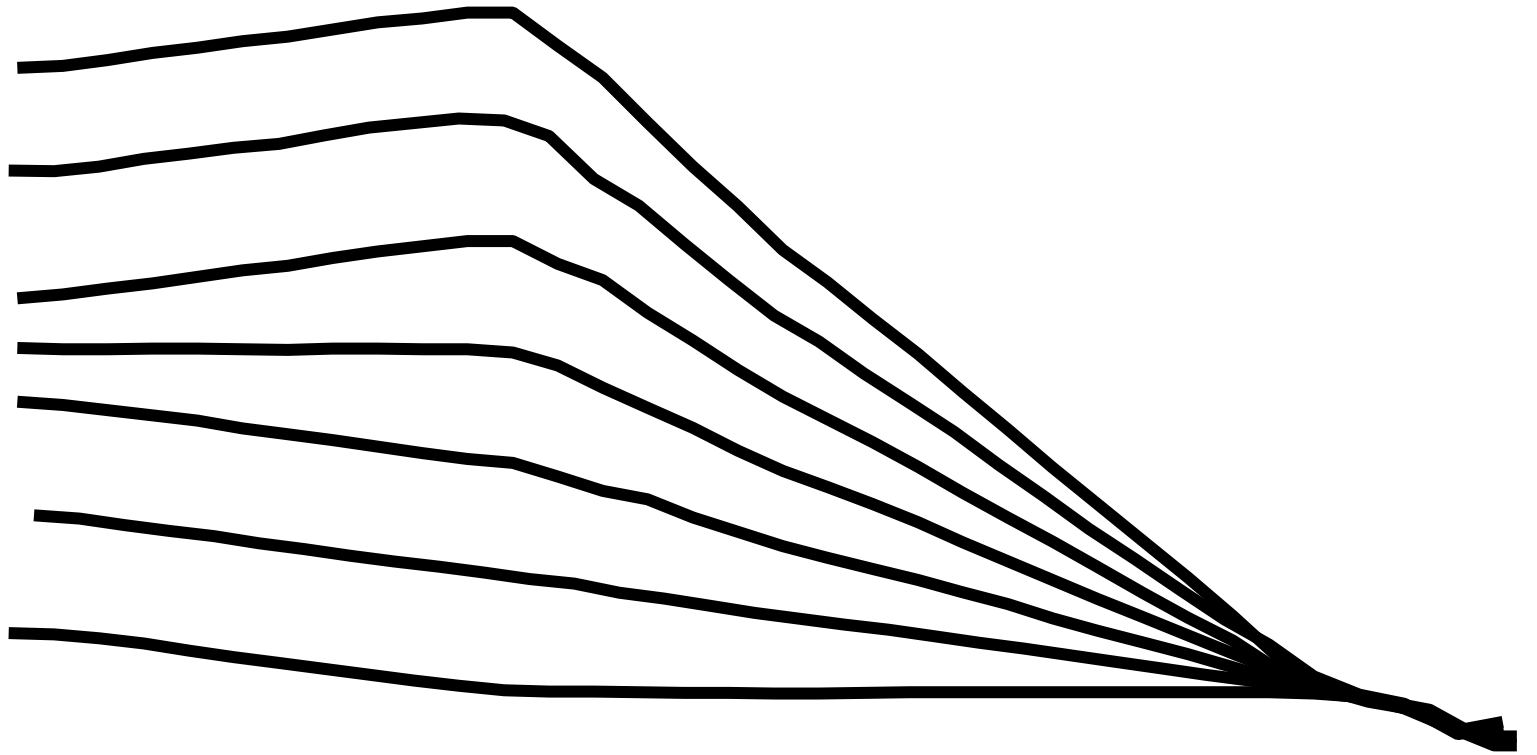
What does that relationship look like?



Committing



Withholding



HLL

Committing

In line with

(Krifka 2015,17)

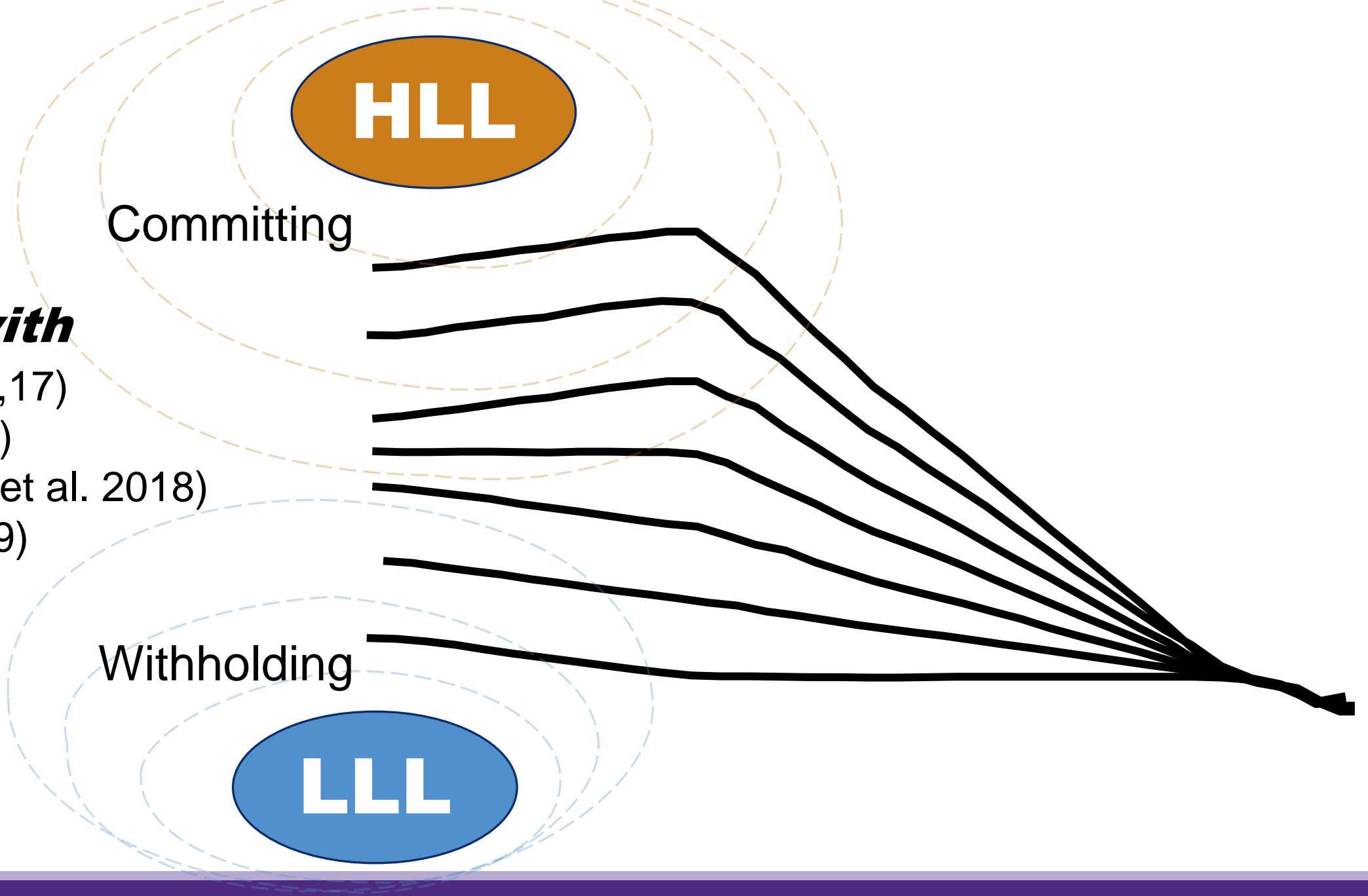
(Rudin 2018)

(Mazzarella et al. 2018)

(Geurts 2019)

Withholding

LLL





Journal of Phonetics 1997, 25, 313–342

1997

The perception of intonational emphasis: continuous or categorical?

D. Robert Ladd and Rachel Morton*

Journal of Phonetics (1997) 25, 313–342



The perception of intonational emphasis: continuous or categorical?

D. Robert Ladd and Rachel Morton*

Department of Psychology, Edinburgh University, George Square, Edinburgh EH8 8JL, U.K.

Revised MS July 1996, and in revised form 2nd April 1997

A series of experiments was carried out to test the idea that there is a categorical difference between 'normal' and 'emphatic' accent peaks in English, rather than a continuum of gradually increasing emphasis. The idea builds on several studies previously published in this journal as well as a pilot study of our own. The experimental stimuli were all naturally spoken short utterances containing a single rising-falling pitch accent, superimposed with modified pitch ranges. In three identical categorical perception experiments we found good evidence of abrupt shifts in identification from normal to emphatic as pitch range increases, but little evidence of an associated peak in discriminability of stimulus pairs. This suggests that the normal/emphatic distinction may be 'categorically interpreted' but not categorically perceived. Additionally, we report a consistent but puzzling order-of-presentation effect that bears further investigation. © 1997 Academic Press Limited

1. Introduction

It is customary to think of an intonation contour as having a linguistically distinctive shape or pattern and an independently variable pitch range. In a one-word English utterance, we may have any one of a handful of distinctive contour shapes—signalling that the contour is, for example, a question or a statement—and any of these shapes may be realized with more or less any pitch range or 'vertical scale'. Some pitch range effects are quite uncontroversially extralinguistic—the differences of overall fundamental frequency (F₀) range due to age and sex differences, for instance—and there can be little doubt that we want to factor these out of the phonetic description of intonation. But even in the case of pitch range effects that convey some kind of linguistic meaning, such as different degrees of emphasis, it still seems appropriate to distinguish them from the shape of the contour, and to treat them as orthogonal (as the 'vertical scale' metaphor suggests). To take a concrete example, it makes sense to treat all the F₀ contours in Fig. 1 as instances of 'the same' basic intonation pattern, with variation in the pitch range signalling different degrees of emphasis independently of what is conveyed by the choice of intonation pattern.

* Currently at Electronic Cambridge Research Laboratories, Cambridge, U.K.
0005-4019/97/250313-30 \$25.00/0 © 1997 Academic Press Limited

“These results [...] are also at odds with the strongest prediction of the ‘gradiance’ theory”

Does pitch co-vary with commitment?

Yes

Relationship between pitch and commitment as indexed by participants' inferences

Confidence

Confidence is greatest when tune aligns with expected inference

Individuals

Variation in how people utilize lexicosemantic & prosodic cues to commitment

What does that relationship look like?

Caveat

Paradigm cannot show *nuanced* mappings between pitch and meaning space

Tricky!

Evidence against the strongest gradient predictions

Acknowledgments

Chun Chang for building the online experiment

Members of ProSD Lab at Northwestern

Funding: NICO Data Science Initiative

IRB: STU00213825



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ON COMPLEX SYSTEMS**

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