

How do “scoops” influence the perception of singing accuracy?

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Musical errors



Contour error



Interval error



Tonality error



Musical errors



Contour error



Interval error



Tonality error



Larrouy-Maestri, P., Lévêque, Y., Schön, D., Giovanni, A., & Morsomme, D. (2013). The evaluation of singing voice accuracy: A comparison between subjective and objective methods. *Journal of Voice*.

Larrouy-Maestri, P., Magis, D., Grabenhorst, M., & Morsomme, D. (revision). Layman versus professional musician: Who makes the better judge? *PlosOne*

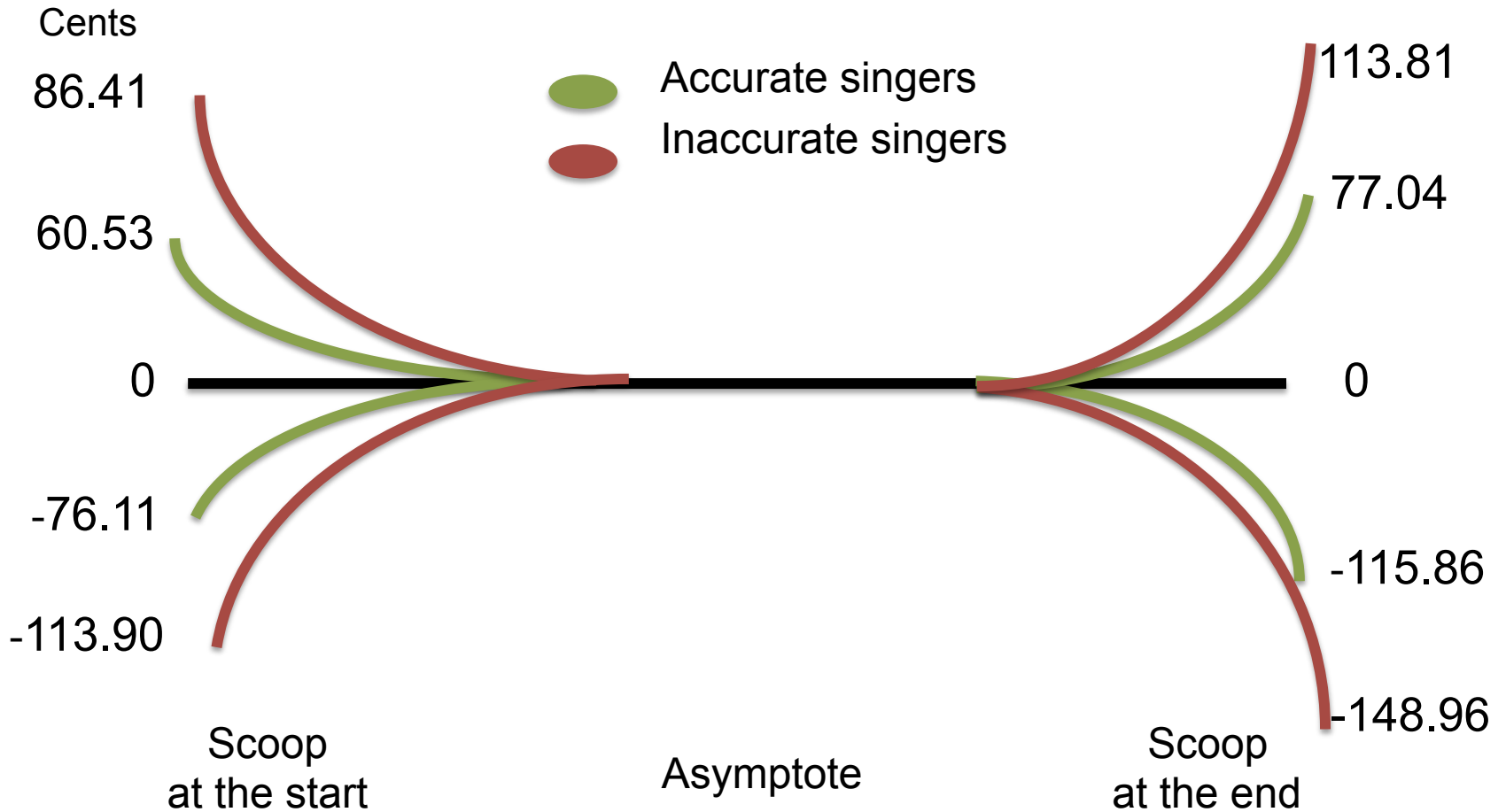
Pitch fluctuations within tones

- Trained singers
 - Vocal generosity effect (Hutchins et al., 2012)
 - Complex signal (e.g. Larrouy-Maestri et al., 2014a; Sundberg, 2013) including vibrato (Ekholm et al., 1998; Garnier et al., 2007; Rothman et al., 1990)
 - Influence on the perception of pitch accuracy (Larrouy-Maestri et al., 2014b)
- Untrained singers
 - Something happens at the start
 - Stevens & Miles (1928)
 - Few studies (Hutchins & Campbell, 2009; Saitou, Unoki, & Akagi, 2005) + Check poster of J. Mantell!

→ Pitch fluctuations within tones?

- Data analysis of Pfordresher & Mantell (2014)
- 12 “inaccurate” and 17 “accurate” singers
- Melodies of 4 notes: 1854 tones

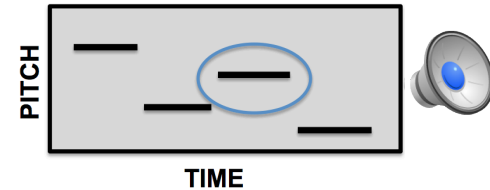
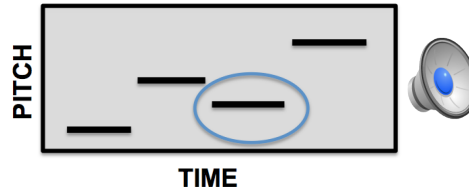
Pitch fluctuations within tones



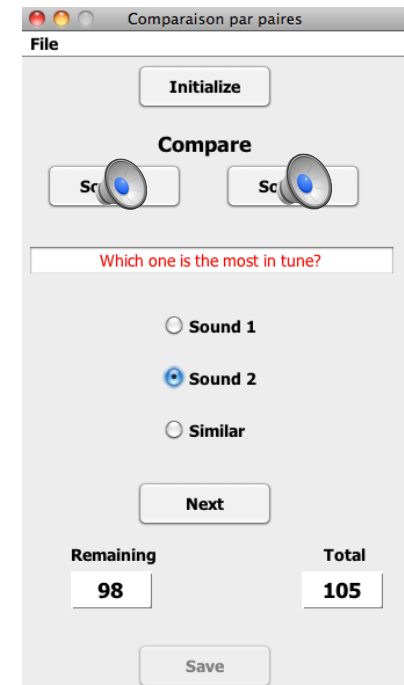
→ How do “scoops” influence the perception of singing accuracy?

Experiments

- Two melodies

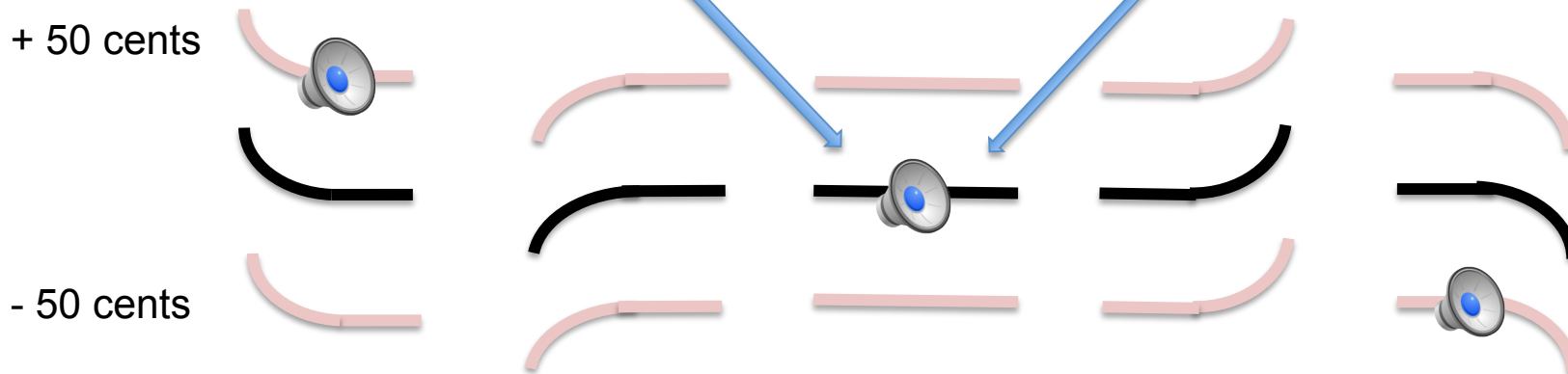
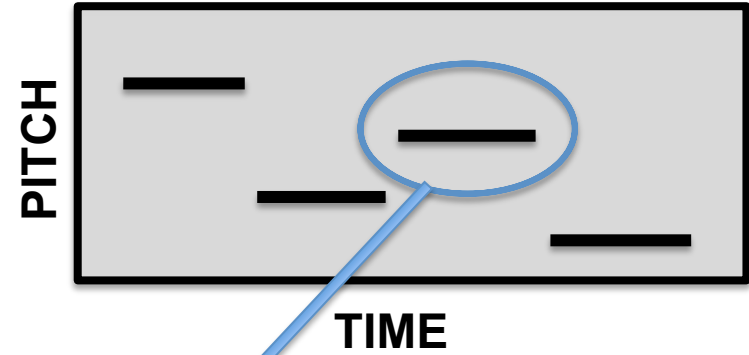
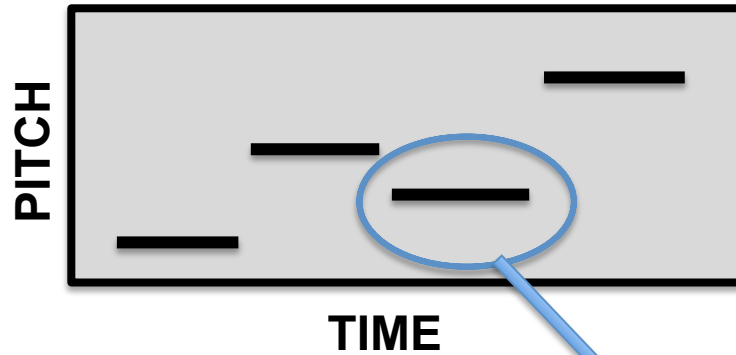


- Manipulations of one tone
 - Asymptote
 - Scoops at the start and/or at the end
- 102 undergrads in 4 Experiments
- For each melody
 - Pairwise comparison
 - Ranking from “most out of tune” to “most in tune”
 - Reliability
 - Effect of one/several manipulations on the rating

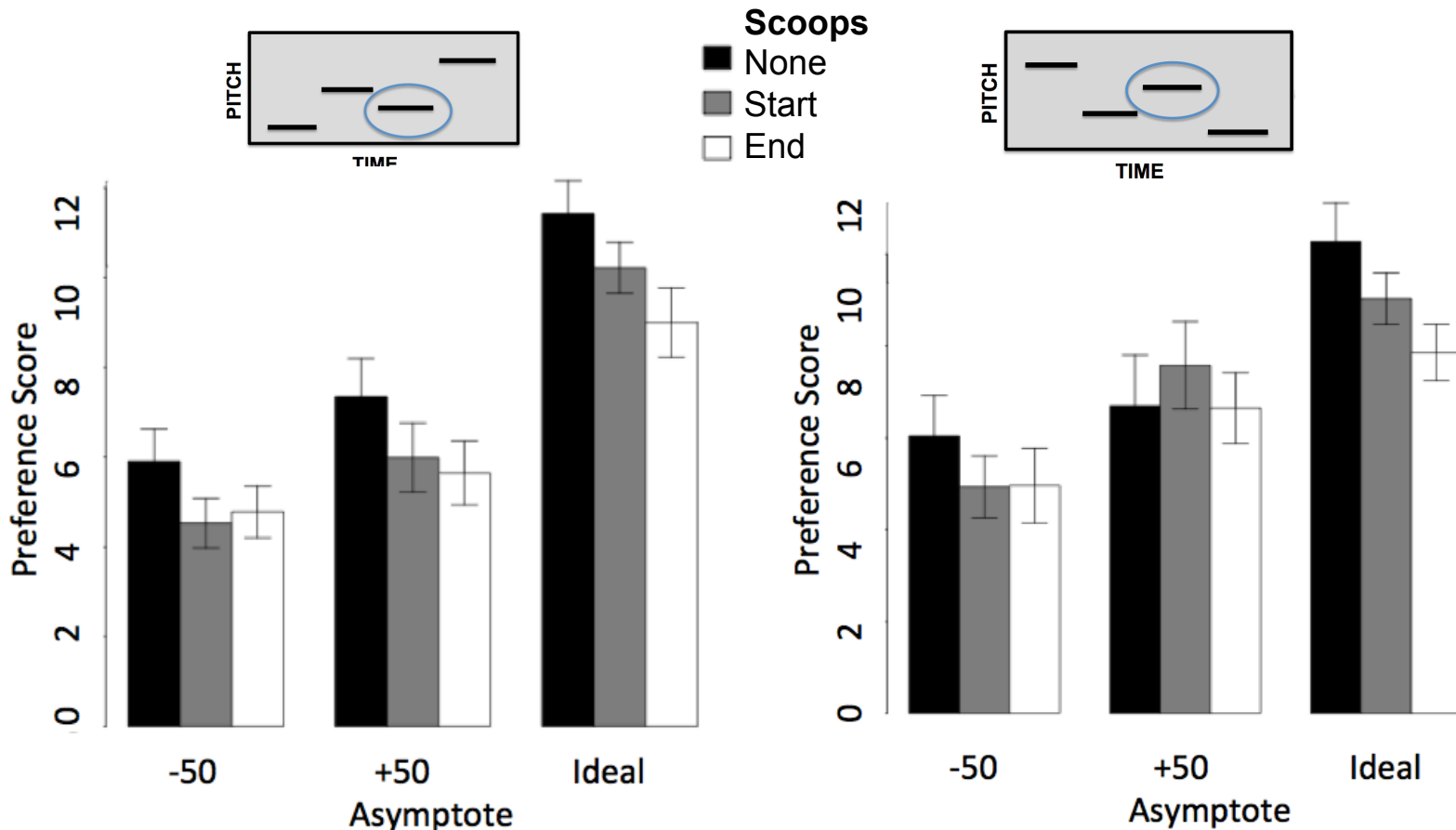




1. Do Scoops matter?

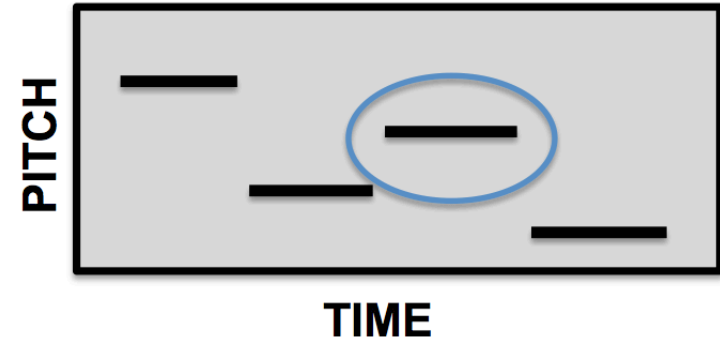
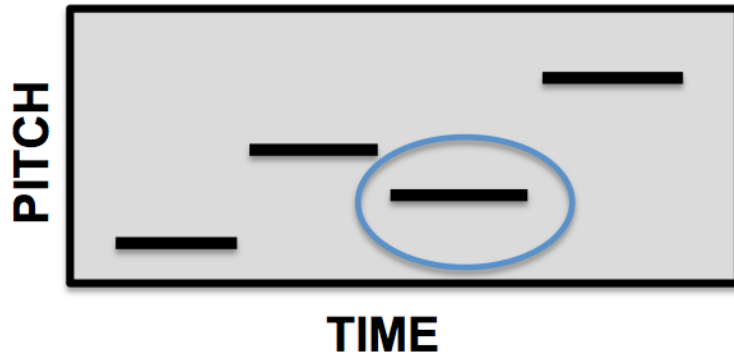


1. Do Scoops matter?



- ➔ Effect of **Asymptote** ($f(2,100) = 113.41$, $p < .001$), but also of **Scoops** ($f(1,50) = 35.03$, $p < .001$)
- ➔ Interaction **Asymptote*Scoops** ($f(2,100) = 7.17$, $p < .001$)
- ➔ None > Start > End: Perfect > Motor adjustment > Lack of stability

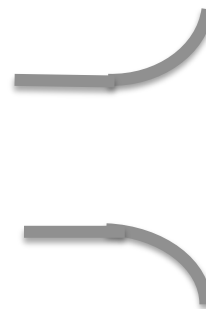
2. Focus on the Scoops



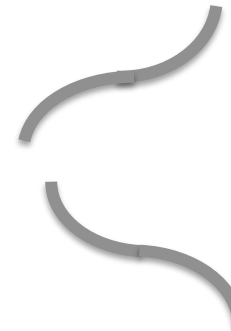
None



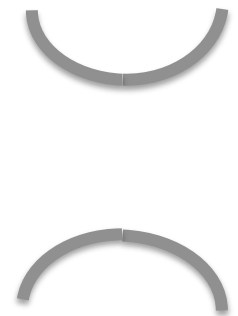
Start



End

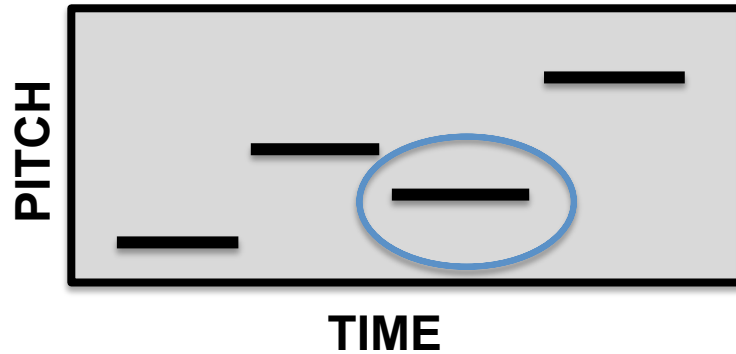


Start and End









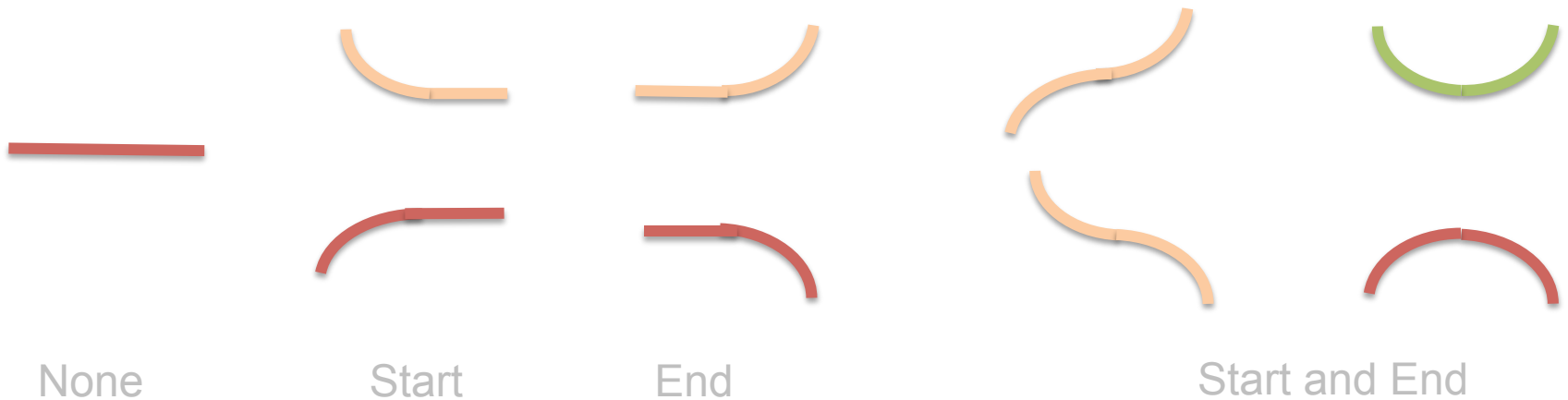
- Asymptote: Ideal
- All kinds of scoops

2. Focus on the Scoops: Relation with contour

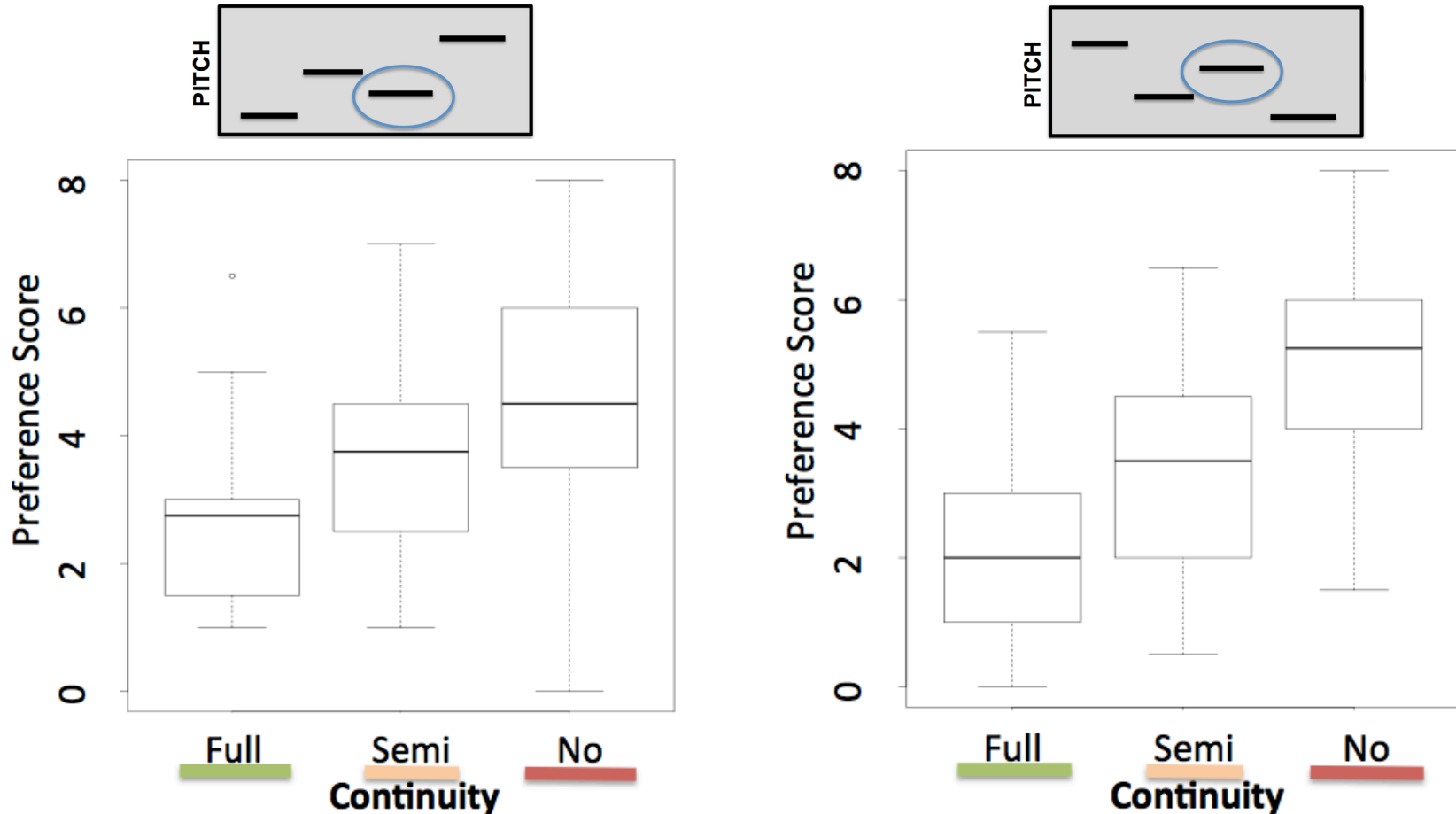


Melody 1: Relation perturbation/contour

-  No continuity 
-  Semi continuity 
-  Full continuity 



2. Focus on the Scoops: Relation with contour



- ➔ Clear preference for NO continuity ($f(2,102) = 66.66$, $p < .001$): Role in segmentation between tones (glides make difficult to find the tone)
- ➔ Argument for sequential process?

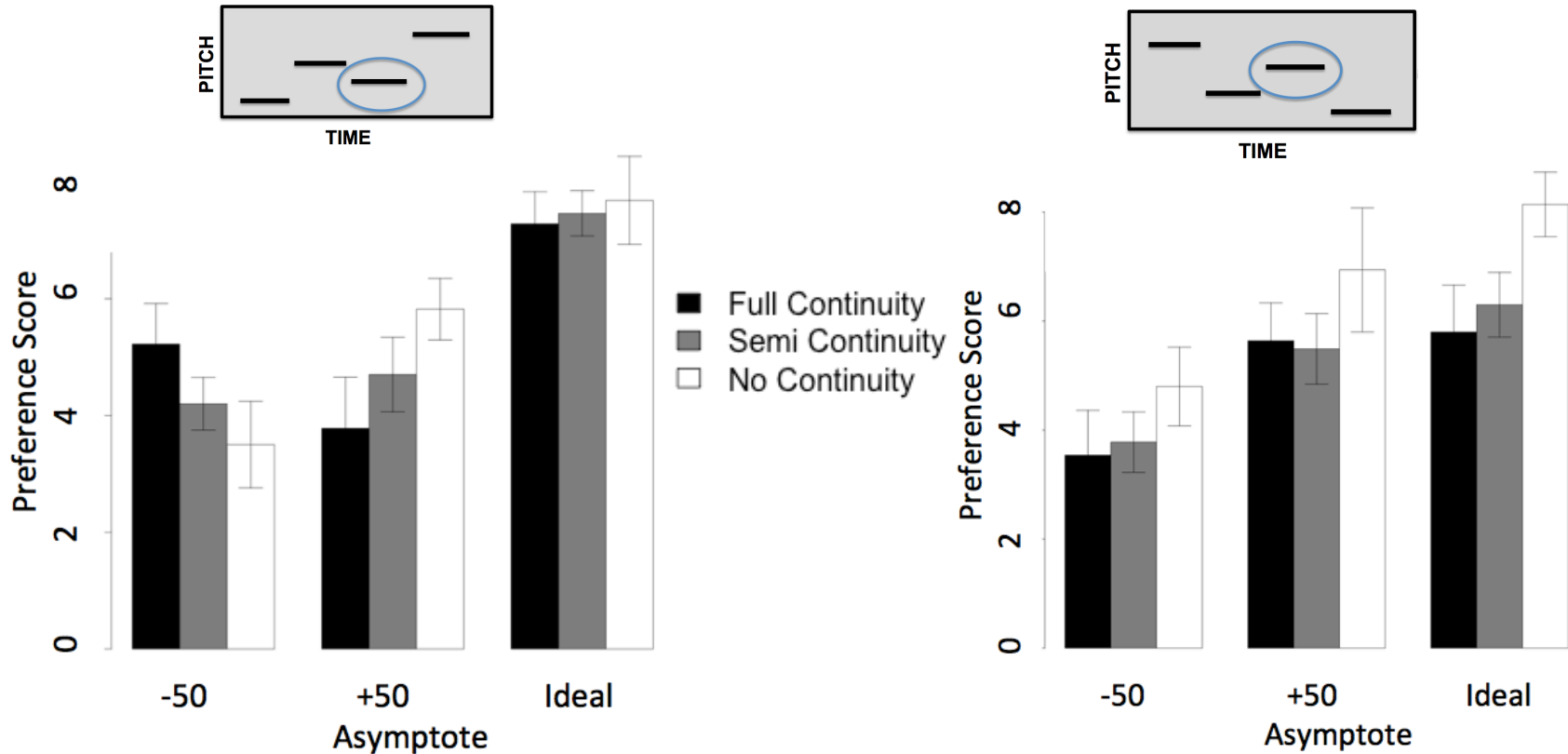
Summary

- Scoops matter, particularly at the end
- Preference for « no continuity »
- Relation with the global pitch of the tone

→ How do “scoops” influence the perception?

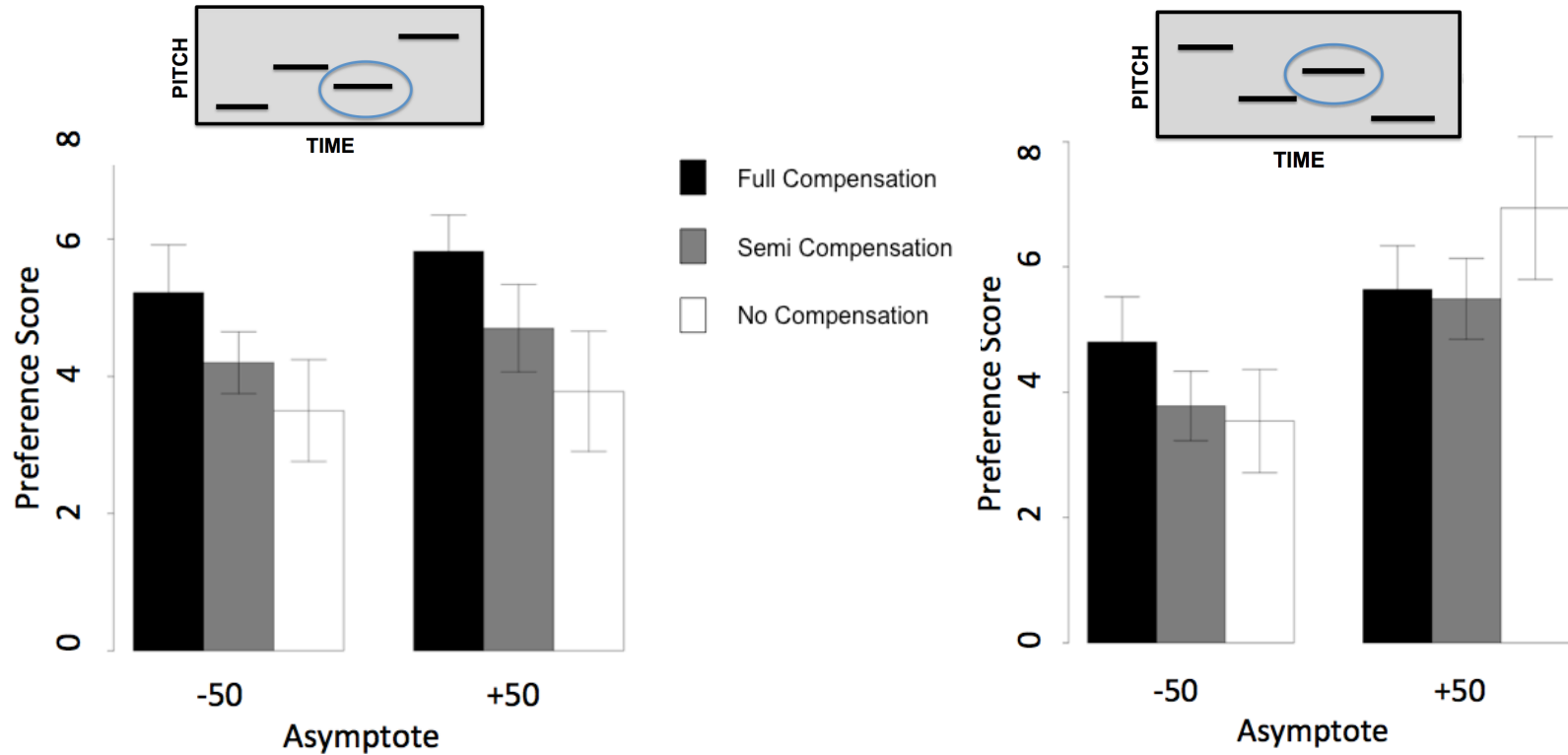
- sequential process
 - averaging process
 - Continuity versus Compensation
- New manipulations: Asymptote AND Start/End
 - Same procedure with new participants

3. Continuity effect



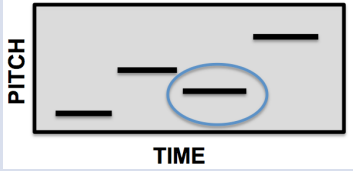
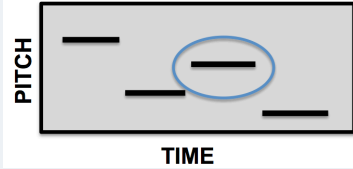
➔ Confirm the preference for **No continuity** (except for Melody 1, flat tone)

3. Compensation effect



➔ Confirm the preference for **Compensation**
(except for Melody 2, sharp tone)

3. Continuity vs. Compensation?


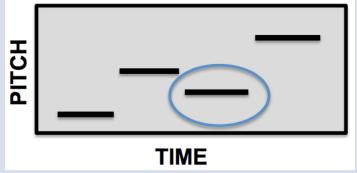


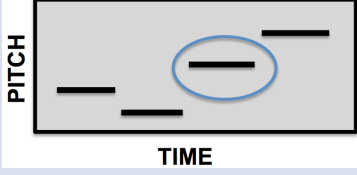

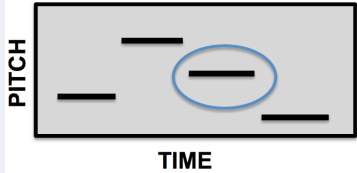
	Continuity	Compensation
	<i>ns</i>	***
	**	<i>ns</i>

* <.05
 ** <.01
 *** <.001

- Both seem relevant
- It depends on the melody
 - Weird profile for “flat tone” in Melody 1 (continuity)
 - Weird profile for “sharp tone” in Melody 2 (compensation)
 - Because of the characteristic of these melodies?

➔ What about melodies with different patterns?

4. Continuity vs. Compensation?

	Continuity	Compensation
 	<i>ns</i>	***
	**	<i>ns</i>
 	*	**
 	*	***
All melodies	***	***

* <.05
 ** <.01
 *** <.001

Take home message

- Scoops in singing performances
- Influence of Scoops in melodic perception
 - Global deviation of the tones does not tell the full story
 - Tolerance regarding motor constraints
 - Glides (i.e., continuity) make the melody sounds “out of tune”
 - ➔ Opportunity to **refine objective tools** for pitch accuracy evaluation
- Multiple perspectives
 - Sequential: Preference for non-continuity/segmentation
 - Global: Average within tones
 - ➔ **Next step to answer this question:** Rate, magnitude...

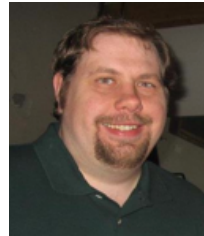
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Paul Kovacs



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Thank you for your attention!

Reference

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